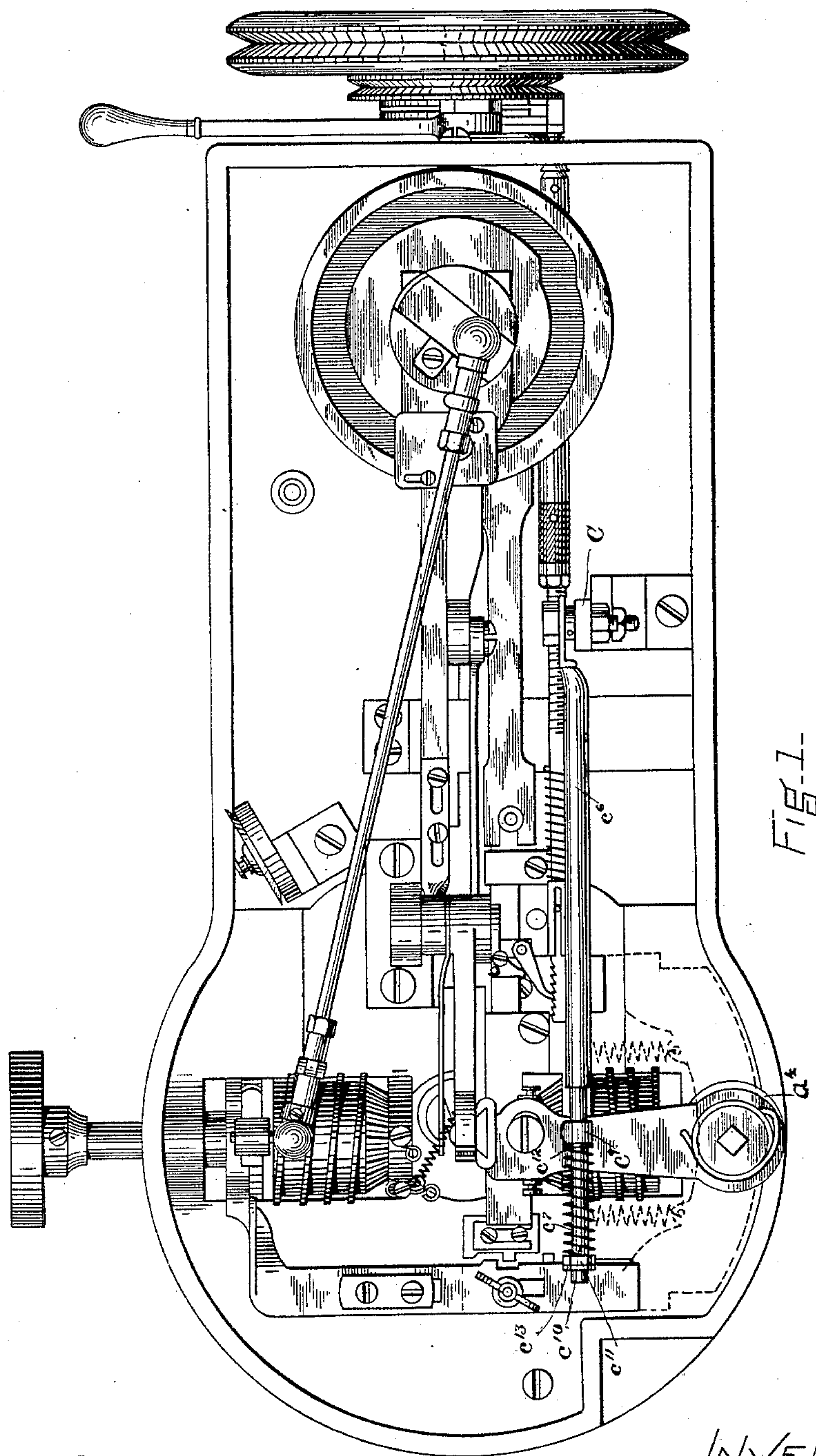


5 Sheets—Sheet 1.

BUTTON HOLE STITCHING AND BARRING MACHINE.

Patented Dec. 4, 1888.



J. W. Dolan.
E. P. Small.

INVENTOR

James H. Reed,
by his attys
Clark & Raymond.

