

No. 682,533.

Patented Sept. 10, 1901.

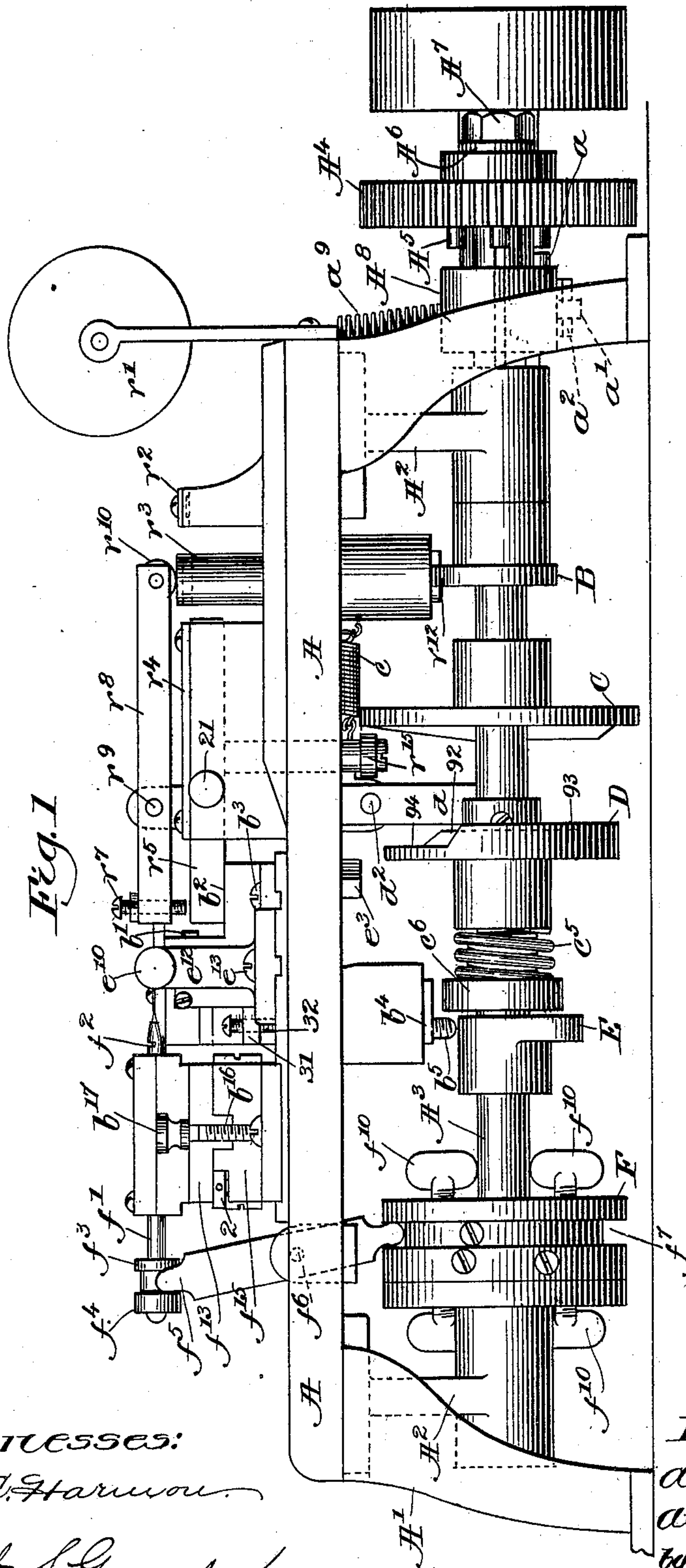
A. CURRIER & A. B. DODGE.

MACHINE FOR INSERTING LATCH PIVOTS INTO LATCH NEEDLES.

(Application filed Dec. 18, 1897.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:

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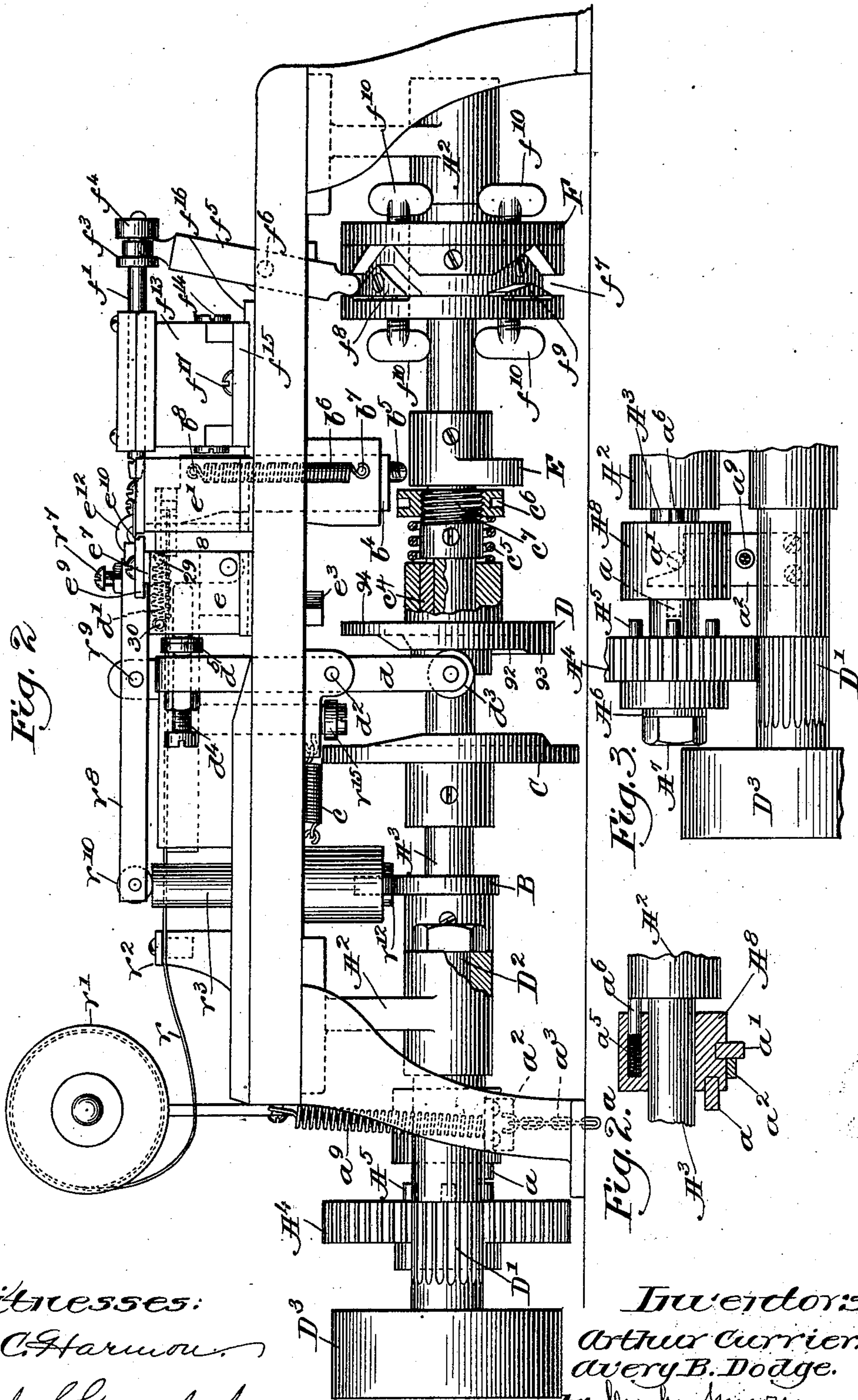
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4 Sheets—Sheet 2.



