Sheet 1 - 4 Sheets.

Garsed & Dean.
Yarn Warping Mach.

No. 25,501.

Patented Sept. 20, 1859.

Fig. 1.

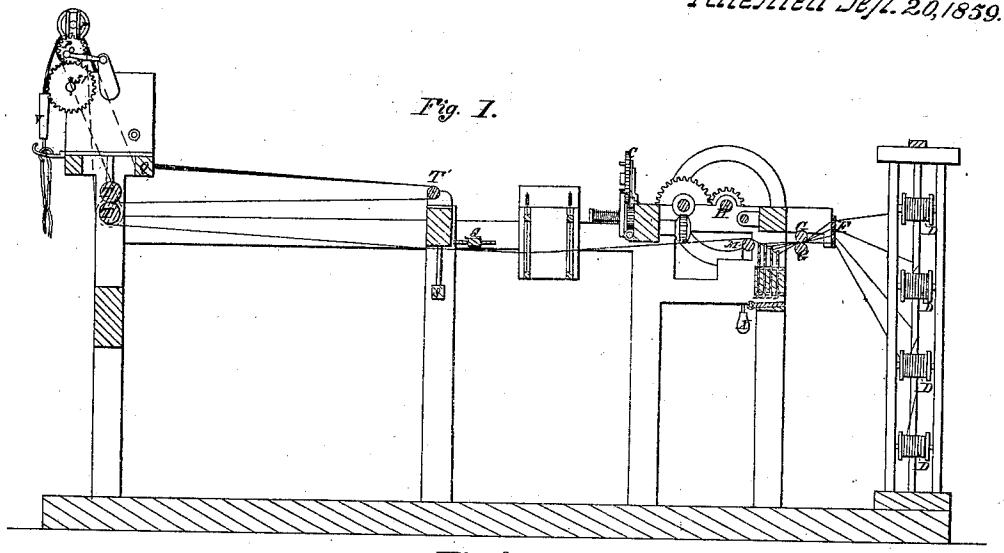

Fig. 2.

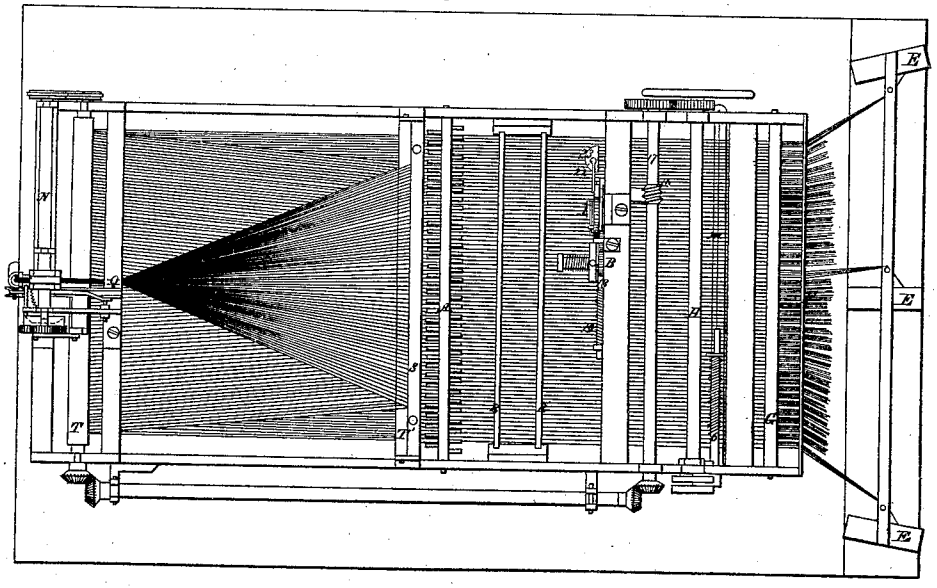

Fig. 3.

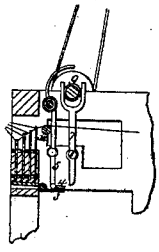

Fig. 4.

