

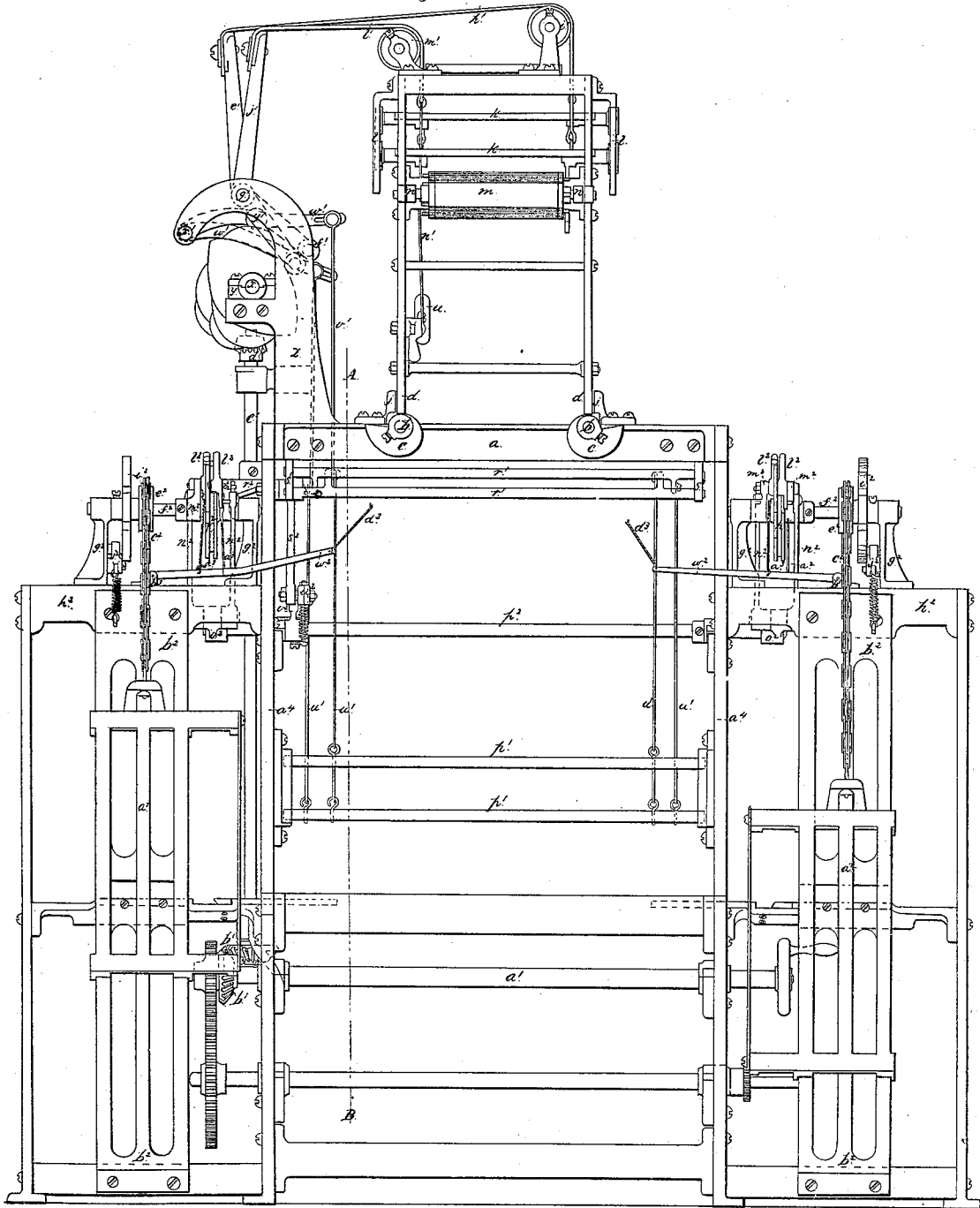
E. B. Bigelow.
Loom.

Sheet 1 - of Sheets.

N^o 89,011.

Patented Apr. 20, 1869.

