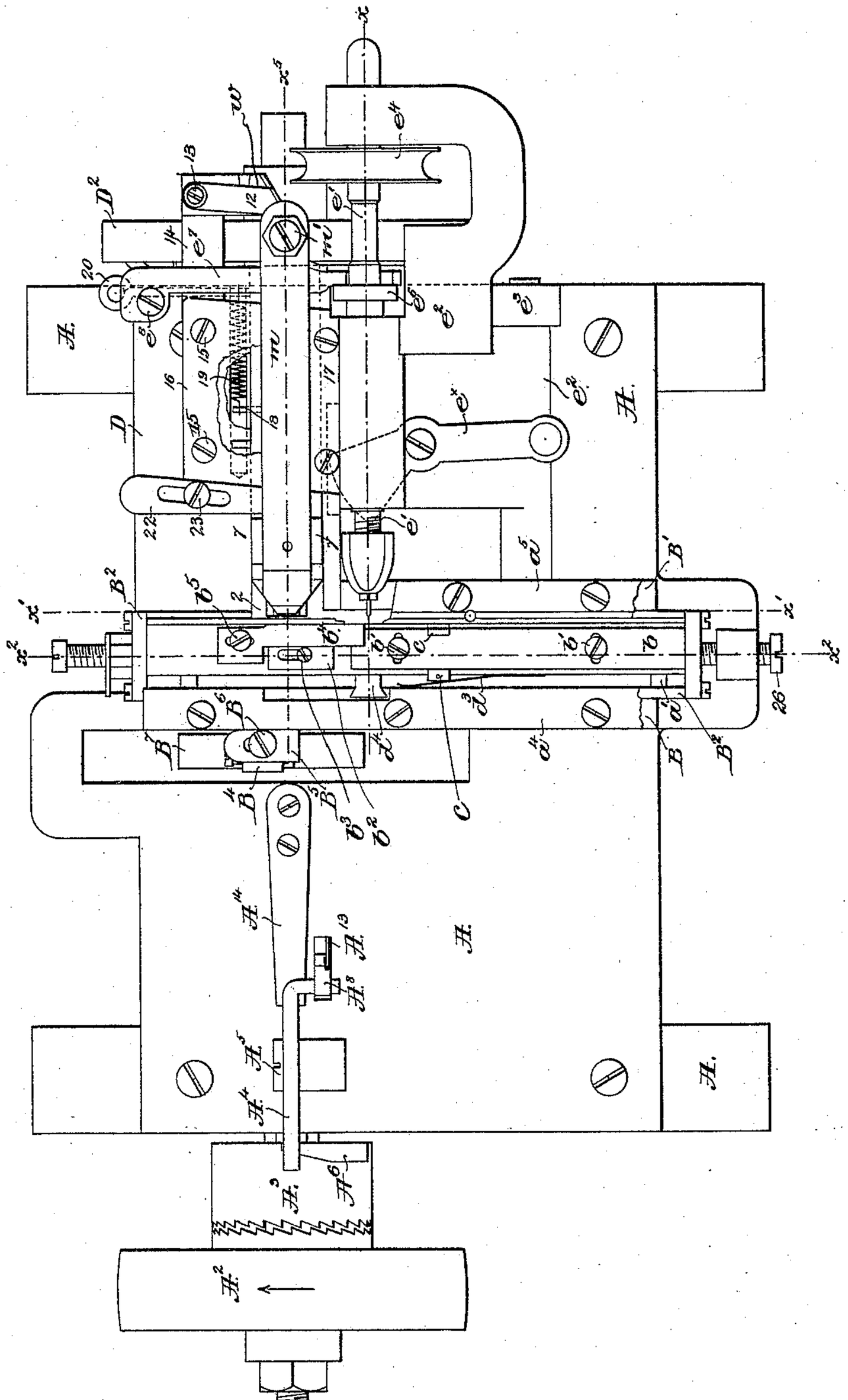
(No Model.) 4 Sheets—Sheet 1.

# J. J. JENKINS.

## MACHINE FOR PROVIDING KNITTING MACHINE NEEDLES WITH LATCHES.

No. 432,802. Patented July 22, 1890.

Fig: 1.



Witnesses.
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Inventor.
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(No Model.) 4 Sheets—Sheet 2.

# J. J. JENKINS.

## MACHINE FOR PROVIDING KNITTING MACHINE NEEDLES WITH LATCHES.

No. 432,802. Patented July 22, 1890.

Fig: 2.