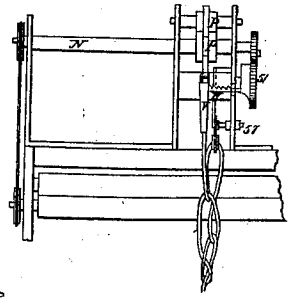

Fig. 5.

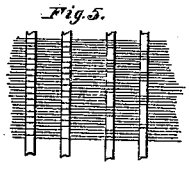

Fig. 6.

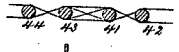

Fig. 7.

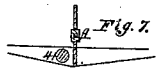

Fig. 8.

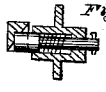

Fig. 9.

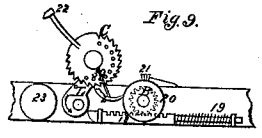

Fig. 10.

Fig. 11.

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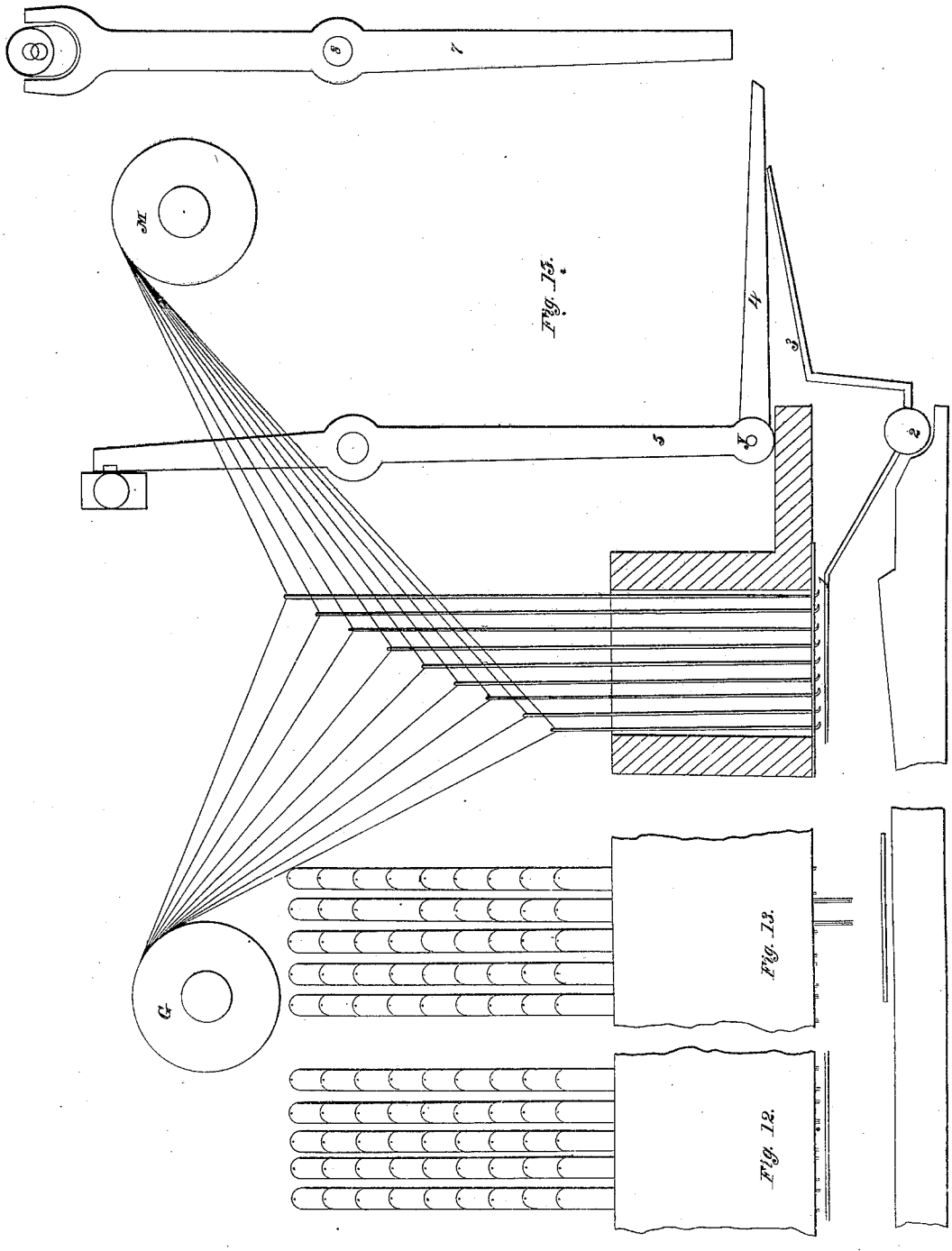