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4 Sheets—Sheet 3.

Fig. 4.

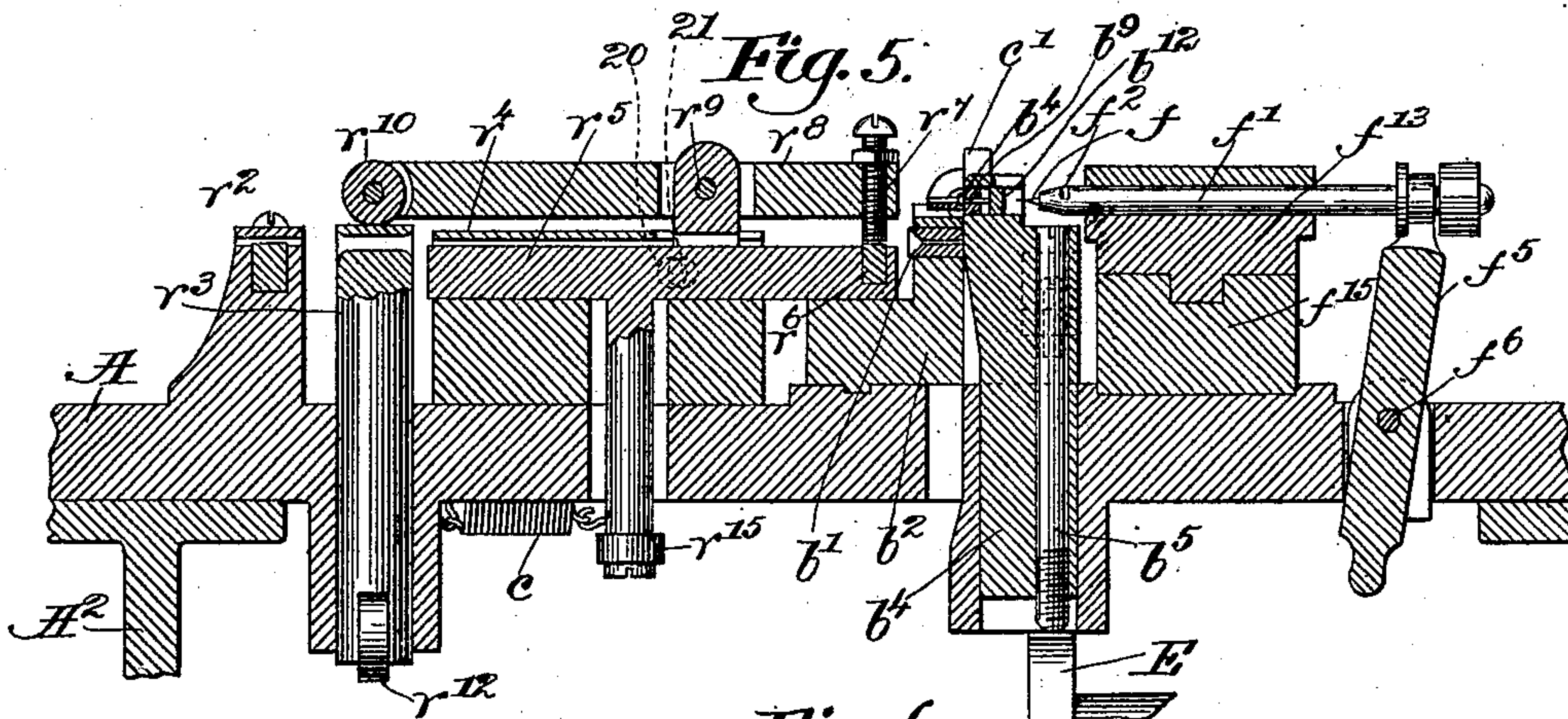
