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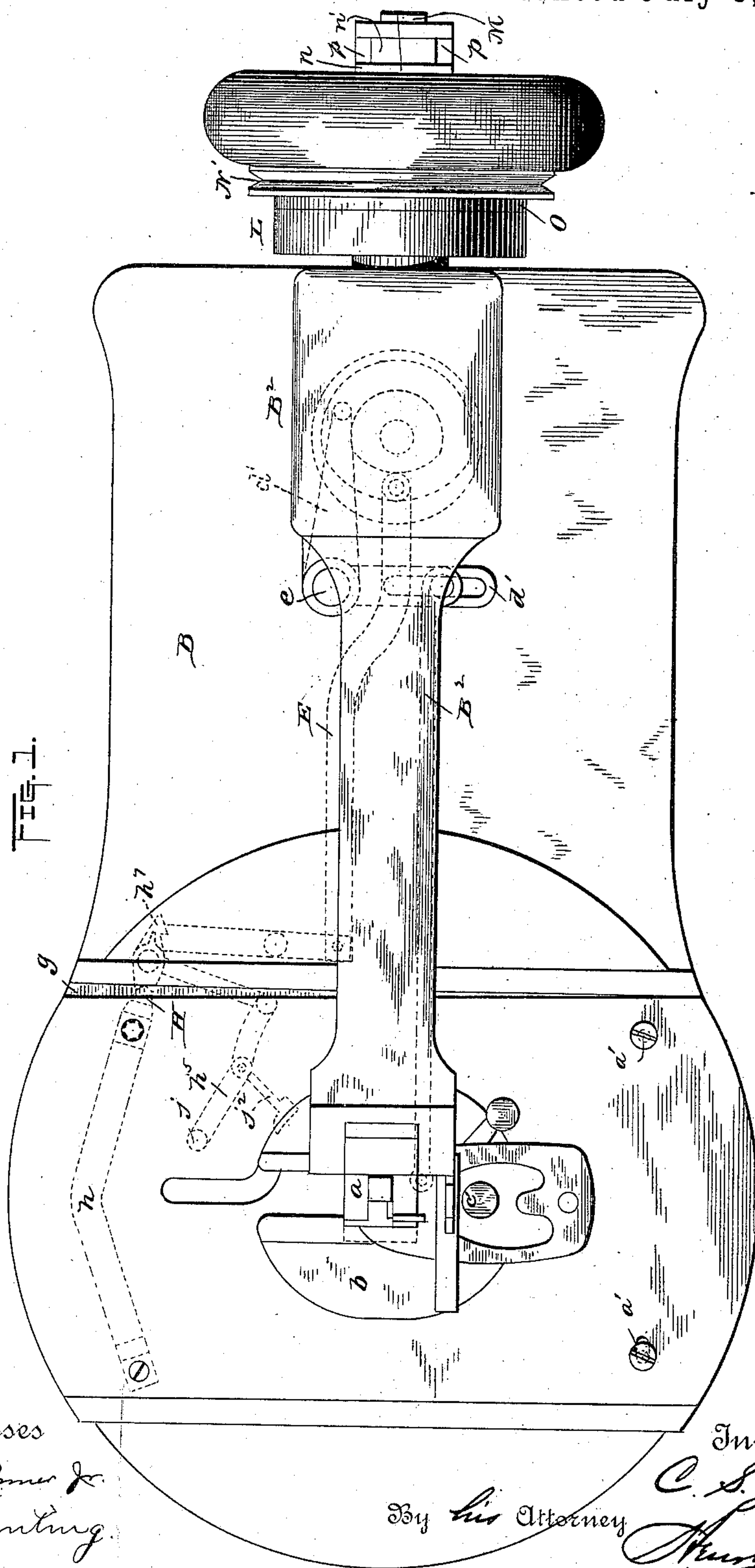
4 Sheets—Sheet 1.

C. S. JORDAN.

BUTTON HOLE SEWING MACHINE.

No. 366,006.

Patented July 5, 1887.



Witnesses

L. Q. Cramer Jr.
J. C. Huntington.

Inventor:

C. S. Jordan

By *his* Attorney

Henry Calver

(No Model.)