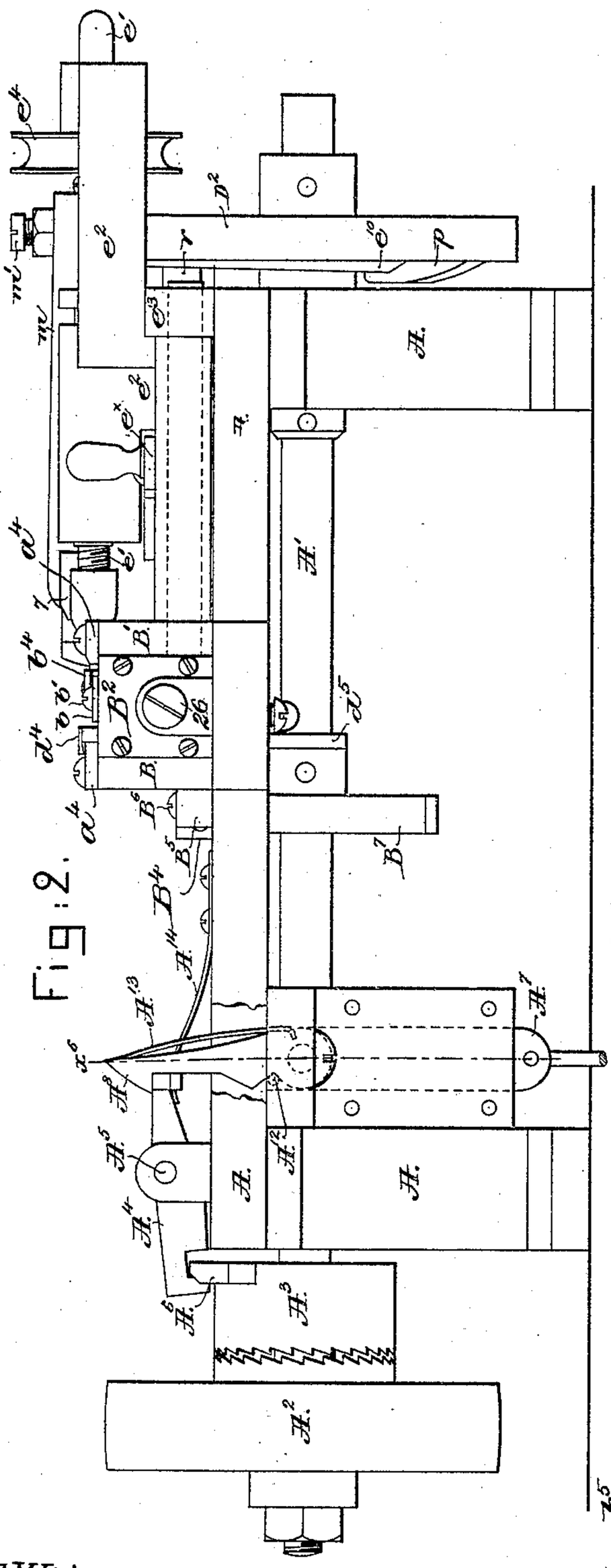

Fig: 4.

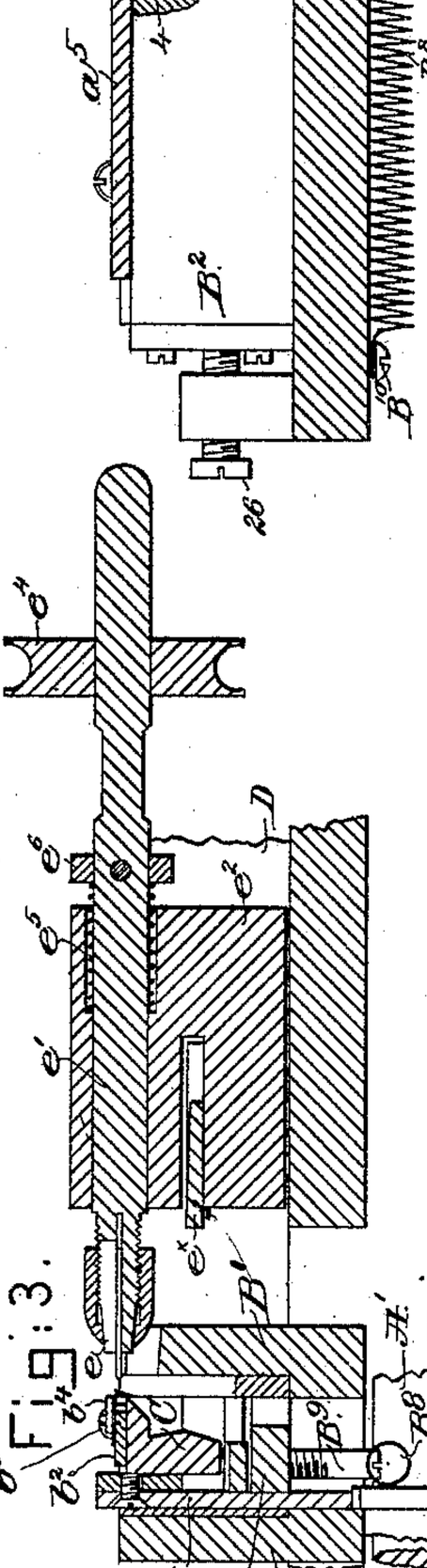

Fig: 5.

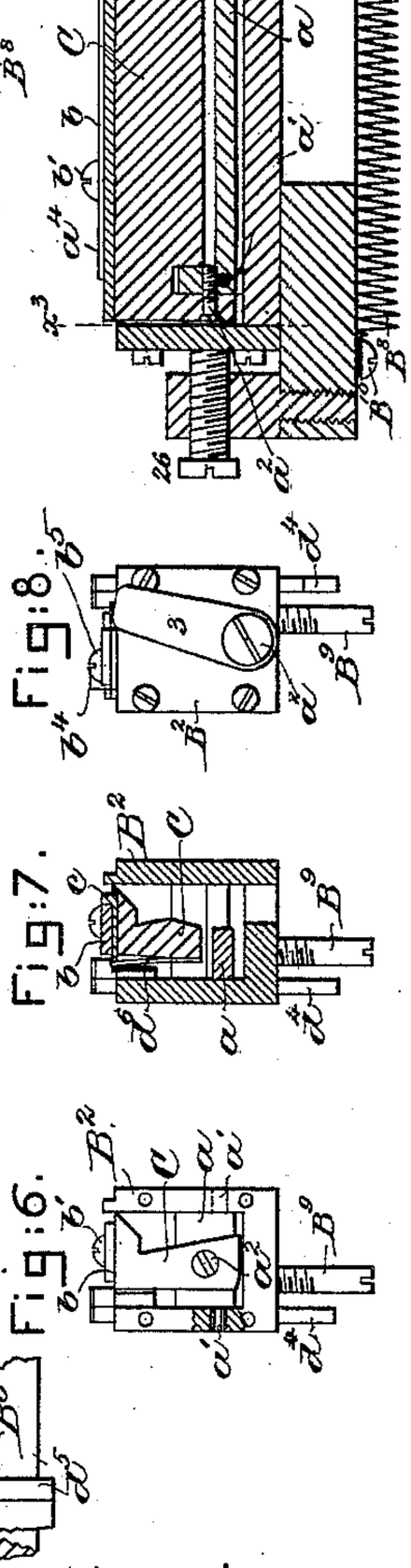

Fig: 3.