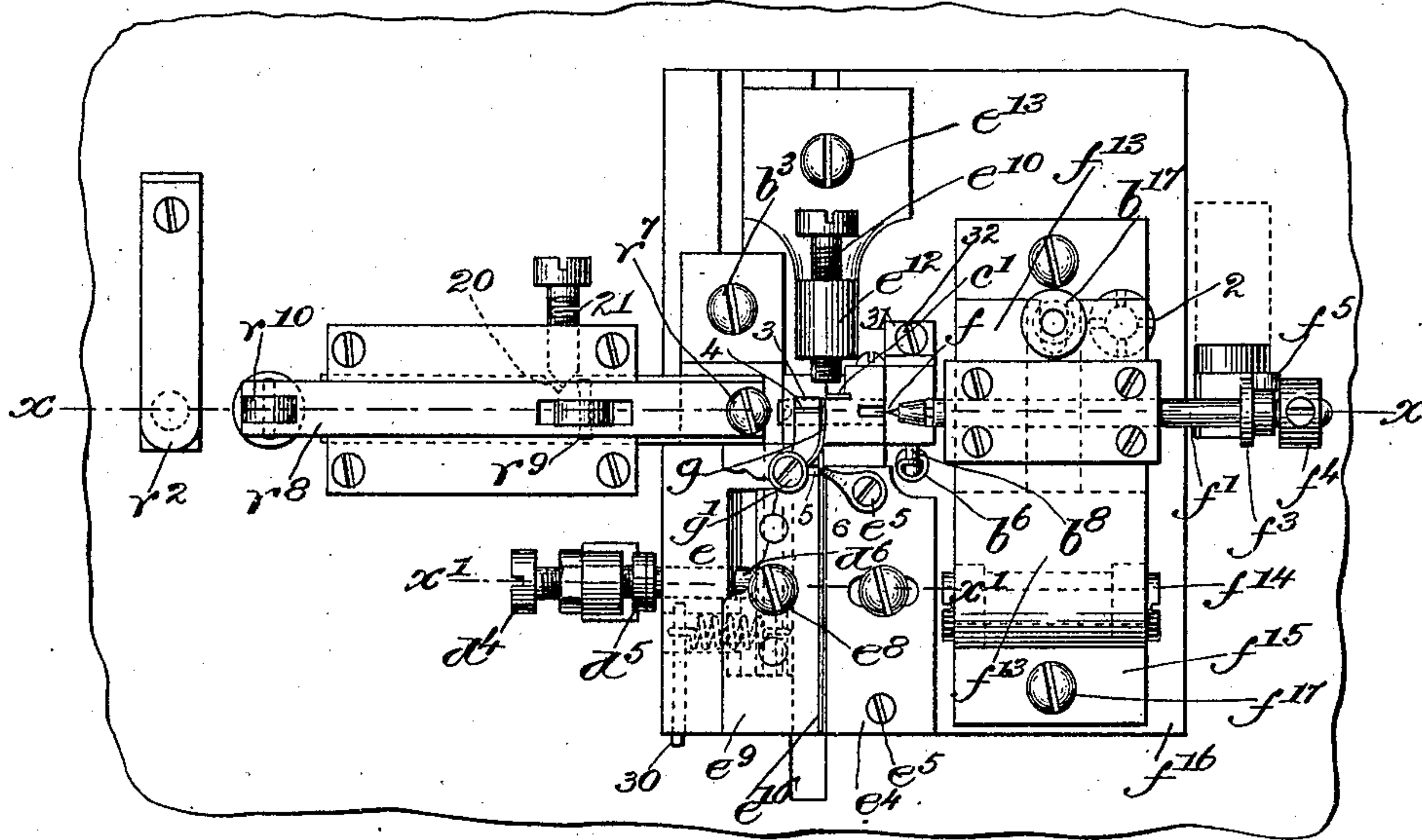
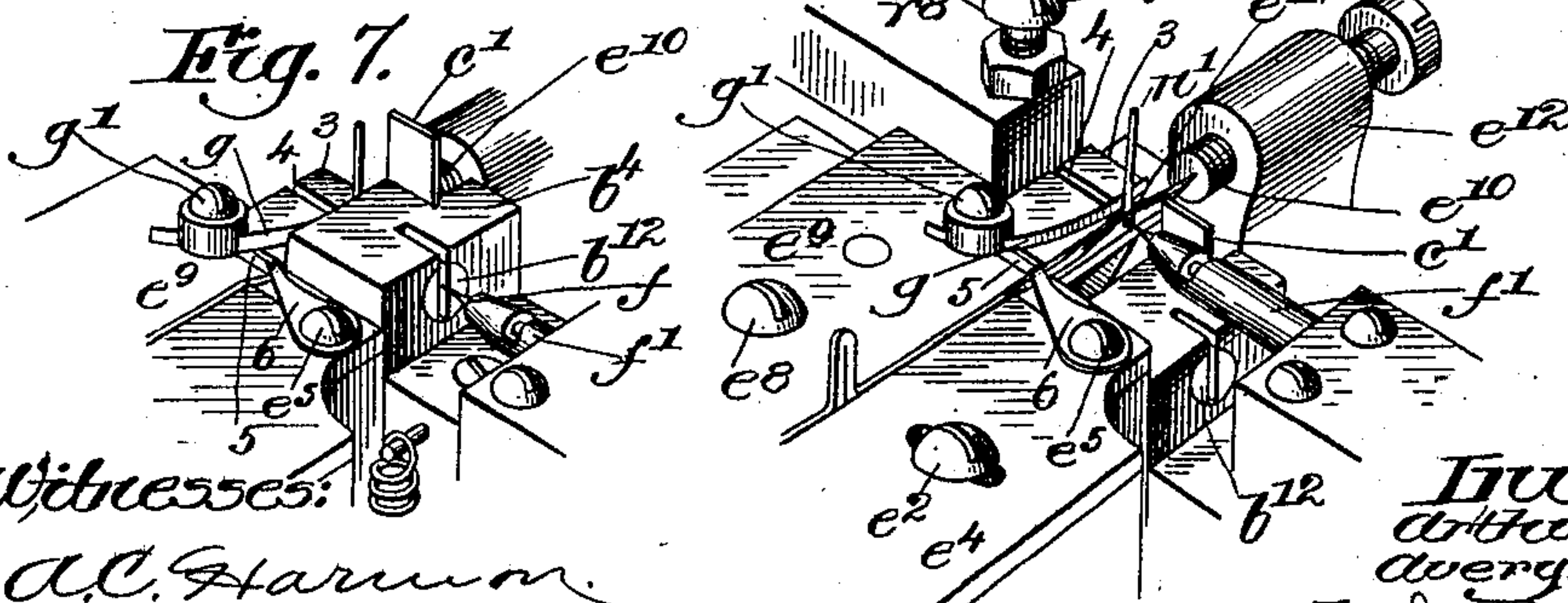