Fig. 1.



Witnesses.
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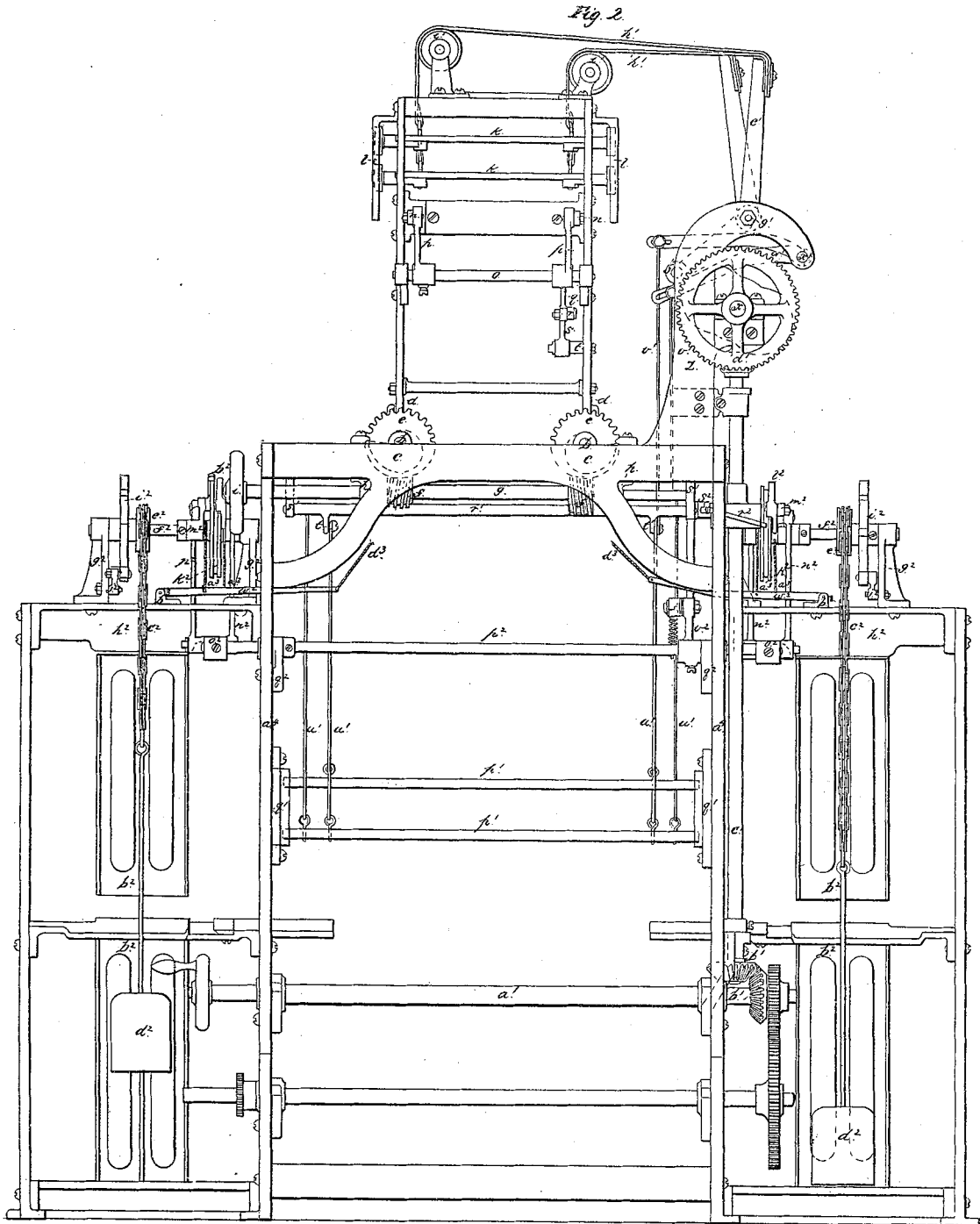
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Sheet 2 - of 5 Sheets.

N^o 89,011.

Patented Apr. 20, 1869.