Fig: 8.



Fig: 7.



Fig: 6.



Witnesses.

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(No Model.) 4 Sheets—Sheet 3.

# J. J. JENKINS.

## MACHINE FOR PROVIDING KNITTING MACHINE NEEDLES WITH LATCHES.

No. 432,802. Patented July 22, 1890.

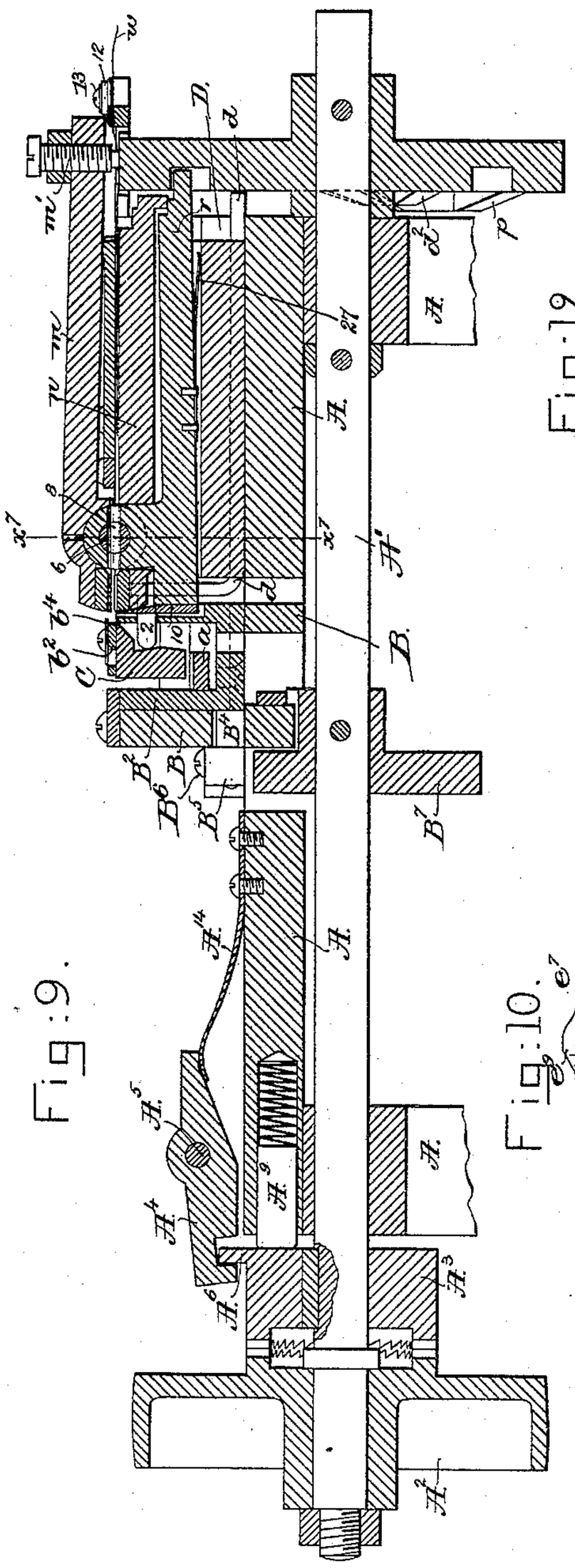

Fig: 9.

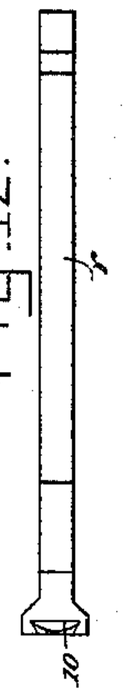

Fig: 12.

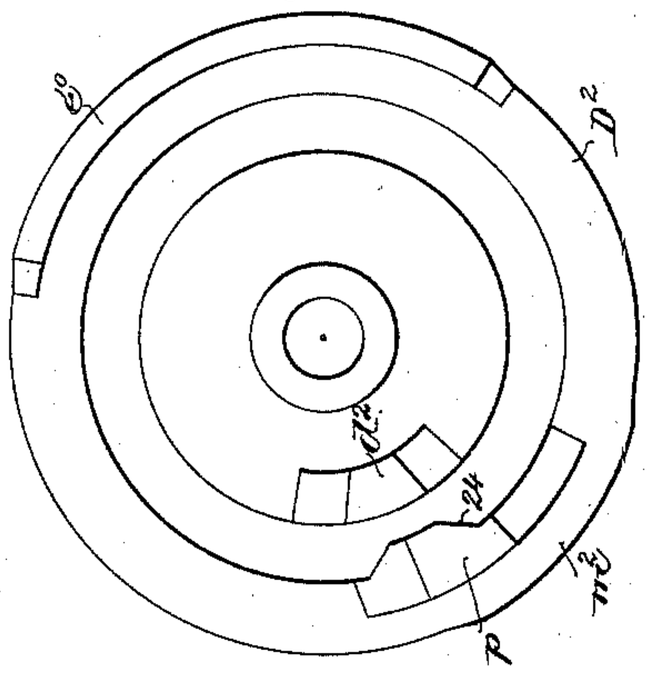

Fig: 15.