Fig. 6.



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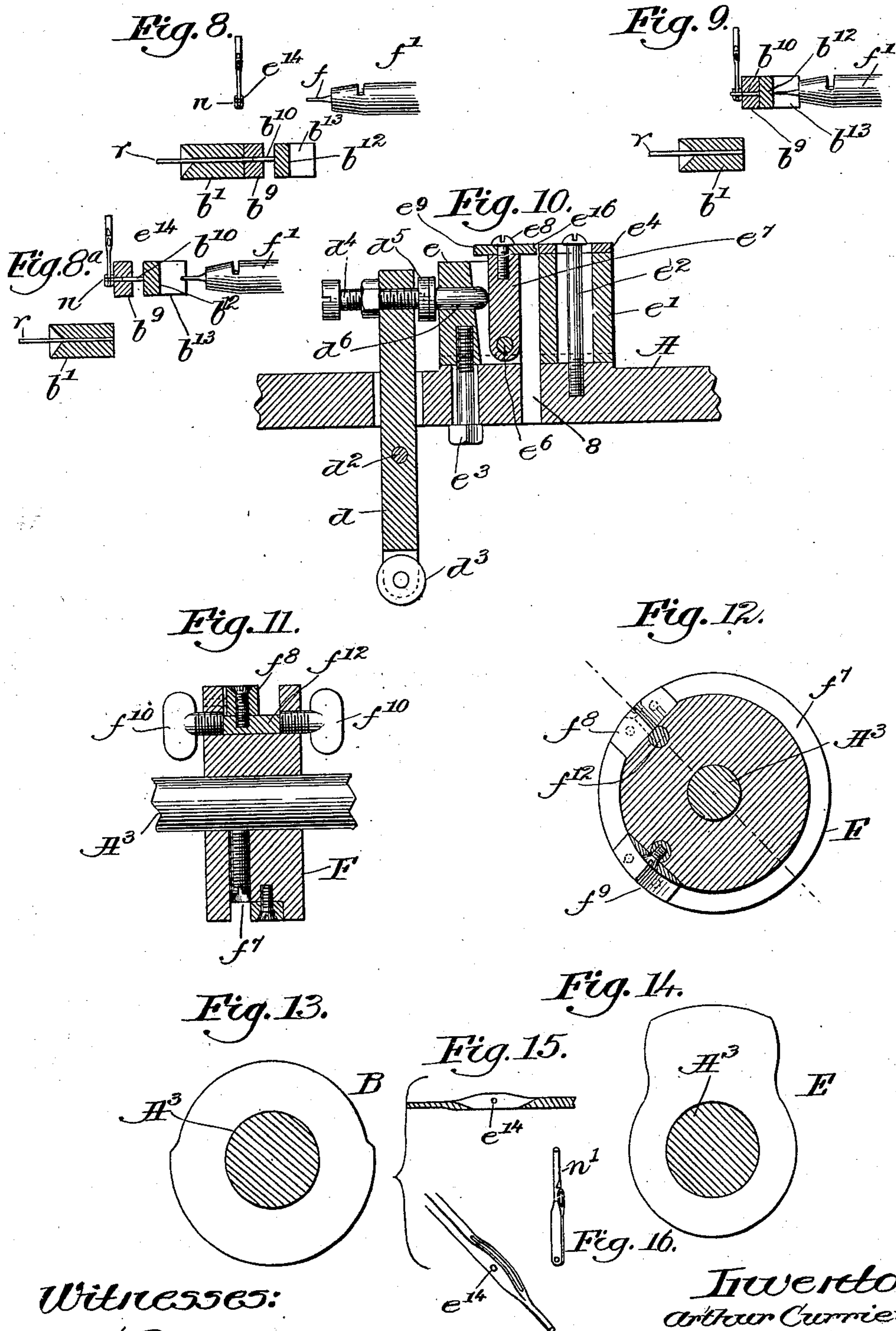
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

ARTHUR CURRIER AND AVERY B. DODGE, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNORS TO DODGE NEEDLE COMPANY, OF SAME PLACE.

MACHINE FOR INSERTING LATCH-PIVOTS INTO LATCH-NEEDLES.

SPECIFICATION forming part of Letters Patent No. 682,533, dated September 10, 1901.

Application filed December 18, 1897. Serial No. 662,382. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR CURRIER and AVERY B. DODGE, of Manchester, county of Hillsboro, State of New Hampshire, have invented an Improvement in Machines for Inserting Latch-Pivots into Latch-Needles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The latches of latch-needles used in knitting-machines are pivoted at one end in grooves or slots made in the body of the needle, and commonly the body of the needle is provided with a hole by means of a suitable drill, and the latches are provided with holes, each being done in a separate operation, and the latches having the holes are put into grooves or slots of the bodies by the hand of the operator, who then by means of suitable pincers holding the pivot for the latch inserts said pivot into the hole in the body of the needle and through the hole in the latch, and thereafter said parts are suitably fastened together, usually by upsetting or heading the pivot. Some attempts have been made to do this work automatically, and in such attempts the latch provided with the hole has been put into the groove or slot of the body of the needle, and the body has then been drilled, the drill being supposed to enter the hole in the latch, and the body having been drilled the parts have been put in a new position, where the end of a wire which is to constitute the pivot to hold the latch in place has been inserted in the drilled hole of the body and through the latch, after which said wire has been cut off; but in this plan it very frequently happens that the drill in its passage through the body of the needle fails to meet correctly the previously-made hole in the latch, and as a result thereof the latch is spoiled, for it will be remembered that the latches are very small, and that they may operate properly, especially with fine needles, the hole in the latch must be kept as small as possible, and the material surrounding the hole in the latch must be as thin as possible, and it must be intact, and if at all split, bent, or broken the needle becomes useless. Further, when the walls of the groove or slot

in the body of the needle are drilled after putting the latch into the groove burs are left next to the latch by the passage of the drill through the side walls of the body, and said burs tend to enter the hole made in the latch, said burs obstructing the free movement of the latch, and when in use the burs wear off the latch is left too loosely pivoted in the needle and the needle has to be thrown away.

We have devised a machine by which to automatically insert the pivots into the previously-drilled holes of the body and of the latch of the needle. The pivots are produced as needed from a continuous wire, and each pivot as soon as it is formed is transferred by a pivot-presenter into position opposite the drilled hole in the body of the needle.

Our machine to be herein described contains jaws, which clamp between their faces the body of the previously-drilled needle to be provided with a latch and its pivot, and said needle when being put into the jaws to receive a pivot is pushed forward against a suitable stop, which by its adjustment insures a definite position for the hole in the body of the needle with relation to the other parts to be described. The latch provided with a hole is inserted in the groove in the body of the needle, and the hole in the latch is positioned approximately in line with the hole in the body of the needle, and the latch is held in such position by a suitable holding device, preferably a spring-finger. After this we call into operation a device which in the absence of a better term we designate as a "hole-finder," it being moved to enter the positioned hole in the body of the needle, said finder also entering the hole in the latch if any part of said hole is so nearly in line with the hole in the body of the needle as to enable the fine sharp point of the finder to enter any part of the hole, said finder correctly centering the latch in the groove or slot of the body, the spring or flexible holder allowing the drilled end of the latch to be moved into the correct position. In case the latch has been incorrectly placed in the groove or slot in the body provision has been made by which to enable that one of the jaws which resists the pressure of the hole-finder against

the needle-body to yield, as will be described, to prevent the breaking of the parts. On the contrary, however, if the hole-finder leaves the latch in proper position then the jaws which previously held the needle in place are further closed to firmly clamp the body of the needle while the hole-finder is retracted. The hole-finder having been retracted, the pivot-presenter, it having in it one end of the continuous wire from which the pivots are made in succession, is moved from its inoperative into its operative position, and in such movement a sufficient portion of the end of the wire to form the pivot next to be inserted is cut off and carried by the presenter into position opposite the hole in the body of the needle, and said pivot having been alined with the hole in the body of the needle the pivot is removed from the pivot-presenter into the said hole by a suitable pivot-inserter and the jaws clamping the needle are opened to release the needle having the pivot inserted in it and permit the needle to drop out of the machine.