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Fig. 3.

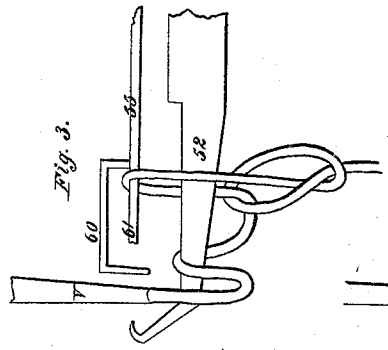


Fig. 6.

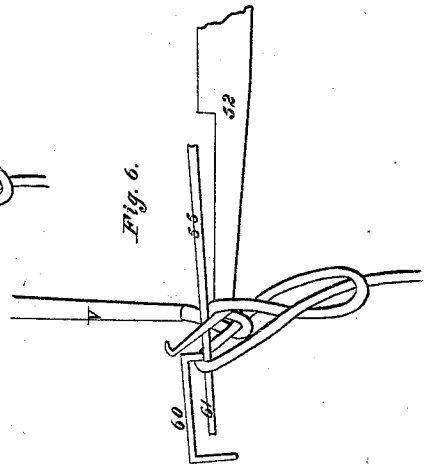


Fig. 2.

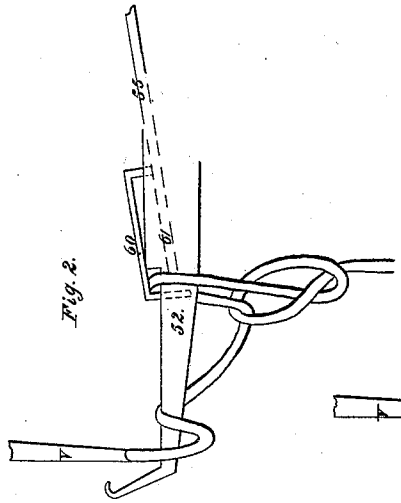


Fig. 5.

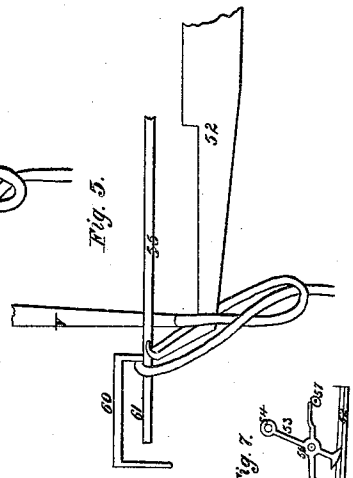


Fig. 7.

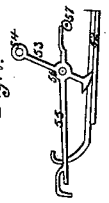


Fig. 1.