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FIG. 2.

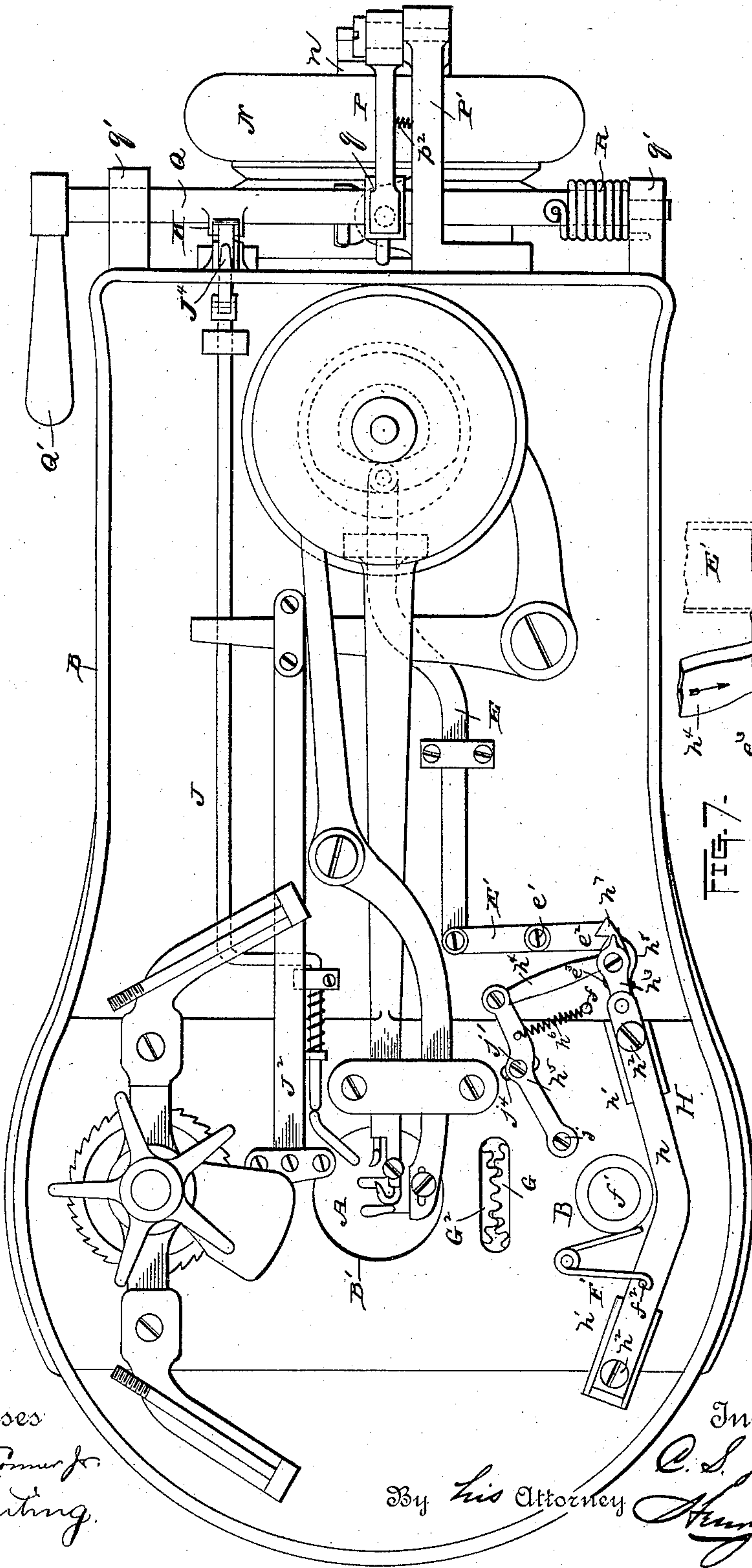
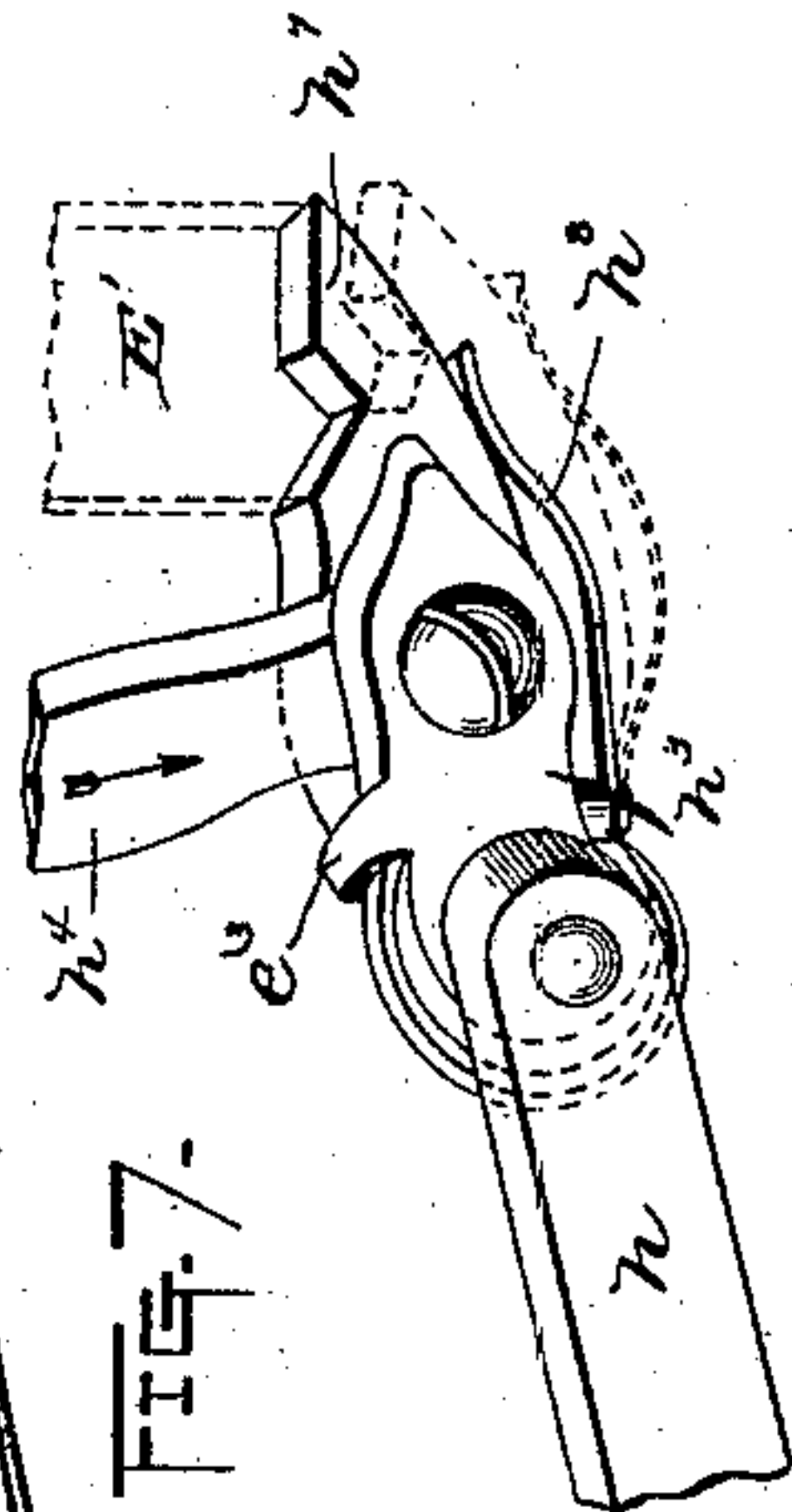