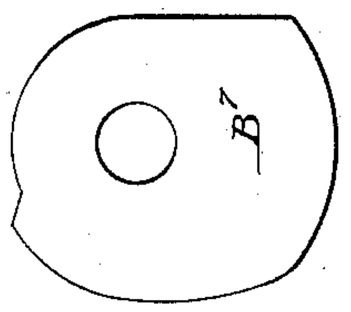

Fig: 14.

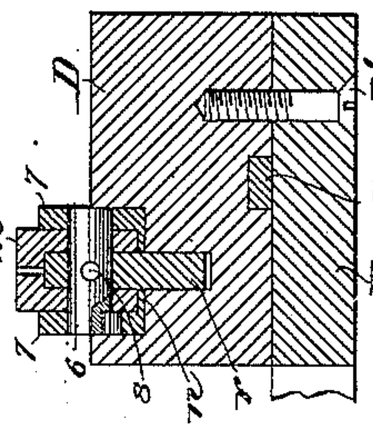

Fig: 13.

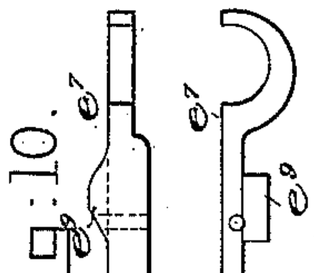

Fig: 10.

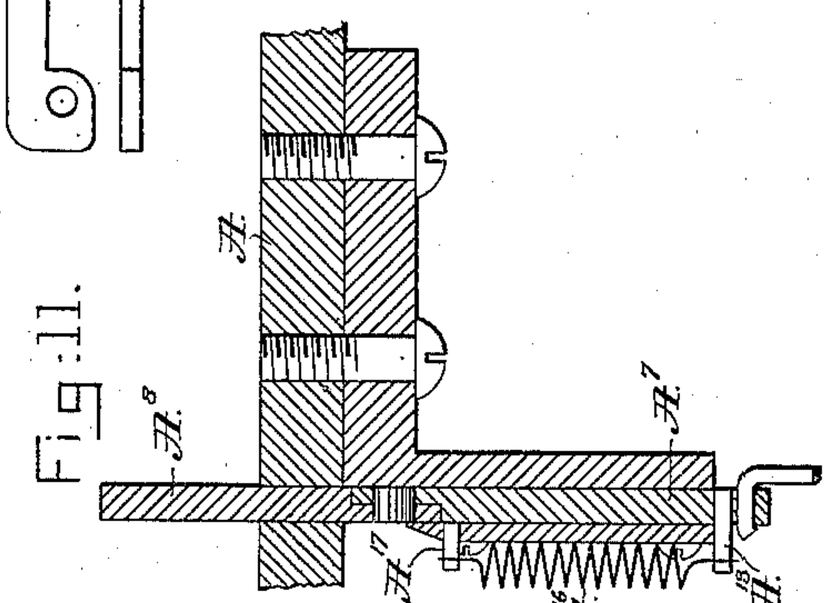

Fig: 11.

Witnesses.

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(No Model.) 4 Sheets—Sheet 4.

# J. J. JENKINS.

## MACHINE FOR PROVIDING KNITTING MACHINE NEEDLES WITH LATCHES.

No. 432,802. Patented July 22, 1890.

Fig. 16.

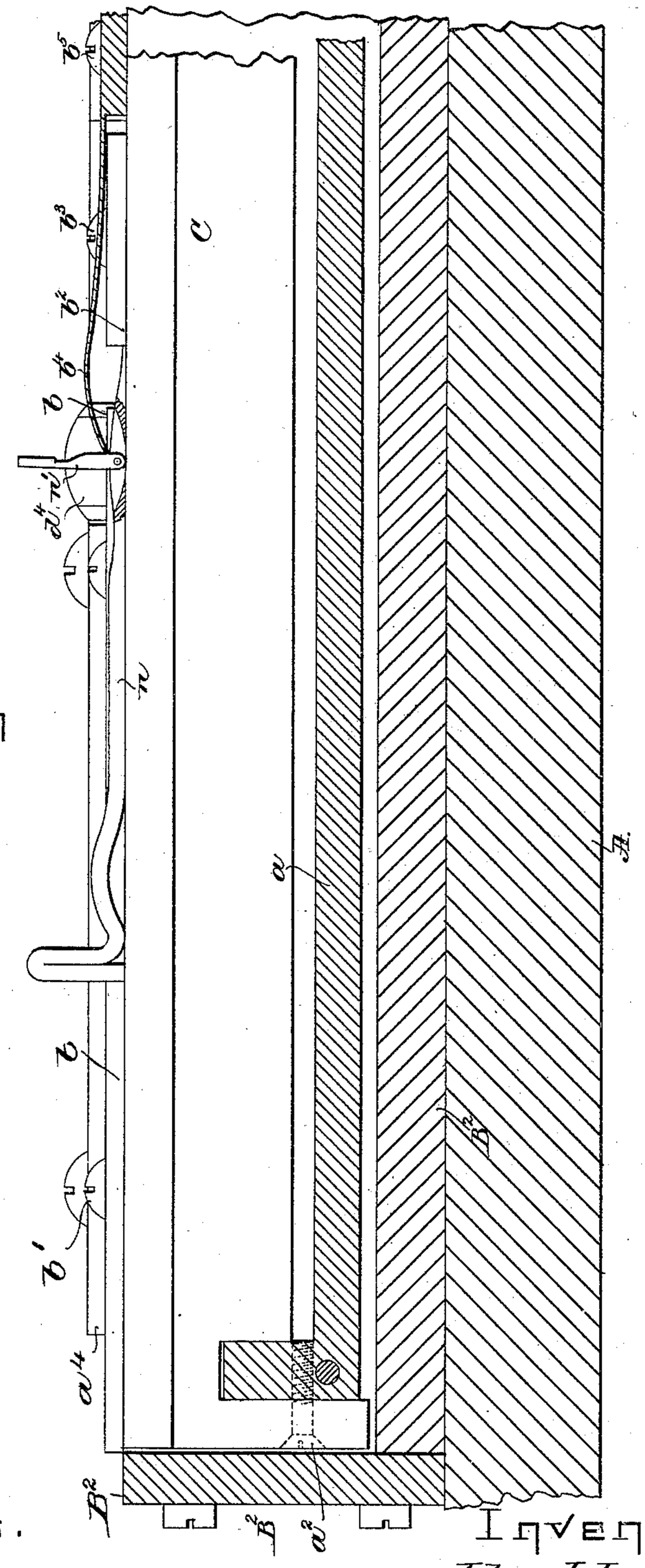
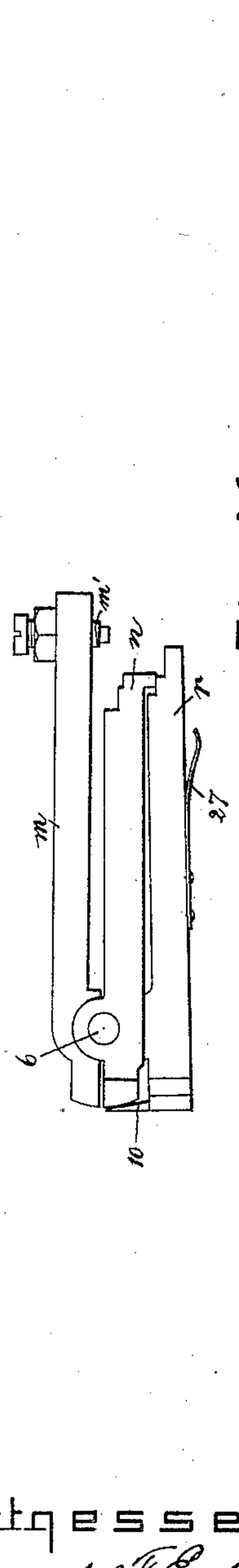