The particular features in which this invention consists will be hereinafter more fully described, and designated in the claims at the end of this specification.

Figure 1 is a front elevation of a machine embodying our invention. Fig. 2 is a rear elevation thereof, partially broken out. Fig. 2^a is a section of the clutching-hub A⁸. Fig. 3 is a detail showing the automatic clutch of the driving mechanism employed to stop the machine at a predetermined point after the completion of the operation of inserting a pivot and by which to start the machine at the proper time. Fig. 4 is a plan view of the top of the machine. Fig. 5 is a section on the line *x*, Fig. 4. Fig. 6 is an enlarged detail in perspective showing the needle-body and its latch as about to be acted upon by the hole-finder. Fig. 7 shows the hole-finder retracted and the pivot-presenter elevated into its operative position. Figs. 8, 8^a, and 9 are diagrammatic views chiefly to illustrate parts of the devices represented in Figs. 6 and 7—viz., the hole-finder, the body of the needle, with a latch set therein, one of the wire-cutting devices, and the pivot-presenter and pivot-inserter. Fig. 10 is a cross-section on the line *x'*, Fig. 4. Figs. 11 and 12 show different sections of the cam for operating the hole-finder twice—once to enable it to act as a finder and a second time to enable it to perform its dual function of aiding in inserting the pivot. Figs. 13 and 14 are details of cams to be described. Fig. 15 represents in two details a longitudinal section of the body of the needle and a perspective view of the body of the needle to illustrate the groove or slot therein, and Fig. 16 an enlarged view of a latch in the condition in which it is put into the groove in the body of the needle.

The framework consists of any usual or suitable bed A, resting on suitable legs A'. This framework supports suitable bearings

A² for the main shaft A³, it being provided with a series of cams B C D E F, to be hereinafter described. The end of the main shaft A³ has mounted loosely upon it a toothed gear A⁴, having at its inner side a series of clutch-teeth or projections A⁵, said loose gear being prevented from longitudinal movement on said shaft by or through the contact of the inner side of said gear with a shoulder on said shaft, a washer A⁶ and nut A⁷ cooperating with the hub of said gear.

Splined on the main shaft A³, at one side of the gear A⁴, is a clutching-hub A⁸, said hub having at its end next said gear a suitable pin or projection *a*, and said hub has projected from its periphery a stud *a'*, (shown only by dotted lines in Figs. 1 and 3,) said stud having cooperating with it a clutch-opener, shown as a spring-plate *a*², suitably fixed to the framing and provided at its end with a tapering finger, (best shown by dotted lines in Fig. 3,) said spring-plate having attached to it at its lower side a chain *a*³, which in practice is connected with any suitable treadle at the floor, so that said spring-plate may be lowered to remove its end from the stud *a'*, a spring *a*⁵ (see Fig. 2^a) then acting on a sliding pin *a*⁶ and causing said pin by contact with the bearing A² to move the clutching-hub A⁸ to the left, viewing Figs. 2 and 3, to put the pin or projection *a* thereof into the path of movement of the continuously-moving pins or projections A⁵, extending from the pinion A⁴, to thus start in motion the main shaft. Near the end of the first rotation of the main shaft the pin or projection *a'* of the clutching-hub A⁸ meets the tapered finger or end of the spring-plate *a*², and the said clutching-hub is slid to the right, viewing Figs. 2 and 3, thus freeing it from the control of the rotating gear A⁴, leaving the shaft A³ at rest and in its normal starting position. In this way the main shaft is stopped at exactly the same position after each operation and is left in condition to be started from the same position. A suitable spring *a*⁹ may be connected with the spring-plate *a*² to normally keep it elevated in proper working position to cooperate with the pin or projection *a'*.

The bed A contains upon its surface two blocks *e* and *e'*, and said blocks are made horizontally adjustable on said bed, one toward or from the other, and to the other cooperating parts. The block *e'* is held in place (see Fig. 10) by a suitable screw *e*² inserted through it and into the bed, while the block *e* is held in position by a suitable bolt *e*³ extended through the bed. The block *e'* presents at its top a jaw *e*⁴, which is held in position on the block by suitable screws *e*⁵. (See Fig. 4.) The block *e* has a pin or rod *e*⁶, on which is mounted a lever *e*⁷, to the upper end of which by a suitable screw *e*⁸ is attached a second jaw *e*⁹, said jaw having its edge shaped to present a shoulder *e*¹⁰, against which may rest the lower side of the needle, which is to be operated upon, said needle,

it being understood, having been grooved or slotted for the reception of the latch and having had the side walls of said groove drilled for the insertion of the pivot of the latch, the extremity of the needle not, however, having been yet bent to form the hook of the needle. This extremity and the hole in the body of the needle are equidistant in all needles of the same size or gage to be run through the machine, and the end of this body when laid in the space between the two jaws referred to is pushed against the adjustable stop e^{10} , shown as a screw mounted in an ear of a suitable stand e^{12} , herein shown as connected to the bed-plate by means of a suitable screw e^{13} . This stop e^{10} may be adjusted to correspond with the particular size of needles to be operated upon, and it will be placed in such position that when the end of the needle is put against it the previously-drilled hole e^{14} in the needle, said hole being shown enlarged in Fig. 15, will be placed in correct position in alinement with a hole-finder f , to be described. This hole-finder is shown as composed of a small fine-pointed pin inserted in one end of a bar f' , having near its end a cross-notch in which is exposed the inner end of the hole-finder, so that said hole-finder may be readily accessible by a tool in the hands of the operator when for any reason the hole-finder is to be removed and another substituted for it. This carrier or bar is provided at its inner end with suitable collars or projections $f^3 f^4$, between which lies the upper end of a lever f^5 , pivoted at f^6 , the lower end of said lever entering an irregular groove f^7 in the cam F, said groove being of such shape that said lever will be moved twice during each rotation of the main shaft, and one side of the cam-groove is so shaped as to impart to the said lever f^5 at each rotation of the main shaft two different throws varying in extent, the greatest throw being that to move the carrier when the hole-finder is operating to find the hole in the body of the needle and the latch, the throw of less length being given to the lever f^5 when the carrier is moved for its dual operation of assisting in inserting the pivot into the body and latch. To enable this cam to act with needles of varying sizes and gages, it has been provided with movable projections or cams f^8 and f^9 , f^8 having the greater throw, each movable cam being made adjustable laterally in the cam-path of the cam F by or through suitable adjusting-screws f^{10} . These cams f^8 and f^9 are each secured to a like pin f^{12} , inserted into the holes in which are inserted the screws f^{10} , and by adjusting said screws in one or the other direction, their ends acting on the pins f^{12} , the position of the cams f^8 or f^9 are adjusted to exactly the desired point to secure for the lever f^5 its desired extent of movement.

