

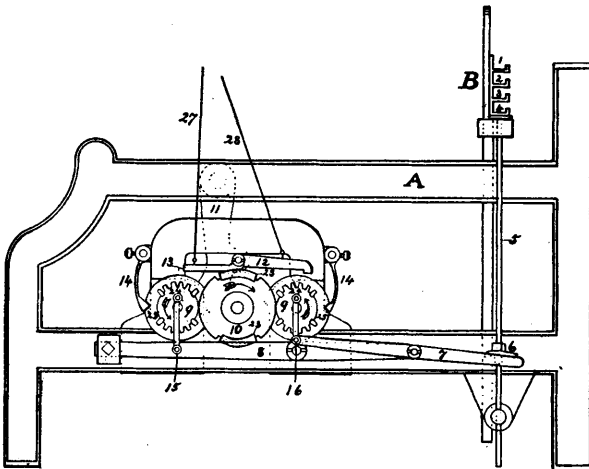
GOODYEAR'S SHUTTLE-BOX-OPERATING MECHANISM.

An explanation of the new device is best given by quoting letters and numerals of reference to the accompanying illustration and of which A, represents the loom side; B, the lay. At the end of the lay B, are arranged, in the usual manner, the shuttle-boxes 1, 2, 3, and 4. The shuttle-boxes are connected to the operating mechanism by rod 5, carrying a shoe 6, which shoe rests on a roller fixed in the end of lever 7. The levers 7, and 8, are double-pivoted. One pivot is on a stud fixed on the side of the loom-frame. The other pivot is on a stud in the short end of lever 8.

10, is a cog-wheel, in which are made ten teeth or cogs, five teeth being directly opposite the other five, as is shown by the dotted lines. This wheel is a driver, and is fixed on the "cam-shaft" of the loom. The outer ends of these teeth are flanged, 23, the first and last space between the first and the last tooth of each series being open.

9, are driven wheels, each having twelve cogs or teeth, six in each series, each series being directly opposite the other. The first and last tooth of each series has a lug, which lugs enter the open spaces at the beginning and end of each series of teeth on the wheel 10.

The wheels 9, are mounted on studs fixed to the loom side A. Each wheel 9, carries a stud, and by pitmen 15, and 16, the wheels are connected to levers



7 and 8. To each of the wheels 9, is fixed or cast a flange 25. In these flanges are made notches, and on the back are cast lugs.

14, are spring-brakes, each having at its lower end a V-shaped lug. These lugs engage in the V-notches in the flanges 25.

11, is a lever hung on a stud fixed to the loom side. This lever 11, carries on a stud, fingers 12, and 13, which are connected by cords or wires 27, and 28, to the pattern-chain for controlling the movements of the shuttle-boxes. On the lower end of lever 11, is pivoted a trigger, also is fixed a stop-lug, and to said trigger is attached a cord by which the trigger is connected to the filling stop-motion.

The operation of the shuttle-box-motion is as follows: Motion is given by the cam-shaft that carries the wheel 10. The movement is in direction indicated by the arrows, one revolution for each two picks of filling. The wiper-cam and lever 11, give a to-and-fro movement to the fingers 12, and 13, which fingers, being controlled by the pattern-chain, raise or drop them so as to cause them to strike in their movement the lugs on wheels 9. The movements of the fingers

and driver-wheel 10, are so timed that the push of the fingers will move the wheels 9, so that the first tooth of a series on wheel 9, will enter the open space of the flange 23, beginning with the series of teeth on wheel 10. This flange 23, prevents the wheels gearing except in the first space of each series. In the position of the shuttle-box, as shown in our illustration, the top box 1, is in use. If finger 12, now moves the wheel 9, on the right hand, it will be revolved one-half of one revolution. The stud and pitman 24, will be moved to the bottom of wheel 9. The pitman 16, being connected to lever 7, will raise the box one shelf, and shuttle 2, will be used. After two picks the finger 13, may be caused to strike a lug on wheel 9, to the left hand. This will cause that wheel to make one-half of one revolution, and its pitman 15, being connected to lever 8, will raise the box to shelf 4, and shuttle 4 will be used. If after two picks fingers 12, and 13, both act at the same time, both wheels 9, will be moved, giving a full drop, and put the boxes in position, as shown in our illustration. Box 3, may be called if box 1 is in position, by solely operating finger 13, wheel 9 on the left, and lever 8. This will skip box 2, and bring box 3, into position. If box 2, is in position, and box 3, is wanted, both pinions 9 are moved, lever 8 raises two and lever 7 drops one, and the box is only raised one shelf. Thus it is required to discount one shelf in order to reach the one desired. The wheel 9 on the right moves one box. The wheel 9 on the left, moves two boxes. Both wheels moving at the same time move three boxes, and it is plain and clear that with the improved device added to looms, any one of a series of four boxes can be commanded at will. (Hughes & Russum, Frankford, Phila.)

SCHEID'S SHUTTLE-BOX-OPERATING MECHANISM.

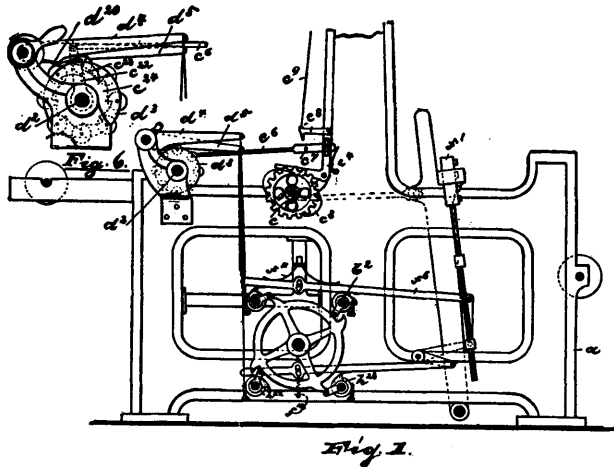
Fig. 1 is a side elevation of a loom provided with this mechanism, only those parts being shown which are necessary to illustrate the nature of the new device; Fig. 2 is an enlarged detail view of the upper shuttle-box lever-controlling cam-wheels and its operating mechanism; Fig. 3 is a top plan view of Fig. 2; Figs. 4 and 5, are left-hand end elevations of Fig. 2, in working and normal positions, respectively; and Fig. 6 is an enlarged detail view in elevation of the pattern-chain and of the treadle-levers operated thereby. The new device refers to looms operated by Jacquard machines or witches placed on top of loom.

The operation of the device is as follows: During the operation of plain weaving, the shuttle-box-operating mechanism is at rest. The hook c^1 , having been lowered, engages the pin c^2 , and thus prevents angle-lever c^4 , from being operated by the cam c^3 , on shaft e . When the Jacquard calls for the introduction of a color to be worked in a fabric, the cord c^5 , is drawn upward by the Jacquard mechanism, thus releasing the pin c^2 , and thereby bringing the angle lever c^4 , into engagement with the cam c^3 . Through the link c^6 , radial lever c^{22} , and pawl c^{23} , the ratchet wheel c^{24} , is thus rotated the required distance. The shaft d^2 , and sprocket-wheel d^3 , are thus revolved, operating the pattern-chain until one of its rollers comes under and lifts one of the levers d^4 , d^5 .

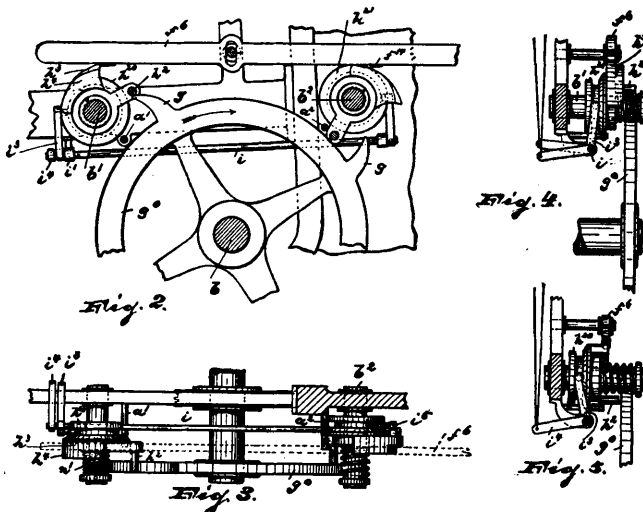
In Fig. 1 of the drawings is illustrated the position of lever f^6 , when the first or top compartment of the shuttle-box is brought opposite the lay or race and ready to discharge its shuttle. Supposing that the second shuttle from the top is called for after the first shuttle has performed its operation, the cam h^{20} , remains in its raised position—that is to say, the angle lever i^3 , and its respective treadle d^4 , are prevented

from returning to their normal positions. The roller on the pattern-chain next to the roller which has lifted the said lever d^4 , engages and travels along the curved cam portion d^{20} , of the latter and thus will keep the said treadle in its raised position.

A second roller simultaneously lifts that treadle



which controls through its cord connection the arm i^4 on shaft i , which latter, through the arm i^5 , (its pin engaging the annular groove,) slides the cam-wheel h^{21} , on the shaft b^2 , until the pin h^2 , is in the path of the cam projection g , of wheel g^o , and the projection h^2 , directly beneath the lever f^o . The wheel g^o , in its rotation and through the projection g , engaging the pin h^2 , operates the cam-wheel h^{21} , until the projection h^2 , has raised the lever to its highest position. The pointed end of said projection now rests against the lug or stop f^{14} , in which position it remains until the cam-wheel is about to be returned for a different shuttle call, as will be manifest.



Raising second box:—Through the connection of the free end of the lever f^o , with the shuttle-box-supporting rod the latter is raised one compartment and thus, the corresponding shuttle (the second one from the top) brought into operation. Should said shuttle be required for more than one pick, the hooked end lever c^2 , is lowered by the Jacquard machine into engagement with the pin c^1 , of link c^o , thus withdrawing

the angle lever c^4 , from contact with cam c^2 , and thus preventing a further rotation of the shuttle-changing device on shaft d^2 .

Raising the third box:—Now supposing that the third shuttle from the top is required it is necessary to return the cam wheels h^{20} , and h^{21} , to their normal positions. The corresponding treadles d^4 and d^5 are lowered by the pattern chain, thus releasing the angle levers from the strain of the cord connections and thereby allowing the spiral springs n' , to slide their respective cam-wheels h^{20} , and h^{21} , back on their stub-shafts until the pins h^2 are out of the path of the projections g of wheel g^o , and the projections h^4 in alignment with the lever f^o . The said lever will be forced downward upon said projections h^4 , by the action of the springs f^{11} , or f^{12} , (see Fig. 1) and as the cam-wheels are oscillated backward and thus returned to their normal position by the action of the uncoiling of their respective spiral springs n' , the said lever f^o , will continue in its downward movement until it has reached its lowermost position. Through the connection of the free end of the lever f^o , with the shuttle-box-supporting rod, said rod and the box are lowered one compartment and the second shuttle from the top is thus brought into operation.

Raising the fourth box:—If the fourth shuttle from the top is called for, the cam wheel h^{21} , is operated until the projection h^2 , has raised the lever to its highest position, when the pointed end of said projection engages the lug or stop f^{14} , as will be manifest.

From the foregoing it can readily be seen that when the cam-wheels are operated to raise the lever they are brought into engagement with the same by their respective angle-levers and are oscillated by the projections g , of wheel g^o , while when the lever is to be lowered the spiral springs n' , which by the former operation has been depressed and coiled tighter, perform the operation of returning (oscillating backward) the said cam wheels to their respective normal positions.

The mode of operation of the lower oscillating cam wheels h^{22} , and h^{23} , and the connecting lever f^1 , is the same as that of upper cam wheel and its lever f^o . (Adam Scheid, Harrison, N. J.)

DU FAUR AND GARTNER'S SHUTTLE-BOX MECHANISM.

This motion is designed for Jacquard or witch-top looms. It is driven directly from the crank-shaft, by a double eccentric motion, an arm from one eccentric working the box pattern chain and an arm from the other eccentric working the cam-ratchet-wheels. It is an easy motion adopted for looms running at high speed.

Fig. 1, is a side elevation of a loom provided with the mechanism, certain portions being removed or broken away, and others shown in section, to better illustrate the nature of the box mechanism; Fig. 2, is a sectional view on the line $x-x$ of Fig. 1, certain parts being added and others removed.

a , represents the loom frame, in which is arranged the driving-shaft b , carrying the eccentric c , and transmitting its motion, through the pitman e , pivoted, as at d , to said eccentric, to the lay or batten s , supported by swords f , which are fulcrumed, as at f^1 , to the bracket-frames a^1 , of the loom a , respectively.

At each end of the lay are arranged the shuttle-boxes f^2 , carried by rods f^3 , each of which rods is guided by the block f^4 , secured to its respective sword.

On the shaft b , is also mounted an eccentric b^o , operating through its projecting arm b^1 , the oscillating lever b^2 , fulcrumed on the shaft b^3 , the latter

having its bearing in the bracket-frame a^4 . On said shaft is also mounted the sprocket-wheel b^2 , carrying the pattern-chain b^4 , which latter controls the treadle-levers b^6 and b^7 , fulcrumed, as at b^5 , to the projecting portion a^5 , of the bracket-frame a^4 . Any device for operating the treadle-levers b^6 , b^7 , can be used.

At the lower portion of the loom-frame a , is arranged a bracket-frame a^7 , serving as bearings for the

The cam-groove wheels on one cam-shaft are in the same plane as the corresponding cam-groove wheels on the other cam-shaft and are each provided with an endless cam-groove consisting of four concave and four convex curves, arranged alternately and symmetrically, as clearly shown in Fig. 1.

On the cam-shafts c^{11} and c^{12} , are loosely mounted the oscillating levers c^{13} and c^{14} , respectively, pivotally connected at their free ends, as at c^8 and c^{10} , to the arm or link c^3 , which latter is provided with the horizontally-arranged pin c^7 , engaging the elongated slot c^6 , of the free end of arm c^2 , of an angle-lever which is fulcrumed, as at c^4 , to the loom-frame. The other arm, c^5 , of said angle-lever is pivotally connected as at c^2 , to the arm c^1 , carried by and projecting from the eccentric c , all as clearly shown in Fig. 1.

The oscillating levers c^{13} and c^{14} , are provided with horizontally-arranged pins g^{20} and g^{21} , respectively, on each of which pins and on each side of the levers are fulcrumed the pawls g^{10} and g^{11} , adapted to engage the respective ratchet wheels g^8 , g^9 , and g^6 , g^7 , to thus intermittently rotate the same (and the cam-groove wheels connected therewith).

The brake-wheel g^{20} , g^{22} , g^{24} , and g^{26} , which are octagonal-shaped, are each engaged and thus controlled by the flat springs g^{21} , g^{23} , g^{25} and g^{27} , respectively, as clearly shown in Fig. 2 of the drawings.

The pawls g^{10} , and g^{11} , are connected at their projecting free ends by cords or wires b^{10} , b^{13} , b^{11} , b^{12} , with their respective treadle-levers b^6 , b^7 . (Adolf Faber du Faur and Alfred Gartner, Newark, N. J., assignors to Robert Atherton, N. J.)

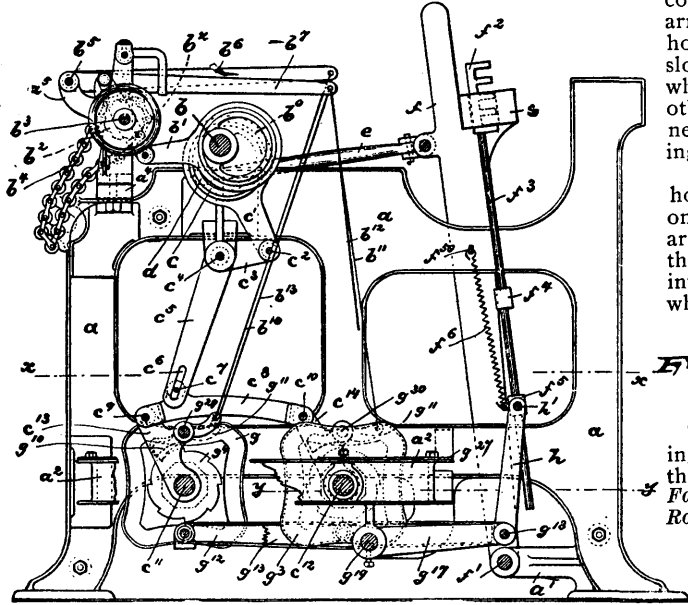


Fig. 1.

DU FAUR'S MULTIPLIER.

parallel cam-shafts c^{11} and c^{12} , which have their inner ends supported by the bracket-frames a^8 .

On the cam-shaft c^{12} , which is provided at its forwardly projecting portion with a hand-wheel c^{16} , is secured the cam-groove wheel g^1 , having integral therewith, the ratchet-wheel g^5 , and the octagonal-shaped brake-wheel g^{24} . On said cam-shaft is also loosely mounted a sleeve, prevented from lateral movement by means of a collar on shaft c^{12} , which sleeve carries the cam-groove wheel g^8 , the ratchet g^7 , and the brake-wheel g^{20} . The projecting end of the sleeve c^{16} , is provided with a hand-wheel c^{18} , all as clearly shown in Fig. 2. As will be observed from said figure, the cam-groove wheels g^1 and g^8 , and their respective ratchet and brake-wheels are arranged symmetrically with relation to each other, and the said ratchet-wheels are on the inner and the brake-wheels on the outer faces of said cam-groove wheels.

On the cam-shaft c^{11} , are arranged and mounted, in a manner similar to that described in connection with

The object of this mechanism is to provide a multiplier for box-loom, as explained in the preceding article, by means of which certain picks can be repeated without the use of a long and cumbersome pattern-chain.

Fig. A, is a side elevation of this improved multiplier arranged on a portion of a loom-frame of ordinary construction; Fig. B, a rear elevation thereof, the pattern and auxiliary chain being removed; Fig. C, a detail view of the sprocket-wheel actuating and controlling mechanism; and Figs. D and E, detail views of the sprocket-wheels and of the pattern and auxiliary chains, respectively, carried thereby.

In place of using one chain as on his box motion explained in the preceding article, Mr. Du Faur uses in the present multiplier two chains. On the box chain is placed, where required, a long chain bar which extends out past the chain links and on which bar is placed a raiser every time "multiplying" is required. When this bar is raised to the top of cylinder it lifts

an arm which stops the pattern-chain and starts the auxiliary chain. On this auxiliary chain is also placed, where required, a long bar having a riser placed thereon, and as soon as the pattern calls for another change of filling this long bar is brought to the top

of cylinder, thus lifting a second arm, which disconnects the auxiliary chain and in turn connects the pattern-chain again. A thorough description of this novel multiplier is best given by quoting letters of reference of which a , represents a portion of a loom-frame, and a^1 , a bracket-frame secured thereto, which latter furnishes the bearings for the shaft c^9 , which is arranged parallel to the main driving-shaft b , mounted in the loom-frame a . On the shaft c^9 , is securely mounted a sleeve e , having integral therewith the sprocket-wheel c^2 , and ratchet-wheel c^{10} , and also the

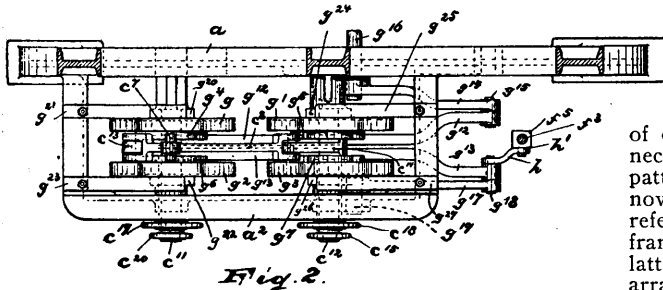


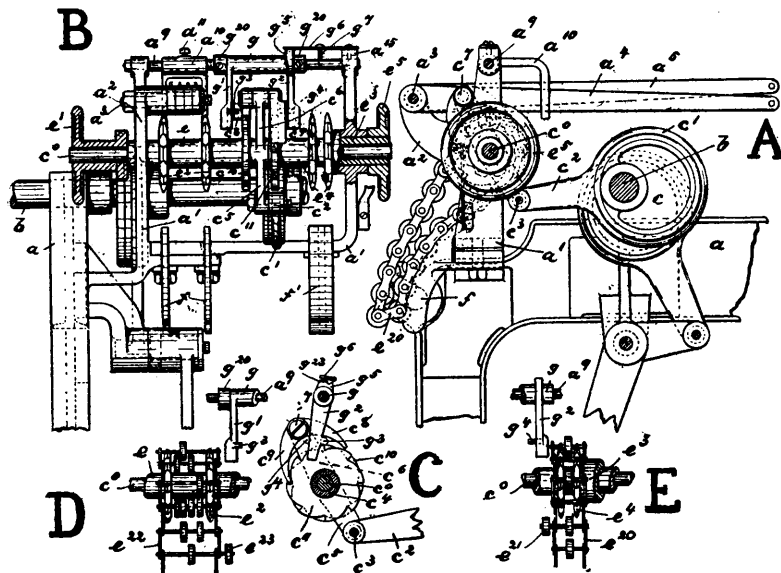
Fig. 2.

cam-shaft c^{12} , Fig. 2, the cam-groove wheels g^1 and g^8 , their respective ratchet-wheels g^5 and g^7 , brake-wheels g^{20} and g^{24} , and hand-wheels c^{20} and c^{19} . (See Fig 2.)

wheel e' , by means of which the shaft e'' , may be rotated by hand. On said shaft e'' , is also loosely mounted a sleeve e^3 , having integral therewith the sprocket-wheel e^4 , the ratchet-wheel e^{11} , and the hand-wheel e^5 .

The ratchet-wheels e^{10} , and e^{11} , which have their teeth cut in opposite directions, are arranged in close proximity to each other and are separated by the sleeve e^4 , loosely mounted on the shaft e'' , and provided with the arms e^6 and e^7 . The free end of the arm e^6 , is pivotally connected as at e^8 , to the arm e^2 , projecting from the ring or rim e' , surrounding the eccentric e , which latter is secured on the main driving-shaft b . To the free end of the arm e^7 , is secured the pin e^9 , on which are arranged—and on each side of the arm—the pawls e^8 and e^9 , adapted to engage the teeth of their respective ratchet-wheels e^{10} and e^{11} . (See Fig. C.)

In the bracket-frame a' , and above and parallel to the shaft e'' , is secured the rod a^1 , from which is adjustably suspended, by means of the set-screw a^{11} , the forked bracket a^{10} , serving as a guide for the levers a^4 , a^5 , fulcrumed on the stub-shaft a^3 , which latter is secured in the projecting portion a^2 , of the bracket-



frame a' . Said levers are arranged above the sprocket-wheel e^4 , and are adapted to be operated by the balls or rolls of the pattern-chain e^{22} , Fig. D, as will be manifest. On the rod a^1 , is loosely mounted the sleeve g , which is prevented from lateral motion by the collar g^{20} , secured to said rod.

Integral with the sleeve g , or secured thereto in any desired manner are the depending arms g^1 and g^2 , carrying the horizontally-projecting pins g^3 and g^4 , adapted to engage the pawls e^8 and e^9 , respectively, in a manner hereinafter described. The sleeve g , and its depending arms g^1 , g^2 , are held in operative position by means of the flat spring g^5 , secured with one end to the projecting portion a^{15} , of the bracket-frame a' , and provided at its other end with teeth engaging the notches g^{23} , arranged in lug g^6 , which latter projects from the sleeve g . (See Fig. C.) The spring g^5 , may be strengthened by the pin g^7 , secured with one end substantially in the centre of the spring and with its other end to the rod a^1 , all as clearly shown in Fig. B.

The pattern-chain e^{22} , is carried by the sprocket-wheel e^2 , and rests with its depending portion on the slide or guide f , secured to and projecting from the

bracket-frame a' , while the auxiliary chain e^{20} , is carried by the sprocket-wheel e^4 , and rests with its depending portion on the slide or guide f , also secured to the bracket-frame a' .

On one or more of the rods of the pattern-chain e^{22} , is arranged a ball e^{23} , in alignment with the depending arm g^1 , and adapted at certain intervals to engage the said arm. The auxiliary chain e^{20} , is likewise provided with balls e^{21} , adapted at certain intervals to engage the depending arm g^2 .

In operation a continuous, oscillating motion is imparted from the main driving-shaft through the eccentric e , and arms e^2 and e^3 , to the arm e^6 , arranged on the sleeve e^4 , and carrying the pawls e^8 and e^9 . The pawl e^8 , is normally held out of engagement with the ratchet-wheel e^{11} , by means of the pin e^9 , and thus prevents rotation of the sleeve e^4 , and the sprocket-wheel (carrying the auxiliary chain e^{20}) connected therewith. The pawl e^9 , whenever the arm e^6 , is oscillated from right to left, Fig. C, moves the ratchet-wheel e^{10} , and thus the pattern-chain e^{22} . The pattern-balls will thus come under and raise or operate the respective levers a^4 or a^5 , thereby actuating the respective parts of the shuttle-changing mechanism to

bring the required box in position to throw its shuttle. The pattern-chain continues to revolve until one box is required for more than one pick, that is to say, one of the levers a^4 , a^5 , is to be lifted and held in its raised position until the necessary picks or throws from the shuttle of the box, actuated from said lever, have been accomplished.

At the required moment the ball e^{23} , of the pattern-chain comes in contact with and throws or swings the depending arm g^1 , carrying the pin g^3 , outward until the said pin, after engaging the pawl e^8 , has thrown the latter out of engagement with the ratchet-wheel e^{10} . Simultaneously the depending arm g^2 , carrying the pin g^4 , is thrown or swung inward, thus clearing the pawl e^9 , and allowing the latter to engage the teeth of the ratchet-wheel e^{11} . The ratchet-wheel e^{11} , is thus rotated in a direction opposite to the direction of the ratchet-wheel e^{10} , and as it is in fixed connection e^{10} , and as it is in fixed connection with the sprocket-wheel e^4 , the auxiliary chain e^{20} , is revolved or operated.

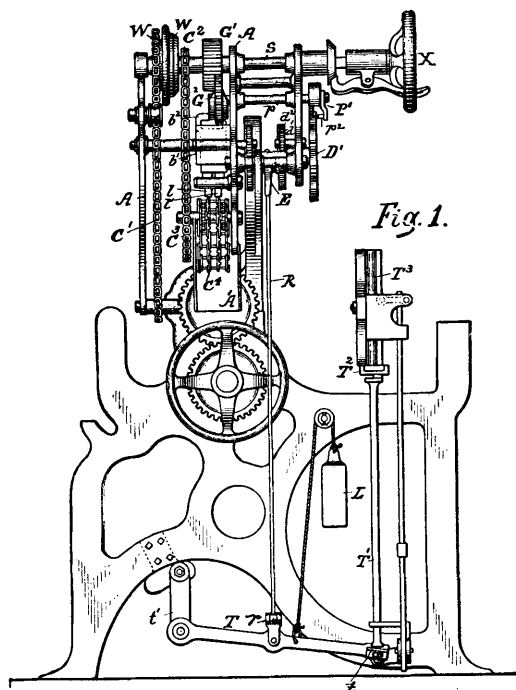
Said auxiliary chain continues to revolve until the respective pick has been repeated the required number of times. At that pick the ball e^{21} , comes into contact with and throws or swings the depending arm g^2 , carrying the pin g^4 , outward until the said pin has thrown the pawl e^9 , out of engagement with the ratchet-wheel e^{11} , thus stopping the rotation of the latter. Simultaneously the depending arm g^1 , carrying the pin g^3 , is thrown inward, thus releasing the pawl e^8 , which latter again engages the teeth of the ratchet-wheel e^{10} , and rotates the same. The depending arms g^1 , and g^2 , are held in their respective positions by the flat spring g^5 , as heretofore described. It will thus be seen that when the ball e^{21} , of auxiliary chain e^{20} , engages the depending arm g^2 , the said auxiliary chain is at rest, while the pattern-chain is rotated. On the other hand, when the ball e^{23} , of pattern-chain e^{22} , engages the depending arm g^1 , the said pattern-chain is stopped in rotation and the auxiliary chain started in a manner heretofore described.

To remedy defective picks, the sprocket-wheels e^2 , and e^4 , may be operated by hand forward and back-

ward by means of the wheels e' and e'' , respectively, as will be manifest. (*Adolf Faber du Faur, assignor to Robert Atherton, Paterson, N. J.*)

LUSCOMB'S SHUTTLE-BOX MECHANISM.

The object of the new mechanism is to provide a shuttle-box-operating mechanism for looms in which accurate and positive movement is imparted to the



box or frame adapted to contain several shuttles which carry filling of varied colors or counts. The movement of the shuttle-box is rapid and accurate, and besides the shuttle-box is locked in position in the line of the shuttle-raceway between any two successive movements.

An advantage gained over a great many other motions of this kind is, that this motion can be thrown out of gear very handy when a weaver has occasion to turn the pattern-chain back by hand.

Of the accompanying illustrations, Fig. 1, is an end view of a loom showing the shuttle-box-operating mechanism in side elevation. Fig. 2, discloses the shuttle-box-operating mechanism in end elevation, viewing the same from the back of the loom. Fig. 3, shows the mechanism directly connected to the shuttle-box-lifting devices. Fig. 4, is a sectional drawing. Fig. 5, shows in detail an automatic release and stop-motion. Fig. 6, shows in detail a compound counterweight for balancing the weight of the reciprocating parts of the shuttle-box mechanism.

For explaining the mechanism, a shuttle-box with four compartments is selected, however a mere mechanical modification or reduplication of the device for raising and lowering the shuttle-box will enable that mechanism to be applied to shuttle-boxes of more or less than four compartments.

The shuttle-box T^2 , is firmly secured to a rod T' , which fits loosely at its lower end in the shoe t , on the free end of the lever T . A rod R , is joined by a flexible joint r , to the lever T , and forms the connec-

tion between the lever T , and a compound eccentric E . The lever T , is flexibly connected to the frame of the loom by a link t' .

The weight of the moving parts of the shuttle-box movement is counterpoised by the weight L , in its relationship to the other parts of the mechanism.

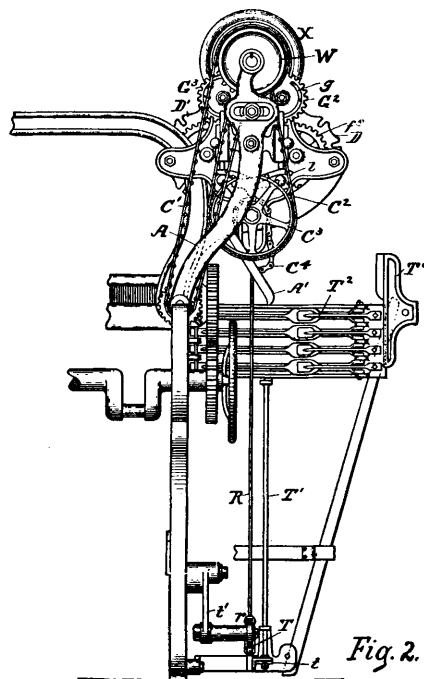
This counterweight is shown in detail in Fig. 6, and consists of two parts m' , m'' , held together by a rod m^3 , which is controlled by a spring m^4 . The upper portion m' , of the counterweight is turned down to a cylindrical projection m^5 , which fits in a socket of corresponding dimensions at the top of the part m'' , of the counterweight. Into the part m'' , is screwed the rod m^4 , which passes into the hole in the lower portion of m'' , in which the enlarged head of rod m^4 , is fitted to slide. Spring m^5 , holds the two parts of the counterweight together in such a manner that whenever the counterpart is lifted or dropped suddenly, the jolt of the movement is in part taken up by the yielding of the spring m^5 .

The nature of the compound eccentric E , is seen by examination of Figs. 3 and 4. The rod R , is screwed into the tongue of the eccentric-strap e , which embraces the outer eccentric e' , which in turn embraces and serves as a strap for the inner eccentric e'' .

The throw of eccentric e' , is twice that of the eccentric e'' , so that if the throw of eccentric e'' , be regarded as the unit of the throw of the compound eccentric E , the rod R , may be lifted either one, two or three units, according to whether either or both of eccentrics e' , e'' , are employed. The unit of throw is that which corresponds to a movement of the shuttle-box sufficient to shift it one shuttle-space.

Eccentric e'' , is integral with or screwed to the sleeve d , which rotates on the stud f , as a bearing. In the sleeve d , are cut gear-teeth which mesh with the pinion d' , which in turn is driven by gear-wheel d'' , fast on the shaft, which is actuated by star-wheel D' .

The eccentric e' , is slotted at e^3 , and within that slot plays the pin f' , secured to the crank-plate f^2 ,



which forms an extension of the sleeve f^2 , which, like the sleeve d , turns on rod f .

The sleeve f^2 , is geared to mesh with the pinion f^4 , which in turn meshes with the gear-wheel f^5 , which is actuated by the star-wheel D.

Each of the trains of gears, actuated by star-wheels D, and D', respectively, is designed to give the ec-

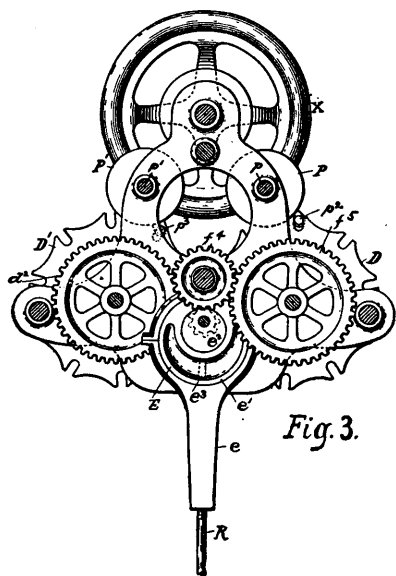


Fig. 3.

centrics e^1 , and e^2 , exactly one hundred and eighty degrees of revolution, so that each turn consequent upon the passage of one segment of the star-wheel will result in giving the eccentric its maximum throw.

As eccentric e^1 , has an amplitude of throw twice that of eccentric e^2 , the resultant throw of the two eccentrics may be made to be either one, two or three units, either up or down. If, for instance, eccentric e^2 , is at the uppermost position of its throw and eccentric e^1 , at its lowermost position and it is desired to move the shuttle-box system another unit of throw upward, simultaneous movement of the two trains of gears connected, respectively with star-wheels D, and D', will result in the desired movement, eccentric e^1 , moving two units up, while eccentric e^2 , moves one unit down, subtracting its unit from the two of upward throw of eccentric e^1 .

The normal position of the system, as shown in the drawings, is the one in which the uppermost compartment of the shuttle-box T^2 , is in line with the shuttle-raceway. The three other possible positions of the shuttle-box are secured by movement of the compound eccentric E. Determination of the movements of the compound eccentric E, is secured by the following mechanism:—

The intermittent movement of star-wheels D, and D', is secured by the agency of pin-wheels P, and P', mounted, respectively, on shafts p , and p' , which shafts are adapted to slide longitudinally in their bearings in the machine frame. At the left-hand end of shafts p , and p' , viewing the machine as in Figs. 1 and 4, are shipper cam-wheels G^2 , and G^3 . The wheel G^2 , and its duplicate G^3 , are spur-gears, meshing with the spur-gear G^1 , and having upon their faces flange-cams ϑ . The wheels P, P', are driven from the main shaft of the loom through the train of mechanism consisting of the chain C^1 , wheel W, and its shaft S, on which the spur-gear G^1 , is keyed. This gear meshes with gears G^2 , and G^3 , on shafts p , p' .

The rotation of the pin-wheels is continuous and their operation upon star wheels D, D', determined by the lengthwise movement of the shafts p , p' . This

movement is determined by the operation of the shippers b^2 , which operate on the cam-flange ϑ , by means of the finger b^3 , and thumb b^4 , Fig. 4. The shippers b^2 , consist of plates sliding in boxes which form integral parts of the yoke b^1 . The lower ends of shippers b^2 , extend through the boxes on b^1 , and rest upon the ends of lifting-levers l , l' , which are provided with toes l^2 , resting upon the links of a pattern-chain C^4 , which is moved at a uniform rate by means of the chain C^2 , and wheel C^3 , Fig. 1. Apron A', is provided with means which insure a proper disposition of the slack loop of pattern-chain C^4 , when the latter is unusually long. Through levers l , l' , operated by the links of pattern-chain C^4 , the shippers b^2 , are raised or lowered. The movements of the pattern-chain C^4 , are timed so that the movement of the shipper up and down shall occur when the cam-flange ϑ , is making the upper half of its revolution. The finger and thumb b^3 , and b^4 , are so proportioned and disposed (see Fig. 4) that a movement of the shipper b^2 , must result in a movement of shaft p' either to the right or left.

Viewing the machine as in Fig. 4, it is obvious that a movement of shaft p' , to the left, will result in the engagement of star-wheel D', by pin-wheel P', and a consequent movement of the eccentric-rod R, through the trains of gears hereinbefore described. To effect this movement, let the lever l' , be raised by a lug on pattern-chain C^4 . Then the shipper b^2 , will be pushed up into such a position that the thumb b^4 , will upon the next half-revolution of the gear G^3 , come into operative contact with the cam-flange ϑ . This contact instantly throws the gear G^3 , shaft p' , and pin-wheel P', to the left. The gear G^3 , moves along the face of wheel G^1 , which is made sufficiently wide to permit this movement and at the same time continue its work of driving the gears G^2 , and G^3 , and their respective trains of mechanism. The longitudinal movement of shaft p' , to the left, brings the flange ϑ , under the guide portion of finger b^3 , and so long as the shipper b^2 , remains elevated, the star-wheel D',

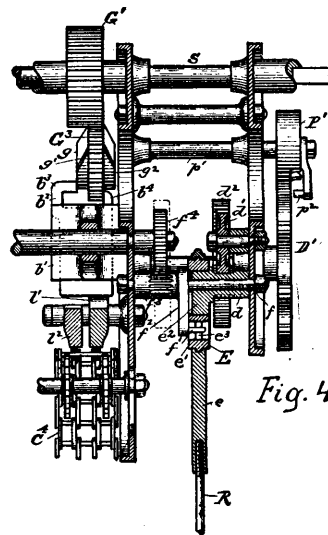


Fig. 4.

is rotated intermittently with every revolution of pin-wheel P'. As the pin p^2 , of pin-wheel P, leaves the star-wheel notches, the disk portion of P, fits in the concave faces of the star-wheel sectors and locks the star-wheel between the intermittent movements of rotation. The same action takes place with pin-wheel P', and its pin p^2 . In order to throw star-wheel D', out of operation, the reversal of the mechanical move-

ment just described, is effected by arranging the links of pattern-chain C' , so that lever V' , will drop and permit the shipper b^2 , to rest in its normal position, as shown in Fig. 4. This movement, like the upward movement of lever V' , and shipper b^2 , takes place when the flange-cams g , are in the upper half of their revolution. The finger b^3 , then operates to throw the gear G^3 , and shaft p' , with pin-wheel P' , a sufficient distance to the right to throw the pin-wheel out of engagement with the star-wheel D' , the disk portion of the pin-wheel remaining in the corresponding face of the star-wheel segment and locking the same in position.

The above description relates only to one of the star-wheels and its train of operating mechanism, but is equally applicable to the others.

Reduplication of the mechanism described in connection with either of the eccentric members e' , e^2 , and their respective actuating mechanism will render the shuttle-box-operating attachment capable of securing the requisite movement to a shuttle-box having more than four compartments or members.

In connection with the shuttle-box-lifting mechanism there is provided means for throwing the box-motion out of connection with the main shaft of the loom.

This disconnection may take place at the will of the operator who desires to manipulate the box-motion by hand, or automatically, when some obstruction to the movement of the shuttle-box renders instant disconnection with the source of power necessary. The portion of the mechanism contrived to secure these results is shown in Fig. 5, which is a detail of Fig. 1.

The driving-shaft of the shuttle-box mechanism is made in two parts S , and S' , the outer shaft S , being

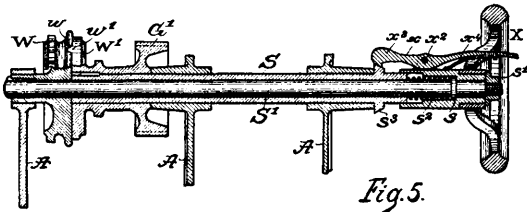


Fig. 5.

capable of sliding along the inner shaft S' . The main driving-wheel W , turns upon the inner shaft S' , and is normally in engagement with the disk W' , by reason of the interlocking of the tooth w , and the notch w' , in disk W' , and wheel W , respectively. At the end of the shaft S' , remote from wheel W , is mounted the hand-wheel X . The hub of hand-wheel X , is bored out to receive the end of shaft S' , upon which is the collar s , which rests against a shoulder of the hub of wheel X . The nut s' , screws the wheel and hub to the shaft S' . The hollow shaft S , is inserted in the hub of wheel X , and in the space between shaft S' , and the sides of the hole bored in the hub of wheel X , is placed a coil spring s^2 , which, bearing against the collar s , at one end, and the end of hollow shaft S , at the other, constantly exerts its bias to hold disk W' , against wheel W . This thrust of spring s^2 , holds the disk W' , and wheel W , normally in engagement with each other by means of the tooth and notch w' , and w , heretofore described.

The hollow shaft S , has a collar s^3 , integral with it, and which collar is turned to a bevel or conical surface, so as to permit the claw x^2 , of notch x , to ride up when shaft S' , is thrust to the left, as viewed in Fig. 5. A spring s^4 , constantly presses the claw x^2 , of catch x , against the conical surface of collar s^3 .

If the operator desires to turn the shuttle-box mech-

anism by hand he has only to thrust the hand-wheel X , toward the disk W' , against the pressure of spring s^2 . The claw x^2 , of catch x , rides up over the collar s^3 , until it catches on the back side of the collar. With the parts in this position the spring s^2 , is locked out of action and the shaft S' , is moved through the hollow shaft S , until disk W' , and wheel W , are turned out of engagement. Then through the mechanism shown and described in connection with Fig. 1, the shuttle-box-mechanism may be operated by hand. Likewise the mechanism of Fig. 5, is useful as an automatic release or stop motion whenever by chance the normal movement of the shuttle-box is interrupted or obstructed.

The sides of tooth w' , and notch w , are inclined at such an angle that while under normal operation the spring s^2 , holds the tooth and notch w , and w' , in engagement with each other, the interposition of an obstruction will increase the sliding tendency of the inclined sides of the said tooth and notch w' , and w , to such a point that the pressure of spring s^2 , will be firm, and the tooth w' , be thrown out of notch w . This results in a lengthwise relative movement of the shafts S , and S' , so that the claw x^2 , of catch x , hooks over the collar s^3 , holding the wheel W , and disk W' , out of engagement. In this position the mechanism is retained until the workman in attendance upon the loom can repair the damage or remove the obstruction. (Andrew Luscomb, Fall River, Mass.)

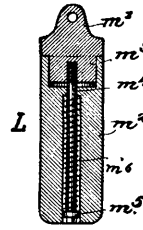


Fig. 6.

SHUTTLE-BOX FOR PLAIN LOOMS.

The object in the construction of this box is, to improve the shuttle-box end of the lay, whereby the flight of the shuttle may be started in the proper direction across the raceway of the lay.

In looms as now commonly made, having a binder in the back of the shuttle-box and an adjustable front plate, said front plate is constructed to present a straight face with short rounded ends.

The portion of the front plate next the end of the lay is adjusted and held in place at just the proper distance from the back plate to leave a space just sufficient to receive the shuttle as it comes to rest in the shuttle-box; but, if the face of the front plate, commencing at its end nearest the end of the lay, should be held parallel with the reed then the space afforded at the open mouth of the shuttle-box to admit the shuttle, would be too small and would not properly receive the shuttle should it be a little out of alignment as it passed the selvage-warps.

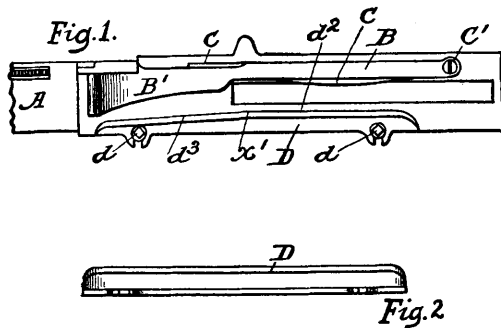
Consequently the face of the front plate is commonly set at an angle to the plane occupied by the face of the reed, and as a result thereof the shuttle, on its arrival in the box, may stop in an inclined position with relation to the face of the reed, and the shuttle when started in such position will be moved in an angular direction with relation to the face of the reed and will be thrown off, of the race of the lay into the shed, causing what is called a "smash."

One of the chief purposes of the face-plate is to correctly position the shuttle in the shuttle-box or line it up in the box, so that when it starts on its flight after it has been struck by the picker, it will have a straight-line movement, and it will continue such movement from end to end of the lay.

To overcome the possibility of starting the shuttle in an angular direction, with relation to the direction of the lay and at the same time afford ample space

for the entrance of the shuttle in the shuttle-box should it have deviated somewhat from a straight line at the time it emerged from the shed, a novel front plate is arranged having two straight or plane surfaces, one intersecting the other at a slight angle, that part of the straight face of the improved front plate nearest the outer end of the shuttle-box, being set substantially parallel with the reed, the second portion of the straight face nearest the open end of the shuttle-box being inclined from the junction of said angle somewhat outwardly toward the breast-beam to thus form an enlarged entrance for an incoming shuttle, the said shuttle when it reaches the picker in the box being positioned parallel with the lay by the straight face of the front plate nearest the outer end of the lay and remaining in that position when it is struck by the picker and during the first part of the flight being guided in a straight line parallel to the reed.

Of the accompanying illustrations Fig. 1, in plain view, shows one end of a lay with the improvements added, and Fig. 2, is a side elevation of the front plate detached.



A, indicates the lay; B, the back plate of the shuttle-box, having an overhanging lip B', at the entrance end of the box. C, indicates the binder as pivoted at C'.

The front plate D, forming one side of the shuttle-box, has slotted ears, which receive the screws d , used to connect the front plate adjustably to the lay. The face of the front plate from near its end nearest the end of the lay is made straight, as at d^2 , to substantially the point x' , and from that point toward the opposite end of the front plate the face is also straight, but the second straight-line face d^3 , is at an obtuse angle to the straight-line face of the other part of the front plate. The straight face d^2 , is located substantially parallel to the reed carried by the lay, so as to insure the proper position for the shuttle when fully into the shuttle-box, so that as the picker strikes the shuttle to throw it from the box through the shed, the said shuttle will start straight.

By inclining the face d^3 , ample entrance for the shuttle into the box will be insured, and thereafter the straight face d^2 , will correctly position the shuttle preparatory to a new flight. (Draper Co.)

NORTHROP'S SHUTTLE-CHECK FOR PLAIN LOOMS.

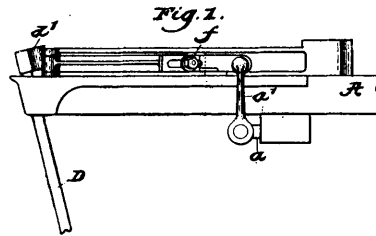
The object of this check is the construction of a binder whereby the same may be adjusted in such manner as to present more or less of its swell in the box to check the shuttle or raise the dagger higher.

The free end of the usual binder used in looms is commonly acted upon by the protector-rod finger.

In this check the binder is made in two parts, one part being adjustable on the other part, whereby by

a greater or less adjustment of one part on the other, a greater or less projection of the swell of the binder into the shuttle-box may be effected.

Fig. 1, in side elevation, represents part of one end of a lay and part of a picker and its stick and the



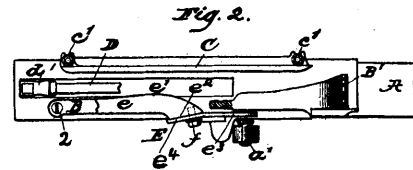
improved binder; and Fig. 2 is a top or plan view of Fig. 1, with the part of the back plate of the shuttle-box broken out to better show the improved binder.

A description of this shuttle check is best given by quoting letters of reference.

A, indicates the lay; B, its back plate having an overhanging lip B'. C, is the adjustable front plate connected by screws c' ; D, is the picker stick, and d' the picker; a , the stop-rod, and a' , its finger.

The binder E, pivoted at 2, is shown as made of two parts, the part e , having the swell e' , and at its back an inclined seat e^2 and a part e^3 , having an angular end e^4 , said end bearing on said seat, the part e^4 , being slotted to receive a threaded stud, on which is placed a clamping-nut f .

With the parts in the position shown in the drawings the swell of the binder projects its greatest amount into the shuttle-box; but to secure a less projection of said swell into the shuttle-box the nut f , may be loosened and the end e^4 be adjusted on the stud to the right, such adjustment putting the fore end of the part e^3 in a different vertical plane with relation to the acting face of said swell, and when in



the desired or proper position the nut will be again set to hold the parts firmly. (Draper Co.)

SHUTTLE-BOX FOR NORTHROP LOOMS.

In automatic looms, or looms in which the shuttle is replenished with a bobbin while the shuttle is in the shuttle-box and the loom in motion, it is necessary in the operation of supplying the shuttle with a bobbin or filling-carrier that the shuttle always occupies as nearly as possible exactly the same position in the shuttle-box whenever the pusher used to push the filling-carrier from the usual filling-carrier feeder into the shuttle acts, the filling in the shuttle having been exhausted or broken.

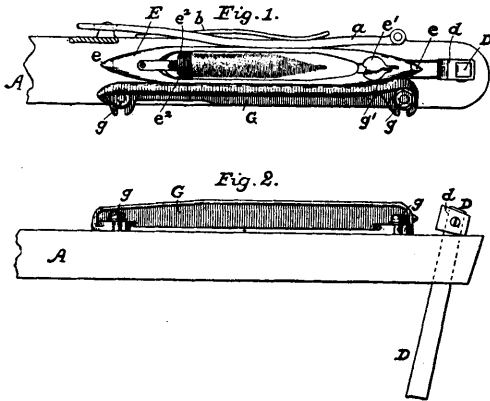
To accomplish this is the object of the present invention, *i. e.*, securing a definite position for the shuttle in the shuttle-box.

Fig. 1, is a top or plan view of a part of lay with its shuttle-box and a shuttle therein, and Fig. 2, is a front elevation of the same.

The lay A, having at its end a shuttle-box slotted through from top to bottom, as shown by dotted lines,

Fig. 2, the binder *a*, the spring *b*, acting thereon to normally keep the binder pressed into the box, the picker-stick *D*, having a picker *a*, and the shuttle *E*, having tips *e*, a suitable self-threading device *e'* and suitable jaws *e''* to receive the ringed head of a bobbin or filling-carrier, are substantially as explained in the previous article "Northrop's Shuttle Check for Plain Looms," and in practice this loom will have cooperating with it a filling-carrier feeder and a pusher, to put a fresh filling-carrier into the shuttle whenever the filling has been broken or exhausted in the shuttle.

To insure the correct positioning of the shuttle in the shuttle-box under the pusher referred to, the



shuttle-box is provided at its front side with a front plate *G*, having ears presenting elongated opening for the reception of screws *g*, by which to confine the front plate in adjusted position. The inner side of this front plate, (see Fig. 1) near its outer end, is provided with an inclined surface *g'*, of such shape as to conform, substantially, to the contour of the shuttle just back of its point *e*, so that as the said shuttle arrives fully into the box its inclined side will meet and bear against the inclined face of the front plate, the further movement of the shuttle in that direction being stopped by the said incline *g'*, the binder acting on the shuttle at its opposite flat side back of the pointed end, thus seating the shuttle against the said incline *g'*, so that the said shuttle will be checked and positioned correctly with relation to the slot in the lay, through which the spent filling-carrier in the shuttle may be ejected. The rigid front plate acts to receive against it the front side of the shuttle, the shuttle being acted upon at its rear side by the binder, which cooperates with the flat or straight side of the shuttle between its pointed ends, the binder exactly positioning the shuttle with its filling-carrier, so that the latter may be correctly ejected from the shuttle and so that the shuttle will be so placed that the transferer, whenever it operates, can unerringly put a new filling-carrier into the shuttle, and, further, the binder being extended along the back of the lay throughout the length of the shuttle prevents any possible displacement of the shuttle with relation to the width of the lay and the slot made in the same, as described. (Draper Co.)

WERNER'S SHUTTLE-CHECK.

The object of this device is to provide a simple and effective check or buffer adapted to be quickly assembled and disposed in looms already in use and readily

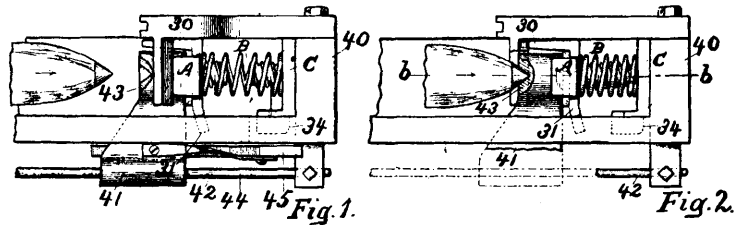
removed therefrom, as required, without loss of time or the services of a machinist, and whereby, in the use thereof, the shuttles may be more gradually brought to rest, and the shocks and jars, as well as the wear on the pickers, incident to machines of this character, thereby materially reduced.

Fig. 1, is a top view of the check, showing the shuttle moving into position to engage the picker and the buffer device in its normal inoperative position with its buffer expanded. Fig. 2, is also a top view showing this buffer device with its buffer compressed, to thereby check or cushion the shuttle.

Heretofore it has been the usual practice to form a buffer by means of cotton or other suitable waste placed in the rear of the picker; but such a buffer is not only unreliable, in that it has no uniform resistance, and therefore permits the picker and the shuttle to come to rest in various positions at different times, but it also becomes, in a short time, compressed into a rigid and practically solid mass, and thus materially loses its action as a buffer.

To obviate these defects and disadvantages, is the object of this buffer device, simple in construction, and effective in operation, and in the use of which, by reason of the uniformity of resistance furnished, the device materially assists in maintaining the regularity and perfect operation of the loom, and also, by reason of the relatively long stroke of the buffer block or head as compared with buffer means heretofore in use, the shuttle is brought to rest more gradually, so that it can be held in the shuttle-box by a less powerful shuttle-binder, and consequently requires a less powerful blow of the picker-staff in order to drive the shuttle out of the box and through the shed into the opposite shuttle-box of the loom, whereby the loom can be operated with less power and a material saving thereby effected, not only in power, but in continuity of operation and cost of maintenance.

The buffer device comprises in a general way, a buffer block or head *A*, preferably composed of metal, although any suitable material might be used, such as raw-hide, adapted to engage the picker-head when in its position of rest; a buffer *B*, comprising one or more springs, herein shown, however, as two in number, preferably one inside of or superimposed upon the other, adapted to cushion and counteract the



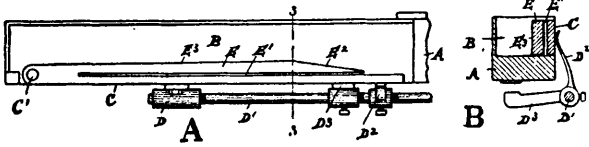
thrust of the shuttle and permit the same to gradually come to rest on its engagement with the picker-head, and a base-block *C*.

