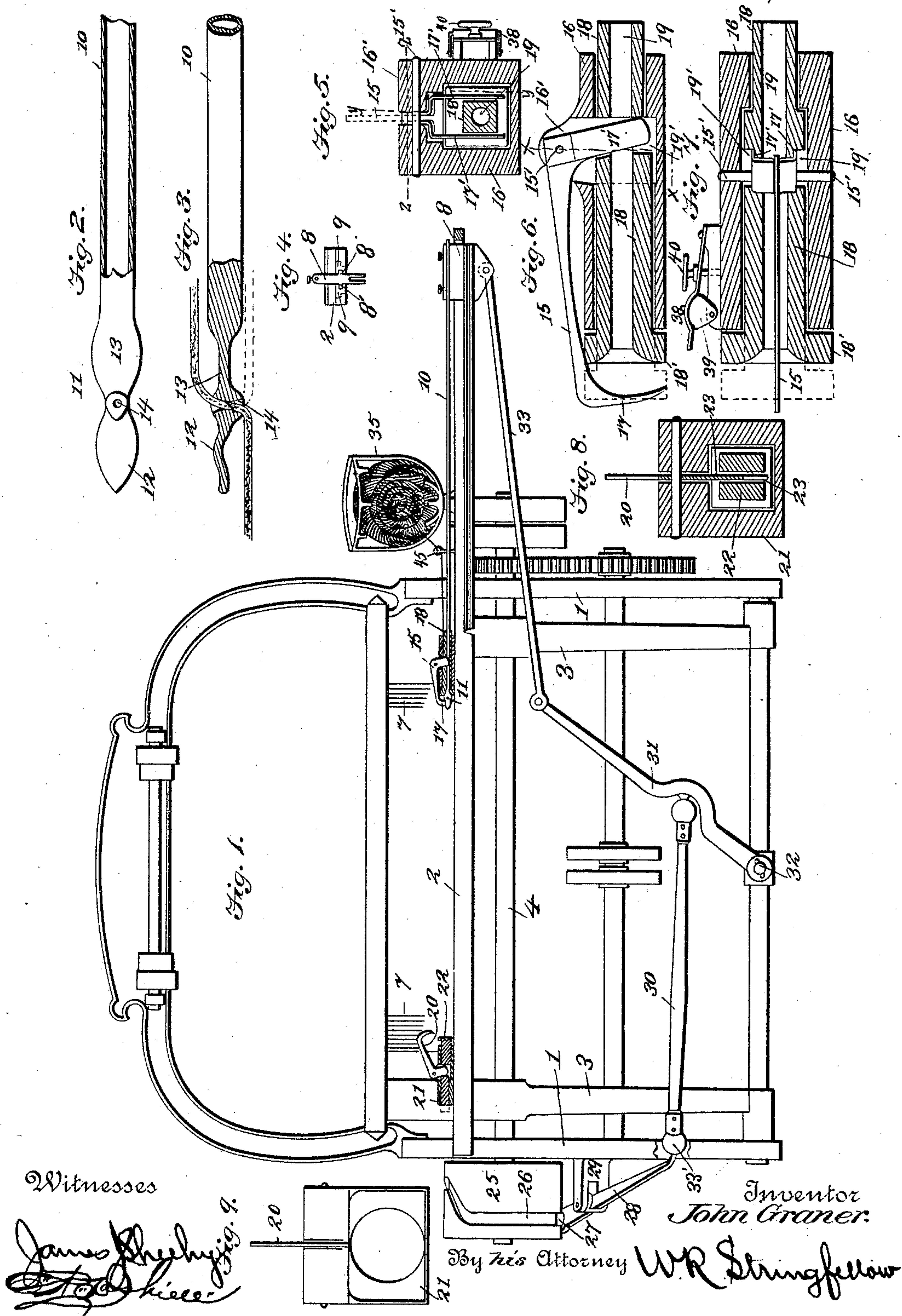


2 Sheets—Sheet 1.

Patented Dec. 2, 1890.

No. 441,796.