Fig. 17.




Witnesses.

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# UNITED STATES PATENT OFFICE.

JOHN J. JENKINS, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO WILLIAM COREY, OF SAME PLACE.

## MACHINE FOR PROVIDING KNITTING-MACHINE NEEDLES WITH LATCHES.

SPECIFICATION forming part of Letters Patent No. 432,802, dated July 22, 1890.

Application filed September 14, 1889. Serial No. 323,907. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. JENKINS, of Manchester, county of Hillsborough, State of New Hampshire, have invented an Improvement in Machines for Providing Knitting-Machine Needles with Latches, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Prior to my invention it has always been customary to drill a hole in the needle for the reception of the rivet, and thereafter the needle is given to an operator, who places the latch in the slot of the needle and by pliers inserts a rivet through the hole drilled in the needle, the said rivet also passing through the hole in the latch. This is a slow and laborious process; and the object of my present invention is chiefly to insert the rivet automatically, the said rivet, in the form in which my invention is herein embodied, forming, when being inserted, part of a wire, the end of the wire when properly inserted being cut off, leaving the rivet in place. My machine is also provided with a spindle and drill to automatically drill the hole in the needle, this being done while the needle is held clamped in a carriage, means being provided to move the said carriage after the needle has been drilled to place the drilled needle in position to have the end of the wire referred to passed into the hole in the needle previously made by the drill. Prior to drilling the hole, in the needle, and after the needle has been placed in the carriage the operator places the punched latch in the slot of the needle, a suitable gage being added to the machine to aid him in correctly placing the latch in such position that the wire will pass through the hole in the latch.

The machine has been provided with a gage for the small end of the needle, so as to properly locate the needle with relation to the drill.

My invention in a machine for drilling knitting-machine needles consists, essentially, in mechanism to clamp and hold the needle to be drilled, combined with a spindle and drill to drill a hole in the needle, substantially as will be described.

Other features of my invention will be hereinafter described, and specified in the claims.

Figure 1 is a top or plan view of a machine embodying my invention; Fig. 2, a front elevation thereof; Fig. 3, a partial section in the line $x$, Fig. 1; Fig. 4, a section in the line $x'$; Fig. 5, a section in the line $x^2$; Fig. 6, a view to the right of the dotted line $x^3$, Fig. 5; Fig. 7, a section in the line $x^4$, Fig. 5; Fig. 8, a rear end view of the carriage holding the clamp; Fig. 9, a section of Fig. 1 in the dotted line $x^5$; Fig. 10, details showing the lever for actuating the drill-spindle; Fig. 11, a section in the line $x^6$, Fig. 2; Fig. 12, a top or plan view of the cutter-carrying lever; Fig. 13, a section in the line $x^7$, Fig. 9. Fig. 14 shows the cam for moving the carriage. Fig. 15 is an inner side view of the main operating-cam of the machine. Fig. 16 is an enlarged detail of part of the jaw C and its connected gages, with a needle in position on the jaw, and Fig. 17 shows the jaws $m$ and $n$ and cutter-carrier $r$ detached.

The frame-work A, of suitable shape to support the working parts, has suitable bearings for the main shaft A′, provided, as shown, with a loose pulley $A^2$, the hub of which has a series of ratchet-teeth, which, when the shaft is to be rotated, engage like ratchet-teeth of a hub $A^3$, splined on the said shaft. The said hub $A^3$ has a wedge or cam-like projection $A^6$, which once during each rotation of the shaft A′ enters a notch in a latch-lever $A^4$, pivoted at $A^5$, the said projection traveling in contact with the said latch, serving to move the hub $A^3$ longitudinally on the main shaft far enough to release the loose pulley and let it run, leaving the shaft A′ at rest, and with the carriage, to be described, in position to enable a needle to be inserted in the then open clamp, to be described. The machine in Figs. 1 and 2 is shown in this position.