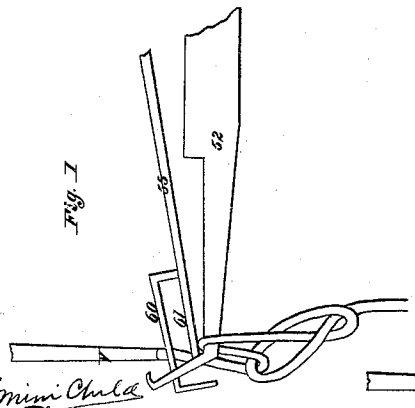
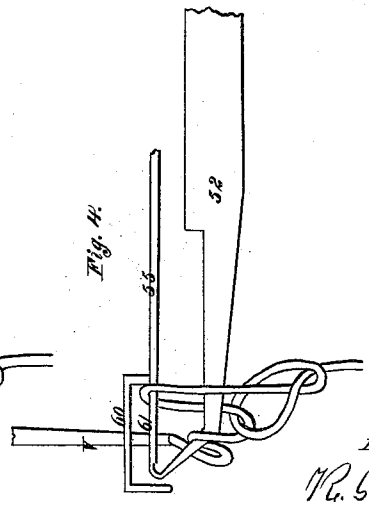


Fig. 4.



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Sheet 4 - 4 Sheets.

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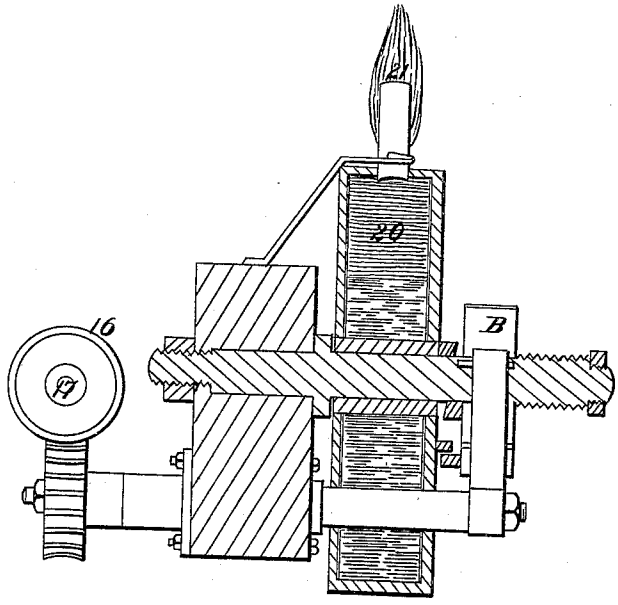

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UNITED STATES PATENT OFFICE.

RICHARD GARSED AND CLAYTON DENN, OF PHILADELPHIA, PENNSYLVANIA.

MACHINERY FOR WARPING YARN.

Specification of Letters Patent No. 25,501, dated September 20, 1859.

To all whom it may concern:

Be it known that we, RICHARD GARSED and CLAYTON DENN, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Machine for Warping Yarn, and do declare the following to be a full and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Plate 1, represents several views of the machine and different parts thereof. Plate 2, represents the arrangement for the stop-motion. Plate 3, represents the looping arrangement. Plate 4, represents a cross-section of the cylinder 20.

Our improvement relates to machinery for drawing the yarn from the spools and forming it into a warp or chain preparatory to sizing and beaming.

Figure 1, Plate 1, is a side view of the machine. Fig. 2, is a top view of the same. Fig. 3, is a view of the arrangement for the stop-motion. Fig. 4, is a view of the linking arrangement. Figs. 5 and 6, are views of the warp after the leas have been taken. Fig. 7, is a view of a cross-section of the bar A, detached and in an upright position. Fig. 8, is a view of the pin 57, detached. Fig. 9, is a view of the marking and registering apparatus. Fig. 10, is a view of the pinion B, with a portion of the rack 18. Fig. 11, is a view of the spring or the back of the perforated ratchet index C.

Our machine consists of a series of spools D, D, D, D, etc., arranged in a suitable stand, as shown in Fig. 1, Plate 1, containing the yarn. These may be arranged on a series of upright stands placed at one end of the machine, as shown at E, E, E, Fig. 2, Plate 1.

F, in Figs. 1, and 2, Plate 1, is a plate perforated with holes through which the yarn passes as it comes to the rollers G, G, from the spools D, D, D, D. The object of this plate is to prevent the tangling of the threads, by keeping them separated. These rollers G, G, are for the purpose of holding the yarn at a certain height, and preventing the twist of the yarn from running from one part to another.