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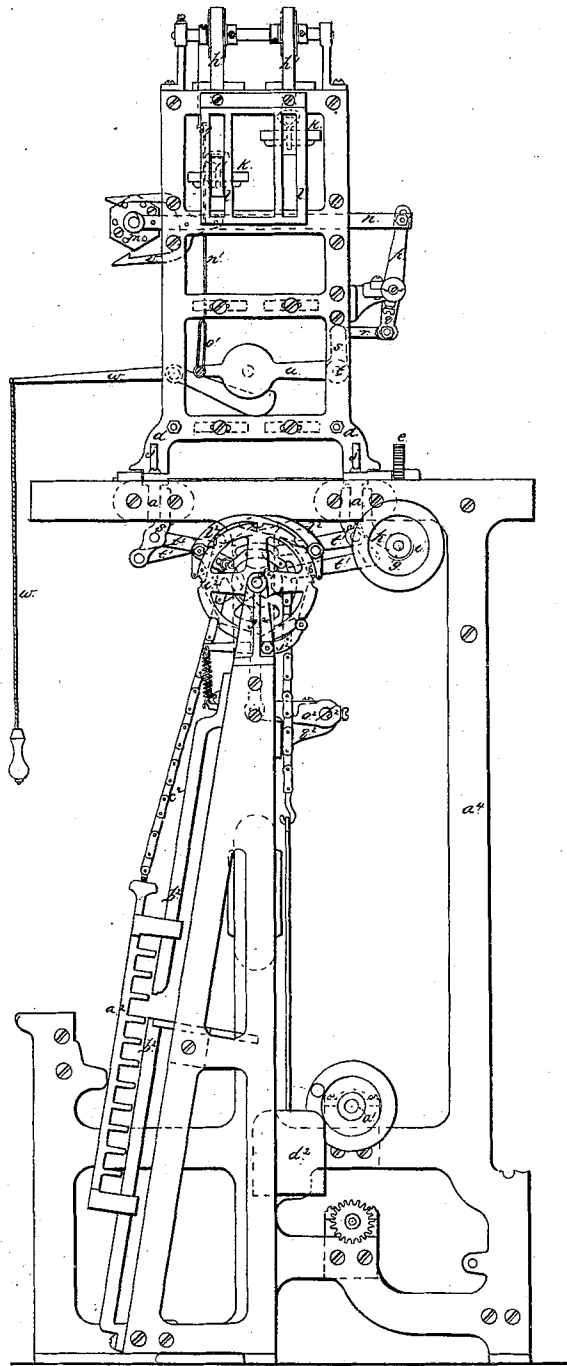
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Sheet 3-5 Sheets.

N^o 89,011.

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Fig. 3.



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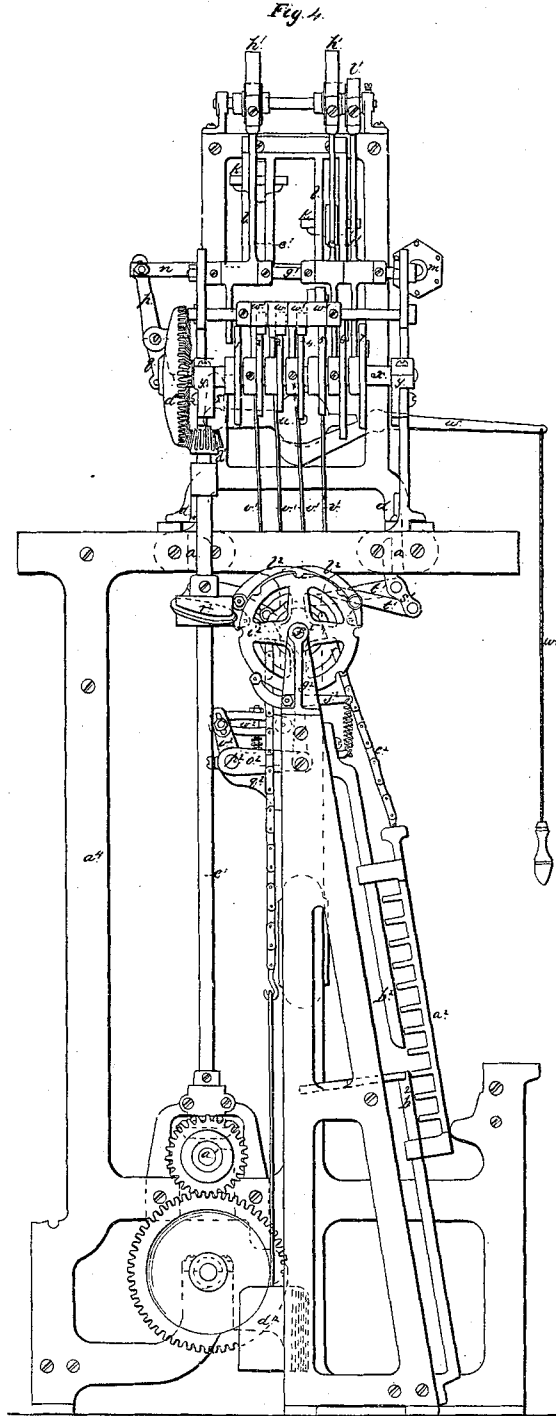
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Sheet 4 - 6 Sheets.