FIG. 7.



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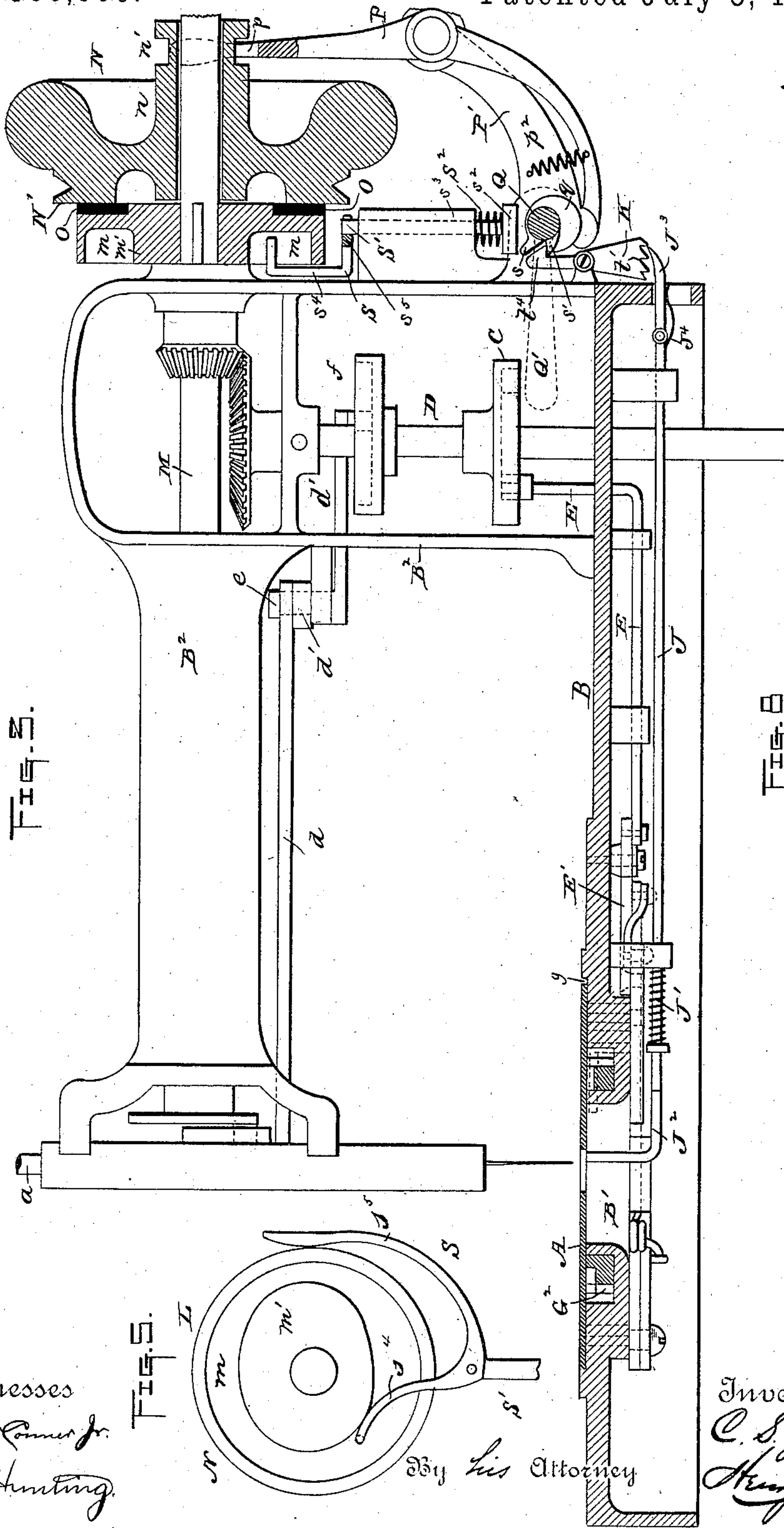
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C. S. JORDAN.

BUTTON HOLE SEWING MACHINE.