In the use of this device, the picker having been placed in its race 35, with the shank 41, thereof carried by the guide-rod 42, and connected by the strap 44, to the picker-staff 45, the buffer-head is placed in position with its guide-arms 30, and extension 31, in their respective positions, to permit the buffer-head to engage the picker-head 43. The base-block is then placed in position with its rear face, engaging the transverse wall 40, and its wings or extensions 34, in the recess 36. The springs are then compressed and placed in position intermediate the base-block and the buffer-head, and the device is then in position for use, and when the shuttle, by means of the picker and picker-staff, is forced through the shed and the end

thereof strikes one of the pickers, the springs are compressed. (See Fig. 2.) The force of the blow is thereby taken up, the shuttle and the picker cushioned with uniform regularity, and the shuttle permitted to gradually come to rest. (*Louis C. Werner, East Windsor, Connecticut.*)

COWGILL'S SHUTTLE-BINDER.

This binder is an excellent device for single box looms running at high speed, and is shown in the accompanying illustrations of which Fig. A, represents a top view of one end of the lay of the loom, showing one of the shuttle-boxes having such a shuttle-binder attached. Fig. B, is a sectional view on line 3-3, of Fig. A.



Quoting letters of reference will clearly explain the construction and operation of the device.

A, denotes a portion of the lay of the loom. B, denotes one of the shuttle-boxes, and C, the binder, pivoted upon a stud C', with the inner side of the binder C, placed in the path of the shuttle, so that when the shuttle enters the box B, the binder C, will be swung upon the stud C', and the free end of the binder moved outward.

Journalled in bearings D, which are attached to the lay, is a protector-rod D', to which is attached a finger D², with its end bearing against the binder C. A weighted arm D³, is attached to the protector-rod and extends beneath the lay, so that its weight will rock the rod and hold the end of the finger D², pressed against the outside of the binder C, with a uniform pressure, or in lieu of the weighted arm D³, a spring can be applied to rock the rod D'.

The binder C, consists of a bar of wood pivoted upon the stud C', and provided upon its inner side with an elastic finger E, integral with the bar C, and separated from it by the saw-kerf E'. The finger E, has its free end scarfed at E², for the incoming shuttle to strike against, and the binder is held in its normal position with the inner side E³, of the elastic finger lying within the path of the shuttle, so as to exert a friction upon the shuttle as it is received within the box. As the incoming shuttle strikes against the scarfed end E², of the elastic finger E, the finger yields slightly to the impact of the shuttle, gradually checking the momentum of the shuttle as it approaches the end of the box. The continued motion of the shuttle, however, after pressing the elastic finger, causes the free end of the binder to be moved out, thereby rocking the protector-rod D'.

This method of construction not only renders the binder extremely cheap and simple, and obviates entirely the employment of a tempered spring-blade attached by screws or bolts, but it also provides a binder which is extremely sensitive to the impact of the shuttle, and causes the momentum of the shuttle to be gradually retarded, as the resistance of the elastic finger is chiefly expended to control the action of the shuttle during the period of its impact against the scarfed end E². In practice, a binder constructed and operating as herein described, renders the loom capable of considerably increased speed. (*James Cowgill, Lowell, Mass., assignor to David L. Bradt and William J. Woods, Worcester, Mass.*)

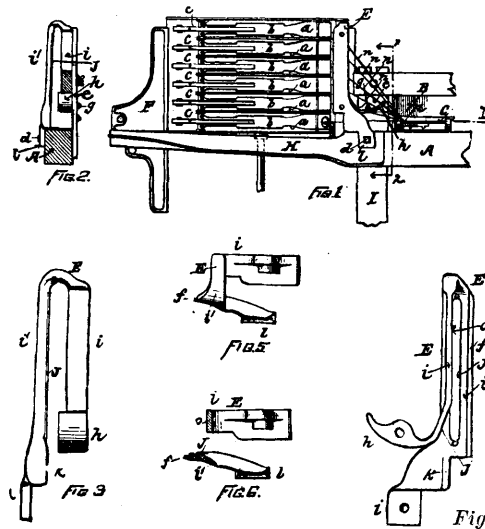
NOLAN & WILKIE'S MOUTHPIECE FOR LOOM SHUTTLE-BOXES.

The object of this mouthpiece for shuttle-boxes for any kind of loom, is to provide means for preventing the yarn of the shuttles in the raised shuttle-boxes from being drawn into the shed with the yarn of the outgoing shuttle; to prevent the straining or breaking of the yarn by engagement between the side of the traveling shuttle and the side of the shuttle-box mouthpiece and to force the shuttle into the box if it does not fully enter the same.

Fig. 1, represents a front side view of the shuttle-boxes and the mouthpiece with a portion of the lay-beam. Fig. 2, represents a vertical section taken in the line 2-2, of Fig. 1, showing a front edge view of the mouthpiece. Fig. 3, represents an enlarged front edge view of the mouthpiece. Fig. 4, represents an enlarged rear side view of the same. Fig. 5, represents an enlarged top view. Fig. 6, represents a horizontal section.

A, represents the lay-beam; B, the reed; C, the loom-temple, and D, the line of the web. The mouthpiece E, is provided with a recessed lip *f*, which serves to guide the up-and-down movement of the forward edge of the drop-shuttle boxes *a*, in which the shuttles are held by the shuttle-binders *b*, which are actuated by means of the springs *c*. The rear edge of the shuttle-boxes is guided in its up-and-down movement by the plate F, which is secured to the arm H, extending outward from the lay-beam A.

The mouthpiece E, is secured to the lay-beam A, by means of the bolt *d*, and to the upward extension *e*, of the lay-sword I, by means of the bolt *g*, the curved surface *h*, of the rear arm *i*, of the mouthpiece serving to guide the nose of the shuttle into its shuttle-box, and the inclined surface *j*, of the said



arm serving upon the upward movement of the shuttle-boxes to force the shuttle completely into its box, in case it has not fully entered the same from the shed, thus preventing the liability of accident to the shuttle-box mechanism, and the upright plane surface *o*, of the said arm *i*, serves to prevent the endwise forward movement of the shuttles from the raised boxes.

The arm *i'* of the mouthpiece E, is offset backward from the attaching-ear *l*, in the direction of the line of the lay-beam, so that the extreme inner surface *k*, at the lower proportion of the offset-arm *i'* will only bear against the shuttle when the shuttle is close!

up to the shuttle-box, and the backward position of the said bearing-surface serves to prevent the yarn from the shuttles in the raised shuttle-boxes from being caught and broken between the inner surface of the mouthpiece and the side of the traveling shuttle, and the yarn is prevented from being discolored by contact with the outside of the shuttle, as in the mouthpieces heretofore employed.

Another advantage of this construction consists in the saving effected in the wear of the shuttles. The striking side of the end of the shuttle when passing through the ordinary shuttle-box mouthpiece is liable to engage with the forward edge of the shuttle-box, whereby the end of the shuttle becomes worn and splintered, so that in a few months it becomes useless, whereas when the bearing-surface of the shuttle-box mouthpiece is offset from the attaching-ear *l*, so as to carry the bearing-surface farther than heretofore toward the mouth of the acting shuttle-box, the shuttle is prevented from coming in contact with the forward end of the shuttle-box and the lasting qualities of the shuttle are increased.

To the inner side of the upright arm *i* of the mouthpiece E, which extends above the line of the acting shuttle-box, is secured the friction-cushion J, made of a strip of felt or woolen cloth, serving to support the threads of yarn *n*, which extend from the selvedge *m*, of the woven web D, at the loom-temple C, to the several shuttles in the raised shuttle-boxes *a*, and when the yarn is so supported by the cushion J, it will not be drawn into the shed by entanglement with the yarn of the outgoing shuttle.

By the use of the thus explained improved attachment to a loom, the selvages of the web may be woven in a perfect manner, so that the trouble and expense of repairing the selvages is avoided. (*Messrs. Nolan and Wilkie, Pawtucket, R. I.*)

GARTNER'S SELF-ADJUSTABLE SHUTTLE-BOX-SUPPORTING ROD.

Fig. 1, is a front elevation of a portion of a loom provided with the improvement; Fig. 2, an enlarged detail sectional view of the self-adjustable shuttle-box-supporting rod.

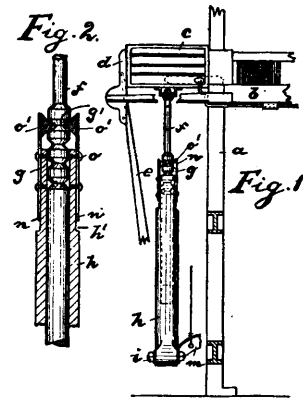
In said drawings, *a*, is the loom-frame; *b*, the lay; *c*, the shuttle-box; *d*, the extended portion of the lay; and *e*, the picker-stick.

To the bottom of the shuttle-box *c*, is secured the shuttle-box-supporting rod *f*, provided at its enlarged portion *g*, with a series of annular V-shaped grooves *g'*. Said enlarged portion *g*, of the rod *f*, is arranged and adapted to operate in the tube or hollow rod *h*, pivotally secured at *i*, to arm *m*.

In the upper portion of the tube are arranged a series of vertical grooves *h'*, in each of which is adjustably secured a flat spring *n*, provided with a vertical slot, through which the tightening screws *o*, pass.

The upwardly projecting portion of the spring *n*, is provided with a V-shaped block *o'*, adapted to rest, when in normal position, in one of the grooves *g'*.

In operation, should a shuttle become jammed between the box and the raceway, or should the shuttle-box be stopped in its downward movement by any other cause, the block *o'*, will be forced outward



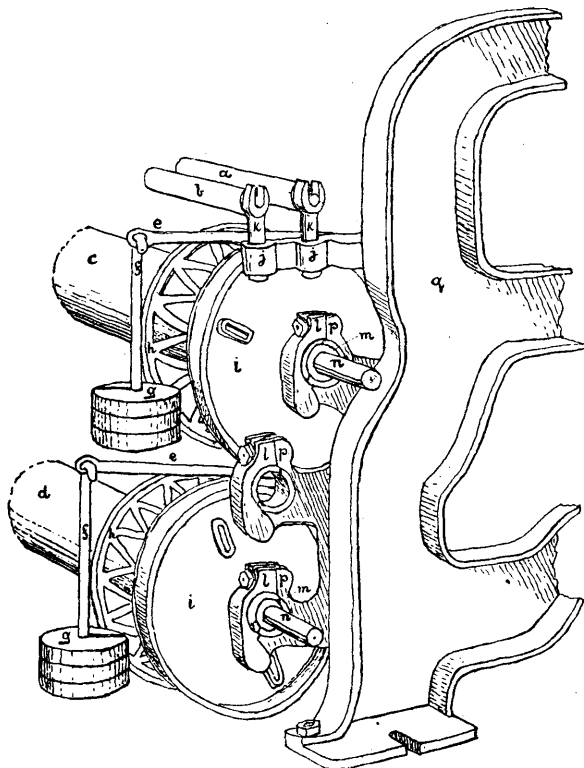
out of engagement with the V-shaped groove *g'*, and the rod *f*, with its enlarged portion *g*, will slide down in the tube *h*, thereby avoiding breakage without interfering with the movement of the shuttle-supporting-rod operating mechanism.

The chief object of this device is to protect the shelves from breaking when anything catches or breaks on the picking motion. Frequently, on account of the breaking of the picking-stick, picking-straps, picker, or pull-back spring, the picker is left to the front end of the box when said box is about to change. There is a stiff spring on the box-rod for the purpose to give way by such accidents, but it is necessary to have this spring very stiff on the rod, so as to hold the boxes steady in position, and for this reason a shelf or lever will frequently break before the spring will act. To overcome this trouble is the object of the present device. The V-shaped blocks will at once be pulled from the grooves and thus allow the box to remain still, in turn avoiding breakage of any kind to any part of box or levers. (*Alfred Gartner, Newark, assignor to Robert Atherton, Paterson, N. J.*)

LET-OFF MECHANISMS.

THE KNOWLES FRICTION LET-OFF MOTION.

The same is shown in the accompanying illustration and best explained by means of quoting letters of references of which *a*, indicates the back warp roll for the top beam *c*. *b*, is the back warp roll for lower beam *d*. *k*, are the pockets setting in back roll stands *j*, for the back warp rolls *a* and *b*. It is always best to set back warp roll *b*, a little higher than back warp roll *a*. *e*, indicates the friction levers and *f*, the racks for



holding weights *g*. *h*, indicates the inside beam-heads or flange-heads. *i*, the outside beam-heads having hub bearings *m*. *n*, the beam shaft. *l*, are the lock levers to hold beams in beam stands *p*. *q*, is the loom side.

Beam heads *i*, are the Knowles Patent Ratchet Beam heads explained in the article on the Knowles Warp Beam. (*Crompton and Knowles Loom Works*.)

THE KNOWLES WARP SLACKENER.

It frequently happens in droß-box looms, that by reason of the breaking or catching of the picker, shuttles are placed in the wrong box, and when, for any reason, one shuttle fails to leave its box at the proper time, a shuttle coming from the other side of the loom, not being able to enter the right box, will remain in the shed or warp, so that when the lay beats up, the shuttle will cause a breakage of the warp threads, before the loom stops.

The object of the warp-slackening mechanism is to

prevent the breaking of the warp threads, above referred to, and to provide an auxiliary mechanism, combined with the ordinary mechanism of the loom, to cause the warp to be automatically slackened, by the tension on the warp, as the lay beats up, in case one or more shuttles stop in their passage across the lay. Thus the present Warp Slackener is also a "smash protector."

Referring to the accompanying drawings: Fig. 1 is a sectional elevation of the auxiliary attachment showing the parts thereof in their normal or working position, and also showing a portion of the lay sword, and lay and connections thereto. Fig. 2 corresponds to Fig. 1, but shows the auxiliary attachment after the same has been operated to slacken the warp. The lay sword and lay, shown in Fig. 1, are not shown in this figure. Fig. 3 is, on a reduced scale, a detail of one end of the back roll and rod, looking in the direction of arrow A, Fig. 1, showing the curved or bent construction of the end thereof.

The method of operation of the mechanism will be best explained by means of numbers of references in the accompanying illustrations, and of which 1 is the bottom wooden girt, 2 is a stand bolted thereto by a bolt 3, and 4 is the upper portion of one of the back roll stands, at one end of the loom, which stand is secured at its lower end to the loom side, not shown. 5, is the back roll, supported at its end in the bearing 4, on the stand 4, and adapted to rock therein. Said back roll 5, has, in this instance, its end curved or bent downwardly, as shown in detail, Fig. 3, which is an ordinary construction of the back roll. 6, is an arm extending up from said roll 5, and supporting at its upper end one end of the rod 7, over which the warp 8, from the warp beam 9, passes to the harness.

In the stand 2, attached to the bottom girt 1, is loosely mounted, to have a vertical motion therein, the upright spring actuated rod 10. Said rod 10, is supported in the stand 2, and has a yielding motion therein, by means of the spiral spring 11, bearing at its lower end upon the upper surface of said stand 2, and at its upper end against a collar 12, adjustably secured to the rod 10, by a set screw 13. A collar 14, is adjustably secured to the lower end of the rod 10, by a set screw 15, and extends below the stand 2, to prevent the rod 10, from being raised out of said stand. The upper end 10', of the spring actuated rod 10, is pivotally connected by a pin 16, with one end of the arm 17. The other end of said arm 17, is provided with a hub, loosely mounted on the back roll 5. On the lower end of the downward projection 17'', of the arm 17, is pivoted, on a pin 18, a rocking locking arm 19, the upper end 19', of which is pivotally connected, through a link 20, with the connector 21, leading to and connecting with the lay 36, see Fig. 1, carrying the lay beam 37, supported on the lay sword 38. The connector 39, connects the lay with the crank-shaft, not shown, through which motion is communicated to the lay. The rocking locking arm 19, has a forward extension 19'', provided with a side flange, or horizontal lip 22, extending out from one side thereof. Said locking arm 19, has also the rearward projection 19''', provided with a stud 23, adapted to engage the upper end of the swinging arm 24, pivoted at its lower end on the pin 18, and provided at its upper end with a side flange, or horizontal lip 24', extending out in the same direction as the lip 22, on the locking arm 19.

Combined with the back rod 7, is a clamping device for holding said rod in its normal position, as shown in Fig. 1, except when a sufficient tension is put upon the warp, by a shuttle stopping in its passage across the lay, to cause said clamping device to operate to release the back rod, and allow the same to rock inwardly, to slacken the warp, as shown in Fig. 2.

Said clamping device consists of an arm 25, provided at one end with a hub 25', mounted on the back roll 5, and secured thereto by a set screw 26. The other end 25'', of the arm 25, extends up at substantially right angles to the straight portion thereof, and is provided with a recessed portion 25''', adapted to engage one side of a stud 27, extending out from the arm 17,

The extreme end of the portion 25'' of the arm 25, has an opening therein, in which is secured a block 28, by a set screw 29. The block 28, extends out from one

outer end of said rod 32. On the arm 17, is a pin 35', which limits the motion of the swinging arm 24, away from the pin 23.

The clamping device above referred to is spring actuated, and is not a positive device for holding the back rod 7, in its upright position, and in order to have the device act quickly at the proper time, a comparatively light tension is put upon the clamping arm 30, so that the ordinary tension of the warp 8, passing over the back rod 7, might rock or move inward the said back rod, and cause the arm 30, to be disengaged from the stud 27, to release the clamping mechanism.

In order to prevent the accidental releasing of the clamping mechanism, and the slackening of the warp, except at the proper time, there is provided an auxiliary attachment, which operates to positively lock and prevent the releasing of the clamping mechanism, to slacken or loosen the warp, except when the lay on its

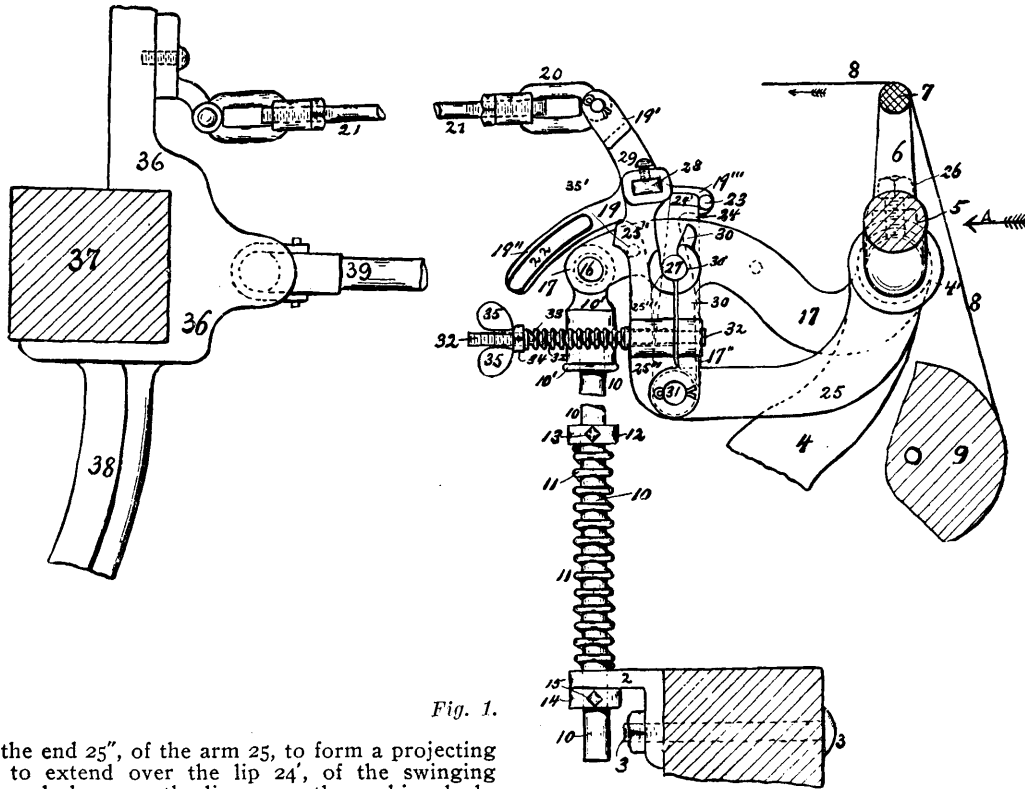


Fig. 1.

side of the end 25'', of the arm 25, to form a projecting surface to extend over the lip 24', of the swinging arm 24, and also over the lip 22, on the rocking locking arm 19, as said arms are rocked on their pivot point.

Combined with the end 25'', of the arm 25, to form the movable jaw for engaging, in connection with said end 25'', the stud 27, is an arm 30, pivoted at its lower end on a stud 31, on the arm 25, and provided at its upper end with a recessed portion 30', adapted to engage in connection with the recessed portion 25''', of the end 25'', the stud 27, on the arm 17. The arm 30, forming the movable clamping jaw, is yieldingly connected with the end 25'', of the arm 25, forming the stationary clamping jaw, by a spring actuated rod 32, extending loosely through hub portions on the end 25'', and arm 30, and headed at its inner end to prevent it from being drawn out from said hubs.

The rod 32, is encircled by a spiral spring 33, one end of which bears against the edge of the end 25'', of the arm 25, and the other end against an adjustable nut 34, held by the thumb nut 35, screwed on to the

forward movement reaches a point where a shuttle remaining in the warp would break out the warp, unless the warp was immediately slackened or loosened, and at this point the locking mechanism for the back rod clamping device is so constructed, that the clamping device is free to release the back rod and slacken the warp.

The length of the lip 22, on the rocking arm 19, in connection with the lip 24', on the swinging arm 24, is a little less than the distance covered by the movement of the lay; and on the forward throw of the lay the lip 22, extends under the block 28, to prevent the disengagement of the clamping device, as the lay beats up, and in case there is no shuttle remaining in the warp, the continued forward motion of the lay moves forward the swinging arm 24, by the engagement of the stud 23, therewith, to bring the lip 24', under the block 28, to lock the clamping device during the

remainder of the forward motion of the lay. After the lip 22, has passed from under the lock 28, and before the lip 24, passes thereunder, in case a shuttle

shuttle from any cause stops in the shed the whip-roll will yield to the strain, and thereby prevent the smashes which happen when the warp is sprung while the shuttle is between the warp. Thus the present whip-roll is also a "smash protector" on account of its action in case the shuttle is caught in the shed and the regular protecting rod on the loom refuses to work.

A spring whip-roll is also of advantage for the weaving of various kinds of textile fabrics, taking off some of the strain on the warp when the reed and lay beat up the filling.

Of the accompanying illustrations diagram A, represents a view of portions of a loom and the improved whip-roll in position, the direction of the movement of the warp being indicated by the arrow *a*. Diagram B, represents a plan view of the whip-roll and its lever, showing one means of yieldingly connecting the same. Diagram C, represents an enlarged view of parts of the whip-roll and its lever, partly in section. Diagrams D and E, represent details of construction, showing the clutch-plates of the roll and the lever.

In the drawings, 6 indicates one of the side frames of a loom, and 7, is a bracket-arm, in which one end of the whip-roll is journaled, it being understood that the opposite end of the whip-roll or its shaft is similarly journaled. The whip-roll in the present instance consists of the shafts 8 and 9, in axial alignment and the main portion 10, bent out of said alignment and furnished intermediate the bent portions with the friction leverage-plate 11,

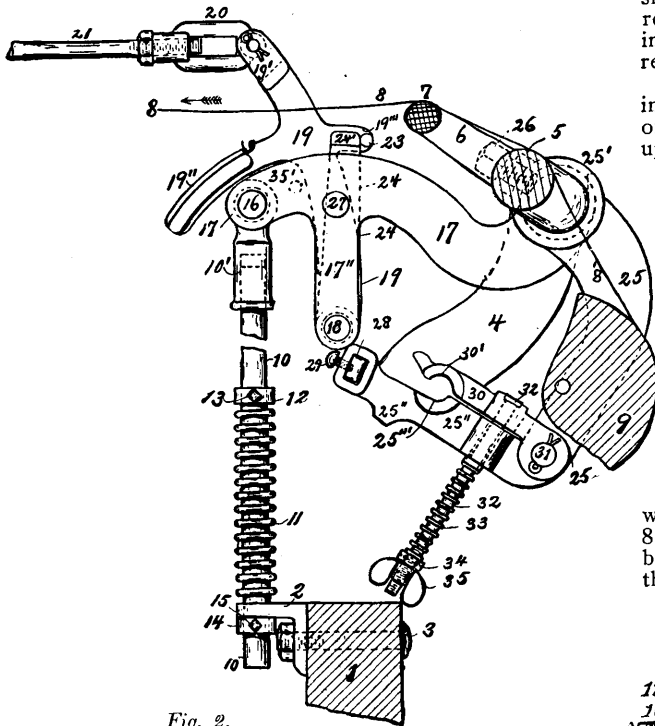


Fig. 2.

remains in the warp, the lay is at that point in its forward movement where the tension on the warp will be sufficient to disengage the clamping device, and at this time the block 28, is free to drop, to release the back rod and loosen or slacken the warp. On the return movement of the lay, the lip 24, bearing against the inner end of the lip 22, is moved backward to pass under the block 28, until the swinging arm 24, has passed by its centre, when it will drop back to engage the pin 23, preparatory to again being moved forward on the forward beat of the lay, to operate, in connection with the lip 22, to lock the clamping device, as before described. (*Crompton and Knowles Loom Works.*)

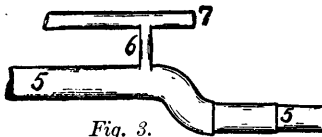


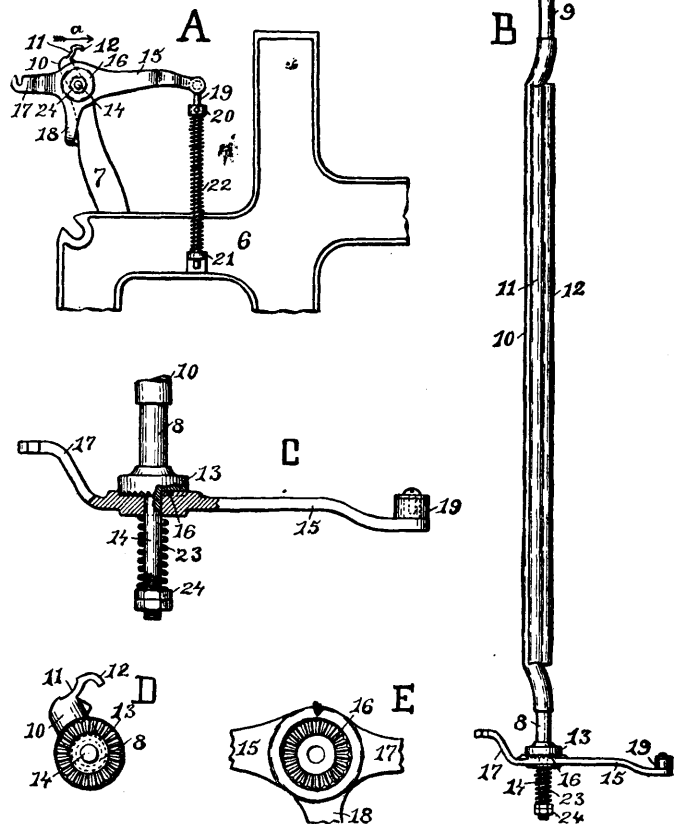
Fig. 3.

THE MASON WHIP-ROLL.

Whip-rolls or bars are usually supported at the rear of the loom and are held in the normal position by a spring acting on a lever, which is secured to the shaft of the whip-roll.

The surface of the whip-roll, or the bar on which the warp is supported, is offset on one side of the axis of the shaft or the bearings of the whip-roll, so that the whip-roll forms a long crank. The whip-roll is held in the normal position by a lever, the longer arm of which bears on a spring, which tends to raise the whip-roll and exerts a yielding tension strain on the warp and gives way to the strain when the warp is sprung to form a shed.

The object of the Mason improved construction of a whip-roll is to increase the capacity of the whip-roll to yield to the strain on the warp, so that when a



having the rounded lip 12, over which the warp passes from the warp-beam to the harnesses.

On the shaft 8, of the whip-roll is a clutch-plate 13,

extending from the centre of which is a short shaft 14, having a screw-threaded end. On this shaft 14, is journaled the lever 15, having a clutch-plate 16, which engages with the clutch-plate 13, on the whip-roll. Extending from the lever 15, are the counter-weight arm 17, and the stop arm 18, which prevent the undue rearward rotation of the whip-roll when relieved from the drag of the warp. The free end of the lever 15, is pivoted to a rod 19, having a collar 20, and movable at its lower portion through the guide 21, secured to the loom frame, the spring 22, mounted on this rod between the collar 20, and the guide 21, tending to exert an upward pressure on the rod and on the free end of the lever 15.

The clutch-plate 16, is held in contact with the clutch-plate 13, by the yielding pressure of the spring 23, mounted on the shaft 14, and held against the back of the clutch-plate 16, by the nuts 24, adjustable on said shaft to increase or diminish the pressure exerted by the spring 23, to hold the clutch-plates together.

Under normal conditions the warp passes over the curved edge 12, of the whip-roll plate 11, which exerts a slight tension on the warp nearly sufficient to overcome the counter-balancing effect of the offset portion 10, of the whip-roll. During the opening of the shed the frictional contact between the warp and the curved edge 12, of the whip-roll is increased by the sudden taking up of the warp in spreading to form the shed, and the spring 22, allows the free end of the lever 15, to move downward as the edge 12, of the whip-roll is drawn forward, thus relieving the tension on the warp. The filling thread is received by the open shed and in due process another shed is opened with similar action on the part of the whip-roll.

When, in place of closing the shed on a fine filling-thread and opening another shed—which takes up the warp over the whip-roll to but a small extent—a shuttle becomes caught in the shed which closes thereon, it is obvious that many times the amount of warp must be taken up by the great diameter of the shuttle or a warp smash must occur. When this is the case, the relief afforded by the yielding of the spring 22, is not sufficient to so reduce the friction of the plate of the whip-roll on the warp that it (the warp) may readily pass. To provide for accidents of this nature is the province of the yielding connection furnished by the clutch-plates 13 and 16, with the tension-spring and adjustment therefor. It will be noticed that by the use of these and by the construction of the whip-roll this roll may be rotated in the direction of the moving warps until the threads are supported below the axial centre of the whip-roll, where they are relieved from the take-up caused by the offset of the shaft and its plate 11. (*Mason Machine Works, Taunton, Mass.*)

PRATT'S LET-OFF MECHANISM.

The object of this let-off mechanism is, to give to the warp beam the capacity to yield to the extra strain on the warp threads when forming the shed, and automatically take up the slack when the shed has closed.

Fig. 1, is a side view of the rear end of the loom, showing the let-off motion and its connection with the pinion shaft, by which the warp beam is operated. Fig. 2, is an end view of part of a loom, showing the warp beam and the pinion shaft. Fig. 3, is a sectional view showing the worm gear mounted loose on the pinion shaft and connected by a coiled spring with a collar secured to the pinion shaft.

4, indicates the frame of the loom and 5, the ratchet gear which operates the let-off of the warp. This

ratchet gear is secured to the vertical shaft 6, on which the worm 7, is secured, and this worm engages with the worm gear 8, mounted loosely on the shaft. The worm gear 8, is secured to the spiral spring 10, surrounding the pinion shaft 9. The opposite end of the

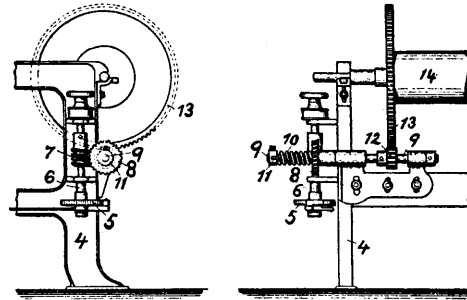


Fig. 1.

Fig. 2.

spiral spring 10, is secured to the collar 11, which is secured to the pinion shaft 9, adjustably by means of a clamp-screw, so that in place of the former rigid connection with the shaft the worm gear 8, is now connected yieldingly by the coiled spring 10, with the shaft 9. The pinion 12, on the pinion shaft 9, engages with the gear 13, secured to and turning with the warp beam 14.

All the parts are supported in their usual bearings, and the operation of the parts remains practically the same as heretofore, with the exception that any excessive strain on the warp is transmitted to the pinion shaft and the coiled spring 10, and any slack in the warp is taken up again by the reaction of the coiled spring acting on the pinion shaft, and through the pinion 12, and gear 13, on the warp beam.

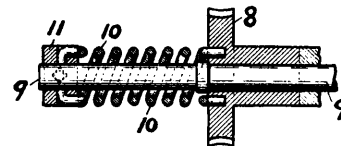


Fig. 3.

The worm gear 8, is held in the required position by suitable collars against longitudinal movement on the shaft by the torsion on the coiled spring 10.

By applying the coiled spring so as to exert the torsional spring action on the pinion shaft, a powerful strain is applied to the warp by a comparatively small spring, because the spring strain is multiplied by the small pinion 12, which engages with the large gear on the warp beam, and thus the let-off of the warp is more perfectly controlled. (*Albert K. Pratt, Assignor, one-half to Frank S. Berry, both of Northbridge, Mass.*)

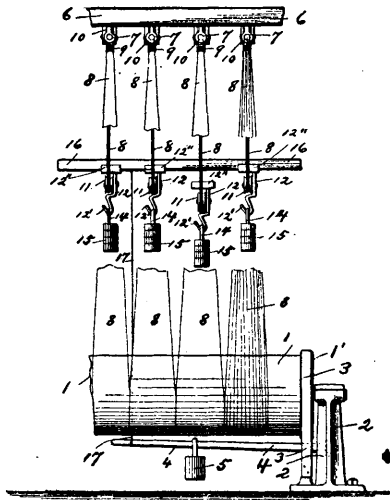
WAITE'S LET-OFF MECHANISM.

Heretofore in narrow-ware looms there has been a separate warp beam for each set of warps that are used in making one of the narrow-ware fabrics, as suspender goods, lamp wicks, etc., and a separate weighted pulley block, carrying a pulley around which the warps pass, said weighted pulley block or frame acting to apply the proper tension to the warp as it is drawn into the loom. In this construction the tension on each set of warps is independent of the tension

on any other set, and the tension is liable to vary in the operation of the loom, so that the finished fabrics will vary, and will not be of uniform tension. Some will stretch more than others.

It is very desirable in manufacturing narrow-ware goods that all the goods manufactured on one loom should be made uniformly and the same tension applied to all the sets of warps simultaneously, so that the finished product will all correspond, and one fabric will not stretch or give more than another, and will not be woven closer or more open than another, etc.

The object of the present invention is to obtain the desired result mentioned above, by using one warp beam for a number of sets of warps, as twelve, instead of an individual warp beam for each set. Ordinarily two warp beams are used in an ordinary narrow-ware



loom, and by using a supplemental attachment or device, combined with all the weighted pulley blocks or frames used for the sets of warps, on one beam, there being one weighted pulley block and pulley for each set of warps, said attachment consisting of a heavy metal bar or rod, (evener bar) which rests and is supported directly on top of the weighted pulley blocks and extends between the warps in the direction of the width of the loom, and is of a length corresponding to the length of the warp beam or the width of all the warps wound thereon.

The weight of the evener bar, which is considerable, ordinarily about fifty pounds, increases the tension on the warps over what is ordinarily given to them by the weighted pulley blocks, so that an additional tension is obtained which is found very desirable in making narrow-ware goods, as the finished goods are substantially non-stretchable.

By means of the evener bar, which rests on all the pulley blocks, as above stated, an almost uniform tension is maintained on all the warps, for in case the tension on one set of warps in weaving the goods tends to raise the weighted pulley block, the evener bar prevents it from raising, as the weight thereof is sufficient to overcome the extra tension. In case several of the pulley blocks are raised simultaneously by increased tension on several sets of warps, the tension being sufficient to raise the evener bar, there is provided a connection from said bar to the friction let-off of the warp beam, to release the friction and allow the beam to let off faster, until the evener bar returns to its normal position, resting on all the pulley blocks.

The accompanying illustration is a rear view of a portion of a warp beam and let-off attachment of a narrow-ware loom, sufficient to illustrate the improvements applied thereto. Numerals of references indicate thus:—1 is a portion of a warp beam, mounted to turn, in this instance, in stands 2 (only one stand is shown), located at the rear of a loom. The beam 1, is provided with a head 1', around which a friction band 3, passes attached at one end to the stand 2, and at its other end to a lever 4, pivoted at one end on the stand 2, and provided with an adjustable weight 5. The top castle 6, is provided with a series of eyes 7, through each one of which one set of warp threads, as 8, pass, and a series of pulleys 9, mounted in brackets 10.

Each set of warp threads, as 8, pass from the beam 1, through an eye 7, and around a pulley 11, mounted in a pulley block or frame 12, then over pulleys 9, mounted in blocks 10, to and between a set of rolls and to the harness.

Each pulley block 12, is provided with a hook 12', on which is hung a rod 14, carrying weights 15, of the desired size to produce the desired tension on the warp threads.

Combined with the pulley blocks 12, is a metal bar or rod 16, of the desired weight. Said bar 16, rests on the top of the blocks 12, and is held in position by projections 12', on each block.

The bar 16 (evener bar) extends between the sets of warp threads in the direction of the width of the loom, and bears evenly on all the pulley blocks when they are in their proper position, and increases the tension on all the warp threads, over the tension produced by the weights 15, by the weight of said bar 16. The weight of said bar is sufficient to prevent any one of the pulley blocks 12, raising said bar out of a horizontal plane, in case the tension on any one set of warp threads is sufficient to overcome the weight of the weights 15, but in case of an increased tension on all or several of the sets of warp threads the bar 16, may be raised with the weighted pulley blocks 12, and when raised to a pre-determined point will, through cord 17, attached at one end to said bar and at its other end to the free end of the lever 4, raise said lever and release the friction band 3, to allow the warp beam to let off more warp. The letting off of additional warp allows the bar 16, and weighted pulley blocks 12, to drop down to their normal position.

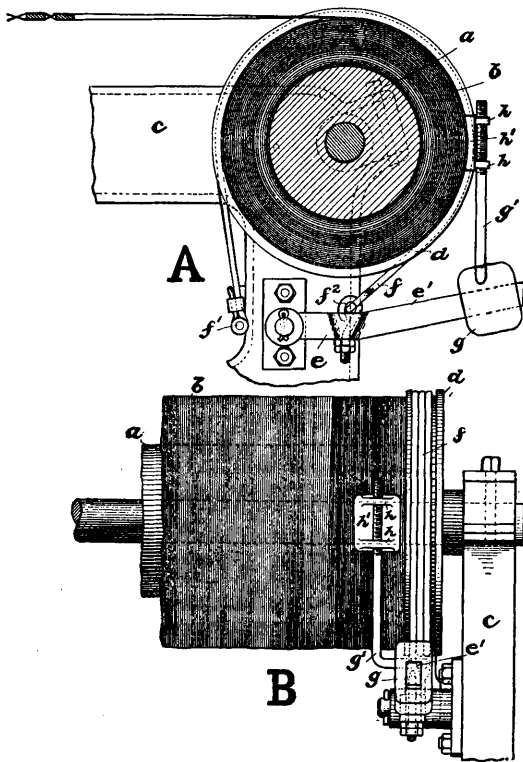
In case the tension on any one set of warp threads is lessened for any reason, the weighted pulley block 12, may temporarily drop down below the evener bar 16, but the tension will ordinarily keep each pulley block 12, in engagement with said evener bar. (*Samuel Waite, Lowell, Mass.*)

FOLSOM'S LET-OFF MECHANISM.

Of the accompanying illustrations Fig. A, shows the mechanism in side elevation with the warp beam in section and B, a front elevation of the same.

The principle of the working of the new device is thus:—The weight for friction is entirely regulated by the yarn on the beam. When the beam is filled with warp yarn, the plate as resting against the warp, moves the weight to the outer end of the weight lever. When the yarn runs off the beam the weight in turn moves automatically gradually back towards the centre, in turn slackening the friction bands running around the heads of the warp beam. The mechanism is simple in construction and will be readily understood by quoting letters of references, of which *a*, designates the beam

from which the warp b , is unwound, and which is journaled in the frame c , of the loom and carries near one end a disk or pulley d .



A lever e , is pivoted at one end to the frame of the machine under the warp beam and has a part e^1 , inclined to the vertical axial plane of the beam. A brake strap f , winds about the pulley d , a number of times and is fastened at one end to the frame of the machine, as shown at f^1 , and at the other to the lever near its inner end, as shown at f^2 . It is here to be noted that by having the friction band or brake strap pass a number of times around the pulley, sufficient friction is provided for to permit the employment of a comparatively short lever and consequent reduction in space occupied by the let-off mechanism. In fact, the lever need not project to an appreciable extent beyond the plane of the warp beam.

A weight g , embraces and is adapted to slide on the inclined part e^1 , of the lever e , and has a rigid arm g^1 , which is angular, projecting laterally to clear the pulley and thence upwardly into the horizontal plane of the warp beam. At its upper end this arm g^1 , is screw threaded to engage ears h , on a shoe h^1 , adapted to bear against the roll of warp. The bearing of this shoe against the said roll controls the position of the weight g , on the inclined arm, for the said weight constantly tends to slide down the incline, and is only restrained from so doing by the bearing of the shoe against the roll. The jarring of machine in operation is sufficient to insure the downward movement of the weight on the arm.

The operation will be apparent. As the diameter of the roll lessens the weight moves inward on the lever and the tension on the brake band is lessened. (*Nehemiah T. Folsom, Manchester, N. H., Assignor of one-half to John S. Folsom, Millis, Mass.*)

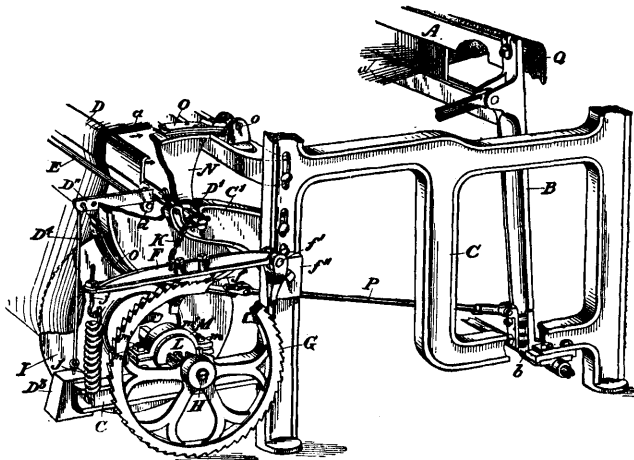
TALBOT'S LET-OFF MECHANISM.

This mechanism relates more particularly to means for effecting a positive and uniform tension on the warp threads in carpet looms without reference to the quantity of thread on the warp beam, so that a carpet of even weight may be produced as the result of this tension.

In the accompanying illustration a perspective view of that portion of a carpet loom is given, as is necessary to clearly show the mechanism.

A, represents the reed of the loom supported and carried by the lathe, the sword B, of which is pivoted at b , to the lower portion of the frame C. Connected to each side of the rear of the frame C, are brackets C' , and journaled in the brackets C' , is the spindle D' , of the whip roll D. Connected to the spindle D' , of the whip roll D, are two lugs d , in which is mounted the tension rod E, rigidly connected to the spindle D' , and located one at either end of the whip roll D, are two outwardly arms D'' . A weight D^3 , is suspended from each of the arms D'' , by means of a rod D^4 . A dog F, provided with two teeth f , is pivoted at f' , to the bracket f'' , which is rigidly connected to the frame C. Connected to the frame C, below the dog F, is one end of a spiral spring J, while the opposite end of the spring J, is connected to an adjustable hook j , extending through the outer end of the dog F. The normal tendency of the spiral J, is to draw downward the said outer end of the said dog to bring the teeth f , of the dog F, into engagement with the teeth of the ratchet wheel G. The ratchet wheel G, is rigidly mounted on the end of the spindle H, of the warp beam I. Connected to the dog F, at or about the middle thereof is one end of a chain K, while the other end of the said chain extends partially around spindle D' , of the whip roll and is securely fastened thereto.

During the operation of the machine the tension of the warp threads draws the whip roll in the direction indicated by the arrow and causes a partial revolution of the spindle D' , of the whip roll D. The partial revolution of the spindle D' , causes the chain K, to be partially wound on the said spindle so that the dog F, will be lifted to disengage the teeth f , from the teeth of the ratchet wheel G, and allow of the unwinding revolution of the ratchet wheel G, and spindle H.



Rigidly mounted on the spindle H, is a friction collar L, made of wood. Surrounding the collar L, is a dividing strap M, the sections of which are connected together by means of bolts and nuts m' , and m , respectively, the lower section of the dividing strap M,

being secured to the frame of the loom. By means of the bolts and nuts m' , and m , the diameter of the strap can be increased or diminished to respectively increase or diminish the friction on the collar L.

Rigidly mounted on the spindle D' , of the whip roll D, is a sector N, and pivoted to the frame C, is one end o , of a brake shoe O. The brake shoe O, extends around the sector N, and the opposite end of the brake shoe O, is connected to the lathe sword B, by a pitman P. The brake shoe O, holds the sector N, during one portion of the movement of the lathe sword B.

Wound on the warp beam I, are the warp threads a , which pass from the warp beam I, under the tension rod E, over the whip roll D, and the reeds A, to the cloth beam Q.

The advantages arising from the use of the mechanism are:—

The ratchet wheel G, it will be remembered, is rigidly mounted on the spindle H, of the warp beam I, and the unwinding revolution of the warp beam I, and spindle H, is prevented until the teeth of the dog F, are disengaged from the teeth of the ratchet wheel G. When the whip roll D, has been moved in the direction indicated by the arrow, the spindle D' , of the whip roll D, is partially turned to partially wind the chain K, on the said spindle D' , and lift dog F, sufficiently to disengage its teeth f , from the teeth of the ratchet wheel G. When the teeth f , of the dog F, have been disengaged from the teeth of the ratchet wheel G, then the ratchet wheel G, the spindle H, and the warp beam I, are free to turn. The tension of the warp threads a , as the carpet is wound on the cloth beam Q, is sufficient to move the whip roll D, into a forwardly inclined position. This position of the whip roll D, may, if desired, be reached every third stroke of the lathe, and it is when the whip roll D, is in its forwardly inclined position that the dog F, is lifted to disengage the teeth f , from the teeth of the ratchet wheel G. The whip roll D, during its return from its forwardly inclined position to its upright position draws on the warp threads a , and causes the unwinding revolution of the warp beam I, the spindle H, and the ratchet wheel G.

When the whip roll D, has returned to upright position the dog F, is drawn back into its normal position and its teeth f , engage with the teeth of the ratchet wheel G. The normal tendency of the spring J, is to draw downward the outer end of the dog F, so that a quick return of the teeth f , into engagement with the teeth of the ratchet wheel may be effected.

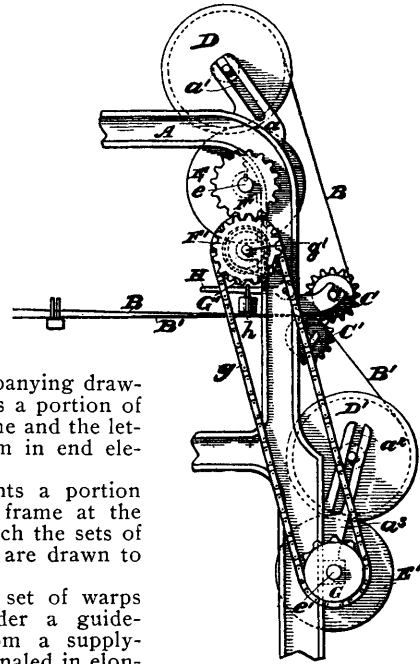
To regulate the tension of the spring J, on the dog F, the adjustable hook j , is connected to the dog F, and by lengthening or shortening the hook j , the tension of the spring J, can be respectively diminished or increased as required. It is by means of the weight D^s , that the quick return of the whip roll D, from its forwardly inclined position to upright position shown in the drawings is effected and the weight D^s , counteracts to a large extent the tension of the warp threads a , on the whip roll D, and also holds the whip roll D, at all times firmly against the warp threads so that the said warp threads will be kept perfectly taut from the top of the whip roll D, to the reeds A. To prevent the possibility of more than the required quantity of warp thread unwinding from the warp beam I, during the disengagement of the teeth f , on the dog F, from the teeth of the ratchet wheel G, there is provided a friction collar L, and friction strap M. The friction collar L, and friction strap M, prevent the free revolution of the spindle H, and yet allow the spindle H, to be turned to unwind sufficient warp threads to allow the whip roll D, to return to its normal position.

In order to further facilitate the making of a carpet of uniform weight throughout, the sector N, and brake shoe O, which are operated immediately upon the

forward movement of the lathe sword and reed so that the whip roll is held stationary during the period that the filling is being forced home into the main body of the web. (*William Talbot, Toronto, Canada.*)

PALMER'S LET-OFF MECHANISM.

The same relates more in particular to an improvement in let-off mechanism for looms, where, from any cause, such, for example, as forming suspension-loops of the warp threads in weaving hammocks, it is found desirable to advance one of the sets of warp threads faster than the other set for the purpose of either leaving an unwoven series of loops across the fabric or fulling one of the sets of warp threads.



The accompanying drawing represents a portion of the loom frame and the let-off mechanism in end elevation.

A, represents a portion of the loom frame at the end from which the sets of warp threads are drawn to be woven.

The upper set of warps B, leads under a guide-roller C, from a supply-roller D, journaled in elongated slots a' , formed in standards fixed to the frame A. The supply-roller D, rests upon supporting-drums E, fixed on a shaft e , journaled in the frame A, and having secured on one of its ends a slip gear-wheel F, so secured to the shaft e , that it will rotate together with the shaft, but be permitted to slide longitudinally of the shaft.

The lower set of warp B' , extends over a guide-roller C' , in proximity to the guide-roller C, from the supply-roller D' , mounted in elongated slots a'' , in standards a'' , fixed to the frame A. The roller C, may be geared together, as shown, when the loom is employed for ordinary plain weaving; but when employed for weaving hammocks in which the warp threads are utilized for suspension-loops, the rollers are disengaged by removing one of the intermeshing gear-wheels. The supply-roller D' , rests upon supporting-drums E' , fixed on the shaft e' , journaled in the frame and provided at one end with a sprocket-wheel G. The sprocket-wheel G, is connected by a sprocket-chain g , with a sprocket-wheel G' , fixed on a spindle g' , in suitable bearings in the frame. The spindle g' , has fixed thereon a spur-wheel F', corresponding in the number of teeth to the spur-wheel F. Spindle g' , has further fixed thereon a brake-wheel (not shown in the illustration) which receives around it a band, one end of which is secured to the frame A, and the

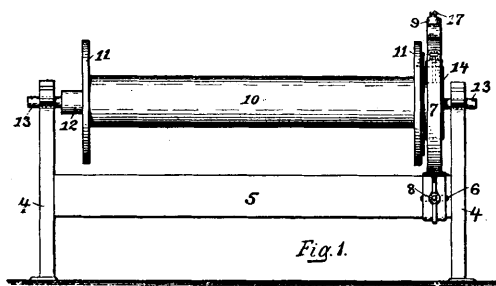
opposite end to the lever H, carrying a weight *h*, adjustable along the lever H, for the purpose of increasing or decreasing the frictional contact of the band with the brake-wheel to increase or decrease the tension under which the warp threads are to be fed.

In operation, whenever it becomes desirable to momentarily advance one of the sets of warp threads, in the present instance the upper set B, the wheel F, is slipped out of engagement with the corresponding gear-wheel F', and the warp threads composing the set B, may then be pulled forward independently of the lower set of warp threads B', the particular means for pulling the threads forward being a matter to be determined for the purposes in hand. The inventor employs a rod which he inserts momentarily under a set of warp and moves it in a direction to pull the threads of the upper set quickly along a distance sufficient to make the desired length of unwoven loops. As soon as this has been done, the gear-wheel F, may be slipped back again into engagement with the corresponding gear-wheel F', and the weaving will continue again as before.

In cases where it is desired to feed one set of warp continuously faster than the other to produce a fulling effect, the supporting-drum or drums, engaged with the supply-roll of the set to be accelerated, may be made larger than those of the other set, the supporting-drums on one or the other of the shafts *e*, or *e'*, being for this purpose conveniently made interchangeable. Instead of changing the size of the drums the drum-driving gear can be made interchangeable to drive one set of supporting-drums faster than the other. (Isaac E. Palmer, Middletown, Conn.)

PIERCE'S AND McALLEN'S WARP-BEAM BREAK.

In a loom, the warp-beam carrying the warp for the fabric to be woven, is rotated partially from time to time and usually at each pick to let off the warp as the woven fabric is taken up. The warp-beams are usually provided with some kind of friction-brake, which may be adjusted to regulate the frictional resistance. When a new warp-beam is inserted into these looms it requires regulating of the



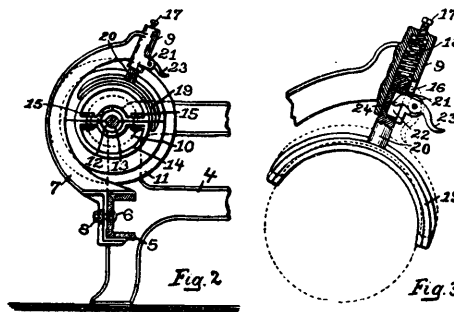
tension so as to hold the warp taut during the forming of the shed and the beating up of the filling.

The object of this brake is to so construct the same, that warp-beams may be exchanged without readjusting the tension on the brake and to secure a reliable frictional resistance on the warp-beam and uniform tension on the warp.

Fig. 1, is a view of so much of the rear end of a loom as is required to illustrate the brake. Fig. 2, is a sectional view of the rear end of a loom, showing the friction-brake. Fig. 3, is a side view of the friction-brake, shown partly in section.

4, indicates the side frames of a loom; 5, the rear strut or beam, extending horizontally and connecting the rear ends of the side frames. In this horizontal beam 5, the slot 6 is formed. The bracket

7 has its lower end formed into a socket inclosing three sides of the beam and is secured to the beam by the bolt 8, extending through the slot 6, so that the bracket can be adjusted laterally.



The bracket 7 is curved, as shown in Fig. 2, and terminates at its upper end in the cylinder 9, the axial line of which is radial from the centre of the warp-beam 10, which is provided with the end flanges 11 and the bosses 12 on opposite ends thereof. The warp-beam is supported on the shaft 13, resting in bearings formed in the side frames.

To one end of the warp-beam the brake-wheel 14 is secured. In the drawings the brake-wheel is shown secured to one of the end bosses 12 of the warp-beam, as this method secures exact concentricity of the brake-wheel with the warp-beam. In Fig. 2, the brake-wheel is shown as made in two halves, secured together by the bolts 15, so as to firmly secure the brake-wheel to the warp-beam.