N^o 39,011.

Patented Apr 20, 1869.



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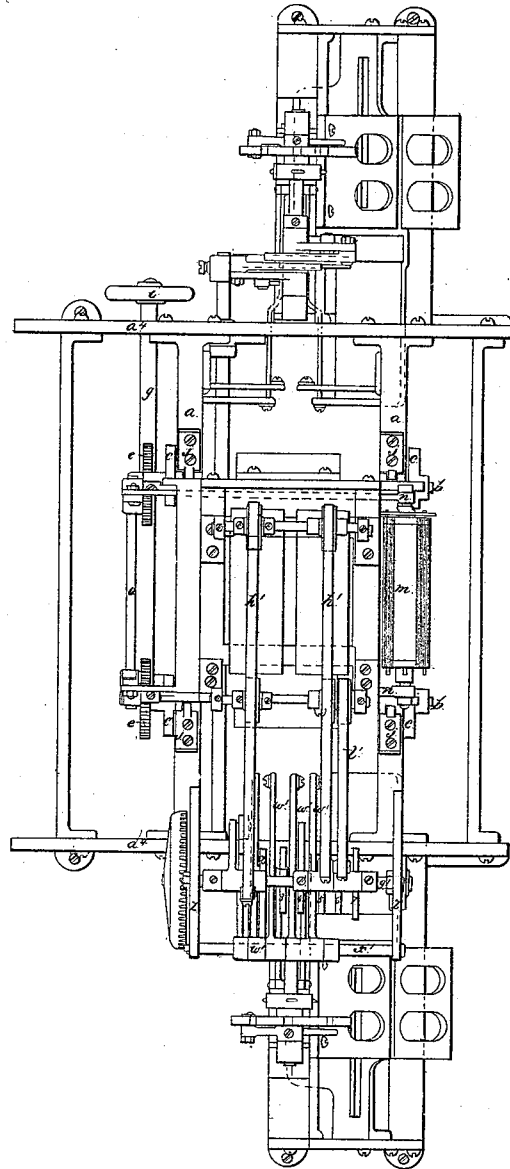
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N^o 89,011.

Patented Apr. 20, 1869.

Fig. 5.



