

T. Robjohn.
Needle Loom.

N^o 64,573.

Patented May 7. 1867.

Fig. 3.

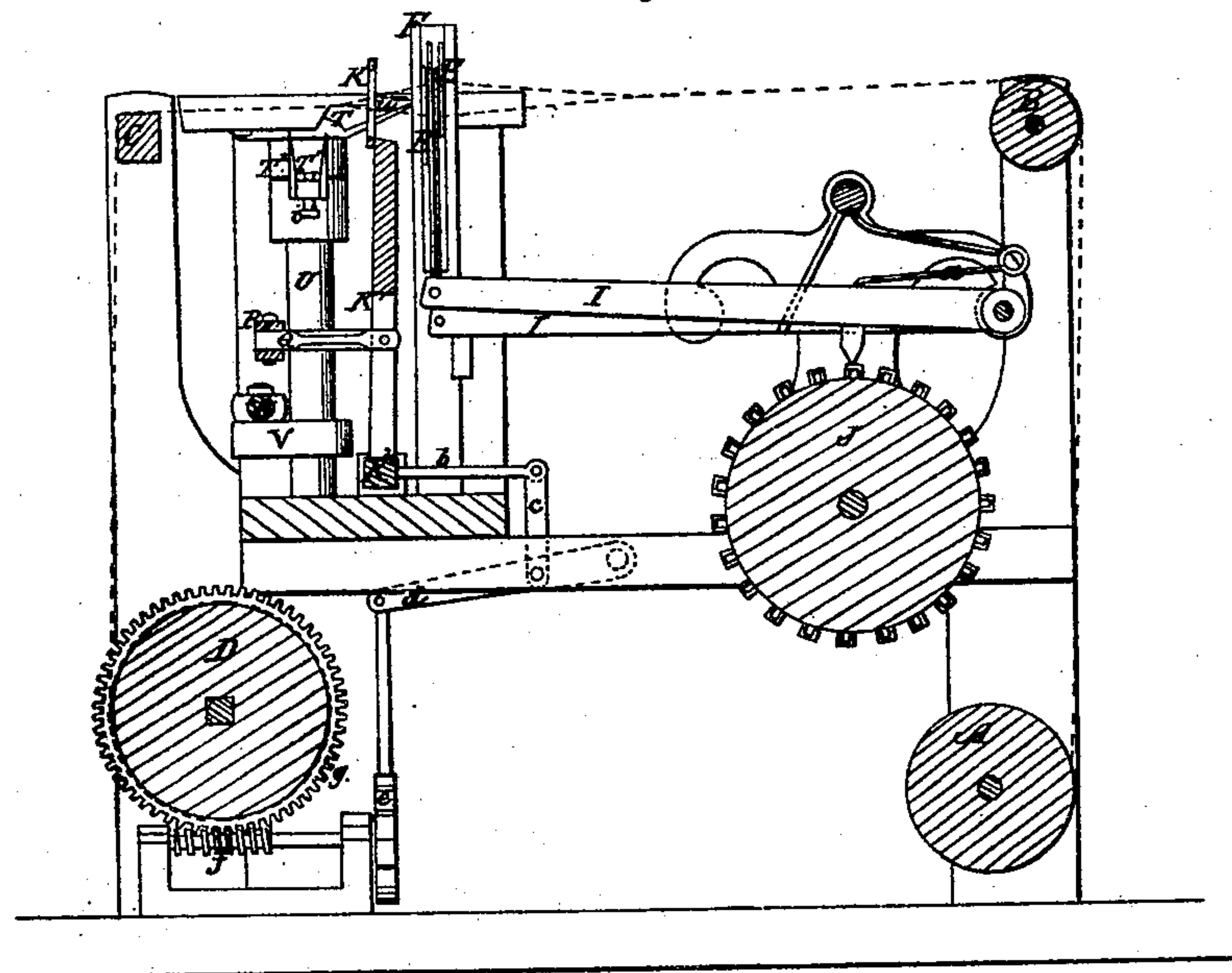


Fig. 4.