(No Model.)

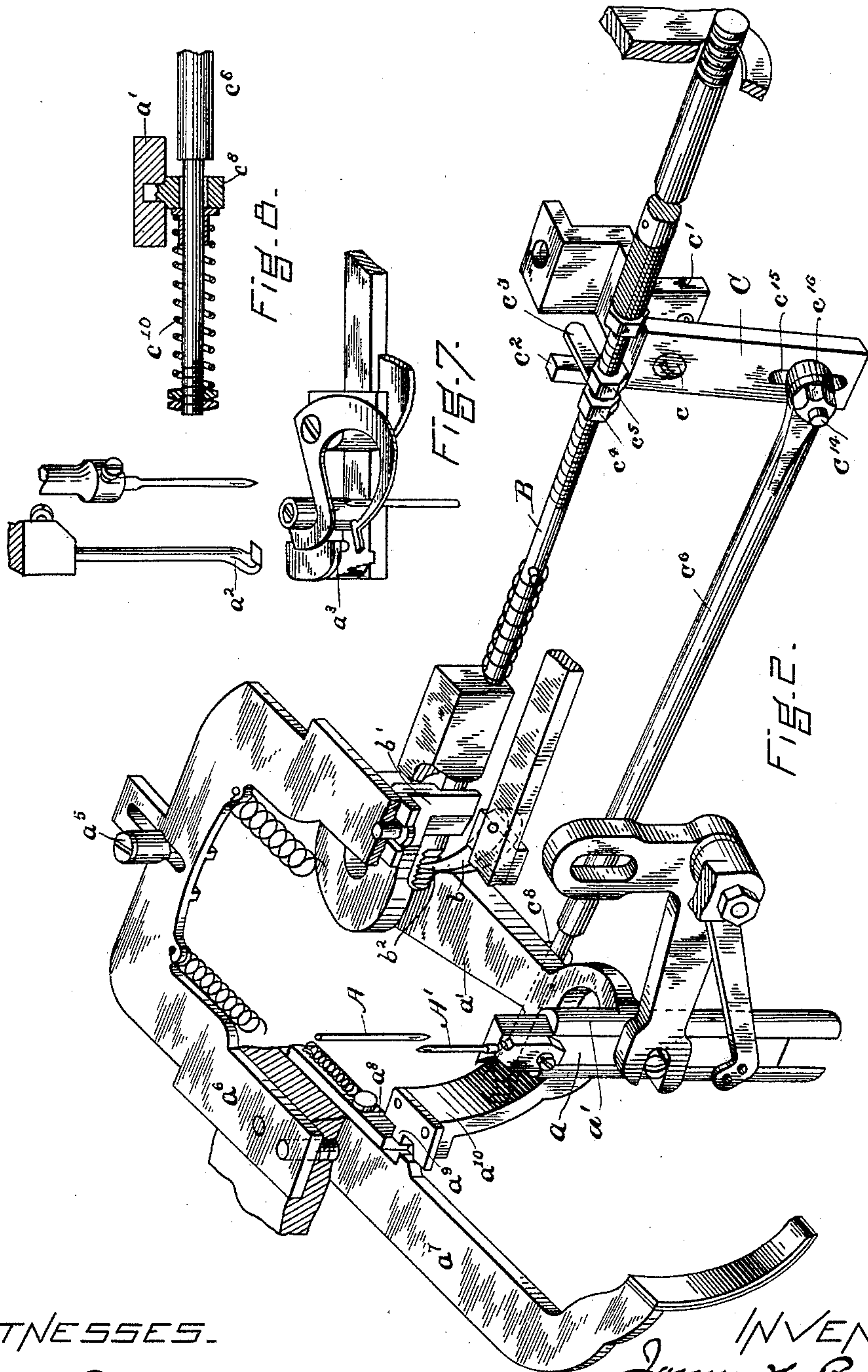
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BUTTON HOLE STITCHING AND BARRING MACHINE.

No. 394,134.

Patented Dec. 4, 1888.



WITNESSES.

