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J. W. WHITE.

LOOM FOR WEAVING WIRE FABRICS.

No. 547,049. Patented Oct. 1, 1895.

Fig. 1.

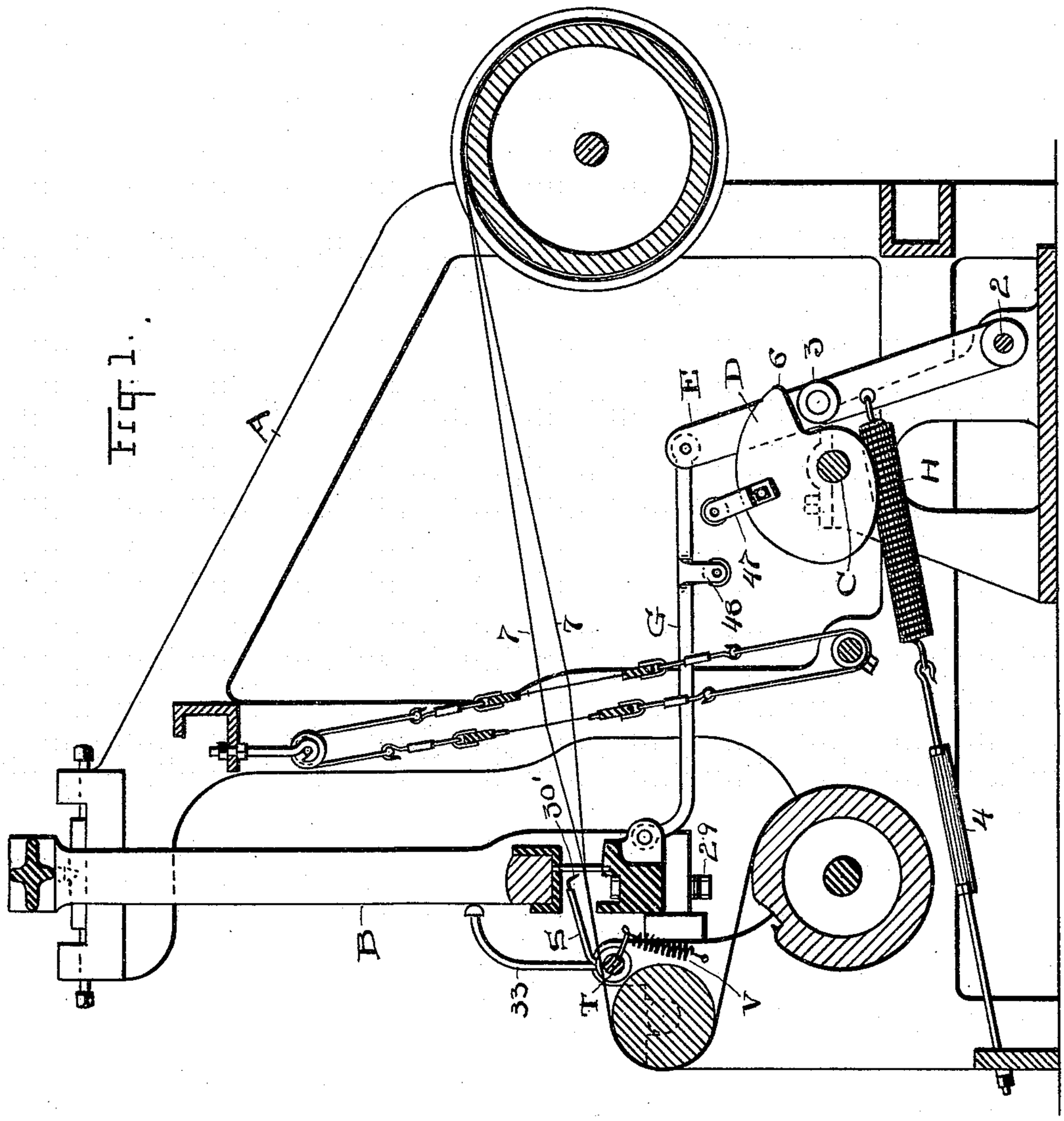

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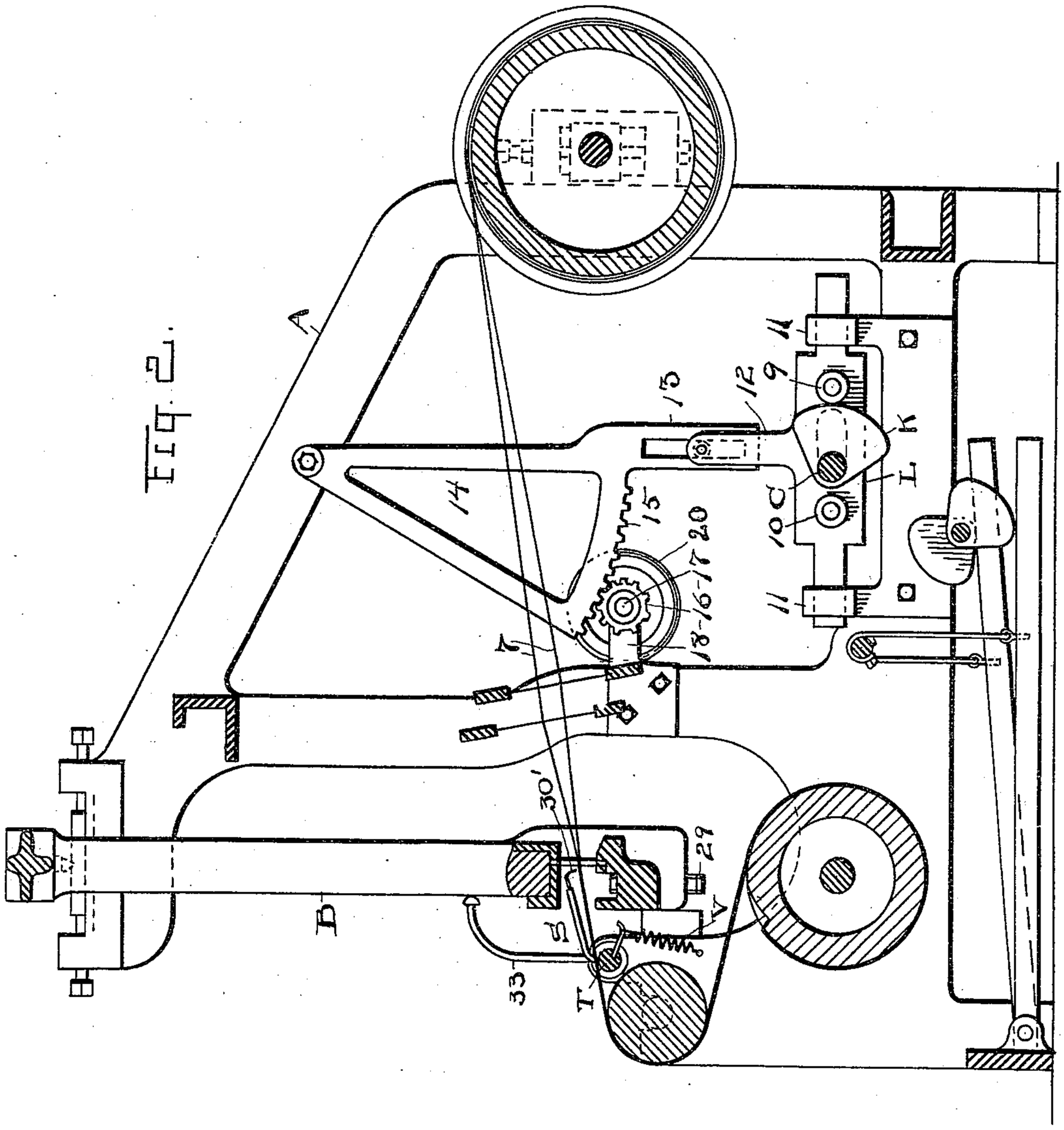
FIG. 2.