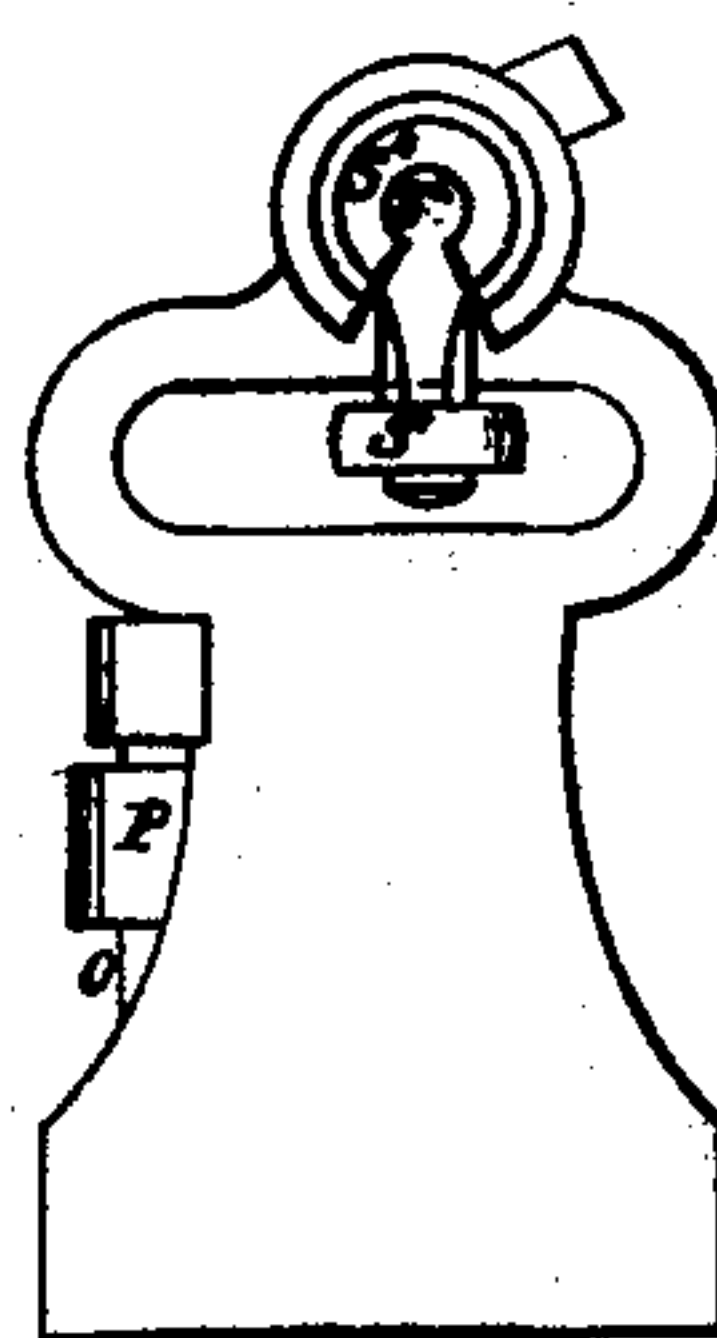


Fig. 5.

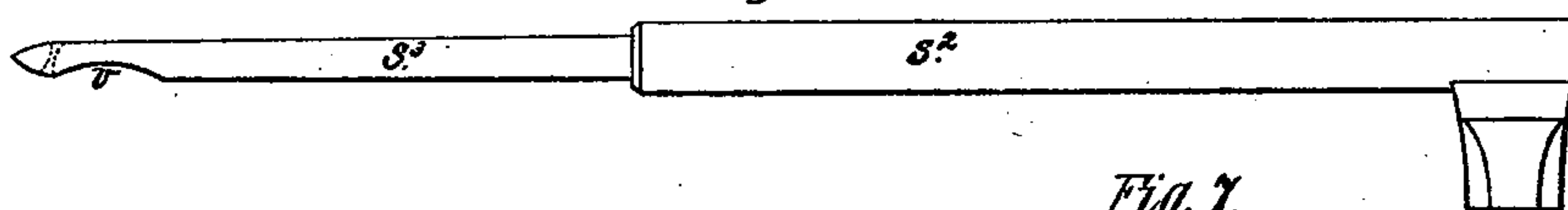


Fig. 6.