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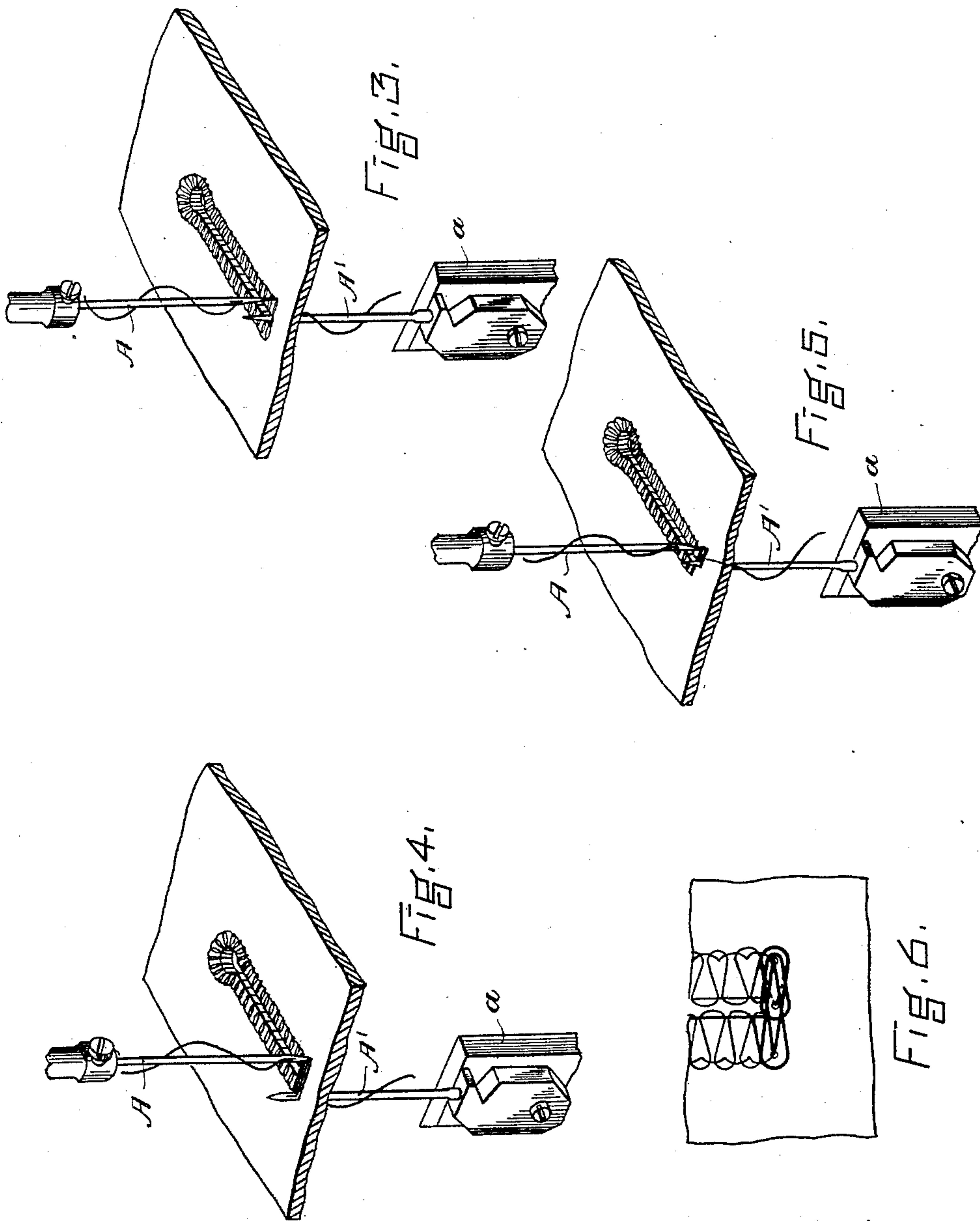
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BUTTON HOLE STITCHING AND BARRING MACHINE.

No. 394,134.

Patented Dec. 4, 1888.



WITNESSES.
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(No Model.)