The bar f' is represented as free to slide in a stand f^{13} , pivoted at f^{14} on ears of a suitable bracket f^{15} , which is secured adjustably

to the bed by means of a suitable screw f^{17} , passing through a suitably-formed elongated slot in said bracket. This being a common means for securing adjustment, I do not deem it necessary to illustrate the slot. The foot f^{15} has a stop made as a screw 2, which may be turned more or less into said foot, and on this stop rests the free end of the stand f^{13} , said stand having a slot (represented in Fig. 1) in which may enter a binding-screw b^{16} , having applied to its threaded upper end a suitable clamping-nut b^{17} . The adjustment of this stop and the manipulation of this nut enables the stand f^{13} to be held at exactly the proper position in a horizontal plane to enable the hole-finder to correctly enter the hole in the body of the needle.

The body of the needle, properly drilled, having been laid in the clamp with its end against the adjustable stop e^{10} , the latch n' (shown separately and enlarged in Fig. 16) is inserted into the groove or slot in the body of the needle, the latch being steadied when being so inserted by contact against a suitable friction device g , shown as a fine spring held in place by a suitable screw g' , having a washer under its head which acts upon the spring. One end of the jaw e^9 (see Fig. 4) is extended, as at 3, to constitute an abutment for the needle at the point where the hole-finder is inserted, said abutment being grooved at 4 for the passage of said hole-finder, and said jaw has the groove 5, which is so located as to receive the end of a spring 6, connected to the jaw e^4 by means of one of the screws e^5 , said spring normally resting on the needle-body between its butt and its grooved part, which receives the latch, said spring acting to depress the needle and throw it down into the space 8 between the blocks e and e' after the said jaws shall be fully opened and the latch shall have been properly pivoted in the body of the needle, said spring also serving to properly keep the needle pressed down upon the shoulder e^{16} of the jaw e^9 . The latch having been placed in position, the lever f^5 is moved by the projection f^8 of the cam F and the carrier or bar f' is moved to the left, viewing Figs. 2, 4, and 5, and the hole-finder enters the drilled hole in the body of the needle, and if the hole in the latch is at all in line with the fine point of the hole-finder said hole-finder enters the hole of the latch, correctly positioning it with relation to the hole in the body of the needle, and the hole-finder passes on through the opposite side of the hole in the body of the needle. The spring g by its friction keeps the latch in this position during the operation of inserting the pivot. The hole-finder having operated, the lever f^5 is moved to retract it into its normal or starting position.

The wire r to be used for the pivot may be taken from any usual or suitable reel or spool r' and led under a suitable tension or friction device r^2 , shown as a spring, thence through a suitable hole in a movable post r^3 ,

and thence underneath a cap or plate r^4 , along over the top of a sliding bar r^5 , and thence between wire-clamping means, shown as a block r^6 , and a suitable screw r^7 , carried in the end of a lever r^8 , pivoted at r^9 on an ear rising from the sliding bar r^5 , the opposite end of said lever having, as herein represented, an antifriction-roller r^{10} , which rests upon the top of the post r^3 , said post having, as herein represented, at its lower end a trundle r^{12} , which is acted upon by the cam B on the main shaft A³. In the rotation of the main shaft this cam elevates the post r^3 , oscillates the lever r^8 , and causes the wire between the surfaces r^7 and r^6 to be clamped and fed while the bar r^5 and lever r^8 , composing the wire-feeding device are being moved to the right, viewing Figs. 2 and 5, and the free end of the wire is fed into a cutting-block b' , inserted in a hole in a block b^2 , held in adjusted position by means of a suitable screw b^3 , the front end of said cutting-block being flush with the vertical face at the right of said block. (Shown in Fig. 5.)

The bed of the machine receives a movable plunger b^4 , provided with an adjustable toe-piece b^5 , which rests on and is actuated by the cam E, said toe-piece being held in contact with said cam by means of a suitable spring b^6 , connected with a stud b^7 , (see Fig. 2,) fixed with relation to the bed, and to a suitable stud b^8 , (shown by dotted lines in Fig. 2 and full lines, Fig. 4,) which is supposed to extend from the said plunger b^4 . This plunger at its upper end has a transverse opening in which is placed a block or cutting member b^9 , constituting both a wire-cutter and a pivot-presenter (shown in Fig. 5 and much enlarged in Figs. 8 and 9,) said block or cutting member having a hole coinciding in the lower position of said block with the hole in the cutting member b' , so that the free end of the wire while the hole-finder is operating, as described, may be fed forward into the member b^9 for the desired distance, the end of the wire during such operation striking against the pivot-inserter b^{10} , (see Figs. 8 to 10,) which is a short pin which normally occupies a position in said member b^9 . When the pivot-inserter is pushed to the right, viewing Fig. 8, by the insertion of the wire r in the member b^9 the right-hand free end of the pivot-inserter meets the face of a block b^{12} , which is mounted loosely in the upper end of the plunger b^4 and slotted at b^{13} . After the hole-finder has operated to properly center the hole in the latch with relation to the holes in the body of the needle the cam E acts to lift the plunger b^4 and in so doing lifts with it the cutter member b^9 and the block b^{12} , and in this movement the wire is severed at the junction of the blocks b' and b^9 , leaving in the hole of the cutter member b^9 a pivot, and said cutter member is elevated until the said pivot is put in line with the open hole in the body of the needle and its latch, as represented in Fig. 9, and

the carrier or bar f' is then given its second thrust by the cam f^9 , so that the end of said carrier or bar acts against the slotted end of the block b^{12} , the hole-finder entering the notch b^{13} in said block, and the said block b^{12} is moved from the position shown in Fig. 8^a to the left into the position shown in Fig. 9, causing said block to act upon the pivot-inserter b^{10} , moving said pivot-inserter so that it will act upon the end of the pivot and push it from the presenter or member b^9 into the hole in the body of the needle and through the hole in the latch, as represented in Fig. 9. This having been done, the cam D, which while the pivot was being inserted acted on the lever d to hold the clamp firmly closed on the needle, is released from its pressure and comes into such position with relation to said lever as to permit the jaws to be opened by or through a suitable spring d' , connected to a suitable stud 29 of the lever e^7 , carrying the jaw, and to a suitable stud 30 of the block e . (See Figs. 2 and 4.) The jaw e^9 is closed by a lever d , pivoted at d^2 and provided at its lower end with a suitable roll or trundle d^3 , the upper end of said lever containing an adjustable finger d^4 , shown as a screw having a collar or washer d^5 at its inner end, which contacts with the head of a sliding pin d^6 , placed loosely in the block e and contacting with the lever e^7 , carrying the jaw e^9 . When the body of the needle is first placed between the jaws, the jaw e^9 is partially closed by the part 92 of the cam D to clamp the needle while the hole-finder is acting to enter the hole in the body of the needle and the latch, and it having entered the hole in the body and the latch properly said body is then firmly clamped between the jaws by the action of the part 93 of the cam D, and then the hole-finder is removed and the jaws continue to clamp the needle firmly until after the insertion of the pivot, when the jaws are opened by the spring d' , as stated, to let the needle be discharged, the part 94 of the cam D then being opposite the roll d^3 .