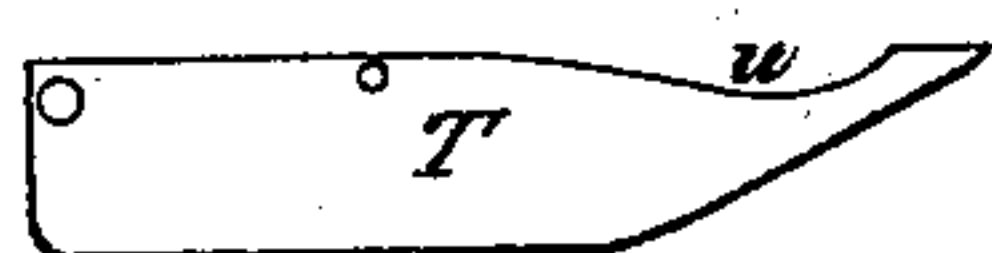
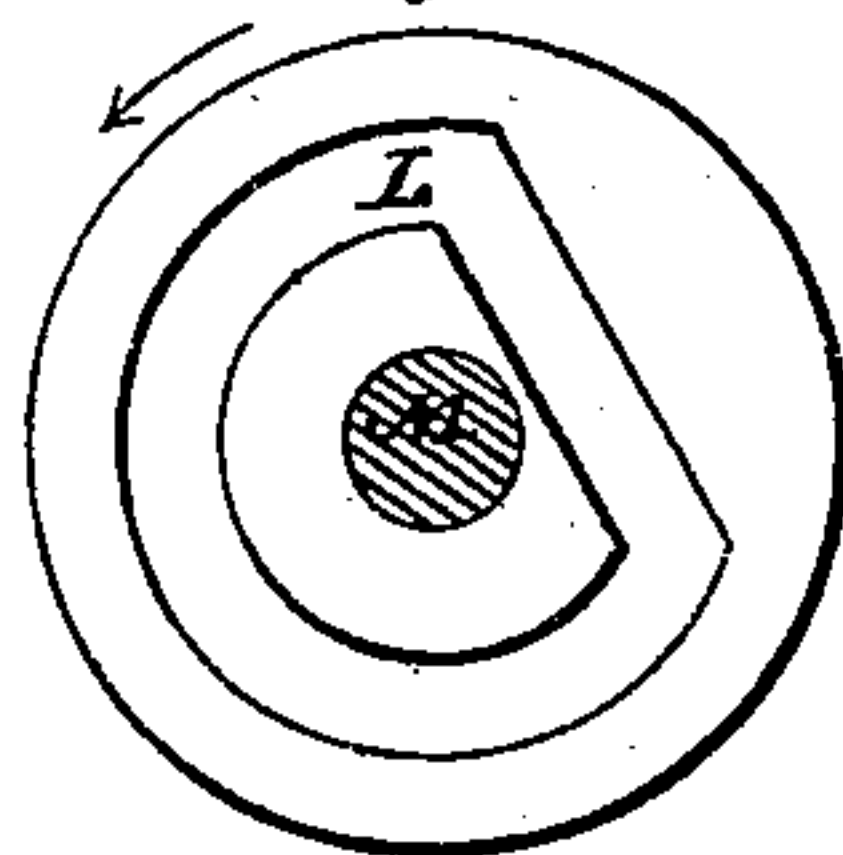


Fig. 7.



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THOMAS ROBJOHN, OF NEW YORK, N. Y., ASSIGNOR TO THE "AMERICAN NEEDLE-LOOM COMPANY."

Letters Patent No. 64,573, dated May 7, 1867.

