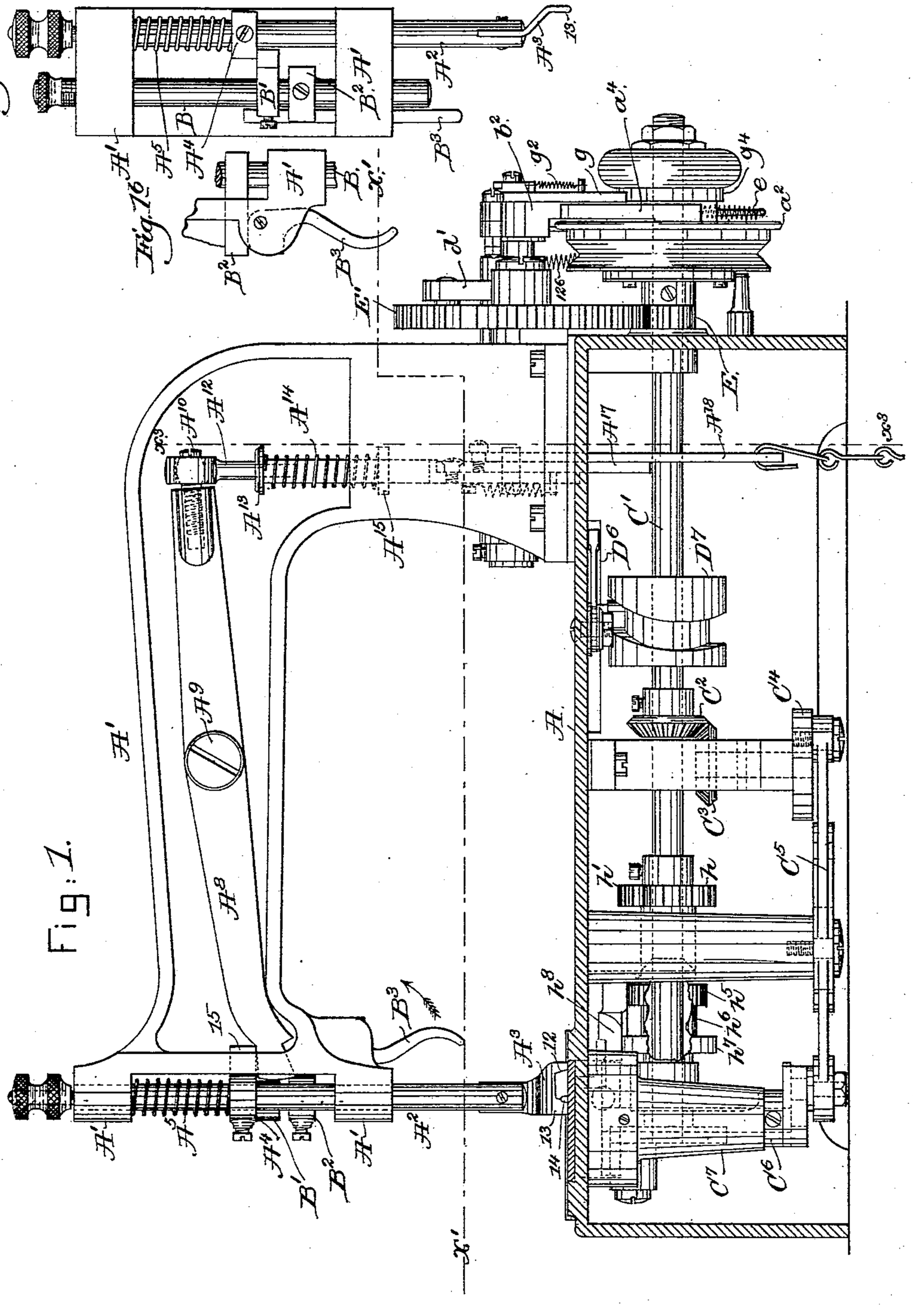
(No Model.) 4 Sheets—Sheet 1.

J. REECE.

SEWING MACHINE FOR BARRING BUTTON HOLES.

No. 441,700. Patented Dec. 2, 1890.



Witnesses.
Fred. A. Greenleaf
Frederick L. Emery

Inventor.
John Reece,
by Crosby & Gregory Attys.

(No Model.) 4 Sheets—Sheet 2.

J. REECE.

SEWING MACHINE FOR BARRING BUTTON HOLES.