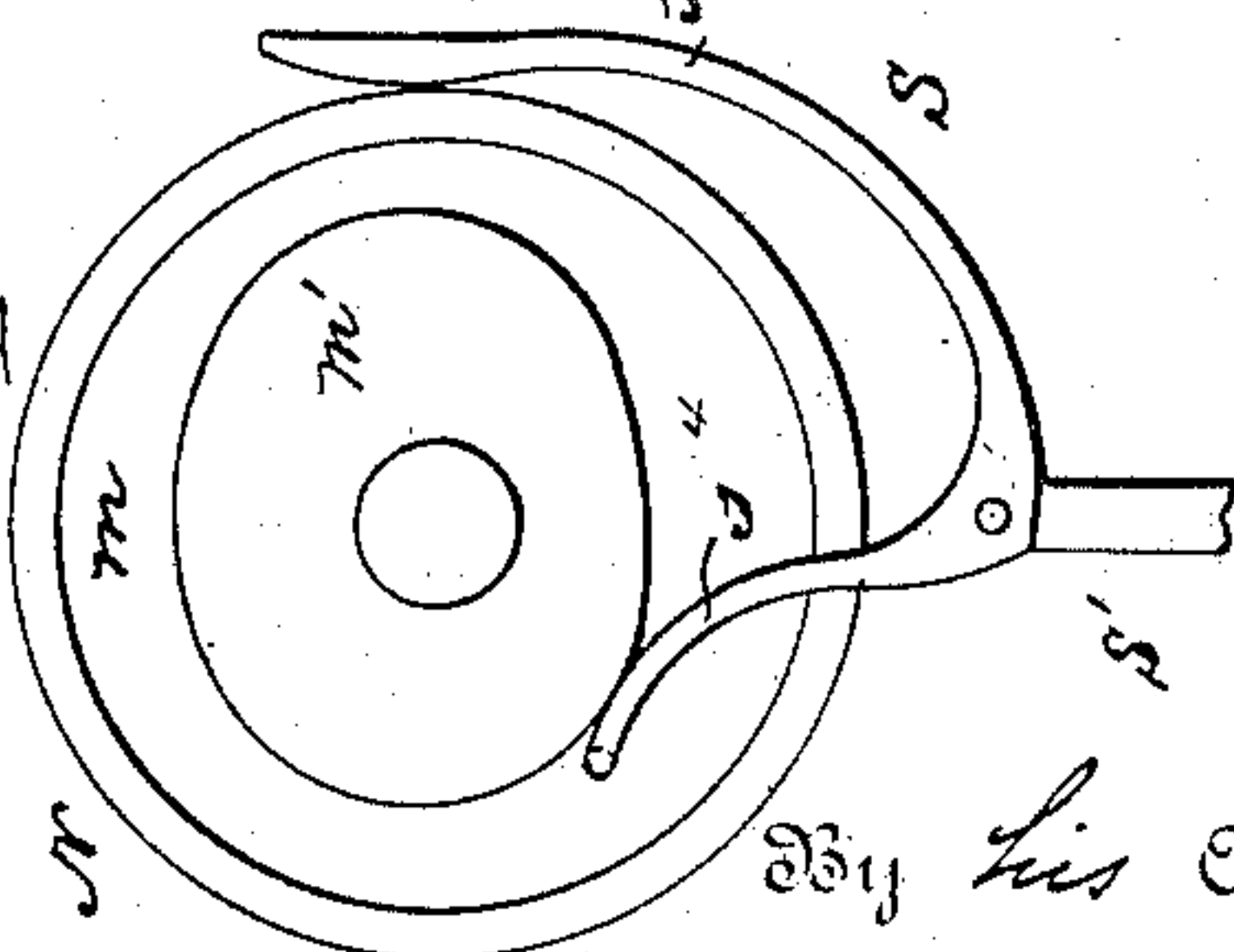
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FIG. 5.



By his Attorney

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(No Model.)