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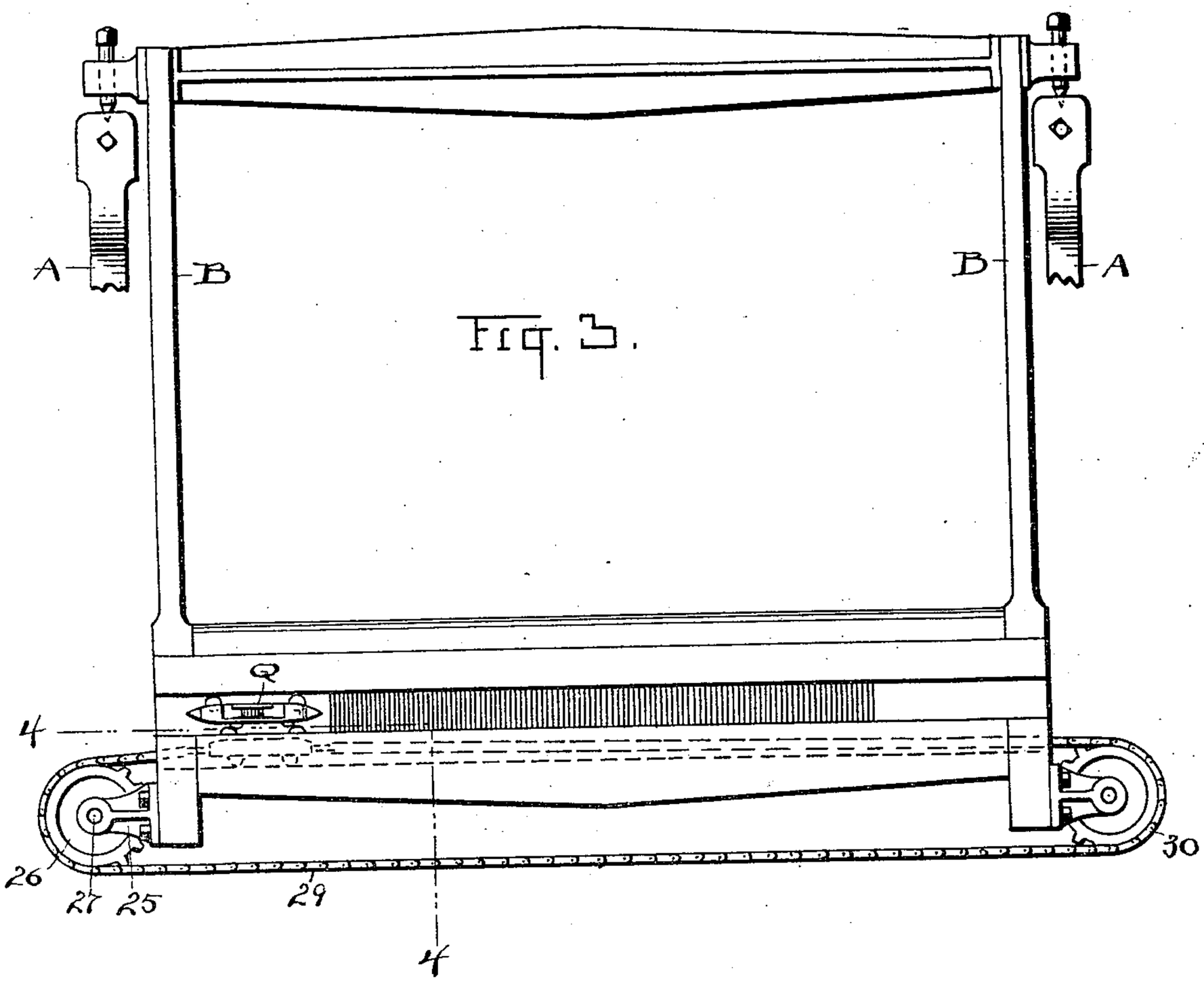

FIG. 3.

FIG. 5.

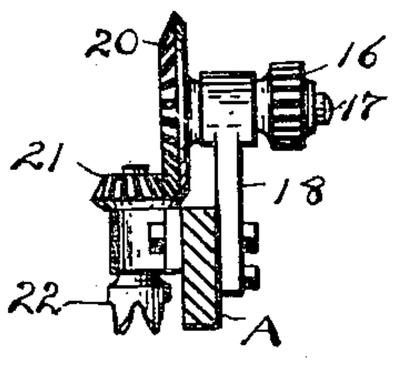

FIG. 4.