Witnesses
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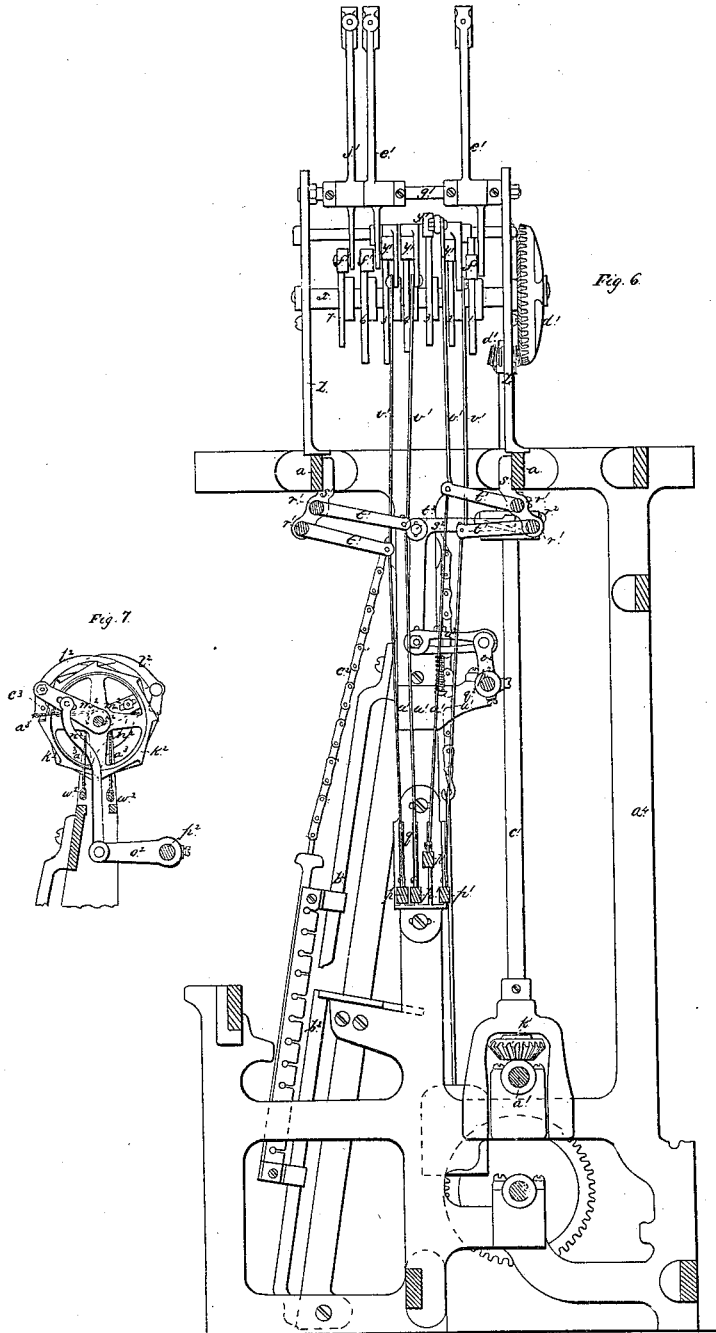
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Sheet 6-6 Sheets.

N^o 89,011

Patented Apr. 20, 1869.



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ERASTUS B. BIGELOW, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 89,011, dated April 20, 1869.

IMPROVEMENT IN LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ERASTUS B. BIGELOW, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in jacquard power-looms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The drawings represent my improvements, and such other parts of a loom as are necessary to exemplify them.

Figure 1 is a front elevation;
Figure 2, a rear elevation;
Figure 3, a right-hand end elevation;
Figure 4, a left-hand end elevation;
Figure 5, a plan; and
Figure 6 is a vertical section, taken on the line A B, in fig. 1, looking towards the left.

A part of my invention relates to a mode of elevating and depressing the jacquard machine used in power-looms, to adjust the height of the harness-cords as they are distended or contracted by atmospheric, or other causes, and of retaining it in position when adjusted.

For this purpose, I place two girths, *a*, across the loom, at the tops of the loom-frame *a'*, which are parallel to each other and to the lay-shaft, and support the mechanism for elevating and depressing the jacquard machine.

In bearings formed in the upper edges of the two girths just mentioned, two transverse shafts, *b*, are placed, to the ends of each of which a scroll-like cam, *c*, is affixed, and on these four cams the four feet, *d*, of the jacquard machine rest.

Each of the transverse shafts carries a worm-gear wheel, *e*, both of which are acted on by corresponding worms *f*, affixed to a connecting-shaft, *g*, which is so placed and supported, by stands *h*, that the worms will engage with their respective worm-gear wheels.