The part r^5 of the wire-feeding mechanism (see Fig. 4) has cut in one side of it a suitable V-shaped notch 20, (shown by dotted lines,) in which is entered the point of a locking-screw 21. If the said screw was fully entered in the said notch, there would be no movement whatever of the feeding mechanism; but by retracting said regulating-screw a space may be left which will define the extent of the feed movement. This feeding mechanism has a suitable antifriction-roller r^{15} , which is acted upon during the rotation of the main shaft by the cam C, said cam always moving the part r^5 toward the cutting-block b' and to the same point; but the said part r^5 is moved back by the spring c for a variable distance, according to the position of the feed-regulator 21.

The upper end of the plunger b^4 has connected with it a stripper c' , which stands against the needle while the hole-finder is op-

erating, as described, (see Fig. 6,) and should the hole-finder stick in the body of the needle when said finder is being retracted, as described, the needle might be bent were it not for the stripper acting against its side.

The machine herein described is and must necessarily be very delicate in its operation, and in case the latch should not be properly placed in the groove or slot of the body of the needle so that the point of the hole-finder can enter some part of the hole in the latch, then in that case the parts would be broken or injured, if means were not provided to let the jaw e^9 , which carries and supports the needle-body, yield to partake of the motions of the hole-finder. To provide for this, we have secured the cam D to the shaft A^3 by means of a spline c^4 and have backed up the hub of said cam by a suitable spring c^5 , so that said cam will move longitudinally upon its shaft whenever the pressure upon the jaw e^9 is in excess of an amount predetermined by the spring c^5 , the amount of pressure that that spring may exert being regulated by turning the nut c^6 , applied to a threaded part of a collar c^7 , fast on the main shaft, said nut coöperating with one end of the spring, or, in other words, the cam D will give way whenever the pressure of the hole-finder on the needle is greater than the parts can bear without injurious strains or whenever the pivot being inserted meets with some unforeseen obstruction which might bend it or if the pivot should be too large for the hole in the body of the needle.

The feeding mechanism herein described represents one form that may be used; but this invention is not limited to the employment of the particular feeding means shown, as we may employ instead any other usual or suitable wire-feeding devices.

The gear A^4 on the main shaft A^3 is rotated continuously by a hollow toothed pinion D' , which is adapted to revolve about a stud D^2 , said pinion having fast on it a suitable driving-pulley D^3 , which may be driven in any usual or suitable manner from any counter or other shaft. The plunger b^4 has an ear 31 extended from it at one side above the table A, (see Figs. 1 and 4,) and said ear has a screw 32, which may be adjusted in said ear to determine the extent to which said plunger may descend to thereby aid in securing the proper position for the plunger with relation to its receiving the wire, and by turning the screw b^5 the height to which the plunger may be lifted is regulated to thereby insure the putting of the pivot-inserter in exactly the proper position.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the class described, a stationary but adjustable jaw, an opposed movable jaw, one of said jaws having at one edge a shouldered part to receive upon it and support the body of the needle, a lever carry-

ing one of said jaws; a rotating shaft, a cam carried by said shaft loosely and adapted to rotate with said shaft and to slide thereon; combined with a spring to keep said cam in its normal position, a lever actuated by said cam, and means between said lever and the lever carrying one of said jaws, said spring enabling said cam to yield at desired times and prevent injury to the operative parts of the machine, substantially as described.

2. In a machine of the class described, a clamp to hold a needle, a lever to force said clamp on the needle, a rotatable shaft provided with a screw-thread, a collar adjustable on said screw-thread, and a cam splined loosely on said shaft and acting against said lever, combined with a spring interposed between the hub of said cam and said collar, the rotation of said collar on said screw-thread adjusting said spring that it may yield at the desired times and prevent injury to the operative parts of the machine.

3. In a machine of the class described, the following instrumentalities, viz: means to clamp the needle; wire-feeding mechanism; a wire-cutting member into which the end of the wire is fed; a pivot-presenter, it also receiving the end of the wire, said pivot-presenter also acting as a wire-cutter; and means for moving said pivot-presenter to not only sever the wire to form a pivot but to place the said wire-presenter and its pivot in line with the hole in the body of the needle, substantially as described.

4. In a machine of the class described, the following instrumentalities, viz: means to clamp the needle; wire-feeding mechanism; a wire-cutting member into which the end of the wire is fed; a pivot-presenter, it also receiving the end of the wire, said pivot-presenter also acting as a wire-cutter, and means for moving said pivot-presenter to sever the wire to form a pivot and place the said wire-presenter and its pivot in line with the hole in the body of the needle; and a pivot-inserter carried by and movable with the said pivot-presenter, substantially as described.

5. In a machine of the class described, the following instrumentalities, viz: means to clamp the needle; wire-feeding mechanism; a wire-cutting member into which the end of the wire is fed; a pivot-presenter, it receiving the end of the wire, means for moving said pivot-presenter to sever the wire to form a pivot and place it with the pivot in line with the hole in the body of the needle; a pivot-inserter carried by and movable with the said pivot-presenter; a block, and means to move it to act upon the said pivot-inserter and cause it to push the pivot from the said presenter into the hole in the body of the needle and its contained latch, substantially as described.

6. In a machine of the class described, jaws to clamp the body of a needle with its latch inserted therein; a hole-finder to position the

said latch correctly in the body of the needle; means to operate said hole-finder; a pivot-presenter; and means to move it to present a pivot opposite the hole in the said body; and a pivot-inserter to act upon said pivot and force it from said pivot-presenter into the hole in the body of said needle and the latch, substantially as described.

7. In a machine of the class described, jaws to clamp the body of the needle with its latch in position; a pivot-presenter; means to move it into position to place its pivot opposite the hole in the body of the needle; a pivot-inserter; a block to act on said pivot-inserter; and a carrier to act upon said block to move it, substantially as described.