H, in Figs. 1, and 2, Plate 1, is the main shaft of the machine.

The next portion of the machine is what we denominate the stop-motion. The arrangement of the stop-motion is shown in Fig. 3, Plate 1, and also enlarged in Plate 2.

The same letters of reference in the two representations refer to the same parts.

In Plate 2, Fig. 12, is a front view of the drop-wires, all in their proper places, as they exist while the machine is running. Fig. 13, is a view of the same, but showing one thread broken and the corresponding drop-wire having fallen. Fig. 14, is a view of a single drop-wire detached. Fig. 15, is an end view of the stop-motion arrangement. This arrangement consists of a finely balanced platform 1, moving upon its center 2, one end of this platform is immediately beneath the drop-wires, while a lever 3, is attached to one side of the other end. 4, is a lever, one end of which rests upon the lever 3, and the other end is attached to the lower end of the lever 5, by a fulcrum at *y*, on which it plays loosely. The lever 5 is supported at its center upon a pivot. 6, Fig. 2, Plate 1, is a sliding rod, acted upon by a spring, which keeps it constantly pushed outward. Upon its outer extremity is a guide, through which the pulley-band passes. This is so arranged that while the rod 6 is kept pressed outward, the band will be over the outer pulley, which is a loose pulley, and when the rod 6 is pulled inward, the band will be pulled upon the tight pulley, and thereby move the machinery. 7, Fig. 15, Plate 2, is a lever fixed upon a pivot 8, and kept vibrating by means of the eccentric 9 at its upper end. The drop-wires, of the form seen in Fig. 14, plate 2, are arranged in rows, as seen in Figs. 12, 13, and 15, Plate 2, in such a manner that the wires of one row will be slightly above the wires in the preceding row.

The machine is started by pulling the rod 6 back by means of the handle X, thus throwing the band over the tight pulley. The rod 6 is retained in this position by the upper extremity of the rod 5 catching in a small notch in the rod 6.

The yarn being drawn from the spools D, D, D, D, etc. through the plate F, and then between the rollers G, is passed through the drop-wires in such a manner that each thread passes through all the wires of its stack which are anterior to it, but supports but a single wire. This arrangement can be better understood by an observation of Fig. 15, Plate 2, showing an

end view of one stack of wires with the threads passing through. Should any thread break, the drop-wire which it supports must necessarily fall. Its weight upon the platform 1 causes the platform to fall, which, by means of its lever 3, raises the lever 4. The lever 7, in vibrating must now necessarily strike against the end of the lever 4, thus pressing against the lower end of the lever 5, and thereby drawing the upper end from the notch in the rod 6. The spring around this rod now forces it outward and by the arrangement previously described throws the pulley-band upon the loose pulley, and consequently stops the machine. It should be remarked that the weight of the platform 1 should exactly counterbalance the weight of the levers 3 and 4.

After the yarn has passed through the drop-wires, it is passed over a roller *m*, shown in Figs. 2 and 3, Plate 1, and Fig. 15, Plate 2. These rollers are for the same purpose as the rollers G, G.

The next portion of the machine is the cut marking and registering apparatus. This is shown detached in Fig. 9, Plate 1 and also in Plate 4. 16, in Fig. 2, Plate 1, and Plate 4 is a worm upon the axle 17, turning a small pinion connected with the cam L in Figs. 2 and 9, Plate 1 and Plate 4. This cam revolves in the direction of the arrow. 18 is a rack, 19 is a spring arranged in such a manner that it will have a tendency to push the rack toward the cam L. B is a small pinion; on the same shaft is a small cylinder 20. This cylinder contains coloring matter. 21 is a brush projecting from one side of this cylinder. C is a ratchet, having a series of teeth around part of its circumference. A series of small holes are placed around near its edge. A hammer, 22, is also fastened permanently to it. 23 is a bell.