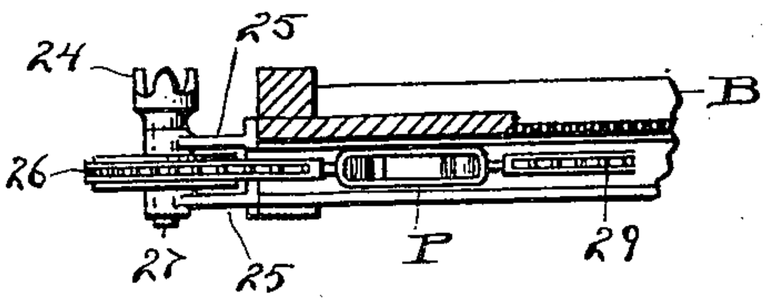

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Fig. 6

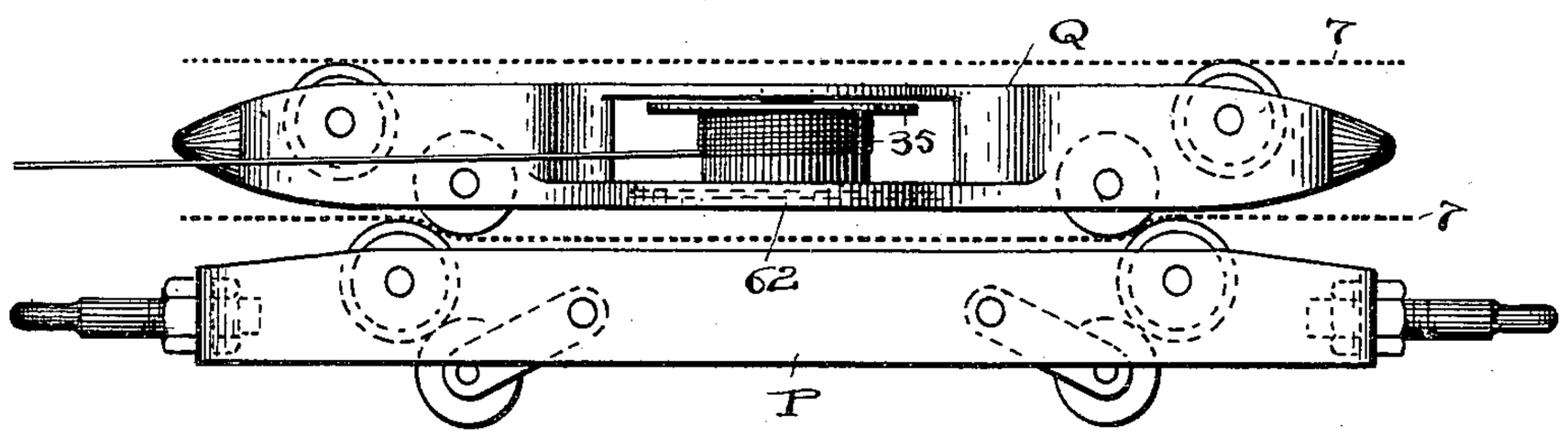


Fig. 7.