To start the machine, the operator with his foot on a suitable treadle will depress the pawl-carrier $A^7$ and pull down the pawl $A^8$ and cause it to turn the lever $A^4$ and release the hub $A^3$, so that the pin $A^9$, (see Fig. 9,) acted upon by the spring $A^{10}$, will move the said hub in the direction to cause its ratchet-teeth to engage the teeth of the rotating pulley A and start the machine. The pawl $A^8$ has one

of its edges (see Fig. 2) made cam-shape, so as to act against a suitable pin $A^{12}$ to turn the pawl on its pivot as it is depressed to thus free the latch, a spring $A^{13}$ normally acting to keep the pawl pressed toward the latch, while the latter is acted upon by a strong spring $A^{14}$ to thus keep the hooked end of the latch in the position shown in Fig. 2. The pawl-carrier is normally elevated by a spring $A^{16}$, connected to the pins $A^{17}$ $A^{18}$. (See Fig. 11.)

The machine has two uprights or flanges B B′ extended across the bed. These flanges receive between them a carriage $B^2$, composed chiefly of side and end pieces, the said carriage having at one side a projection $B^4$, to which, as shown, is attached a block $B^5$, the same being adjustably held in place by a clamp-screw $B^6$, inserted through a slot in the block, the block being acted upon by the cam $B^7$ on the shaft A′, the shape of the said cam (shown separately in Fig. 14) being such as to move the said carriage forward at the proper time, a spring $B^8$, attached to a stud $B^9$ of the carriage $B^2$ and to a stud $B^{10}$ of the frame, normally acting to return the carriage to its starting-point. This carriage $B^2$ receives within it a bed-block *a*, having upturned ears. (See Figs. 5 and 16.)

The bed-block at that end next the front of the machine (see Figs. 5 and 6) has a pivot-pin or fulcrum *a′* extended from it into holes in the carriage $B^2$, so that the opposite end of the bed-block, acted upon by a wedge-like adjusting-screw $a^{\times}$, may be raised or lowered, according to the width of the needle which is to be drilled.

The ears referred to receive horizontal screws $a^2$, which serve as pivots for the clamp C, the said clamp being movable on the said pivot-screws, the clamp co-operating with the inner side of the wall $B^2$ of the carriage next the upright B′. The carriage $B^2$ is retained down in position between the uprights B B′ by the caps $a^4$ $a^5$, held in place by suitable screws. The clamp has a jaw *b* adjustably connected to it at its top by screws *b′ b′*, extended through slots therein, so that the said jaw may be adjusted to occupy a position (see Fig. 6) more or less back of the clamp, thus leaving a space between the edge of the jaw and the inner face of one of the side walls of the carriage for the reception of the body of the needle *n* (see Fig. 16) which is to be drilled, and provided with a latch *n′*, the back of the needle resting on the top of the clamp C, the front of the needle, or that end thereof farthest from the butt, being pushed against a gage $b^2$, (shown as adjustably attached by a set-screw $b^3$ to the upper side of the clamp C,) a latch-gage $b^4$ (shown as a spring) being also connected to the clamp by a screw $b^5$, to, by its end, serve as a gage for the latch *n′*, (shown in Fig. 16 as inserted into the slot of the needle,) one wall of the needle at its slotted part being shown as broken out in said figure to show the usual hole in the latch.

The clamp C is provided at its top with a cross-groove, in which is placed the needle-ejector *c*, which, when the clamp is turned to the left from the position shown in Figs. 1, 2, and 7, strikes against one of the walls of the carriage, and is thereby moved longitudinally to push the needle off the edge of the clamp, the jaw at such time being opened or turned away out of clamping position to let the needle drop down through a slot in the bottom of the carriage and through the top of the machine.

The clamp C is moved at the proper time on its pivots $a^2$ to release the needle by a pin 2 on the upturned end (see Fig. 9) of a slide-bar *d* let into a block D, secured to the frame by a screw D′, (see Fig. 13,) the said slide-bar being acted upon at the proper time by a cam projection $d^2$ (see Fig. 9) on the cam wheel or hub $D^2$, fast on the shaft A′, a spring $d^3$, suitably brazed or otherwise connected to the back of the clamp C and with its free end acting against the carriage $B^2$, serving normally to press the clamp toward the right in Fig. 1.

To cause the needle to be held firmly by the clamp when the needle is being drilled, as will be described, I have provided the inner side of one of the walls of the carriage (see Figs. 3 and 6) with a dovetailed groove, in which I have mounted a clamp-locking device $d^4$, the upper end of which is thickened in suitable manner or provided with a slightly-tapering projection, herein shown as attached by a screw, the said clamp-locking device being herein represented as descending behind the closed clamp by gravity and standing there while the needle is being drilled and while the rivet is being put in, when the said locking device is raised by a suitable cam $d^5$ on the shaft A′, the said locking device when down, as stated, between the clamp and carriage, as in Fig. 3, preventing the movement of the clamp in opposition to the clamp-spring $d^3$. The ejector is normally retracted by a suitable spring $d^6$, attached at its lower end (see Fig. 7) to the clamp and having its upper end extended into the said ejector. The adjusting-screw $a^{\times}$ has a check-nut 3.