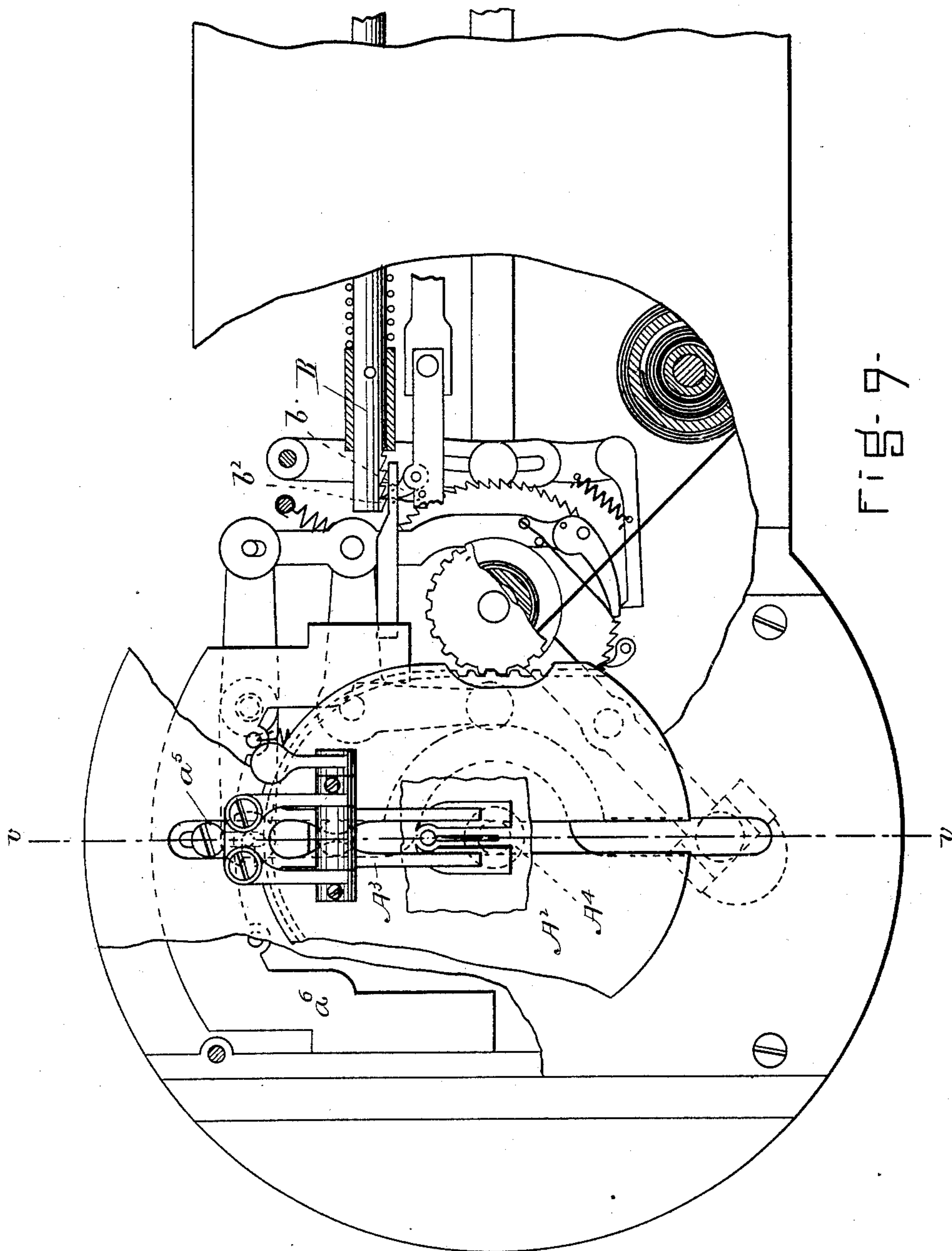
5 Sheets—Sheet 4.

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BUTTON HOLE STITCHING AND BARRING MACHINE.

No. 394,134.

Patented Dec. 4, 1888.



WITNESSES.

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(No Model.)

5 Sheets—Sheet 5.

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BUTTON HOLE STITCHING AND BARRING MACHINE.

No. 394,134.

Patented Dec. 4, 1888.