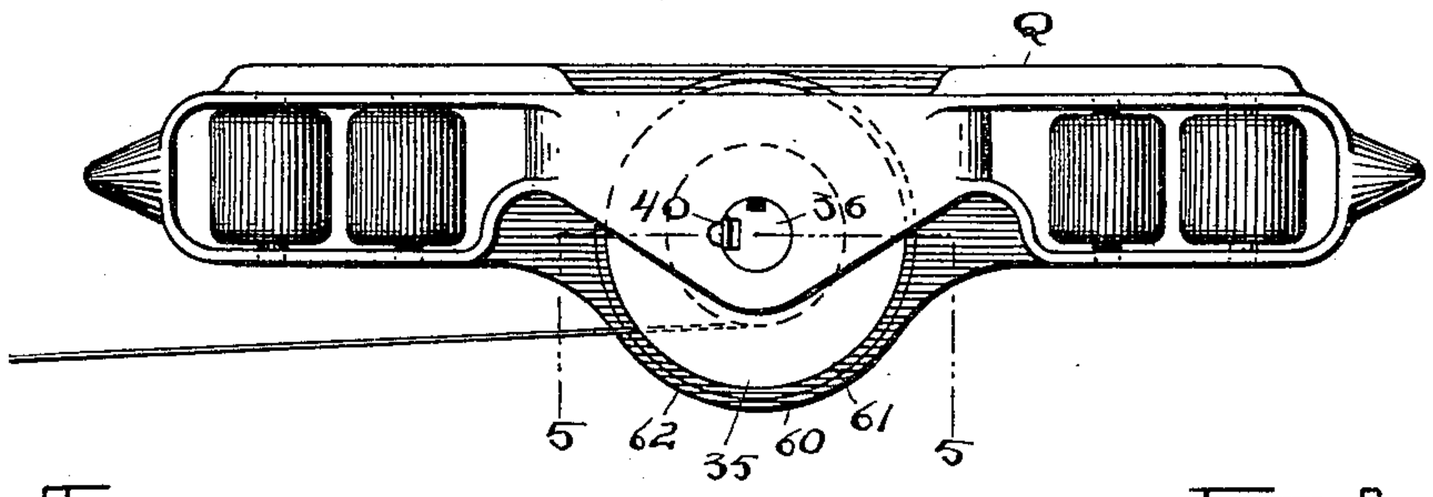


Fig. 9.

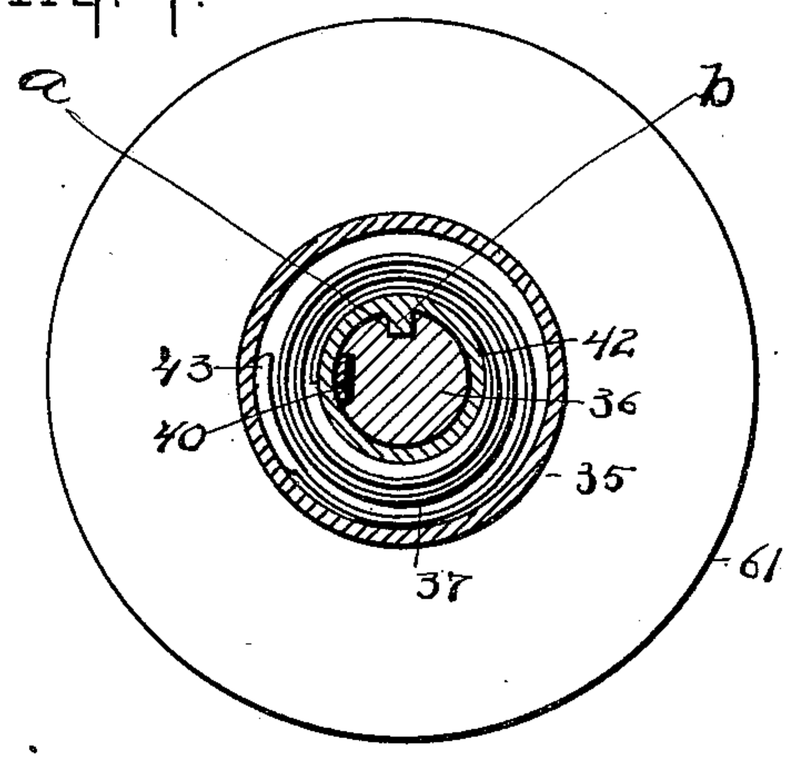
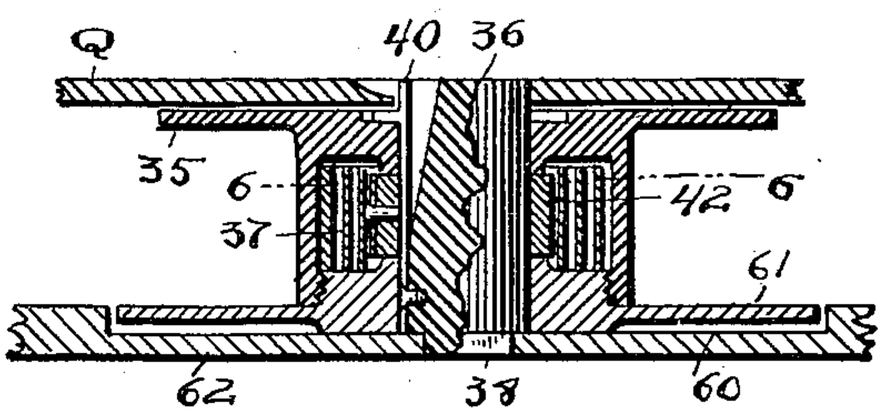


Fig. 8.



