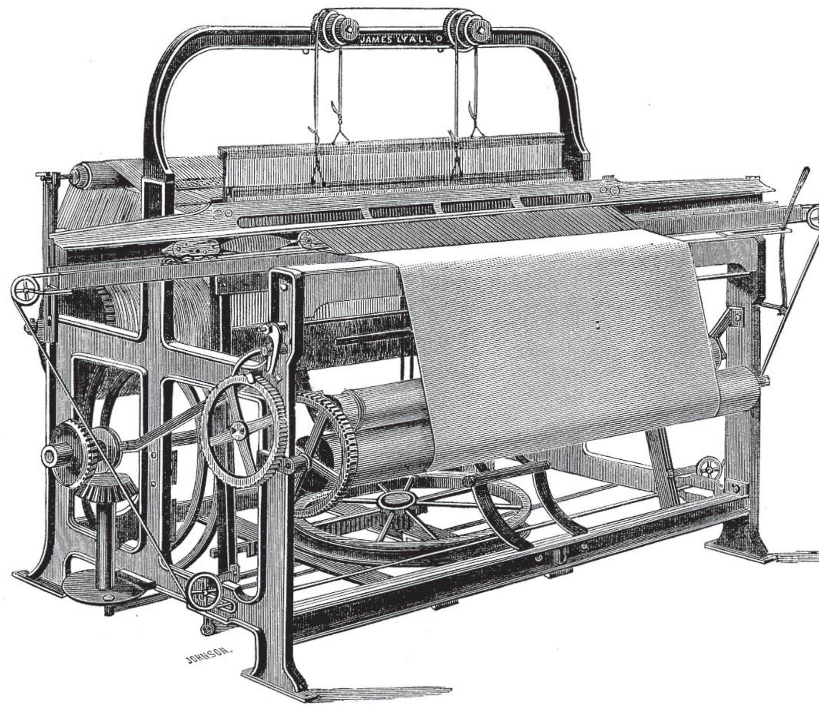

Fig. 1.

Important Improvement in Looms.

THE loom has perhaps undergone as little radical change at the hands of modern mechanics as any machine employed in the production of the great necessaries of human existence. If we except the devices which have been required to adapt it to an association with the great inanimate motors, we shall find that the loom which is to-day employed in the production of ordinary fabrics does not greatly differ from that of ancient times, and the same difficulties which were encountered by the weavers of the last century still plague their successors. In the loom of which we present a very accurate representation, one of the most serious of these difficulties is completely obviated, and that by means so simple and efficient that the only wonder is, that it had not been discovered earlier. In all forms of looms hitherto used, the shuttle has been thrown from side to side either by hand or by the automatic action of machinery. The shuttle is thus made to speed across the web entirely uncontrolled by the weaver, and with a velocity which must be equal to the requirement of carrying it entirely across at a single movement. After it has once left the hand of the operator, or the box of the picker-staff, it is no longer under control, but flies to its destination with an unchecked speed which renders wonderfully appropriate the simile of the Psalmist, who exclaimed, "My days are like a weaver's shuttle." And what was said of shuttles in the time of David, might be appropriately said of the shuttles in the looms of the nineteenth century; for when once projected, their movement can not be arrested. This is evidently a serious defect. It not only takes away from the operative all control of one of the most important elements of the weaving machinery, but it destroys the correlation which should subsist between that element and the rest of the apparatus. Every time the shuttle is projected across the web in our common looms, it becomes an independent agent; the machinery may meanwhile move faster or slower, but no effect is produced on it. If the loom is making one thousand picks per minute, the shuttle is virtually lost and found that number of times during the same space. We say *found;* unfortunately, it is not always *found.* The machinery may move faster or slower than it ought to do, and in that case the shuttle either falls short of its destination, or rebounds, and in either case a "smash" is the result, destroying the web and producing much mischief generally.

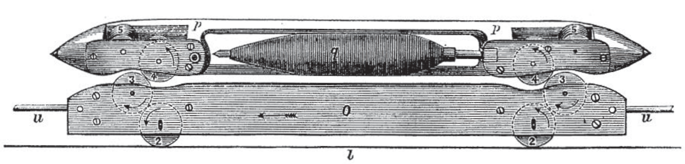

Fig. 2.