The lower end of the cylinder 9, has a slot 16. The upper end of the cylinder has the adjusting-screw 17, by which the tension of the coiled spring 18, inclosed in the upper end of the cylinder 9, may be adjusted. The brake 19, has its bearing-surface formed to closely fit the brake-wheel 14 and is provided with the cylindrical post 20, which fits the bore of the cylinder 9 with a sliding fit. The post 20, is provided near its upper end with the projection 21, which extends through the slot 16 of the cylinder 9, and has the cavity 22, formed below the projection 21, into which the end of the lever 23 extends. The lever 23, is pivotally supported between two lugs projecting one on each side of the slot 16. By pressing on the lever 23, the brake 19 and brake-post 20, are raised off from the brake-wheel 14, into the position shown in broken lines in Fig. 3.

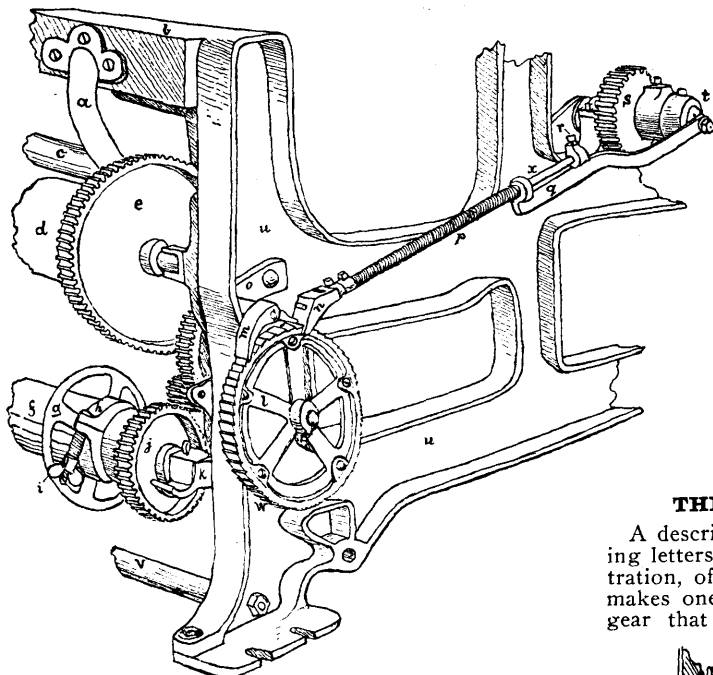
When the brake-wheel is secured to the warp-beam and they are in the proper position in the loom, the pressure of the brake on the surface of the brake-wheel is regulated by the screw 17, until the desired uniform tension on the warp is secured. When, now, the warp on the beam is exhausted, a full beam is either provided with the brake-wheel of the exact diameter as the brake-wheel on the warp-beam in the loom, or the brake-wheel on the empty warp-beam is removed and secured to the full warp-beam, and before making the exchange the lever 23 is depressed so as to raise the brake 19, off from the brake-wheel. The brake is supported in this position by the cam end of the lever 23 against the pressure of the coiled spring 18.

After the full warp-beam has been placed in the loom, the raising of the outer end of the lever 23 permits the coiled spring 18 to press the brake on the brake-wheel with exactly the same pressure and the same frictional resistance on the warp-beam and warp as existed under the previously-adjusted conditions, and the readjustment, which takes up time, is not required. (O. S. Pierce and J. McAllen, Central Falls, R. I.)

TAKE-UP MECHANISMS.

THE KNOWLES RATCHET-RING-TAKE-UP.

The same is shown in the accompanying illustration. Letters of references indicate thus:—*a*, the bracket fastened to the breast beam *b*, with screws, for holding the iron guide cloth roll *c*. *d*, is the sand roll;



sand roll gear; *f*, the bottom roll that takes the cloth and winds it in a roll. *g*, the hand wheel; *h*, the friction band; *i*, the thumb-screw for tightening friction band; *j*, the ratchet gear that is worked by a pitman from the bottom of lay sword. *k*, is a box for holding the bottom cloth roller; *l*, a spider that holds the ratchet rims *w*; *m*, a catch that holds the ratchet *w* from flying backwards; *n*, the dog fastened to the end of pitman *x*, that engages with the teeth of the ratchet rings *w*. *o*, is a casting bolted to the loom frame *u*, and which has a stud riveted fast to hold the top catch *m*. *p*, indicates the spring that goes on the pitman rod *x*, to be used only for conditional motion. *q*, is a casting that holds the pitman rod *x* at one end, and at the other end it is fastened loosely by a bolt to a collar *t*, that is fastened to the crank shaft (not shown).

At each revolution of the crank shaft which is once at each pick the pitman rod *x* is moved forward and back. The collar *t*, has a slot cut from the centre to the outer end of the collar, and the further the bolt that fastens the casting *q*, to the collar, is moved from the centre, the more sweep the pitman rod *x*, will have, making the dog *n*, take up as many teeth as required on the ratchet ring *w*.

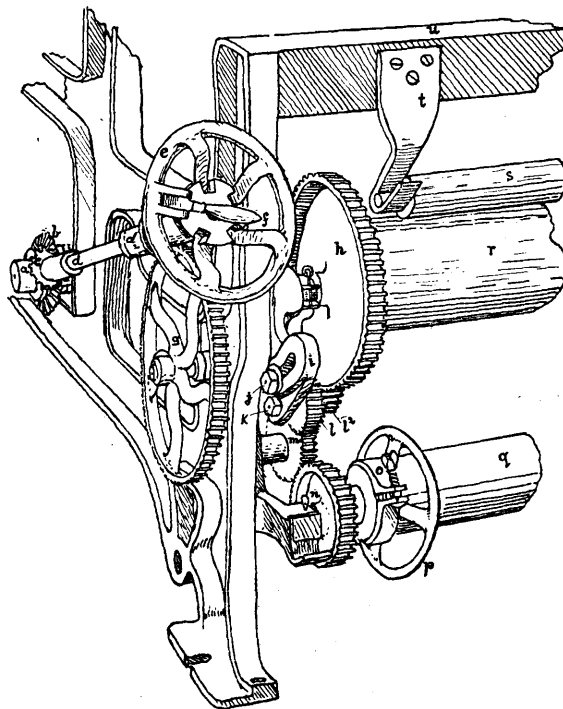
s, is the gear that drives the head motion; *u*, is the loom frame; *v*, a rod fastened near the foot of the loom frame extending the width of the whole loom and fastened at the same place on frame on the opposite side of loom so as to make the loom frame more rigid. *r*, is a set screw that fastens the pitman rod *x*, to the casting *q*, and is only used when using a positive motion.

When using a conditional motion the set screw *r*, is left loose, and the pitman rod *x*, is then forced through the hole in the casting *q*, by the tightness of the cloth pulling against the top of the cloth roller *d*, which depresses the spring *p*. As the cloth then slackens a little, the spring *p*, will force the pitman rod *x*, back again, moving the dog *n* and the ratchet *w*, forward. The proper weight must then be kept on the warp that will put in the amount of picks required per inch.

If using a positive motion the set screw *r*, is tightened and the dog *w*, will take up 1, 2, 3 or 4 teeth each pick as may be required. To change the number of picks on a positive motion, the ring ratchet *w*, is changed by loosening the screws that fastens the ring ratchet *w*, to the spider *l*, and another ring ratchet wheel with more or less teeth is put on. If the dog *n*, takes up one tooth at a time it will put in one inch of cloth as many picks as there are teeth in the ring ratchet; if the dog *n*, takes up two teeth, half as many picks will be put in, and so on. (Crompton and Knowles Loom Works.)

THE KNOWLES WORM TAKE-UP.

A description of this take-up is best given by quoting letters of references from the accompanying illustration, of which *a*, indicates the bottom shaft which makes one revolution every two picks. *b*, is a bevel gear that works on bottom shaft to drive Worm



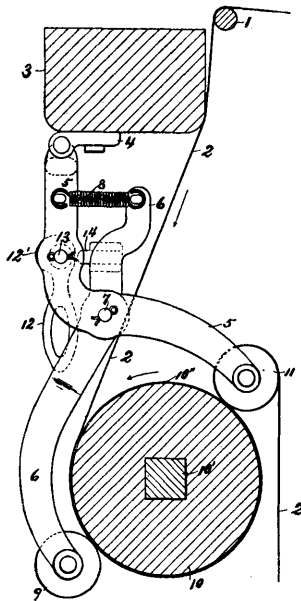
Take-Up. *c*, is another bevel gear one-half the size of gear *b*, making it a two to one drive. *d*, is the

shaft that connects the take-up with the bottom shaft *a*. *e*, is a hand wheel with which to manipulate the take-up. *g*, is a spur gear that connects with *d*², which is a small worm gear. *f*, is a handle which locks hand wheel *e* to worm gear *d*². *h*, is a cloth roll gear, geared into *v*.

l is a change gear. Multiplying number of picks by 5 and dividing by 12, will tell you the number of teeth that are required in gear *l*, to produce number of picks required. Gear *m*, is an intermediate gear to drive bottom cloth roll by friction. *o*, is the friction band; *p*, the hand wheel; *q*, the bottom cloth roll; *r*, is the top cloth roll; *s*, the guide roll; *t*, one of the stands for guide roll, and *u*, the breast beam. *Crompton and Knowles Loom Works.*)

TAKE-UP ATTACHMENT FOR THE KNOWLES NARROW WARE LOOM.

The gist of the improvement consists in providing a take-up attachment which will take up the goods as they are woven, and which is provided with a release device to release the woven fabric or cause it to become slack in case the operator wishes to pick out, etc.



The accompanying illustration is a side view of this take-up attachment, showing the breast-beam and friction-roll in section and the clamp-rolls closed or in the position they occupy when the take-up is in operation.

Numerals of references indicate thus:—1, is the glass rod over which the woven narrow-ware fabric 2 is drawn. 3, is the breast-beam, to the under side of which the stands 4, carrying the take-up attachment, are bolted or secured.

The take-up attachment consists of the pair of hangers 5, and 6. One of the hangers, as 5, is pivoted at its upper end in the stands 4. The other hanger, as 6, is pivotally supported by a pin 7, on the hanger 5, and the upper ends of said hanger 6, extend above its pivotal support and are connected by spiral springs 8, with the upper part of the hanger 5, to draw said ends toward said hanger. The lower end of the hanger 6, carries a roll 9, which is adapted to bear against the fabric 2, on the under side of the take-up or friction-roll 10, as said fabric passes under said

friction-roll and over a roll 11, carried at the lower end of the hanger 5. Said roll 11, is adapted to bear on the fabric to hold it on the take-up or friction-roll 10, in connection with the roll 9.

The friction-roll 10, fast on a central square shaft 10', is driven by gearing, and is provided with a sand-paper or other covering 10'', to make a frictional contact between said roll and the woven fabric passing around the same. The springs 8, act to move the two clamp-rolls 9, and 11, toward each other to hold the woven fabric on the friction-roll.

In order to move apart the rolls 9, and 11, to release or slacken the fabric, there is combined with one of the hangers, as 5, a cam-lever 12, which is pivoted on a pin 13, on said hanger. The cam portion 12', of said cam-lever 12, as said lever is raised, is adapted to engage the projecting end of a (non-metallic) stud or pin 14, secured in the hanger 6, above its pivotal support.

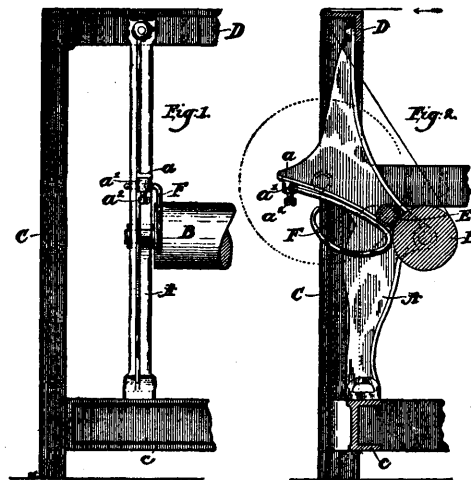
It will thus be seen that when it is desired to release or slacken the woven fabric to pick out, or for any other purpose, the operator simply raises the cam-lever 12, which operates to move apart the lower ends of the hangers 5, and 6, carrying the rolls 9, and 11.

It will be seen that the revolution of the friction-roll 10, in the direction indicated by the arrow, when the clamp-rolls 9, and 11, are in the position shown in illustration, will cause the fabric 2, to be positively taken up, and if at any time it is desired to stop the take-up of the fabric or to slacken the same, it is only necessary to move the cam-arm 12, to release the fabric from the friction-roll.

When it is desired to bring the take-up into operation again, the free end of the fabric is drawn over the upper roll 11, to tighten the fabric around the friction-roll 10, and the cam-lever 12, is moved down into the position shown in illustration to allow the springs 8, to act to bring the rolls 9, and 11, toward each other to bear on the fabric. *(Crompton and Knowles Loom Works.)*

THE MASON ADJUSTABLE GUIDE FOR CLOTH-ROLL STANDS.

The same has for its object the improvement of that part of a loom which is used for winding the cloth into a roll after it is woven, so that the selvage may be wound evenly, and so that the cloth may not be



soiled or frayed by coming in contact with any of the adjacent parts of the loom.

As usually constructed, there is no provision on the loom for guiding the edges of the cloth as it is wound upon the cloth-roll after being woven, and it therefore frequently happens that one edge or selvage as it progresses in its winding gradually works sidewise until it comes in contact with the stand or bearing which supports the cloth-roll. This stand or bearing having been lubricated in common with the other bearings, it follows that the edge of the cloth contacting therewith is stained by the lubricant, and is also sometimes frayed by the stand or bearing.

The new device is best explained by means of the accompanying drawings, of which Fig. 1, is a fragmentary elevation showing the guide applied to one end of the take-up roll. Fig. 2, is a vertical cross-section of Fig. 1.

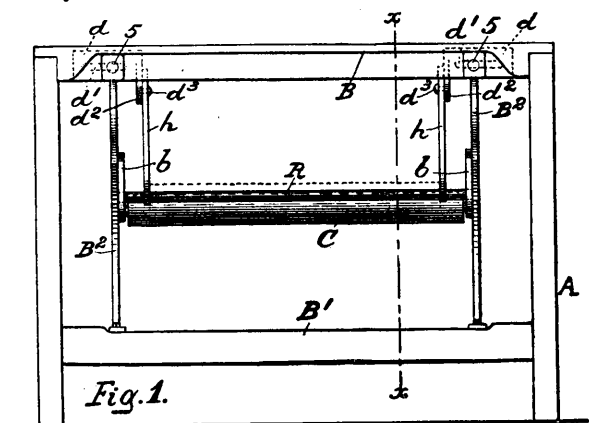
Letters of reference indicate thus:—A, designates the stand of an ordinary loom for supporting one side of the take-up roll B, said stand resting at its base on a cross-beam *c*, of the frame C, and suitably secured at its opposite end to the breast beam D. The take-up roll B, is similarly supported at its opposite end. (Not shown.) Adjacent to the take-up roll is the cloth-roll E, loosely mounted above the take-up roll on a suitably inclined track *a*, along which it rolls as it increases in size by reason of the cloth wound thereon, as shown by dotted lines.

F, designates the cloth-guide, consisting of a stiff wire bent in suitable shape so as to be brought adjacent the edge or selvage of the web of cloth before the same is wound on the cloth-roll E. This guide is shown in the illustrations as adjustably mounted in a hub *a'*, perforated to receive the same and securely clamped therein in desired adjustment by the set-screw *a''*. As the cloth comes from the loom in the direction of the arrow, Fig. 2, it passes over the breast-beam and around the sand roll or take-up roll B, and is guided in proper alignment to the cloth-roll E, by having its edges brought against the side of the adjacent bent portion of the guide F. (*Mason Machine Works.*)

SULLIVAN'S CLOTH-GUIDE.

The object of this device is to guide the cloth evenly and without injury as it is wound up on the cloth-roller in a loom, since unless carefully watched, the cloth will not be wound true or its selvage edges will be folded over or creased during the winding.

By means of the new device we are enabled to weave



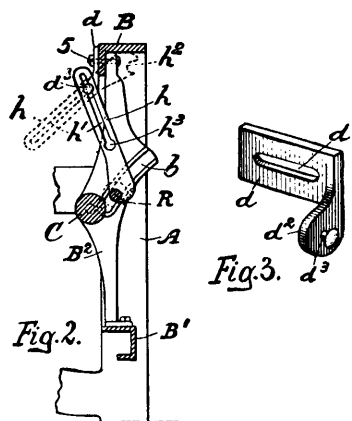
cloth the full width of the loom, if desired, or any narrow width, by a very simple adjustment of the guide mechanism, which can be applied at once to looms now in common use without altering them at all.

When it is desired to remove the cloth-roller, the guides are simply thrown into inoperative position out of the way of the attendant.

Fig. 1, is a front elevation of a sufficient portion of a loom to be understood with the invention applied thereto. Fig. 2 is a longitudinal section thereof on the line *x-x*, Fig. 1, looking to the right; and Fig. 3 is an enlarged perspective view of one of the adjustable guide-supports.

A, indicates the loom-frame; B, the breast-beam; B', the cross-girth; B'', the standards, secured to the breast-beam and girth, providing bearings for the sand roll C, and the open guide ways *b*, to form bearings for the journals of the cloth-roller R.

On bolts 5, securing the standards B'', to the breast-beam, are mounted guide-supports, shown as brackets *d*, longitudinally slotted at *d'*, to receive the bolts and provided with downturned ears *d''*, at right angles to the body portion of each bracket.



Each ear has integral therewith on its inner side, when in place, a headed stud *d''*, adapted to enter a longitudinal slot *h'*, in the cloth-guide *h*.

The cloth-guides *h*, two in number, are made as arms with enlarged lower ends, in which a substantially semicircular recess *h''*, is made (see dotted lines Fig. 2) to embrace as much as possible of the cloth-roller R, the size of said recess corresponding to the diameter of the latter.

The longitudinal slot *h'*, in the arm extends from near its upper end and terminates at its lower end in an enlargement *h''*, large enough to admit the head of the stud *d''*.

When the brackets *d*, are adjusted in position, the guides *h*, are hung upon the studs *d''*, with the recesses *h''*, embracing the cloth roller close to the selvage of the cloth, said guides hanging freely upon the studs by their own weight.

As the cloth rolls up, the roller R, is lifted gradually in the open bearings *b*, (see Fig. 2) the guides *h* moving up as required along the studs *d''*, and as the roll of cloth increases the outward pressure on the guides is resisted by the ears *d''*, and the heads of the studs *d''*. The cloth is thus kept straight and smooth on the roller and wound hard and firmly thereupon, while the selvages cannot creep in or catch between the roller and the guides, owing to the large portion of the roller embraced snugly by the recesses *h''*.

When the roll of cloth is to be removed, the guides are slid up along their supporting studs to the ends *h''*, and then swung upward until they assume the dotted line position, Fig. 2, resting against the under side of the breast-beam, the weight of the slotted portions of the guides retaining them in such position by gravity.

It will be seen that the guides are very thin and that they can be moved up against the bearings *b*, by adjustment of the brackets, so that the width of the cloth to be woven is practically limited only by the loom itself.

The notched ends of the guides are of such shape that they will not at any time contact with the sand-roll *C*. (*Patrick Sullivan, Fall River, Mass.*)

BRADY'S TAKE-UP AND DROP-BOX GOVERNING MECHANISM.

The object of this device is to provide a loom with mechanism whereby the movement of the take-up and of the drop-box chain will be arrested on the stoppage of the loom caused by the action of the stop motion, said parts remaining out of action during the time that the loom is being operated by hand, so that when the loom is again thrown into action, said take-up and drop-box mechanism will be in precisely the same position as when the loom was knocked off.

The device applies to looms having one box on one side and two or four boxes on the other side. On all these looms built without the present improvement added, when the filling breaks the loom will turn over 2 or 3 picks before the belt will entirely leave the tight pulley, and the take-up and box will work when no filling is weaving; but by the new device this trouble is done away, as soon as the stop motion acts, the dog that operates the box-chain will be raised and also the catch that holds the take-up wheel will be raised, therefore letting the boxes and the take-up remain the same and not changing them while the loom is running without filling.

Fig. 1 is a perspective view showing sufficient of a loom to illustrate the application of the improvement thereto, the parts to which said improvement particularly relates being shown in full lines and the remaining parts in dotted lines. Figs. 2 and 3 are perspective views on a larger scale, illustrating parts of the loom to which the new mechanism relates.

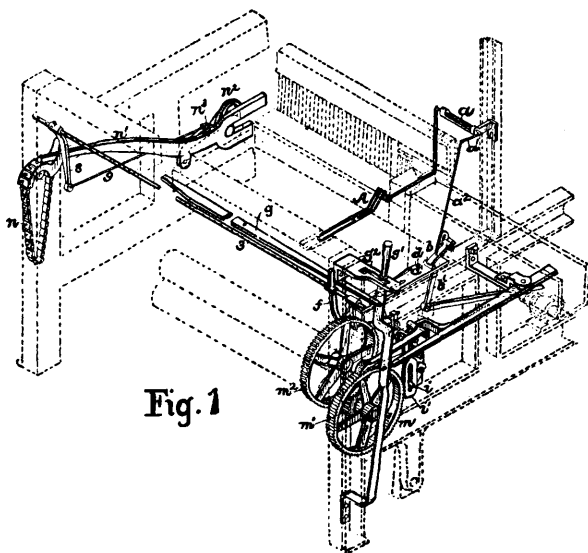


Fig. 1

In Fig. 1, *A*, represents the usual stop motion connected by a rock-shaft *a*, which has an arm *a'*, connected by a cord *a''*, to a pivoted finger *b*, carried by a bell-crank lever *b'*, the latter being hung to the side frame of the loom and acted upon by a cam on the main shaft, so as to impart a reciprocating movement to the finger *b*.

When the pick is properly shot into the open shed

of warp threads, said pick will, on the forward beat of the lathe, strike the stop motion and push the same forward, so as to swing the rock-shaft *a*, and lift the finger *b*, to a point above a lug *d*, on a slide *d'*, known as the "stop-motion tripper-slide," and which is guided on the frame of the loom. Hence, the forward motion of the finger has no effect upon said stop-motion tripper-slide; but in the absence of a pick in position to strike the stop motion *A*, the latter is not

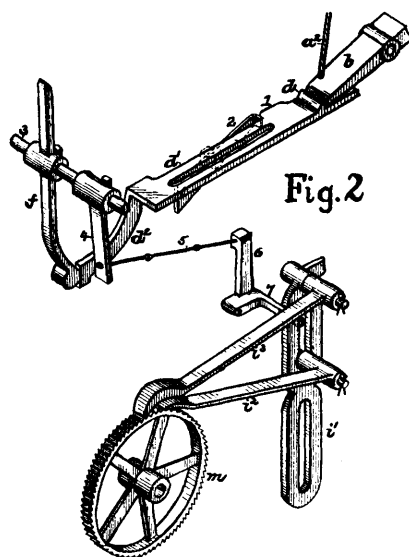


Fig. 2

moved forward and the finger *b*, is permitted to hang down, so as to strike the lug *d*, and move the slide *d'*, forward, a depending finger *d''*, at the outer end of the slide in such case acting upon one arm of a trip-lever *f*, the other arm of which acts upon the shuttle stop-lever *g*, hung to the under side of the breast-beam, the outer end of said lever thereupon pressing upon the spring shifter-lever *g'*, and releasing the same from the notch in the retainer plate *g''*, so as to permit it to swing outward and shift the clutch on the main shaft, so as to throw the loom out of gear.

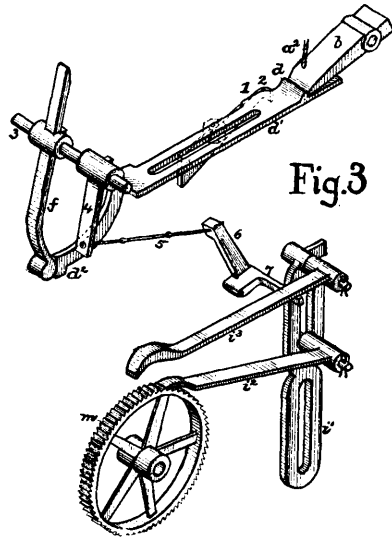
The swinging lathe has a projecting stud *i*, which enters a slot in a lever *i'*, hung to the frame of the loom and carrying a pawl *i''*, which acts upon a ratchet-wheel *m*, constituting the primary wheel of the take-up train, the shaft of said wheel having a spur-pinion *m'*, meshing with a spur-wheel *m''*, on the shaft of the take-up roll, any backward movement of the ratchet-wheel *m*, being prevented by means of a retaining-pawl *i''*, hung to the pivot-stud of the lever *i'*.

The drop-box chain *n*, is actuated by a reciprocating bar *n'*, which receives movement from a cam *n''*, on the main shaft, said cam acting upon a pivoted toe or finger *n'''*, hung to the bar *n'*.

On the inner side of the stop-motion tripper-slide *d'*, is a lug or projecting *1*, and with this lug is adapted to engage a spring catch or retainer *2*, hung to the side of the loom, so that when the slide *d'*, has been pushed forward by the finger *b*, the retainer will engage with said lug *1*, as shown in Fig. 3, and will hold the slide so far as regards any accidental backward movement of the same, but will permit it to be moved back when sufficient force is applied to it.

Upon a rock-shaft *3*, which carries the trip-lever *f*, is mounted an arm *4*, connected by a suitable link *5*, to an arm *6*, on a lever *7*, hung at some fixed point and adapted to act upon the retaining-pawl *i''*, of the ratchet-wheel *m*, so that when the slide *d'*, is pushed

forward, said retaining-pawl will be lifted from engagement with the teeth of the ratchet-wheel, and there will be no forward movement of said wheel or of the take-up roll until the pawl has been again permitted to drop into engagement with the teeth of the wheel, an operation which is not effected until the clutch-operating lever *g'*, has been pulled into the notch of the retainer-plate *g''*, in order to again start the loom, this operation having the effect of pushing back the slide *d'*, under the action of the lever *f*.



The rock-shaft 3, has at the other side of the loom an arm 8, connected by a cord 9, to the pivoted toe *n''*, on the reciprocating bar *n'*, which operates the pattern chain, and the same movement of the rock-shaft 3, which actuates the lever 7, and lifts the pawl *i''*, causes such movement of the arm 8, as to lift the toe *n''*, out of the path of the cam *n''*. Hence, as soon as the loom is knocked off there will be no operation either of the take-up mechanism or of the drop-box pattern-chain, the throwing of the loom again into gear, however, restoring both take-up and drop-box chain to operative position, the loom thus starting again with the take-up and drop-boxes precisely at the points which they occupied when the loom was stopped. (Thomas A. Brady, Phila.)

KASTLER'S CONDITIONAL TAKE-UP MECHANISM.

This mechanism is shown in the accompanying illustrations of which Fig. 1, is a side view of a part of a loom having the device applied thereto. Fig. 2, is a partial front view of the same, and Fig. 3, is a detail perspective of the device.

A, designates a short or stud-shaft suitably attached to the loom frame *A'*. On shaft A, is journaled, so as to turn freely a wheel B, and alongside of the latter is pivoted on said shaft a swinging arm C. To the face of the wheel B, is secured a pinion *b*, which by a train of gears is connected with a cloth roller *B'*, to enable the latter to be revolved by the rotation of the wheel B.

In the drawing no support is shown for the wheel and pinion intermediate the pinion *b*, and the gear on the cloth shaft, in order to simplify the illustration by reducing the parts shown.

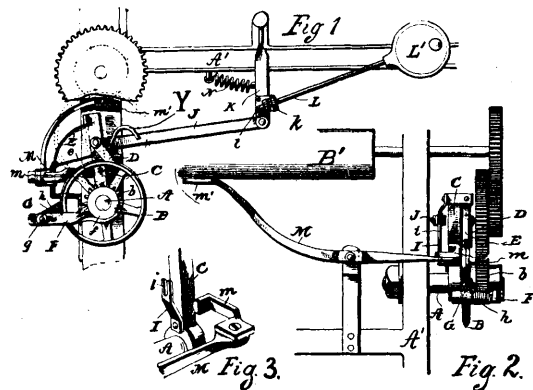
Pivoted to the arm C, is a pawl D, that engages the periphery of the wheel B, against which it is pulled with considerable friction by a bowed flat spring E, that at one end is secured to the outer extremity of the arm C, and has at its other end connected by a rod *e*, to pawl D, which stands substantially tangential to the wheel so that when the arm C, moves it in one direction, it will slip over the wheel B, without revolving it, while when moved in the opposite direction, it will engage said wheel B, with sufficient friction to rotate it.

Y, is a handle whereby the pawl may be lifted from engagement with the wheel. The wheel has its periphery V-shaped in cross section and the pawl is correspondingly grooved to engage it, and in order to produce friction has its wheel engaging faces covered with leather and other analogous material.

Extending outward from a collar *f*, that is fixed to a shaft A, is an arm F, that at its outer end carries a pin *g*, to which is pivoted a friction pawl G, that is forced yieldingly against a wheel B, by a coil spring *h*. Said pawl G, serves to hold the wheel B, against backward rotation when the pawl D, is slipping over the same.

To the side of the arm C, opposite wheel B, is attached a plate I, having a radically extending slot *i*, by means of which a link J, is adjustably attached to said arm. The outer end of the link is pivoted to the lower end of the pivoted arm K, which is moved by a spring N, in the direction which causes pawl D, to slip over the wheel B, without revolving it, while the reverse movement is effected by rod L, actuated by an eccentric *L'*, the rod passing through an opening in a lug *k*, carried by the arm K, and has a collar *l*, to strike said lug *k*, and thereby swing the said arm K, and through it move the pawl D, in the direction necessary to revolve the wheel B.

The feed is regulated by the size of the roll of cloth, by limiting the backward throw of the arm C, by means of a pivoted rod or lever M, that has one end *m*, in the plane of motion of said lever, and at its other *m'*, arranged to engage the periphery of the roll of cloth.



As the diameter of the roll of cloth increases, the bar M, will be moved to change the position of the end *m*, to cause it to engage the arm C, at points successively further and farther outward from the centre of motion of said arm C. The spring is required on account of the variation of the throw of the arm C, caused by the engagement therewith of the end *m*, of the lever M. The latter will operate to vary the throw as described because its end *m*, is placed to engage the arm C, at a point to one side of a vertical line passing through the centre of the motion of the said arm C. (E. Kastler, Philadelphia.)

WARP-BEAMS.

THE KNOWLES WARP-BEAM AND RATCHET BEAM-HEAD.

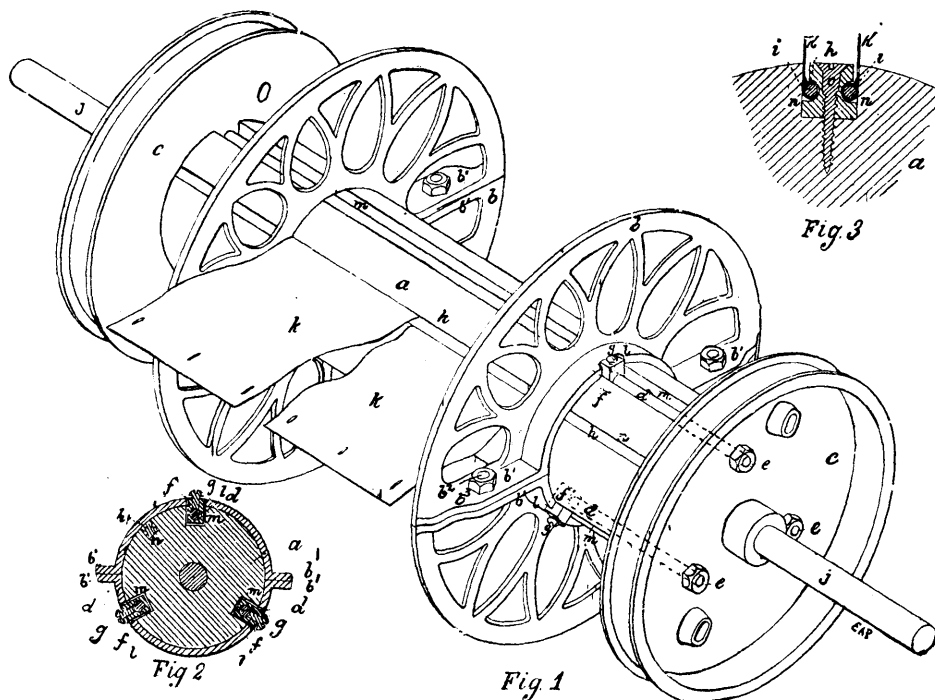
Fig. 1 shows the warp-beam in its perspective view; Fig. 2 is a transverse section of it, and Fig. 3 a transverse section on an enlarged scale, of the upper portion of the warp-beam, such section being to exhibit the mechanism for connecting the aprons to the beam.

a, denotes the warp-beam body, it being, as usual, provided at each end of it with a journal *j*, and a grooved beam-head *c*.

Between the two beam-heads and concentric therewith there are two circular flanges *b*, each of which is a wheel or disk consisting of two equal segments provided at their chords with flanges *b'*, the segments being held together by means of headed screws *b''*,

Each of the flanges is movable on the beam longitudinally thereof, and is held in position thereon by certain of the sliders *f*, and their set-screws *g*, the notches in the hub of the head serving, with the said sliders, to prevent the flange from being revolved on the beam independently thereof when a weaver may take hold of such flange and turn it for the purpose of revolving the beam. The object of having the flanges so movable on the beam is to adapt them to the width of warp to be wound upon the beam, the two aprons shown at *k*, being to aid in connecting the warp to the beam, such warp being suitably fastened to the two aprons, each of which is movable lengthwise of the beam and more or less across the other or fellow apron.

At its inner end each apron is hemmed to receive



going through these flanges, and by nuts *b''*, screwed on such screws, thus enabling the flanges to be easily applied to or removed from the beam, as occasion may require. The hub of the head is also formed by continuations of the flanges around the beam, as shown, each of such continuations having in it one or more rectangular notches *l*, each of which is for reception of a slider *f*, arranged on one of three rods *d*, and provided with a set-screw *g*, for clamping it to the rod. Each of these rods is placed within one of three grooves *m*, made in the beam and opening out of it at its periphery, and having a width sufficient for the reception of the slider and to allow of it being moved along upon the rod in either direction of the length of the latter. Each rod at its ends is securely fastened to the beam or extends through the beam-heads, and is held thereto by nuts screwed upon it, three of which are shown at *e*, in Fig. 1.

a wire or rod *i*, arranged within the hem and extending across the apron. Furthermore, there is made in the beam, longitudinally of it, a groove *n*, square or rectangular in transverse section. In this groove there is fitted or arranged, as shown in Fig. 3, a tongue *h*, shaped very like a T-rail of a railway, the opposite sides of it being grooved or channelled to receive the two aprons and their wires or rods in the manner as represented in said Fig. 3. This tongue is fastened in the groove by screws going through the tongue and screwed into the beam, one of such screws being shown at *o*, in said Fig. 3.

From the above it will be seen how each apron can be moved lengthwise of the beam, so as to carry the outer edge of the apron up to the inner face of the next adjacent flange *b*.

In illustration, Fig. 4, the inside of the Knowles Ratchet Beam-Head is shown. An explanation of its

working is best given by quoting letters of references of which *a*, indicates the beam-head where the friction band goes on; *b*, the inside ratchet gear as made fast to the beam-barrel. *c*, are small lugs cast on to ratchet, and embedded into the beam wood barrel. *d*, are small lugs cast on the ratchet same as *c*. The lug *d*, is where the iron rods go through running from one end of the beam to the other, holding them tight to the beam, making it impossible for the ratchet to get loose. *e*, is a small hold-fast pall; *f*, is a small plate riveted on to beam-head *a*, coming down on the inside of ratchet gear *b*. This is what holds the beam-head *a*, in position. Loosen screw *g*, turn plate half round, and the beam-head *a*, will slip off.

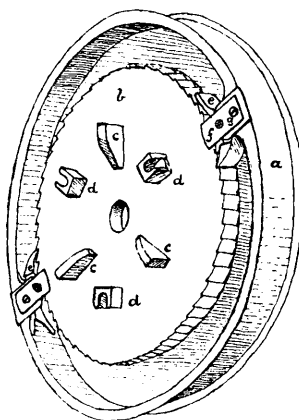


Fig. 4.

(Crompton and Knowles Loom Works.)

THE KNOWLES WARP-BEAM FOR EXTRA HEAVY BUILT LOOMS.

This beam is shown in sectional elevation in the accompanying illustration. 1, indicates the warp-beam body, made of iron pipe, five or six inches in diameter; however, the size of the pipe may be varied, according to the length of the beam and the strain to be put upon it.

One end of the pipe or beam 1, is provided with an external right-hand screw-thread 1', thereon, and the other end with an external left-hand screw-thread 1''.

One of the outside beam-heads as 2, has the central portion or hub 2', thereof recessed or cored out to form a chamber, which is provided with an internal right-hand screw-thread, and said beam-head 2, is screwed onto the right-hand screw-threaded end 1', of the pipe 1, until the end of the pipe butts against the end of the chamber in the hub, as shown.

The other outside beam-head, as 3, has the central portion or hub 3', thereof recessed or cored out to

the pipe 1, until the end of the pipe butts against the end of the chamber in the hub as shown.

Both beam-heads 2, and 3, are secured on the ends of the beam 1, and prevented from turning off in this instance by bolts or screws 4, which extend through holes in the hubs of said heads and are tapped into the ends of the beam 1.

The peripheries of the outside beam-heads 2, and 3, are in this instance provided with teeth 2'', and 3'', which mesh into let-off pinions (not shown) in the ordinary way.

A central shaft 5, extends through the beam 1, and the ends thereof extend beyond the hubs of the outside beam-heads 2, and 3, as shown in the illustration, to act as journals for the warp-beam. A bolt 6, tapped into the hub of one of the outside beam-heads, as 2, secures the shaft 5, in place.

Mounted upon the beam 1, between the outside beam-heads 2, and 3, are the inside beam-heads 7, and 8, the hubs 7', and 8', of which are internally screw-threaded and adapted to turn on the screw-threads on the ends of the beam 1, to adjust the distance between the inner ends 7, and 8, as desired.

In order to hold the beam-heads 7, and 8, in their adjusted positions and prevent them from turning on the beam 1, a key 9, for each beam-head is employed. This key is adapted to slide in a longitudinal external groove 10, made in the beam 1, and to enter a corresponding groove in the hub of the inner beam-head. (Crompton and Knowles Loom Works.)

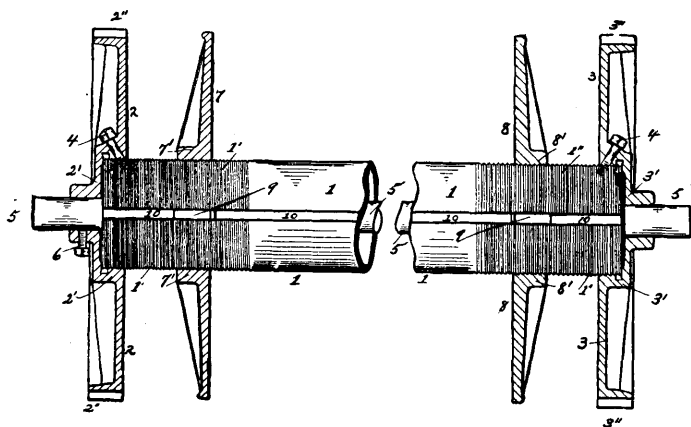
ADJUSTABLE HEAD FOR WARP-BEAMS.

The same is shown in the accompanying illustration in vertical longitudinal section. Quoting letters of reference in the description will readily explain the construction of this device to the reader. *a*, represents a portion of one end of a warp-beam to which ratchet *a*², is secured by means of screws *a*². Loosely mounted upon the shaft *a*¹, adjacent to the ratchet *a*², is a wheel or head *a*⁴. Mounted upon the inside of this head and in a position to engage with the teeth of the ratchet *a*², is a pawl which is pivoted to the head of *a*⁴, by means of a pin, and one of its ends is kept in engagement with the teeth of the ratchet *a*², by means of any suitable spring.

Slidably mounted upon the beam is the adjustable head *b*, which is provided with a centrally-apertured hub *b*¹, arranged upon the beam *a*. This head is designed to be adjusted back and forth on the beam, in order to confine the warp within a space corresponding to the width of the fabric to be woven. This width is the distance between the adjustable head *b*, and a corresponding fixed head (not shown) upon the other end of the beam.

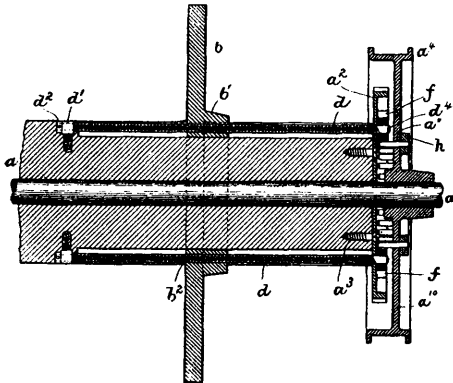
d, represents screw-threaded rods mounted in screw-threaded apertures *b*², formed in lugs *b*³, integral with the hub *b*¹, and extending into grooves in the beam. These grooves are of sufficient depth to receive the rod so that the rod will be below or flush with the surface of the beam. The inner ends of these rods are rotatably mounted in eyes *d*¹. The object of this construction, that is, the arrangement of the rods with the eyes, is to permit the rod to turn in the nut and at the same time to prevent any longitudinal movement of the rods.

This is accomplished by omitting the screw-threads at this end of the rods and making the inside bore of the eyes *d*¹, smooth, the rods being maintained in the eyes by means of a



form a chamber, which is provided with an internal left-hand screw-thread, and said beam-head 3, is screwed onto the left-hand screw-threaded end 1'', of

collar a^2 , fastened on the ends of the rods. At their outer ends these rods are also free from screw-threads



and are arranged in suitable apertures in the ratchet. To the outer ends d' , of the rods d , that extend through the ratchet, there are rigidly secured spur-gears f . From the foregoing it will be seen that as the rods are rotated by means of the spur-gears f , the head b , will be adjusted back and forth. The rods are preferably provided with screw-threads having a steep pitch, in order that the head may be quickly adjusted. The head being in one piece and controlled in its movement by the screw-threads, there is no liability of its slipping on the beam after it is adjusted. Any desired means may be employed for turning these rods; but it is necessary that the rods be turned in unison. For this reason the rods are provided at their ends d' , with spur-gears f , each having the same number of teeth and which are operated by means of a disk provided with pins, arranged in a circle on one side of said disk after the manner of a lantern-gear. The web a^{10} , of the head a^1 , is provided with a circular series of apertures a^{11} , through which the pins previously referred to pass into a position so as to engage the teeth of the gears f .

The operation is as follows: It being desired to adjust the head b , the pawl is thrown out of engagement with the ratchet a^2 , and held out in any way. This releases the head a^1 , from the ratchet and permits

the former to turn upon the shaft a' , without effecting the beam. The disk as provided with pins, is then inserted, the pins of the disk passing through the apertures a^{11} , in a position to engage the teeth of the gears f . Now, by turning the head a^1 , the gears f , will be rotated, causing the head b , to travel back or forth until the desired position is reached. The disk as provided with pins is then removed, and the pawl permitted to return into engagement with the ratchet. (Thomas Blackburn, Dover, N. H., assignor of one-half to John Lancaster, same place.)

THE FAIRMOUNT MACHINE COMPANY'S ADJUSTABLE BEAM-HEAD FOR GING- HAM-LOOM WARP-BEAMS.

Fig. 1 is a plan of this beam-head, and Fig. 2 a sectional view of the same. This beam-head serves a double purpose, being used as warp-flange and friction head at the same time.

The construction of this beam-head is best explained by quoting letters of references of which a , is the open space for the beam-barrel onto which the warp is beamed; b , is a projecting flange cast to the head;

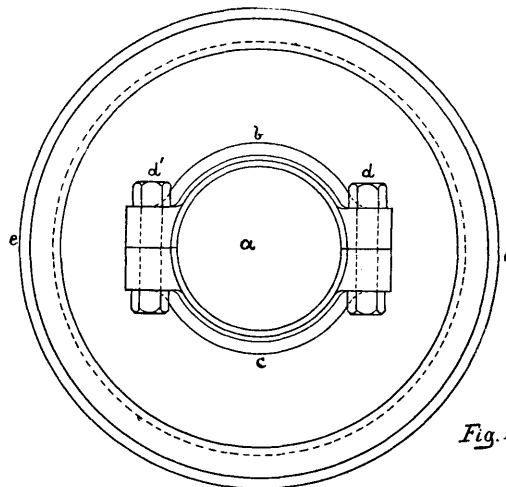


Fig. 1

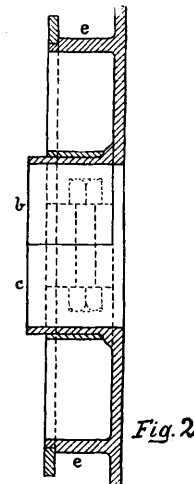


Fig. 2

c , is a cap that is bolted to the projecting flange b , by means of bolts d and d' ; e , is a depression designed to hold a rope or band for creating friction to the warp-beam and in turn onto the warp threads.

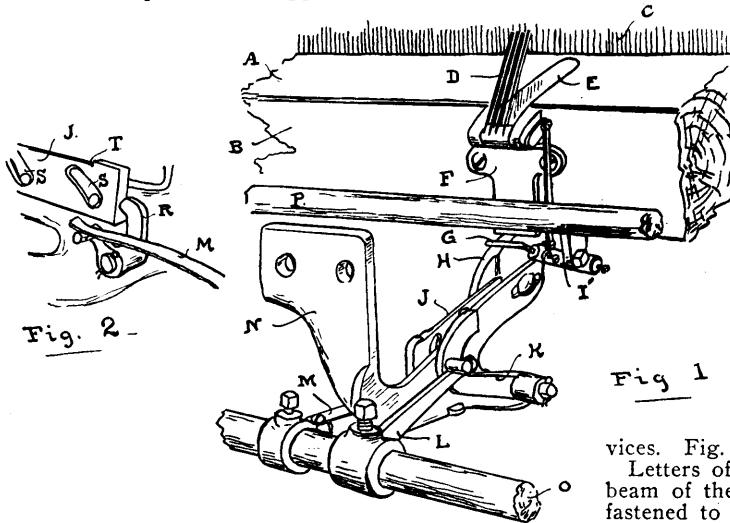
This combined beam-head and warp-flange can be readily adjusted to any width of warp desired by simply loosening bolts d and d' , placing the beam-head the required distance apart and then tightening bolts d and d' again. Two of these beam-heads are employed on a beam, one at one side and the other at the opposite side, both having their flange sides placed against each other. (Fairmount Machine Co., Philadelphia.)

STOP-MOTIONS.

THE KNOWLES CENTER STOP-MOTION.

The same is shown in the accompanying illustrations of which Fig. 1 is a perspective view of the complete motion, and Fig. 2 a view in detail of the sliding shield tumbler, its spring and the sliding shield, seen from the other side compared to view given in Fig. 1.

A, is the race plate; B, is the lay wood; C, is the reed; D, are the feeler wires; E, is the slot in the race plate and lay into which the feeler wires drop when the lay comes forward; F, is the feeler stand; G, is the dagger; H, is the cam on which the dagger G, slides to raise and lower the feeler wires; I, is the dagger socket; J, is the sliding shield which prevents the dagger G, from knocking the loom off on the first pick after the shipper handle is pulled on; K, is the tumbler, which, when struck by the dagger, throws off the shipper handle; L, is the tumbler finger which connects the tumbler with the shipper shaft; M, is the shield spring finger; N, is the breast-beam stand; O, is the shipper shaft; P, is the protector rod; R, is the sliding shield tumbler, which, with the aid of the spring M, throws the sliding shield J, up to the end of the slots S, when the shipper handle is thrown off and holds it up until the dagger comes in contact with



the notch T, and pushes the shield back on the first pick after the handle is pulled on.

As the lay moves back the feeler wires are raised, by the dagger G, sliding up the cam H, to allow the shuttle to pass under them. If there was no filling under the feeler wires when the lay came forward, the dagger would slide down the cam H and strike against the tumbler K, throwing off the shipper handle; but when the filling is under the feeler wires the dagger is held up so that it cannot slide down the cam and strike the tumbler, but instead passes over the tumbler without striking it.

When the loom is stopped and the lay turned back, the filling is apt to get out from under the feelers, so that if it were not for the sliding shield, the shipper handle would be thrown off on the first pick after it

was pulled on. This shield is thrown up into place when the shipper handle is thrown off and remains up, preventing the dagger from striking the tumbler, until the first pick after the handle is pulled on, when the dagger strikes the notch in the shield and pushes it back and down, leaving the dagger free to strike the tumbler on the next pick if there is no filling under the feeler wires. (*Crompton and Knowles Loom Works.*)

McMICHAEL'S FILLING STOP-MOTION.

In devices of this character heretofore constructed, difficulty has been experienced from the fact that the stop-motion was found to offer an obstruction to starting up the loom again when it has been stopped with the lay up close to the breast-beam, and it was found necessary for the weaver to move back the lay by manual exertion before the loom could be set in motion. To overcome this difficulty, additional devices were employed to remove the obstruction offered by the stop-motion, in the first pick of the loom, when no filling is present to sustain the fork of the locking-dog.

The new device provides a stop-motion which requires no such additional attachments and at the same time allows for starting up the loom, with the lay in any position, without obstruction being offered by any part of the stop-motion, although it may have just operated to throw the loom out of action.

In addition to the above, the invention has in view the combination of the filling stop-motion with the loose-reed motion of the type known as the "McMichael Smash Protector."

Fig. 1 shows a top plan view of a sufficient portion of a loom to illustrate the application of the invention thereto. Fig. 2 shows a perspective view of the stop-motion devices which are attached to the lay. Figs. 3 and 4 show perspective views of two of these devices. Fig. 5 shows a section on line *x, x*, of Fig. 1.

Letters of reference indicate thus: *a*, designates the beam of the lay, and *b*, the breast-beam. A plate *c*, fastened to the front side of the said rail of the lay, is formed with a dovetailed slideway which receives a plate *c'*, having a raised cam-surface *c²*, along a portion of its upper edge and a vertical shoulder *c³*, adjacent to one end of said cam-surface. A dog *d*, is pivoted between ears on the plate *c'*, and rests by gravity on the cam *c²*, and said dog is provided with a detector fork or finger *d'*, which extends over a depression *a'*, in the lay, and is designed to be sustained by the pick *z*, crossing said depression, so as to prevent the dog entering into engagement with the shoulder *c³*.

The design is to cause the plate *c'*, to reciprocate in the slideway of the plate *c*, as the lay moves to and fro, and so long as the filling is unbroken and extending under the fork *d'*, the reciprocations of the plate *c'*, carry its shoulder *c³*, past the dog *d*. The cam *c²*, riding under the dog, elevates the fork *d'*, to allow the shuttle to pass under it, and after the shuttle

passes, the fork drops upon the pick left by the shuttle. Should the pick be absent over the depression *a'*, the dog will be free to gravitate into the path of the shoulder *c³*, and the plate *c'*, is thereby prevented from

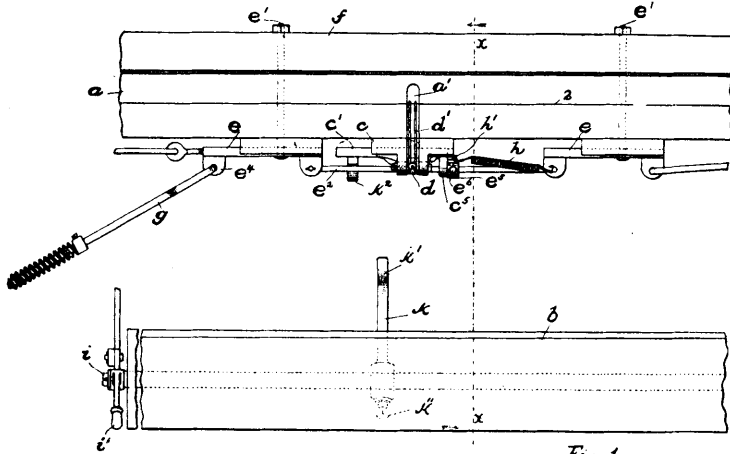


Fig. 1

completing its stroke, and is held at a position to effect the discontinuance of the loom's operation.

c, designates two of the slotted locking-plates of the loose-reed motion, previously referred to, which plates are arranged to reciprocate lengthwise of the lay and alternately lock and release the reed by registry of different-sized portions of their slots with heads of bolts *e'*, which connect with a holding-bar *f*, back of the reed. The two plates *e*, are connected together by a rod *e²*, whose ends are bent at right angles and entered through ears on the plates, and one of the said plates is connected by a rod *g*, with the breast-beam, the said rod *g*, having a bent end passed loosely through an ear *e⁴*, on the plate and being connected, through a swivel *g'*, with an ear *g²*, on the breast-beam.

By reason of the connection between the locking-plates of the loose-reed motion and the breast-beam, it will be readily seen that reciprocations of said plates will be produced by the to-and-fro movement of the lay. A further object is to also reciprocate the plate *c'*, through the same agency, but as it is not desirable to restrict the movement of the plates *e*, by the locking of the plate *c'*, provisions are made permitting continued movement of said plates *e*, after the plate *c'*, has been locked by the dog *d*.

The rod *e²*, passes loosely through an ear *e³*, on the plate *e'*, and carries a collar *e⁵*, fastened by a set-screw *e⁶*, and arranged to abut one side of the ear *e³*, and by acting against said ear under one direction of movement of the plates *e*, to impel the plate *c'*, unyieldingly, in that direction.

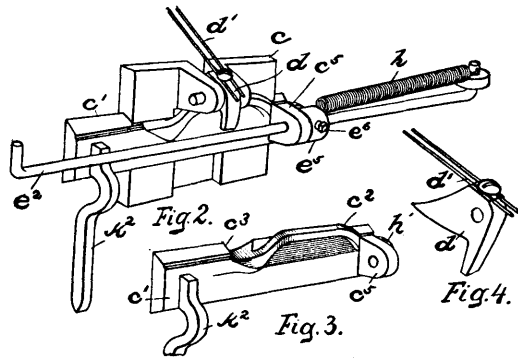
A spiral spring *h*, is connected at one end to an ear *n'*, on the plate *c'*, and at the opposite end to one of the bent ends of the rod *e²*, and this spring exerts itself to hold the ear *e³*, against the collar *e⁵*, and cause the plate *c'*, to travel with the plates *e*, in the reverse direction to that above mentioned in the absence of any obstruction such as the dog *d*, presents when it has dropped down in front of the shoulder *c³*.

i, designates a rock-shaft or rotary shipping-rod which is located under the breast-beam and carries a handle *i'*, whose turning operates a belt-shipping or clutch mechanism, so as to throw the loom into and out of action. An arm *k*, is affixed to the shaft *i*, by a set-screw *k'*, and projects out in front of the breast-beam, and it is formed at its free end on the upper

side with a V-shaped cam *k'*. The plate *c'*, has a pendent arm *k²*, which when said plate is locked by the dog *d*, encounters the cam *k'*, in the movement of the lay toward the breast-beam, but at all other times clears said cam by passing around the end of the same.