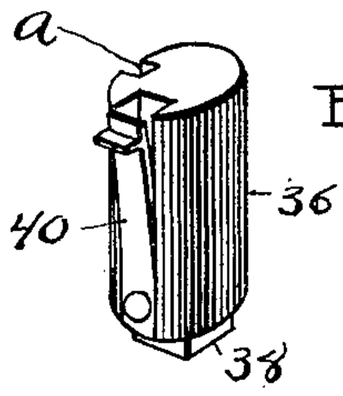


Fig. 10.

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UNITED STATES PATENT OFFICE.

JOSEPH W. WHITE, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO WASHINGTON S. TYLER, OF SAME PLACE.

LOOM FOR WEAVING WIRE FABRICS.

SPECIFICATION forming part of Letters Patent No. 547,049, dated October 1, 1895.

Application filed June 4, 1894. Serial No. 513,426. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. WHITE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Looms for Weaving Wire Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to looms to weave wire for paper-making purposes.

The invention is embodied in the accompanying drawings, in which—

Figure 1 is a vertical substantially central sectional elevation of a loom having my improvements. Fig. 2 likewise is a vertical sectional elevation thereof, but taken near one side of the loom and showing operating mechanism not disclosed in Fig. 1, as hereinafter more fully described. Fig. 3 is a vertical elevation of the batten or lay and certain of its attached parts, and also of a portion of the top of the frame of each side upon which the batten is pivoted. Fig. 4 is a plan view in section of a part of the batten and mechanism at one side and taken substantially on line 4 4, Fig. 3. Fig. 5 is a plan view of the gear mechanism and parts on the main frame and which lie immediately behind the sprocket-wheel at the left in Fig. 3, and hence not disclosed in that view. Fig. 6 is an elevation of the shuttle and the shuttle carrier or driver, and Fig. 7 is a plan view of the shuttle. Fig. 8 is a vertical sectional elevation substantially on line 5 5, Fig. 7. Fig. 9 is a cross-section on a line corresponding substantially to 6 6, Fig. 8. Fig. 10 is a perspective view of the spindle in the shuttle.

Referring now to Figs. 1 and 2, we have the main frame A, which does not differ from the ordinary frame in looms of this kind, and the batten or lay B, which likewise is of any approved pattern or construction and is swung from pivots at its top and ends and upon the top of the main frame A. The operations of the batten are wholly mechanical; but they are designed to be the same in practical effect substantially as if the batten were operated by hand in the old way. To effect these operations I have provided a simple mechanism, comprising first of all the main shaft C, upon which is fixed a cam D. Then at the rear of the said shaft and the cam I have arranged a lever E, pivoted on the base of the machine at 2 and extending upward above the cam somewhat and substantially in vertical plane thereto and provided at one side thereof with a roller or sheave 3, which the cam D is adapted to engage. The top of said lever E is connected with the batten by means of a bar or rod G, and a retracting-spring H is fixed to said lever about midway of its length beneath said shaft C and has an adjustable rod connection 4 at its opposite end, which rod in turn is fixed to the main frame. As the cam D is rotated by the shaft C, it is brought around and caused to engage with the shaft or roller 3 and to press the lever E back to the extent of the throw of the cam. The extent of this throw or movement is sufficient at the top of said lever to give the batten its desired movement to the rear, the same as if it were carried back by hand the usual distance. The cam, however, has an abrupt shoulder or break at 6, which enables all the parts to drop forward as far as the batten is required to swing to make the beat up and without any of the parts coming in contact with other parts so as to disturb this forward action. In addition to the release which the cam gives to the lever E by the abrupt break 6 in the edge of the cam, the spring H exercises a tension in the direction of the swing of the batten, so that in addition to the momentum or force which the batten itself obtains in swinging forward it is facilitated in this direction by the spring H. This spring is a long cylindrical wire coil, as here shown, and has considerable strength and resiliency. It follows by reason of the construction and relation of these parts, as shown and described, that the moment that the first stroke of the batten has been made there will be a considerable rebound, in which the spring H participates, if it does not facilitate the same, and as such rebound occurs from the first beat up of the batten the tension of the spring is at once brought into action again and a second stiff blow of the batten is delivered.