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, THOMAS ROBJOHN, of the city, county, and State of New York, have invented a new and useful Improvement in Looms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to novel means of depositing the filling or weft within the warp, and of forming the selvage at one edge of the web. The weft-yarn or filling is taken from a bobbin, spool, or yarn-beam, arranged in a suitable position by means of a straight, eye-pointed needle, the length of which is somewhat greater than the width of the warp or web to be woven, and which is so arranged, applied, and operated as to have a longitudinal movement to and fro in a direction transverse to the warp, and properly timed in relation with the harness motion of the loom to enter the warp from one side, pass through it, and be withdrawn therefrom every time the shed is opened by the harness in the usual manner. By this movement the said needle is made to carry the weft yarn or filling double through every shed of the warp. At the opposite side of the warp to that at which the needle enters there is arranged a shuttle, such as is used in sewing machines, and which moves in the arc of a circle, in a plane parallel or thereabouts with the plane in which the closing of the sheds of the warp takes place, and the movement of which is so timed that, while the shed of the warp remains open after the passage of the weft-carrying needle through it, and before the return of the said needle commences, or immediately after the commencement of such return, the said shuttle carries a yarn through the loop formed by the doubling of the weft-yarn at the eye of the needle, and so causes the doubled weft-yarn to be retained within the warp while the needle returns. The yarn carried by the aforesaid shuttle forms the selvage yarn on that side of the warp at which the said shuttle works, and the movement of the said shuttle is so timed that it reaches its greatest distance from the warp after passing through the doubled weft at the same time as the needle completes its return movement, so that the weft-yarn and the selvage-yarn pull or are drawn one against the other in such manner as to form a tight selvage. One advantage which these devices for depositing the weft-yarn or filling within the warp and causing its retention therein, as compared with the shuttle commonly employed, consists in the provision it affords for the use of a greater length of weft-yarn or filling, particularly in looms for weaving tape, ribbon, or other narrow wares to which, on this account, the invention is especially suitable, obviating as it does the frequent stoppage of the loom for the substitution of full shuttles for the spent ones. Another advantage which I believe to result from the invention, particularly in weaving narrow wares, is the more rapid production of the woven fabric by reason of the greater rapidity at which the filling or weft-needle may be worked, as compared with the shuttle. The present invention also consists in a peculiar combination and arrangement of a weft-retractor for drawing back the slack weft from the warp, and in a peculiar arrangement of a shaft and its adjuncts for operating both the weft-carrying needle and the shuttle which carries the selvage-yarn. The invention is illustrated by the accompanying drawings, in which—

Figure 1 is a plan of a loom with the invention applied.

Figure 2 is a front elevation of the same with the breast-beam and front of the framing removed to expose the filling mechanism, which is partly in section, to view.

Figure 3 is a vertical section of the same parallel with the warp.

Figure 4 is a side view of the filling device.

Figure 5 is a longitudinal view of the needle and the stock in which it is held.

Figure 6 is a side view of the shuttle.

Figure 7 is a plan of the cam by which the reed is operated.

Similar letters of reference indicate corresponding parts in the several figures.

The loom is represented as having the warp-beam A, whip-roll B, breast-beam C, take-up roll D, and harness E E, arranged substantially in the usual manner, but these parts may be arranged in any other suitable way. The heddle-frames E E are represented as working in fixed upright guides F F, erected upon the framing G, and operated by treadles I I, the upward movements of which are produced by means of a rotating studded barrel, J, and their downward movements by springs a, fig. 3, but they may be applied and operated in any other known or suitable manner, their number being such as may be necessary for plain, twilled, or other weaving. The