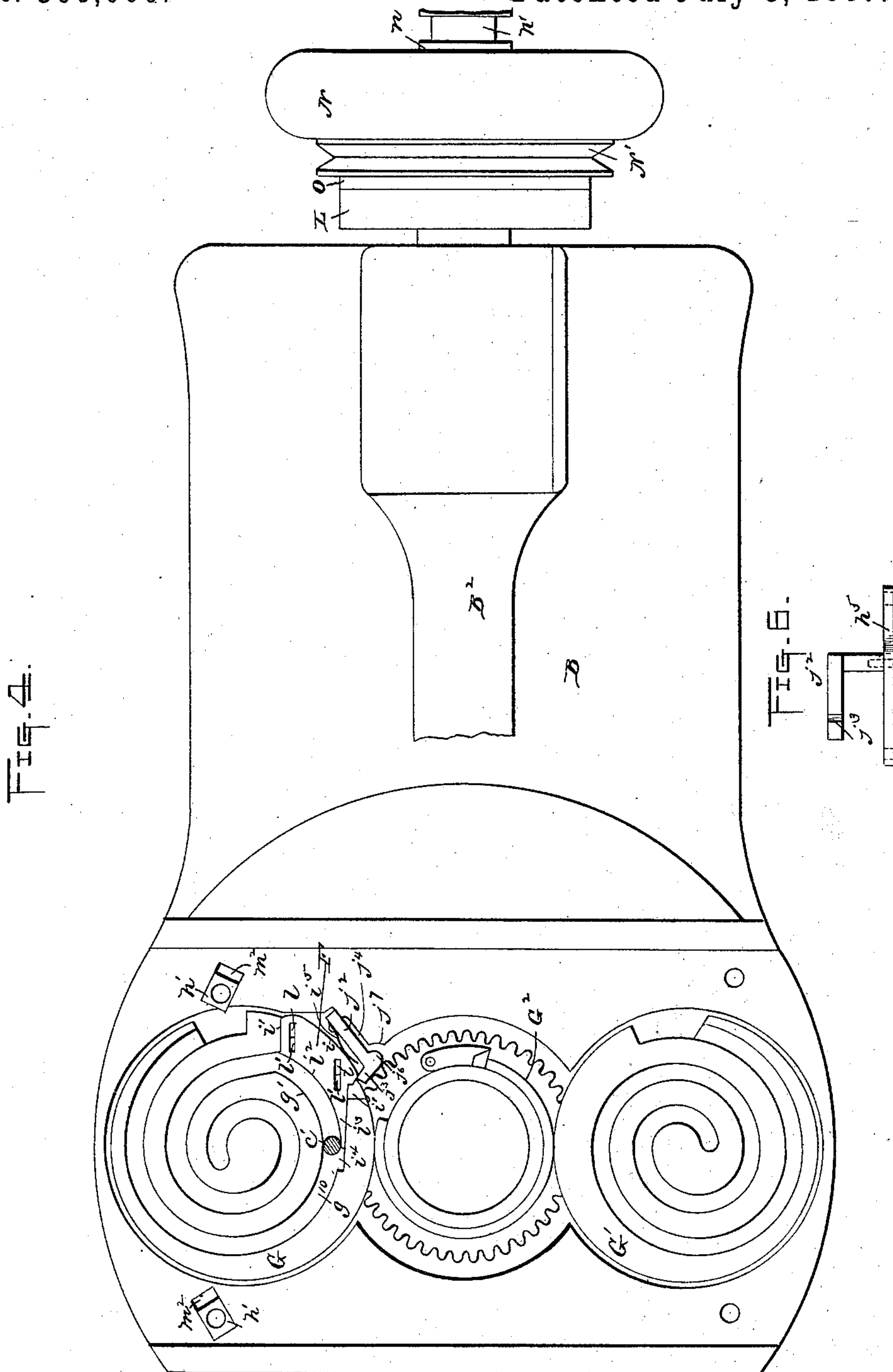
4 Sheets—Sheet 4.

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BUTTON HOLE SEWING MACHINE.

No. 366,006.

Patented July 5, 1887.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES S. JORDAN, OF NEW YORK, N. Y., ASSIGNOR TO THE SINGER
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BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 366,006, dated July 5, 1887.

Original application filed July 2, 1885, Serial No. 170,486. Divided and this application filed April 7, 1887. Serial No. 234,051.
(No model.)

To all whom it may concern:

Be it known that I, CHARLES S. JORDAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Button-Hole Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates more particularly to that class of button-hole sewing-machines in which the work-clamp is given a straightforward feeding movement to work one side of a button-hole, a semicircular feeding movement for the purpose of working the eye of the button-hole, and then a second straight feeding movement to work the other side of the button-hole.

The object of my invention is to provide machines of the class referred to with mechanism whereby, when a button-hole has been otherwise completed, a bar or stay may be automatically formed across the end of the said hole, and, also, when the said bar or stay has been formed the machine may be automatically stopped.