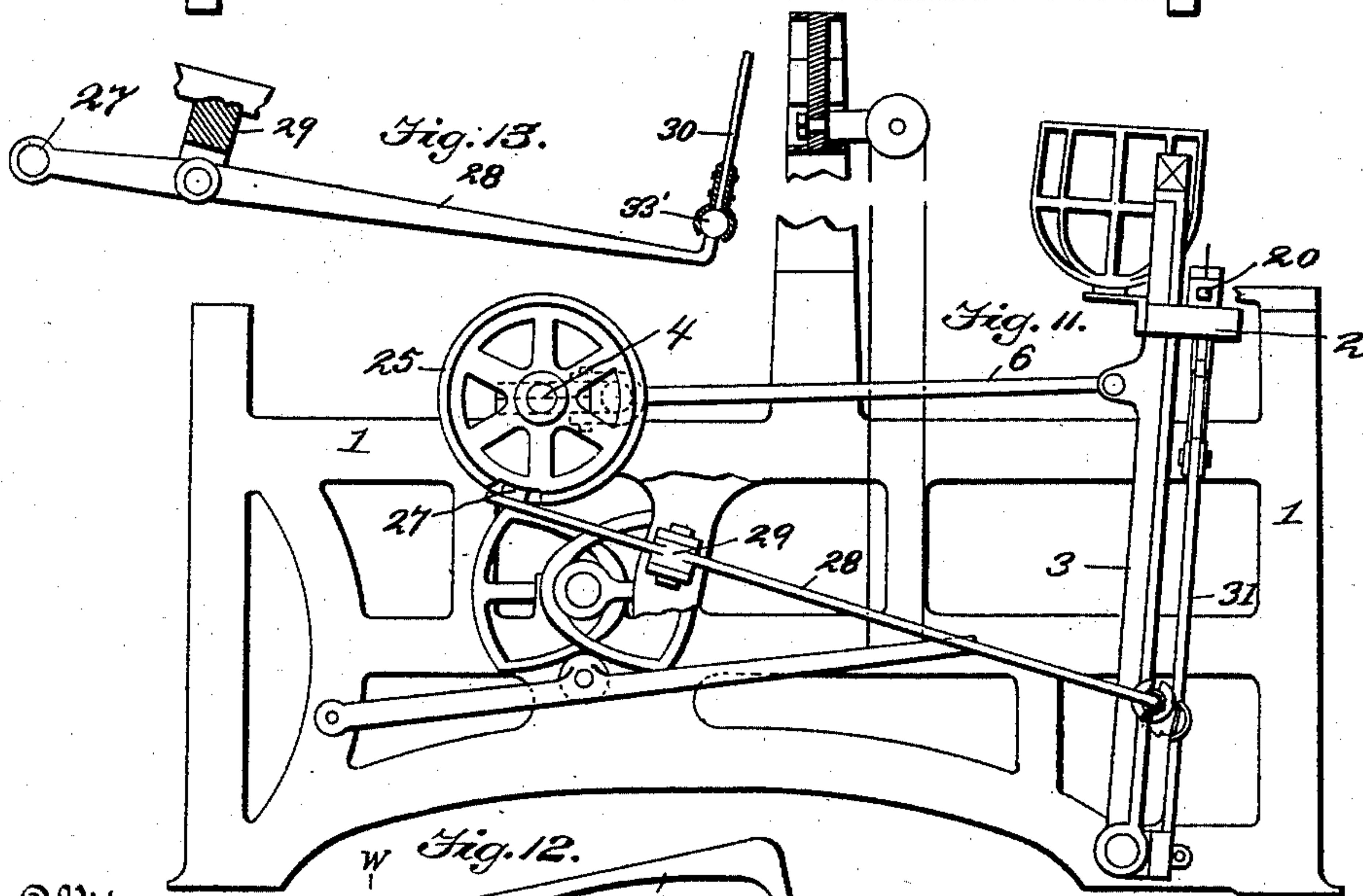