Referring now especially to Fig. 2, we see the power mechanism for propelling the shut-

tle from side to side of the loom. Here we have another cam K, fixed upon the power-shaft C and adapted to work between two rollers or sheaves 9 and 10 on a sliding part L, supported at its ends in posts 11 and having its extremities reduced and constructed to pass through openings in said posts. This part L has a vertical arm 12, and said arm has antifriction connection with a slotted arm 13 upon the segment-frame 14. This segment-frame is suspended from the main frame A at its top and has a toothed segment 15, adapted to mesh with a pinion 16 (seen likewise in Fig. 5) and supported upon a short shaft 17 in a bearing-bracket 18, fixed upon the main frame A. Upon the other end of said shaft 17 is a miter-wheel 20, which meshes with a miter-pinion 21 on a short shaft at right angles to the shaft 17 and having a pointed beveled coupling 22 at its opposite end from the miter-pinion 21. Now, returning to Fig. 2, we find that the sliding bar L is carried to the extent of its movement and to the extent of the throw of the cam K to the rear, and hence the parts will remain in that position until they are changed by the action of the cam operating upon the opposite sheave or roller 10. However, this action will not begin immediately after the cam has left the roller 9; but there will be a moment of intervening time before moving engagement is made with the roller 10. When this engagement does occur, the arm 12, of course, moves with the bar L, and correspondingly moves the segment 15 and rotates the pinion 16. The rotation of this pinion is intermittent and is designed to occur only when the shuttle is to be propelled from one side to the other. Hence the rotation occurs when the batten has been swung to the rear by the action of cam D on lever E, as hereinbefore described, and the shuttle Q and its carrier P are at one end of the shuttle. In the engagement here shown said parts are at the left of the machine, as seen in Fig. 3, and in position to be propelled to the right, and the mechanisms hereinbefore described and connected with said described parts are all in a corresponding relation to the shuttle and its carrier. Now, assuming that the rotation of pinion 16 has begun by and through the action of cam K and the sliding part L and that the batten is back in position to make a stroke, it will also be found at this time that the parts are in position to have the shuttle carried to the right. As this occurs, the coupling 24, Fig. 4, supported upon the bracket 25 upon the batten, is brought into engagement with the coupling 22, and the sprocket-wheel 26 on the short shaft 27, which carries the coupling 24, is rotated, so as to propel the shuttle-carrier P and its shuttle Q to the right by means of the endless sprocket-chain 29, which runs over the sprocket-wheel 26 and at one side of the batten and the wheel 30 at the other side, the said chain of course being connected with the carrier P, as clearly seen in Fig. 4.

To provide a stop at the outer warp-thread for the pull of the weft-thread I employ a stop S, made of stiff wire, having a right-angled tapering point 30′, adapted to take its place by the side of the outer warp-thread at the moment that the shuttle is ready to traverse the warp from that side to the opposite side. This stop or pick is movable up and down in respect to the work according as the occasion occurs for its use and the relation thereto of its operating parts. The means for operating the said stop and alternating its position consists, primarily, in a shaft T, extending across the loom and having a stop S, fixed thereto at each end in the relation already described. This shaft, rod, or bar T is adapted to rotate at least sufficiently to effect the desired movements of the stops S and is moved in direction to raise the stops out of use by the batten B, engaging curved arm 33, fixed on said shaft when it swings back to beat up the weft. The said stops will then remain raised until the batten is carried back again to permit another throw of the shuttle, when the shaft T is left free to rotate in the opposite direction and the spring V, fixed thereto, turns into position. As this occurs, the stops S are brought down into engaging position. Then, as the shuttle is caused to fly in the opposite side, the weft-thread will pass on the outside of hook or point 30′, and the bend of the wire will be around this point. Then immediately upon the shuttle reaching its destination, the batten will return and lift the stop S out of engagement with the weft and the beat-up will occur as usual. Both stops S are operated together and alike and serve the same purpose. The rotation of shaft T is limited, so that the stops S will always take the right place and go no farther down than the work requires.