In the accompanying drawings, Figure 1 is a plan view of a button-hole sewing-machine with my invention applied thereto. Fig. 2 is an inverted plan view of the same. Fig. 3 is a sectional elevation showing all of the parts of my improvement, but with most of the ordinary operative parts of the machine removed. Fig. 4 is a broken plan view of the machine with the plate removed to show the feed-spirals and middle feed-gear. Fig. 5 is a detailed view showing the form of the brake-lever and wheel L for stopping the machine. Fig. 6 is a detailed edgewise view of the lever h^5 and arm j^2 . Fig. 7 is an enlarged detailed perspective view of the preferred means for connecting bar h with the lever E' . Fig. 8 illustrates a button-hole finished or barred by my machine.

The stitch-forming mechanism, the mechanism for operating the needle-bar a vertically, and the clamp b , for holding the goods in while a button-hole is to be worked, are or may be the same as in many button-hole sewing-machines now in use, and need not be particu-

larly described herein; and the mechanism for giving the needle bar a an "out" and "in" movement horizontally, consisting of the sliding bar d , slotted lever d' , pivoted stud e , and cam f , is also the same as in many well-known machines, and its special construction and action need not be here more minutely described.

The plate A, instead of being held stationary on the bed B of the machine, is adapted to have a side or edgewise movement to carry the clamp b and the goods held therein back and forth under the needle at right angles to the general direction of the feed. This side reciprocation of the plate A alternates with the out-and-in motion of the needle-bar a , and this lengthens the "laps" or overlay of the stitch, and the reciprocations of the plate A take place only at the end or finish of the button-hole, so that the "overlay" stitches bar the button-hole. The bed B is cut away at g to form a clearance for the side movement of plate A, as shown clearly in Fig. 1. The motion for reciprocating the plate A is derived from the cam C on the upright shaft D. This cam acts when the machine is in operation, and constantly reciprocates endwise the rod E, held beneath the bed of the machine.

The movement of rod E reciprocates on its pivot e' the lever E' , with the end e^2 of which, Fig. 2, the connecting mechanism H (which is attached to plate A below the bed B) is adapted to be engaged at the proper time, so that the movement of the lever E' will draw the plate A one way.

The plate A is by preference moved back by a spring, F' , acting between the stud f' on the under surface of the bed B and the pin f^2 on the bar h of the said connecting mechanism H. The said connecting mechanism H is caused to engage with and to be disengaged from the lever E' by devices connected with the back feed-spiral, G, and lever h^5 , (shown in Fig. 2 and in dotted lines in Fig. 1,) which devices are caused to operate at the proper time by the feed-pin c' of clamp b , as hereinafter described.

The above-mentioned bar h , Fig. 2, forms the main part of the said connecting mechanism H.

The plate A is attached at one end to this

bar h by screws passing through the plate and through slots $m^2 m^2$ in bed B, Fig. 4, and entering screw-openings made in said bar, or in screw-openings made in the blocks $h' h'$, Figs. 2 and 4, which latter are screwed to the sides of the bar h by screws $h^2 h^2$.

Pivoted to the inner end of bar h is the short plate h^3 , Fig. 2. This is connected by rod h^4 , Fig. 2, to one end of the lever h^5 , the inner end of which is constantly drawn toward the bar h by the spring h^6 , attached to the pin f and to the said lever, so that this spring acts through lever h^5 and rod h^4 to naturally hold the small pivotal plate h^3 swung away from the end of the lever E' . Upon the same pivot that holds the small pivotal plate h^3 is pivoted above the plate h^3 the connecting plate or latch h^7 , which is adapted to engage with the notched end e^2 of the lever E' , and this latch h^7 swings independently of plate h^3 , so that it may accommodate itself to the arc described by the end of lever E' when reciprocated, thus avoiding binding of the parts and unnecessary friction.

The latch h^7 also facilitates the connection with the lever E' , as it is constantly pressed forward against a stop, e^3 , on plate h^3 by a small spring, h^8 , so that it will yield to pressure of the lever E' and permit the latter to pass the latch in its backward movement. The stop e^3 is to cause the latch h^7 to be held always in proper position and cause it to be forced away from the end of the lever E' when the lever h^5 is operated to move the small plate h^3 outward away from the lever E' .