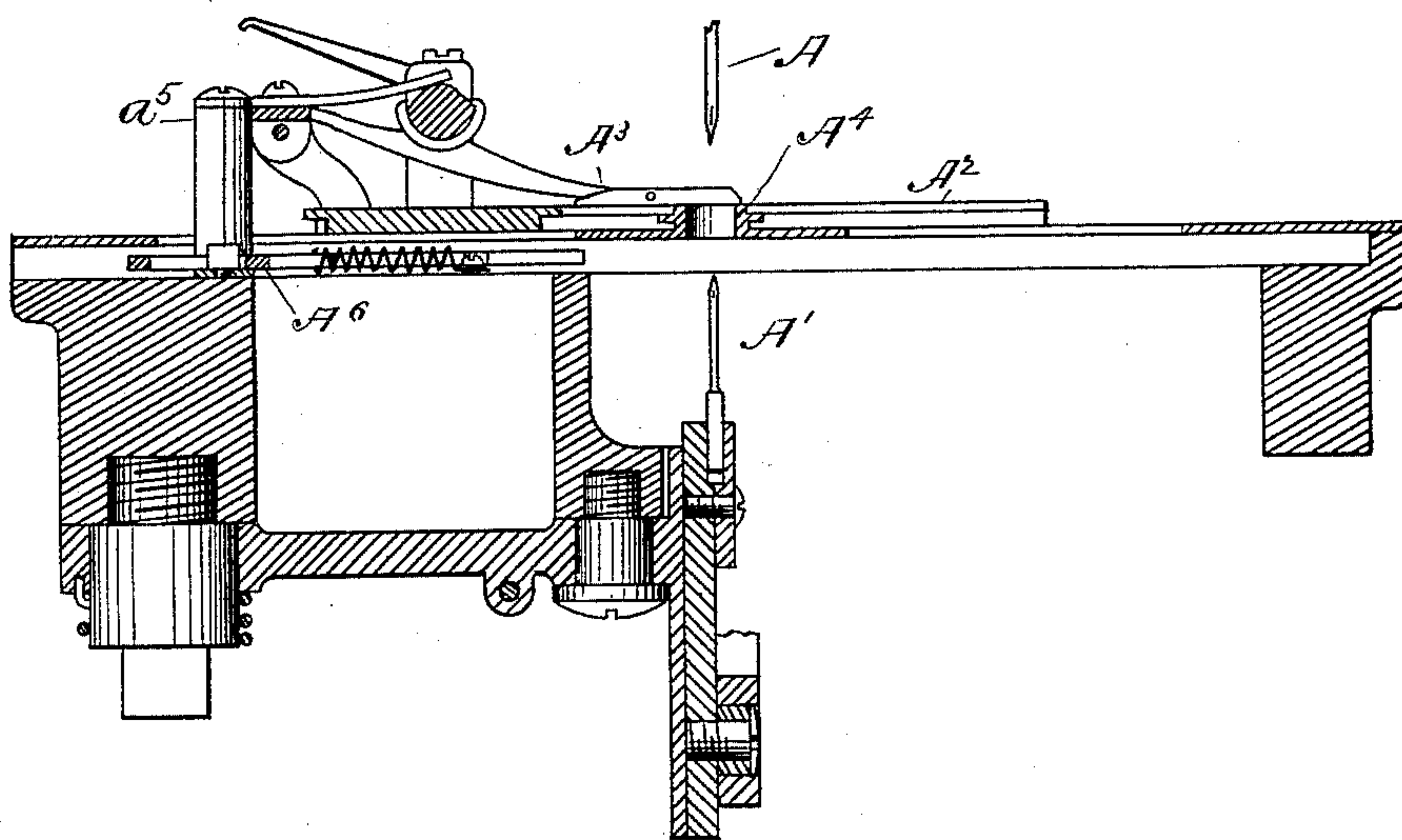


Fig. 10.

WITNESSES.

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UNITED STATES PATENT OFFICE.

JAMES H. REED, OF LYNN, MASSACHUSETTS.

BUTTON-HOLE STITCHING AND BARRING MACHINE.

SPECIFICATION forming part of Letters Patent No. 394,134, dated December 4, 1888.

Application filed November 16, 1887. Serial No. 255,293. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. REED, of Lynn, in the county of Essex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Button-Hole Stitching and Barring Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention is an improvement upon that described in my patent, No. 378,404, dated February 21, 1888, and I have illustrated and described herein only so much of said mechanism as is necessary to show the connection between it and the devices herein specified.