The cams and worm-gear wheel of one of the transverse shafts are made opposite-handed to the cams and worm-gear wheel of the other transverse shaft; that is, right-handed for one shaft and left-handed for the other, in order that the tendency of the weight of the jacquard machine to turn the transverse shafts may be counter-balanced.

The connecting-shaft *g* is provided with a hand-wheel, *i*, by which the shaft may be readily turned, and when turned in one direction, it will elevate the jacquard machine, and when turned in the opposite direction, it will depress it, while the counterbalancing-arrangement just described will sustain it in any position in which it may be placed.

The jacquard machine is kept in position upon the cams, and guided in its up-and-down movement by guide-stands *j*, which ply in grooves, or recesses formed in the feet of the jacquard machine, as shown in fig. 5, there being one such stand for each of the four feet.

Another part of my invention relates to a mode of operating the trap-boards and the pattern-cylinder of the jacquard machine, whereby I obtain steadiness of motion, and am enabled to elevate and depress the jacquard machine, to adjust the height of the harness without the necessity of adjusting the connections between the trap-boards and the pattern-cylinder and the levers which operate them.

The trap-boards are marked *k*, and are guided in their up-and-down movements by guide-stands *l*.

The pattern-cylinder is marked *m*, and is carried from and toward the needles by sliding bars *n*, which are connected with a rock-shaft, *o*, by upright arms *p*.

From the rock-shaft *o* an arm, *q*, extends downward, which is connected, by a bar, *r*, to the upright arm *s* of a crank-lever, which vibrates on a stud, *t*.

By vibrating the horizontal arm *u* of the crank-lever, a corresponding movement will be imparted to the pattern-cylinder; that is, when the arm *u* is raised, it will carry the pattern-cylinder away from the needles, and when it is allowed to descend, its weight will draw the pattern-cylinder against them.

The double hook which turns the pattern-cylinder, to present a change of pattern-cards, is marked *v*, and the cord and lever by which the weaver turns the pattern-cylinder, to adjust the pattern-cards, are marked *w*.

The parts of the jacquard machine which I have just described involve nothing new; and as the pattern-cards, needles, and harness-cords may be arranged as is usual, I have deemed it unnecessary to represent them in the drawings.

The trap-boards and the pattern-cylinder are operated by a cam-shaft, *x*, which is placed transversely to the trap-boards, and turns in bearings *y*, affixed to the standards *z*, extending upward from the cross-girths *a*, before described.

The cam-shaft *x* receives motion from a loom-shaft, *a'*, through the action of the mitre-gears *b'*, upright shaft *c'*, and bevel-pinion and gear *d'*, the relative sizes of the gears being varied according to the character of the cloth to be woven.

In looms (such as represented in the drawings) for weaving two-ply carpets, the cam-shaft *x* should revolve once to every four beats of the lay; and, for weaving three-ply carpets, once to every six beats of the lay.

The cam-shaft *x* carries seven cams, four of which (Nos. 2, 3, 4, and 5) operate the journals hereinafter to be described, and Nos. 1 and 6 operate the trap-boards, and No. 7 the pattern-cylinder.

I would remark in this connection, however, that the number of cams will vary according to the number of the trap-boards and journals employed. For weaving three-ply carpets, ten cams are required.

The cams Nos. 1 and 6 act on vibrating levers *e'*, which carry cam-bowls *f'* at their lower ends, and vibrate on an axis, *g'*, supported by the standards *z*, before described.

From the upper ends of the vibrating levers e^1 , straps h^1 lead off horizontally, or nearly so, over guide-pulleys i^1 , down to the trap-boards k , there being two straps attached to each vibrating lever; that is, one for each end of each trap-board, whereby the trap-boards are maintained in a level position.

The guide-pulleys for the longer straps are placed higher than those for the shorter straps, in order that the jacquard machine may be elevated without causing the straps to clash.