In the operation of the loom when the filling is running properly there is no operation of the stop-motion to throw the loom out of action, for the filling extending over the depression *a'*, in the lay serves to support the fork *d'*, and prevent the dog *d*, from dropping far enough to take it into engagement with the shoulder *c³*. The plate *c'*, receives its full movement and the cam *e²*, raises the fork each time for the passage of the shuttle, allowing said fork to lower after the shuttle has passed and rest on the filling. As long as the plate *c'*, makes its full stroke lengthwise of the lay, its arm *k²*, is carried around the cam *k'*, in the to-and-fro movement of the lay. Upon breakage or depletion of the pick or other cause preventing its extending across the depression *a'*, so as to support the fork *d'*, the latter will fall into the said depression and the dog *d*, will then drop in front of the shoulder *e³*, and prevent completion of the stroke of the plate *c'*. When the said plate is thus locked, its pendent arm *k²*, is directly in line with the cam *k'*, and as the lay approaches the breast-beam, said pendent arm, by action against the said cam, moves the arm *k*, sufficiently to throw the clutch or shipper, the said arm *k*, then taking a position some distance below the arm *k²*.

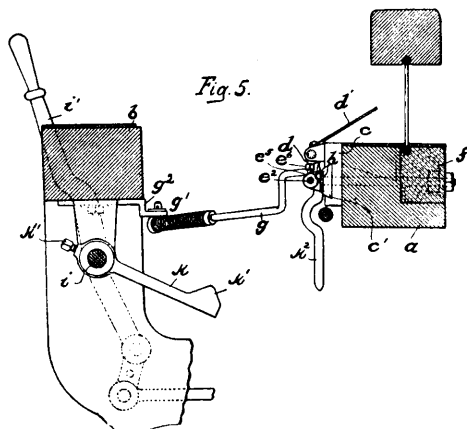
An advantage of the new device is, that while the latter adjustment of parts obtains and the lay is close up to the breast-beam the loom can be started by turning the handle, substantially three-quarters of a full movement of the latter being allowed without causing the arm *k*, to encounter the arm *k²*, and this three-quarters movement being sufficient to put the loom in operation. This is principally due to the formation of the arm *k*, with a V-shaped cam *k'*, for after the arm *k²*, has passed the point of the cam the



arm *k*, can be raised to a sufficient distance without encountering the arm *k²*, to put the machine in operation.

With the new arrangement by holding the handle three-quarters on, the weaver can run the loom while the detector-fork has no support, and the arm *k²*, will pass over the cam *k'*, without touching it. This is an advantage, as it is frequently desired to run the loom experimentally without doing any work, and,

therefore, in the absence of filling. The new device can be also readily attached to looms in which the



shipper-rod moves longitudinally under the breast-beam instead of rocking. (*Woonsocket Machine and Press Company, Woonsocket, R. I.*)

WARP STOP-MOTION FOR NORTHPROP LOOMS.

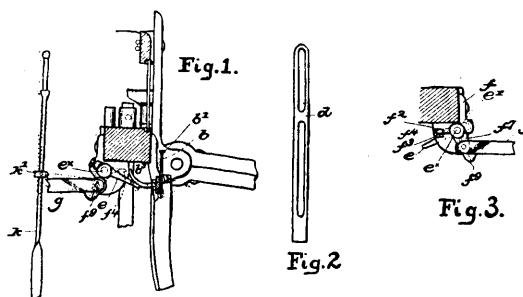
In this stop-motion the detectors, which are normally supported by the warp-threads, are located between the harness mechanism and the lay, so that they are brought as closely as possible to the fell or weaving point, such position bringing the said detectors nearer the usual breaking point of the warps, which point is for the most part in front of the harness mechanism. Being located in front of the harness, the operator can readily see any dropped detector, due to warp breakage, and so locate it to repair the warp more readily than if he were required to look through the harness to see a dropped detector, as is necessary with the usual location of the warp stop mechanism. The location of the detectors in a stationary horizontal plane at the back of the lay makes them also free from the frictional action on the warp that would ensue were they carried by the lay.

When the loom is running properly the parts are in the position shown by full lines in our illustration Fig. 1, (being a side elevation of a portion of the new mechanism, the lay being forward, the vibrator, the releasing-lever of the stopping mechanism, and the intermediate connections being shown in normal position by full lines and by dotted lines in abnormal position, due to a dropped detector) the friction-locking device holding the rock-shaft and its attached parts in inoperative position, the path of movement of the outer end of the dagger g , being below the collar k' , on the releasing lever k , when the lay is forward. The finger e , at such time bears against the feeler b^3 , and the vibrator b and its flange b' , are free to enter the detector guide in the back stroke of the lay, all of the detectors d , (see Fig. 2,—a side elevation of one of the detectors enlarged) being lifted. A dropped detector, however, will encounter the flange b' , of the vibrator, the web supporting the rear edge of the detector when the lay moves back, and the vibrator will be turned into the dotted line position, Fig. 1, depressing the curved feeler b^3 .

The depression of the feeler turns the finger e , into its dotted line position, thereby partially rotating the rock-shaft e^x , withdrawing the lug f^1 , from the depression f^2 (see Fig. 3, showing a detail of the connections intermediate the vibrator and stopping mechanism) in the ear f , and moving into the depression f^3 , a spring permitting sufficient longitudinal movement

of the rock-shaft for such purpose. This rotative movement of the rock-shaft elevates the outer end of the arm f^1 , causing its tip f^3 , to act against and lift the dagger g , the said parts assuming thereby the position shown in dotted lines, Fig. 1, so that the forward movement of the lay will bring the dagger into engagement with the stop k' , of the releasing lever k , and knock it out from its usual holding-notch, permitting the lever to fly outwardly in the usual manner and moving the belt shipper to stop the loom.

It will be seen that the connections between the detectors and the stopping mechanism will be moved into operative position at the first back stroke of the lay after a detector is dropped, and that the next forward stroke of the lay causes the stopping mechanism to stop the loom. All the intervening devices which thus control the stopping mechanism by the position of the vibrator are carried by the lay and are very simple and efficient, as well as rapid in their operation. The loom having been stopped, the operator lifts the dropped detector and mends the warp, and when the



lay moves back again the stopping mechanism is in proper position to act again without any necessity for the attendant to pay any attention to it. (*Draper Co.*)

NORTHPROP'S FILLING STOP-MOTION.

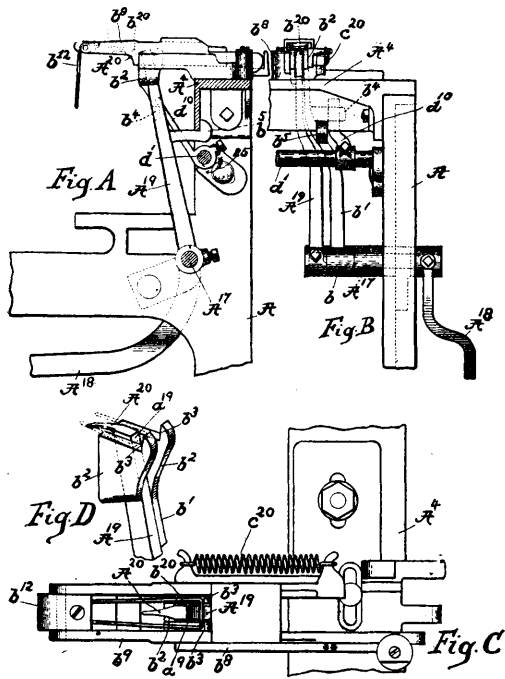
Fig. A, shows a sectional detail of a sufficient portion of a loom with the improvement embodied therein. Fig. B, is a front elevation of the mechanism shown in Fig. A. Fig. C, is a top or plan view thereof, on a larger scale, and Fig. D, is a perspective detail of the upper ends of the filling-hammer and actuating-arm.

The loom-frame A , breast-beam A^1 , the starting-shaft d' , the filling-fork b^{12} , its carrying-slide b^6 , sliding in the guide b^5 , the lever A^{18} , actuated by a cam (not shown) on the usual lower shaft of the loom, and the spring c^{20} , are all of usual construction.

In the drawings Figs. A, and B, there is shown a rock-shaft A^{17} to which the lever A^{18} is attached, and a filling-hammer A^{19} , is rigidly secured to said shaft to be vibrated thereby, the upper end of said hammer having a convexed rearwardly extended upper end A^{20} , to readily pass under the tail b^{20} , of the filling-fork when the latter is not acted upon by the filling.

The hub b , of an actuating arm b^1 , Figs. B, and C, is herein shown as loosely mounted on the shaft A^{17} , said arm having a bifurcated head b^2 , recessed to receive the filling-hammer A^{19} , as it swings inward (see Fig. D,) the top of the head being cut away laterally to form a seat, and leave shoulders b^3 , at its front side, between which and the straight front face a^{19} , of the filling-hammer, the looplike tail b^{20} , of the filling-fork enters when the filling fails. The arm b^1 , has a lug or projection b^4 , thereon to engage a finger d^{10} , fast on the starting-shaft d' , when the actuating arm is operated, to turn said shaft in the direction of arrow 25, Fig. A, a detent b^5 , on the actuating arm engaging some fixed part of the loom to limit its movement rearwardly.

The filling-fork slide is normally held by spring c^{20} , in the position best shown in Figs. A and C, and so long as the tail b^{20} , of the filling-fork is not caught between the shoulders b^3 , of the actuating arm and the



filling-hammer, the latter will swing back and forth without moving the actuating-arm, and the starting-shaft d' , will not be turned. If the filling fails in front of the fork, however, and the latter is not tipped, its tail will be caught between the filling-hammer and the shoulders b^3 , and the actuating-arm b' , will be moved toward the breast-beam with the filling-hammer, thereby causing the lug b^4 , to act upon the finger d'' , turning the starting-shaft d' , without the intervention of the filling-fork proper, or its slide.

The shoulders b^3 , are separated by a space only sufficient to admit the entrance of the filling-hammer and present broad abutments against which the tail of the filling-fork is held by the hammer, so that the strain upon the tail is more evenly distributed. (Draper Co.)

MOMMER'S ELECTRIC WARP STOP-MOTION FOR LOOMS.

This invention, relating to looms, has for its object to provide a warp stop-motion which when a warp thread breaks will permit a metallic drop device having a warp eye and a slot, to fall and effect the closing of an electric circuit, the closing of the circuit causing an electromagnet, carried by a knock-off lever, to put a lever or finger, pivoted and forming the armature of the said magnet, in position to be struck by a hammer actuated continuously by a suitable device on a cross-shaft of the loom, the blow of the hammer causing the knock-off device or lever to be moved and push the usual shipper-handle out of its usual holding notch.

Fig. 1, shows a sufficient portion of a loom with the improvement added to enable the invention to be understood. Fig. 2, is a partial front elevation of the left-hand end of the loom, showing part of the usual shipper-handle and the knock-off device or lever.

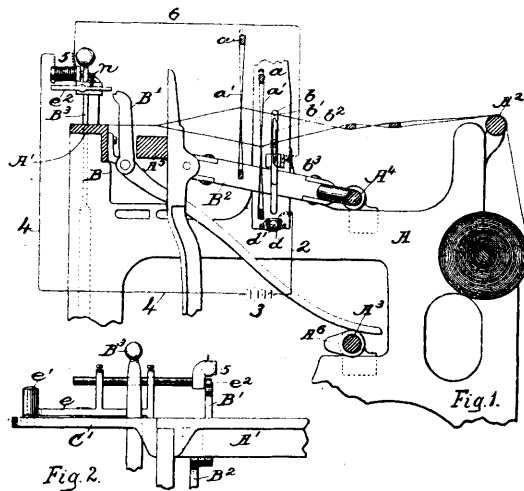
A, represents the loom frame; A', the breast-beam;

A², the whip-roll; A³, the under shaft; A⁴, the crank-shaft; A⁵, the lay; A⁶, the cam on the under shaft; B, the rock-shaft, and B', a hammer and B², the lay connecting rods; a, the harness frames having harnesses a'; B³, the shipper-handle adapted to be moved in a slot in plate C, one side of said slot having a notch to receive the said shipper-handle and hold it in place, to keep the driving-belt on the driving-pulley (not shown).

The object of the new device is to stop the loom on the breaking of a warp thread, and for this purpose there are provided a series of flat ribbon-like drop devices b , each having a warp eye b' , to receive a warp-thread, and at one side of said eye a slot b^2 , through which is extended a metallic bar b^3 , said bar acting to keep the said drop devices substantially parallel and to also act as a guide for a series of said devices. Below the lower ends of these drop devices is arranged a closure device, shown as a trough d , properly insulated from the frame of the machine and shown as filled with mercury d' , the breaking of a warp-thread letting a drop device fall so that its lower end enters the mercury and closes an electric circuit.

The electric circuit shown contains a wire 2, which starts from the mercury cup and extends to a battery 3, and from the battery by wire 4, to an electromagnet 5, mounted at or near the end of a knock-off lever or device e , pivoted at e' , and carrying a finger or lever e'' , which constitutes the armature of said magnet, the outer or heavier end of said armature keeping the same in its "normal" position, a wire 6, connecting the opposite end of said magnet to the said guide-bar b^3 .

When the circuit is open, the inner or right-hand end of said armature is normally kept elevated out of the range of motion of the hammer B', operated at each rotation of the shaft A³, and said hammer device passes under the said armature, but in case a drop device falls into the mercury, it constituting a closure device for the circuit, the magnet is excited and turns the armature, putting its inner end in its abnormal position when it will be struck by the hammer or



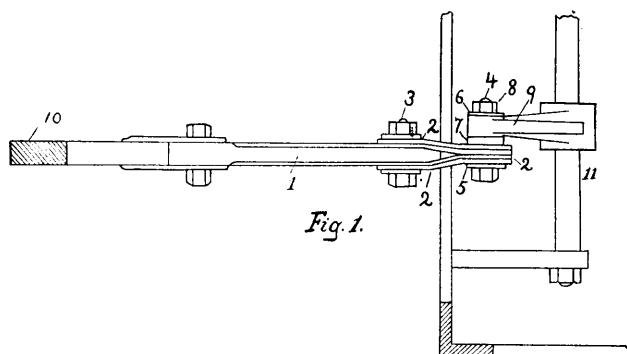
equivalent device as it comes forward, thus moving the armature and with it the knock-off device or lever e , causing it to meet the said shipper-handle and push it from its holding notch and effect in usual manner the shipping of the belt to stop the loom.

The screw n , is employed as an up-stop for the magnet. Instead of the mercury any other suitable device, which, as the lower end of the drop device meets it, will close the electric circuit, can be used. (Draper Co.)

PICKING MECHANISMS.

KRITLER'S SWEEP-STICK FOR CONNECTING THE SWEEP-ARM AND PICKING-STICK OF A LOOM.

The object of the device is to so construct this member of a loom so as to obviate the disadvantages which have been heretofore experienced, consequent upon the inability of the sweep-stick to adapt itself to the variety of movements occasioned by the transmission of power from a sweep-arm, moving in one plane about a center, to a picking-stick moving in a plane



at right angles thereto and about another center, as well as swinging back and forth in the same general plane as the sweep-arm.

Fig. 1, is a sectional plan view of a portion of the frame of a loom, showing the sweep-arm, picking-stick and sweep-stick, in one of the positions assumed by these parts in their operations; Fig. 2, is a similar view, showing another of the positions assumed by these parts and illustrating the several strains to which the sweep-stick is subjected; Fig. 3, is a side elevation of the sweep-arm and the sweep-stick; and Fig. 4, is a section taken at the line x, of Fig. 3.

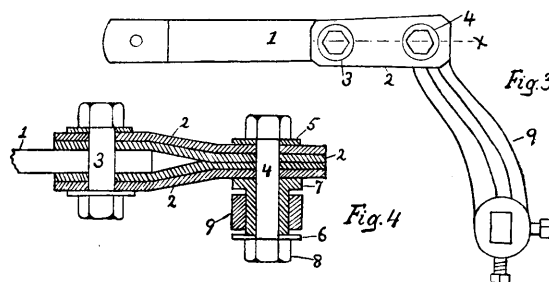
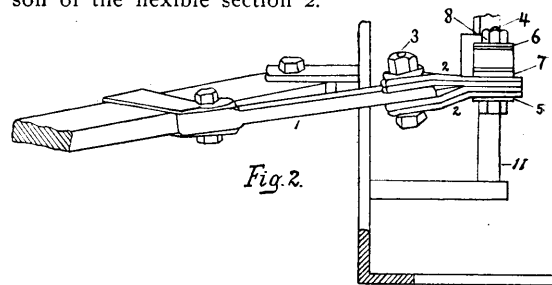
The difficulties heretofore experienced in the operations of the shuttles of a loom by the picking-stick, from power transmitted thereto from the sweep-arm, through the sweep-stick, have been lost motion, occasioned by the necessity of having to connect the sweep-stick to the sweep-arm and picking-stick, by very loose joints formed by the passage of bolts through enlarged holes in said sweep-stick; the rapidity with which the connecting holes in the sweep-stick are enlarged by the constant hammering of the bolts therein, occasioned by the lost motion; the inaccuracy with which the shuttle was thrown from side to side, on account of this lost motion; the varying time in which the shuttle was thrown, on account of the wear in said holes; the loss of time occasioned by the stopping of the loom to replace the worn-out sweep-stick; and the cost of constantly having to replace said sweep-stick.

These disadvantages are necessitated by having to connect too loosely the sweep-stick to the sweep-arm and picking-stick on account of the several movements of said arm and picking-stick, which require that the sweep-stick shall adapt itself to the several angles thus occasioned. All these disadvantages are overcome in the present device by forming the sweep-stick in two sections 1, and 2, the former being made of

hard wood and the latter of leather; the flexible section to be composed of four layers of leather, so divided at one end that two layers will embrace one end of the wooden section upon either side thereof. 3, in the illustrations indicates a bolt, with suitable washers and nut, whereby the layers of leather are securely clamped to the wooden section, as clearly shown in Fig. 4. At the inner end of the flexible section, the layers of leather are brought together parallel and are held firmly in this position by the bolt 4, passing therethrough, and the washers 5, and 6, and hub 7, drawn together by the nut 8.

The hub 7, is reduced in diameter so as to pass through a hole in the upper end of the sweep-arm 9, whereby the sweep-stick is pivoted to said arm, as will be readily understood by reference to Fig. 4. The outer end of the sweep-stick is secured by a collar and lug strap 10.

The operation of the mechanism is thus:—During the operation of a loom, the lathe or member in which the shuttles are guided, has a to-and-fro movement lengthwise of the loom, which is at right angles to the swinging movement of the picking-stick, and as the picking-stick is connected at its upper end to this lathe, it has a swinging movement which is utilized to throw the shuttle. The picking-stick receives this latter movement from the sweep-arm, which is rocked in an arc by the shaft 11; and as said sweep-arm is rigid as to any side movement, the sweep-stick which connects the arm and picking-stick, is compelled to assume a number of angles relative to said arm and picking-stick so that if the sweep-stick be bolted to the arm and picking-stick without lost motion, it must be capable of giving in several directions, in order that it may assume these angles, and this, the present stick does, by reason of the flexible section 2.



When the swinging movement is imparted from the sweep-arm to the picking-stick the hub 7 is free to turn in its bearing in the upper end of the sweep-arm

and when the picking-stick is swung laterally by the movement of the lathe, the flexible section bends side-wise and is also given a torsional action, as shown in Fig. 2, by reason of the twisting of the sweep-stick upon its axis, in following the compound movement of the picking-stick.

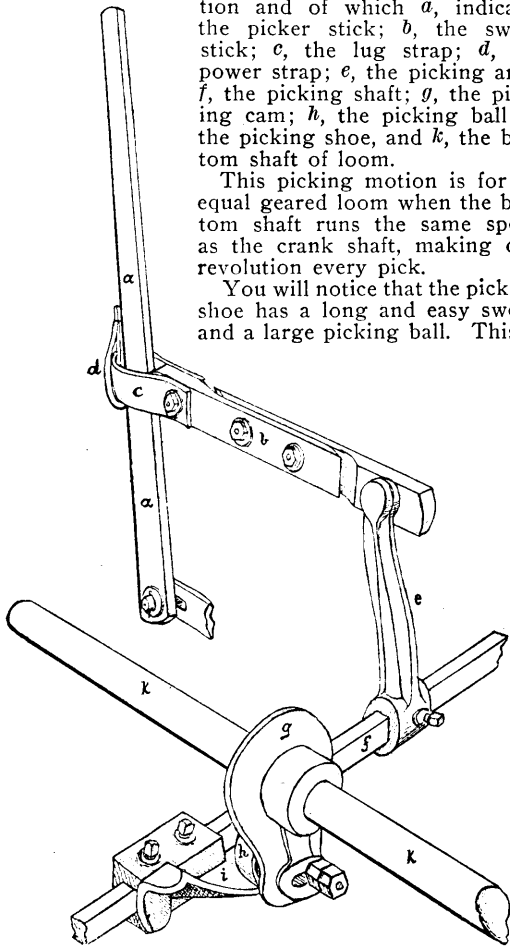
In practice, by the use of Kritler's mechanism, the number of picks per minute of a loom may be increased, since as there is no lost motion between the sweep-arm and picking-stick, the shuttle is thrown with more accuracy and less loss of time and the wear and tear upon the loom is decreased as less power is required to throw the shuttle and less vibration is imparted to the machine, by reason of the hammering caused by the lost motion, and a better result is had in the fabric woven. By actual experiments, it has been found that from twenty-five to thirty-five per cent. more fabric can be woven by a loom having the improvement applied thereto, and the cost of maintaining said loom is greatly decreased, on account of the decrease in vibration and the increased length of time in which the sweep-stick has to be replaced. (Geo. W. Kritler, Philadelphia, Pa.)

THE KNOWLES PICKING MOTION FOR EQUAL GEARED LOOMS.

The same is shown in the accompanying illustration and of which *a*, indicates the picker stick; *b*, the sweep stick; *c*, the lug strap; *d*, the power strap; *e*, the picking arm; *f*, the picking shaft; *g*, the picking cam; *h*, the picking ball; *i*, the picking shoe, and *k*, the bottom shaft of loom.

This picking motion is for an equal geared loom when the bottom shaft runs the same speed as the crank shaft, making one revolution every pick.

You will notice that the picking shoe has a long and easy sweep and a large picking ball. This is

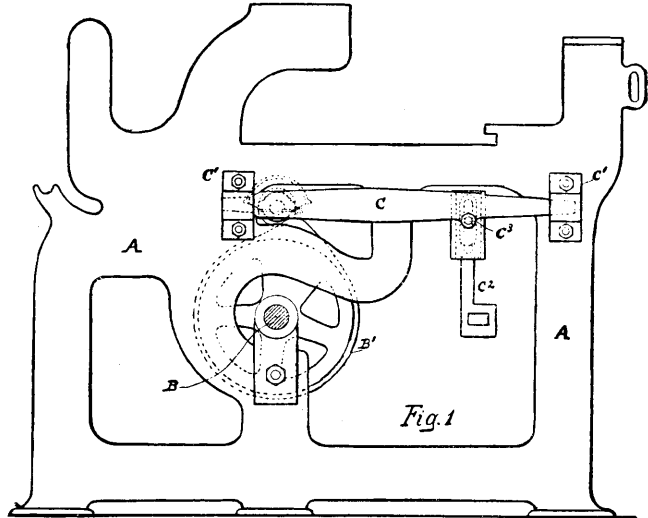


on account of the picking ball traveling so fast it does not require as sharp a picking shoe as a loom where

the bottom shaft makes one revolution in two picks. (Crompton and Knowles Loom Works.)

THE MASON PICKING MECHANISM.

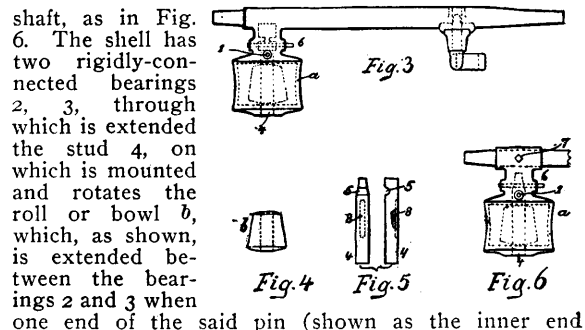
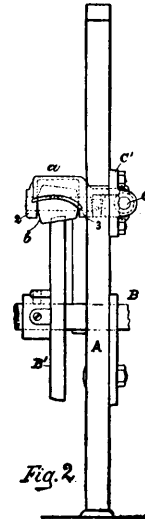
This mechanism has for its object to improve the picking motions of looms, providing means for holding the picking roll or "bowl," as it is called, the



shell inclosing the said roll or bowl being in one piece and firmly or rigidly carried by the picker rock-shaft. Means are also provided whereby the stud on which the roll or bowl rotates may be lubricated.

Fig. 1, in side elevation, represents part of a loom having this mechanism added; Fig. 2 is a partial elevation from the left of Fig. 1; Fig. 3 is an enlarged detail of the picker rock-shaft. Fig. 4, shows the roll detached. Fig. 5, shows the stud detached, and Fig. 6 shows a modification.

A, indicates the loom side and B, the cam-shaft, having the picking-cam B' thereon. The picker rock-shaft C, mounted in bearings C', has an attached arm C', made adjustable thereon by a bolt C' in a slot of the said arm. The arm C', is connected by a strap to the picker-stick. The shell a, extended from the picker rock-shaft, is made in one piece, and integral with the rock-shaft; however the said shell and its hub made in one piece may be attached firmly and rigidly by a set-screw 7 to the said



shaft, as in Fig. 6. The shell has two rigidly-connected bearings 2, 3, through which is extended the stud 4, on which is mounted and rotates the roll or bowl B, which, as shown, is extended between the bearings 2 and 3 when one end of the said pin (shown as the inner end

provided with a notch 5) receives a locking device 6. (Shown as a pin.) The stud 4 is shown as provided with an oil-chamber, as at 8, (see Fig 5) the oil entering therein through the hole 1, to lubricate the stud on which rotates the said roll *b*.

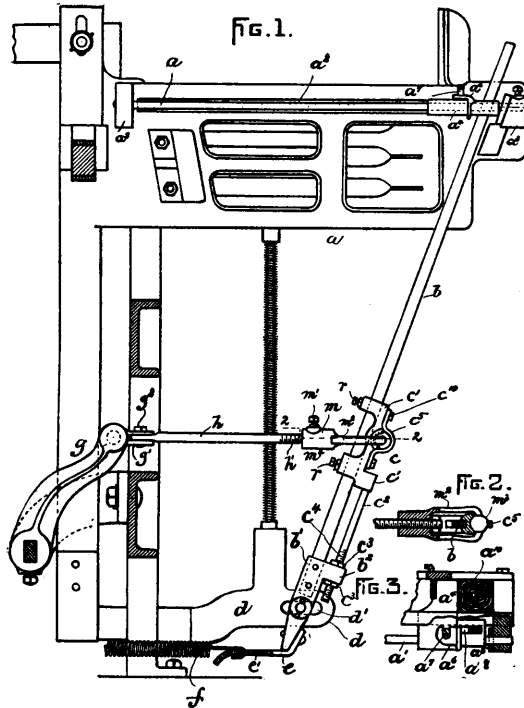
Making the shell, including the bearings 2 and 3 and the shank of the shell, in one casting adds greatly to the strength, stiffness, and durability of the parts. (*Mason Machine Works, Taunton, Mass.*)

WERNER'S PICKER AND RELIEF MOTIONS.

A. PICKER MOTION.

The same is shown in the accompanying illustrations of which Fig. 1, is a front view of an end portion of a loom, showing the motion applied thereto. Fig. 2, is a horizontal sectional view of the adjustable means on the line 2-2, of Fig. 1. Fig. 3, is a top view of a portion of the shuttle-box showing the picker and its engagement with the stick.

a, represents a shuttle-box, and *b*, the picker-stick (steel) pivoted at its lower end in a slot *a'*, of the casting *d*. A strap *e*, is connected to the lower end of the picker-stick and provided with holes *e'*, in which one end of a coil spring *f*, is inserted. A series of holes are provided so that the tension of



the spring may be regulated as desired. The picker-stick *b*, and its casting *b'*, are shown in illustration as in two parts; but they may be made equally as well in one.

*a*⁵, is a picker block provided with the slot *a*⁵, in which the picker-stick can play up and down. *a*⁴, is the picker. *a*⁶, is a latch upon the block engaging a screw *a*⁷, or other part upon the picker to join the picker and block together. Said picker and block are mounted to slide upon a rod *a*¹, and in a groove *a*², thus insuring the picker moving in a straight line to and fro. Since the picker-stick is pivoted in its movement to and fro, it will have a sliding engagement with the block *a*⁵, by means of the slot *a*⁵.

The tendency of the picker-stick when it first starts is to throw the picker upward, very often dislodging the shuttle by causing the picker to make a lateral blow upon the end of the shuttle. To obviate this and to insure the picker giving a direct blow upon the shuttle in the direction of its axis, the picker block is provided, and which is loosely connected with the picker.

Now, when the picker-stick moves forward and gives its blow to the picker block, this blow is transmitted to the picker in a direct line, and the picker and block, by means of the latch, move together.

*a*¹⁰, is the ordinary buffer for the picker and *a*³, for the picker block.

g, represents the arm of the rock shaft. *h*, is the rock rod having a swivel connection at one end with said arm by means of the lugs *g'*, and the pin *g*², passing through said lugs and the reduced end of the rock arm.

c, is an adjustable sleeve mounted upon the stick *b*, and having its arms *c'* hollow and shaped to fit the stick, and provided with set-screws *r*, for securing the sleeve upon the stick at any desired point.

*c*², is a rod rigidly secured to a lug *c'*, upon the sleeve, and provided at its opposite end with screw threads *c*³. The pivoted end of the stick or its casting *b'*, when the two are made separate, is provided with a lug *b*², having an aperture in which the rod *c*² is arranged.

*c*⁴, are nuts, one upon either side of the part *b*², by means of which the rod *c*², and its connected sleeve *c*, may be adjusted up and down on the stick and retained in any desired position.

m, is a connecting piece provided with a hollow head *m*⁴, to receive the screw threaded end *h'*, of the rock rod *h*. *m*¹, is a set-screw for firmly binding the rod in said head. *m*², is a loop connected to the head and provided at its end with the ball shaped projection *m*³, which fits in a correspondingly shaped socket in the sleeve. A strap *c*⁵ is arranged to fit over said ball shaped projection and hold it to its seat, the strap being secured to the sleeve by means of rivets or screws *c*¹⁰.

The sleeve is adjusted upon the stick by means of the nuts *c*⁴, and the set-screws *r*, to any desired position, according to the length of the throw it is desired for the stick to take, the length of the rock rod *h*, being also suitably adjusted.

Upon the starting of the machinery the picker-stick moves back and forth, driving the picker and sliding freely up and down in the slot *a*⁵, in the picker block. At the same time the picker-stick by means of the swivel connection is permitted to have a lateral play. The ball-joint by means of which the loop is connected with the sleeve gives a secured and almost frictionless connection between the rock rod and the picker-stick.

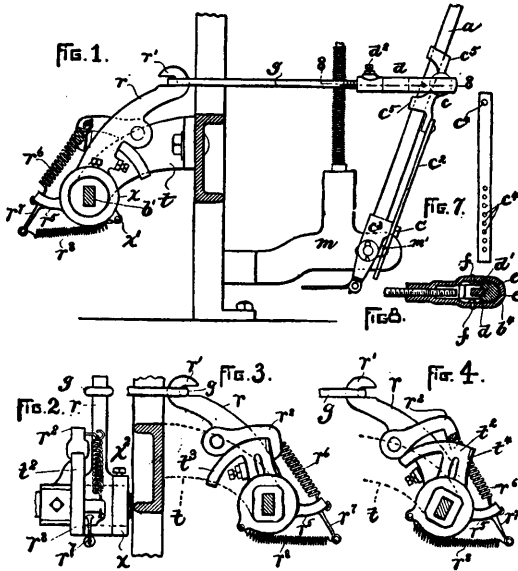
The picker block and adjustable sleeve may be made of aluminium if desired.

B. RELIEF MOTION.

The same relates to a clutch mechanism constituting a relief motion, for use in connection with the picker-motion, and has for its object, among other things, to provide means whereby the rocker arm may be released and the shipper rod operated to stop the loom should any unusual strain come upon the picker-stick.

Fig. 1, is a view of a portion of the loom, showing the relief motion associated therewith. Fig. 2, is a front view of the clutch mechanism. Fig. 3, is an end view of the clutch mechanism, showing the parts in operative position. Fig. 4, is a similar view, showing the parts released from operative connection with the rocker shaft. Fig. 5, is a detail view, showing the

picker stick, picker block and picker in operative connection. Fig. 6, is a detail view, showing the arrangement of the picker and its associated parts in the shuttle-box. Fig. 7, is a detail view of the adjusting strap. Fig. 8, is a sectional view taken on the line 8-8 of Fig. 1. Fig. 9, is a view similar to Fig. 1, showing the connection between the relief motion and the shipper rod, the connection between the relief motion and the picker-staff being omitted for the sake of clearness. Fig. 10, is an end view of Fig.



1, looking from the inside of the loom frame. Fig. 11, is a detail, showing the connection between the relief motion and the shipper rod.

a , represents a picker-stick (steel) pivoted at its lower end in a slot m , of a projecting arm m .

a' , represents a picker block provided with a slot a^2 , in which the stick plays. b , represents the picker provided with a finger-piece b' , having a finger b^2 , arranged to engage a projection a^3 , on the picker block.

Both the picker and picker block are constructed and arranged to travel at one end on a rod b^4 , and the other end in a slot in the shuttle-box (not shown). By this arrangement the picker can travel back and forth in a straight line uninfluenced by the upward thrust of the picker-stick, which plays up and down in the slot a^2 .

c , is a sleeve having two arms c^5 , engaging the picker-stick. c^2 , is an adjustable connector secured to the lower arm of said sleeve at one end and at its other end secured to a lug on the casting c^3 , by means of a screw c^4 . This connector is provided with a series of holes c^6 , by means of which the sleeve may be adjusted to any desired position on the stick.

g , is the rocker rod provided at one end with a loop engaging a hook r' , on the end of the rocker arm r .

At its other end said rocker rod is provided with screw-threads for engagement with a hollow head d , of a loop d^4 , the rod being retained in said head by means of a set-screw d^2 . The loop is provided upon its interior with horizontally arranged flanges d^3 , on both upper and lower edges. e , is a ball cast on said sleeve arranged to play in the said loop to form a ball-and-socket bearing. f , are pins inserted in the loop to prevent the ball from leaving the flanges. The ball is provided with a slot e' , in which the picker-stick rests.

b^1 , is the rocker shaft. On said shaft is mounted loosely the rocker-arm r and a coupler t^2 , fast upon said shaft, said rocker-arm and coupler being retained in place by collars x , rigidly secured to said rocker shaft by set-screws x^2 . The rocker shaft is carried by the arms t .

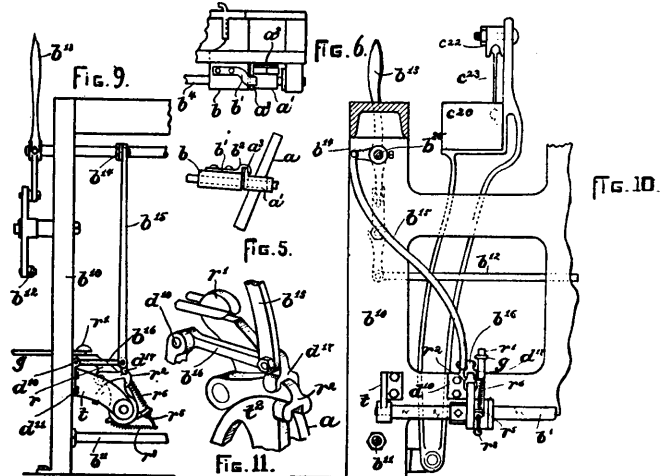
r^2 , is a dog pivoted on the rocker arm and arranged for detachable engagement with the coupler t^2 . Said dog is provided with a slot at its free end in which the arc-shaped portion t^3 of the coupler can play, thus keeping the dog always in alignment with the coupler. The coupler is provided with a radical portion t^4 , with which the dog engages.

r^3 , is a spring connected at one end with the free end of the dog and at the other end with a lug r^5 , projecting from the hub of the rocker arm. r^4 , is a spring connected at one end with an arm r^7 , projecting from the lug r^5 , and at its other end with a lug x' , on one of the collars x . The spring r^4 , serves to return the dog to its engagement with the coupler, and the spring r^3 , serves to draw the rocker arm forward so that its dog can engage with said coupler.

The parts being constructed and arranged as shown and described, it will be seen that the picker-stick plays up and down in the slot in the picker block, driving the picker to and fro in a straight line. The sleeve c , enables the loom fixer to adjust the throw of the picker, and at the same time to so connect the rocker arm with the rocker rod and with said sleeve as to allow a lateral play of the picker-stick.

The coupler and its associated parts being in the position shown in Fig. 3, with the coupler in engagement with the dog, the picker-stick will be moved back and forth as the rocker arm moves. Now, should any unusual strain be brought upon the picker-stick, the dog and coupler are so arranged that under such circumstances the free end of the dog will be released from the coupler, thus releasing the rocker arm and leaving the coupler, free to rock with the shaft.

Referring now to Figs. 9, 10, 11, in which the relief motion is shown connected to the shipper rod in order to stop the loom should the picker meet with any obstruction, the connection between the relief motion and the picker-stick being omitted in these views for the sake of clearness, b^{12} represents the usual shipper rod connected and operated by a lever



b^{13} , mounted upon the shaft b^{20} . b^{14} , represents an arm fast upon said shaft to which a lever b^{15} is pivoted, this lever at its lower end being pivoted to the free end of a lever b^{16} , pivoted at d^{10} , to a casting d^{11} , secured to the loom frame b^{10} . The free end of this

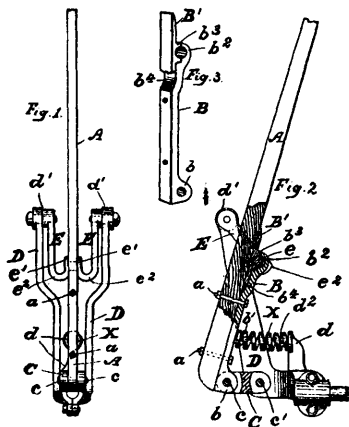
lever is provided with a saddle d^{17} , constructed and arranged to straddle and ride upon the top of the dog r^2 .

From the foregoing, it will be seen that as long as the picker meets with no obstruction, the relief mechanism will move back and forth with the parts in normal position the saddle d^{17} and its lever resting upon the dog r^2 , which plays back and forth in said saddle without affecting the lever b^{15} . Should, however, the picker meet with any obstruction, as has already been described, the dog r^2 will be thrown upward, releasing the rocker arm, and leaving the coupler free to rock with the shaft, as heretofore described. This upward movement of the dog r^2 , will give an upward thrust to the lever b^{15} , turning shaft b^{20} , and by the connections operating the shipper rod to stop the loom.

In Fig. 10, c^{20} represents the lay, c^{21} the lay sword, c^{22} the hand rail, and c^{23} the reed, and which are shown merely to clearly exhibit the motion in relation to the other parts of the loom. b^{11} , represents one of the rods connecting the parts of the frame. (Louis C. Werner, Broadbrook, Conn.)

PAIGE'S PICKER MECHANISM.

The object of this motion is to prolong the life of the picker and picker-stick as well as to throw the shuttle straight. Fig. 1, is a front elevation; Fig. 2, is a vertical sectional elevation, and Fig. 3, an enlarged detail view of the mechanism.



A, is the picker-staff or stick. Bar B, is bolted to the picker-stick at a, a , the lower end of the bar being enlarged, as at b , sufficiently to receive and form a bearing for a pin e , which connects said picker-stick with one end of a link C, the other end of said link being pivoted at e' , to a bifurcated bracket or support D, adapted to be rigidly attached to a loom.

As shown, the stick is supported directly on the link and immediately on the bracket or support D. The said bifurcated support comprises short and long arms, respectively, d, d' , the short arm d , being provided with a boss d^2 , opposite to which on the bar B of the picker-stick is a similar projection or boss b' , each boss or projection being designed to support the ends of a helical spring X, for insuring the quick return of the picker-stick to its normal position.

The long arm d' , of the bifurcated support carries the free ends of a yoke E, which is provided with a journal e , adapted to fit a bearing formed in the upper end of the bar B, and thus support a picker-stick. This bearing in the upper part of the bar B, is open or separable, one portion being formed

in said bar, as at b^2 , and the other portion being formed upon a plate B', as at b^3 , said plate being formed quite long, its journal-bearing being located at a point midway from its ends so that it cannot even produce an abrasion upon the picker-stick, against which it rests on a plane with the bar B, said plate B', being let into the bar B, as shown at b^4 , for this purpose.

The plate B', is reversible, end for end, and is not fastened in any way to either the picker-stick or the bar B, the flanges or shoulders e' , of the yoke E, at each side of its journal e , answering the purpose of holding said plate in position, and thus providing just enough elasticity in the connection of the yoke E, with the picker-stick to avoid unnecessary friction.

The present picking mechanism prevents the stick from being worn by the bearing, and the plate B', being made easily reversible can be frequently reversed to insure uniformity of wear, which, however, will be comparatively small.

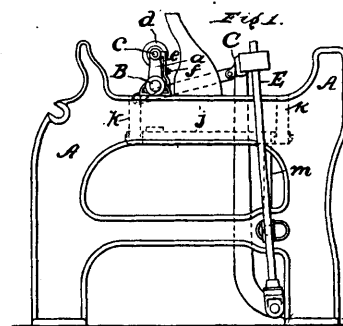
To avoid weakening the stick at this point and to provide for easily reversing plate B', the bar B is recessed at b^4 , to receive between itself and the stick the plate B' and to aid in holding the plate in its proper situation. Said plate is held laterally by the shoulders e' of the swinging yoke E, and by these means the journal-bearing of the yoke is provided and the stick left entire adjacent thereto.

The metal at each side of the journal e , of the yoke E, is curved, as will be seen at e' , below the said journal, and this is done to allow more room for the picker-strap, permitting it to drop as low as may be required. (J. W. Center and S. C. Kennard, Manchester, N. H.)

PERHAM'S PICKER-OPERATING MECHANISM.

Fig 1, is an end view of sufficient of a loom to explain the device. Fig. 2, is a front view of the same, a part of the crank-shaft, breast-beam, and lay being shown as broken away, so as to better illustrate the picking mechanism.

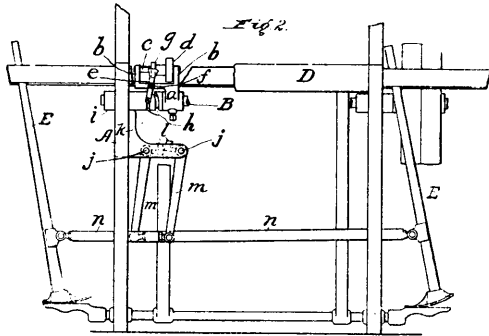
A, designates the loom-frame. B, is the crank-shaft, by which the lay C is operated. D, is the breast-beam, and E are the picker-sticks. Fastened upon the crank-shaft by means of a set-screw, is a bracket a , with two arms b, b . Journaled in and extending between the arms b, b , there is a short shaft or pin e , supporting a wiper d , which is adapted to be moved from side to side thereon between the said arms. e' , is a lever fulcrumed at f , on the bracket a , and having one end loosely engaged with a collar or flange g , connected with the hub of the wiper d , so that in moving the lever on its fulcrum it may move the wiper from side to side on its pin or shaft. The



other end of the said lever is provided with a traveler, pivoted to the lever and adapted to move in a double cam-groove h , formed in the box.

j, are rock rods or pins journaled in brackets *k*, connected with the loom-frame, which rods or pins have upwardly-projected crank-arms *l*, secured to their outer ends, the ends of which arms extended into the path of the wiper *d*, when it is shifted to the extremes of its allowed movement longitudinally on its supporting shaft or pin. To the other ends of the rods *j*, *j*, are secured the upper ends of arms *m*, *m*, the lower ends of which are connected with straps, or it may be rods or cords *n*, with the picker-sticks *E*.

It will now be seen, that as the crank-shaft *B*, is rotated, the bracket *a* will be rotated, revolving the wiper *d* around the shaft, and as the traveler crosses from one cam-groove to another, as it were, the lever *e* will be moved upon its fulcrum, so as to shift the wiper *d*, from side to side on its supporting-pin, and cause it to act first upon the end of one of the crank-arms *l*, and then upon the other, actuating



one of the arms *m*, and the picker-stick operatively connected therewith, so as to pick the shuttle through the shed.

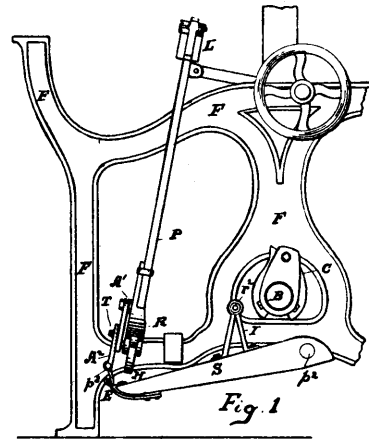
By means of this mechanism it will be possible in the construction of a loom to entirely dispense with the cam-shaft for operating the picker-staves or their equivalents—thus greatly simplifying the construction and cost of manufacture of the loom, giving more room for the warp-beam and cloth-roll, and lessening the liability of breakage of parts. Besides this, the loom is made much easier of operation, is more quickly and easily stopped, and is relieved of much of the shock and jar that is occasioned by the abrupt cams of the picker motion on the cam-shaft. The wiper makes double the number of revolutions of the cams on the cam-shaft, and hence, it is not necessary to make the said wiper so abrupt or blunt, or to act with the same suddenness, so as to create the same shock or jar. (Charles Foster Perham, Lowell, Mass.)

BARSELOU'S ROCKER AND SHOE CONNECTION FOR PICKER-STICKS.

Fig. 1, is an end view of a part of a loom-frame, showing the end of the lay, the picker-stick, the main driving-shaft, and its cam operating the shoe, and a side view of the connection made between the shoe and rocker, to which the picker-stick attaches. Fig. 2, is a view in elevation of a part of a loom-frame, showing the lay, the picker-stick, and the rocker, and a front view of the connection made between the rocker and shoe. Fig. 3, is a perspective of the mechanism for connecting the shoe and the rocker.

F, designates that part of the loom-frame with which the improvement connects. *B*, designates the main driving-shaft, and *C*, a cam located on said shaft where projecting beyond the frame. *S*, designates the shoe, which is at its heel end, at *p*², pivoted to the

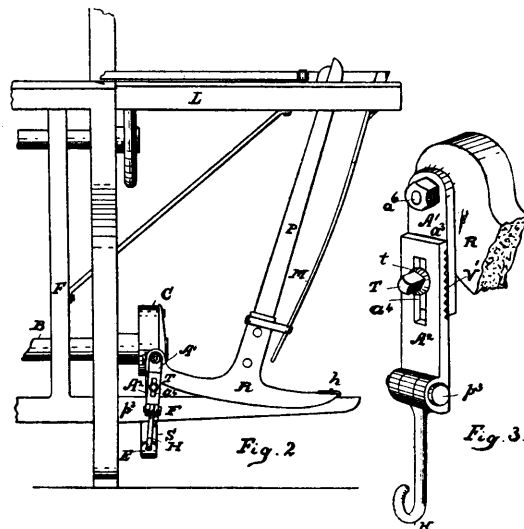
frame. *L*, designates the lay. *P*, the picker-stick, and *R*, the rocker, with which the picker-stick connects. *I*, designates a standard upwardly projected from the



shoe, and *r*², a friction-roller arranged in the top of of the standard for engagement with the cam which operates the shoe.

A', designates a plate which at its upper end *a*⁴, pivotally connects with that end of the rocker which is opposite to that which is hinged to the frame at *h*, and this plate *A'*, on its outer face *a*³, is provided with a V-shaped rib *V'*, projecting therefrom at right angles to the side edges of the plate. *A*², designates another plate provided with V-form recesses *V*², arranged side by side on the inner face of the plate, in which they are formed at right angles to the side edges of the plate, and each of these recesses is adapted to receive the ribbed projection *V'*, on the outer face of the underlapping plate *A'*.

*a*¹, designates a slot made in the exterior plate *A*², and *T*, designates a set-screw which is passed through the slot *a*¹ to be threaded into the plate *A'* and at its outer end this set-screw is provided with a collar



t, by which when the set-screw is screwed inwardly this collar will straddle the slot so as to hold the two plates *A'*, and *A*², with the rib *V'*, in such one of the recesses *V*², of the plate *A*², as is desirable to

regulate the distance at which the shoe shall pull down the rocker and the measure of throw given to the picker-stick. The lower end of this plate A², is provided with a hook H, which latter is pivoted to the plate A², at p³, and this hook is arranged to hook into the toe end of the shoe S, in the eye E, formed therein.

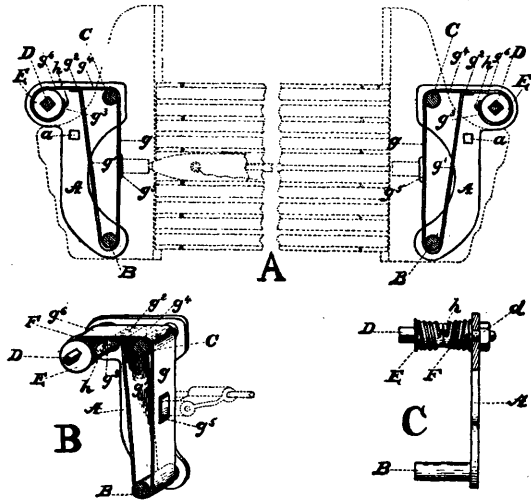
As thus made, the connection made between the shoe and the rocker, to which the picker-stick is attached, is adjustable as to length, is quite free from jar, and is much more durable than the ordinary leather loop used.

The operation of the mechanism thus described is as follows:—The driving-shaft B, when revolving, causes its cam C, to engage with the roller r², so as to force downwardly the shoe S, on its hinged connection, thus pulling down the rocker and operating the picker-stick to throw the shuttle, with the picker-stick drawn back to its initial position after the cam has passed from off the roller r², by the return-spring M. (A. Barselou, assignor of one-half to L. N. March, Cohoes, N. Y.)

DOYLE'S PICKER-CHECK.

Heretofore, yielding abutments supported by springs have been used to receive the blow of the picker as it is driven back or outward by the point of the shuttle as the latter enters its appropriate shuttle-box. In this class of devices the reaction of the spring used to sustain the yielding abutment has always heretofore caused the shuttles to rebound, more or less, which has interfered greatly with the introduction and use of devices of this class.

In the present picker-check, we find introduced, between the yielding abutment which receives the impact of the picker and the point of application of the sustaining-spring therefor, means for creating fric-



tional resistance, which dulls or deadens the recoil of the sustaining-spring, and although this spring still has considerable strength, its action is slowed or dampened, so that it is not so quick in its recoil as to cause the shuttle to rebound. This feature may be accomplished in a variety of mechanical forms, of which one is shown in the accompanying illustrations.

Fig. A, is a side view of the mechanism, shown therein by solid lines, and showing also the position, by dotted lines, of the adjacent portions of the loom to which the same is designed to be attached. Fig. B, is an isometric view of the new device, the view also indicating by dotted lines the relation thereto of the

picker and the rod upon which it slides. Fig. C, is a view in end elevation, partly in section, showing some of the parts of the improvement.

A, is a plate of suitable size and shape and intended to be applied and secured to a portion of the frame-work of the lathe of a loom at the outer end of the shuttle-box thereof.

The device illustrated is intended particularly for use in looms having shifting shuttle-boxes, but if desired, it may be applied to looms in which the boxes do not move or shift.

The base-plate A, is secured in suitable manner to the part by which the check is to be carried, as, for instance, by a bolt passing through a hole a, in the base-plate, said hole being shown in Fig. 1.

To the base-plate A, are secured studs or posts B, and C, and at a short distance laterally from the stud C a short shaft D is mounted on said plate. One end of the shaft D, passes through a hole in the plate A, and is threaded. A nut d, being turned upon the threaded end of D tightly against the plate A, secures said shaft D in position. Upon this shaft is fixed a sleeve or barrel E, to which is applied a spring F, the opposite ends of said spring being secured to the sleeve or barrel near the ends of the latter, and the middle portion of the spring first being coiled around the sleeve or barrel to form oppositely-directed spirals, is then bent to form a hook h.

A belt of flexible material—as, for instance, leather—is shown at g' g' g' g' g' g'. This belt is drawn around the studs B and C to form a loop, as is indicated by the drawings at g' g' g' g'. The slack portion of this loop toward the rear is attached by a connecting-link g² g³ g³ to the hooked end h of the spring F. Upon the front face of the belt g' g' g' g' a protective shield or reinforcement g⁵ is shown at that point, which is likely to be abraded by the impact of the picker.

The operation is as follows: When the shuttle is driven rapidly into its box, its point engages with the picker, and the latter is driven backward or outward against the front face of the loop g' g' g' g' at the point indicated by the reinforce or shield g⁵. This is the point which constitutes the yielding abutment for the picker. This abutment at g⁵ is driven backward or outward, and in this operation certain portions of the loop, which are shown as lying between the stud C and the point g' (at g⁵) are made to slide over the surface of the stud C from the rear to the front, and if the blow of the picker is sufficiently strong, this will continue until the points of the loop at g' and g⁵ are in contact, when the loop being all taken up, a dead-stop will be obtained. During this movement the link g² g³ g³ will have drawn the spiral spring out around the barrel E, and this spring being of proper strength will finally check the rearward movement of the picker, after which its resiliency will restore the parts to their normal position. (Indicated in the drawings.) In this return movement of the spring F, portions of the loop g' g' g' g' are again drawn over the surface of the stud C with considerable friction, which dulls or deadens the recoil of the spring, and the parts return less rapidly to their normal position than in devices in which no resistance is interposed between the yielding abutment and the sustaining spring. The loop will be found to slide very little, if any, around the stud B. (James T. Doyle, Skaneateles Falls, New York.)

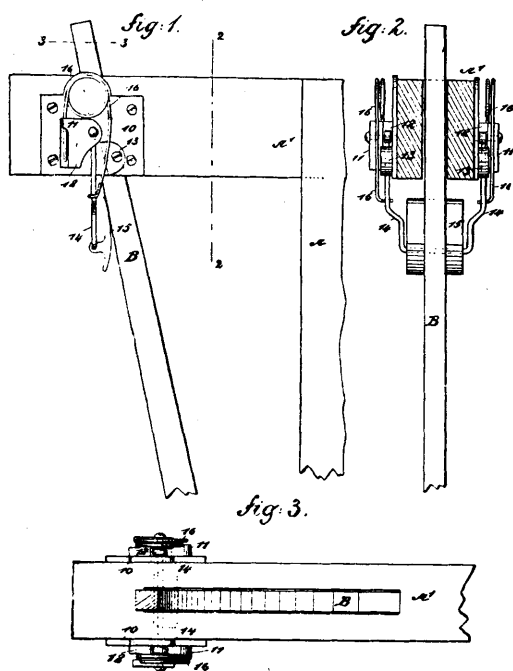
SARTWELL'S PICKER-STICK CHECK.