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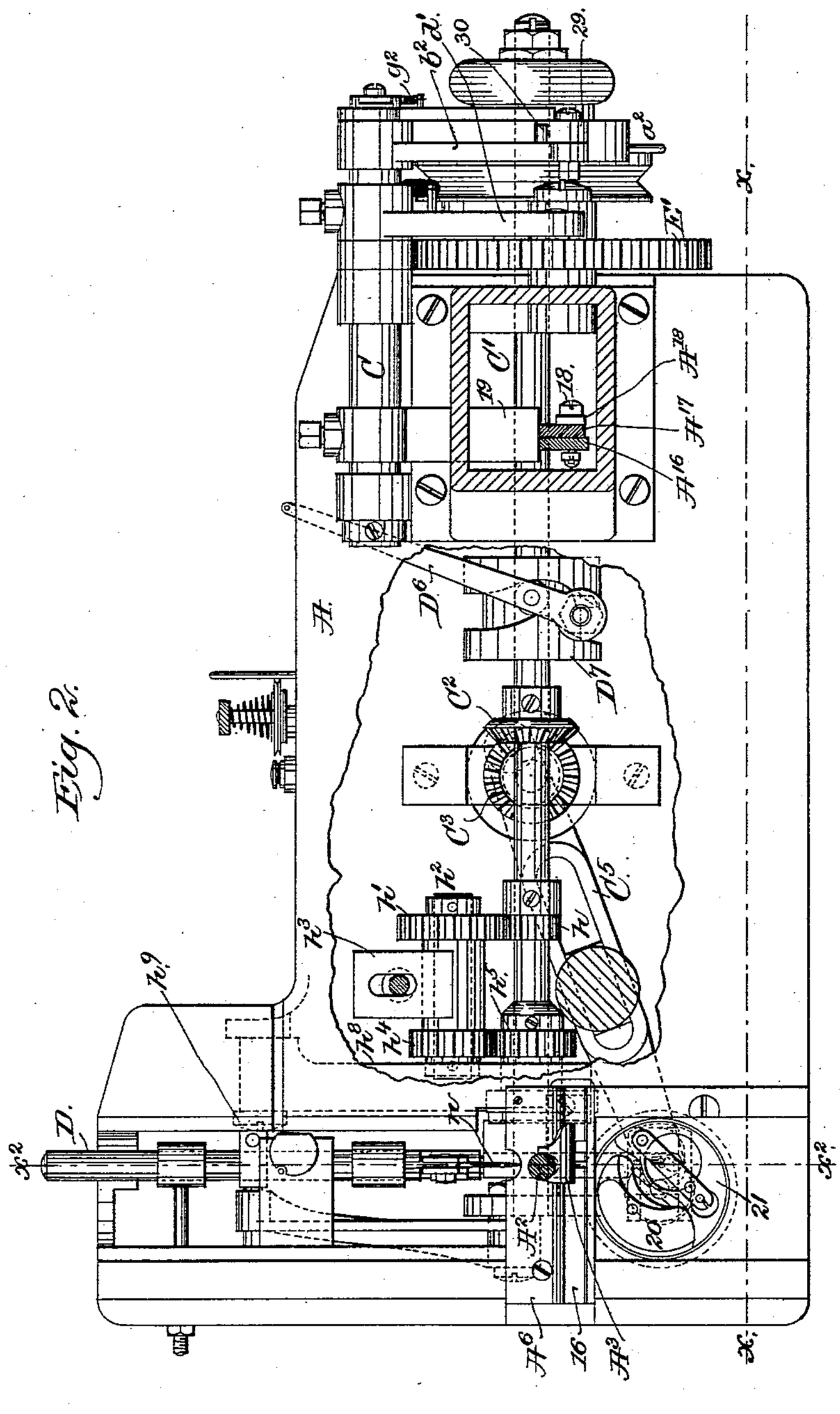


Witnesses.
Fred. A. Greenleaf
Frederick L. Emery

Inventor:
John Reece,
by Crosby & Gregory attys

(No Model.) 4 Sheets—Sheet 3.

J. REECE.

SEWING MACHINE FOR BARRING BUTTON HOLES.

No. 441,700. Patented Dec. 2, 1890.

Fig: 3.