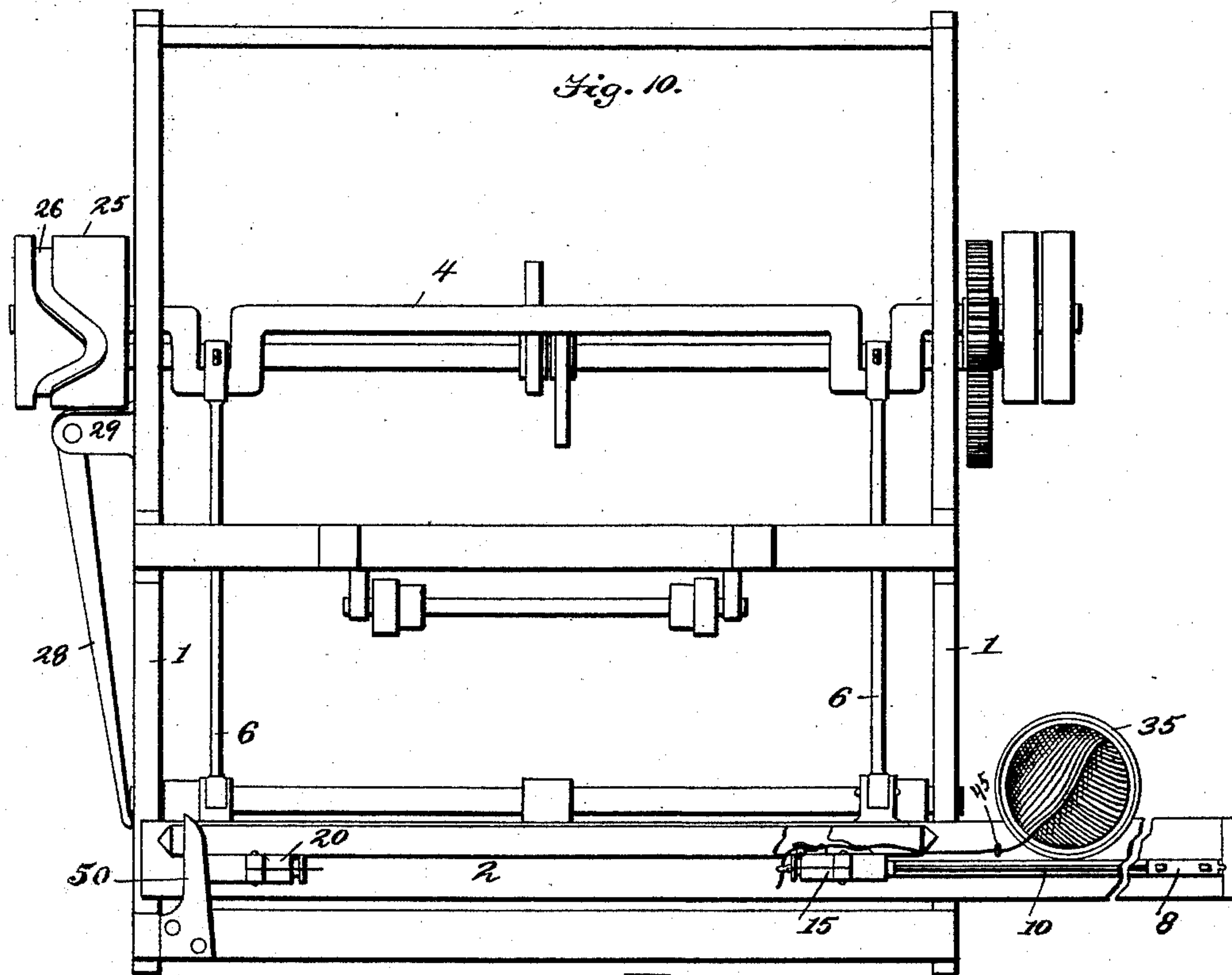
(No Model.)