This mechanism is adapted for use in that class of looms in which the shuttle that carries the filling is thrown back and forth in the lathe by picker-sticks, located one at each end of said lathe; the

object being to provide a yielding stop to check the picker-stick in its outward movement and to cushion the said stick and thus relieve the shock at the sudden stopping of the shuttle as it shoots through the shed and comes in contact with said stick; and a further object of the mechanism is to provide a check which will be exceedingly simple, durable, and economic, and which will not exert a downward thrust on the picker-stick, but a tension in a horizontal direction.

Fig. 1, is a side elevation of a portion of the lathe of a loom, illustrating the picker-stick in side elevation and likewise the check. Fig. 2, is a vertical section taken on the line 2, 2, of Fig. 1; and Fig. 3, is a horizontal section taken practically on the line 3, 3, of Fig. 1.

A, represents a portion of the loom-frame; A', the lathe, and B, the picker-stick, arranged to throw the shuttle. At each side of the lathe a plate 10, is secured, and each of said plates is provided with a lug 11, provided with a recess 12, while adjacent to



the lug 11, an offset 13 is secured to the plate, as is best shown in Fig. 1, and the face of the offset substantially opposed to the lug 11, is of a yielding or elastic material, such as leather or rubber, or the equivalent thereof.

A substantially U-shaped arm 14, has its members pivoted in the upper portion of the recesses 12, of the said lugs 11, the bottom or bow portion of the arms being a predetermined distance below the bottom portion of the lathe, and upon the lower or bow portions of the arms 14, a stop-plate or shield 15 is secured, adapted to be engaged by the picker-stick B, in its outward movement, and the face of the stop-plate or shield which is engaged by the picker-stick B, is made cylindrical or convex, as best shown in the said Fig. 1.

A spring 16, is located at each side of the lathe A', and one end of each spring is secured in one of the lugs 11, of the base-plate 10, the spring being provided with one or more coils above the top of the lug with which it is connected, and the said springs are then carried downward to an engagement with the

side members of the U-arm 14, the tendency of the spring being to carry the stop-plate 15, in an inward direction, at which time the arm 14, will have a downward and inward inclination.

In the operation of this device, when the shuttle strikes the picker-stick, the picker-stick is forced outward or rearward, engaging with the stop-plate 15, and as this plate has a convex surface it has a rocking connection with the picker-stick, and, therefore, the plate will exert a lateral tension upon the picker-stick (and in turn impart it to the picker and shuttle) at all times and not the downward tension which is found in most other checks for looms, and under this construction the picker-stick will have less wear than heretofore.

Furthermore, when the picker-stick is carried outward the springs 16, will be placed under tension, and as these springs are simply engaged with the pivoted U-arm 14, their ends are free to slide on the members of the arm 14, and they are not weakened to any appreciable extent when acted upon by the stick, since none but torsional strain will come upon the springs; and when the springs act to return the picker-stick in an inward direction, the moment that the U-arm 14 strikes the check-projections 13, on the base-plate 10, the springs will be free to vibrate independently of the arm 14, and, therefore, will come to rest more rapidly than if they were secured to the arm to vibrate therewith. Therefore, it is obvious that even in both movements of the picker-stick the springs 16, will not be in any manner injured, while they will act as effectively as though the springs were connected directly with the stop-plate 15. (William E. Sartwell, Troy, Vt.)

MOONEY'S PICKER CHECK-STRAP.

By it the weaver is enabled to see at a glance whether the shuttle is running properly or not, and the adjustment and correction are made with great ease.

Fig. 1, in front elevation and centrally broken out, represents the lay of a loom with the improvement applied thereto. Fig. 2, is a plan view thereof, also centrally broken out.

A, represents the lay which is slotted at *a*, for the picker-sticks P. B, B', are the shuttle-box binders. A check-strap C, is secured at its ends to the lay, back of the shuttle-boxes, passing around outside of the picker-sticks and along the front of the lay through guide-loops 20.

At the under side of the lay and near its center, is secured a stand B^x, having ears 5, through which and into the lay suitable screws 7 pass, a third outwardly-extended ear *b*, projecting in front of the lay.

The ear *b*, is notched or slotted at *b'*, and the stand B^x is provided with upturned guides *b²*, rounded at their inner sides and adapted to rest against the front of the lay.

A headed stud *b³*, having a wooden roll *b^x* thereon is threaded at its lower end and extended through the slot or notch *b'* and held securely in place by a check-nut *n*, a washer *w* being interposed between the nut and under side of the ear *b*.

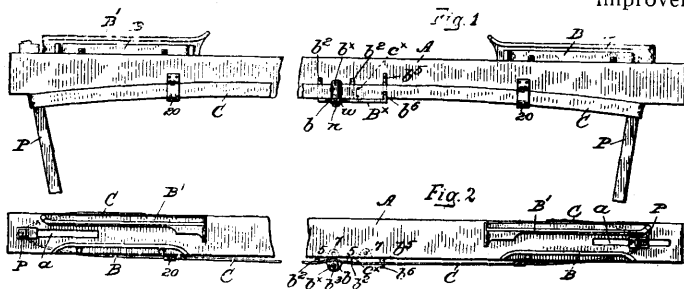
The roll *b^x* is held in parallelism with the guides *b²* of the stand B^x and with its inner periphery set more or less within the plane of said ends, according to the adjustment of the stud in the ear *b*.

The check-strap passes over the guides *b²* and under the roll, and the tension on said strap will be greater or less, according to the position of the roll nearer to or farther from the bottom of the notch or slot *b'*, varying the bend in the strap as it passes the roll and thus regulating the friction.

As the picker-sticks are oscillated within the looped

ends of the strap, the latter moves longitudinally back and forth, regulated by the tension device.

A suitable lug or stop c^x , (a block of leather) is



fastened to the outer face of the strap C, between one of the guides b^2 , which also forms a stop, and a second upturned stud or stop b^5 on the stand B^x , the opposite reciprocations of the said strap bringing the lug c^x into engagement with one or other of said stops, the further movement of the looped strap being stopped and the picker-stick arrested. A short upturned stud b^5 in front of the stop b^2 serves to guide the strap between them.

The tension-roll b^x is so adjusted that when the shuttle engages the picker-stick at the right-hand, Figs. 1 and 2, the momentum will be checked gradually, and when the lug c^x engages the stop b^5 further movement of the strap and stick is checked just before the stick engages the outer end of its slot a . The stop b^2 will cooperate with the lug c^x on the opposite throw of the shuttle and the latter will be brought to a stop gradually in the shuttle-box, eliminating the chance of rebound.

If the shuttle is not running properly, the lug c^x will not bring up against the stops b^2 b^5 , and the attendant, by noting the movement of the lug, can thus know whether the shuttle is operating properly.

This check-strap is adapted to looms wherein the lay or the shuttle-stroke varies in length, it being obvious that the shorter the stroke of the shuttle the greater the force with which it will enter the shuttle-box, the blow of the picker-stick being constant, and for a longer stroke the force of the shuttle at the end of its stroke will be diminished.

When the stroke is long, the tension on the strap is decreased by moving the roll b^x outward, but when the stroke is short the roll is moved inward, thus increasing the friction on the check-strap and acting to take up the greater force of impact of the shuttle upon the picker-sticks.

By the use of this check-strap the shuttle-box binders may be adjusted to permit the shuttle to enter freely, yet with sufficient friction to be retained in place, so that wear on the shuttle and binders is decreased.

The length of the strap is such that neither picker-stick can strike the end of the slot a , on its outward throw, the stick striking the inside of the strap and avoiding shock. (Draper Co.)

DURKIN'S PICKER MECHANISM.

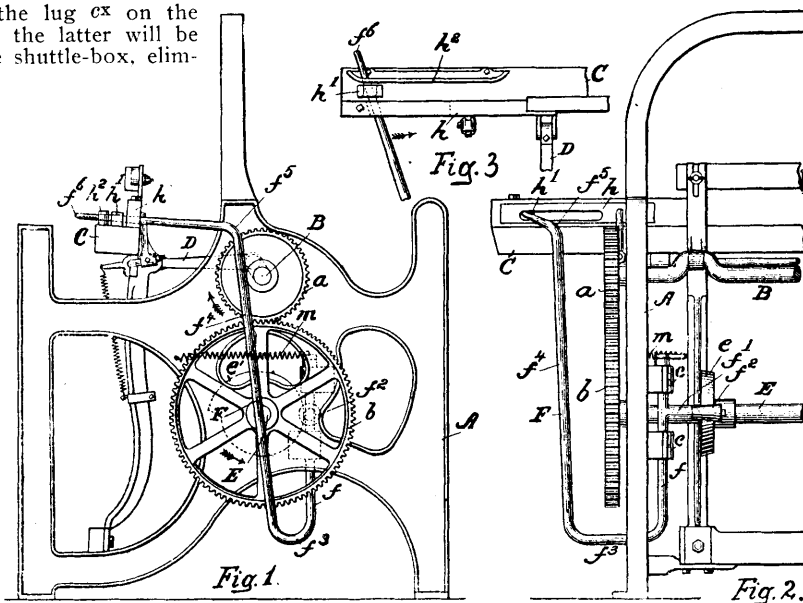
The novelty of this picker mechanism consists in improvements whereby the picker is actuated to throw the shuttle across the loom.

Fig. 1, in side elevation, represents a sufficient portion of the right-hand side of a loom to enable the improvements to be understood; Fig. 2, is a rear view of the part of the loom shown in Fig. 1, and Fig. 3 is a detail view.

Letters of references indicate thus:—A, the loom-frame; B, the crank-shaft; C, the lay; D, the connecting-rods between lay and crank-shaft; E, the under or picking shaft; and a , b , the gearing connecting the said shaft with the crank-shaft.

Upon the inside of the loom-frame are located bearings c , in which are placed the arm f , of picker-rod F, the said arm having projecting from it a finger f^1 , upon which is a roll f^2 , which is normally kept pressed by a spring m , toward the picking-bowl e , on the shaft E.

The rod F is bent at f^2 outwardly through the loom side and is then carried upwardly outside the loom side, as at f^1 , to the point f^3 , where the rod is again bent horizontally forward at an inclination, as shown in Fig. 2. The substantially horizontal extremity f^3 , of the rod extends through a slot in the binder h , forming one side of the shuttle-box, and through the usual picker h^1 in the shuttle-box and through the stationary side h^2 , of the shuttle-box. The spring m



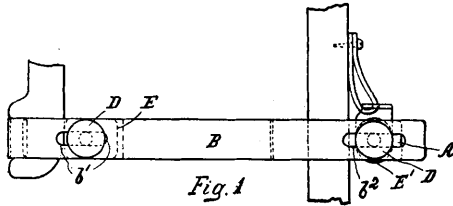
acts to normally keep the roll f^2 against the cam e' . (Draper Co.)

LEMAIRE'S PICKER-STRAP.

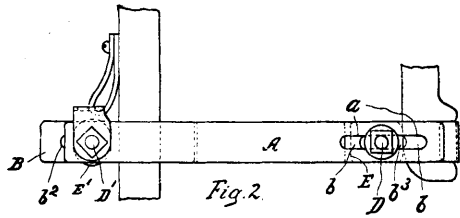
Figs. 1, and 2, are side elevations showing the opposite sides of this improved strap, and Fig. 3, is a plan.

Picker-straps of this kind (for plain looms) as heretofore made, consisted of a stiff strip of leather having a leather strap at each end. These straps were passed one around the picker-stick, and the other around an arm of the picker-shaft, and the free

end of each strap was secured to the stiff connecting-strap. Picker-straps made in this way soon wear out, because of the severe strain put upon the straps,

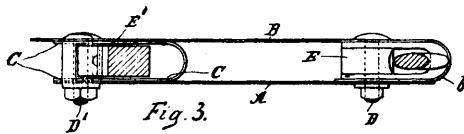


and are, moreover, hard to adjust, a change in the adjustment necessitating the removing of the nuts on the ends of the bolts which connect the straps to the strip. To overcome these objections is the purpose of the new strap, which is made up of strips A, B, and C of metal, the strip B, being bent to form a hook *b*, and the strip C, being bent into the form of a staple. These three strips are fastened together by bolts D, D', the bolt D, passing through the strip B, the free end of the hook *b*, and the strip A, while the bolt D', passes through the strip B, the free ends of strip C, which is placed between the pieces A, and B, with its closed end toward the bolt D, and through the strap A. The bolt D, and hook *b*, form a loop to hold the picker-shaft and the bolt D', and the strip C, form a loop for the picker-stick.



The bolts D, D', pass through the blocks E, E', made of pressed paper, which are placed between the strips A and B, and serve to make a better bearing for the picker-stick and arm of the picker-shaft.

The strip A has a lengthwise slot *a*, and strip B has three lengthwise slots *b*¹, *b*², *b*³. These are adjusting-slots and form an important feature of the improvement, for it will be clear that the long slot *a*, in strip A, and the shorter slots *b*¹, *b*², *b*³, in strip B,



provide for the adjustment of the length of the picker-strap, and also for the adjustment of block E'.

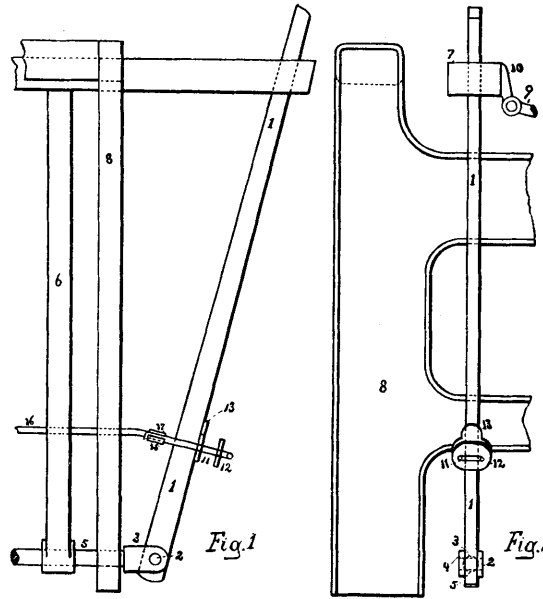
A cushion of leather H, is placed inside the hook *b*, thus rendering the operation of the strap less noisy. (N. Lemaire, Taunton, Mass.)

LAHUE'S PICKER-STRAP.

This strap relates to the connection between the pick-strap and the staff.

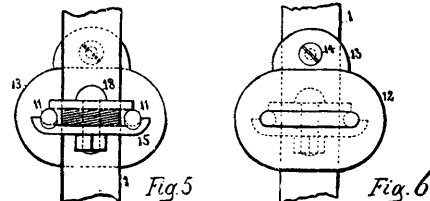
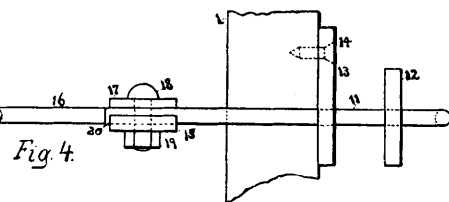
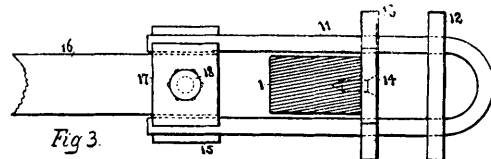
Fig. 1, is a side view of that portion of a loom comprising the picker-staff and connected mechanism. Fig. 2, is an end view of the same. Fig. 3, is a top view of the pick-strap connection with the staff. Fig. 4, is a side view of the same. Fig. 5, is an end elevation of the same from the left end. Fig. 6, is an end elevation of the same from the right end.

The staff 1, is pivoted by a pin 2, in a slot 3, in the head 4, of the shaft 5, which carries the sword 6.



7, is the lay-sill, and 8 is the frame of the loom. 9, is the pitman, and 10, its bearing on the lay-sill.

11, is a round rod bent into a U-shape, making the clear distance between the stems of the U somewhat greater than the thickness of the staff 1. Two leather pieces are cut out whose outline is immaterial, but one of which, 12, is made oval, while the other, 13, is provided with a tab or flap, and two holes are punched in each piece, so that they will slip upon the U-shape rod. The oval piece is slipped on first and pushed to the bend of the U. The flapped piece is then attached to



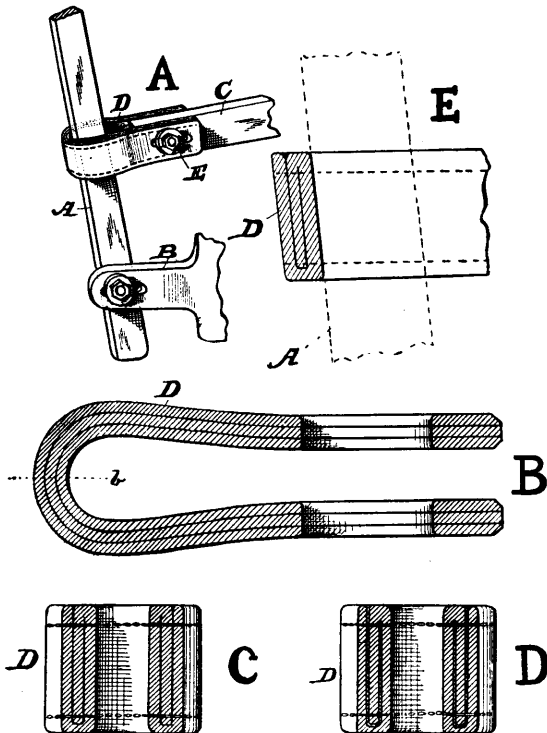
the picker-staff by a screw 14 at whatever distance from the pivot of the staff will give the desired power. A plate 15, with bent-up ends, is placed under the ends of the U, the pick-strap 16 is laid upon it and be-

tween the stems of the **U**, and a leather washer 17 laid over that, and all are clamped together by a bolt 18 and nut 19, passing through corresponding holes in them. To make the clamp surer, the extreme ends of the **U** are bent down, as at 20, to form shoulders. Thus, however violent and frequent the jerks on the pick-strap, it can never pull loose from its connection. Owing to the different angles of the staff with respect to the direction of pull of the strap the ordinary connection chafes the sides of the staff, as well as wearing out the connecting-loop; but with the new connection, the **U**-shaped rod never touches the staff and all the wear comes on the leather piece 13. The rod being round, even that wear is slight. The leather piece 12 is pressed slightly into the bend of the **U** at each pull of the strap and forms an exceptionally simple and durable cushion, its elasticity relieving the strain on the staff and on the shuttle. (*O. A. Sawyer and M. M. Lahue, Lowell, Mass.*)

WARREN'S PICKER-STAFF STRAP.

Fig. A, represents sufficient of a picker-staff, its strap and connections, as is necessary to illustrate the application of this strap to practice. Fig. B, is a full-size central longitudinal section of said strap. Fig. C, is a transverse section thereof, taken at the point indicated by line *b*, Fig. B; and Fig. D, is a similar view, showing a slight modification. Fig. E, is a partial sectional view of this improved strap, taken on line *b*, Fig. B, cutting through the fold at the center of the bend of the strap.

The object is to produce a lug-strap for looms which shall embody strength, durability, and elasticity



during use, and consists in a lug-strap made of a single piece of leather of sufficient size to produce the strap, said piece being folded upon itself and then fastened near the folded edges and bent into the loop form of a lug-strap.

A, represents the picker-staff of a loom, which is pivoted at its lower end to a stationary bearing B, forming, in practice, a part of the loom-frame.

C, represents part of the lug-strap operating-bar, to the outer end of which is attached the lug-strap D, through the loop of which the picker-staff passes, as shown in Fig. A.

The completed lug-strap is made from a single piece of leather, about square in shape, said piece being folded upon itself to produce several thicknesses, one lying against the other, with folds at the edges of the completed strap, as is shown in the drawings.

This strap is so folded that one edge of the piece of leather from which the strap is made comes upon the outside of the strap at what is to be the top thereof, and the other edge of the said piece of leather comes upon the inside of the completed strap near what is to be the bottom thereof, thus forming a wide fold at the bottom of the strap, with the inner edge of the leather lying in said fold, and a narrower fold at the top of the strap, with the outer edge of the leather lying against the outside of the fold.

By folding the leather in the manner just described, with the wide fold at the bottom of the completed strap and the narrower fold at the top thereof lying against the outer edge of the leather, it results that when the strap is bent into its proper shape for use the top of the loop formed by the bend in the strap flares outwardly, slightly upwardly, so that what may be termed the "end" of the completed loop, against which the picker-staff strikes, is somewhat inclined relative to a vertical plane, as shown in Figs. A and E, and thus conforms to the radial striking position of the picker-staff at the time of the impact of the blow of the latter. Moreover, in forming the completed lug-strap by a single piece of leather, folded as described, it will be observed that the wearing portions of the said strap, or the parts thereof, subjected to the blow of the picker-staff, are all upon what is the finished surface of the piece of leather before the latter is folded, which surface has the greatest capability for resisting wear, and, consequently, the greatest endurance in use.

The strap, after having been folded, as above described, has its several plies firmly secured together, this being done by two rows of stitching, as shown in the drawings.

The completed strap is provided near its ends with transverse openings, through which passes the fastening-bolt E, or other securing devices by which the strap is attached to the operating-bar C.

The piece of leather from which the lug-strap is formed may have a lining of cloth, as shown in Fig. D, if desired. (*J. F. and C. G. Warren, Worcester, Mass.*)

ASHBY'S PICKER-STRAP.

The object of the device is, to prevent the wearing of the loop of the picker-strap by so constructing the dog that at the time when the blow is given and the full force exerted the loop will bear on the dog fairly and along its whole width.

Fig. 1, is a view showing the connection of the picker-arm with the picker-stick in the relative positions when the picker-stick has been drawn fully back by the picker-stick spring. Fig. 2, is an enlarged view showing the dog secured to the picker-arm, the loop of the picker-strap being shown in section and the position of the picker-arm being the same as in Fig. 1, when no strain is exerted on the picker-strap. Fig. 3, is an enlarged view showing the picker-arm, the dog, and the loop of the picker-strap in the position when the projection on the cam strikes the

picker-roller and the force is transmitted by the picker-strap to the picker-stick to send the shuttle across the fabric and the loom. The loop of the

with cement and rolled upon itself until the desired thickness is reached. The blank thus provided is then doubled back upon itself in approximately the

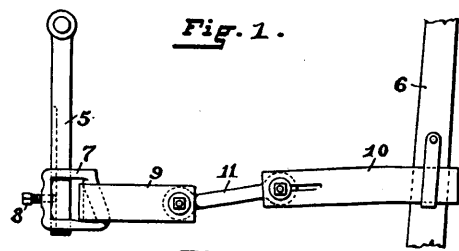


Fig. 1.

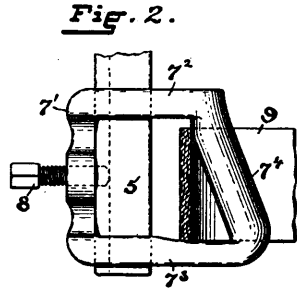


Fig. 2.

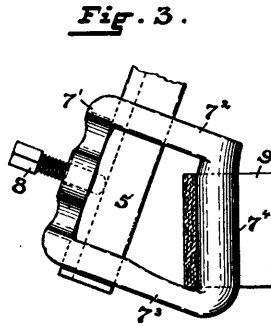


Fig. 3.

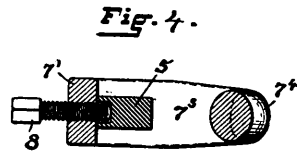


Fig. 4.

picker-strap is shown in section and shows the surface bearing on the dog the whole width of the strap. Fig. 4, is a transverse sectional view of the dog.

5, indicates the picker-arm; 6, the picker-stick; 7, the dog secured to the free end of the picker-arm. The dog 7, consists of the face-plate 7', in the centre of which the clamp-screw 8, is secured by screw-threaded engagement. From the upper end of the plate 7', the bracket 7² projects and from the lower end the bracket 7³. Both of these brackets are slotted for the reception of the picker-arm 5.

The bracket 7³ is longer than the bracket 7². The ends of the brackets 7² and 7³, are connected by the strap-bar 7⁴, which forms an angle of less than ninety degrees or right angle with the bracket 7³, and an angle of more than ninety degrees with the bracket 7², the angular position of the strap-bar 7⁴, being such that the strap bears its whole width on the bar when the greatest strain on the strap is exerted.

In practice it is found that the strap-bar 7⁴, when inclined at an angle of about twenty degrees to the picker-bar, will form a fair bearing on the loop, but the same may be varied to the oscillation of the picker-arm. The loop 9, extends through the dog and is connected with the loop 10, by the link 11. This construction allows some adjustment of the loops to their bearings on the dog and the picker-stick.

It will be found that with a dog the strap-bar of which is placed, as shown in the drawings, at an inclined angle to the picker-bar, instead of parallel with the same, the picker-strap wears evenly its whole width. (*Whitins Machine Works, Whitinsville, Mass.*)

LIVSEY'S LUG-STRAP.

In order to show the advantages of the new strap the accompanying illustrations are given, of which Fig. A, is a side view, and Fig. B, a top or plan view of a lug-strap of the new form. Fig. C, is a cross-sectional view of the same on line *x, x*, of Fig. B.

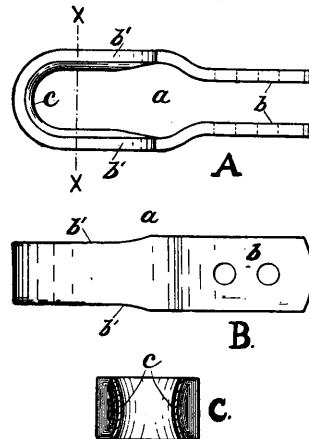
a, indicates the strap as a whole, the same being made of duck or similar material, that is saturated

with cement and rolled upon itself until the desired thickness is reached. The blank thus provided is then doubled back upon itself in approximately the shape shown in Fig. B, of the drawings and is then placed in a powerful mold (while yet in a plastic condition) and molded into the form here illustrated, that is to say, the ends are left flat, of uniform thickness, and parallel with each other, as at *b*, so they may be conveniently secured to the flat sides of the sweep-stick, but the body portion of said blank is upset edgewise, as *b'* Fig. A, thus reducing its width and forcing the surplus material into the inner side of said body portion, leaving the inner face of the strap curved, as at *c* Figs. A and C, and the outer face flat. This construction provides an increased thickness of material opposite the centre of the curve *c*, at the point of impact of the picker-stick, thus reinforcing and strengthening that portion of the strap which ordinarily wears out first. When the strap thus molded becomes thoroughly hardened, it is practically as solid and strong as if made of a single piece of raw-hide or other tough material, yet it re-

quires no more material in its construction and costs no more to produce than the ordinary cemented duck lug-strap.

To prevent the picker-stick from striking the ends of the thickened portions, the sides *b'*, of the loop or bowed portion of the strap, are located farther apart than the ends *b*, which is accomplished by forming a gradual bend or jog between the portions *b*, and *b'*, and by gradually compressing the ends of the thickened portions, an inclined surface is presented leading from the inner surface of the flat portions of the sides to the inner surface of the concaved portions, which will avoid any abrupt shoulders against which the picker-stick might engage as it entered the loop.

It is of advantage to provide the curved and thickened portion *c*, not only at the bow end of the strap,



as already described, but also along the sides of said strap, as seen in Fig. B. By thus shaping the sides only, the projecting central portion of the strap is in contact with the picker-stick and friction of the parts is thus reduced to a minimum as the stick swings back and forth, and the curved and thickened sides

are also made stronger and less liable to yield and weaken under the constant pounding of the bow end by the picker-stick.

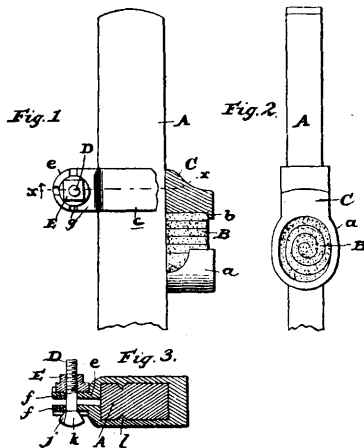
It will be found in practice that this strap gives better results and lasts longer than straps of uniform thickness as commonly constructed. (E. H. Jacobs Manufacturing Company, Danielsonville, Conn.)

DEVICE FOR SECURING PICKERS TO LOOM PICKER-STAFFS.

The object of this device is to provide a cheap and simple picker-holder which may be quickly and easily secured upon a picker-staff, and one which when properly secured upon the staff will not be liable to be loosened by the shock and jar to which pickers and picker-staffs are ordinarily subjected.

Of the accompanying illustrations Fig 1, is an elevation, partly in section, illustrating the device as holding a picker on a picker-staff. Fig. 2, is a similar view taken at right angles to Fig. 1. Fig. 3, is a transverse section taken in the plane indicated by the line x-x, of Fig. 1, and Fig. 4, comprises perspective views of the picker-holder and the devices by which it is fixed on the picker-staff.

A, indicates a picker-staff; B, the picker, and C the holder which receives the picker and secures the same to the picker-staff A. This holder C, is formed in one piece and of metal and it comprises the body portion *a*, provided with an inwardly-directed flange *b*, to retain the picker within it, and the resilient

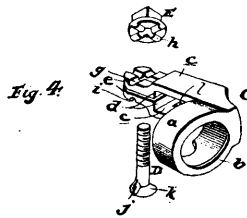


arms *c*, which are designed to receive the staff A, between them, as clearly shown in Fig. 3, and are provided with shoulders *d*, between which and the body *a*, the staff is interposed. The forward portions *e*, of the arms *c*, are provided with aligned transverse apertures *f*, to receive the fastening-bolt D, and one of said portions *e*, is provided in its outer side with four (more or less) grooves *g*, designed to receive the four (more or less) protuberances *h*, on the inner side of the nut E, which is mounted on the bolt D. The portion *e*, of the other arm *c*, is provided in its outer side with one or more grooves or seats *i*, which are designed in practice to receive the protuberance *j*, upon the head *k*, of the fastening-bolt as clearly shown in Fig. 3.

The arms *c*, are furthermore provided upon their inner sides with the barbs *l*, which are designed and adapted to take into the shaft A, as shown in Fig. 3, to better fix the picker-holder thereon.

In applying the improvements to a picker-staff the picker B, is placed in the holder C, after which the

picker-staff is inserted between the arms *c*, of the holder, as illustrated. The bolt D, is then passed through the apertures *f*, of the arms *c*, until the protuberance on its head rests in the seat *i*, in the one arm *c*, and the nut E, is turned upon said bolt until the protuberances on its inner side engage the outer side of the adjacent arm *c*. As the said nut is tightened it will be seen that the barbs *l*, will be sunk into the sides of the staff A, and will assist materially in securing the holder on the staff and when the nut is sufficiently tight it is left with its protuberances *h*, resting in the seats or grooves *g*, of one of the arms *c*, as shown. By means of this and the fact that the protuberance on the bolt-head rests in a seat *i*, of the other arm *c*, and the said arms *c*, are resilient it will be seen that both the bolt and the nut will be effectively prevented from working loose, no matter how much shock and jar the picker and picker-staff are subjected to, as the arms *c*, will exert an outward pressure against the nut and bolt-head, and will consequently retain the protuberances thereof in the grooves. The arms *c*, by reason of their resiliency, will give inwardly when the nut D, is tightened, and consequently will not prevent the nut from turning upon the arm which it impinges against. (W. B. Moody, Blackstone, Mass.)



terially in securing the holder on the staff and when the nut is sufficiently tight it is left with its protuberances *h*, resting in the seats or grooves *g*, of one of the arms *c*, as shown. By means of this and the fact that the protuberance on the bolt-head rests in a seat *i*, of the other arm *c*, and the said arms *c*, are resilient it will be seen that both the bolt and the nut will be effectively prevented from working loose, no matter how much shock and jar the picker and picker-staff are subjected to, as the arms *c*, will exert an outward pressure against the nut and bolt-head, and will consequently retain the protuberances thereof in the grooves. The arms *c*, by reason of their resiliency, will give inwardly when the nut D, is tightened, and consequently will not prevent the nut from turning upon the arm which it impinges against. (W. B. Moody, Blackstone, Mass.)

KEITH'S PICKER-STICK.

The objects of this picker-stick are to lessen the wear on the stick itself and on that part of the picker through which the stick projects and to render the stick less liable to break.

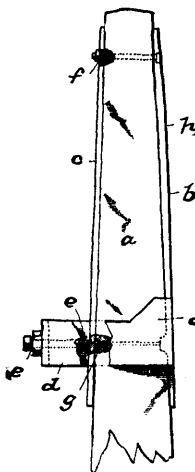
The new picker-stick consists in a stick having on its front edge a metallic plate which comes in contact with the picker in the forward movement of the stick, and on its back edge a plate which comes in contact with the picker in its backward movement and means for firmly securing the lower extremities of said plate to the faces of the stick by pressure.

In the accompanying illustration a side elevation of the improved picker-stick, with parts broken away, is given.

A, represents a picker-stick. To the front and back edges of the stick are attached plates *b*, and *c*, respectively. Integral with the lower extremity of the front plate *b*, is a collar *d*, surrounding the stick and the lower extremity of the back plate. In the top of the collar is a set-screw *e*, adapted to be screwed down upon the lower end of the back plate in such manner that the lower ends of both plates are firmly secured to the stick. The top ends of both plates are secured to the stick by a screw threaded bolt passing through them and the stick.

To prevent bolt *f*, from working loose, the hole in the end of the plate *c*, is threaded, which taken in connection with the ordinary nut on the end of the bolt outside of the plate, serves as a check to prevent the bolt from working loose.

To prevent the plates from wearing in the wood and to give a firm bearing for the set-screw, there is inserted in the stick at a point under



the set-screw in the collar a metal screw *g*, upon which both plates bear. The screw may be so small that it will weaken the stick but very little, and yet afford a perfectly unyielding bearing for the plates. To strengthen the front plate, the middle *h*, can be made thicker than the ends.

Where the top of the picker is of wood alone the wood soon becomes worn and rough and wears the hole in the picker very rapidly, thus necessitating the constant renewal of both picker and stick, it very often happening that a picker breaks out before the shuttle receiving end of the picker is worn out, while under the new construction, it will last until both edges of the shuttle receiving end of the picker are worn out.

The advantages as claimed for the new stick are that it does not wear the picker or stick, it is easily attached to the stick, it does not weaken the stick, it does not wear loose on the stick, it gives a steady picker motion, and, if the stick becomes broken for any reason, it can be easily removed and attached to another stick. (*W. L. Keith, Milltown, N. B.*)

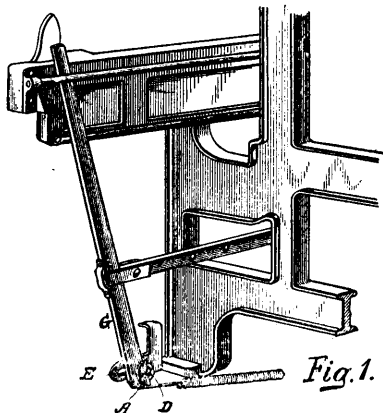
BEARING FOR LOOM PICKER-STICKS.

Great annoyance and loss of time, as well as expense, have been heretofore occasioned by the constant wear and breakage of picker-sticks at the point where they are pivoted to the loom-frame, and when a stick is rendered useless by such wear or breakage it is necessary to stop the loom and remove the old stick, replacing it with a new one; all of which requires time, thus resulting in a loss of product of the loom. These disadvantages are overcome in the new picker-stick by providing a metal bearing which may be quickly attached to or detached from a picker-stick.

Fig. 1, is a perspective of a portion of a loom-frame and lay, showing a picker-stick attached thereto by the new device; and Fig. 2, is a detailed perspective of the lower end of the picker-stick and the bearing removed therefrom.

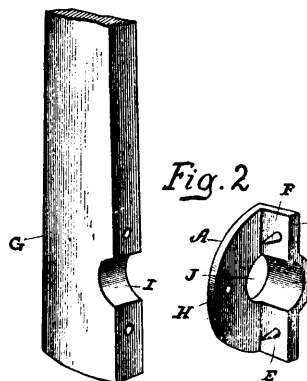
Examining these illustrations we find provided a semi-circular plate *A*, with which is formed a box *B*. Within the box is a half-bearing *C*, adapted to fit the pivot-bolt *D*, which projects from the stud *E*.

From the inner surface of the box project prongs *F*, so that when the box is to be attached to the picker-stick *G* it is only necessary to place said prongs in proper position against the inner edge of said stick and embed them therein by sufficient force, after which



a screw passed through the hole *H*, formed in the plate, and into the face of the picker-stick will securely hold the box and plate in position upon said stick.

A half-bearing *I*, is formed in the edge of the picker-stick which corresponds with the half-bearing in the box, so that the pivot-bolt *D* is inclosed upon one side by the bearing *I* and upon the other by the bearing *C*.



From this it will be seen that when a picker-stick is thus pivoted to the stud *E* and the loom is in operation the thrust upon the lower end of the picker-stick which is incident to the action of the sweep in causing said stick to throw the shuttle will be received by the bearing in the box, and as this may be made of steel or other suitable metal it is obvious that but little wear will be brought about by this thrust, and, further, that it will be impossible to split the picker-stick at its lower end, as no strain comes upon the grain of the wood passing through the bearing-hole, as is the case in picker-sticks as now used.

The return movement of the picker-stick, occasioned by a suitable spring, causes the bearing in the stick to act upon the pivoting-bolt, but as this movement performs no work it is obvious that but little strain will be exerted upon this bearing; but to prevent the liability of considerable wear taking place upon the bearing *I*, the hole *J* is made to fit the bolt *D* snugly, thereby causing the plate to receive a portion of the strain incident to the reverse movement of the picker-stick.

As now constructed the life of a picker-stick is very short, as it is constantly liable to split at the point where the pivoting-hole is formed, as such a stick is subjected to an enormous strain and jar by the rapid movements and sudden stops which are necessarily transmitted thereto by the actions of the loom.

One of the advantages of the new device is that it may be readily attached to a picker-stick with little or no alteration of the latter, and when the stick has become worn or useless from any cause it may be removed and attached to another stick. (*Harry M. Schadevald, Philadelphia.*)

LANGUIRAND'S PICKER-STAFF.

This device relates more particularly to means for effecting a connection between the picker-staff and the connecting bar or stick for transmitting motion to said staff; and it has for its general object to provide a simple and durable device through the medium of which the tug of the connecting bar or stick may be adjustably fixed at various points on the picker-staff so as to regulate the throw of said staff and that of the shuttle without the objectionable necessity of perforating the staff or otherwise weakening the same.

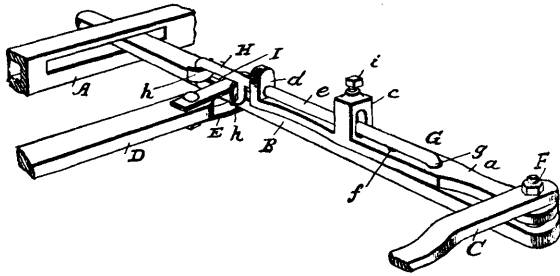
The accompanying illustration is a perspective view of so much of the mechanism of a loom as is necessary to explain the device.

A indicates the lay of a loom; *B* indicates the picker-staff; *C* indicates the arm of the rocker-shaft (not illustrated); *D* indicates the connecting bar or stick, and *E* indicates the staff-receiving tug carried by the bar or stick *D*.

The rocker-shaft arm *C*, and the picker-staff *B*, are connected by a bolt *F*, and this bolt also serves to effect a connection between the picker-staff and the adjust-

ing device G, the body portion *a*, of which is mounted on the bolt between the arm C, and the picker-staff, as shown.

The body portion *a*, of the device G, is formed from malleable iron and it is provided with an aper-



tured post *c*, and a guide lug *d*, to receive the shank *e*, of the adjustable section H, and is also provided at intervals with transverse sockets *f*, to receive the angular stud *g*, of the said shank.

The loop or eye I, of the section H, receives the tug E, of the bar or stick D, and it is provided at its ends with the transversely disposed curved portions *h*, which present a convex surface to the loop E, and thereby prevent unnecessary frictional wear of the same. The shank *e*, of the adjustable section extends as before stated, through the apertures of the lug *d*, and post *c*, and its stud *g*, is designed to be fixed in any one of the apertures *f*, by the binding screw *i*, which takes through the post *c*, and engages the shank as shown. By this construction it will be seen that the loop or eye I, may be readily and positively fixed at various distances from the free end of the picker-staff, to increase or diminish the throw of the said staff, without the objectionable necessity of perforating or otherwise weakening the same. It will also be seen that the device has no direct connection with the picker-staff and consequently when said staff is worn or broken, it may be readily removed and a new staff employed in conjunction with the adjusting device. (*J. Languirand, Woonsocket, R. I.*)

HOLBROOK'S PICKER.

The same is shown in its perspective view in the accompanying illustration.

In raw hide loom-pickers, as heretofore constructed, considerable difficulty has been experienced on account of their liability to become cracked or split under the hard wear and blows to which they are subjected, especially when the loom is running at a very high speed. To overcome this difficulty and to greatly increase the strength and durability of loom-pickers of this description, is the object of the new picker.

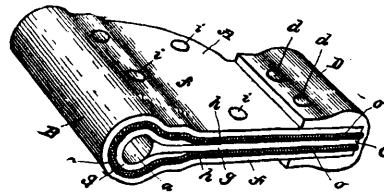
A, represents the body or shank of a loom-picker, one end of which is enlarged to form the rod-holder B, which is provided at its centre with a rod-hole *a*. Over the opposite end *c*, of the shank A, is fitted a head-cap D, into which the shank extends as shown, the end *c*, and the cap D, which embraces it, and is secured thereto by rivets *d*, constituting the head of the picker, which contacts with the point or beak of the shuttle.

The body A, is composed of an outward layer or thickness *f*, of raw hide folded or doubled over, and having an inner raw hide filling *g*, composed of any desired number of pieces, and, between said layers or pieces *f*, *g*, is interposed a piece of thick woven fabric *h*, preferably canvas or heavy cotton duck, the

several layers or thicknesses of raw hide and woven fabric being securely fastened together by rivets *i*.

In constructing the picker a piece or strip of wet raw hide of suitable shape or size is taken, to form the outside layer or thickness *f*, and lay upon it the woven fabric *h*, which is doubled in such manner as to cause the folded edges *o*, to lie flush with the adjacent edges of the raw hide or preferably extend a little beyond the same. The filling *g*, is then laid in place and the raw hide and canvas are then doubled over a spindle to form the rod-hole *a*, after which the rivet holes are punched and the rivets inserted. The picker is then removed from the spindle and allowed to dry, after which the operation of riveting is completed. The head-cap D, composed of a solid piece of raw hide of single thickness throughout, is then applied and secured in place by the rivets *d*.

By thus interposing a piece of woven fabric between the layers of raw hide as before described the picker is rendered much stronger and more durable, as the woven fabric, on account of its toughness and elasticity, will hold the layers of raw hide together in such a manner as to effectually prevent splitting or cracking of the picker, and will also enable the picker to better resist the blows of the picker-stick and the concussion produced by the contact of the picker with the end of the loom box. Furthermore, the extension of the doubled or folded edges *o*, of the woven fabric beyond the edges of the raw



hide forms elastic cushions or buffers, which thus relieve the picker of the sudden shocks to which it is subjected from contact with the picker-stick and loom box and reduces the wear to a minimum, thus particularly adapting the picker for use in looms which are run at a very high speed. (*C. W. Holbrook, Providence, R. I.*)

GLEASON'S PICKER.

The great wear that a picker is exposed to in a loom in receiving many thousand blows per day from the steel point of a shuttle has made it very important to find some material of which to make it that will last a reasonable time. Cotton very closely compressed together and confined, offers a most durable resistance and for this reason is made use of in the construction of this picker, producing in turn an article which will work well and last longer than the average leather pickers (the raw hide pickers excluded). The new picker is well suited for plain one shuttle looms.

The accompanying illustrations show this picker. The same consists of several vertical layers of leather, of a shape to be easily secured to the picker-stick, cemented together so as to make practically one thick piece of leather, and the duration of this thickness is limited to a few days use. Next take all the layers of leather but the two outside ones *s*, *s'*, and punch a piece out of the centre of the broadest part of each, as seen in Fig. 2, in which *a*, is the hole. Then these punched layers *b*, are cemented together

with one of the whole layers *s'*, on the outside. The chamber formed by the holes in the punched layers is then filled with cotton compressed together very hard, and the other outside layer *s*, is cemented over the chamber, so that the whole resembles an ordinary picker. The picker is then attached to the picker-stick, and being put to use the steel point of the shuttle soon pierces the outside layer of leather *s*, and beds itself in the compressed cotton.

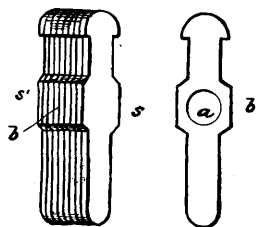


Fig. 1. Fig. 2.

The main cause of the destruction of a picker arises from the impossibility of striking it with the shuttle-point exactly in the centre, and consequently it sways to one side. Owing to the coarse texture of the leather, the steel point soon makes its way toward that side, disintegrating the leather and spoiling the picker. This trouble is obviated in this picker by the extremely fine texture and hardness of the compressed cotton, which prevent the shuttle-point from taking effect on the sides of the recess first formed by it, as these sides do not offer the point the chance to begin an entrance that the coarse texture of the leather does. (M. Gleason, Bristol, R. I.)

WARDWELL'S PICKER.

Fig. 1, represents a perspective view showing the parts assembled together on a picker-staff for use. Fig. 2, represents a longitudinal section of the same. Fig. 3, represents a cross-section on the line 3-3, shown in Fig. 2. Fig. 4, represents a vertical section on the line 4-4, shown in Fig. 3.

In the drawings, A represents a loom picker-staff, adapted to receive the metal loop or binder B, secured to such staff by means of a screw C.

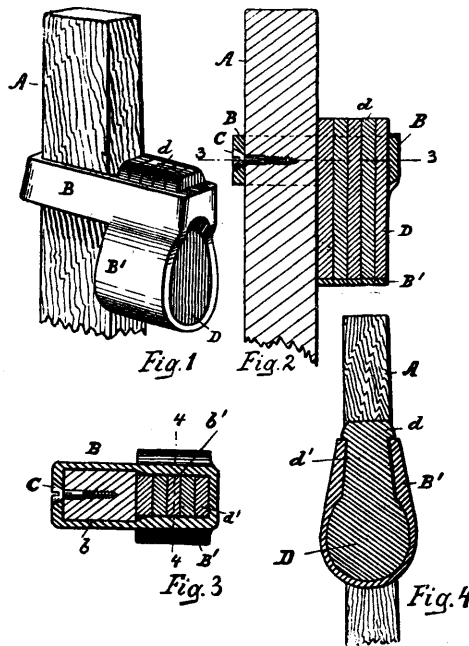
In one piece with the loop or binder B, is made the picker casing or shield B', in which is retained the picker or filling D, made of leather or other suitable material.

The loop or binder B, is made as a skelton frame and has at its rear portion a vertical, rectangular, perforation *b*, of sufficient size to receive the picker-staff, as shown. The forward portion of said skeleton loop has a reduced perforation *b'*, which forms a continuation of the opening *b*, but is of a reduced width as compared with the opening *b*.

The picker D, has a shank *d'*, adapted to fit the interior of the loop or binder-opening *b'*, said shank terminating at its upper end as a head *d*, of a width equal to the interior width of the opening *b*, in the loop or binder B.

In assembling the parts together for use, the picker D is first put up from below through the picker-staff slot *b*, in the loop or binder B, and then moved forward into the narrow slot *b'*, and into the shield or casing B', after which the picker-staff A is pushed through the slot *b* and secured to the loop or binder B, by means of the screw C. It will thus be seen that the picker or filling D will be most firmly secured in place within the reduced slot *b'* of the loop or binder B, as it cannot move upward on account of the lower increased size of said picker, and it is prevented from moving downward on account of the increased head *d*. The picker-staff holds it from going backward and the forward end of the loop or binder B prevents it from moving for-

ward, and it is thus firmly locked in position relative to the loop or binder and the picker-staff.



The picker casing or shield B' may be dispensed with, particularly in slow looms running on heavy goods. (Frank A. Wardwell, Methuen, Mass.)

WILKINS' LOOM PICKER.

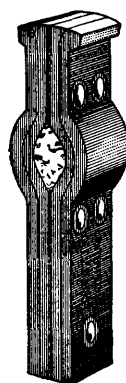
The majority of pickers for single box-loom in use to-day in cotton mills, are known as the "doll picker," and are composed of several lifts of leather cemented one upon the other until the desired thickness is obtained. These pickers in a short time are worn through by the action of the shuttle striking the leather the short way of the grain, making the average life of the pickers from two weeks to six months, according to the quality of the leather used and the care the picker gets by the loom fixer. Some mills frequently have them nailed together to keep the cement from breaking.

The Wilkins' picker, as seen by the accompanying illustration is composed of four pieces of leather, riveted together with strong iron rivets, in such a manner that the shuttle strikes the leather edge ways, thereby obtaining the greatest strength of the leather.

At the point of contact of the picker with the shuttle, there is an opening made and filled with common cotton put in under pressure, thus the picker receives an elastic blow, as both cotton and leather yield.

These pickers are an improvement upon Gleason's picker illustrated and explained in a previous article. Gleason's patent having been improved in the picker as made by the Wilkins Mfg. Co.

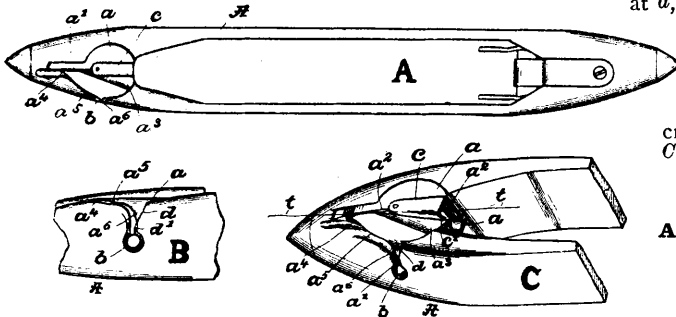
The Wilkins' loom pickers can be applied to the loom in about one half the time, and will last three or four times as long, some having been yet in good condition after fourteen months use. (Wilkins Mfg. Co., Woonsocket, R. I.)



SHUTTLES.

DRAPER'S SELF-THREADING SHUTTLE FOR NORTHROP LOOMS.

Self-threading shuttles for looms are now usually constructed with a slot through which the thread is led to the eye in the side of the shuttle. When such shuttles are used in automatic looms provided with devices for supplying fresh filling to the shuttle when



the previous filling is nearly or quite exhausted, the thread must guide itself into the slot by reason of its position, as it is drawn off from the end of the filling-carrier or bobbin. It frequently happens that the thread thus led into the slot will slip or fly out again before it has passed under the spur or projection which is intended to guide it to the side eye. This shuttle has for its object the production of means for guarding or confining the thread while in line with the threading-slot, so that it cannot accidentally escape therefrom before passing about the guide projection or spur.

Fig. A is a top view of this shuttle. Fig. B is an enlarged perspective view of the eye end of the shuttle, showing the thread as confined by the guard, and Fig. C, is an enlarged detail in side elevation of a portion of the shuttle adjacent the thread-eye.

The shuttle-body A, shown as entirely open at its upper and lower sides, has a filling-carrier or bobbin held therein, and the shuttle-body is cut away beyond the tip of the filling-carrier to receive therein a thread-guide block *a*, longitudinally slotted at *a'*, to receive the thread after it has entered the thread-eye, the block having a vertical face *a²*, and an inclined face *a³*, converging to the said slot to direct the thread thereinto as it is drawn off from the end of the filling-carrier.

At that side of the guide-block *a*, having the inclined face *a³*, the spur or projection *a⁴* is formed to guide the thread along the passage formed by the shuttle-body and the edge *a⁵* of the guide-block to the thread-eye *b*, in the side of the shuttle.

Now, when the thread *t* is drawn off from the end of the filling-carrier, in line with the slot *a'*, it frequently slips or flies out of the slot before it had been guided to the thread-eye *b*, and to prevent this there is provided a thread-guard shown as a shelf *c*, bent or curved downward at *c'*, and overhanging the entrance to the guide-slot *a'*, the lower edge of the guard approaching closely the inclined face *a³*, while permitting the thread to pass easily thereunder to the slot *a'*.

In Fig. C the thread *t* is shown as above and in line with slot *a'*, but confined by the overhanging guard in such a manner that it cannot fly or slip out of position, the guard maintaining it in line with the slot *a'* to properly enter it, and be guided by the spur or projection *a⁴*, to the thread-eye *b*. The rear edge *a⁵*, of the spur-base is inclined forward and downwardly, the shuttle-body being similarly shaped at *d*, and extending slightly below the spur-base at *d'*, making a better construction of the parts, whereby the thread cannot become wedged or caught between the two parts, as the pull of the thread over the downwardly-inclined edge draws it away from any possible crack or crevice between the wood and metal. (*Draper Company.*)

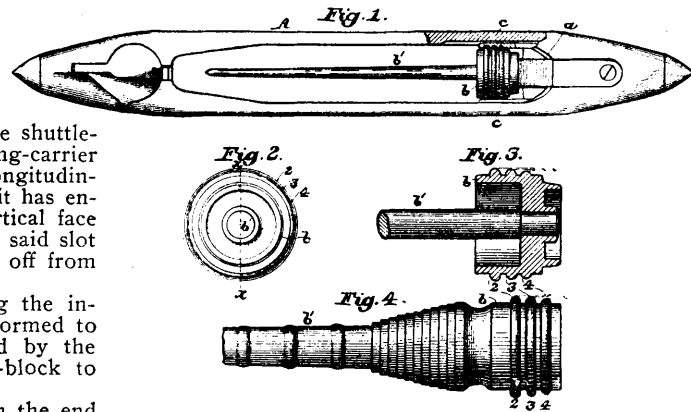
ANOTHER IMPROVEMENT IN SHUTTLES FOR NORTHROP LOOMS.

The object in this instance is to improve the construction of loom-shuttles containing bobbins, the heads of which are held by or between separable spring-arms, whereby the said arms may hold the said bobbin-head more securely and spread their hold more uniformly over the head.

Of the accompanying illustrations, Fig. 1 shows a top view of this shuttle; Fig. 2, a left-hand end view of the head of the bobbin or filling-carrier; Fig. 3, a section of Fig. 2 in line *x*, and Fig. 4 shows a modified form of bobbin.

The shuttle-body A, has an inclined bridge *a*, to direct the head *b* of the bobbin, down into position between the jaws *c* and *c'* of the bobbin-holder.

Heretofore the heads *b* of the bobbins *b'* have been cylindrical from end to end, and the rings or annular



projections thereon have been of the same diameter.