The cam No. 7 acts on a cam-bowl, f^1 , on the lower arm of a vibrating lever, j^1 , which lever is similar to those just described, and vibrates on the axis g^1 .

From the upper end of the vibrating lever j^1 , a strap, l^1 , leads off horizontally, or nearly so, over a guide-pulley, m^1 , down to a rod, n^1 , by which it is connected with the arm u , before described, the rod n^1 being provided with a slot, o^1 , to allow the arm u to be raised by the weaver, to adjust the pattern-cards, while the loom is at rest.

From this description, it will be seen that the cams Nos. 1, 6, and 7 operate in such manner as to raise the parts with which they are severally connected, and to allow them to descend by their own weight.

It will also be seen, that by placing the part of the straps which extends from the vibrating levers to the guide-pulleys in a horizontal position, or nearly so, as represented in the drawings, the jacquard machine may be elevated or depressed, to adjust the height of the harness without requiring the length of the straps to be adjusted.

The next part of my invention relates to a mode of operating the journals of jacquard power-looms, and may be understood as follows:

The journals which co-operate with the jacquard machine to work the jacquard harness are marked p^1 , and are placed across the loom above, but near the warps, and are guided in their up-and-down movement by guide-stands q^1 , (see fig. 6,) affixed to the loom-frame.

Above the journals a series of oscillating shafts is placed, which are marked r^1 , and are supported by the stands s^1 , there being one such oscillating shaft for each of the journals.

The oscillating shafts severally carry two lever-arms, t^1 , one at each end thereof, which are connected with the journals, by the connecting-wires u^1 , in such manner that when the shafts are turned in one direction, they will raise the journals with which they are respectively connected, and when they are turned in the opposite direction, they will allow them to fall by their own weight.

One of the lever-arms, t^1 , on each shaft is connected by wires v^1 to horizontal levers w^1 , placed above the transverse cam-shaft x , before described, there being one such horizontal lever to each of the oscillating shafts.

The horizontal levers w^1 vibrate on an axis, x^1 , and carry bowls y^1 , which are severally acted upon by the cams Nos. 2, 3, 4, and 5, before described, the cams being so shaped as to raise the journals, and allow them to descend by their own weight, at the required time.

The cams for actuating the journals, and also those before described for actuating the trap-boards, should be so shaped and adjusted, with respect to each other, as to elevate one part of the jacquard harness, while the other is depressed, so that the descending portion shall, in a considerable degree, counterbalance the ascending portion, thus maintaining the harness in a state of equipoise during the operation of the loom.

Another part of my invention relates to a mode of shifting a series of shuttle-boxes, or holders, and is particularly applicable to looms in which the shuttle-boxes are detached from the lay, and supported by stationary frame-work.

A series of shuttle-boxes, or shuttle-holders, capable of moving up and down on the guide-plates b^2 , and marked a^2 , is suspended by a chain, c^2 , and counterbalanced by a weight, d^2 , there being one such series on each side of the loom.

The chain c^2 is carried by a chain-wheel, e^2 , affixed to a shaft, f^2 , which is supported by two stands, g^2 , on a girth of the frame-work h^2 .

To shift the series of shuttle-boxes, or holders, the shaft f^2 is caused to turn one way or the other, according as they are to be elevated or depressed; and, after the shuttle-boxes, or holders are shifted, they are held in position by a spring-lever, j^2 , acting on a wheel, i^2 , in the usual way.

The mode of turning the shaft f^2 , to shift the shuttle-boxes, or holders, is as follows:

Two ratchet-wheels, marked k^2 , are affixed to the shaft f^2 , with teeth opposite-handed; that is, the teeth of one wheel facing in one direction, and those of the other in the opposite direction.

These wheels are actuated by hooked pawls l^2 , which are severally jointed to and carried by lever-arms m^2 , which lever-arms are caused to vibrate in opposite directions on the shaft f^2 .

Each lever-arm is connected by bars n^2 , jointed to another lever-arm, o^2 , affixed to an oscillating shaft, p^2 , which extends across the loom, and is supported by the bearings q^2 .