The object of the invention is to provide means for automatically locking the threads at the end of the stitching of the bar.

In the drawings, Figure 1 is a plan view, inverted, of a machine having the features of my invention. Fig. 2 is a view in perspective of the parts forming the subject of the invention. Figs. 3, 4, and 5 show various positions of the needles in relation to each other and the material upon which they work in stitching a button-hole, in forcing the bar, and locking the barring-stitch. Fig. 6 shows in plan, enlarged, the barred end of the button-hole. Fig. 7 is a perspective view of the needle and upper and lower thread-looping devices. Fig. 8 is a detail section showing the connection of a link with the arm carrying the lower needle-block. Fig. 9 is a view illustrating the clamp-plate, clamp, and other operative parts of the machine. Fig. 10 is a sectional view on the line *x x* of Fig. 9.

The machine described in said application uses two threads, and has two needles and appropriate looping devices, one of which is above the work-plate and the other below. In stitching the sides and eye of a button-hole these needles have a fixed relation to each other—that is, each is reciprocated or moved upon a given line or track, which line or track is not varied in any respect in relation to the line or track of the other. At the completion of the last side of the button-hole to form the longer stitch necessary for barring the end of the button-hole, and also to form a stitch which shall be substantially twice the length of the stitch which is used upon the

sides and eye of the button-hole, one needle is moved automatically from the path in which it was reciprocated or moved away from the other needle to a position about twice as far from it as that which it occupied during the stitching of the sides and eye, and it continues to move or reciprocate in this new position or upon this new line. This makes the length of the horizontal portion of the stitch twice that which was before sewed by the same needles, and the needles are moved or reciprocated in their new relation to each other and the looping devices operated to carry the upper and lower threads and spread the loops until any desired number of these long stitches have been made across the end of the button-hole. At the completion of the last long stitch the movable needle is moved back to its original position, and one, two, or more stitches sewed through the material to fasten the ends of the threads. To enable this short locking-stitch to be made, the lower needle is transferred or moved backward to its original position, and this is accomplished by connecting the movable block which supports the needle-bar of the said needle with the rod which operates the stop-motion mechanism. This is the rod which is automatically moved during the barring of the button-hole, and after the sewing of a certain number of stitches it operates the stop-motion mechanism to disengage the driven from the driving pulley and bring the machine to a rest, so that after the desired number of barring-stitches have been formed, and when the machine is within one, two, or three stitches of its stopping-point, the needle is caused to be transferred or moved backward to its original position, in order that one, two, or three more short stitches may be taken through the material before the machine is automatically stopped.

Referring to the drawings, A represents the upper needle, which is moved or reciprocated continuously in the same path or line.

A' is the lower or movable needle. It is reciprocated by the needle-block *a*, and this block is mounted at the end of the carrying or transferring arm *a'*. (See Fig. 2.)

*a*² is the upper looping device, and *a*³ the lower looping mechanism.

The transferring-arm *a'* is moved in one direction—namely, in a direction to move the

needle A' from the needle A by the spring a^4 , which has a constant tension upon the arm to move it in this direction; but this movement can only take place when the clamp-plate of the machine comes into contact with the movable stud a^5 , and this stud is so located in relation to the path or movement of the clamp-plate as not to be operated by it until at the instant that it is desirable to begin the formation of the barring-stitch, and its movement at that time, through the medium of the connecting slide-plates a^6 a^7 , causes a latch, a^8 , to be withdrawn from operative connection with the projection a^9 upon the arm a^{10} , connected with the needle-block carrying or transferring arm a' , thereby permitting the spring a^4 to move the needle A' from the needle A. These parts and the manner of operating them are fully described in my said application.

A^2 , Fig. 9, represents the clamp-plate; A^3 , the clamp; A^4 , the button about which the clamp-plate is turned.