In use it has been found that the jaws *c*, fail to engage the ring nearest the tip of the bobbin as firmly as that farthest from the said tip, and to overcome this difficulty and insure the firm and secure holding of the head throughout its entire outer ringed surface, the rings 2, 3, 4, of the said heads are made of a decreasing diameter from the tip end of the spindle

outwardly, and in this way, as the jaws connected at a common point and adapted to be sprung apart, are sprung apart by the insertion of the ringed head, the inclination of the jaws due to their change of position exactly contact with and engage and hold all the rings of the head alike and with equal force, thus preventing any liability of the bobbin being held loosely and moving unduly in the jaws in the shuttle.

Of the series of rings 2, 3, 4, the ring 2, is of greater diameter than 3, and ring 3, is of greater diameter than ring 4. (*Draper Company.*)

BOBBIN HOLDER FOR DRAPER SHUTTLES.

This holder is intended as an improvement on the class of shuttle wherein the head of a bobbin is held between spring-jaws, the bottom of the shuttle being open for the passage of a spent bobbin through it, and the delivery end of the shuttle having a self or automatically threading slot into which the thread on the cop-holder is threaded during the movement of the shuttle through the shed. In this class of shuttle the thread as it is unwound from the end of the bobbin, it then describing a circular path, is thrown into an open slot at the top of the shuttle, and in practice it sometime happens that the thread does not enter the slot instantly. To overcome this, means are provided in the present shuttle whereby the free end or tip of the bobbin is held in a slightly-elevated position, so that the thread can readily enter the slot as it first starts to run off.

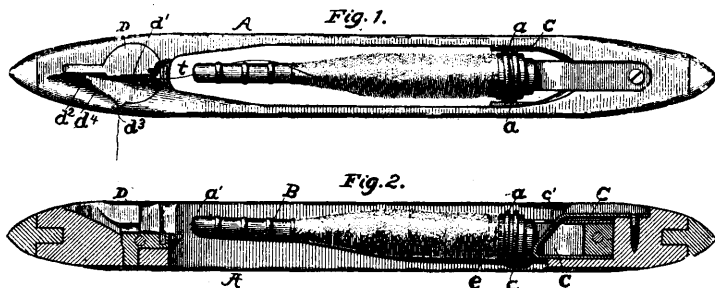
The shuttle referred to has spring arms which constitute holders, the said arms at the interior having a series of grooves to be centered by a series of rings surrounding the base of the bobbin, but the said grooves are perpendicular to a line drawn longitudinally through the shuttle.

In the new shuttle the grooves are inclined so that the said rings as they slide down in said grooves cause the bobbin to assume an inclined position with its tip elevated a little above the center line of the shuttle.

Fig. 1, shows the improved shuttle in its top or plan view, Fig. 2, is a longitudinal section.

A, indicates the shuttle body; c, c', the inclined bobbin-directing plate, and B, the bobbin, having the rings a.

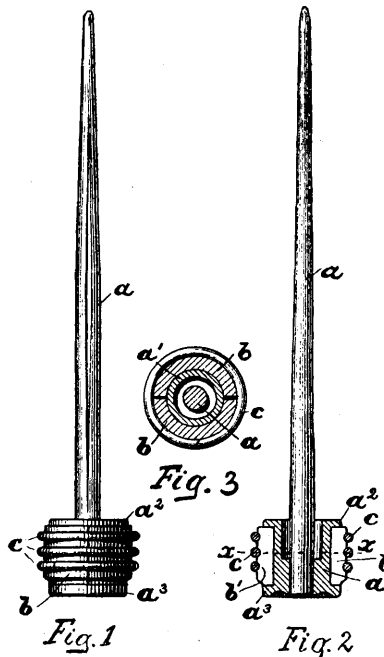
The holder to engage and hold the bobbin consists of two like arms C, the grooves e, being so inclined as to receive and hold the bobbin with its tip or delivery end a', elevated substantially as shown in Fig. 2.



The self or automatic threading device D, has a substantially straight slot d', at one side of which is a horn d², along the outer side of which is a space d³, so that the thread t, coming into the slot d', to get under the horn, is led into the delivery-eye d'. (*Draper Co.*)

COP-SKEWER FOR SHUTTLES FOR NORTHROP LOOMS.

Cop-skewers or filling-carriers for shuttles have heretofore had their heads provided with unyielding ribs or rings which were adapted to enter grooves in springs carried by shuttles.



In "automatic looms," the "cop-skewers" or "filling-carriers" are transferred rapidly from the filling-carrier feeder into the shuttle while the loom is in motion, and much trouble has been experienced therein owing to the rapid wearing away of the grooves in the shuttle-springs, that being due to the hard unyielding rings surrounding the head of the skewer or filling-carrier.

The object of construction of the new device is the production of a cop-skewer or filling-carrier the head of which is capable of yielding to a limited extent when being inserted into the shuttle between the said springs, such construction greatly reducing the wear of the shuttle-spring grooves. To effect this improvement, the metallic head of the skewer or filling-carrier has been surrounded with a wooden split ring, and the head of the filling-carrier has been provided with an annular groove in which this split shell or cylinder is located, the shoulders of the groove preventing longitudinal movement of the split ring.

Fig. 1, represents in side elevation this new cop-skewer or filling-carrier. Fig. 2, is a vertical sectional view of the head, the blade of the skewer being in elevation. Fig. 3, is a transverse sectional view of the head on the line x-x, Fig. 2.

a, is the skewer-blade which has secured thereto a metallic head a', provided at its ends with annular flanges a², a³.

A wooden split shell or cylinder b, surrounds the head a' between the flanges thereof, and it is annularly grooved, as at b', to form seats for the encircling

metallic split rings *c*, which enter the grooves in the shuttle springs or jaws. These rings retain the shell *b* on the metal head *a*, and when the filling-carrier is being forced into the shuttle-springs, the split shell yielding slightly to the pressure, thus greatly reduces the wear on the shuttle-springs.

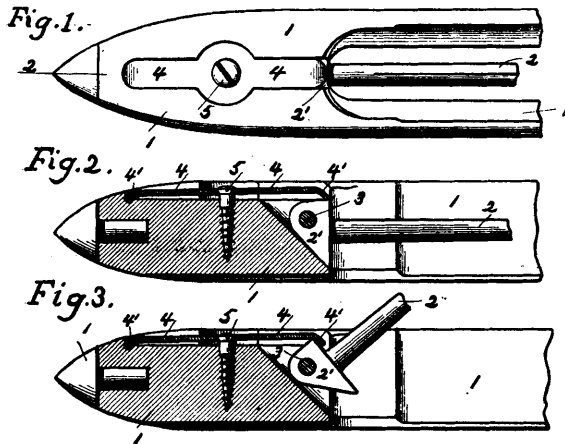
It will be seen that the ends of the wooden shell do not abut one against the other, and therefore the shell has a capacity of yielding somewhat under pressure put upon the metallic rings *c*.

Fig. 3 shows the ends of the shell as separated to permit limited amount of yielding of the shell. (*Draper Co.*)

THE LITCHFIELD SHUTTLE.

The improvement relates to the spring of shuttles, which holds the spindle in its lowered or raised position.

In the ordinary construction of the spring which engages with the head of the spindle, the spring is liable to set or break when the spindle is raised by



reason of the strain thereon. This setting or breaking of the spring causes considerable trouble, and also expense in replacing the broken springs with new ones; and, further, the screw which secures the spring to the shuttle, by reason of the great strain on it when the spindle is raised, frequently breaks or pulls out, necessitating other means for holding the spring. The pressure of the spring during the operation of raising the spindle on the head thereof will wear the corner of the head very fast, so that the point of contact of the spring with the head will be worn back to a point nearly over or back of the fulcrum-point of the head, and the leverage of the spindle thus being lost, the pressure of the spring, to hold the spindle in its lowered or raised position will be practically ineffective, so that a new spindle must be substituted.

Other objections to the ordinary construction and shape of the spring which bears on the head of the spindle to hold it in its lowered or raised position might be stated, for example, by increasing the leverage of the spindle by placing the fulcrum-pin farther from the point of contact of the spring with the spindle-head, or by increasing the pressure of the spring by screwing in the holding screw, so that the spindle will be more firmly held down in the shuttle-body when the shuttle is in motion. The strain on the spring and screw when the spindle is raised is also increased in proportion, which is very objectionable for the reasons before stated.

The object of this shuttle is to provide a spring which

will overcome the objections before stated; and the improvement consists more particularly in so constructing the spring that the strain thereon will be relieved when the spindle is being raised, and when it is in its raised position, and the leverage of the spindle, and the pressure of the spring on the head of the spindle can be increased without increasing the strain on the spring and screw when the spindle is raised.

Referring to the drawings, Fig. 1, is a plan view of one end of a loom-shuttle provided with a spring embodying the improvements. Fig. 2, is a central longitudinal section on line 2, Fig. 1. Fig. 3, corresponds to Fig. 2, but shows the spindle raised. Fig. 4, show a spring embodying the improvement used in connection with what is termed the "Baldwin-head" spindle. Fig. 5, corresponds to Fig. 4, but shows the spindle in its raised position.

A description of the improvement is best given by quoting letters of references along with explanations:—1, is the shuttle-body; 2, is the spindle, provided with a head 2', which extends in a recess in the body of the shuttle and is pivoted on a pin 3, extending transversely in the shuttle-body.

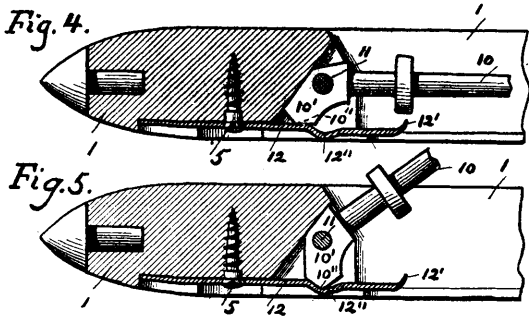
4, is a top spring embodying the improvement, which extends in a recess in the top of the shuttle-body, and is secured therein by a screw 5.

In the spring 4, which is reversible, the ends of the spring which extend over and engage the upper side of the spindle-head when the spindle is in its lowered position are made bent, or provided upon their inclined surfaces with inclined portions 4', which extend at an angle to the main portion of the spring, so that while the inner surface or main portion of the body of the spring extends in the arc of one circle the inner surface of the ends which come in contact with the spindle-head, lie in the arc of another circle.

By this construction of the ends of the spring a recess is formed to receive the projecting portion of the spindle-head, and lessen the pressure or strain on the spring when the spindle is being raised and held in its raised position, for as soon as the top point of the head of the spindle passes by the point or extreme end of the spring it follows the curve or incline on the end of the spring until it reaches the inner end of said incline when it is in its raised position, as shown in Fig. 3, and in this position the end of the spring is not raised to strain or break the spring or pull out the attaching-screw, but is substantially in its normal position. Moreover, by this construction the upper corner of the spindle-head is not worn and rounded, so as to bring the point of bearing of the spring on the head of the spindle back over the fulcrum. At the same time the fulcrum-pin may be set farther from the point of contact of the spring with the spindle-head to increase the leverage, or the attaching-screw may be screwed in to increase the pressure of the end of the spring on the spindle-head without causing the end of the spring to be raised any higher when the spindle is in its raised position.

In Figs. 4, and 5, is shown what is termed a "Baldwin-head" spindle and a spring embodying the present improvement combined therewith. The spring is attached to the lower side of the shuttle instead of the upper side, as in the case of the spring 4, and acts upon the spindle-head to hold it in its raised or lowered position below and back of the fulcrum point of the spindle-head. The upper edge of the spindle-head, when the spindle is in its raised position, strikes against the body of the shuttle and limits the raising of the spindle. In said Figs. 4, and 5, the spindle 10, is provided with a head 10', ordinarily termed the "Baldwin-head." A transverse pin 11, forms the fulcrum of the spindle.

The spring 12, embodying the present improvement is secured in the under side of the shuttle-body by the attaching-screw 5, and is in this instance provided with a catch 12' at its end which extends into the circumferential groove in the bobbin. The spring 12, is provided with a recess 12'' therein for the purpose of relieving the strain on the spring when the spindle is being raised and is in its raised position, as shown in Fig. 5. That portion of the spring just back of the recess 12'', bears on the spindle-



head back and below the fulcrum-point thereof when the spindle is in its lowered position, as shown in Fig. 4.

When the spindle is being raised, the lower corner, or point 10'' of the head thereof follows down the outward incline or depression in the spring formed by the recess 12'' therein, and extends into said recess. When the spindle is in its raised position, as shown in Fig. 5, the inclined portion of the recess bears on the inclined edge of the spindle-head below and back of its fulcrum-point, and forces the upper edge of the spindle against the shuttle-body, as shown in Fig. 5.

By means of the bend in the spring forming the recess 12'', the same results are accomplished with the Baldwin-head spindle than that accomplished with the spring 4 in connection with the ordinary spindle-head; that is, the strain on the spring is relieved when the spindle is in its raised position. At the same time the leverage of the spindle can be increased by placing the fulcrum-pin farther from the point of contact of the spindle and spring, or the pressure of the spring can be increased by screwing in the attaching-screw 5, without increasing the strain on the spring to any extent, and, further, the wearing of the lower corner, or end of the spindle-head, is prevented from the raising and lowering of the spindle, as is the case in the old form of spring used in connection with the Baldwin-head spindle. (Litchfield Shuttle Company, South-bridge, Mass.)

SERGESON'S SHUTTLE.

In this shuttle a catch for holding a bobbin is provided, the same being released by throwing up the spindle. The catch is so constructed that a pivot-pin therefor is dispensed with, and provision is made for preventing the catch when thrown up from breaking out the shuttle.

Fig. 1, represents a top or plan view of a portion of this shuttle. Fig. 2, represents a longitudinal section thereof. Fig. 3, represents a longitudinal section showing the parts in different positions from those shown in Fig. 2.

A, represents the body of the shuttle. B, the spindle for holding the bobbin, the same being secured to a head C, which is pivoted to the body, whereby the spindle may be thrown out and in. In the upper part of the head C, is an opening D, which receives the pivot E of a catch F, the latter projecting over

the head and having a flange or tongue G, which is adapted to enter a groove in the bobbin for securing the latter on the spindle.

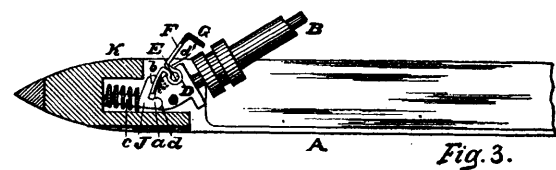
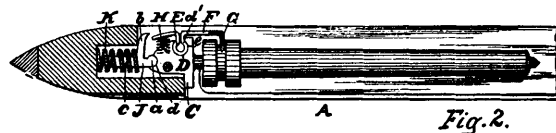
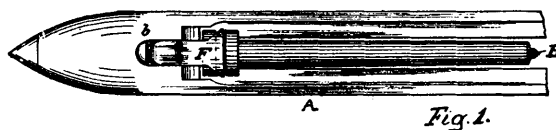
Bearing against the under side of the rear or heel end of the catch F, is a spring H, which is seated on the head C, and serves to hold the tongue end of the catch in engaging contact with the bobbin.

J, represents a knuckle freely fitted within the body A, consisting of a partly-cylindrical piece forming a journal a, an outwardly-projecting lip b, and a longitudinally-extending stem c. In the back of the head C, is a circular recess d, which receives the journal a, of the knuckle, said journal being pressed against the head C, by means of a spring K, which bears against the knuckle and a proper part of the body, so that the pressure of the spring is exerted against the head C, for holding the spindle B in position. The lip b, of the knuckle extends at an angle to the heel of the catch F, and is so disposed that when the spindle is thrown out said heel engages with the lip and motion is imparted to the catch, so that the front end, or tongue G, thereof is raised clear of the bobbin.

When the bobbin is to be removed, the spindle is thrown out, and the heel of the catch then reaches the lip of the knuckle and impacts against the same as a deflector. The knuckle slightly yields, so as to prevent binding of the parts, and the catch is forced toward the head C, whereby the opposite tongue end is raised, and the tongue emerges from the groove in the bobbin. As the bobbin is now uncontrolled by the catch, it may readily be withdrawn from the spindle.

It will be seen that owing to the knuckle the catch is thrown out, and said catch is prevented from bearing against the wall of the slot in the body in which it plays and breaking out said wall, the body thus being preserved intact.

When the bobbin is restored to the spindle, or a fresh bobbin applied thereto, the spindle is returned into the body of the shuttle, and as the catch is re-



leased of the pressing action of the knuckle or deflector J, it returns to its normal position, the tongue G then entering the groove in the bobbin, so that the catch engages with the bobbin, and the bobbin is firmly held on the spindle, the latter retaining its position in the body owing to the action of the spring K. The pivot E, of the catch F, is integral therewith, and is formed by bending the metal of the same in partly-cylindrical form, leaving a contracted portion

or neck d' , at the place of meeting of the catch and pivot. The outer end of the opening D, in the head C, is also contracted, as at e , and receives the neck d' , of the catch.

The pivot is inserted in the opening D, at the side of the latter, and owing to the contracted portion e , of said opening, the pivot is prevented from being displaced, said pivot turning freely on the wall of the opening as its bearings, and a separate or loose pivot-pin being obviated.

The lower portion of the head C, is provided with a shoulder or projection adapted to be brought in contact with the body of the shuttle when the spindle is thrown in, so as to limit the movement thereof. (James C. Sergeson, Philadelphia.)

ANOTHER SERGESON'S SHUTTLE.

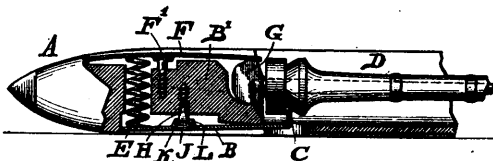
The improvements in this shuttle consist in having a catch plate for engagement with the bobbin, formed with an angular and tapering opening, and a screw which is provided with an angular and tapering head, said plate having on its inner surface a boss which is continuous of the wall thereof, and having its opening coinciding with that of the plate, whereby the screw is prevented from rotating itself loose, it having a broad bearing on said plate, and its hold on the body is firm and secure without the employment of a nut for such purpose.

The accompanying illustration represents a longitudinal section of a portion of this shuttle.

A, designates the body of a shuttle; B, the catch plate, which is connected with the part B', of the body of the shuttle, and has at one end a nose C, for engagement with an angular groove on the head of the bobbin D, whereby the latter is held in operative position, the other end of said catch plate being pressed outwardly by the spring E, which bears against said catch, and the opposite spindle-holding plate F, on the heel ends thereof, said plate F, exerting pressure on the pivoted head G, of the spindle.

The plate F, is adapted to bear upon one face of the spindle head to hold the spindle in proper alignment in the shuttle, and upon another face of the head when the spindle is raised to hold it in position to change the bobbin.

H, designates the bolt or screw which connects the catch plate with the body of the shuttle, the same having an angular head J, the latter occupying a countersunk opening K, in said plate, whereby the latter is permitted to rock or oscillate lightly on said head as the bobbin engages with and disengages from the nose C. The walls of the opening K are extended inwardly, forming the boss L, whose opening is continuous of said opening J, and whose wall is both



angular and tapering, like a truncated pyramid. The head of the screw coincides in its angle and tapers with the walls of said opening and boss, and occupies the opening of both the plate and the boss, whereby it has an increased holding surface on the catch plate, and the material of said catch around said opening K is vastly strengthened at a place where the plate is subjected to considerable strain, the screw

being also prevented from rotating in reverse direction, as its head is controlled by the wall of the opening K, and the boss L.

When the plate B is forced inwardly against the spring E, the head J of the screw H, is uncovered, when the same may be engaged by a suitable key, and rotated to remove the screw H, and consequently said plate, the same provision existing when said plate is to be restored to position, the head being caused to register with the opening K, the plate then being let go, whereby the wall of said opening and boss L, again embraces the head of the screw. The plate F, has a boss similar to that of the plate B, and the screw F', is formed with an angular head similar to the screw H. (James C. Sergeson, Philadelphia.)

SERGESON'S COP-SHUTTLE.

The special feature of this shuttle consists in so constructing the same that when yarn, thread or stock is used therein in wet condition, in the shape

Fig. 1.

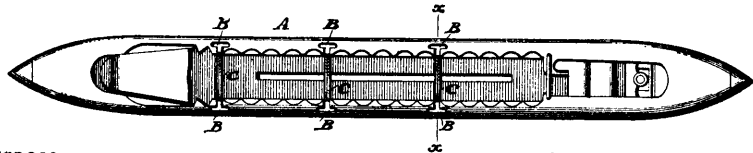


Fig. 2.

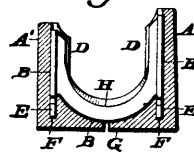
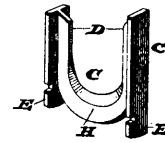


Fig. 3.



of cops, the body of the shuttle is prevented from warping or becoming injuriously irregular on its outer face.

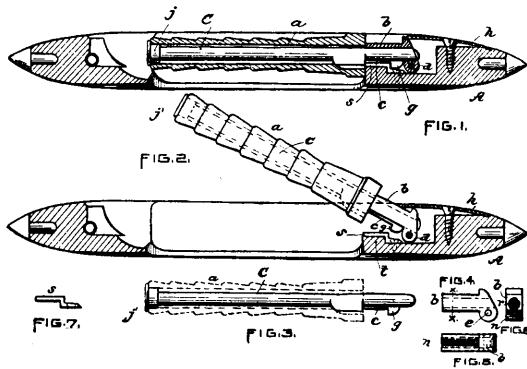
Fig. 1, represents a top or plan view of this shuttle. Fig. 2, represents a transverse section thereof, on an enlarged scale, on line x x , Fig. 1. Fig. 3, represents a perspective view of a detached portion thereof.

The inner face of the side and base of the body A, of the shuttle has grooves B, formed therein, the same receiving the braces or stays C, which consist of somewhat V-shaped pieces of metal. The side limbs D, of said stays have projecting flanges thereon, so as to make said limbs T-shape in cross-section, and the sides grooves B, are similarly shaped, so that said limbs which occupy said side grooves are interlocked with the side wall A', of the body of the shuttle, thus preventing said walls from springing apart and warping or materially warping. Again there depends from the limbs D, the legs E, which enter the grooves F, in the side portion of the base G, of the body of the shuttle. Hence, as the limbs D, are connected at bottom by the webs H, of the stays, said legs E, serve to resist the tendency of the base of the bottom to swell or expand laterally. By these means the shape of the body of the shuttle is preserved and caused to run true in the raceway which it occupies. (James C. Sergeson, Philadelphia.)

SUTCLIFFE & MARSHALL'S SHUTTLE.

The advantage of this shuttle consists in the improved method of holding the bobbin spindle in the shuttle where such spindle is made removable for the purpose of changing an empty bobbin for a full one.

Fig. 1, shows a vertical section of this shuttle, taken lengthwise through its centre with the spindle in elevation. Fig. 2, shows the same parts as Fig. 1, with the spindle turned up in position to be removed to change the bobbin. Fig. 3, represents the spindle and bobbin separate from the socket, which remains



in the shuttle when the bobbin is changed. Fig. 4, is a side elevation of the socket that holds the spindle. Fig. 5, shows the under side of the socket. Fig. 6, is a cross-section of the socket taken on the line *x-x*, Fig. 4. Fig. 7, is a separate view of plate *s*.

A, indicates the body of the shuttle made of wood, and protected at each end by steel points. *C*, is the spindle that holds the bobbin, and which is made removable to facilitate changing the empty bobbin for a full one when run out.

b, is the socket made to hold the spindle *C*, in the shuttle, and which has a hole *e*, made through it sidewise at the lower part of its rear end to receive a pivot *d*, held on both sides in the wood of the shuttle-body, and on which it turns when raised as shown in Fig. 2. A hole *r* is made through the socket lengthwise to receive the spindle *C*, and a wide slot *n*, (see Fig. 5) is made through the under side of the socket into the hole *r*, for about two-thirds of its length from the front end to receive a raised spline *c*, made on the under side of a portion of the spindle that enters the socket. This spline *c*, is for the purpose of preventing the spindle from turning, and as a guide in entering the spindle in the socket properly. The wood *t*, of the shuttle-body under the socket *b*, is cut out in a stepped form to receive the metal plate *s*, which is held in place by a screw entering the wood beneath. The plate *s*, forms a step or notch *j*, to receive a block *g*, made on the back end of the spline *c*, which shuts into it when the spindle is pushed down, as in Fig. 1, and prevents it from coming out of the socket.

The spline *c*, in front of the block *g*, projects out of the slot in the socket and rests on the plate *s*, to assist in keeping the spindle steady and from wearing loose. A button *j'*, is made fast on the free end of the spindle *C*, consisting of a body to enter the end of the bobbin and a flange or head that projects, so as to protect the thread from being injured by the rough end of the bobbin when it is pulled off over the end in weaving. A flat stiff spring *h*, of the usual form is held on the top of the shuttle by a screw through its middle, screwing in the wood, with the front end of the spring resting on the socket *b*, just in front of the pivot *d*, so as to hold the spindle down when in use.

To change the bobbin *a*, the spindle *C* is raised, as in Fig. 2. Then the spindle, with the bobbin on it, is taken from the socket. The spindle is then drawn out of the bobbin by the button *j'*, and inserted in the full bobbin and then put back into the

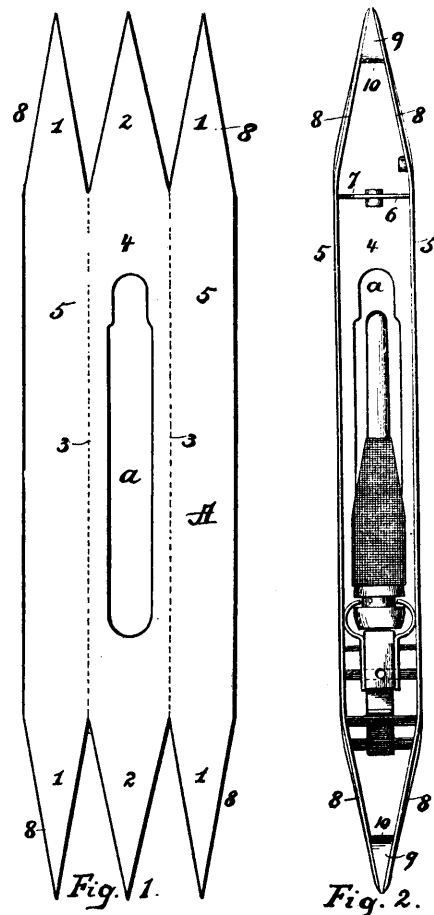
socket and turned down again, as in Fig. 1. (*T. Sutcliffe and J. Marshall, Pawtucket, R. I.*)

MORRISON'S SHUTTLE.

Fig. 1, is a view of the blank from which the shuttle-frame is made. Fig. 2, is a plan view, of the complete shuttle-frame.

An explanation of the construction of this new shuttle is best given by quoting letters and numerals of reference of which *A*, represents a blank, rectangular plate of thin sheet-steel having a slot *a* in its centre. Each end of the blank is cut so as to form three points 1, 1, 2. The blank is then bent up on the lines 3, 3, so as to form the rectangular open frame of the shuttle, said frame comprising a bottom 4, and sides 5. The points 1, 1, 2, at the respective ends of the frame are brought together and brazed to form the pointed ends of the shuttle-frame. The brazed joints between the meeting edges of the points 1, 1, 2, are slightly rounded and made perfectly smooth.

Between the sides 5, a brace 6, is located near one end thereof being braced by the transverse pins or bars with which the spool-holder is connected. The



edge 7, of the brace is curved so as to be out of line with the sides of the frame, and the edges of said sides 5, are slightly rounded, so as to avoid all possibility of the warp-threads being cut by them.

It will be observed that those portions of the sides

of the frame which constitute parts of the pointed ends of said frame are so shaped that their edges 8, will be beveled or inclined and said pointed ends will therefore be nearly conical.

Within the extremities of the pointed ends of the frame, steel blocks or tips 9 are brazed, and the upper faces of said blocks or tips will be made smooth and exactly flush with the edges 8, of the frame, so as to expose no projection whatever, which can catch or engage the warp-threads.

In order to further guard against the engagement of the warp-threads by the inner ends of the blocks or tips 9, said inner ends are beveled or rounded, as shown, at 10.

By making the walls of the frame thin, the amount of frictional contact of the shuttle with the warp-threads and parts of the loom will be reduced to a minimum.

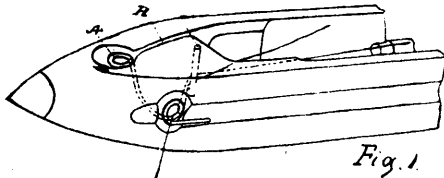
Another advantage of thin walls of the frame is, that the space within the frame will be enlarged, thus permitting the use of a large amount of thread on the spool when the latter is first inserted into the shuttle-frame. The improved shuttle-frame is a mere shell of steel and is open from tip to tip, and by thus making the frame open the frictional surface is still further reduced.

This shuttle-frame cannot chip, splinter, or break, and there are no exposed points or connections and consequently nothing to catch or injure the warp-threads. (*Thomas Morrison, Williamsport, Penna.*)

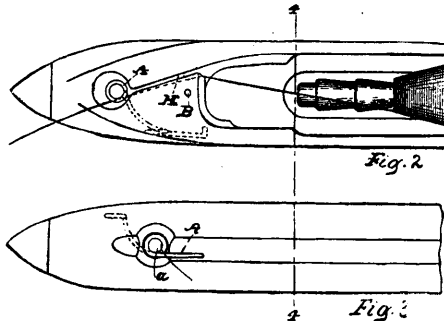
NASON'S SELF-THREADING SHUTTLE.

Fig. 1, is a view, in perspective, of the front end of this shuttle. Fig. 2, is a plan, and Fig. 3, an elevation of the same, and Fig. 4, a cross-section on lines 4-4 of Figs. 2 and 3.

A, is the feeding pin preferably in one piece with



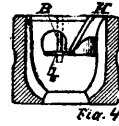
the eye *a*. The thread from the bobbin must be passed about that pin and thereby guided into the eye. The groove *H*, is at its front end at the middle line of the shuttle, but the mouth of the groove *H*, slants away from that line as shown in Fig. 2, and the walls of the groove also slant inward from top to bottom, as plainly shown in Fig. 4; and it is this



groove, doubly slanted, as above described, which constitutes the main feature of the improvement in the construction of this shuttle. With such a groove

the thread will when led from the bobbin and along the groove as shown in Fig. 2, be brought into proper relation with the feeding pin *A*; and while this is a practical advantage of some consequence, because it makes it easier for the weaver to bring the thread into proper relation with the feeding pin *A*, it also facilitates the slipping of the thread down the feeding pin to cause a bight in the eye *a*, as clearly shown in Fig. 1. The slanting of this groove inward also enables a guide pin *B*, to be used in the thread passage.

To thread the shuttle, the thread is led from the bobbin through groove *H*, and is thereby brought to the proper side of the feeding pin *A*, (see Fig. 2) and the free end of the thread is then pulled sideways, to form a bight about the feeding pin, and then back through the groove *H*, to cause it to follow down the feeding pin *A*, and form the bight through the eye *a*, as clearly shown in Fig. 1. This bight is then caught by a wiping motion of the fingers, and the free end of the thread pulled through the eye as shown in Fig. 3. The whole operation is performed rapidly and with certainty by reason of



the relation of the doubly slanted groove *H*, to the feeding pin *A*.

When the shuttle is in use the thread extends from the bobbin through the space between the guide pin *B*, and that part of the shuttle body, which forms the inner wall of groove *H*, and thence out of the eye *a*.

The angle formed in the thread by the guide pin *B*, serves as a light tension, and this tension may be increased by a fibrous washer *b*, as shown in Fig. 4. (*Joseph Herbert Nason, Somerville, Mass.*)

ALLEN'S TWO-BOBBIN SHUTTLE.

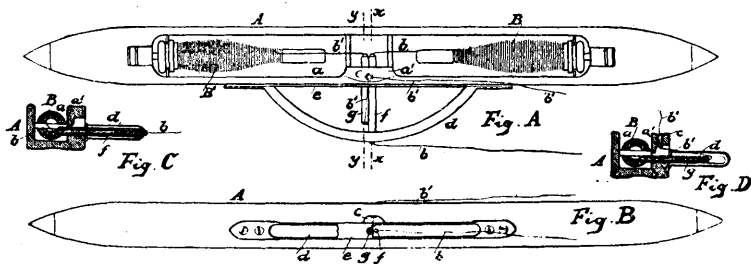
This shuttle, while capable of application to weaving generally, is especially adapted to the weaving of silk fabrics, and generally to that class of silk fabrics, which may be designated as "changeable," "iridescent" or "cameleon," such fabrics being generally composed of three differing colors, one of said colors being supplied by the warp and the other two by the filling.

To produce the optical effect peculiar to this kind of silk fabrics, the filling threads are necessarily woven in parallel relation and have a regular and uniform alternation of color. This effect has been previously accomplished by the use of two separate shuttles in a loom of the drop-box type; the employment of said separate shuttles being necessary to avoid the twisting, mixing or tangling of the two threads, the occurrence of which, even in a slight degree, is fatal to the peculiar effect desired. By means of this two-bobbin shuttle, the extra shuttle, as formerly required, is dispensed with, and, consequently, we are enabled to employ for the manufacture of the fabrics thus referred to a single-box-loom. The improved shuttle has two bobbins which feed simultaneously two filler threads at the point of delivery from the shuttle, and thus insures the same result as that attained by the employment of the two separate shuttles in the drop-box-loom.

Aside from the great economy incidental to the use of the single-box-loom as compared with the use of the box-loom, the extra shuttle is dispensed with and the output of the loom is greatly increased. Moreover, we are enabled to attain by the performance of this shuttle an improved product, owing to the maintenance of parallelism of the filling threads throughout the body of the fabric and the conse-

quent regular and uniform alternation of color. In addition to these advantages the plain type of loom employed, is more readily controlled and can be operated at less expense than a loom of the drop-box type. For a clear understanding of this ingenious shuttle the accompanying illustrations are given, of which Fig. A, is a plan view of the improved shuttle. Fig. B, is a side elevation partly broken away. Fig. C, is a sectional view on line *x-x*, of Fig. A, and Fig. D, is a sectional view on line *y-y*, of same figure.

A description of the construction of this shuttle is best explained by quoting letters of reference, of which A, denotes the shuttle-body, provided with the recess *a*, made of sufficient length to accommodate two bobbins BB' which are mounted on tongues pivot-



ally arranged. The said bobbins lie in position end to end and deliver the threads centrally of the shuttle, at which point the body is provided with a thread-delivery eye *c*, vertically arranged in an enlargement *a'*, of one of the side walls of the body, said eye being located centrally between the ends of the shuttles, but to one side of the line thereof. Secured to one side of the shuttle is a semi-circular guard *d*, and a strip *e*, is interposed between the side of the body and the guard to serve as a means for holding rigidly two thread-tubes *f*, *g*, lined with porcelain, and at their inner ends extend to a point in line with the bobbins. The tube *f*, extends to and through the guard; but the tube *g*, terminates short thereof.

In threading the shuttle, the thread *b* from the bobbin B, is passed directly through the tube *f*, being thereby delivered at a point some distance from the body of the shuttle. The other thread *b'*, of the bobbin B', is first passed through the tube *g*, and from thence to and through the eye *c*, the point of its delivery being thereby within the side of the shuttle adjacent to the point of delivery of the thread *b*, and same distance from the latter. By this means threads are not only fed or delivered in a separate condition, but the separation is maintained by reason of the initial distance between the points of delivery until the weaving actually takes place. There is no contact until the threads are in the cloth, and hence there is no twisting nor tangling, as would be the case were the threads delivered from the same eye. (The Rettger Allen Co., Paterson, N. J.)

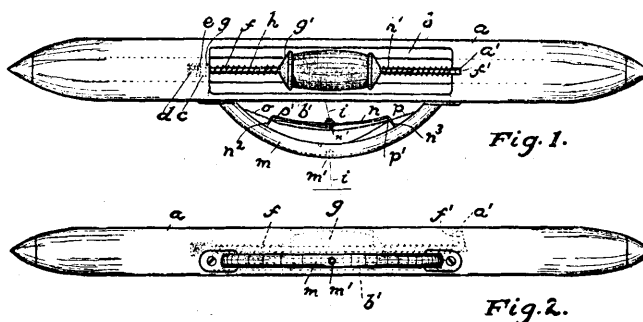
TODD'S SHUTTLE FOR NARROW WARE LOOMS.

The novelty of the shuttle consists in its tension and bobbin holding and controlling device, being a spring which holds the bobbin from rotating too fast. Fig. 1, is a plan view of this shuttle and its tension and bobbin holding and controlling device and Fig. 2, a front elevation of Fig. 1.

a, represents the shuttle-body provided with a longitudinal chamber *b*, in the top thereof and with an elongated slot *b'*, in its front portion.

In the shuttle-body and at one end of the chamber *b*, is arranged a horizontal hole or recess *c*, closed by a centrally-perforated plate or disk *g*, through which one end of the bobbin shaft or rod *f*, is adapted to pass. Said shaft bears against the plate *e*, resting on the spiral spring *d*, arranged in said hole or recess. The other end of said shaft is bent upward at an acute angle, as at *f'*, and is adapted to engage a vertically-arranged recess *a'*, having its inner back wall at an acute angle to its bottom. On said shaft is slidingly arranged the bobbin *B'*, carrying the thread or threads *i*, which bobbin is normally held and controlled by means of the spiral springs *h*, and *h'*, arranged on and surrounding the unoccupied portions of the shaft *f*. On the front portion of the shuttle-body *a*, and in alignment with the elongated slot *b'*, is secured the shuttle bow *m*, provided in its culminating point with the horizontally-arranged eye *m'*. Within said bow is arranged, and secured thereto by means of its depending ends *n²*, and *n³*, a bridge *n*, parallel to the shaft *f*, and provided in its centre with an eye *n'*. The ends *n²*, and *n³*, are each provided with an opening penetrated by its respective spiral spring *o*, and *p*, secured with their outer ends to and within the end portions of the bow or conductor, and are provided at their ends with loops *o'*, and *p'*, respectively, forming passages for the thread or threads *i*. Said thread or threads pass from the bobbin through eye *n'*, into and through loop *o'*, from whence into and through loop *p'*, and finally leave the shuttle after passing through the eye *m'*, in the bow or conductor *m*, as clearly shown in Fig. 1.

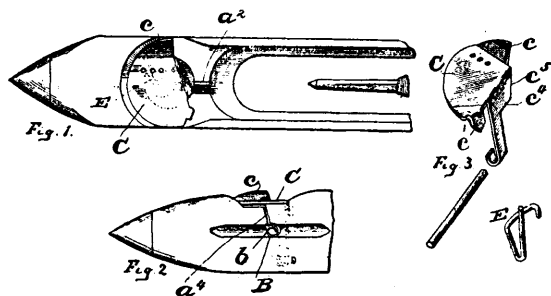
In placing the bobbin in position the rounded end of the shaft *f*, is inserted through the perforated plate *g*, into the recess *c*, and the spiral spring is depressed sufficient to allow the insertion of the bent-up por-



tion *f'*, of shaft *f*, into the recess *a'*. When said shaft is released, it remains locked within the chamber *b*. The spiral springs *h*, and *h'*, normally hold the bobbin in position, but are so adjusted that said bobbin can move from one side to the other when the shuttle, for instance, is thrown over the race, and is suddenly stopped in its movement by the box on the loom, by which arrangement breakage is avoided, and yet the proper tension is maintained. The spiral springs *o*, and *p*, serve also as take-up or tension devices and thus prevent a breaking or looping of the thread. (Walter Todd, Paterson, N. J.)

DAUDELIN'S SELF-THREADING TENSION DEVICE FOR SHUTTLES.

This device is shown in the accompanying illustrations, of which Fig. 1, represents a top plan view of the portion of a shuttle containing the threading

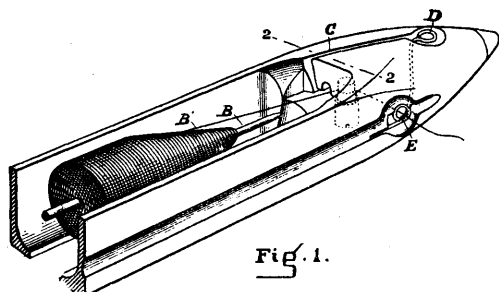


mechanism. Fig. 2, is a side elevation of the same. Fig. 3, is a detail perspective view of the threading plate, its securing devices, and the thread-tension device.

In order to thread the shuttle but two movements are necessary. The thread is drawn forward longitudinally of the shuttle until it is caught beneath the upturned end *c* of plate *C*, and conducted thereby into the semi-circular threading passage formed beneath the plate *C*, between said plate and the upper surface of the shuttle body, and is then drawn laterally toward the side on which the thread-delivery eye is located. This latter movement causes the thread to find the vertical threading slit *a*¹, which takes it directly into the delivery eye. As the thread is paid out it is drawn into engagement with the tension device *E*, and made to engage the inclined edge *c*¹, of the plate *C*, which guides it down below the shoulders *c*², which prevents its rising. The thread will also be drawn by the movements just described into the thread notch *a*², and will pay off from the spindle through said notch around the arms of the tension device, and directly out through the delivery eye. The delivery eye *B*, is provided with the retaining finger *b*, to prevent the escape of the thread upwardly. (*Jean Baptiste Daudelin, Fall River, Mass.*)

NASON'S TENSION DEVICE FOR SHUTTLES.

The object of this device is to provide means whereby the tension of the yarn carried by the shuttle may be accurately controlled, the tension-clamp being



so constructed that the thread is drawn into it by the same movement that threads the shuttle

Another object is to provide a tension which will yield at need to permit small knots in the yarn to

pass through without breaking the yarn. This device with its friction-surfaces not positively adjusted in their relations the one to the other, but controlled by means of a spring, which tends constantly to press them together, serves this purpose admirably, the spring yielding more or less readily, according to the position of the adjusting screw, to permit the passage of the knot between the friction-surfaces.

Of the accompanying illustrations, Fig. 1 is a perspective view of one end of a self-threading shuttle with this device added. Fig. 2 is a sectional elevation on line 2-2, of Fig. 1, enlarged for clearness. Letters of reference indicate thus:

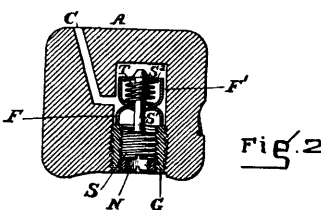
A, the shuttle-body; *B*, is the spool, and *B'*, the yarn upon the spool; *C*, is the slot, and *D*, the pin which carries the yarn *B'*, to the eye *E*.

The tension-clamp consists of two friction-surfaces *F*, *F'*, relatively adjustable by means of a screw *S*, working in the body of the shuttle, which controls the pressure of a spring which presses upon the back of one of the friction-surfaces, and a side pin *S'*, prevents the yarn from drawing between the friction-surfaces, the tension device being held within a recess formed within the shuttle.

G, is a socket of metal screwing into the body of the shuttle, in which work the adjusting screws *S*, and the check-nut *N*, for locking the screw *S*. The adjusting-screw *S*, carries pin *S'*, which projects into the cavity formed in the body of the shuttle for the tension device, and serves, among other uses, as a

side pin to keep the yarn in its proper position between the friction-surfaces.

The friction members *F*, *F'*, are hemispherical in form, the poles being slightly flattened or indented and having a hole through the flattened part through which the pin *S'* passes, the



flattened surfaces upon the two hemispheres being opposed. A spring *T*, surrounds the upper end of pin *S'*, one end being in contact with the inside of *F'*, and the other end being in contact with a disk *S*², fast to the end of a pin *S*¹, or the upper end of the spring may be attached to the upper end of pin *S*¹.

The operation of the tension device is as follows: The yarn *B'*, is laid in the slot *C*, about the upper end of the guide pin *D*, and back again in the slot *C*. It is then drawn back and slips downward along the slanting guide-pin *D*, to the eye *E*, the movement drawing it into the tension device between the two friction-surfaces *F*, *F'*, to one side of the pin *S'*. By a wiping motion of the finger of the operative over the eye *E*, the loop of yarn is drawn out of the eye. The eye *E*, being upon the opposite side of the shuttle from the slot *C*, the pin *S'*, serves to cause the yarn to draw between the friction-surfaces *F*, *F'*, near their centre. To adjust the tension, the screw *S* is turned in the required direction, the pin *S'*, and disk *S*², upon the screw *S*, putting more or less pressure upon spring *T*, which in turn presses upon *F'*. The requisite pressure having been secured, the check-nut *N* is turned to place, securely holding screw *S*. (*Joseph Herbert Nason, Somerville, Mass.*)

HOWARD AND FITTON'S TENSION DEVICE FOR SHUTTLES.

The object of this device is to provide means applicable in drop-box weaving for automatically stopping

the feed of the filling thread in a shuttle when the shuttle passes into the drop-box and for holding the thread taut or without undue slackness while said shuttle is within the box, thereby avoiding liability of the idle filling thread from one shuttle being partially drawn into the warp or fabric by a shuttle thrown from an adjacent box when the boxes are changed.

Another object is to provide a shuttle with improved means adapted to be automatically operated by contact with the common shuttle-binder of the loom as the shuttle enters the drop-box for retarding or stopping the feed or for increasing the tension on the filling-thread running from the shuttle, thereby to tighten or hold the filling-thread straight until beaten up into the web, and to prevent the fabric being woven loose or heavier at the selvage or adjacent thereto than in its central portion.

Of the accompanying illustrations, Fig. 1, is a top view of a shuttle illustrating the nature of this tension device; Fig. 2, is a plan view of the shuttle as entered in the drop-box, showing the manner in which the stop device for the filling is actuated by the shuttle-binder of the drop-box.

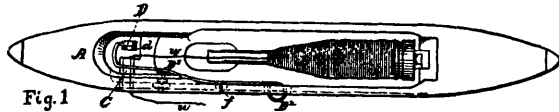


Fig. 1

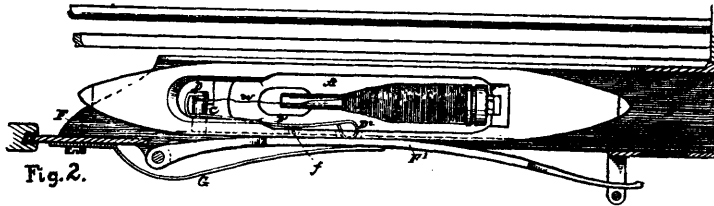


Fig. 2.

A, denotes the body of a loom-shuttle; B, the cop or bobbin; *w*, the filling-thread which is delivered through guiding eye C.

D, indicates a movable presser or stop device arranged to be forced down upon the thread *w*, where it passes into the eye C, for retarding or stopping the run of the thread from the shuttle. Said presser is an arm or lever D', pivoted to the side of the body at *f*, and having a portion D², that projects through an opening *a*, in the side of the shuttle-body, standing out therefrom in such manner that, when the shuttle is in use, it will engage with the inner surface of the binder which is commonly employed in the shuttle-boxes of looms and be thereby pressed inward flush with the side of the shuttle, swinging the lever D', and causing the pad to bear upon the thread at the shuttle-eye, as indicated in Fig. 2. The arm of the lever is made of an elastic bar, so as to yield or spring somewhat under excess of pressure. This presser-lever can be adapted to the various forms and sizes of shuttles employed for weaving different classes of fabrics and materials—as silk, wool, cotton, or other fibre. The bearing-head of the presser is provided with a facing *a*, of leather, rubber, felt, or such material as will give the desired action on any particular class of filling in any instance employed. An adjusting-screw arranged in the presser-lever and having a head that strikes against the body of the shuttle, serves to arrest the action of the presser and regulate the approach of the pad upon the thread to give greater or less force of pressure thereon, any excess of movement of the operating-arm being accommodated by the yielding or spring of said arm.

F, indicates the shuttle-box or one of a series of drop-boxes; F', is the shuttle-binder thereof, and G, the binder-spring.

In the operation as the shuttle passes into the box F, the projecting part D², of the presser-lever by striking the binder F', is automatically forced inward causing the pad *a*, to be pressed down upon the thread *w*, which is embraced between the pad and the end of the guide C, thereby retarding or stopping the delivery of the filling as the shuttle approaches or arrives at its destination, also holding the thread from running from the shuttle or increasing its slackness while the shuttle remains in the shuttle-box, but instantly and automatically relieving the stop upon the filling as the shuttle is delivered from the box and the end D², released from contact with the face of the binder or engaging part.

By combining the stop or presser device with the shuttle in a manner shown and described and adapting it to be automatically brought into action by the binder with which it makes contact as the shuttle comes to the end of its throw, we attain the following benefits viz.: The filling stop is rendered simple,

efficient, and comparatively inexpensive, and conveniently practical for service in fancy weaving where changeable shuttle-boxes are required, the improvement can be incorporated in shuttles of the ordinarily employed types, and applied to use in the common drop-box-loom without necessitating any change in or addition to the drop-box structure. The filling, while the shuttle is retained in the box is held from running off, thus preventing any liability, when the boxes are changed, of the shuttle thrown from an adjacent box drawing the idle thread from the standing shuttle into the edge of the woven fabric. (T. Howard and J. R. Fitton, Worcester, Mass.)

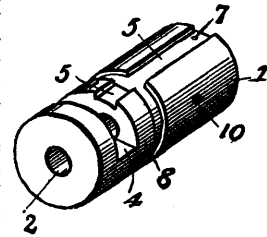
SWEENEY & STROBLE'S AUTOMATIC TENSION DEVICE FOR SHUTTLES.

Of the accompanying drawings Fig. 1, is a perspective view of this tension device with the tension lever or arm removed. Fig. 2, is a longitudinal sectional view with the lever or arm in position. Fig. 3, is a perspective view of the tension lever or arm removed from the tension device.

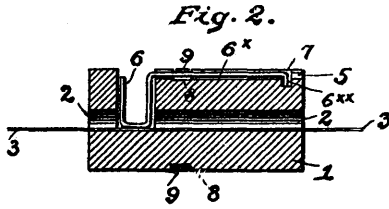
Numerals of references indicate thus:—1, the tension device *per se*, the same consists of an elongated cylinder of metal, china or other suitable material provided with a central opening 2, as to its entire longitudinal axis for the passing of the thread 3.

The cylinder 1, near one end thereof is provided with a recess 4, extending into the opening 2, and also with a longitudinal guide 5, on its outer surface extending from the recess 4, to the opposite end of the cylinder; the recess and groove combined adapted to receive a tension lever or arm 6. This tension lever or arm 6, (see Fig. 3) consists of a piece of steel or other desired suitable material, broad and U-shaped at one end at right angle with its shank or extension

Fig. 1.



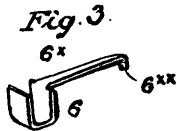
6^x; and its opposite end provided with a bent or downward projection 6^{xx}, the U-shaped end of the lever or arm adapted to be seated in the recess 4, and the shank portion 6^x, adapted to be seated in the



groove 5, of the cylinder 1, while the bent end 6^{xx}, of the lever or arm takes into a hole 7, formed in the cylinder 1, near the outer end of the groove 5, (see Fig. 1) to prevent endwise or lateral movement of said lever or arm. The cylinder 1, in juxtaposition to its recess 4, is further provided with a circumferential groove 8, which receives, after the placing of the lever or arm 6, a band of rubber 9 or other resilient means adapted to hold the lever or arm 6, in normal working position; that is to say, permit vertical movement of the lever or arm only that the latter may accommodate itself to inequalities in the thread, at the same time preserving a steady uniform tension.

The tension device is mounted within the eye of the shuttle secured in place by a set-screw passing from the outer side of the shuttle and takes into a bearing 10, conveniently located on the outer surface of the cylinder 1, for either a right or left-hand shuttle.

A tension device for the construction described permits the passing or feeding of the thread from the cop in an easy and uniform manner without damage to or cutting of the same, the thread 3, passing into and being guided in the first place by the opening 2, in the cylinder 1, and thence passing under the U-head of the lever or arm 6,—the latter accommodating itself as to its tension properties to the irregularities or inequalities in the thread, and this by reason of the resilient means 9, employed for retaining the lever or arm in position and operation and permitting vertical movement only while at all times preserving the tension, and encounters no rough, sharp, uneven or other cutting edges or contacts to cut or damage the thread. (J. Sweency, Pottstown, and G. Stroble, Philadelphia.)



HAMBLIN & CORNELL'S TENSION DEVICE FOR SHUTTLES.

The object of this device is to prevent the screw which secures the tension device in the shuttle, and by means of which the tension is regulated, from working out, and thereby breaking the warp threads as forming the shed.

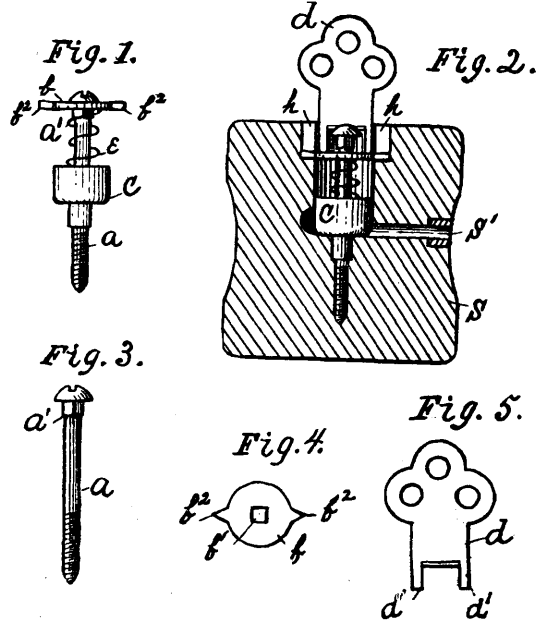
Fig. 1, is an elevation of a shuttle-tension device provided with the improvement. Fig. 2, is a view in cross sections of a shuttle through the point occupied by the tension device. Fig. 3, is a view showing the peculiar construction of the screw which secures the tension device in the shuttle, and by means of which the degree of tension is regulated. Fig. 4, is a plan view of a lock plate, which prevents the screw from working out. Fig. 5, is a view of the key, by means of which the screw is operated.

a, indicates a screw, having a small portion of its shank, immediately under its head, made square.

as at a'. b, indicates a plate, having a square hole b', in its centre, to fit the square shank a', of the screw, and provided with the wings b². s, represents the shuttle, and s', its delivery eye.

In the sides of the opening made to receive the tension plug c, are the grooves h, adapted to receive the wings b², of the plate b, so that said plate may move easily up and down in said opening.

The tension device consisting of the screw a, plate b, plug c, and spring e, being adjusted in the shuttle as shown in Fig. 2, the plate cannot turn, because of its wings b², projecting into the grooves h; and the



screw cannot turn, because the spring e, holds the plate on the squared shank of the screw, and thus locks it in position.

To advance or retract the screw, a key d, shown in Fig. 5, having the legs d', is used, as shown in Fig. 2. The legs d', push the plate below the squared portion of the shank of the screw, and the key then takes into the slot of the screw, and is turned in the direction desired. On the key being removed, the spring e, acts to push the plate b, upward on the squared shank of the screw, and thus locks the screw in position. (S. M. Hamblin and P. Cornell, New Bedford, Mass.)