The shuttle Q is adapted to operate with the mechanism hereinbefore described. As already stated, there is a tendency in the spool, by reason of its momentum of rotation, to continue to turn when the shuttle has reached the end of the race and thus to unwind a lot of wire, which is apt to become tangled when the return throw is made. This tendency and objection has been wholly remedied by my improvements, and now when the shuttle stops the spool stops also, and there is no loose wire to disturb or impede the operations of the machine. The means whereby this result is accomplished consist in the construction of the recessed shuttle-casing Q, the spool 35 therein, the spindle 36 for the spool, and the spring 37 within the hub and about the spindle 36. The spindle has an augular extremity 38, which sets in a like hole or opening in the shuttle, so that the spindle cannot rotate, and a spring-catch 40 locks the spindle in the spool, the spindle being grooved longitudinally to permit the depressing of said spring to remove the spindle. The spool is made in two parts screwed together, and the hub thereof has an internal annular cham-

ber adapted to receive the spring 37. One end of this spring is fixed to a collar or sleeve 42, which fits over the spindle within said chamber, and the spindle is splined, as seen at *a*, Figs. 9 and 10, to receive a projection or rib *b*, Fig. 9, on the inside of said collar, whereby the collar is prevented from turning, but leaving the spindle free to be removed and inserted, as occasion requires. The other end of the spring 37 is seen at 43, Fig. 9, bearing against the inside of the hub of the spool. The engagement of these parts is exclusively frictional, and the pressure by said spring against the hub depends on the strength of the spring. The said pressure is designed to be just enough to prevent any slack wire being paid out at any time by the spool and to keep the wire taut or at least slightly stretched at all times. The spool will thus be left free to rotate and the hub thereof will turn with the spring bearing against its inside and operating as a brake. This will not prevent a perfectly free action in paying out the wire thread; but it will prevent unwinding of the wire after the shuttle stops, and thus serve the purpose for which the spring is intended. The spool is removed by first removing the spindle and is replaced by putting the spool into the shuttle and then inserting the spindle. So, also, might the means for conveying and propelling the shuttle-carrier be modified and remain substantially the same invention.

Referring to Fig. 8, it will be seen that the lower inside surface of the horizontal opening through the shuttle-casing for the spool is recessed at 60 to substantially the depth of the flange 61 of the spool, so as to prevent the wire from working downward, getting wound and entangled about the spindle or center pin. It will be noticed in Fig. 7 that the lower side 62 of the shuttle-casing having recess 60 extends out beyond the flange 61 of the spool all around, and the recess is coextensive with the flange at all exposed points.

Having thus described my invention, what I claim is—

1. The mechanism for propelling the shuttle and its carrier, consisting in the shuttle and the carrier, an endless chain connected with said carrier over wheels at the ends of the batten, and a toothed coupling on the batten connected with one of said wheels, in combination with a toothed coupling on the main frame to engage with the coupling on the batten, and means to operate the said coupling on the main frame, substantially as set forth.

2. The main frame, the coupling-actuating toothed segment pivoted on said frame, a cam and mechanism to vibrate said segment and a pinion and gear mechanism connecting the segment and coupling, in combination with the batten and a coupling at one end thereof to engage with the coupling on the main frame, and the shuttle and carrier and endless connection operated by said couplings, substantially as set forth.

3. A recessed shuttle casing, a removable spool having an internal chamber in said recess in the shuttle, a removable spindle through said shuttle and spool and locked in the shuttle to prevent rotation, the collar engaging said spindle and a flat coiled spring confined within said spool and fixed at one end to said collar on said spindle and the other end bearing frictionally against the inside of the spool, and the said collar, all said parts in combination, substantially as set forth.

4. The shuttle casing, in connection with a spool formed in two parts and having an intermediate annular chamber within its hub, a non-rotatable spindle around which the spool revolves, a collar located in the said chamber, and engaging the said spindle, a flat coiled spring also located in said chamber, one end of the spring being attached to said collar and the other end bearing frictionally against the inside of the spool chamber, substantially as described.

Witness my hand to the foregoing specification this 14th day of May, 1894.

JOSEPH W. WHITE.

Witnesses:
S. Q. KERRNIST,
H. T. FISHER.