2 Sheets—Sheet 2.

J. GRANER.
NEEDLE LOOM.

No. 441,796.

Patented Dec. 2, 1890.



Witnesses
James Schuch
W. H. Schuch

Inventor
John Graner.

By his Attorney *W. R. Stringfellow*

UNITED STATES PATENT OFFICE.

JOHN GRANER, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-HALF TO
JOHN B. CAMORS, OF SAME PLACE.

NEEDLE-LOOM.

SPECIFICATION forming part of Letters Patent No. 441,796, dated December 2, 1890.

Application filed January 4, 1890. Serial No. 335,841. (No model.)

To all whom it may concern:

Be it known that I, JOHN GRANER, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Needle-Looms; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in needle-looms; and it consists of the combination, with a single reciprocating eye-pointed needle having a staff or bar and a needle-carrier of two loop-holders of improved construction, which are arranged in the path of the said reciprocating needle and are alternately operated by the needle in a positive manner to catch the loops of the weft-threads carried by the reciprocating needle, and in certain combinations of devices and peculiar construction and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the claims.

To enable others to understand and practice my invention, I will now proceed to a detailed description thereof in connection with the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section, of a loom embodying my invention, the breast-beam and other parts being omitted. Fig. 2 is an enlarged detail view, in elevation, of the eye-pointed needle, showing the staff or bar, partly in section. Fig. 3 is a detail view of the needle in longitudinal section with a part of the needle-staff in elevation. Fig. 4 is an end elevation, in detail, of the sliding needle-carrier and the guides in which said carrier operates. Fig. 5 is an enlarged transverse sectional view through the case and plunger of the right-hand loop-holder on the plane indicated by the dotted line *xx* of Fig. 6, the loop-holder being shown in elevation. Fig. 6 is a longitudinal vertical central sectional view through the case and plunger of the right-hand loop-holder in the plane indicated by the dotted line *yy* of Fig. 5. Fig. 7 is a longitudinal horizontal sectional view through the case and plunger of the right-hand loop-holder on the line *zz* of Fig. 5. Fig. 8 is a vertical transverse sectional view

through the case and plunger of the left-hand loop-holder on the line *ww* of Fig. 12. Fig. 9 is an end elevation of the left-hand loop-holder, looking at the front end thereof. Fig. 10 is a plan view of the loom. Fig. 11 is an elevation of the left-hand end thereof. Fig. 12 is a longitudinal sectional view through the case and plunger of the left-hand loop-holder; and Fig. 13 is a detail view, partly in section and elevation, of a portion of the connecting devices between the needle-carrier and the rotary cam for actuating said carrier.

For the purposes of this specification I have not deemed it necessary to particularly describe or illustrate in detail the features or devices common to every loom, but confine myself more especially to the illustration and description of the parts which constitute my improvements and those parts of the loom associated immediately therewith.

Like numerals of reference denote corresponding parts in all the figures of the drawings, referring to which—

1 designates a part of the main frame of the loom; 2, the lay-beam thereof, which is carried by the pivoted lay-swords 3; 4, the crank-shaft; 6, the links intermediate of said crank-shaft and lay-beam, and 7 the reed.

8 designates the reciprocating needle-carrier, which is provided with lateral flanges 8', and these flanges are fitted in longitudinal guides 9, which are fixed to the lay-beam 2 and extend from the right-hand end thereof nearly one-half the length of said lay-beam. To this needle-carrier is rigidly fixed a staff or bar 10, which carries or is formed at its free end with an eye-pointed needle 11. The extreme end of the needle is bent or curved, as shown at 12 in Fig. 3, and in the rear of this bent or curved end, which is reduced slightly in width, (see Fig. 2,) the said needle-bar is bulged or enlarged at 13, Fig. 2, so that the end of the needle is greatest in diameter or width at the bulged point 13, for a purpose to be hereinafter explained, and between the bent or curved end 12 and the bulged enlarged part 13 the needle-eye 14 is formed through the needle.

The reciprocating needle bar or staff 10 operates in a hollow plunger of the right-hand loop-holder 15, and in the path of the needle-

bar is arranged the solid plunger of the left-hand loop-holder 20, whereby both loop-holders are positively actuated by their plungers, and the plungers are in turn operated by the needle staff or bar in its reciprocating movements to actuate the loop-holders with certainty and precision.

I will now proceed to describe my improved loop-holders, the right-hand one of which is shown more clearly in Figs. 5 to 7, inclusive, in which figures the numeral 16 designates the case or shell of said loop-holder, which is suitably fixed to the lay-beam and is open at both ends. This case or shell is formed on its upper side with the lugs or extensions 16', between which is fixed the shank of the loop-holder 15, which holder is pivoted on a shaft or pin 15', supported in said lugs or projections, the loop-holder being arranged exteriorly of the fixed shell or case, and provided at its forward end with a depending hook 17, adapted to engage and retain the loop in the weft-thread, while the rear end of the loop-holder is provided with a depending right-angled arm 17', which is bifurcated, as shown in Figs. 5 and 7, to embrace a reciprocating plunger 18. This plunger 18 is arranged longitudinally within the fixed case or shell 16 to slide freely therein, and at one end this plunger has an enlarged head or buffer 18', which is adapted to receive the thrust of the bulged part 13 of the needle staff or bar when the latter is returned to its normal position, and which also serves to arrest the rearward movement of the plunger, because said head abuts against the end of the case or shell. Through this reciprocating plunger is formed an axial longitudinal bore or passage 19, and transversely across the plunger, on opposite sides of its axial bore or passage, are formed recesses 19', the longitudinal bore or passage admitting of the free play or movement of the reciprocating needle bar or staff through the right-hand loop-holder 15, while the transverse recesses 19', in the sides of the plunger receive the bifurcated arms 17' of the pivoted loop-holder, whereby the plunger and loop-holder are connected together and the position of the loop-holder is regulated and determined by the plunger, and the plunger is in turn operated by the reciprocating needle bar or staff to elevate or depress the hook-shaped end of the loop-holder.