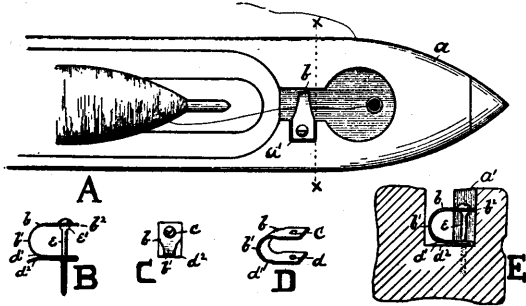
HAMBLIN AND DAMON'S TENSION DEVICE FOR SHUTTLES.

Fig. A, is a top view of a portion of a loom-shuttle showing this tension device adjusted therein. Fig. B, is a side view of the tension device as it appears when removed from the shuttle. Fig. C, is a top view of the same. Fig. D, is a view in perspective of the device with the regulating and retaining screw removed and showing a slight modification in its construction. Fig. E, is a view in cross-section through the dotted line x-x of Fig. A.

a, indicates a portion of a shuttle-body having the recess a', made in one side of the throat thereof, in which recess is secured the tension device b, consisting of a piece of spring sheet metal bent into a semi-circle with the ends elongated parallel to each other having one end provided with the square hole

c, and the other end with the round hole a, and a screw e, adapted to pass through the hole d, having a square shoulder e', under its head adapted to fit in the square hole c.

In Figs. B and E, the spring b is shown as having its lower end bent upon itself and extending to a



point in line with the portion of the circle b', where it is slightly bent downward, as at d².

When the tension device is constructed as shown in Fig. B, the thread runs between the parts d' and d²; but when it is constructed as shown in Fig. D, the thread runs between the part d' and the bottom of the throat of the shuttle, and when greater tension on the thread is desired, the end b² of the spring b, is pressed downward until the square hole c therein is free from the square shoulder e, and the screw is advanced to a sufficient degree. To lessen the degree of tension, the screw is retracted.

The ends of the spring b, are made square, so that when the device is adjusted, as shown, the said ends will bear against the side of the recess and prevent the device from turning from side to side and getting out of its proper position.

It will be observed that when the square shoulder of the screw is in the square hole in the spring b, the screw is prevented from turning and working out, and thus a uniform tension is maintained on the thread.

It will also be observed that the operation of threading the shuttle is the same either with or without the tension device and that the thread will draw under the tension device of its own motion. (S. M. Hamblin, New Bedford, and E. S. Damon, Plymouth, Mass.)

HAMBLIN AND DAMON'S IMPROVED TENSION DEVICE FOR SHUTTLES.

The gist of the invention consists of a piece of spring-wire having one end formed into nearly a circle, adapted to hold itself by expansion in the threading cavity of a shuttle, then carried downward in a curve to a lower plane, where it is provided with a straight portion adapted to bear against the floor of the threading-cavity and produce tension on the thread as it is drawn under it.

Fig. A, is a view of the head of a shuttle in horizontal section through the line x-x of Fig. B, and showing the improved tension device adjusted in place. Fig. B, is a view in cross-section of a shuttle-head through the line x-x of Fig. A, with the tension device removed. Fig. C, is a view of the same, showing the tension device in place. Fig. D, is a front view in perspective of this improved tension device constructed with a close coil between the portions of the device which produce the tension and the portion which operates to retain the device in the shuttle.

Fig. E, is a view in perspective of the tension device constructed without the said coil.

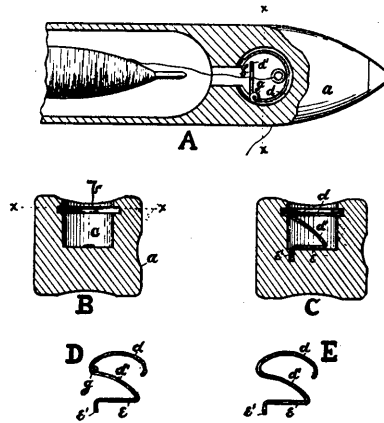
a, represents the head end of a shuttle, the threading-cavity c, being provided with the shallow groove b, near the top of its walls.

This tension device is constructed of spring-wire, one end of which is bent into nearly a full circle d. It then is carried downward in a curve d', to a lower plane, and is then bent backward in a straight line, as at e, to a point nearly coincident with the sweep of the circle d, where it is carried downward at a right angle with the plane of the portion e, as at e', as shown in Fig. E.

In order to give the device greater rigidity it may be provided with the close coil g, between the portions d, and d'. The portion of a circle d, is made larger in diameter than the cavity c, in order that when it is sprung into the groove b, it will expand into said groove and be held securely in place. The perpendicular portion e', is made to enter loosely a hole in the floor of the cavity c.

The device being arranged in the shuttle, as shown in Figs. A, and C, does not obstruct the operation of threading the shuttle, and when threaded the thread draws down over the curved portion d', and under the portion e, where it receives the necessary tension by being pressed between the portion e and the floor of the cavity c.

As will be seen, the device cannot of itself become displaced, nor is there any part of it, when adjusted in the shuttle on which the thread can catch and



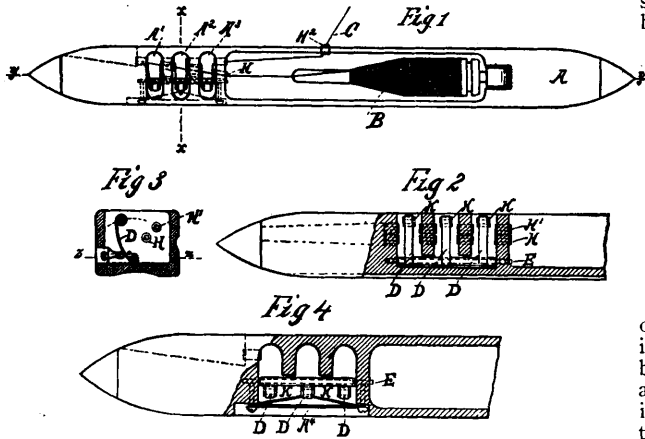
break. The tension on the thread may be regulated by slightly bending the wire between the portions d', and e. (S. M. Hamblin, Taunton, and E. S. Damon, Plymouth, Mass.)

GRANT'S TENSION DEVICE FOR SHUTTLES.

Fig. 1, is a top view of a shuttle with this tension device secured therein. Fig. 2, is a part side sectional view through the line Y-Y, of Fig. 1. Fig. 3, is a part end sectional view through the line X-X, of Fig. 1, and Fig. 4, is a part sectional plan view on the line Z-Z, of Fig. 3.

In Figs. 1, 2, and 3, dotted lines extending from end of shuttle to the wall of compartment A, indicate that a piece of the shuttle is cut out in order to expose the upper end eye H', and lower end eye H, to enable the thread to be passed from the lower series of eyes to the upper series.

A, represents a shuttle, which is provided with the perpendicular recesses or compartments A¹, A², A³, and the horizontal recess or compartment A⁴, into which the other compartments open. B, represents



the spool or bobbin containing the silk or thread C. A long pin E, is secured in the bottom of the compartment A⁴. To the pin E, are secured arms, such as D, which are adapted to move or swing in the compartments A¹, A², A³, into which they extend. The swinging ends of said arms D, are provided with the eyes K. The arms D, are slightly curved, as shown in Fig. 3, in order that each arm D, when pressed forward will bring the eye K, in direct alignment with an upper series of eyes H', located in the walls of the perpendicular compartments, in order that the thread or silk or other material may be passed or drawn alternately through the eyes H', and the eyes K, in the ends of the arms D, after having been passed through a series of eyes located beneath the upper series of eyes. The silk C, first passes from the bobbin B, and is conducted through the lower series of eyes H, and out of the end of the bobbin, or near the end of the bobbin, through an opening indicated by the dotted line in Figs. 1, 2 and 4. The swinging arms D, are then pressed forward until the eyes K, in the ends of the arms D, are in line with the upper series of the eyes H'. The thread is then conducted, by means of a hook or needle, up to and through the upper eyes H', and the eyes K, in the ends of the arms D, and through the eyes H², as shown in Fig. 1.

The relative position of the upper and lower series of eyes is shown in Figs. 1, 2 and 3.

The arms D, are held in the position, as shown in Fig. 3, by means of an elastic or rubber band, which is secured to the said arms, and to the shuttle, so as to give the required tension.

As the shuttle performs its functions in weaving, the thread C, is drawn from the bobbin B, passing through the lower series of eyes H, up to the upper end eye H', and then alternately through the said upper eyes and the eyes K, and out of the eye H², as shown in Fig. 1. As the thread C, is drawn through the eye H², the arms D, are drawn forward, so as to turn on, or with, the pin E, and when the shuttle is about to return, the elastic or rubber band secured to the shuttle and to the swinging arms D, as shown in Figs. 3 and 4, causes the swinging arms to return to the position shown in Fig. 1, thus taking up the slack thread.

The elastic or rubber band may be varied in size or thickness, so as to provide various degrees of tension. (William A. Grant, Paterson, N. J.)

WHITLEY'S TENSION DEVICE FOR SHUTTLES FOR WEAVING BROAD SILK GOODS.

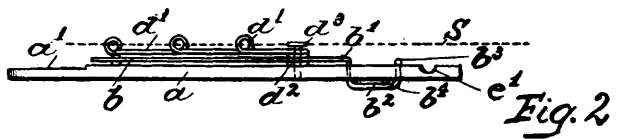
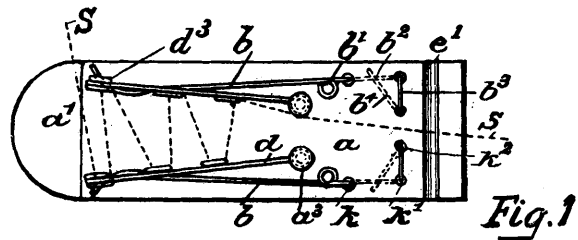
The object aimed at in the construction of this shuttle is to secure the accurate binding of the cloth by the use of tension-springs, to afford facilities for the proper adjustment of these springs and to regulate the tension thereof with alacrity.

In what is commonly known as the "French" shuttle a semi-circular plate is secured to the outside of the shuttle, and arms provided with guides as well as tension-springs are secured to said plate, all of which necessitates the use of a lathe constructed specially for their use, the projection on outside of shuttle working outside of the lathe.

The purpose of the new shuttle is to accomplish the same results then obtained by the French shuttle by employing a plate of metal three-quarters of an inch in width by about three inches in length, which is placed within the shuttle on the bottom thereof and to which are secured guide-arms and tension-springs so as to extend longitudinally along the same in the bottom of the shuttle, as shown in the accompanying illustrations of which Fig. 1 is a plan of the device; Fig. 2 is a side or edge view; Fig. 3 is a detail view of eye bar with binder; Fig. 4 is a plan of shuttle with device in position, and Fig. 5 is a longitudinal section of the same.

Letters of references indicate thus:—A, the shuttle; A², a lip-engaging device; A³, a groove in side of shuttle; B, the quill; S, the filling.

a, is the plate of the device, which is provided with the engaging lip a' adapted to slide under the projecting part of the shuttle A², when the plate a, is slid along the bottom of the shuttle into its proper position.



When the plate a is in its proper position, it is securely held there by means of the securing pin or screw e, which passes transversely through the sides of the shuttle along the transverse groove e', in the top of the plate a.

A spring b, having a coil b', is secured to the plate

a, by means of the loops *b*², *b*³, *b*⁴, formed by passing the steel wire through and under the plate by means of the small perforations or openings shown in Fig. 1.

A looped tension-bar *d*, or, rather, a pair of the same, are secured to the plate *a*, by screws or rivets

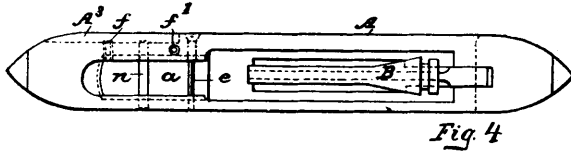


Fig. 4

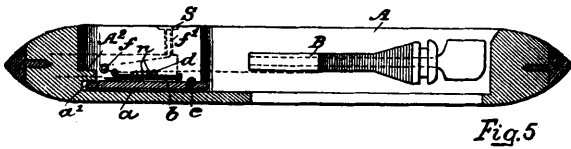


Fig. 5

*a*². On the back of each of said loop tension-bars is an eye *d*², through which the end of the spring *b*, passes and is permitted to move as the loop-bar is operated by the tightening or loosening of the thread or filling *S*. The loop tension-bar *d*, is provided with the desired number of loops or eyes *d*¹, *f*, and *f*¹, are the eyelets in the shuttle.

In the construction of this new tension device strength and durability are attained by winding a copper wire *e*, around the steel loops *d*, and soldering the same together to prevent the loop from opening or breaking by the concussion of the shuttle. Two or more threads or cords, as indicated by the letter *n*, in the illustrations, are passed from one side of the shuttle to the other, over which cords the filling passes from the quill to the eyes in the tension-bars to prevent it from becoming entangled or caught in the springs.

To regulate the tension of the springs, they may be adjusted for that purpose by increasing or diminishing the number of the coils *b*, thereby varying the length of the springs *b*. The springs being constructed of a very fine and delicate wire which is easily manipulated, the length of the springs may be changed with facility for the purpose of regulating the tension.

Instead of passing the ends of the tension-springs through the lower eyes *d*², of the tension-bars *d*, said tension-springs *b*, may have the ends thereof coiled around said tension-bars *d*, at a point anywhere between the engaging ends *d*² of said tension-bars and the nearest loops thereon without varying from the essential principles of the improvement, the gist of which consist in the combination, with a shuttle, of the plate *a*, placed within the shuttle and extending longitudinally along the bottom of the same, the two looped tension-bars secured to said plate, the two tension-springs also secured to said plate being provided with the coils *b*, the ends of said tension-springs *b*, being loosely connected with the loop tension-bars to afford the tension required. (Ralph Whitley, Paterson, N. J.)

KOESTER'S TENSION DEVICE FOR SHUTTLES FOR RIBBON LOOMS.

The object of this device is to provide a spring for that class of shuttles where a lever is pressed against the quill containing the silk, the tension of the spring to be regulated without removing or bending the spring; the device, from its simplicity of construction and ease of operation, to facilitate and reg-

ulate the taking of the silk from the quill in the operation of weaving.

In shuttles as now in use, the lever is pressed against the bottom of the quill by a flat spring, one end of which is secured in the shuttles by means of a pin, the free end being forked to receive the arm of the lever.

To regulate the tension of the spring in shuttles as now in use, said spring is taken out and bent more or less, or it is bent without taking it from the shuttle. It is difficult to regulate the tension desired, by this procedure, and often the spring has to be manipulated several times before the desired degree of tension is obtained, while with the improved tension device the tension-spring is regulated positively to suit, and this almost instantly, thus saving time and labor.

The gist of the improvement consists in the employment of a supplemental spring guide or strip beneath the spring proper and of a sliding connection for holding down or releasing the spring, as required.

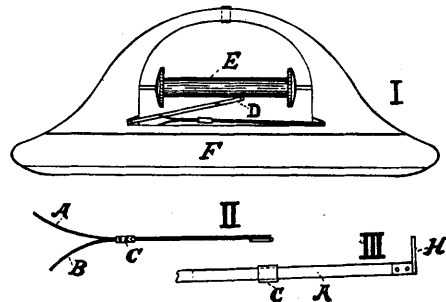
Fig. 1, represents a shuttle provided with a quill, a lever, and the improved tension-spring adapted to operate said lever. Fig. 2, represents the tension-spring, guiding-strip and sliding connecting-piece, being a side view thereof. Fig. 3, is a top view of spring, slide and pin for securing spring in shuttle.

A, is the spring; *B*, the guiding-strip; *C*, the sliding connection; *D*, the lever; *E*, the quill; *F*, the shuttle-body, and *H*, the pin for securing the spring in shuttle-body.

Fig. 3, shows a spring and guide riveted together at the end where the securing-pin is located.

The old spring device is not exact enough, and especially when heavy dyed silk is in use; but the improved spring may be regulated to a nicety, according to the quality of the silk.

In the drawings the sliding connection shown is a loop, which encircles the spring and the guide, and by sliding the same backward or forward the tension



is regulated by holding down or releasing the spring *A*, which presses the lever *D*, upward against the bottom of the quill *E*.

The regulation of the tension of the spring *A*, is greatly facilitated by the use of the guide *B*, and sliding connection *C*, it being but the work of a moment to adjust the sliding connection for that purpose. (George C. Koester, Paterson, N. J.)

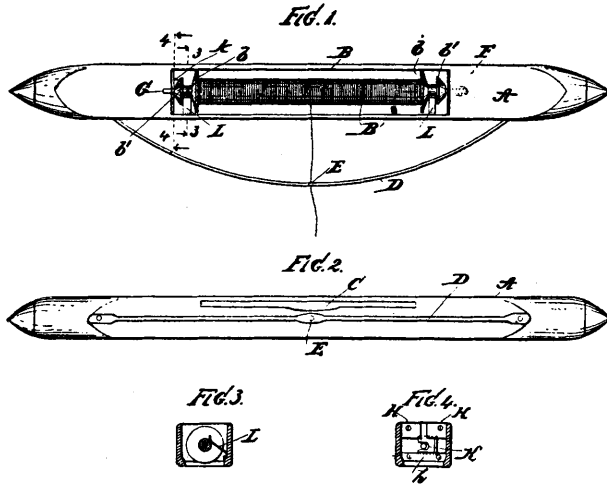
TODD'S TENSION DEVICE FOR SHUTTLES FOR NARROW WARE LOOMS.

The object thereof is to provide a simple, durable and effective tension device, dispensing with the complicated and expensive tension devices now in use.

Fig. 1, is a plan view of this shuttle, showing also a reel or spool in position thereon, on which is

wound the yarn. Fig. 2, is a side view of the shuttle. Fig. 3, a section on the line 3, 3, of Fig. 1. Fig. 4, a section on the line 4, 4.

A, represents a shuttle provided with a longitudinal chamber B, in the top thereof and longitudinal slot C in one side, and secured to the side of the shuttle in which the slot C is formed is an outwardly-curved



wire or rod D, in which is formed a perforation E.

At one end of the longitudinal chamber B, is formed a small central hole or bore F, adapted to receive one end of a shaft or rod which passes through the reel or spool B', and at the other end is formed a vertical slot G, which extends to about the middle of the end of the chamber B, and at the top of the end of the chamber, and secured to the end wall thereof are plates H, which are separated by a space equal to the width of said slot, and below said slot is a transverse plate h, and between these plates is a sliding plate K, having a groove or recess in the inner end thereof, and the outer end of which is outwardly-curved, as shown at K, forming a projection by means of which said sliding plate may be operated.

The reel or spool B', is provided at each end with main heads b, and with supplemental heads is placed a spring L, one end of which is secured to the side wall of the longitudinal chamber B, and the other end of which is adapted to bear upon the spool as clearly shown in Fig. 1.

In placing the reel or spool in position, one end of the central shaft thereof is inserted into the hole or bore F, and the other end is dropped down into position through the vertical slot G, after which the sliding plate K is moved forward, so that the slot or recess in the end thereof incloses the shaft or rod of the spool or shuttle and prevents the removal thereof, as shown in Fig. 4.

The same principle of construction can also be applied to shuttles having two compartments, i. e., where using two bobbins.

The springs L constitute the improved tension device and are so formed and arranged as to bear upon the spool or reel with just sufficient force to provide the proper tension and prevent the too free movement of the spool or reel, and the object of the supplemental heads b', is to hold the spool or

reel in place and prevent the longitudinal movement thereof. (Walter Todd, Paterson, N. J.)

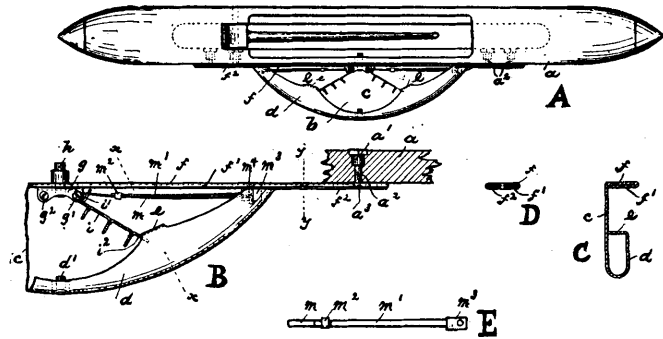
RIGBY'S CONDUCTOR FOR SHUTTLES FOR NARROW WARE LOOMS.

The advantages of this new conductor are: That it is made in one piece; that the tension-wires are made of one piece of finely tempered steel wire; that the springs are so constructed that the whole spring is in full play, from end to end at all times, no matter how much tension is on, which is a great improvement on the style of spring in the ordinary conductor; that the springs can be most readily and easily taken out for repairs; that there is nothing about the conductor but what can be attended to by the loom fixer, since there is no soldering about it and none to get loose and cause trouble.

Fig. A, represents a top plan view of a shuttle provided with the improved bow or conductor. Fig. B, is an enlarged detail view of a portion of the latter and also illustrates the means for securing the latter to the shuttle-body. Fig. C, is a sectional view on the line x, x, of Fig. B. Fig. D, is a sectional view on the line y, y, of Fig. B, and Fig. E, is a detail view of the tension-spring used in connection with the improved shuttle-bow.

a, represents a shuttle of ordinary construction, and b, the bow or conductor, secured to said shuttle by means of the screws or bolts a', having their heads a'', embedded in the projecting flanges of the bow and engaging the internally-threaded nuts a', having their heads embedded into the body of the shuttle, as clearly shown in Fig. B.

The bow or conductor b, is formed of one continuous plate or sheet of metal, which is struck up and bent to form the straight bottom c, the hood-shaped front d, and the back f, which latter projects upwardly from the bottom and on the same side as the hood d. To strengthen said back f, and to thus obtain the desired thickness, the portion forming said



back is doubled over or folded upon itself, as clearly shown at f', in Fig. C, and to avoid sharp edges at the portions of the back projecting beyond each side of the bottom, the metal is bent or returned upon itself, as clearly shown at f'', in Fig. D, that is to say, said projecting portions consist of three thicknesses of metal.

The hood d, in the central portion of which the eye d' is arranged, is provided at each side of its centre with a projection or stop e, bent substantially at right angles to the bottom of the bow and soldered thereto.

Within the bow and secured to the central portion of its back is arranged a bracket g, supporting the

pins ρ' , ρ'' , which latter are adapted to serve as fulcrums for the tension-wires i , each provided at its free end with a projection i' , adapted to bear against the stop e , formed by the bow, as hereinbefore described. At the inner end of said tension-wire, and projecting therefrom at substantially right angles, is arranged a loop i' , adapted to be engaged by the free end of the flat spring m , the other end of which is fixed to a block m^2 , which latter is removably secured by means of the screw m^4 , to and within the bow, as clearly shown in Fig. B. The flat spring m , and its tension are controlled and regulated by a flat spring-plate m' , of less elasticity and resting on the said flat spring m , and secured with one end to the block m^2 . A sleeve m^2 fits snugly over the flat springs m , and m' , and can be moved thereon for the purpose of regulating the tension of said springs.

The bracket ρ , as well as the back f , is penetrated by the eye h , arranged directly opposite the eye d' . (Holden Rigby, Paterson, N. J.)

DOLBER'S SHUTTLE-THREADER.

Fig. 1, is a perspective view of a loom-shuttle. Fig. 2, is an elevation of the improved threader. Fig. 3, is a similar view, but showing a modified form.

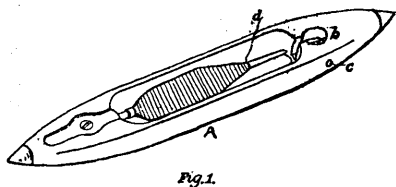


Fig. 4, is a detail view of the removable brush portion, and Fig. 5, is a detail view of one of the arrangements for holding the removable brush portion.

A, denotes the shuttle, which is provided with the usual pot-eye b , and the side eye c , and d , is the thread, which in practice is deposited on the pot-eye and is drawn through the side eye by the use of the improved threader.

The threader comprises a handle e , in one end of which is inserted and held the shank f , for the brush, and secured to and projecting laterally from said shank is a finger g , having a recessed or notched end g' , which in practice engages the thread and forces it to the bottom of the pot-eye.

The brush portion h , (shown in detail in Fig. 4,) is cylindrical in form and consists of bristles spirally arranged on a shank h' , formed of twisted wire.

In the drawings are shown two arrangements for removably securing said brush portion to the holder, one arrangement being a spiral coil i , of stiff wire, having one end i' , closed and the other end open and adapted to be turned in the shank f , in the manner shown in Fig. 2.

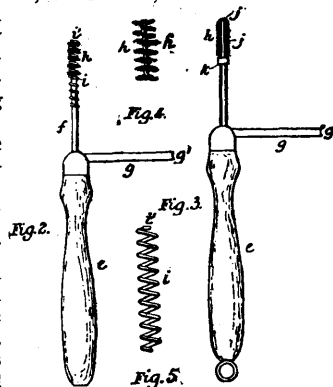
The brush portion being cylindrical in shape may be turned or screwed into the coil, the flexible bristles readily following the spiral turns, and when the brush is so inserted the bristles project beyond the coil sufficiently to engage the thread when the threader is inserted and partially rotated in the side eye.

Fig. 2, shows the threader when ready for operation, the brush portion being arranged within the coil and interposed between the closed end i' , and the end of the shank f . When the brush from constant use becomes worn and useless, the coil is turned until disconnected from the shank f , the brush is withdrawn by rotating it in the reverse direction and a new brush is inserted.

Referring now to Fig. 3, the shank f , is divided into four parts, each of which terminates in a jaw j , and these four jaws receive and hold the brush when the jaws are closed by a sleeve or ring k , which latter is slidable on the shank. The bristles of the brush project beyond the jaws, as shown, and when worn and useless the brush is removed and a new one inserted by sliding the ring downward and opening said jaws.

In practice, the thread being deposited by the finger in the base of the pot-eye, the brush is inserted to the depth of the side eye, and upon being slightly rotated the bristles engage and hold the thread, and as the brush is withdrawn the thread is drawn through the eye and the operation is completed.

This shuttle-threader is only used on shuttles where there is a top and side eye. (John E. Dolber, Manchester, N. H.)



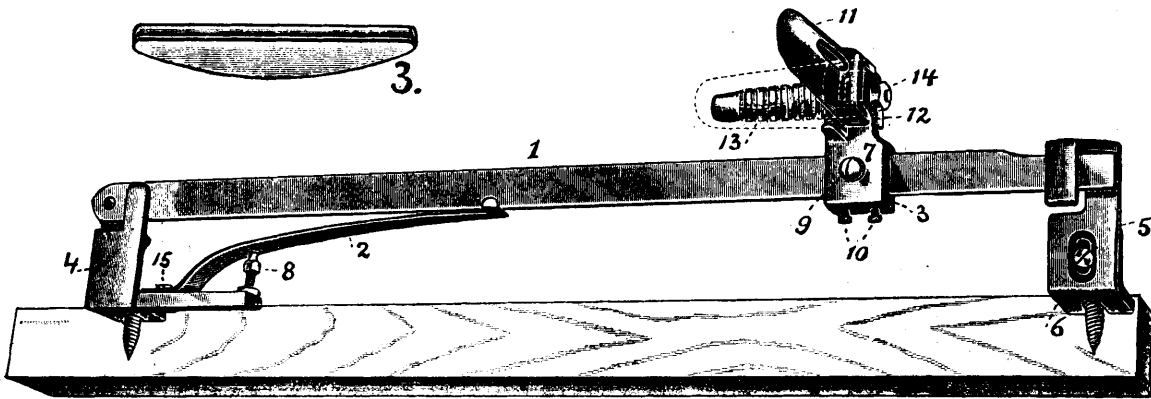
TEMPLES.

THE KNOWLES TEMPLE.

This temple is shown in the accompanying illustration and is best explained by quoting numerals of references, of which 1, is the bar to which the temple complete is fastened and on which it can be moved to suit the width of cloth to be woven. 2, is the spring that bears against the bar to keep it up to the weaving point. At 3, the swivel is located that is used for adjustment of the temple, throwing

in properly placing the fabric in engagement with the teeth of the bur-rolls, particularly when two bur-rolls are used, and the fabric has to be drawn edge-wise under one roll and over the other. To obviate this difficulty is the object of this new temple.

Fig. 1, of the drawings is a plan of this improved loom-temple. Fig. 2, is an end elevation. Fig. 3, is a side elevation. Fig. 4, is a sectional plan of the same with the upper or movable leaf of the temple and one bur-roll raised into a vertical position, the cutting



the inner teeth of rolls away or to the weaving point. This swivel is not shown in the main illustration and for this reason a separate illustration of it is given (enlarged compared to the main illustration and one-third of its actual size).

4, is the inner bracket which holds the bar, also the tension screw for adjusting spring 2. 5, is the outer stop which holds the bar from moving forward. 6, is the outer bracket which holds outer stop 5. 7, is the temple-head which holds the bur-rolls, also the top cap 11 and which is movable on bar 1.

8, is the tension screw whereby the spring 2 is adjusted.

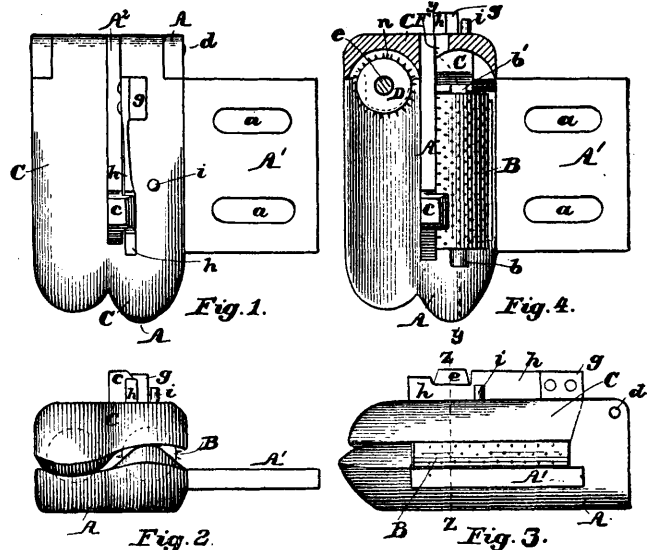
9, is the screw that holds the temple-head and fastens it to the bar. 10, are the screws that are used in adjusting the swivel. 11, is the cap which is fastened by the pin 12, to the head 7, and covers the bur-roll. 12, is the pin which fastens the top cap 11 to the temple-head 7. 13, is the bur-roll that goes in the head 7, that revolves and holds the cloth out. 14, is the nut that fastens the bur-rolls to the temple-head 7.

15, is the screw that fastens the spring to the inside bracket 4. This temple is the favorite make for woolen and worsted mills, especially for open-shed looms. (*Draper Co.*)

PAINCHAUD'S TEMPLE.

Loom-templates having one or two bur-rolls mounted upon fixed axes are in common use, but, as heretofore constructed, with the two leaves of the temple-frame bolted together in fixed positions relative to each other, serious difficulties are often experienced

plane being on line *x, x*, on Fig. 5. Fig. 5, is a sectional elevation of the same, the cutting plane being on line *y, y*, on Fig. 4. Fig. 6, is a vertical transverse section on line *z, z*, on Fig. 3. Figs. 7 and 8, are respectively a side elevation and an end view of the spindle set in the lower leaf of the temple and upon which the bur-roll is mounted, and Figs. 9 and 10,

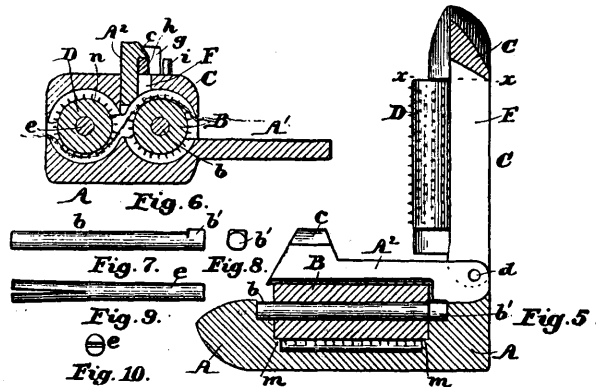


are similar views of the bur-roll spindle for the upper leaf of the temple.

A, is the lower leaf of the temple-frame, provided with the flange A', having slots a, a, by means of which and suitable screws or bolts it is securely attached to the ordinary carrier. This leaf A, has mounted therein, so as to be non-revoluble, but easily removable therefrom, the spindle b, provided with the flat-sided head b', and upon this spindle is mounted, so as to be revoluble thereon, the burr-roll B.

The leaf A, has formed thereon or secured thereto the overhanging arm A², connected thereto only at

h, to disengage it from the catch c, and lifts the leaf C, and burr-roll D, into or past a vertical position, and then passes the fabric beneath the arm A², and over the burr-roll B, draws it straight and smooth, then turns the leaf C, and roll D, down into its closed position, when the spring-latch h, will automatically engage the catch c, and lock the parts together. (Ludger Painchaud, Salem, Mass.)



its outer end and provided at its other or free end with the catch c, as shown.

The upper leaf C, of the temple-frame is pivoted or hinged at d, to the leaf A, and has mounted in bearings therein the spindle e, which has its outer end bifurcated and slightly expanded and made of spring steel, so that when inserted in its bearings it is compressed and the tension of the spring or its tendency to expand creates sufficient friction in its outer bearing to prevent its rotation in its bearings, and also prevents its moving endwise in said bearings when the upper leaf is turned upward into a vertical position.

The spindle e, has mounted thereon the burr-roll D.

The leaf C, of the temple-frame has a slot F cut through it, from its outer end toward its inner end, of suitable length and shape to receive the arm A², and catch c, the latter projecting above the upper surface of said leaf C, when in its normal or closed positions, as shown in Figs. 2 and 3. The leaf C, is also provided with the upwardly-projecting ear g, to which is firmly secured one end of the spring-latch h, the other end of which engages the catch c, to lock the two leaves together when closed, and i, is a stop-pin set in the upper side of the leaf C, to limit the movement of the spring-latch h.

The leaves A, and C, both have formed in their inner or adjacent faces two nearly semi-cylindrical cavities having diameters somewhat larger than the diameters of the burr-rolls B, and D, including the projecting spurs or teeth thereon, and the cavities in the leaf A, beneath the burr-rolls B, and in the leaf C, above the burr-roll D, have in each end thereof nearly semi-circular shoulders m, and n, respectively, upon which the ends of the burr-rolls B, and D, respectively bear when the strain of the fabric inserted in the temple is applied thereto and the bearing of the roll upon its spindle has become worn, the purpose of which is to prevent the points of the spurs of said rolls coming in contact with the bottoms of said cavities to their injury.

By this construction of the loom-temple, the fabric can be very readily and easily placed in position between the burr-rolls without disturbing or drawing out of shape said fabric, as when the fabric is to be inserted the operator simply presses the spring-latch

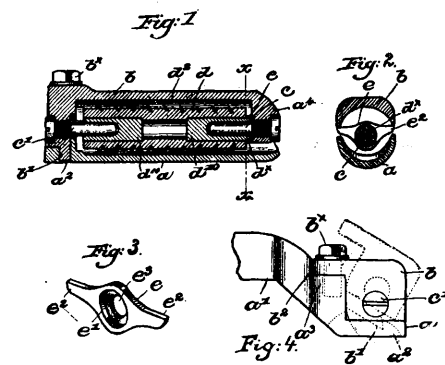
THE DUTCHER TEMPLE.

In the use of temple-rolls, with different kinds of cloth, much difficulty has been experienced in the marks which are left by the teeth of the rolls on thin fine goods, and with heavy closely woven cloth the rolls fail to take proper hold, particularly at the selvages, which latter curl up, and cloth with straight selvages are hard to be made.

The construction of this temple has for its object the production of a temple-roll which will overcome the before-named objections, the wear on the journals of the temple-roll being also decreased.

Of the accompanying illustrations, Fig. 1, is a vertical longitudinal sectional view of the new temple-roll, the pod and cap being shown in section. Fig. 2, is a transverse section taken on the line x, x, Fig. 1, looking to the right. Fig. 3, is an enlarged inner side perspective view of the dust protector for the roll-journal, and Fig. 4, is a rear end elevation of the pod and cap with a portion of the supporting-shank.

Referring to Figs. 1 and 4, the inner end of the pod a, forming a part of the shank a', is transversely slotted at a², to receive a locking ear b', formed on the cap b, the latter in this instance, supporting the temple-roll. A lug b², on the cap (see Fig. 4) rests on the enlarged end a³ of the shank when the cap is in operative position, a bolt b^x passing through the lug and into a threaded hole in the end a³, retaining the cap rigidly in place. The inner end of the cap is down turned at a⁴, and threaded to receive and support one of the pivots or stud-bearings c, of the temple-roll d, a similar pivot or bearing c', being held



in the outer end of the cap, as clearly shown in Fig. 1.

In the same the temple-roll is shown provided with bushings d¹⁰, axially bored at the ends to receive and freely turn upon the smooth inner ends of the stud-bearings c, c', the end of one bushing projecting beyond the end of the roll, as at d^x.

It is found in practice that lint, dust, etc., are apt to collect about the inner end bearing of the usual temple-roll and which is prevented in the construction of this temple by extending the bushing, as at d^x,

and inserting it loosely in the counterbore e' of a protector e . (Shown separately in Fig. 3.) This protector is made of brass with laterally extending wings e^2 , which enter between the edges of the cap and pod, holding it in place, the bearing or pivot e , passing through a hole e^3 , in the protector, the latter also taking up the end-thrust of the temple-roll when in use. By this means the necessary longitudinal play of the roll is permitted while effectually protecting the bearing from the entrance of lint or dirt.

In weaving heavy, closely-woven cloth it is found that if the teeth of the roll are reduced in number at the outer end of the roll, they take a much better hold of the cloth along the selvages, and slack selvages can then be held properly, thus preventing the curling up of the selvage.

With the usual temple-roll, having the teeth disposed equally from end to end, the teeth cannot properly enter and take hold of slack selvages, and cloth with straight selvages cannot be woven.

The teeth are also made at the outer or selvedge end of the roll of uniform height, the teeth gradually decreasing in height from about the point d^2 , Fig. 1, to the inner end of the roll. This prevents the teeth at the inner end of the roll from taking the greatest hold of the cloth and marking it, for the gradually decreasing height of the teeth toward the inner end of the roll causes them to take a gradually diminishing hold on the cloth inward from the selvage.

When weaving thin fine goods the arrangement of the teeth as to number is reversed—that is to say, the teeth are set closer together at the selvedge end, so that a greater number engage the cloth at any one time, and being set closer together they cannot enter so deeply into the material, thus avoiding marking. Furthermore, the close setting of the teeth enables them to let go of the fabric more easily as the cloth is moved along.

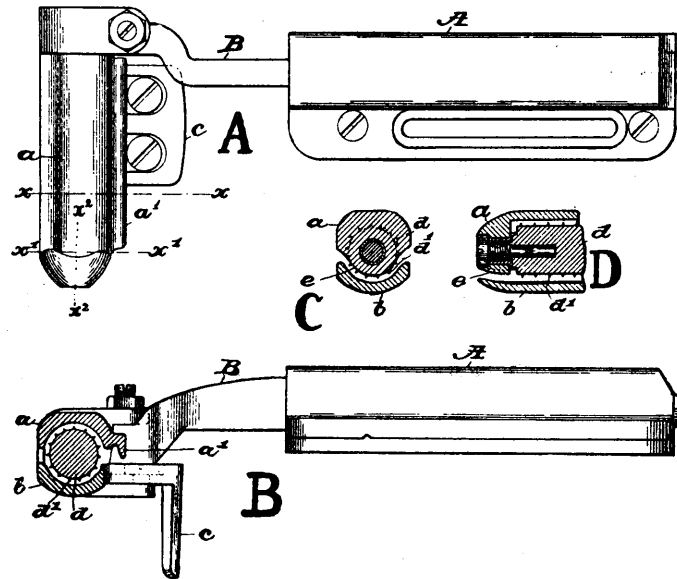
The arrangement of the teeth as to height is, however, the same as heretofore, the teeth decreasing in height from the vicinity of the middle of the roll to the inner end, as described. This "tapering" of the teeth, as it may be termed, decreases the pressure of the cloth on the inner end of the roll and so decreases the wear on the bearing. (*Draper Co.*)

IMPROVED DUTCHER TEMPLE.

In loom-templates as now commonly made and in use, the cloth after passing the roll emerges from the temple through an open slot between the inner side edges of the cap and pod. This construction is objectionable, because when a fault occurs in the cloth, so that the latter presents loose yarn, which becomes wrapped about the roll or in any way obstructs its movement, or if a fault occurs in the cloth which should be removed by cutting the same out, the operative, with a knife or other cutting instrument, cuts the yarn or cloth while on the roll, the blade of the knife being used against the roll, and in this operation the knife always strikes the very fine, sharp teeth of the roll and blunts or damages them, so that thereafter they cannot enter the cloth properly, but, on the contrary, they tear and damage the cloth, and the temple-roll has to be removed and a new one inserted. To prevent the operative from

putting a knife against the roll, the inner edge of the cap is provided with a downturned lip or guard, which so far closes the cloth-passage at the rear side of the roll as to preclude the introduction of the blade of a knife to cut anything off against the roll.

Fig. A, shows this improved loom-temple in top or plan view; Fig. B, a section in the line $x-x$, Fig. A; Fig. C, a section in the line $x'-x'$ of Fig. A, and Fig. D, is a partial longitudinal section of the cap above the roll in the line x^2-x^2 , Fig. A.



Letters of references indicate thus:—A, the stand; B, the shank; a , the cap; b , the pod; c , the heel, and d , the roll having the characteristic sharp points or pins d' .

The cap a , is provided with a lip or guard a' , extending downwardly from the inner side of the cap toward the top of the heel, said guard almost closing up the usual cloth-passage at the rear side of the roll and completely obviating the introduction of a knife-blade in such position as to cut against the roll d , to sever the cloth or yarn.

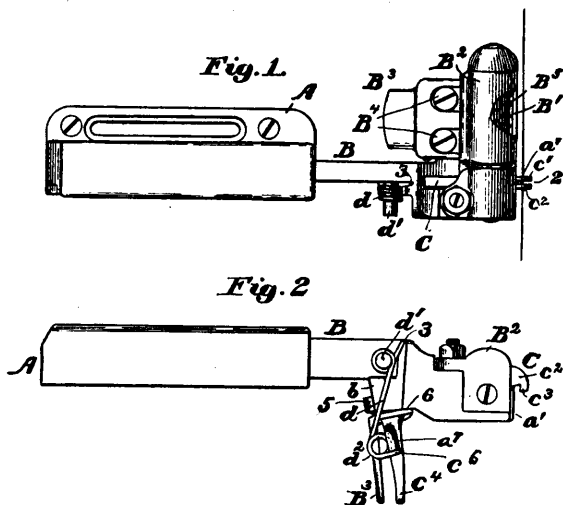
The lug or ear e , at the free end of the cap, which receives the usual journal or pin on which the roll turns, is made longer than heretofore, so that it extends down to substantially the line occupied by the periphery of the roll, so that said lug, and not the roll, as heretofore, keeps the cloth down. This construction results in greatly reducing the wear on the said journals and on the said rolls, and adds very greatly to the life of the temple.

In Fig. D, the lug or ear e , is shown extended down to take the strain of the cloth. The dotted lines in said figure show where the said ear usually terminates. (*Draper Co.*)

THE DUTCHER THREAD-CUTTING TEMPLE.

In automatic looms, the filling is supplied to the shuttle in the shuttle-box while the loom is in action, the filling-carriers are supported above the shuttle-box and the outer end of the filling on the filling-carrier is connected to a filling-end holder, so that after the filling-carrier has been put into the shuttle and the shuttle thrown through the shed the said filling-thread, so held, will be automatically threaded

into the delivery-eye of the shuttle. Each insertion of a new filling-carrier into a shuttle consequently leaves outside the selvage a filling-end of from fifteen to twenty inches long, it leading from the selvage to the said filling-end holder. This filling-end must be removed, else it is liable to be caught by subsequent shots of filling, making bunches at the selvage which



damage the appearance of the goods and lessens its salable value in the market. Numerous attempts have been made to break or cut off these filling-ends, but none of them so far known have been so completely successful as to promptly part or cut off the said filling, and the loom might sometimes run a dozen picks before the filling-end was removed. In experiments made, to provide a cutter which will operate promptly and unerringly to cut off this filling it was ascertained that the filling-end should be caught and cut before the temple carrying the cutter is moved toward the breast-beam as the lay beats in the filling.

In the present temple, a cutter-blade or cutter mounted on or so as to move with the temple, is provided, and the cutter is so shaped that it normally stands in a plane outside the path of the filling-end, and its movement is such that at each beat of the lay the cutter is moved so that it catches behind the filling-end, if one is present, and the cutter, having engaged the filling-end, is then moved toward the breast-beam to engage the thread between itself and the temple and cut the same, this cutting movement being substantially completed a little before the temple is ready to start with the lay toward the breast-beam. In this way the filling-end when present is promptly cut off.

Fig. 1, is a top or plan view of the new thread-cutting temple; Fig. 2, a side elevation thereof; Fig. 3, a front end elevation, the roller being omitted; Fig. 4, a partial section taken longitudinally through the cutter-blade or cutter and part of the temple; Fig. 5, shows the cutter-blade or cutter detached and enlarged, and Fig. 6, is a detail drawing.

The loom-temple, consists of the stand A, adapted to be secured to the breast-beam of the loom, the slide-bar B, having the pod B', the cap B^2, the heel B^3, attached to the pod by screws B^4, and the toothed roller B^5 between the pod and cap turning on pivots. The said stand A, contains a spring which surrounds the bar B, to normally keep it pressed forward toward the lay. The pod (see Figs. 3, and 4.) is slotted at a, to receive a steel blade a', said blade having, as shown in Fig. 3, an open space at both sides of it.

The shank or bar B, has secured to or formed as part of it an ear b, which is slotted in continuation of the slot a. In the slot in the ear is inserted the body c of the thread-cutter C, the acting front end of the cutter being shown as slotted at 2, to leave two arms c', c^2, each having a suitable hook c^3.

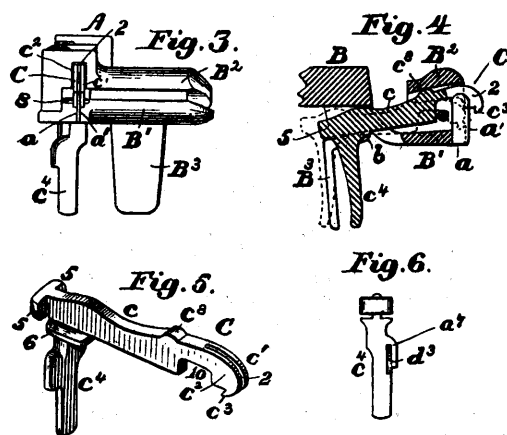
The slot 2, straddles the steel blade, and in its normal or inoperative position the acting end of the cutter is, by the action of a spring d, kept projecting through the slot a, and elevated as shown in Figs. 2 and 4.

The spring d, has near one end a coil which is fitted over a stud d', extended from the bar B, the end 3 of the spring bearing against a part of the bar, but the opposite free end of the spring is bent into the form of a circular loop d^2, one edge of which enters a notch d^3, in the heel c^4 of the cutter, the end c^5 of the spring near the loop d^2, resting against a shoulder a' of the heel, said spring serving to retain the said cutter in its normal forward position, with its cutting end out of the plane of the filling-end, and as herein shown elevated. By removing the loop of the spring from the notch d^3, the cutter may be readily removed to be cleaned or oiled.

The cutter has two forward stop-lugs 5-5 to limit the forward position of the cutter under the action of the spring d, and a shoe 6, which slides on the under side of the ear b, which under side is beveled or shaped, as shown in Fig. 2, to let the shoe both slide and rock. The shoe also receives the wear of the cutter and keeps the top side of the cutter from being worn.

The temple at its front edge (see Fig. 3) is cut or milled away each side the slot a, to leave grooves 8, to receive the filling-end when the cutter acts on the same to sever it, said grooves obviating any liability of the cutter drawing the said ends into said groove a, during the operation of severing the end, for the cutting edge of the hooks c^3 are moved into the temple only substantially flush with the bottoms of said grooves, the edges of the steel plate standing outside the line of the bottom of the said grooves.

The body of the cutter at its upper side is provided with a projection c^6, which as the cutter rises under the action of the spring d, meets the bottom of the



groove in the cap, (see Fig. 4) thus preventing the slotted front end of the cutter from striking said cap and being battered or jammed to close the slot 2 in any way.

The cutter has near its front end a notch 10, to embrace the stud by which the roll B^5 is supported at one end.

will occupy the forward guide and will therefore permit the roller and its casing to be turned part way around so as to be clear of the web of cloth.

Fig. 1, is a perspective view of this loom-temple,

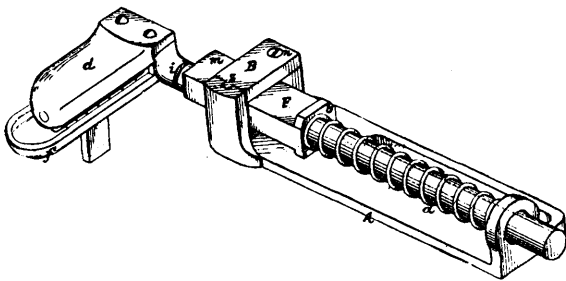


Fig. 1.

showing the parts in the position which they assume when the temple is in use; Fig. 2, is a perspective view illustrating the roller casing turned down so as to clear the woven web.

A, represents the slotted plate adapted to be secured to the breast-beam of the loom and having front and rear guides, B and D, for the shank F, of the temple, the forward portion of said shank being rectangular in cross section and adapted to slide in the front guide B, while the rear portion of the shank is circular in cross section and is adapted to the rear guide D, a spring F, being interposed between said rear guide and a shoulder *b*, of the shank, so as to tend to project the same.

The outer end of the shank carries the usual toothed roller and the casing therefor, said casing comprising the cap *b*, and trough *f*, but that portion of the shank at and near the roller casing is rounded, as shown at *i*, this reduction in the size and shape of the forward end of the shank resulting in the formation of a shoulder *m*, at the junction of the round and rectangular portions of the shank. During the working of the loom the rectangular portion of the shank F, slides backward and forward in the forward guide B, and retains the toothed roller and its casing in proper condition for engaging with the web of cloth, but when it becomes necessary to pick out a defect in the web, the toothed roller and its casing would otherwise interfere, thus the web is simply withdrawn from engagement with the toothed roller, and the temple is pushed so far forward that the

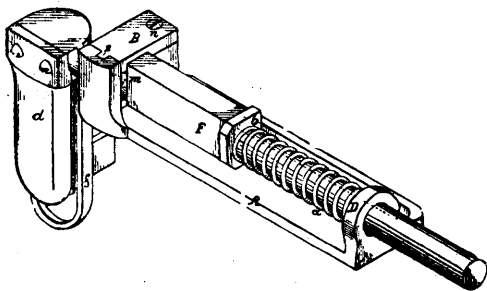


Fig. 2.

rounded front end *i*, of the shank F, occupies the forward guide B, and thus permits the turning of said shank and the roller casing part way around, as for instance, by turning it downward, as shown in Fig. 2, or downward and outward, the shoulder *m*, engaging with the front guide B, so as to prevent the spring *a*, from projecting the temple, and said shoulder also serving to retain the roller casing in

the position to which it has been adjusted, the friction between the shoulder *m*, and the guide B, being sufficient to prevent accidental displacement of the roller casing.

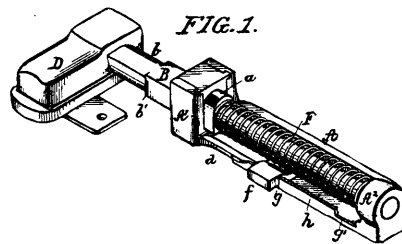
When the roller casing has been turned to a vertical position, it is beyond the selvage of the fabric, and hence is entirely out of the way of the same and does not interfere with the picking out of filling threads, so that defects extending even as far as the breast-beam of the loom can be easily remedied.

The shoulder *m*, of the temple-shank also serves, by engagement with one side of the guide B, to retain the temple in a retracted position without turning the same, said shoulder performing, in this case, the same function as the usual side notch of the rectangular temple shank.

The cap of the forward guide B, is detachable, being held in place by a screw *n*, at one end, and a tongue *s*, at the other end, so that it can be readily taken off when it is desired to remove the temple shank. (Thomas Sykes, Philadelphia.)

SYKES'S IMPROVED TEMPLE.

The previously explained temple has thus far met with favor amongst our manufacturers; however there are two disadvantages to this loom-temple, viz., the accidental turning of the temple shank in its bearings when the shank has been pushed inward to its full extent, and the reduced portion of the shank occupies the forward guide. The second objection consists in the vertical or lateral play of the shank in the forward guide. These two objections have been



successfully overcome in the new temple and of which Fig. 1, is a perspective view and Fig. 2, is a side view of the same, showing the temple shank pushed fully inward, but locked so as to prevent turning. Fig. 3, is a similar view showing the shank unlocked, so as to permit of the turning of the same.

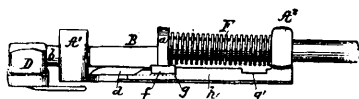
Of the letters of reference accompanying the illustrations—A, represents the fixed guide plate of the temple, adapted to be secured to the breast-beam of the loom, and B, is the temple shank, having at its forward end the roller box or casing D, the said shank having a rectangular portion adapted to a forward guide A', on the plate A, and a cylindrical portion adapted to a rear guide A², on said plate, a spring F, being interposed between said rear guide A², and the rectangular portion of the temple shank, so as to serve to normally project the latter, the extent of such projection being limited by the contact of an enlarged portion or lug *a*, of the temple shank with the cap or top plate of the forward guide.

Adjacent to the roller box or casing D, the shank B of the temple is reduced, as shown at *b*, so that when the shank is driven inward until this reduced portion occupies the forward guide A', the shank can be turned in said guide so as to permit the roller box, or casing D, to be turned down out of the way of the

fabric, in order to permit of the ready picking out of the imperfect shots.

It occasionally happens, however, that the temple is accidentally forced inwards until its reduced portion occupies the forward guide, as for instance, when the shuttle fails to properly enter the box and strikes the temple on the beating up of the lathe, and at such times it is advisable to prevent the turning of the temple shank in its guide. For this reason this temple is provided with a movable locking bolt which normally engages with the shank of the temple when the latter is pushed inward, and prevents the turning of said shank in its guides, the bolt, however, being capable of retraction or withdrawal, so that the temple shank is then free from its influence, and

FIG. 2.



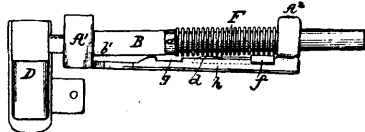
can be turned in its guides when pushed so far inward that the reduced portion of the shank occupies the forward guide.

The locking bolt, (see Fig. 1) is represented as in the form of a plate *d'*, resting on the base plate *A*, of the temple beneath the sliding shank *B*, said plate having a laterally projecting lug or finger *f*, which may be adapted to either of two notches *g*, *g'*, formed in a flange *h*, at one side of the base of the temple.