One side of the carriage (see Fig. 4) is provided with two drill-holes 4, bored close together, so that one breaks into the other. One of the said drill-holes is filled with oil and the other with a wick or other absorbent 5, (shown in heavy black,) which acts to oil the drill *e* as the same is moved forward to drill the rivet-hole in the needle. This drill is and may be held between usual jaws at the end of a rotating spindle *e′*, mounted in a block $e^2$, herein shown as having journals, one of which is inserted in an ear $e^3$, while the other (see Fig. 2) is inserted in a hole in the upright B′. The spindle *e′* has fast on it a pulley $e^4$, which may be driven by a belt from any suitable source of motion, the said spindle, surrounded by a spring $e^5$, which normally acts to retract the spindle or move it

longitudinally away from the carriage, having a collar $e^6$, which is acted upon by one end of the spindle-sliding lever $e^7$, (see Fig. 1,) pivoted at $e^8$ on the block D, the said lever having a cam projection $e^9$, adapted to be acted upon by the cam projection $e^{10}$ on the cam $D^2$, the shape of the said cam projection being such as to gradually move the spindle in the direction of its length and cause the rotating drill to pass through both side walls of the needle opposite the slot therein, in which is placed the latch, as stated, and as shown in Fig. 16. The block $e^2$ is provided, as shown, with a locking device, (represented as a lever $e^\times$,) which, when in the position shown in Figs. 1 and 6, locks the block firmly in position; but by turning the said lever aside on its pivot the said block $e^2$ may be tipped up about its pivots, as when it is desired to change or adjust the drill. The needle having been drilled and the drill retracted by the spring $e^5$, the carriage $B^2$ is moved forward by the cam $B^7$ until the hole drilled in the needle arrives in position opposite the wire-feeding jaws, now to be described.

The wire-feeding jaws $m$ $n$ are connected by a pivot-pin 6 inserted through the jaw $m$ and through ears 7, forming part of the jaw $n$, the jaw $n$ being adapted to slide in a suitable groove in the block D, referred to, (see Fig. 13,) only the jaw $m$ turning to clamp or release the wire $w$, which is partially shown in Figs. 1 and 9 by a heavy black line, the said wire being taken from any usual reel or holder. The wire is led along in a groove in the jaw $n$, and thence through the hole 8 in the pivot 6 and between the front ends of the jaws, the diameter of the wire being just that required for the rivet and just of a size to fully fill the hole drilled in the needle, the said hole being brought into position just in front of the jaws $m$ $n$ and in the line of the wire and the direction of movement of the jaws, so that when the jaws are clamped upon the wire $w$ (a portion of the said wire projecting beyond the ends of the jaws next the carriage) the said jaws will, when moved forward by the projection $p$ on the cam $D^2$, cause the end of the said wire to be inserted into the hole made by the drill $e$, the said wire in its passage through the needle also passing through the hole in the latch. The jaw $m$ has at its outer end an adjustable stud $m'$, which is acted upon by the peripheral projection $m^2$ of the cam $D^2$ to thus close the said jaw upon the wire when the latter is to be moved forward and inserted into the needle for the formation of a rivet. By adjusting the stud $m'$ the jaws may be adapted to wire of different gage. The pivot-pin 6 referred to also has pivoted upon it an ear of the cutter-carrying lever $r$. (Shown in Figs. 9 and 13, and separately in Fig. 12.) This cutter-carrying lever has at its front end a blade 10, which at the proper time is thrown up between the short end of the jaw $n$ and the side of the needle which is directly exposed about the rivet, for the side wall of the carriage next the upright B′ is cut away opposite and about that part of the needle into which the drill is made to enter, the said blade co-operating with the end of the wire therein to constitute a rivet. In this way the handling of separate rivets is entirely avoided, and the rivets may be formed in the needles very rapidly. The wire $w$ (partially shown in Fig. 9) on its way into the groove in the jaw $n$ is passed under a friction device 12, shown as a spring attached by a screw 13 to a bar 14 let into a groove in the block D, the said bar being held in place by the screws 15 in the cap 16, said cap and the cap 17 both held by screws upon the top of the block D, keeping the sliding jaws down in the groove referred to in the said block. The jaw member $n$ has a pin 18, (shown in Fig. 1 by breaking away the cap 16 and the block D,) the said pin having connected to it one end of a spiral spring 19, the other end of which is attached to a suitable pin 20 inserted in the block D, the said spring normally acting to draw the wire holding and feeding jaws backward or away from the carriage, the extent of such backward movement being regulated by the stop 22, adjustably connected by the screw 23 to the block D′. As the said jaws are retracted by the said spring they are opened, for at such time the projection $m^2$ is away from under the stud $m'$, and as the wire is held frictionally by the spring 12 the jaws are moved back along over the said wire, the ends of the jaws being drawn back of the end of the wire more or less, according to the position of the said stop 22, the jaws being thereafter clamped upon the wire when the latter is again to be carried forward to have its end inserted into the needle. While the jaws are being moved backward or retracted over the wire, as stated, the slide-bar $d$, before referred to, is pushed forward to turn the clamp C in the direction to release the body of the needle and permit the ejector to discharge the same, and the carriage is moved back to its starting-point. The cutter-carrier is moved at the proper time to cause the blade 10 to act and cut the wire by the projection 24 of the cam $D^2$, the spring 27, connected to the said carrier, (see Fig. 9,) normally acting to keep its end against the cam 24. The screw 26 acts as a stop for the carriage $B^2$ in its backward movement.

Believing myself to be the first to make a machine by which to drill rivet-holes in the needle and then to feed the needle into position to have a rivet inserted in the said drilled hole to hold the latch, and also believing myself to be the first to insert the end of a rivet or a wire automatically into the needle to hold the latch, I do not desire to limit my invention to the exact form of the drill-spindle or to the exact form of the jaws for inserting the wire, or to the exact form of the cutting mechanism by which to cut off the wire, or to the exact form of clamp to hold

the needle, or to the means employed by which to actuate the said parts, as instead I may use any other equivalent or well-known form of mechanical devices.

I claim—

1. In a machine for providing knitting-machine needles with latches, the following instrumentalities, viz: a clamp having a movable jaw and adapted to support and grasp and hold at its sides the needle to be drilled, leaving the slot in the needle exposed and open for the reception of the latch, and a spindle having a drill to drill a hole in the needle and at the same time to pass through a hole in the latch of the needle, substantially as described.