In attempting to avoid these difficulties, the problem which presents itself is this: Required a device which will carry the shuttle across the web and between the "shed," as it is called, and yet shall require no cord or rail to be present in that shed. This has been accomplished by Mr. James Lyall of this city, as follows: Referring to Fig. 2, it will be seen that the shuttle is carried through the shed on a carriage which moves on an iron raceway, and is carried back and forth by a band which receives an alternating longitudinal motion from the large horizontal wheel seen in Fig. 1. Upon this carriage is laid the shuttle which rests on the rollers, 3, 3. These rollers revolve because they are in contact with the rollers, 2, 2, which are in turn caused to rotate by the movement of the carriage on the raceway, and impart a precisely equal motion to the rollers, 4, 4, of the shuttle. Hence, in passing over the lower threads of the shed, the shuttle produces no friction whatever, and the slightest fabric will pass between the shuttle and the carriage without injury. At the same time it is evident that the shuttle can not move off the carriage. It must move with it and retain its place firmly. Neither can it jump off, for it is held down by the cast-iron projection, W, against which the rollers, 5, 5, play in a similar manner. The upper threads of the shed pass between this projection and the rollers, 5, 5, as is seen in Fig. 3. From the fact that provision is made for producing an amount of motion in the circumferences of the wheels, 5, 5, 4, 4, 3, 3, precisely equal to the longitudinal motion of the shuttle, all friction against either the upper or lower threads of the shed is completely avoided.

Having removed these difficulties, it is obvious that we can now secure the most perfect control of the shuttle. Instead of depending upon the varying force of a blow, or the power of muscles which are liable to weary, we can carry the shuttle for any distance and at any speed. We can stop it midway, or we can increase its velocity to any desired pitch. Variations in the speed of the prime motor have no effect on it. Moreover, the angle formed by the threads of the web, as shown in dotted lines in Fig. 3, is less than in the

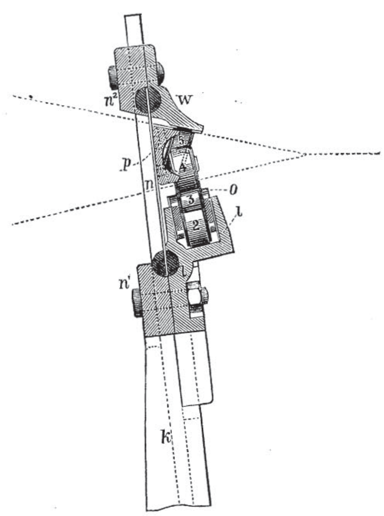

Fig. 3.

common loom, and this lessens the strain on the warp. As the shuttle is carried instead of being knocked or thrown through the warps, the width of the fabric may be extended indefinitely, and the quantity of weft which is carried may be greatly increased. At the loom warehouse of the Positive Motion Loom Company, 35 and 37 Wooster street, we have seen a loom on this principle, six yards wide, which could be operated with perfect facility by a single individual. Indeed, so perfectly automatic and reliable is the machine, that a boy or a young woman would be perfectly competent to operate it.

A point of no small consequence in this connection is the character of the selvage formed by this loom. As the tension of the weft is maintained until after the reed has operated, all looseness is avoided, and the selvage is remarkably close and fine, presenting an edge which forms a sufficiently even and delicate finish for most purposes.

This invention is one in which every person is interested, for it deals with one of the great necessaries of life.

peat which is made by working the disintegrated peat into a paste with water, forming it into bricks and drying it in the sun. In order that peat may stand the strong blast of engines and other fires, it must be rendered compact, and it has been attempted to accomplish this by means of a machine which applied to it a powerful pressure. Owing, however, to the fibrous character of the peat, it is exceedingly elastic, and the pressure is no sooner removed from its surface than it expands and becomes porous. To remedy this, it was found necessary to remove or destroy the fibrous character of the material. This was most easily accomplished by means of a cutting or grinding apparatus,

sulphuret is chemically combined with a double silicate of alumina and soda. Iron and calcium have been proved to have nothing to do with the cause of the blue color, and to be simply accidental. In the original paper, from which we condense the results, no less than ten analyses of samples of artificial ultramarine, made by different analysts, and from different makers, are given. Varrentrapp's results are, for 100 parts, as follows: Silica, 46.60; alumina, 23.30; soda, 21.46; sulphur, 1.68; potassa, 1.75; iron, 1.06; lime, 0.02; sulphuric acid, 3.08; with traces of chlorine, oxide of iron, oxygen, and an accidental trace of clay. The ingredients required for the manufacture of artificial