When the finger *f*, occupies the forward notch *g*, the rectangular shank *B*, of the temple bears upon the locking bolt when the shank is pushed inward as shown in Fig. 2. Hence any turning of the temple shank in its guides is effectually prevented, but if the locking bolt *d'*, is drawn backward so that its finger *f*, occupies the rearward recess *g'*, as shown in Fig. 3, the temple shank when pushed fully inward will be free from the influence of the locking bolt and hence will not be retained but can be turned in its guides so as to carry the roller box or casing away from the woven web.

The turning of the temple shank in its guides causes a slight inclination of said shank as shown in Fig. 3, and for this reason the opening formed in the guide *A*, for the reception of the cylindrical portion of the shank is beveled, as shown by dotted lines, so as to provide for this disposition of the

FIG. 3.



temple shank and yet prevent any excessive looseness of fit of the cylindrical portion of the shank in said outer guide. The opening in the forward guide *A'*, is slightly wider than its height and the portion *B*, of the temple shank is so formed as to completely fill said forward guide *A'*, so as to prevent any vertical or lateral motion of the shank in said guide as the shank is reciprocated longitudinally, the reduced portion *b*, of the shank being

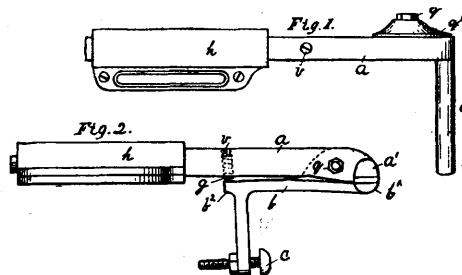
rounded so as to permit of the turning of the roller box, in which case the shoulder *b'*, formed by reducing the shank, engages with the bottom portion of the forward guide, the reduced portion in this case vertically filling said guide so as to prevent any rise of the temple shank, such as would release the same and permit its projection by the spring. (Thomas Sykes, Philadelphia.)

MASON'S TEMPLE.

Fig. 1, represents a top view, and Fig. 2, a side view of this temple.

a, indicates the shank of the temple, whose rear end is constructed in the ordinary manner, and enclosed in the ordinary box or casing, which is adapted to be adjustably secured to the breast-beam of the loom. The front end of the shank *a* is provided with an arm *a'*, extending at right angles thereto and parallel with the loom reed.

b, indicates a shank, having its rear end *b'*, projecting downward at right angles thereto, and the lower end of said projection is provided with a screw *c*, adjustable in a direction parallel with the shank *b*; and its front end is provided with the arm *b'*, extending underneath, and parallel to the arm *a'*. The shank *b*, is also provided with the ear *q'*, by means of which it is pivoted to the shank *a*, by the bolt *q*. Opposite to the rear end of the shank *b*, the shank *a*, is perforated vertically to receive the spiral spring *g*;



and the top of said perforation is screw-threaded, to receive the screw *v*, by means of which, the pressure of said spring, to force the shanks *a*, and *b*, apart, is regulated, by advancing or retracting said screw. The shank *b*, is provided with a shallow perforation for the bottom of the spring *g*, to rest in.

In operation, the screw *c*, is adjusted, so that the lay in beating up, strikes its head, before the reed comes in contact with the front of the arms *a'*, and *b'*, thereby compressing the spring *g*, and causing said arms to recede from each other, and allowing the cloth to pass between them. As the lay recedes, the expansion of the spring *g*, causes the said arms to clamp and hold the cloth until the next beat up.

It will be observed that the fabric is held between surfaces which can leave no mark upon it, as there is no part which penetrates it; and as no part of the device which comes in contact with the cloth, requires lubrication, there is no liability of oil stains thereon. This temple is for plain fabrics which will hold itself out to the reeding point. (Henry W. Mason, New Bedford, Mass.)

REEDS AND REED MOTIONS.

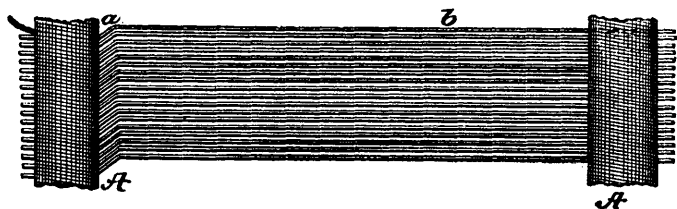
ADAMSON'S REED.

The accompanying illustration represents an elevation of this improved reed.

The novelty in construction of this reed consists in forming a suitable bend or curvature *a*, in each of the wires or dents *b*, inside the reed and next to the back *A*, in such manner as to allow an elastic movement of the wires or dents within the reed, thereby reducing friction upon the said wires or dents and increasing the usefulness—that is to say, the resiliency or elasticity of the dents laterally permit of greater freedom of the warp-threads through the reed, and especially those threads which have knots, tufts or other imperfections—of the same while in operation.

The wires or dents of the reed are arranged in the usual manner in parallel lines, and are firmly wound and held rigidly in position in the back of the reed, the elastic movement being secured by the expansion of the wires at the parts *a*, and the return to their normal positions by virtue of the springy nature which the formation of the wire imparts.

It will be observed that the wires may be provided with the small bends or curvatures *a*, at or near both backs or on one side only, and the form or shape of the bends or curves may be varied or modified at



pleasure to produce the elastic action desired. It will thus be seen that the spring action or elasticity of the wires or dents is confined wholly between the backs of the reed, the ends of the said wires being firmly bound in the backs of the same. (Joseph Adamson, Pawtucket, R. I.)

LIOTARD'S REED.

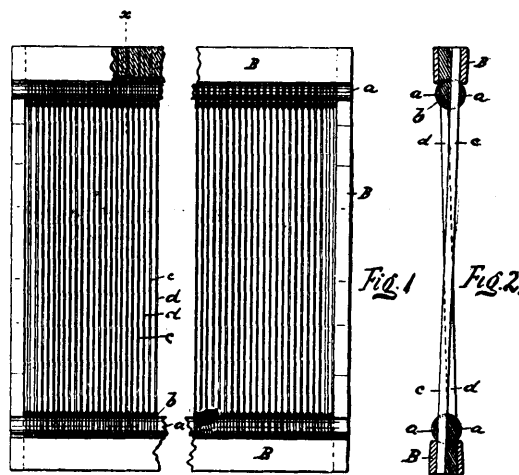
The improvement consists in the arrangement of the teeth of a reed, the method of attaching them to the reed frame and the combination and arrangement of the various parts thereof. The novel construction of this reed strengthens its centre by having a double wire instead of a single one.

Fig. 1, is a front elevation of this improved reed; Fig. 2, is a sectional view on line *x*, Fig. 1.

B, B, represents the frame of the reed, to which are secured semi-cylindrical cross bars *a*, *a*, around which is wound a wire *b*, forming a continuous spiral coil.

Between the bars *a*, *a*, and resting between the coils formed by the wire are arranged two sets of teeth *c*, *d*, in such a manner that one set runs from the front of the upper frame to the rear of the lower one, the other set, from the rear of the upper frame to the front of the lower one. By this arrangement the teeth will alternate in their direction and thereby

cross each other at or near the centre of the reed, as clearly shown in Fig. 2. It will be understood the



semi-cylindrical cross-bars *a*, *a*, are fixed in their relative positions by the coil *b*, that is, they are held so that they face each other and yet are separated sufficiently to permit the teeth to be inserted directly in the frame. The space between the wire coils, the cross-bars and the upper and lower portion of the frame is filled up with solder as in ordinary reeds. (Louis F. Liotard, Paterson, N. J.)

THE CROMPTON REED FOR WEAVING TUFTED FABRICS.

In these fabrics the tuft-yarns must be regularly inserted between the warp-threads.

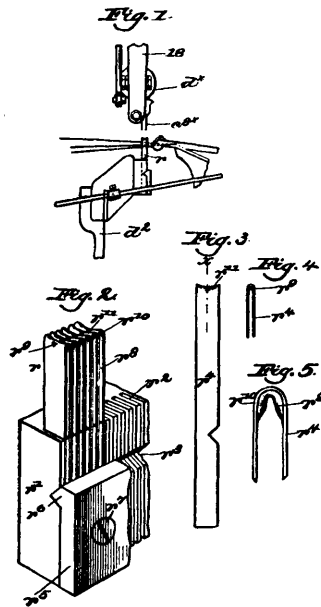
The object of the new reed is to provide the same with reed-spaces having at or near their upper ends entrances made flaring, to better receive enlargements or knots on the warp-threads traveling there-through and to prevent said enlargements or knots catching at the entrances, to said spaces.

Fig. 1, in side elevation represents a sufficient portion of a tufted loom provided with this reed to enable the latter to be understood. Fig. 2, in perspective shows a part of this reed. Fig. 3, in side elevation shows one of the reed-dents detached; Fig. 4, a detail on the dotted line *x*, *x*, Fig. 3, showing one of the reeds and reed-spaces in vertical cross-section; Fig. 5, an enlarged detail of the top of the upper end of the reed member in elevation.

Referring to the drawings, the various parts of the mechanism are indicated thus:—The arms 18, the tuft-arm beam or spool *d*^x, the tuft-yarn tubes or quills *c*^x, the lay *d*^x.

Referring to Fig. 2, *r*' is a bar mounted upon the lay *d*^x, and shown as provided at its front side with a series of closely-arranged vertical slots *r*², intersecting which is a longitudinal (preferably V-shaped) groove *r*². The reed *r*, as herein shown, is made

up of a series of independently-removable (preferably U-shaped) members r^4 , shown as formed from



flat metal strips and arranged with their legs in the slots r^2 , each slot receiving adjacent legs of two of said U-shaped members, as best shown in Fig. 2. The legs of these U-shaped members r^4 , are notched at their front edges to correspond and register with the V-shaped groove r^3 , the said members, as shown, being retained in proper position by a clamping member r^5 , applied to the face of the bar r^1 , and having a A-shaped longitudinal lip or flange r^6 which enters the groove r^3 , referred to and the corresponding notches in the legs of the U-shaped members and is secured in position by screws r^7 .

By this construction, removal of the plate r^5 , permits any single reed member to be removed without disturbing the position of any other member, each pair of vertical legs in any single slot r^2 , constituting a reed-dent and each space r^8 , formed by and within a U-shaped reed member constituting a reed-space.

The reed-spaces r^8 , are of a normal width sufficient to permit two or more warp-threads passing therethrough to be freely crossed in shedding. At one of their ends—herein their upper ends—the said reed-spaces are shown at their middle contracted at r^9 , accomplished by pinching together the legs of the members adjacent the crown-bends thereof to a width as will receive but a single thread each, so that when the threads are opened in shedding, those threads

moved into the upper plane of the shed will be carried into these contracted portions of the reed-spaces and will therefore be properly centered and spaced one from another and restrained against lateral vibration or play. The entrances to the reed-spaces and preferably the entrances to the upper portions of said spaces at opposite sides of the reed are made larger than the smaller portions back of said entrances; that is, said entrances are made, as it were, flaring, as best indicated at r^{10} , to enable burs or knots on the warp-threads to more freely enter the reed-spaces. Thus, were it not for the flaring entrances, the contracted upper portions of the reed-spaces would frequently bar the entrance thereto of any considerable enlargement on a warp-thread, whereas by the new reed the flaring entrances admit of the entrance to the reed-spaces of any burs

or enlargements, which latter are worked or carried through the more contracted portions of the reed-spaces without breaking the threads or interrupting the passage of the same through the reed.

The tops of the reed-spaces are also depressed as shown at r^{11} , at their middle, to not only provide a better and more suitable enlargement at the entrances thereof, but also to present at least a part of the tops of said reed-spaces in such positions as will more nearly conform of the angular position of the warp-threads relatively to the reed when the latter is in its extreme angular position. (Crompton and Knowles Loom Works, Worcester, Mass.)

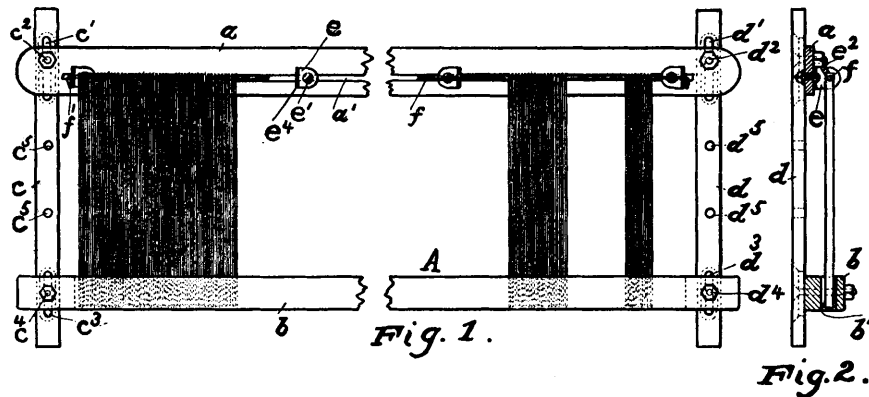
ALBINSON'S FALSE REED.

The object of the reed is to provide a false reed for looms to take the place of the ordinary "cord or string reed." It is intended for separating the ends back of harness, as in warps run from spools; it also may be used back of reed in loom for separating the threads in some kind of work where it is necessary to divide the ends in each split of reed.

Fig. 1, is a front elevation of said improved reed, certain portions being broken away, and others removed to better illustrate the nature of the improvement; Fig. 2, is a vertical central section of the same.

A, indicates the rectangular-shaped reed-frame, consisting of the sections or sides a , b , c , and d . The side sections c , and d , are each provided at or near the ends with elongated slots c^1 , c^2 , and d^1 , d^2 , penetrated by the bolts c^3 , c^4 , and d^3 , d^4 , respectively, by means of which latter the said longitudinal sections or sides a , and b , are adjustably secured to the side sections c , and d .

The upper section or head-bar a , is provided with an elongated slot a^1 , in which are adjustably secured,



by means of the bolts e^1 , the end and intermediate brackets e^2 , provided in their forwardly-projecting portions e^1 , (arranged at right angles to the head-bar a ,) with the inclined slots e^2 , adapted to receive and support the rod or wire f .

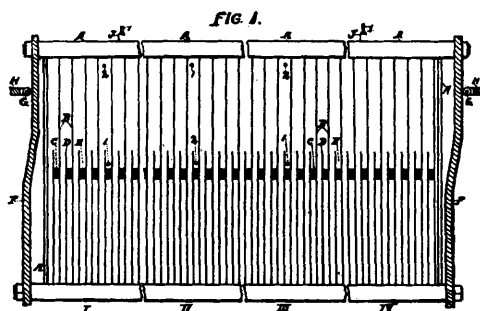
Said rod is bent at its end portions, as at f' , adapted to bear against the end brackets, and to thus prevent a lateral motion of the said rod, or wire f .

On the latter are fulcrumed and slidably arranged a series of dents of uniform width and length, which dents project downward into the elongated groove or slot b^1 , of the bottom section b , by means of which latter, the swinging motion of the dents is limited.

The frame A, is adapted to be secured to the batten of a loom by means of screws or bolts penetrating the openings c^5 and d^5 , arranged in the side sections c and d , of the reed-frame A, or in any desired manner. (Thomas Albinson, Paterson, N. J.)

REED FOR DOUPING.

The object of this reed is to produce cross-weaving for low textured fabrics (chenille weaving) thus far produced by passing one set of warp threads through



eyes in a bar having a traverse motion and then leading them between the splits of a combined comb and reed, while the other set of warp threads pass beneath this bar and through the eyes of teeth in the combined comb and reed.

The new reed is designed to have a traverse and a vertical motion, by means of which and its peculiar construction it both crosses the warp and forms the shed for the filling.

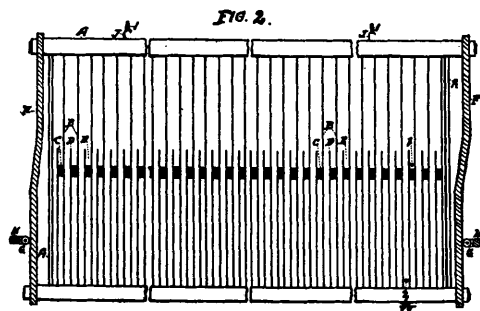
Fig. 1, illustrates the reed, broken in parts or sections in the first position occupied in the operation; and Fig. 2, illustrates it in the second position of the operation.

The reed frame A, is provided with two sets of metal strips. The primary splits B, cross the frame and are secured in the usual manner. The secondary splits D, extend part of the distance only across the frame and divide the spaces formed by the primary splits. The lower ends of these secondary splits are secured to the frame and each is correspondingly secured to the adjacent primary split as at C, a point below the top of the secondary split, thus forming a space E.

Guide rods F, bent as shown in the drawings, are secured to the ends of the reeds, and bear against rollers G, mounted in the stationary parts H, of the loom-frame.

The usual mechanism for lifting heddles may be used for lifting the reed, and the straps I, and hooks J, constitute a part of this mechanism. As the reed harness lifts, the rollers G, bearing against the guide rods F, at a point just above the bends, impart a traverse motion to the reed.

The numerals 1 and 2 designate the two warp threads or spitufuls, and the several parts of the



drawing show the several positions they occupy in weaving chenille. The position of these threads in Part I, is that of the first pick of the loom, when the shed is open, thread 2 being at the top of the reed, while thread 1 lies in space E, between the primary

and secondary splits. The position of the threads in Part II, is that of the second pick of the loom, thread 1 being now at the top of the reed, while thread 2 lies in the secondary space between the primary and secondary split. The position in Part III, is that of the third pick of the loom, it being the same as that shown in Part I. The position shown in Part IV, Fig. 2, is that of the fourth pick of the loom, effected by the lifting of the reed harness, which lifts with it the thread 1, lying in the space E, the reed also being moved sidewise or transversely by the guide and rollers thus crossing the threads, the thread 2, now lying at the bottom of the reed. The crossing of the whip thread, or the doubling, is thus accomplished, and the shed formed without the use of a doubling harness.

It will be readily understood that the reed is in the present invention required to form the shed for every fourth pick only and coincidentally to cross the whip thread, the first three sheds for picks 1, 2 and 3 being formed by the usual mechanism. (A. Weithasse, Philadelphia.)

DAVENPORT'S REED FOR WARPING.

The object is to provide a reed for warping which, from its simplicity of construction and ease of operation, greatly facilitates the forming of a single or a double cross or lease or a cross of two or more threads in preparing warps and to avoid the necessity of changing reeds, one reed only being employed for any one combination, thus saving the trouble and expense as well as avoiding the waste of material in threading a reed each time a warp is to be made.

When the new reed is once threaded, it is not necessary to be changed, as the ends left in the reed when one warp is made may be tied to the ends of the next warp-threads as the bobbins are changed instead of threading the reed anew for the next warp.

At present in warping the single or double filaments are separated either by lifting the strands by hand or by the use of a reed in which the dents are so united by blocks that in the centre of the reed longitudinally a row of eyes or openings is formed which alternate throughout the length of the reed with spaces which are open from the top to the bottom of the reed-frame. These reeds may be so constructed that the eyes or openings in the centre of the reed are either single or double. When these eyes are double, the double eyes alternate with two vertical slits extending from the top to the bottom of the reed-frame.

Under the methods now in use in order to change from a cross of single threads to a cross of groups of more than one thread it is necessary to change reeds or to employ two reeds.

The new reed obviates the necessity of using more than one reed, and with it any desired cross of threads may be obtained by uniting with blocks the number of dents required to carry the desired number of threads to be crossed.

The new reed is composed of dents having wide or enlarged ends, either with or without an eye or opening at each end thereof, which may be formed in any suitable manner, the dents being secured at top and bottom in a suitable frame with the necessary spaces between the dents, the upper ends or eye portions of the dents being joined at different portions by blocks soldered between said portions of the dents, leaving a space between the middle portions of dents where all the threads pass through, and the ends or eye portions of the dents being joined by blocks soldered between them. (Herbert Davenport, Paterson, N. J.)

THE KNOWLES LOOSE-REED MOTION FOR SILK LOOMS.

The same relates to looms for weaving textile fabrics provided with spring-reeds, and more particularly to a supplemental attachment combined with the spring-reed.

The object of the improvement is to provide a supplemental mechanism combined with the spring-reed of a loom by means of which the reed will be caused to strike a sharp quick blow to beat up the filling just as the lay reaches its forward position thus making a fabric of closer and evener texture, particularly silk fabrics.

The accompanying illustration shows a portion of a loom side, one lay-sword, and a sectional view of the breast-beam, lay, and spring-reed frame and the supplemental mechanism applied thereto.

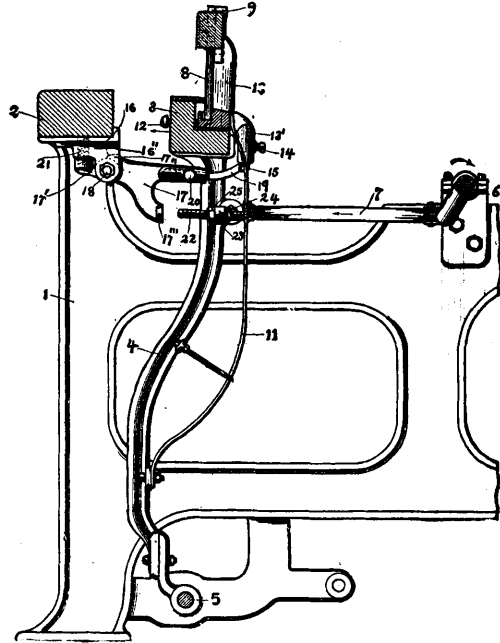
1, indicates the loom side; 2, the breast-beam; 3, the lay; and 4, the lay-sword, pivoted at its lower end at 5, and operated by the crank-shaft 6, through the crank-connector 7. The reed 8 is pivotally supported at its upper side between uprights 9, at each end of the lay 3, by pins to swing in and out at its lower part, which extends in a recess in the rear upper part of the lay. A flat spring 11, secured at its lower end on the lay-sword 4, bears at its upper free end against the rear side of the reed 8. Screw 12 extends through the lay and may be turned in or out to regulate the forward swing of the reed.

To the back of the swing reed-frame, near the end thereof, is secured a stand 13, having an arm 13', which extends down below the lay and is provided with a socket at its end, in which is adjustably secured by a set-screw 14, a contact piece 15, made of hardened steel.

A bracket 16 is secured to the under side of the breast-beam, and in this instance is slotted to receive the rear end of the knock-off lever or arm 17, which is pivoted to the bracket 16 by a bolt 18 and carries at its front end in a socket therein a finger or contact piece 19, adjustably secured by a set-screw 20 and adapted to engage the contact-piece 15.

A coiled spring 21 extends in a recess in the bracket 16 and bears on the rear end 17' of the knock-off lever 17 back of its pivotal support and acts to raise the front end of said lever 17. A projection 17'' on said lever 17 engages with the projection 16'' on the bracket 16 and limits the raising of said lever. The engagement of the rear end 17' with the bracket 16 limits the downward motion of said lever.

A downwardly-extending projection 17''' on the lever 17 is adapted to be engaged by a screw 22, ad-



justable in an ear or lug 23 on the lay-sword 4 and held in its adjusted position by two nuts 24 and 25. The screw 22 acts as a trip to engage the knock-off lever 17 on the forward movement of the lay and move it down to cause the finger 19 to be disengaged from the contact-piece 15 on the swing-reed 8, and allow the spring 11 to act to force the reed forward.

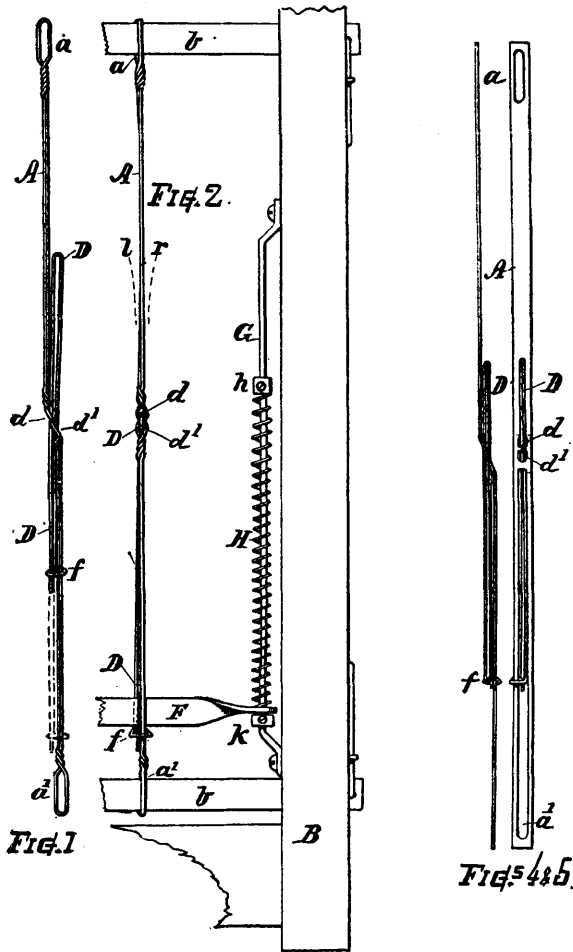
As the lay beats up the finger 19 will engage with the contact-piece 15 and hold or retard the reed 8 at its lower part. Just as the lay reaches the limit of its forward movement the screw 22, which is properly adjusted as desired, engages the lever 17 and moves it down to trip or disengage the finger 19 from the piece 15 on the reed 8 and allow the spring 11 to act to force the lower part of the reed forward and cause it to beat up the filling with a sudden sharp blow. (*Crompton and Knowles Loom Works.*)



HEDDLES AND HARNESSES.

REDDING'S DOUP-HEDDLE FOR LENO-WEAVING.

Leno or cross-weaving is effected by a doup action that crosses warp-threads between the picks. For this purpose doups threaded in the heddles and connected with a separate harness-frame have been employed; also frames carrying needle-formed heddles have been employed for such purpose; but so far a heddle having a wire doup mounted and guided



thereon has not been devised, neither means for depressing or controlling the tension of the douping devices.

The object of the new heddle is to provide a more efficient and durable device; also, to provide a heddle with a wire doup supported and guided thereon.

Another object is to provide, in combination with the heddles having the sliding doups thereon, means for weighting or depressing the doups to afford a proper degree of tension therefor.

These objects are attained by the heddle mechanism illustrated in the accompanying drawings, wherein—Fig. 1, is a side view of the heddle. Fig. 2, is a front view of the heddle, together with a portion of the harness-frame showing the manner of combining the heddle and doup depressing devices. Fig. 3, is an enlarged or detail view showing the manner of arranging the doup upon the heddle, and Figs. 4 and 5, show, by side and front views, the modification of the heddle as made from a flat metal strip.

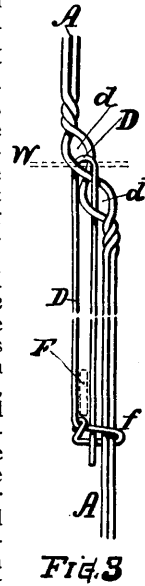
A, denotes the heddle, having the open ends *a, a'*, whereby it is supported on the rods *b, b*, in the harness-frame B, and also provided with a double central eye or guide-openings *d, d'*, as indicated.

D, indicates the doup, which is formed of wire or a metal strand folded at the top to form a loop or eye for the warp-thread W, and having its parts brought together and extended downward through the openings *d, d'*, in the heddle A, and having its lower extremities joined by means of a loose-running clasp, turn, or connection *f*, about the wire of the heddle or one strand thereof, so that the doup D, can move freely up and down thereon, it being supported and guided by the eyes *d, d'*, and the clasp *f*. The doup is shown as elevated in Fig. 1, and as depressed in Fig. 2.

F, indicates a small bar arranged through or engaging with the foot of the doup D, for normally depressing the same. Said bar may extend across the harness-frame and engage all or any desired number of the doups in a row of heddles, and its ends are best arranged in movable connection with guide-wires G, suitably attached to the frame, and having light springs H, combined therewith for normally pressing down the bar.

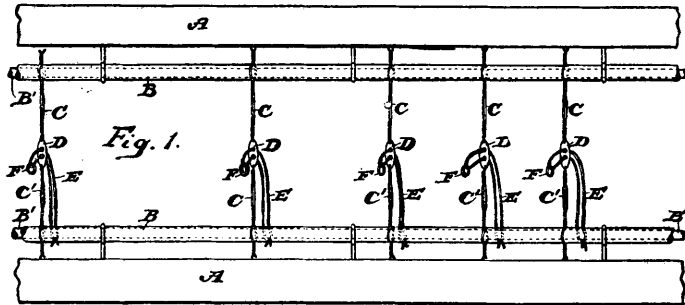
An adjustable collar *h*, is provided for regulating the tension of the spring H, as required in any instance, and a stop *k*, is disposed beneath the bar for limiting the downward action of the bar F and doups D. A spring of very light tension is ordinarily sufficient to depress the bar F and heddle-doups D, and in some instances even the bar of its own weight may be sufficient. In other instances the heddles may be used without the bar F, the gravity of the doup or a slight weight added to the lower part thereof being depended upon for the normal depression of the same.

The heddle A, is made of wire twisted to form the eyes *d, d'*, as in Figs. 1, 2 and 3, but in some instances it can be made of flat band metal, with the eyes and doup-guiding slot punched through the same, as shown in Figs. 4 and 5, the doup D, being of wire or metal and arranged to slide up and down the heddle, as above set forth. When made as shown in Fig. 2, the doup can be threaded to pass either to the right or left, as indicated by dotted lines *r* and *l*. If made of flat form, then the heddles may be set in the harness with their inclined portions at either right or left position, as required for weaving any particular pattern. (William H. Redding, Worcester, Mass.)



HAMPSON'S LOOM-HARNESS FOR WEAVING LENO GOODS.

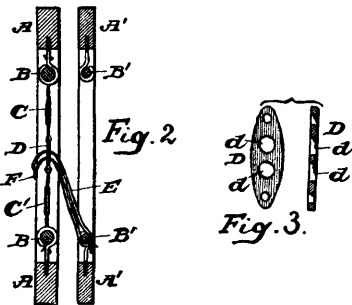
These goods are usually woven with several harnesses, in some of which the warp-threads do not pass directly through the leashes, but are run through the bight of a double cord, which is rove through the eye in the leash and is attached to an adjacent heddle. These cords are called "doups," and serve to pull down certain warp-threads at each pick of the loom, so that the shuttle will pass over instead of under said threads, as the figure demands.



The varying action of the heddles causes the doups to work back and forth through the eyes of the leashes and the warp to pull through the doups, so that the doups break very frequently, the usual life of one being not more than a day or two, and sometimes much less. The material of which they are made is the best, and they are quite expensive, so that the loss of material and of the time required to make repairs is excessive and costly. To avoid this delay and expense by improving the construction of the leashes and the doups is the subject of the improved loom-harness thus to be described.

Fig. 1, is a front elevation of a heddle-frame provided with the improved doup attachment. Fig. 2, is a cross section showing the manner of connecting the doups. Fig. 3, shows forms of guide-plates for the doups.

The heddle-frame A, has near its top and bottom the metallic rails B, to which are attached the upper and lower ends of the respective strands C, C', of the leashes made of wire. The adjoining ends of the strands C, C', are fastened to guide-plates D, of rigid material, such as metal, bone, ivory, celluloid, hard rubber, glass or the like. Each plate contains two enlarged apertures or eyes d, which are arranged between and in alignment with the end apertures of the plate. Said eyes are provided with rounded edges to prevent wear of the doups in working through them.



The doups E, are rove through the eyes in the guide-plates. The ends of the doup are secured to a

rail B', on an adjoining heddle-frame A', which has no leashes.

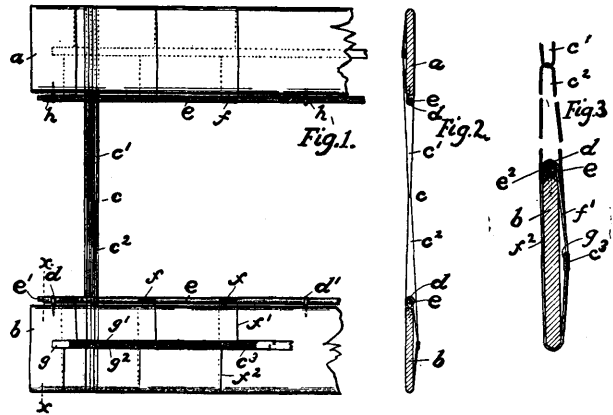
In the bight of the doup is a loose ring F, of rigid material, such as metal, hard rubber, or the like, through which the warp-thread is passed. (Joseph Hampson, Fall River, Mass.)

HARNESS SHIFTER AND ADJUSTER.

The object of this shifter is to provide a harness and its shafts with means for shifting the harness, that is to say, changing its relative vertical position on the said shafts for the purpose of introducing at certain intervals new portions of the harness for their looped connections to prevent the said harness at the place above mentioned from being worn through by the continuous friction with the warp-threads, and to thus make it more durable.

Fig. 1, is a front elevation of a portion of the shafts and the harness carried there by and provided with the improvements. Fig. 2, is a side elevation of Fig. 1, and Fig. 3, an enlarged sectional view on the line x, x, of Fig. 1.

A description of this shifter is best given by quoting letters of references, of which a, and b, represent the shafts, and c, the harness, which latter con-



sists of the looped threads c', and c'', connecting substantially midway between the shafts and passing over the outer edges of the latter. At the inner edge of each shaft and near each end thereof, are arranged the bearings d, d', for the shaft or rod e, which latter is provided at one end with a squared portion e', adapted to be engaged by a key. Around said shaft or rod e, are wound at certain intervals, a series of cords f, having their central portions or loops secured to the said shaft. One end f', of each of said cords f, is directly secured to the rod or strip g, while the other end f'', passes first over the outer edge of its respective shaft and is then also secured to the said rod or strip g. The said strip is provided with a series of fingers or projections g', g'', by means of which latter it is secured to the band or edge c'', arranged on and connecting the free ends of its respective harness.

The shaft or rod e, is provided with an elongated groove, in which is arranged a wire, by means of which latter the central portions or loops of the cords f, are secured to the said shaft or rod. Said

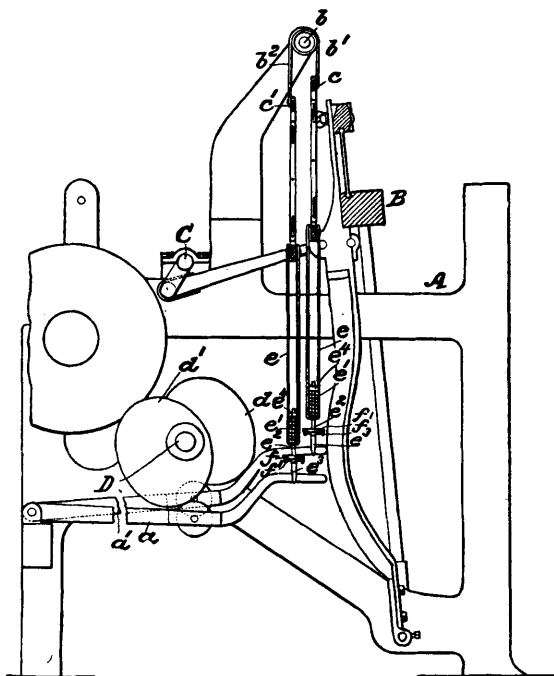
wire extends beyond the bearings d , and d' , and is thus held firmly within the groove.

The shaft or rod e , is prevented from lateral motion by means of pins h .

Whenever a certain amount of weaving is accomplished, the shafts or rods e , on the shafts a , and b , are turned by means of the key or wrench. The length of the ends f' , and f'' , of the cords f , are thus changed, and the rod or strip g , raised or lowered, and as the latter is firmly connected with the harness-connecting band or edge c^3 , the said harness is vertically shifted, that is to say, a new portion of it will form the connecting-loops. By this arrangement the harness is made more durable. The warp-threads will wear on different portions thereof, as will be manifest. (*John David Ulrich, Haldon, N. J.*)

HARNES CONNECTION FOR PLAIN LOOMS.

In ordinary looms for weaving plain cloth with two or more harnesses, and in which the harness-frames are actuated by treadles struck by cams, the treadles are commonly connected with the harness-frames by flexible straps, and in use, owing to the wear of the parts, these straps become slack and the harness-frames are not held at tension, and when the loom stops the backlash, due to the slackness of tension or lack of firm holding of the harness-frames, results in making thin places in the cloth.



The straps commonly used are difficult to get at, and with the buckle commonly used they cannot be adjusted to exactly the proper point, and frequently

the straps are adjusted so that they are too tight, which, besides creating undue wear of the parts, adds materially to the power required to run the loom. The looseness of the usual harness not only occurs through the stretch of the straps, but also from the impracticability of making a connection between one harness-cam through the heddle, straps, roll above the harness, and back again through harness and heddle to another cam, one heddle being longer than the other and the roll at the top being longer for one harness than the other, at the same time maintaining the bearing of both heddles against both cams all the way around.

If every part were made with absolute correctness of design, this might be accomplished, but such correctness is impossible in ordinary mechanical work. To overcome this objectionable connection between the usual treadles and the harness-frames, a novel connection is produced by means of the new device, it containing two parts connected by a spring, the spring acting normally to keep the treadle always up to and against its actuating-cam, so that there is no backlash or slip, and the harness-frames are moved uniformly and with the least amount of objectionable strain.

The accompanying illustration shows in section a sufficient portion of an ordinary loom with the improvements added.

A, indicates the loom-frame; B, its lay; C, the crank-shaft; D, the cam-shaft, having the shed-forming cams d , d' ; a , a' , are the treadles, having rolls acted on by said cams; b , is the top roll, supporting the top cording b' , b'' , attached to the harness-frames e , e' .

Each lower bar of the harness-frames, has connected to it a metallic loop or connection e , which supports a suitable spring e' , and a rod e'' , having loosely hung on its head at its lower end an eye e' to fit over the free end of the treadle, is passed upwardly through this spring and has applied to it a nut e^3 , so that said two-part connection may yield to any endwise strain and yet keep the treadle always against the actuating-cam.

The nut e^3 , is restrained from rotation in the loop e , but the stress of the spring may be readily adjusted to the required amount by rotating the bolt in the loop and in the eye. To do this, there is applied to a squared part of the bolt an adjusting device f , having a series of lugs f' , which embrace the flattened sides of the head of said eye and keep it from rotating when the loom is in use. To adjust the spring, it is only necessary to lift the device f far enough to remove its lugs f' from the head of the eye and turn the device f and rotate the bolt, it moving in the nut e^3 and adjusting the stress of the spring. When adjusted to the desired tension, the device f will be dropped.

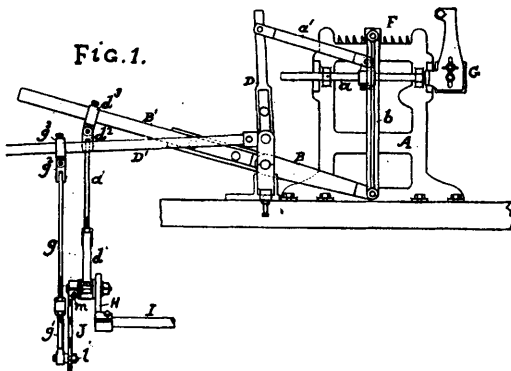
By the use of a harness connection such as described the levers may be always kept firmly against their actuating-cams and no loss of motion is permitted, the spring obviating any difficulty due to wear of parts.

The harness-frames are shown as provided with sheet-metal heddles and with such heddles which add to the weight of the harness-frames the thus explained device has great and peculiar benefit. (*Draper Co.*)

JACQUARDS AND CARD-CUTTING MACHINERY.

HALTON'S JACQUARD MECHANISM.

The object of this mechanism is to operate the griff-frame or frames and Jacquard cylinder of a Jacquard machine from the same shaft, but independently, and to provide for varying the time of



one part in respect to the other to accord with practical requirements.

Of the accompanying illustrations, Fig. 1 is a side view of sufficient of a "single-lift" Jacquard machine to illustrate the application of the new mechanism thereto. Fig. 2 is a similar view illustrating the application of said mechanism to a "rise-and-fall shed" Jacquard machine.

A, represents part of the frame of a Jacquard machine; F, the griff-frame; B, B', the operating-lever therefor; G, the card-cylinder and D, D', the operating-lever therefor.

The card-cylinder is carried by guided rods *a*, connected to the arms D, of the operating-lever by links *a'*, while the griff-frame is connected to the arms B of its lever by links *b*.

The arm B', of the griff-frame operating-lever is connected by a rod *d*, *d'*, to a crank-pin carried by a crank-arm H, on the operating-shaft I, the latter

portion *d*, of the rod is threaded and provided with nuts whereby it can be adjusted longitudinally in respect to the portion *d'*, the outer end of said portion of *d*, of the rod being connected by a universal link *d''*, to an adjustable block *d''*, on the arm B'. In like manner the arm D', of the operating-lever for the card-cylinder is connected by means of a rod *g*, *g'*, link *g''*, and block *g''*, to a pin *i*, on an arm J, which is rotatably mounted upon a projecting portion of the crank-pin, so that it can be adjusted on said pin, a set-screw *m* serving to secure it in position after such adjustment.

By this construction the movement of the card-cylinder in respect to that of the griff-frame may be regulated to any desired extent. For instance, if the arm J is turned so as to be directly in line with the arm H, the movement of the griff and cylinder levers will be exactly the reverse of each other, the cylinder being at its extreme outward position when the griff-frame is fully raised and in its extreme inward position when the griff-frame is fully lowered, while by shifting the arm J, in one direction or the other the movement of the card-cylinder may be caused to lead or follow that of the griff-frame to any desired extent.

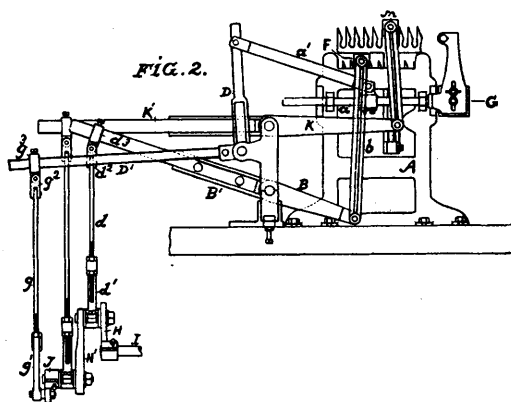
The same principle of operation attends the use of the new mechanism in connection with the rise-and-fall machine shown in Fig. 2, the adjustable arm J, in this case being hung to the crank-pin, which is carried by the outer crank-arm H', and receives the operating connection for the lever K, K', which operates the second griff-frame M.

The connections shown in Fig. 1 may be reversed, if desired, that is to say, the griff-frame operating-lever might be actuated by the pin of the arm J, and the cylinder operating-lever by the pin of the arm H, again the arm J, might be secured permanently to, or form part of the crank-pin, if said pin is capable of turning around its axis and susceptible of being secured to the arm which carries it in any position of adjustment. (Thomas Halton, Philadelphia.)

THE KNOWLES OPEN-SHED JACQUARD.

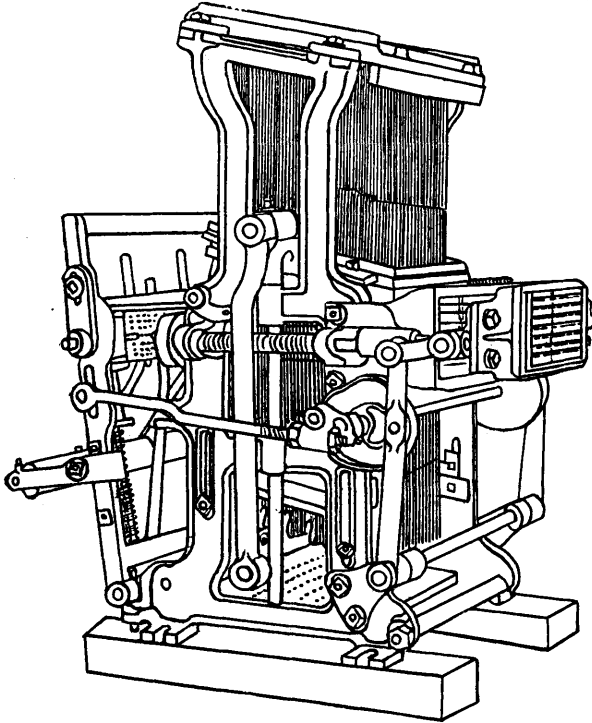
This class of Jacquard machine is rapidly coming into favor on certain classes of goods where the open-shed feature is found desirable as compared with the ordinary straight-lift, so called, or rise-and-drop closed-shed type of machine. The difficulty with open-shed Jacquards heretofore has been, that the action of the machine was such, that the cylinder carrying the pattern cards was required to make two beats, or in other words, to present the same pattern card twice in one beat of the loom. This of necessity involved a decrease of speed in the operation of the loom, owing to the fact that the movement of the cylinder was twice as fast, so to speak, as the beats of the loom.

In the construction of the Jacquard as shown in the accompanying illustration this defect has been overcome. The machine, properly speaking, is of the ordinary straight-lift type, that is to say, the shed is lifted from its lowest normal position into the upper shed and returned again to that point when required to descend from the upper shed. By the



being any available rotating shaft of the loom. The portion *d'*, of the connecting-rod has a two-part bearing for the reception of the crank-pin and the

peculiar action of this machine, however, hooks that are indicated to rise and on the succeeding pick of the loom are required to be up, remain up, and



continue to do so for an indefinite number of picks, unless a card is presented that governs the needle in such a way that the hook will descend carrying the shed in normal position.

In this improved form there are two stationary griffs, so called, one at the top of the machine and one at the bottom; between the griffs above mentioned there is a second intermediate griff, which has a vertical movement at each pick of the loom. The griffs here shown are set upon an angle for the purpose of varying the distance between the position of the hooks on the upright and the needle, so that a movement of the needle gives the same kind of lateral movement to an upright in the back row as at the front.

The operation of the machine is as follows: When the shed is open, the cylinder with pattern-card upon it comes in contact with the needles and depresses such needles as there are blanks in the card, the effect being to throw the bottom of the upright clear of the stationary griff at the bottom; at the same time the needles so depressed are acted upon by the reciprocating griff at the back of the machine, the needles through their angular form being raised to come in contact with the plates of the reciprocating griff, and this in its backward movement engages with

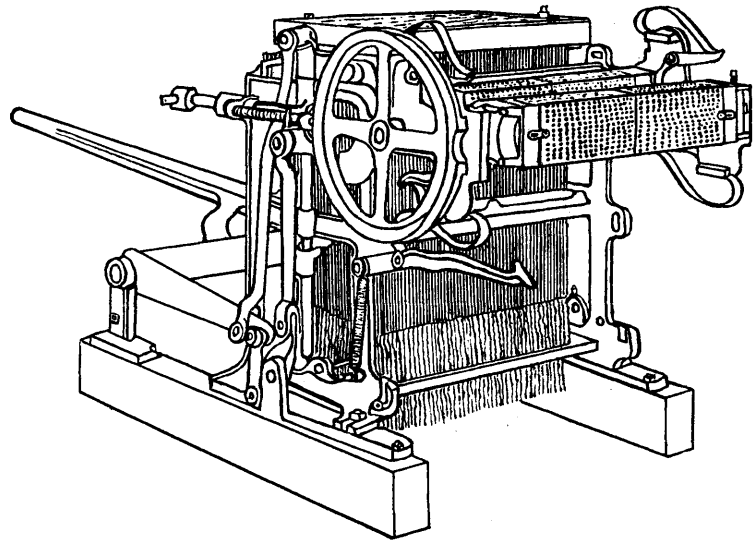
the back end of the needles and holds them back; thus when the downward movement of the vertical movable griff takes place, the hooks so held back by the action of the needles, descend with the harness and warp threads into the lower shed. It will be seen therefore that the action of the card cylinder takes place when the vertical moving griff is at its highest point, or the shed open, this being the exact reverse of the action of a Jacquard cylinder in the ordinary construction of Jacquard. It naturally follows that any needles acted upon by the cards, that is to say, the blank portion of the card, must of necessity rise to come in contact with the reciprocating griff as mentioned above, and the griff having considerable dwell at its extreme outward movement, necessarily holds the needles and the uprights passing through in such position that they must of necessity descend into the lower shed.

It will be seen that in this operation there is no complication in designing or card cutting; an ordinary set of cards that will produce the goods on a machine in the usual manner will produce exactly the same pattern on this machine, the only difference being, comparatively speaking, as to the time of their coming in contact with the needles. This machine has been found particularly desirable for narrow ware goods, as in such goods the shed requires to remain open, or warp threads remain in upper shed, for sometime, hence there is a very perceptible decrease in the wear and tear of the harness by the use of a machine of this class. (*Crompton and Knowles Loom Works.*)

THE KNOWLES DOUBLE CYLINDER SINGLE-LIFT OR RISE-AND-DROP JACQUARD.

This device has been found in practice doing excellent work, running two sets of cards for the production of goods having cross-borders or all-round borders. The cylinder is mounted upon horizontal-reciprocating rods having a movable head with two or more cylinders upon it.

In operation the cylinder reciprocates, coming in contact with the needles in the usual manner, and on one of the cylinders is placed a sufficient number of



cards to make a cross-border on the goods or possibly two cross-borders.

The borders are woven making either one or two revolutions of the set of cards, as the case may be, and at the same termination of the weaving of the second border the card operates upon a needle, which in turn governs a hook in the Jacquard machine, which in turn governs the multiplying-device on the box-motion and effects a stoppage of the loom through the usual stop-motion device on the loom. The operator then revolves the cylinders by means of a cord, as shown, throwing one cylinder out and bringing another cylinder into position to act upon the needles. The second cylinder may have a series of cards for a figure, or simply a set of twill ground.

In operation this cylinder will be used a sufficient number of picks to weave whatever space may be contained between two borders in the goods to be woven, and the number of picks contained in such space is determined by the multiplying-device attached to the box-motion of the loom, and through such multiplying-device the given distance between two borders is determined; at the termination of the space the loom is again stopped by the action of the multiplying-chain and the usual stop-motion attachments of the loom, and the cylinders are again revolved bringing into position the border cards, borders are woven, and a repetition of the foregoing completes the fabric woven. (*Crompton and Knowles Loom Works.*)

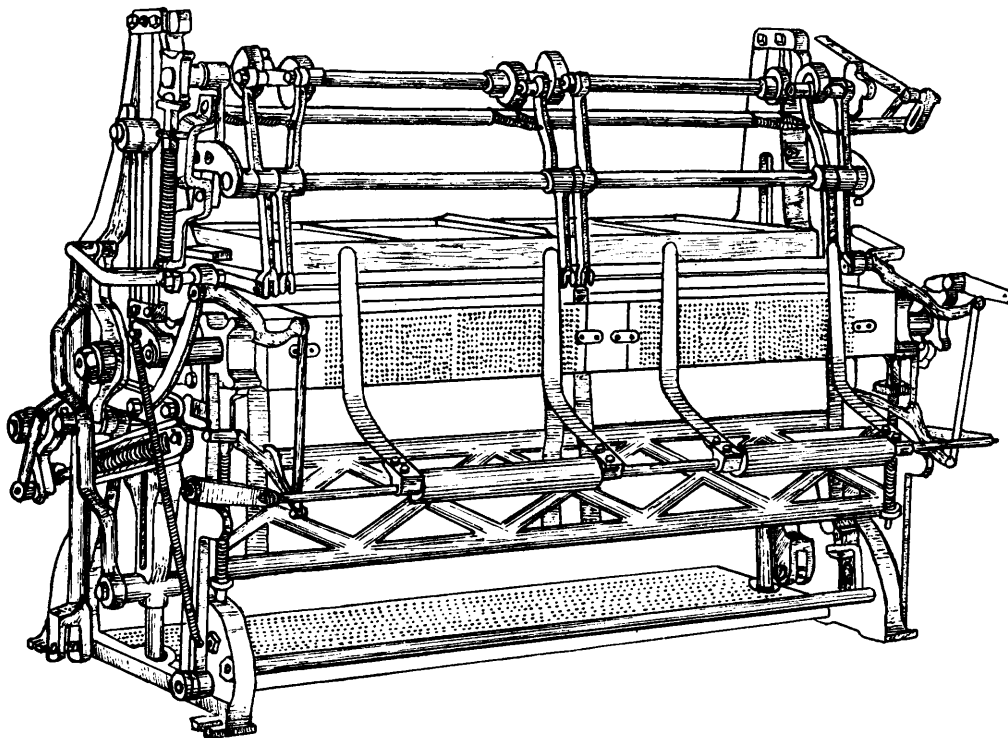
THE KNOWLES MARSEILLES-QUILT JACQUARD.

In the accompanying illustration is shown the Knowles rise-and-drop Jacquard machine, having a plain card attachment, and which Jacquard is exten-

sively used for quilt weaving and similar goods where heretofore a plain card between each two figure cards has been required. This feature of saving cards is accomplished by means of the device shown in the illustration on the top of the machine, which has a cam upon shafts running across the machine, coming in contact with the end of the lever fulcrumed at a point lower on the machine, as shown, and a series of rods in reciprocating frames, one rod in front of each row of the upright hooks in the Jacquard machine and under the griff that lifts the hooks. When the griff rises the pawl acting upon the ratchet held at the side of the machine gives a movement to the cam shaft, that throws the cam in contact with the lever, thus depressing one-half of all the upright hooks in the machine, leaving the other half of the hooks in position to be acted upon by the griff, and upon further movement of the machine the cam is turned out of contact with its lever and a second cam operating upon a second lever performs the same operation upon the hooks that were formerly not acted upon by the rods; hence a two-weave attachment is got without any action of the Jacquard cylinder or cards. The plain ground of any kind of fabric may be woven in this way.

This machine as previously mentioned has been very extensively introduced in mills manufacturing Marseilles-quilts. To fully understand its operation necessitates a description of the principles of Marseilles weaving, and which is thus:—

Two warps are used, a coarse and fine; the coarse being the figure or binder warp, and the fine the face warp. The fine warp is operated by ordinary harnesses in front of the Jacquard harness; two shuttles are used, one for the fine or face filling, the other for the coarse or backing filling. In operation, the



sively used for quilt weaving and similar goods where heretofore a plain card between each two figure cards has been required.

In this case the plain card, so called, is entirely dispensed with, thus largely reducing the total num-

ber of cards required. This feature of saving cards is accomplished by means of the device shown in the illustration on the top of the machine, which has a cam upon shafts running across the machine, coming in contact with the end of the lever fulcrumed at a point lower on the machine, as shown, and a series of rods in reciprocating frames, one rod in front of each row of the upright hooks in the Jacquard machine and under the griff that lifts the hooks. When the griff rises the pawl acting upon the ratchet held at the side of the machine gives a movement to the cam shaft, that throws the cam in contact with the lever, thus depressing one-half of all the upright hooks in the machine, leaving the other half of the hooks in position to be acted upon by the griff, and upon further movement of the machine the cam is turned out of contact with its lever and a second cam operating upon a second lever performs the same operation upon the hooks that were formerly not acted upon by the rods; hence a two-weave attachment is got without any action of the Jacquard cylinder or cards. The plain ground of any kind of fabric may be woven in this way.