B is a movable rod operating the stop-motion mechanism, which is given a step-by-step movement in one direction during the barring of the button-hole and until a certain number of stitches have been made, when it serves to bring into action the devices for releasing the driving-pulley. This rod is operated by the movement of the reciprocating pawl b , which, upon the movement of the stud a^5 by the clamp-plate, the plate a^6 and the pawl-guard b' , is permitted to come in contact with the teeth b^2 upon the inner end of the rod B. (See Fig. 2.) This operation is as described in my said patent, and serves to actuate the devices for disengaging the driving-pulley, as therein described, so as to govern the number of stitches which are made from the beginning of the first barring-stitch until the locking-stitch is finished; and it is therefore necessary, in order that all the stitches sewed after the movement of the stud a^5 and of the needle A' should not be barring-stitches, that this rod B be connected with the arm a' , supporting the needle-block a , carrying the needle A', in such a manner that after the sewing of the desired number of barring-stitches, which are of substantially twice the length of the ordinary stitches upon the sides and eye of the button-hole, the needle A' should be returned to practically its original position in relation to the needle A, or nearer to it than that, if desired, for the purpose of sewing two or three additional locking-stitches through the longer barring-stitches; and this connection between the rod or bar B and the movable arm a' is obtained by means of a lever C, (see Fig. 2,) which is pivoted at c , and the bracket c' fastened to the frame of the machine, and this lever is placed so that its upper end, c^2 , comes in line with the projection of arm c^3 , carried by the rod B, and which preferably is made horizontally-adjustable thereon by means of the adjusting-nuts c^4 c^5 . The lever C is connected with the

arm a by a long rod or link, c^6 , which preferably has a yielding connection with a movable arm, a' . This is shown as obtained by extending the end c^7 of the rod or link through a hole, c^8 , in a stud, c^9 , extending downward from the arm a' , and mounting thereon a spring, c^{10} , arranged to bear against a collar, c^{11} , at the extreme end of the link or rod, and a loose collar, c^{12} , which bears against the face of the stud. (See Fig. 1.) The tension of this spring is adjusted by the nut c^{13} . The other end of the rod or link c^6 is connected with the lever C, preferably by means of a pin, c^{14} , movable in the slot c^{15} in the end of the lever, and secured to the lever by the nuts c^{16} . This permits the end of the link or rod to be adjusted toward and from the fulcrum of the lever, so that the extent of the throw of the link and of the arm a' , and consequently the length of the locking-stitch, can be varied.

The spring c^{10} permits the movement of the rod or link c^6 by the stop-motion bar or rod B, after the needle A' has been moved or turned to its normal position to sew the locking-stitches. This return movement of the needle is quick or rapid, because it is desirable for uniformity that there should be practically little variation between the length of the barring-stitches as a whole and the length of the locking-stitches as a whole, and as it is desirable that there should be two or three locking-stitches sewed before the machine comes to rest it is necessary that the stop-motion bar B continue to be actuated, and this motion of necessity continues to move the link c^6 , but no motion is thereby communicated to the needle A'.

Upon the operation of the machine in barring, the rod B is given a step-by-step movement until the projection or arm c^3 comes in contact with the upper end of the lever C, and it then serves to move the lever, causing the lever to draw, by means of the rod or link c^6 , the arm a' back or toward its original position—or, in other words, nearer the line of movement of the upper needle—so that the lower needle is moved into a position which enables it to locate or place one end of the stitch nearer the other end than before, and thus a locking-stitch of any desired length is made; and as many of these stitches are taken as may be desired—generally two are sufficient—and the mechanism controlling the movement of the bar or rod B is set generally so as to provide for the sewing of three or four barring-stitches and then the sewing of the two locking-stitches before the machine is automatically stopped.

Before the machine is started the bar or rod B is caused to assume its original position, which releases the operating-lever C and enables the spring c^{10} to return it to its original position, and also to release the tension upon the arm a' , so that it may be easily moved by its operating-spring into its barring position.

A portion of a button-hole having its barring-stitch thus locked is represented in Fig. 6.