8. In a machine of the class described, jaws to clamp the body of the needle with its latch in position; a pivot-presenter; means to move it into position to place its pivot opposite the hole in the body of the needle; a pivot-inserter; a slotted block to act on said pivot-inserter; and the carrier to act upon said block to move it, whereby the hole-finder carrier is enabled at a second operation to aid in inserting the pivot, substantially as described.

9. In a machine of the class described, jaws to clamp a needle having a hole made in it for the reception of a pivot, a stop for the end of the needle, a device to aid in holding in a slot of the needle the latch to be pivoted therein, a hole-finder, and means to actuate it to enter the hole in the needle and also the hole in the latch, combined with a stripper acting against said needle to prevent any lateral movement thereof while the hole-finder is being drawn out of the hole in the needle and the latch, substantially as described.

10. In a machine of the class described, jaws to hold the body of the needle, one of said jaws having a shoulder; combined with a spring carried by one of said jaws to produce friction upon the latch of the needle when inserted in the groove or slot in the body of the needle, substantially as described.

11. In a machine of the class described, a jaw e^4 , means to adjust said jaw upon its support, an opposed jaw having a groove at one edge in which may be placed the needle to be treated, a lever carrying said jaw, combined with a spring carried by the said stationary yet adjustable jaw, said spring acting upon the body of the needle to keep the same in the groove of the movable jaw, and means to move said movable jaw away from the fixed jaw, the said spring as the movable jaw is retracted from under the said needle serving to depress the needle and throw the same out from between the said jaws, substantially as described.

12. In a machine of the class described, jaws to hold the body of the needle drilled for the reception of a pivot; wire-feeding mechanism; a pivot-presenter; means to move it to place the pivot carried by it into position opposite the hole in the body of the needle; and

means to insert said pivot automatically into the said hole, substantially as described.

13. In a machine of the class described, wire-feeding mechanism, a wire-cutter b' , a second cooperating wire-cutter and pivot-presenter, and a pivot-inserter carried by the said wire-cutter and pivot-presenter, combined with means to move said wire-cutter to form a pivot and with it said inserter, and means to move said inserter longitudinally in said wire-cutter and pivot-presenter to drive said pivot therefrom, substantially as described.

14. In a machine of the class described, a fixed and a movable jaw, a lever to carry one of said jaws, and a spring to normally separate said jaws, combined with a lever, a yielding cam to actuate said lever, and connections between this latter lever and the lever carrying the said jaw, substantially as described.

15. In a machine of the class described, a sliding post having a hole to receive a wire-cutter, and a pivot-inserter also rising and falling with said wire-cutter, combined with a block also movable with said post, and means for moving said block to cause the pivot-inserter to drive said pivot from the said wire-cutter, substantially as described.

16. In a machine of the class described, the following instrumentalities, viz: a clamp composed of a stationary jaw, and a movable jaw having a recess to receive and hold the needle to be treated, a lever to carry said movable jaw, a wire-cutting member consisting of a block having a hole to receive the wire, a movable block carrying said cutting member, a stationary, opposed cutting member as b' , wire-feeding mechanism to move the wire through a hole in said stationary member and into the hole in the said movable member, the movement of the said movable member cutting off from the end of the wire a length thereof sufficient to form a pivot, and means to enter said movable cutting member and drive the pivot therefrom into the drilled hole of the needle when the said block is raised, putting the movable cutting member with its pivot contained therein opposite the hole in said drilled needle, substantially as described.

17. A clamp to grasp the body of the needle, a support for the rear side of the needle where it is provided with a drilled hole, combined with a latch-retaining device located in a plane just above the level of the top of said needle, and adapted to act frictionally against the latch, the end of which has been put into a slot of the said needle, said retaining device holding said latch in place in the needle, that it may receive the pivot to be inserted through the needle and the latch.

18. In a machine of the class described, a plunger having a wire-cutter to cut a pivot from the end of the wire, said plunger being provided with an adjustable foot; combined with a cam acting on said foot, and a pivot-inserter carried by said plunger, the adjustment of said foot determining the position to

be occupied by the pivot under the action of said cam, substantially as described.

19. In a machine of the class described, a plunger having a wire-cutter to cut a pivot
5 from the end of a wire, said plunger being provided with an adjustable foot, combined with a cam acting on said foot, and a pivot-
10 inserter carried by said plunger, combined with an adjusting device to determine the position of the said wire-cutter when the plunger is in its lowest position or down, substantially as described.

20. In a machine of the class described, the following instrumentalities, viz: a clamp to
15 clamp a drilled needle in position to receive a pivot, wire-feeding mechanism, wire-cutting mechanism coöperating with said wire to cut the same into pivot lengths, a pivot-inserter moving with one member of the wire-cutting
20 mechanism, and means to actuate said pivot-inserter to put said pivot into the drilled hole of the needle and through the latch held in position in said needle, substantially as described.

21. In a machine of the class described, a
25 hole-finder, means for operating the same to cause it to enter the alined holes in a needle and a latch, a pivot-inserter, and separate devices for holding the needle and latch in
30 proper relative position during a certain period of operation of the machine.

22. In a machine of the class specified, a
35 hole-finder, means for operating the same to cause it to enter the holes of a needle and its latch, a pivot-inserter operable independently of the hole-finder, and separate devices for holding the needle and the latch in proper relation during a certain period of operation.

23. In a machine of the class specified, a

hole-finder, means for operating the same to
40 cause it to enter the holes in a needle and its latch, a pivot-inserter operable independent of the hole-finder, and means for holding the needle and its latch in proper relative position during a certain period of operation. 45

24. In a machine for inserting pivots through previously-formed holes in needles and their latches, a stop located to be directly engaged by the needle, and a hole-finder mounted to move into the holes of the
50 needle and its latch.

25. In a machine for inserting pivots through previously-formed holes in needles and their latches, a standard, a screw carried by the standard and disposed longitudinally
55 of the line of feed of the needles and constituting an adjustable stop and located to be directly engaged by a needle, a hole-finder, and means for operating the hole-finder to cause it to enter the holes in the needles and
60 latches.

26. In a machine for inserting pivots through previously-formed holes in needles and their latches, a stop located to be directly engaged by the needle, means for clamping
65 the needle with one end in contact with said stop, means for holding the latch in proper relative position to the needle, and a hole-finder located to enter the holes in the needle and latch. 70

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR CURRIER.
AVERY B. DODGE.

Witnesses:

HARRY E. LOVEREN,
MARY E. PAIGE.