As the cam L is revolved by means of the worm and pinion previously mentioned, it presses back the rack 18, which causes the pinion B, to revolve, the hollow cylinder 20 being held stationary by a spring catch. The projection on the cam having now passed the end of the rack, the rack, by the action of the spring, is carried forward to its former position, causing also the revolution of the cylinder. In the revolution of the cylinder the brush rubs against the warp, and deposits a portion of the coloring matter upon it. On the back of the perforated ratchet-wheel C, is a coiled spring, as shown in Fig. 11. On the cam L is a slight pin. This pin, catching in the teeth of the ratchet-wheel, carries this wheel around one tooth for each revolution of the cam, and consequently for each cut. The spring, by this means, is gradually wound up. The ratchet-wheel is prevented from being carried back by a spring-click *z*. In one of the holes of the ratchet-wheel is placed a pin, and a second pin is placed in a second hole, with as many holes intervening between the two as the number of cuts desired in one warp. A small arm, 30, attached to the axis of the ratchet-wheel, and hanging loosely on it is permitted to hang between the two pins. As the ratchet-wheel revolves, the pin behind the arm drives the arm forward until its lower extremity presses against and releases the spring-click, and by catching in a notch or other suitable contrivance upon the spring-click retains it out of the teeth of the ratchet-wheel C.

The spiral spring on the back of the ratchet-wheel C immediately causes the wheel to be thrown around. During this backward motion of the ratchet-wheel, the second pin striking against the arm 30, forces it from the spring-click *z*, thereby permitting the spring-click to return to its position in the teeth of the ratchet-wheel. The hammer, which is permanently fastened to the ratchet-wheel consequently strikes against the bell, thus giving notice that a warp has been completed. The operation is then repeated. Any number of cuts may be had to a warp by simply placing the two pins a corresponding number of holes apart.

R, R′, Fig. 2, Plate 1, are the heddles. A is a rod supported by pivots on the frame of the machine, having upon its two sides a series of fingers, placed in such a manner that no finger on one side will be directly opposite to any one on the other. The fingers may, however, be placed only upon one side. S are the reeds. T, and T, Plate 1, are two rollers, driven by being connected by beveled wheels or other suitable contrivance with the main or driving shaft of the machine. T′, is a guiding roller.

When the bell rings, indicating that the desired number of cuts has passed through the machine, the attendant turns the bar A, as shown at Fig. 7, Plate 1, which depresses every other four threads, or as many as are passed together between the reeds S, when he inserts a rod 41, as seen in the drawing, after which he turns the bar down in a contrary direction, and inserts another rod 42; thus he has 4 threads above, and 4 under, throughout the width of the warps. He then raises one heddle, and consequently every other thread, when another rod, 43, is inserted; the other heddle is raised next, and another rod, 44, is passed between. The threads then assume the position shown in Figs. 5 and 6, Plate 1. The rods are replaced by springs, which are secured, and the whole run through the machine. It is then cut between the beamer's and the weaver's leas, and the ends tied. The machine is now ready for starting again. The warp, after it leaves the reeds, passes between the rollers T, T and over the roller

T'. From here it passes to the linking apparatus.