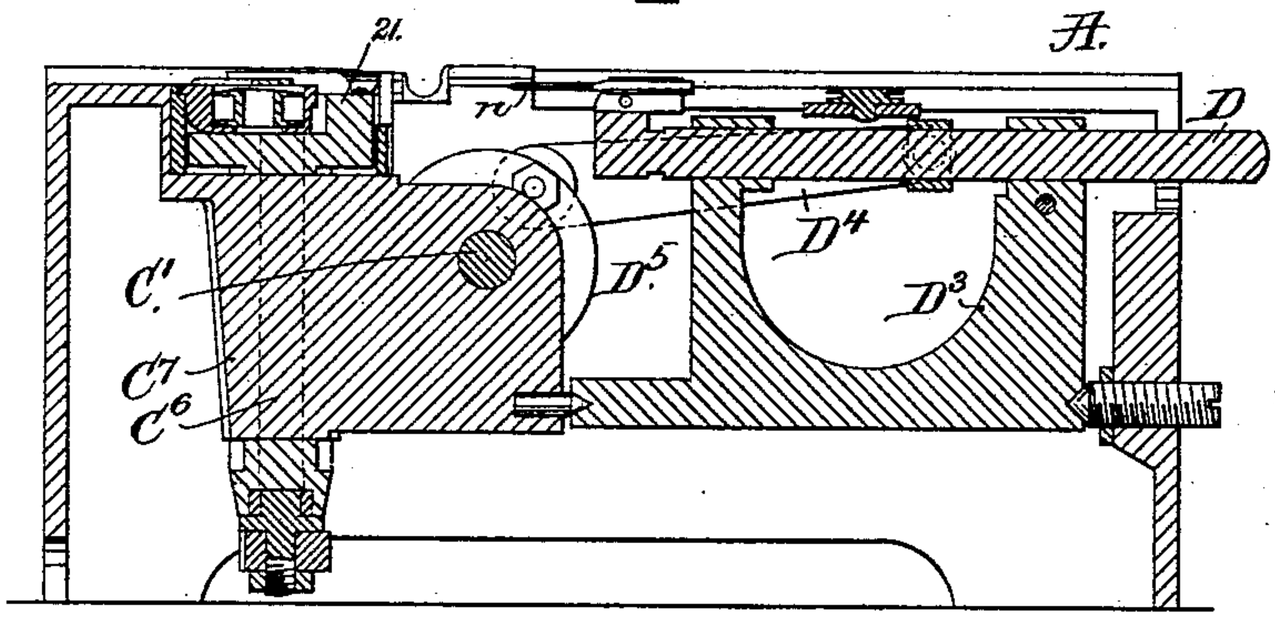


Fig: 7

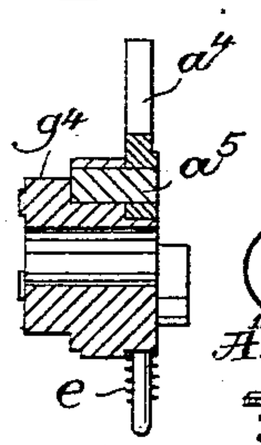


Fig: 8

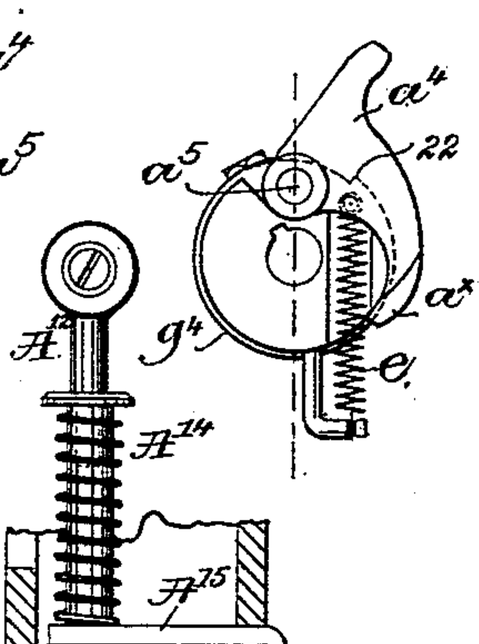


Fig: 9

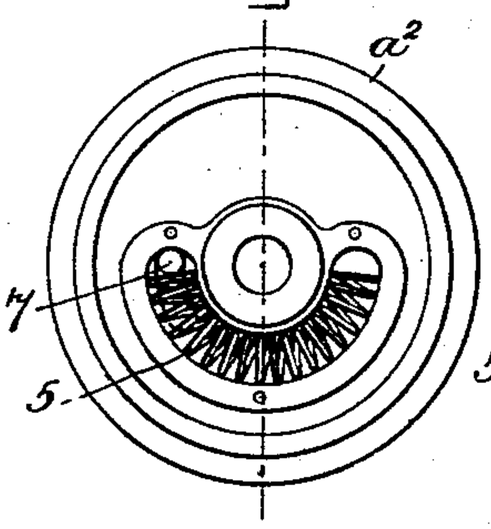


Fig: 10.

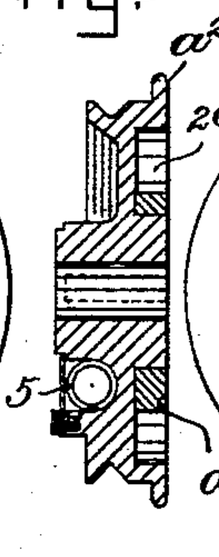


Fig: 11.

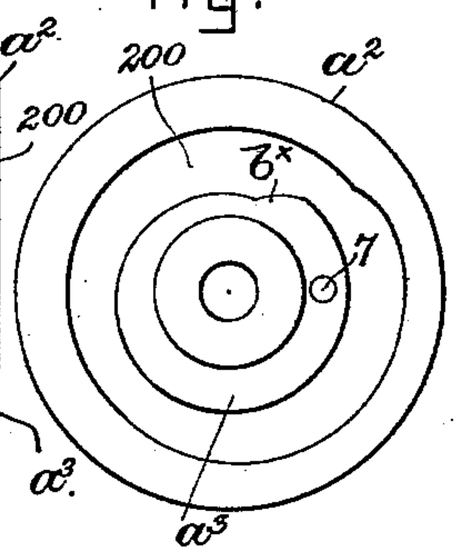


Fig: 4.