The left-hand loop-holder 20 is essentially the same in construction as the right-hand loop-holder—namely, it has an open-ended case 21, which is fixed to the lay-beam in line with its fellow loop-holder 15, the reciprocating slotted plunger 22, and the exteriorly-arranged loop-holder pivoted to the shell and provided with an arm 23, which fits in the slot 23' in the plunger. In the case of the left-hand loop-holder, however, the needle-bar does not pass through the plunger, and hence the latter is made solid, with the exception of the transverse slot 23', and the arm 23 of the loop-holder 20 is in one piece,

instead of being bifurcated, as is the case with the arm of the right-hand loop-holder.

The plungers of the two loop-holders 15 20 are operated by the impact or thrust of the needle to positively depress the loop-holders alternately to take into or engage with the loops formed by the weft-thread and at the termination of each back-and-forth movement of the needle. Thus when the needle has completed its forward movement through the shed it impinges against the concave head of the plunger 22 of the left-hand loop-holder and forces the said plunger forward to depress the hooked end of the loop-holder 20 and cause it to engage the loop in the weft-thread, and when the plunger completes its return movement the bulged part 13 of the needle-bar impinges against the enlarged head of the plunger 18 of the right-hand loop-holder 15, which impact forces the plunger rearward with the needle-bar a short distance, which is sufficient to depress the loop-holder 15 and cause it to engage the loop of the weft-thread. The left-hand loop-holder is first disengaged from the weft thread or loop by means of an arm 50, (see Fig. 10,) which is fixed to the front part of the frame 1 and in the path of the rear end of the plunger, so that when the lay is swung forward the rear end of the plunger 22 rides against the curved heel of the fixed arm, and the plunger is thus moved longitudinally and operates to lift the free end of the loop-holder 20.

The plunger of the right-hand loop-holder 15 is arranged in the path of the reciprocating needle-carrier 8, and as the carrier is moved forward and the needle is pursuing its course through the shed this carrier impinges against the rear end of the plunger and forces the same forward, thereby lifting the free hooked end of the right-hand loop-holder 15, as will be readily understood.

The crank-shaft 4 is provided at one end with the fast and loose pulleys, as is usual, and at its opposite end the said crank-shaft carries a cam 25, which is formed with a peripheral cam-groove 26. In this cam-groove is fitted a friction-roller 27, which is mounted on a suitable pin fixed to one end of a horizontally-inclined lever 28, which lever is pivoted at a point intermediate of its length in a fixed bracket 29 on the frame 1, and is adapted to be vibrated on its fulcrum as the friction-roller follows the course of the groove in the cam. To the free end of this inclined lever is coupled a link 30, which has its other end coupled to an upright lever 31, which is fulcrumed at its lower end on the lay rock-shaft, as at 32. The upper free end of this upright lever 31 is pivoted to a link 33, which in turn is pivoted to a depending portion of the needle-carrier 8, whereby the cam is connected by intermediate devices with the needle-carrier to impart a rectilinear reciprocating movement to said carrier and the needle at suitable regular intervals.

The pivoted connections between the le-

vers 28 and 31 and the link 30 is effected by means of loose ball-and-socket joints 33', (see Fig. 13,) in which the sockets are formed or secured on the ends of the link, and the balls suitably secured to the levers.

Near the right-hand end of the lay-beam is provided the thread-receptacle 35, from which the weft-thread is led to the needle and passed through the eye thereof; but before the weft-thread reaches the needle-eye it passes through a tension-regulating device 38, which is preferably applied laterally to the shell or case of the right-hand loop-holder 15. This tension-regulator consists of a spring-arm 38, suitably secured to the fixed shell 16 and having a friction-shoe 39 at its free end, upon which said spring-arm bears, and the pressure of the spring-arm on the thread can be regulated by the adjustment of a thumb-screw 40, as shown in Figs. 5 and 7.

It is obvious from the foregoing description, taken in connection with the drawings, that the needle-carrier is moved forward and backward in its guides on the lay-beam by the operation of the cam thereon through the system of levers and links.