2. The spindle and drill, a cam to move the spindle and drill longitudinally to drill a hole in the needle, and devices, substantially as described, to support the back of the needle and clamp it at its sides, combined with a gage to determine the position of the latch between the side walls of the needle preparatory to drilling the said walls, substantially as described.

3. The drill-carrying spindle, the drill, and means, substantially as described, to actuate it, combined with means, substantially as described, to clamp and hold the needle to be drilled, and a gage for the end of the needle, substantially as described.

4. In an organized machine for providing knitting-machine needles with latches, the following instrumentalities, viz: a clamp to clamp the sides of the needle to be drilled with its slot exposed, a gage to determine the position of the needle in the clamp, a gage to determine the position of the latch in the slot between the side walls of the clamped needle, and a drill-spindle and drill to drill the side walls of the needle and during such operation pass through a hole previously made in the latch, substantially as described.

5. In an organized machine for providing knitting-machine needles with latches, the following instrumentalities, viz: a clamp to clamp the sides of the needle to be drilled with its slot exposed, a gage to determine the position of the needle in the clamp, a gage to determine the position of the latch in the slot between the side walls of the clamped needle, and a drill-spindle and drill to drill the side walls of the needle and during such operation pass through a hole previously made in the latch, and movable jaws to grasp and insert the rivet-wire into the drilled hole in the needle to secure the latch, substantially as described.

6. In an organized machine for providing knitting-machine needles with latches, the following instrumentalities, viz: a clamp to clamp the sides of the needle to be drilled with its slot exposed, a gage to determine the position of the needle in the clamp, a gage to determine the position of the latch in the slot between the side walls of the clamped needle, and a drill-spindle and drill to drill the side walls of the needle and during such operation pass through a hole previously made in the latch, and movable jaws to grasp and insert the rivet-wire into the drilled hole in the needle to secure the latch, and cutting devices to cut the rivet-wire, substantially as described.

7. The carriage, the pivoted clamp C and jaw *b* thereon, and the needle-ejector, combined with means to move the said clamp upon its pivots in a direction to release the needle and enable the ejector to push the same from the said clamp, substantially as described.

8. The carriage and the pivoted clamp therein having a jaw *b*, combined with a spring to normally close the said jaw upon the needle, substantially as described.

9. The carriage, the clamp therein having a jaw *b*, and a drill-spindle and drill, combined with the clamp-locking device, to operate substantially as described.

10. In a machine for providing needles with latches, jaws to grasp and hold and feed a wire to form a rivet, combined with means to hold the needle and latch for the reception of the said rivet-wire, substantially as described.

11. The carriage, means, substantially as described, to clamp the needle to be drilled, and the drill-spindle and drill, and means, substantially as described, including a cam to actuate the same longitudinally, combined with the pivoted block in which the said drill-spindle is mounted, substantially as described.

12. The carriage, the means to clamp the needle to be drilled, and the spring-controlled drill-spindle and drill, and means to actuate the same longitudinally against said spring-action, combined with the pivoted block in which the said drill-spindle is mounted, and with means, as described, to lock the said block in place, substantially as described.

13. The carriage, means therein to clamp a needle, and mechanism therein, substantially as described, to drill the rivet-receiving hole in the needle, combined with means, substantially as described, to move the carriage, and with jaws and means, substantially as described, to operate them to insert the end of a wire for a rivet into the hole drilled in the needle, substantially as described.

14. Clamping means to hold a needle with a latch therein, combined with jaws to grasp a rivet-wire and insert the end thereof into a hole previously drilled into the needle and through a hole in the latch of the needle, substantially as described.

15. The jaws to grasp and insert a wire into a hole previously drilled in a needle, and means to clamp and hold the said needle, combined with a cutter to sever the said wire after inserting the same into the needle to thereby form a rivet, substantially as described.

16. The jaws *m n* and means, substantially

as described, to move the jaw *m* to hold and release the wire, and means, substantially as described, to reciprocate the said jaws, combined with a pivoted clamp to clamp and hold the needle having a hole in which the end of the said wire is to be inserted for a rivet, substantially as described.

17. The sliding jaw member *n* and the jaw member *m*, pivoted thereon at 6, combined with the cutter-carrier *r*, also pivoted at 6, and with a cam having projections to actuate the said parts to feed a wire and cut the same off, substantially as described.

18. The uprights B B′ and the carriage thereon having a projection provided with a block $B^5$, combined with a drill-spindle, a drill, clamping mechanism for the needle to be drilled, and a cam to move the said carriage, substantially as described.

19. The uprights B B′ and the carriage thereon having a projection provided with a block $B^5$, combined with a drill-spindle, a drill, clamping mechanism for the needle to be drilled, and a cam to move the said carriage, and with the shaft A′, the loose pulley having ratchet-teeth and a projection $A^6$, and a latch $A^4$ to engage the said projection and draw the hub on the said shaft to stop the machine at the completion of one rotation of the said shaft, substantially as described.

20. The carriage, the bed-block *a* therein pivoted at one end, and an adjusting device to elevate one end of the said bed-block, combined with a clamp and jaw thereon to clamp a needle to be drilled, the movement of the adjusting device enabling the machine to be adjusted to the depth of the needle to be drilled, substantially as described.

21. In a machine for providing needles with latches, the following instrumentalities, viz: a drill-carrying spindle, a drill, means to actuate the said drill, means to clamp and hold the needle to be drilled, a gage to position the said needle, and with feeding and clamping jaws to insert the end of a wire into the hole previously drilled, and cutting mechanism to sever the said wire and thus form a pivot for the latch of the needle, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN J. JENKINS.

Witnesses:
C. J. DARRAH,
DAVID F. CLARK.