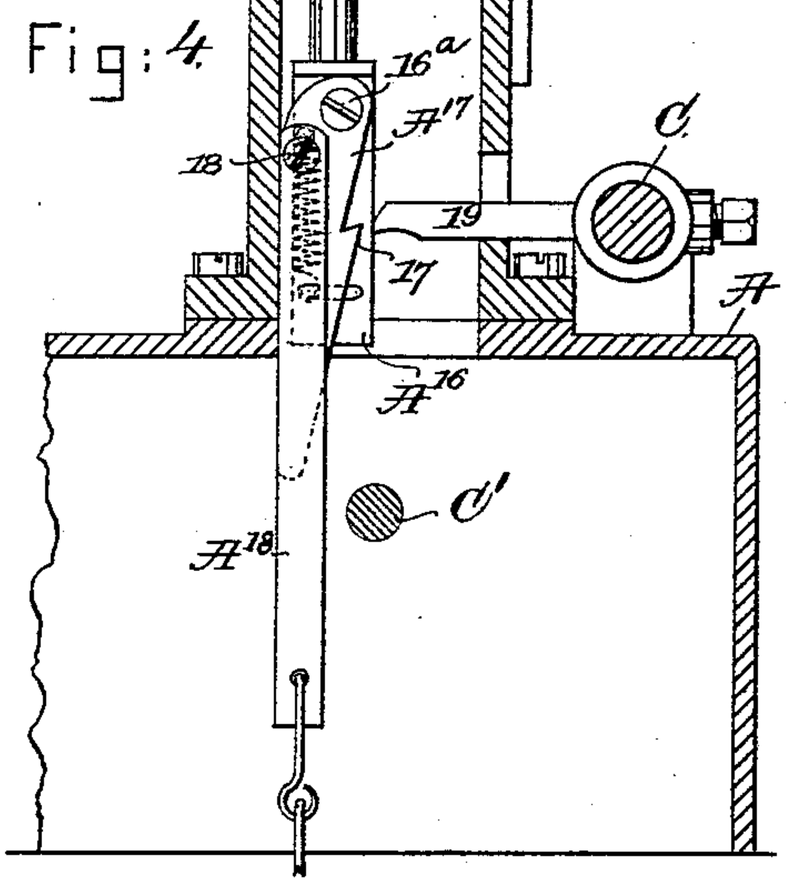


Fig: 5.

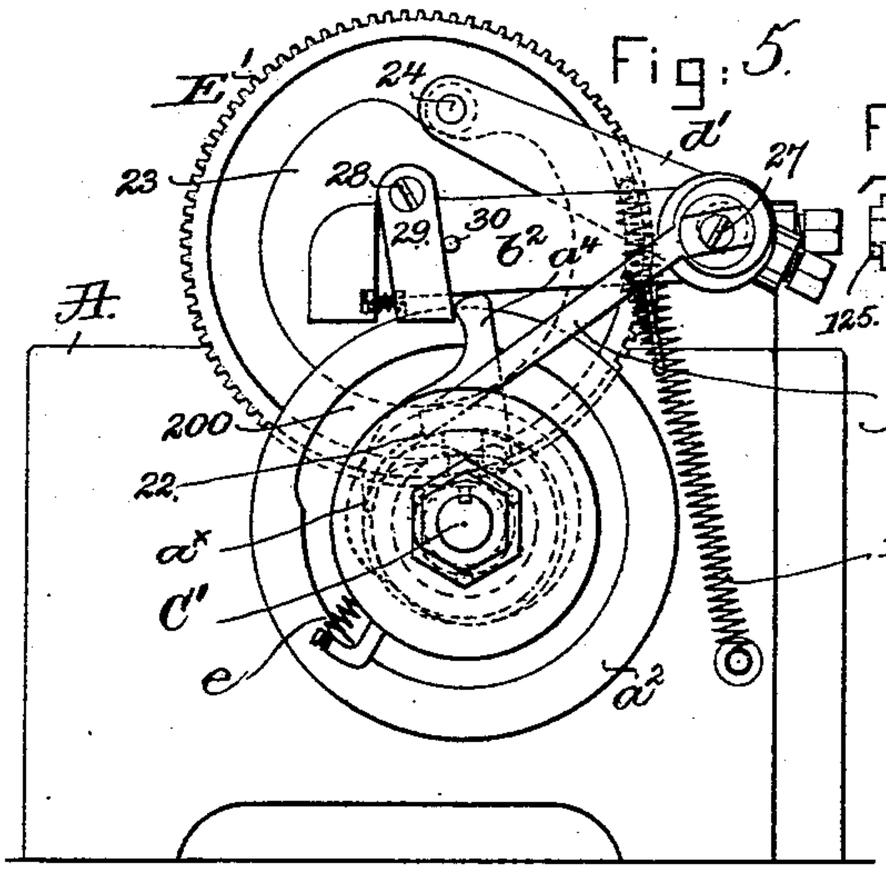
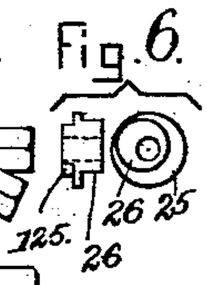


Fig. 6.



Witnesses.
Fred. L. Greenleaf
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SEWING MACHINE FOR BARRING BUTTON HOLES.

No. 441,700. Patented Dec. 2, 1890.

Fig. 12.