It will be observed that the sewing of the sides and eye of the button-hole is the same as that described in my said patent until the locking-stitches are formed—that is, the needles $A A'$ are held in predetermined positions in relation to each other during the stitching of one side, the eye, and the other side of the button-hole, and then to sew a barring-stitch across the end of the button-hole slit the needle A' is moved away from the needle A automatically, it being permitted to assume this new position in relation to the needle A by the withdrawal of a latch which is operated by the cam-plate, which permits a spring to immediately move the needle. Upon the movement of the latch the number of stitches to be sewed before the completion of the button-hole is determined by the engagement of a pawl with a notched bar operating the stop-motion mechanism; and these barring-stitches would be of the same length were it not that the needle A' is caused to be returned to its original position in relation to the needle A , after the sewing of the desired number of barring-stitches, by connecting the arm supporting the needle A' , as above described, with the stop-motion bar B , whereby it is caused to return the arm a' , supporting the needle A' , in opposition to the spring a^4 , and to hold the arm while the two or three additional shorter locking-stitches are being sewed.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination, in a button-hole stitching and barring machine, of two reciprocating needles, looping devices to co-operate therewith in forming the stitches, and an automatic transferring mechanism—as arm a' , carrying the needle-block a and spring a^4 —to transfer one needle from the other during the stitching of the bar, and to then return it to substantially its original position to stitch one or more locking-stitches, as and for the purposes described.

2. The combination of the needle A' , its reciprocating block a , the transferring arm or support a' , upon which said block a is reciprocated, a spring or other equivalent device for bearing against the said arm, a latch for acting in opposition to said spring and operated by the clamp-plate, a bar or rod connected with stop-motion mechanism, and engaging devices released by the clamp-plate for causing it to be moved automatically during the switching of the bar, and devices connecting said rod or bar with the movable arm or support for moving it to its normal position in opposition to said spring after the sewing of one or more barring-stitches, substantially as described.

3. The combination, in a button-hole stitching and barring machine, of a needle, a re-

ciprocating block supporting it, a movable arm or piece in which the needle-supporting block is reciprocated, and devices operated by the clamp-plate to move said arm or piece automatically in one direction to transfer the needle in relation to the other stitch-forming devices at the beginning of the sewing of a barring-stitch to cause a longer stitch to be made, and devices also operated by the clamp-plate to return the said arm or piece, after the sewing of one or more barring-stitches, to its original position, as and for the purposes described.

4. The combination, in a button-hole stitching and barring machine having a movable clamp-plate provided with an intermittent feeding movement about the button or throat of the machine, of an upper eye-pointed reciprocating needle, a lower eye-pointed reciprocating needle, a transferring device for automatically moving the lower needle in relation to the upper needle at predetermined intervals, a latch controlling the position of the lower needle connected with the clamp-plate to be operated thereby, the stop-motion mechanism, and a device connecting it with the lower needle and adapted to return the needle to its normal position after it has been moved to sew one or more barring-stitches, and appropriate looping devices, substantially as described.

5. The combination, in a button-hole stitching and barring machine, of mechanism specified—such as a pawl and ratchet—for communicating a step-by-step movement to a rod or similar moving part to operate a stop-motion mechanism, said rod and said stop-motion mechanism, the stitch-forming devices, one element of which is a reciprocating needle, its supporting-bar, and a movable support for said bar, and devices—such as a rod and spring—connecting the movable needle-bar support with the rod-operating stop-motion mechanism, as and for the purposes specified.

6. The combination, in a button-hole stitching and barring machine, of the looping devices, the reciprocating needle A , the reciprocating needle A' , its block a , a movable support or holder, a' , and devices, as arm a' , carrying the needle-block a , and spring a^4 , for moving it and the needle A' toward the said needle A at the end of the stitching of the bar, to enable the needles and the looping devices to sew one or more locking-stitches, substantially as described.

7. The combination of the bar or rod B , means for operating the same, the projection or arm c^3 , carried thereby, the lever C , one end of which is extended into the path of the movement of the arm or projection c^3 , the movable support or arm a' , carrying the reciprocating block holding the needle A' , and the link or rod c^6 , connecting said support a' with said lever, as and for the purposes specified.

8. The combination, in a button-hole stitch-

ing and barring machine, of the needle A', its
reciprocating block *a*, the movable arm or
support *a'*, the lever C, actuated as specified,
the link or rod *c*⁶, and a spring, *c*¹⁰, carried
5 thereby, forming a yielding connection be-
tween said lever and said arm and permit-
ting the movement of the link or rod *c*⁶ after

the said arm or support *a'* has been moved to
its normal position, as and for the purposes
described.

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Witnesses:

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