The weft-thread from the receptacle 35 runs or extends through an eye or guide 45 on the lay-beam, and thence extends alongside of the shell or case of the right-hand loop-holder 15 over the outer rounded surface of the lug 39 and beneath the spring 38, after which it passes to the eye of the needle. The weft-thread is held under proper tension by being compressed against the lug 39 by the spring 38, which latter is adjusted by a thumb-screw 40. The right-hand loop-holder engages the weft-thread as the latter is introduced in the eye of the needle, the point of said loop-holder 15 descending in front of the point of the weft-needle—that is, between the point or tip of the needle and the weft-thread when in the position shown in Fig. 3 of the drawings, and this loop-holder 15 operates to hold the weft-thread as the needle-bar moves forward through the shed and until the hollow plunger of said loop-holder is thrust forward in the manner described to raise the said right-hand loop-holder as the needle-bar completes its forward movement, and thereby release said loop-holder 15 from engagement with the loop in the weft-thread. As the needle-bar completes its forward movement through the shed, the front end of said bar comes in contact with the plunger of the left-hand loop-holder 20 which is depressed by the movement of the plunger to engage the loop of the weft-thread, and simultaneously with the impact of the needle-point on the plunger of the left-hand loop-holder 20 the needle-carrier 8 strikes against the plunger of the right-hand loop-holder 15, which plunger is operated to raise the loop-holder 15 in position to engage the weft-loop, when on the backward or return movement of the needle the bulged part 13 thereof impinges on the head of the plunger 18 and moves the latter rearward to

depress the loop-holder 15 and cause it to engage the weft-loop. Just before the completion of the forward movement of the lay-beam the left-hand loop-holder 20 is raised into position to engage the next weft-loop by reason of its plunger riding against the fixed arm on the frame and being forced to the right by said arm.

I am aware that slight changes in the form and proportion of parts can be made without departing from the spirit or sacrificing the advantages of my invention, and I would therefore have it understood that I reserve the right to make such modification as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a reciprocating needle-bar, of an endwise-movable plunger arranged in the path of the said needle-bar to be moved in one direction thereby, and a movable loop-holder connected to said plunger, substantially as and for the purposes described.

2. The combination, with a reciprocating needle-bar, of an endwise-movable plunger arranged in the path of said needle-bar to be actuated by the same, and provided with a transverse recess or slot, and a pivoted loop-holder having a hook at its free end, and an arm which fits in the recess or slot of the plunger, substantially as and for the purposes described.

3. The combination of a reciprocating needle-bar having the enlarged portion, an endwise-movable plunger having an axial longitudinal bore for the free play of the needle-bar therein, and a movable loop-holder connected to said endwise-movable plunger, substantially as and for the purposes described.

4. The combination, with a lay-beam and a reciprocating needle-bar, of a shell or case fixed on said lay-beam, a loop-holder pivoted in said shell, and an endwise-movable plunger guided in said shell and connected to the loop-holder to elevate or depress the latter, as and for the purposes described.

5. The combination, with a lay-beam and a reciprocating needle-carrier guided therein, of an endwise-movable plunger supported on the lay-beam and arranged in the path of the carrier to be moved in one direction thereby, a bulged needle-bar secured to the needle-carrier, and which passes through the plunger and moves the latter a limited distance in an opposite direction, and a movable loop-holder connected to said plunger, as and for the purpose described.

6. The combination, with a lay-beam and a reciprocating needle-bar, of an endwise-movable plunger arranged in the path of said needle-bar to be moved a limited distance in one direction by the same, a loop-holder connected to said plunger, and a fixed arm arranged on the main frame in the path of the rear end of the said plunger to return the lat-

ter to its normal position and lift the loop-holder, as and for the purpose described.

5 7. The combination, with a lay-beam, of the solid and hollow plungers supported in guides on the lay-beam and arranged in line with each other, the loop-holders pivoted in the guides of the plungers and connected to the plungers, a bulged needle-bar passing through the hollow plunger and adapted to
10 operate the plungers to positively depress the loop-holders, a needle-carrier having the needle-bar secured thereto and arranged to actuate the hollow plunger and elevate its loop-holder, and a fixed arm in the path of the solid
15 plunger to move the latter and raise its loop-holder, as described.

8. The combination, with a crank-shaft having the cam, the lay-beam, and the needle-carrier mounted on said lay-beam, of the lever 28, having a roller which rides in the
20 groove of said cam, another lever pivoted at one end and linked to the needle-carrier, and a link intermediate of the two levers and connected at each end by ball-and-socket joints
25 to said levers, as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN GRANER.

Witnesses:

JOHN BROSSART,
PERCY D. PARKS.