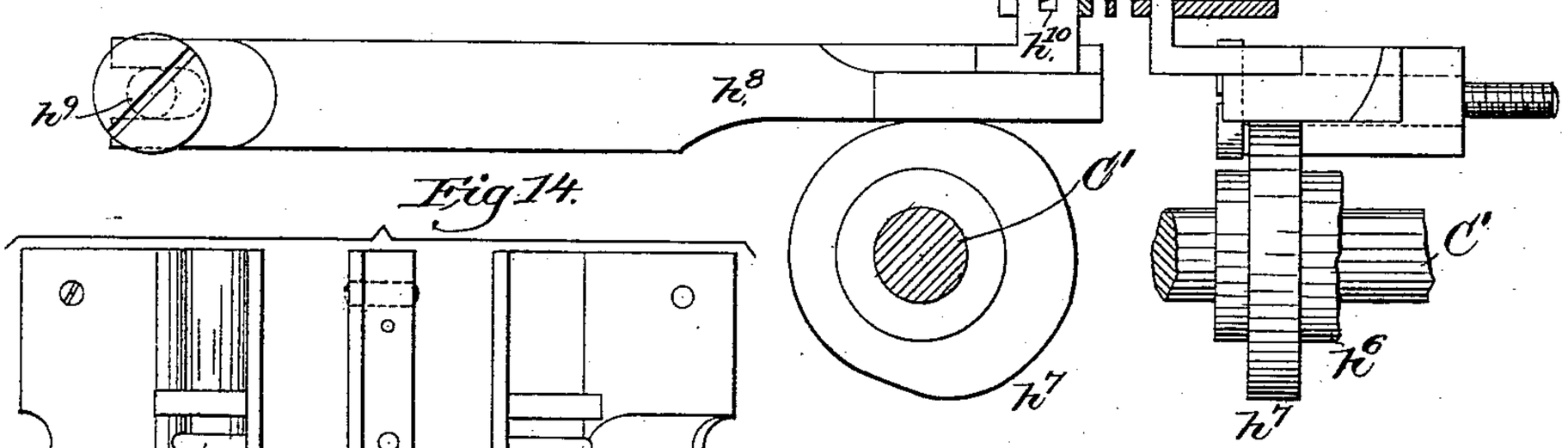


Fig. 13.

Fig. 14.

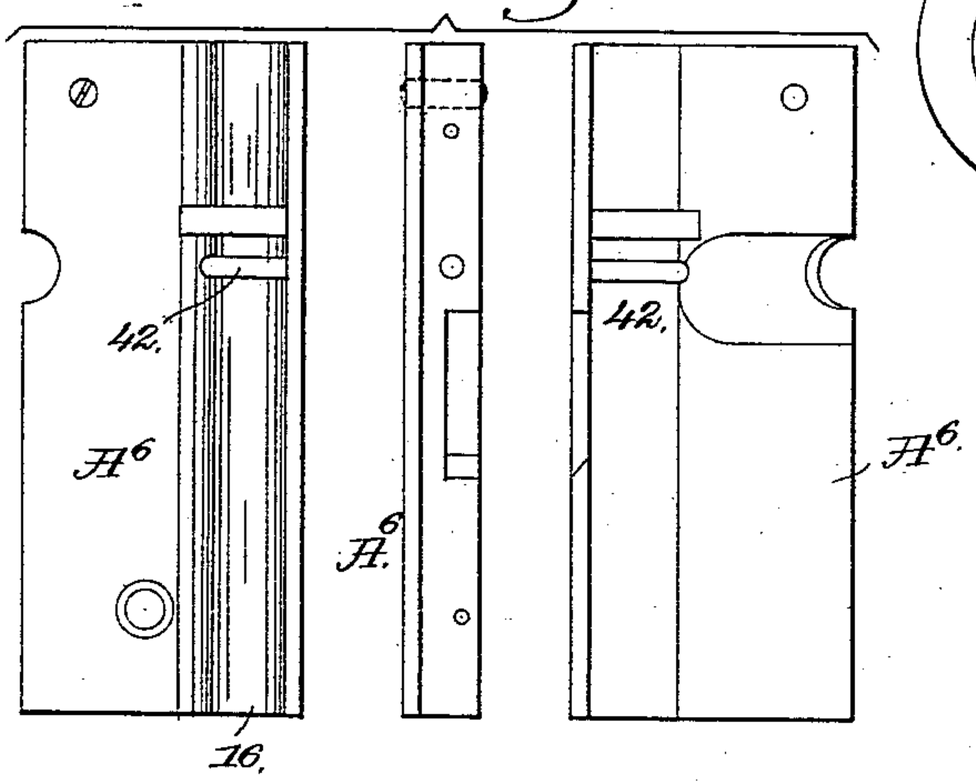


Fig. 15.

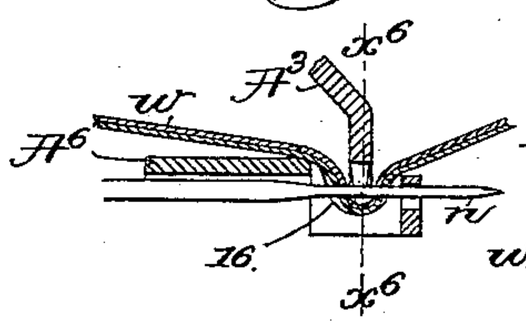


Fig. 16.

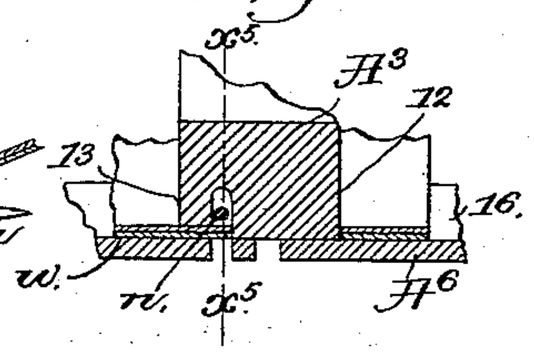
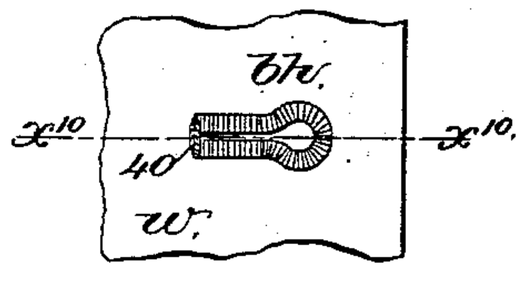


Fig. 17.