warp is represented in red color. The reed K is arranged in a vibrating frame K¹, attached to a rock-shaft K², and substantially like the lay of an ordinary loom, but having no race-board. The reed-frame K, instead of having a regular reciprocating motion like the lay of an ordinary loom, requires to have its motion produced more quickly to give time for the needle to pass into and be withdrawn from the warp, and to this end it is represented as worked by means of a cam, L, on the main shaft M of the loom, which is shown in an upright position. This cam, of which fig. 7 is a plan view, has its groove, by which the reed-frame is operated, of such form that it produces the forward and backward movement of the lay during a small portion of each of its revolutions, one of which takes place for every opening and crossing of the shed of the warp to beat up the filling and afterward return to its normal position against or in proximity to the harness. Motion is or may be communicated from the cam L to the vibrating frame K¹ of the reed by means of a lever, N, attached to a rock-shaft, O, and fitting at its opposite end by a projecting pin or roller in the groove of said cam, and serving, by its vibration of the rock-shaft O, to operate a lever, P, attached thereto and linked by a rod, Q, to the reed-frame K¹. The same lever P may also answer to work the treadles I I, that is, to give them their upward movement during the beating up of the reed, by means of a rod, R, constructed to bite against or on a ratchet-wheel, J', made fast to the shaft of the studded barrel J, which is prevented from back action by a spring resting thereon, as usual in ratchet-feeds or actions. The manner of hanging and guiding the treadles, also the construction of the harness, being the same as in ordinary looms, or not necessarily different, need no minute reference here. Attached to the rock-shaft K² of the reed-frame is an arm, b, (see more particularly fig. 3,) which is connected by a rod, c, to a lever, d, that has a pawl formation at its lower end, which, as the reed beats back, acts against a ratchet-wheel, e, the shaft of which carries a screw, f, gearing into a worm-wheel, g, fast to the take-up roll D, to give the necessary take-up action thereto; or said roll may be differently operated. The main shaft M may also be made to drive, in a direct manner, the needle carrying the weft-yarn and shuttle with its interlacing or locking yarn as follows: S is a crank fast to the main shaft, and connected by a rod, S¹, with a needle-stock or holder, S², which accordingly has a reciprocating motion given it to project the eye-pointed needle S³, with its weft-yarn, through the shed of the warp, and in due time to retire it therefrom and return it to its original or starting position within a long sleeve, S⁴, which acts as a guide to the needle-stock. T is the shuttle, or its equivalent, on the opposite side of the warp to that at which the needle enters. This shuttle carries a reel, h, the yarn, s, from which passes out through an eye in the shell of the shuttle that is seated loose in its carrier T' to permit of the shuttle passing with its yarn through the loop of the weft-yarn, the same as if said loop were slipped or drawn over the shuttle after the manner of certain well-known interlocking thread devices in sewing machines. The shuttle-carrier T' may be of an elastic character, hinged in its rear to a reciprocating driver, T², and adjustable in front thereof from below by a set-screw, i, to facilitate the passage of the shuttle through the loop of the weft-yarn. To give to the driver T² its necessary reciprocating action it may be secured to a shaft, U, carrying an arm, V, which is operated by a rod, W, through an eccentric, X, on the main shaft M. The weft-yarn is wound round a yarn-beam, spool, or bobbin, Y, and from thence run through a guide, j, on to or over a friction device or runner, k, regulated by a spring, l, and screw-nut, m, to throw more or less tension on the yarn accordingly as the running friction of said device is increased or diminished, and from whence said yarn may be entered through guides N O, to and through an eye, p, of a slack-controller or weft-retractor, Z, and from thence to and through the eye of the needle S³. This weft-retractor Z may be of the form and construction represented in figs. 1 and 2, where it is shown as made of wire twisted so as to rest in a swinging and loose manner round a fixed pin, q, and terminating in two arms, the longer one of which has the eye p at its end, and the shorter arm r made to rest over a slot in the needle-holding guide S⁴, and when thrown fully back to slightly lock in a notch or depression in or on said guide so as to restrain the weft-retractor from starting in its action till the pull on it of the weft-yarn, as hereinafter explained, causes it to move toward the warp. Attached to the needle or needle-holder is a loop or arm, t, that works in and out of the slot in the needle-holding guide projecting above it, and that in the back stroke of the needle strikes the short arm r of the retractor Z and carries back the latter with it. Motion being communicated to the main shaft M, the warp, filling, and interlacing yarns being first properly arranged and connected with their respective devices, and the shed being open by the operation of the harness, the eye-pointed needle S³ moves forward toward the warp, while, and simultaneously or thereabouts, the shuttle-carrier with its shuttle T travels backward, the needle in such movement drawing its supply of weft-yarn through the eye p of the weft-retractor Z, which latter, by its short arm resting in the notch on the sleeve S, remains stationary during the early portion of the needle's forward motion, but, as the front end of the needle passes with its double line of filling through the sheds of the warp and beyond the latter, said needle, pulling on the weft-yarn, detaches the short arm of the retractor Z from its holding notch and draws said retractor forward, taking up yarn from the bobbin Y, which yarn is controlled in its passage to the needle by the tension device k that may be of any suitable construction. During this movement of the needle through the warp the shuttle continues to retire, but commences to advance before the needle finishes its forward stroke, or before it commences its return one, or thereabouts, in order that the shuttle may enter between the needle and weft-yarn while the latter is taut, that is, before the loop is formed by the retraction of the needle. This obviates all risk of the shuttle not entering the loop, which being loose is apt to twist, and to accomplish it the under forward portion of the needle is made with a recess, v, to admit of the shuttle-point entering to interlace with the weft-yarn before slacking, while the upper forward portion of the shuttle is provided with a recess, u, to allow of the free backward passage of the point of the needle, so enabling the needle and shuttle to work in closer proximity. The shuttle in further advancing passes, with its interlacing yarn s, through the loop of the weft-yarn left by the retiring needle. After the shuttle has cleared itself of the filling by entirely passing through the loop of the latter it continues to advance and the needle to retire, the latter, immediately of its return, striking, by its arm, t, the short arm r of the weft-