This shaft actuates the shifting-mechanism on either side of the loom, and derives its oscillating movement from a cylindrical cam, r^2 , on the upright shaft c^1 , before mentioned, there being one oscillation at each beat of the lay.

The projection of the cylindrical cam r^2 acts on the horizontal arm of a crank-lever, s^2 , which oscillates on a stud, t^2 , (seen in fig. 6,) the depending arm thereof being connected, by a spring-connecting bar, u^2 , to a lever-arm, v^2 , extending upward from and affixed to the oscillating shaft p^2 .

The crank-lever s^2 is connected with the arm v^2 by a spring-connection, as is usual, to prevent breakage of the parts, in case the movement of the shuttle-boxes, or holders, is obstructed.

The depending arms of the hooked pawls l^2 are severally connected with horizontal balance-levers w^2 , by cords a^2 , which pass around the shaft f^2 , on the side opposite to that at which they are attached to the arms of the pawls, so that the weight of the balance-levers w^2 tends to draw the pawls away from their ratchet-wheels.

The balance-levers w^2 are jointed to the stands b^2 , so that their inner ends are capable of being moved up and down freely.

The depending arms of the pawls are each provided with a stop-projection, c^3 , (see Figure 7,) which is so placed that when it is drawn against its lever-arm m^2 , by the weight of its balance-lever w^2 , the hook of its pawl will vibrate without acting on its ratchet-wheel.

From this description, it will be seen that as long as the pawls are held out of contact with their ratchet-wheels by their balance-levers, they will vibrate without producing any action, and when any one of the balance-levers is raised, the hooked arm of the pawl, with which it is connected, will fall upon its ratchet-wheel, and shift the shuttle-boxes, or holders, as before explained.

The inner ends of the balance-levers are connected by cords d^3 , to knot cords of the jacquard machine; and as these connections are formed in the usual way, they are not represented in the drawings.

The jacquard machine governs the order in which the shuttle-boxes, or holders, are shifted; that is to say, it raises one or the other of the balance-levers, according as one or the other of the series is to be shifted, and the direction in which it is to be moved,

the governing action of the jacquard machine being conveyed to the pawls by the balance-levers, and the cords with which they are severally connected.

Having described my improvements,

What I claim as new therein, and desire to secure by Letters Patent, is—

The combination of mechanism, herein described, for elevating and depressing the jacquard machine, and retaining it in position, consisting of two loom-girths, which support the elevating and depressing-mechanism, four cams, arranged in pairs on two shafts, on which the four feet of the jacquard machine rest, and a connecting-shaft and two sets of worms and gears, by which the cams are simultaneously operated, the two sets of cams, worms, and gears being opposite-handed, substantially as and for the purpose specified.

Also, the combination of mechanism, herein described, for operating the trap-boards and pattern-cylinder of the jacquard machine, consisting of a cam-shaft, placed transversely to the trap-boards, and receiving its motion from a loom-shaft, as herein specified, the cams on said cam-shaft, by which the trap-boards and pattern-cylinder are actuated, (the number of the trap-board cams varying according to the number of the trap-boards employed,) and the upright levers, and the connecting-straps, or their equivalents, arranged

horizontally, or nearly so, as described, by which the action of the cams is imparted to the trap-boards and pattern-cylinder, as described.

Also, in combination with the cam-shaft, for operating the trap-boards of the jacquard machine, placed transversely thereto, as herein described, the cams for operating the journals, (the number of the cams varying according to the number of journals employed,) and the levers and oscillating shafts by which the action of the cams is imparted to the journals, substantially as specified; and

Also, in looms having their shuttle-boxes detached from the lay, the combination of mechanism herein described, for operating a series of shuttle-boxes, or holders, on one or both sides of the loom, consisting of a shaft, from which the shuttle-boxes, or holders, are suspended, two ratchet-wheels, with teeth of opposite faces, affixed thereto, two vibrating lever-arms and pawls, which vibrate in opposite directions, and the cords and balance-levers, which convey the governing-action of the jacquard machine to the pawls, substantially as specified.

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Witnesses:

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