Witnesses.
Fred. S. Greenleaf
Frederick L. Emery

Inventor:
John Reece,
by Lemby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

JOHN REECE, OF BOSTON, MASSACHUSETTS.

SEWING-MACHINE FOR BARRING BUTTON-HOLES.

SPECIFICATION forming part of Letters Patent No. 441,700, dated December 2, 1890.

Application filed April 4, 1890. Serial No. 346,525. (No model.)

To all whom it may concern:

Be it known that I, JOHN REECE, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Sewing-Machines for Barring Button-Holes, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object the production of a sewing-machine by which to bar the small end of a button-hole, the barring being done by means of an eye-pointed needle, which at one thrust is made to pass through the bent material at right angles to the length of the button-hole, the needle at its next thrust passing the edge of the folded part of the material, the loops of needle-thread at each thrust being locked to form stitches.

To fold the material of the button-piece for the barring in accordance with this present invention, the button-piece is acted upon by a bender having one part shaped to enter and substantially fill the button-hole, another part of the said bender being extended beyond the small end of the button-hole and being notched, so that the material just beyond the small end of the button-hole will be folded in the line of the length of the button-hole, the said notch in the bender permitting the eye-pointed thread-carrying needle used to be passed through the said material at each alternate thrust without striking the bender, the thread of the stitch being shown upon the face of the material just at the inner end of the button-hole to form a bar, and this bar may be smaller or larger, as desired, according to the number of stitches taken.

One feature of my invention, therefore, consists in a bender adapted to enter the button-hole and position the inner end thereof to be barred, the said bender having an extension separated from it by a notch, the extension of the bender acting to bend the material at the small end of the button-hole and in the line of the length of the same.

I have also provided the machine herein shown with means whereby the machine will be automatically started after the entrance of the bender into the button-hole. So, also, I have provided the machine with gearing whereby the lifter on which the material is borne by the bender is lifted automatically after every alternate thrust of the needle, thus lifting the material and the bender into a different plane, so that the needle at its thrust made when the material is lifted will pass the folded part of the said button-hole piece.

Figure 1, in side elevation, with the bed-plate in section on the line x, Fig. 2, represents a sewing-machine embodying my present invention. Fig. 1^a is a partial left-hand end view of the machine shown in Fig. 1; Fig. 1^b, a detail to be referred to; Fig. 2, a section below the line x', Fig. 1, the top of the bed-plate being broken out, the plate covering the needle and shuttle being withdrawn. Fig. 3 is a section in the line x^2, Fig. 2. Fig. 4 is a sectional detail to the left of the line x^3, Fig. 1; Fig. 5, a right-hand end view of the machine shown in Fig. 1, chiefly to illustrate the gearing at that end of the machine; Fig. 6, details of the eccentric for adjusting the pawl, which engages a ratchet-tooth fast with relation to the main shaft to prevent any retrograde motion of the machine. Figs. 7 to 11 are details showing different parts of the clutch mechanism for stopping and starting the machine; Figs. 12 and 13, details showing the lifter and cam to actuate it, together with the throat and bender, the material being omitted; Fig. 14, different views of the throat-plate. Fig. 15 is a detail showing part of the button-hole piece in position between the bender and the lifting device in the throat, the figure showing the needle, the section-line being at x^5, Fig. 16; Fig. 16, a section of Fig. 15 in the line x^6. Fig. 17 is a detail showing the button-hole piece, which, when it is to be barred, is bent about the bender in the line x^{10}, or in the direction of its length.

The bed-plate A, having the overhanging arm A′, is and may be of any usual or suitable shape. The forward end of the head receives within it a bender-carrying bar A^2, to the lower end of which is attached the bender A^3, it being shaped substantially as shown in Figs. 1, 1^a, and 13, so that it has a part 12 to enter and substantially fill the slit of the button-hole *bh*, the said bender having a co-operating extension 13 to act upon

the button-hole material at the inner end of the button-hole to bend the same, as will be hereinafter described, in the line of the length of the button-hole slit, or in the line x^{10}, Fig. 17, the said bender having also a hole or slot 14 through it for the passage of the needle n, to be described.

The bender-bar has adjustably attached to it a block A^4, having a lug 15, the said block receiving upon it a spiral spring A^5, the upper end of which abuts against a portion of the head A′, the said spring normally acting to throw the bender-bar and bender down upon and so as to bend the work into the slot or depression 16 of the throat A^6.

The head of the machine is also provided with a rod or bar B, (see Fig. 1^a,) upon which is secured a stop B′, against which the collar A^4 strikes when the bender-bar is in its lowest position, the said stop being adjustable on the said bar, so as to limit the extent of the descent of the bender-bar.