retractor and forcing back the latter so as to tighten up the slack, and, in connection with or by the retiring action of the needle, as the latter completes its return, which is simultaneous or thereabouts with the shuttle completing its advance stroke, causing the doubled weft-yarn on the selvedge side of the warp to pull on the interlacing yarns which not only serves to retain the doubled portion of the weft-yarn from being drawn out of the warp by the return of the needle, but also forms the selvedge yarn, which, as the shuttle completes its advance, draws on or against the weft-yarn simultaneously with the pulling of the latter on the interlacing yarn, and so makes tight the lock of said yarns against and while the reed beats up to form the web, said reed beating up during or at the close of the return stroke of the needle and retiring before the needle again commences to make its advance, or during the early portion thereof. As in this, my invention, the needle draws its supply from an outside bobbin, or its equivalent, a much larger amount of weft-yarn can be worked up without stopping the loom than where the filling is carried by a shuttle that soon spending itself renders necessary the frequent substitution of full shuttles. The needle, too, in most or all cases may be worked quicker than a shuttle carrying the filling, while the interlocking of the interlacing yarn with the filling in the manner described gives a tight straight selvedge to the warp. Moreover, the short action of the reed, as compared with lay motions generally, reduces wear on the warp-yarns.

This improvement is not restricted to weaving narrow ware, as the same may be used for producing webs of considerable width; likewise the loom may be constructed to simultaneously weave several webs, as in ordinary narrow-ware looms.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a needle for carrying the weft-thread through the warp in a loom, a shuttle so applied and actuated as to operate in an arc of a circle parallel with the plane of the warp, that in approaching to enter the loop of the weft-yarn it moves nearly parallel with and close to the selvedge of the web being woven and afterward gradually moves away from the warp, so that in completing its movement at the same time as the needle completes its retiring movement it pulls its yarn or thread tight in a direction transverse to the warp, substantially as and for the purpose herein specified.

2. The weft-retractor Z applied to operate on the weft, substantially as and for the purpose herein specified.

3. The arrangement of the upright shaft M and its crank and eccentric in relation with the warp, whereby they work the needle-holder and shuttle-carrier at opposite sides of the warp by direct rod connections, substantially as herein specified.

THOS. ROBJOHN.

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