The linking apparatus is supported above the rollers T, T, and is driven by a band from the pulley on the roller T, to a pulley attached to the main shaft of the linking apparatus, and is shown in Fig. 4, Plate 1, and the various positions of its looping-hooks etc. in Plate 3. It consists of a pair of rollers, P, P, Plate 1, Fig. 1, between which the warp passes after it has been collected by passing through a hole in the cross-piece Q. It then passes down through a vibrating tube V. This tube is caused to vibrate laterally by being loosely suspended upon a pivot above it. To a point near the upper extremity of this vibrating tube, one end of a bolt W is attached—the other end of this bolt passes through a hole in the frame-work, for the purpose of grinding it. A spiral spring is attached in such a manner as to cause the bolt to project slightly beyond the frame-work, and consequently causing the vibrating tube to incline toward that side. 51, Figs. 1, and 4, Plate 1, is a toothed wheel, gearing into a corresponding toothed wheel on the main shaft. Upon the inner surface of this wheel is a cam so constructed that during a portion of the revolution of the wheel 51, it will press against the end of the bolt W, and thus push it in (counteracting the effect of the spiral spring) and consequently forcing the vibrating tube over to the other side. Immediately beneath the vibrating tube is a stationary hook, grooved upon its upper surface, and having a slit upon its outer end, extending about one-third of its length. 52, Plate 3, shows a side view of the extremity of this hook; 53, Fig. 7, Plate 3, is a lever moving upon a pivot at 54, and its lower end sliding in the groove of the stationary hook 52. To facilitate it in its movements, the lower extremity, which slides in the groove is made a segment of a circle. The lever 53 is moved backward and forward by being connected by a short crank with a wheel on the driving shaft. A movable hook, 55, of a peculiar shape, as seen in Plate 3, is attached by a pivot at the point 56, Fig. 7, to the lever 53. The tail of this movable hook is made slightly curved, and is acted upon by a stationary pin, 57, in the frame, in such a manner that the point of the hook 55 will be alternately raised and depressed in its backward and forward motion. This portion of the machinery is designed for the formation of the loops.

Plate 3, represents the formation of the loop in its various stages. The yarn, passing through the vibrating tube, is laid across the stationary hook 52, as seen in Fig. 1, Plate 3, by the tube vibrating across it. The movable hook 55 then passes forward and falls in the slit in the stationary hook 52, with its upper prong beyond hook 52; and the lower prong consequently rests upon the yarn. The movable hook 55 then being drawn back, carries the yarn back with it, which being pressed between the lower end of the upper prong 60, and a projection on the stationary hook 52, falls into the space between the two prongs. The tube V then vibrates to the opposite side, and lays the yarn again across the stationary hook, as shown in Fig. 2, Plate 3. The movable hook 55 then passes forward, being raised at the same time by the action of the stationary pin 57, and carries the yarn resting on its lower prong, which it previously drew back with it, forward and over the yarn just laid, by the vibrating tube upon the stationary hook, as seen in Fig. 3, Plate 3. The movable hook passes still farther out, as seen in Figs. 4 and 5, Plate 3, until the prongs 60, 61, have completely passed the points of the stationary hooks. Then by the action of the gravity, or of any suitable contrivance, the point of this movable hook is lowered, as shown in Fig. 6, Plate 3. The movable hook is then drawn back through the slit of the stationary hook, and thus forms a link. In the backward movement of the movable hook, it carries back with it the yarn lying across the stationary hook, as shown in Fig. 1, Plate 7. The operation is then the same as before. On each side of the prong 61 of the movable hook are slight grooves, in which the points of the stationary hook rest, as the movable hook is passing between them. The object of these grooves is to cover the points of the stationary hook so that the yarn may not catch upon them.

The pin 57 is shown detached in Fig. 8, Plate 1. It is made so as to slide in and out of a slight tube. A spring keeps it constantly pressed outward. The movable hook 55, in drawing backward by means of an inclined plane upon the side of its tail, presses the pin back out of its way. The object of this sliding pin is to raise the movable hook while going outward only.

It should be stated that the frame-work of the machine is sufficiently high to enable the operator to pass beneath to examine the working of, and to adjust, the various parts.

Having thus described our improvement, what we claim as our invention and desire to secure by Letters Patent is,

1. The form of the drop-wires, as in Fig. 14, arranged in the manner and for the purpose specified.

2. The cylinder 20 for the purpose of marking the cuts, operated substantially as above described.

3. The employment of a register constructed substantially as above specified for the purpose of registering the number of cuts while the machine is in motion.

4. The employment of the bar A, for the

purpose of taking the leas, constructed with fingers either on one or both sides, as above described.

5. The combination of the vibrating tube V, the stationary hook 52, the movable hook 55, and the pin 57, for the purpose of forming the yarn into links, constructed and operated in the manner substantially as above described.

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