The bar B has a collar B^2 attached to it, which is extended backwardly, as represented by dotted lines, Fig. 1^b, and acted upon by a thumb-lever B^3, the movement of which in the direction of the arrow in Fig. 1 enables the rod B to be lifted, at which time the stop acting upon the collar A^4 also lifts the bender-bar; but this lifting of the bender-bar is that which takes place when the operator desires to permanently stop the machine. At all other times the bender-bar is lifted by means of a lever A^8, pivoted at A^9, and having, as shown, at its rear end a projection A^{10}, which is acted upon by a rod or link A^{12}, having a collar A^{13}, which is acted upon by a spring A^{14}, resting upon a seat A^{15}, fixed with relation to the frame-work, the said spring normally acting to keep the rear end of the lever A^8 elevated.

The lower end of the link A^{12} is shown as provided with a flattened portion A^{16}, (see Fig. 4,) upon which is pivoted at 16^a a lifting-latch A^{17}, having a projection 17. This lifting-latch A^{17} has pivoted to it at 18 at one side of its center 16^a a link A^{18}, in turn connected by suitable devices with any foot-treadle or usual lever, (not shown,) so that the operator by putting the foot upon the treadle or any other equivalent device below the bed-plate may draw the link A^{12} down and thereby cause the lever A^8 to lift the bender, as when the button-hole piece is to be moved under the bender, and the button-holes placed in proper position to be entered by the bender. By connecting the link A^{18} to the lifting-latch A^{17} at one side of its pivot it will be seen that the said latch, while the foot of the operator is on the treadle, will be drawn over to the right, viewing Fig. 4, and the latch against the arm 19, attached to the rock-shaft C, and when the operator is ready to let the bender-bar descend the foot is gradually lifted, and as the link A^{12} rises under the action of the spring A^{14} the said latch striking the arm 19 turns the rock-shaft C and lifts arm b^2 to effect the engagement of the clutch-lever a^4, to be described, with the ring a^3 and rotate the main shaft C′ of the machine.

The main shaft C′ of the machine, the gears C^2 C^3, the crank-disk C^4, the lever C^5, actuated thereby, the vertical shaft C^6 (shown by dotted lines) supported in the bearing C^7, and having at its upper end a shuttle-driver, as 20, to actuate the shuttle 21, the needle-bar D, carrying the eye-pointed needle n, the rocking-arm D^3, in which the said needle-bar is reciprocated by the link D^4, the crank-disk D^5 on the shaft C′, and the take-up D^6, and its actuating-cam D^7, are and may be all as common in other sewing-machines heretofore patented to me. The shaft C′ has fast upon it a gear E, which engages and rotates a toothed gear E′ once during every six rotations of the gear E, or it may be once during each four rotations of the gear E, that depending upon whether six or four stitches are required for barring the small end of the button-hole. The gear E′ has at its outer side a cam 23, (shown best in Fig. 5,) upon which rests a roller or other stud 24 of an arm d', fast upon the rock-shaft C, the said roller or other stud 24 entering the recess in the said cam once during each rotation of the gear E′, at which time the spring g^2 causes the pawl g, also connected to the said rock-shaft, to descend and engage a ratchet-tooth 22 (see dotted lines, Fig. 8) in a wheel or hub g^4, keyed upon the main shaft C′, the said pawl acting to prevent any retrograde motion of the main shaft C′ after the machine has been stopped, as will be described. The pawl g at its outer end is bored to surround the eccentric part 26 of an adjusting-block 25, secured adjustably to the end of the rock-shaft C by a screw 27, the said block having a square projection 125, to be engaged by a wrench to rotate the said eccentric block upon the said rock-shaft and within the opening at the end of the said pawl when desired, thus enabling it to be adjusted upon the said shaft C. The rock-shaft C also has fast upon it an arm b^2, having pivoted upon it at 28 a spring-pressed dog 29, the movement of which in one direction is arrested by a pin 30, the arm b^2 being acted upon by a spring 126.

The wheel or hub g^4 has pivoted upon it at a^5 a clutch-lever a^4, the said clutch-lever having a projection $a^\times$ near one end, to enter the cam-groove 200, shown in one side of the belt-pulley a^2. (See Fig. 11.) The said belt-pulley receives loosely upon its hub at its grooved side a cam-ring a^3, having a rather abrupt projection $b^\times$, and provided with a pin or stud 7, which pin projects through a hole in the said belt-pulley and bears against one end of a spring 5, placed in a pocket at the other side of the belt-pulley. The part $a^\times$ of the clutch-lever is normally kept down upon the cam-ring a^3 by the spring e. The spring e normally keeps the projection $a^\times$ pressed with considerable force against the sharp incline $b^\times$ of the cam-ring a^3, so that the loose pulley

a^2 in its rotation, acting through the clutch-lever connected to the wheel g^4, will rotate the machine; but when the clutch-lever is turned upon its fulcrum to remove the projection $a^\times$ from the sharp incline $b^\times$, then the pulley a^2 is free to rotate, leaving the shaft C′ at rest.

In the drawings, Figs. 1 and 5, it will be supposed that a button-hole has just been barred, that the upper end of the clutch-lever a^4 has just come in contact with the dog 29 of the lever b^2, which lever has been permitted to drop by the entrance of the roller or other stud 24 into the notch of the cam 23, and that the contact of the said clutch-lever with the said dog has removed the part $a^\times$ from the part $b^\times$, thus permitting the belt-pulley a^2 to rotate freely while the shaft C′ remains at rest. After this the operator will lift the bender, by or through the treadle described, to remove the material, and as the foot is removed from the treadle the catch A^{17}, acting through the arm 19, will turn the rock-shaft C and lift the arm b^2 to remove the dog 29 from the clutch-lever a^4, when the part $b^\times$ of the cam-ring a^3, in the rotation of the pulley a^2, will engage the said clutch-lever and cause it to be rotated with the pulley, thus rotating the shaft C′ in unison with the said belt-pulley. This belt-pulley, clutch-lever, pawl g, arm b^2, cam-ring a^3, pin or stud 7, springs 5 and e, and ratchet-wheel or hub g^4 are all substantially the same in construction and operation as in my patent No. 367,063, and are not herein specifically claimed; and instead of the particular clutch-device shown I may employ any other usual or well-known suitable clutch mechanism under the control of the rock-shaft C.

The shaft C′ has fast upon it a gear h, which engages a gear h' of sufficiently larger size to be rotated once while the gear h is rotated twice. The gear h' is fast upon a short shaft h^2 in a bearing-stand h^3, the opposite end of the said shaft having connected to it a gear h^4, which engages a gear h^5 of the same size, the latter gear being fast upon or forming part of a sleeve h^6, provided at its front end with a cam h^7, which once during each two rotations of the shaft C′ acts upon the under side of the lifter h^8, pivoted upon a stud-screw h^9 and having a vertical projection h^{10}, slotted and concaved, as best shown in Fig. 12, which projection rises after each alternate stroke of the needle, or after each alternate stitch, to act upon the material w, bent between the said projection and the bender to lift the said material, so that the needle at its next thrust will pass the bent portion of the material without penetrating the same.

In operation the operator takes a button-hole piece which has been stitched around its sides and eyeleted end in a regular button-hole-stitching machine, and places the said button-hole piece in the machine, herein to be described, in such position that the bender in its descent will enter one of the slits, the inner end of which is to be barred. That portion of the button-hole piece at the small end of the slit which is entered by the bender will be bent by the bender in the direction of the length of the button-hole slit in line x^{10}, and will be bent down into the groove 16 in the throat A^6, the said throat being slotted, as best represented at 42, Fig. 14, so that the needle n, carrying a thread, will at one thrust pass through the bent material, (see Fig. 15,) entering the same at the inner face, passing through one part of it to its outer face, entering the other part at its outer face and emerging at its inner face, when the loop of thread carried by the needle will be locked in usual manner to form a stitch and the needle will be retracted. Next the lifter h^8 will be acted upon, and its projection h^{10}, rising against the material bent about the bender, will lift the material and the bender with it, so that the needle in its next forward thrust will pass below or outside the bent portion of the material and will not penetrate the same, and at such thrust of the needle its loop will be caught and locked to form another stitch. The next stitch will pass through the material in substantially the same spot as the first, and so on, each alternate stitch passing through the material, thus accumulating a number of stitches—say six or four, as may be desired—to constitute a bar, as 40, at the end of the button-hole bh. (Shown in the material w in Fig. 10.) After the completion of the desired number of bar-stitches the machine will be automatically stopped through the mechanism described, and the operator will lift the bender by the treadle, remove the material, place an unbarred button-hole under the bender, and let the bender descend and enter the said button-hole, the entrance of the bender into and through the button-hole starting the machine, for the bender cannot enter the button-hole and pass through it without the latch A^{17} acting upon the arm 19, as before described.

I do not desire to limit my invention to the exact stitch-forming mechanism herein described, as I may instead use any other usual or suitable stitch-forming devices. By permitting the bender to enter and substantially fill the button-hole slit it is possible to insure the making of the bar-stitches exactly at right angles to the length of the button-hole.

I claim—

1. In a machine for barring button-holes, a bender having a projection 12 to enter the button-hole slit, and a portion 13 to act upon and bend the material at the end of the button-hole slit in the direction of the length of the button-hole, and a throat in which the said material is bent by the bender, combined with stitch-forming mechanism, to operate substantially as described.

2. In a machine for barring button-holes, a bender having a projection 12 to enter the button-hole slit, and a portion 13 to act upon

and bend the material at the end of the button-hole slit in the direction of the length of the button-hole, and a throat in which the said material is bent by the bender, combined with stitch-forming mechanism, and with a lifter to lift the material and bender out of the groove of the said throat at alternate stitches, to thereby enable a stitch to be made through the bent material, and the next stitch outside the bent portion of the material, substantially as described.

3. In a machine for barring button-holes, a bender consisting, essentially, of a portion to enter and fill the slit of the button-hole, and an extension thereof to bear upon the material at the end of the button-hole in the direction of the length of the button-hole, and notched, substantially as described, combined with stitch-forming mechanism and a throat-plate, substantially as described.

4. A bender-bar and attached bender, a lever to actuate the same in one direction, a link, and a lifting-latch, combined with a clutch mechanism, and with intermediate devices actuated by the said lifting-latch as the bender enters the button-hole slit, to thereby automatically start the machine, substantially as decribed.

5. In a machine for barring button-holes, the spring-actuated bender-bar and its attached bender, combined with the rod B, having a stop thereon to limit the descent of the bender, substantially as described.

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

JOHN REECE.

Witnesses:
GEO. W. GREGORY,
EMMA J. BENNETT.