From the above it will be understood that the lever h^5 controls the devices that connect the plate A with the power for reciprocating it, and this lever h^5 , as above mentioned, is operated by the feed, or rather the feed and spring h^6 , so that the connection of the plate A with and its disconnection from its operative power will be effected automatically and always at the proper time, or at the finish of the button-hole.

The lever h^5 is operated as follows: It is fulcrumed on the pin or screw j , and has formed upon or connected to its upper surface about midway of its length, by the screw j' , the upwardly-projecting angle-arm j^2 , Figs. 4 and 6, which reaches up through an opening, j^4 , Fig. 2, in the bed B, so as to stand near the periphery of the back feed-spiral, G, as shown clearly in Fig. 4. The upper end of the arm j^2 is formed or provided with a side projection or lug, j^3 , so that a projection or plate, F, on the edge of the feed-spiral G will strike it as the spiral revolves and press the upper end of the arm j^2 forward, which movement will draw the lever h^5 forward toward the center of the machine, causing the latch h^7 to connect with the lever E' .

Opposite to the lug j^3 the arm j^2 is provided with the shoulder j^6 and the bed B is cut back, as shown at j^7 , Fig. 4, so that when the flange i on the plate F strikes the lug j^3 and forces the arm j^2 forward, as just mentioned, the shoulder j^6 , when it reaches the cut-away place j^7 , will

permit the arm j^2 to be shifted away from the flange i , the shoulder j^6 entering the opening j^7 . In this manner the forward end of the plate F will be permitted to pass the lug j^3 and the outer edge of the plate will hold the shoulder j^6 in the opening j^7 , so there can be no backward movement of the arm j^2 until the feed-pin c' is removed from the feed-spiral G, and in this manner the arm j^2 does not interfere with the slow forward movement of the feed-spiral G at the time the barring-stitches are being formed. When the feed-pin c' is removed from the spiral G, the plate F is free to move inward, so that the spring h^6 will act to draw the lever h^5 and arm j^2 back to their original position, disconnecting latch h^7 from lever E' . The projection or flange i , which impinges against the lug j^3 , is in this instance a part or the outer edge of a sliding plate F fitted in a cut-away place, i' , in the upper surface of the spiral G. The entire edge of this plate F, that constitutes the projection or flange i , is of considerable length, which governs the length of time that the latch h^7 is held in connection with the lever E' . The inner edge of the plate F is the arc of a true circle, and the plate is formed with the curved finger i^3 , that laps along the outer edge of groove g^{10} of the spiral G, the upper surface of the said spiral being cut away at i^4 for that purpose.

The outer edge of the finger i^3 is straight, to fit the straight edge of the cut-away place i^4 , and the plate F is slotted, as shown at l , to fit over studs or stop-pins l' , to limit its sliding out and in radial movements. The inward movement of the plate F is to permit the projection or flange i from coming in contact with the arm j^2 while the machine is stitching the button-hole, and this movement is caused by the small arm or spring i^5 , attached to the inner surface of the arm j^2 , which spring bears upon the outer edge of the plate F, to push it inward before it reaches the lug j^3 , so that the plate will pass said lug at every revolution of the feed-spiral G until the hole is to be barred, at which time the plate will be moved outward by the feed-pin c' , notwithstanding the pressure of the spring i^5 . (See Fig. 4.)

The outward movement of the plate F is caused by the feed-pin c' striking the inner curved edge, i^2 , of the plate or coming between the edge and the curved edge g' of the feed-spiral, and is for the purpose of causing the projection or flange i to strike the arm j^2 or projection j^3 thereof, for connecting the mechanism H with the lever E' to reciprocate plate A, as just described.

The groove in the feed-spiral G is spiral throughout, except at g' , opposite to the curved edge i^2 of the plate F. At this point, g' , the groove is formed on a true circle concentric with the said curved edge i^2 of the plate F. In this manner, while the plate F is in contact with the feed-pin c' and while the edge i is in contact with the arm j^2 and plate A is being reciprocated, the clamp b and the goods held therein will remain at rest on plate A, so that

the barring-stitches will be collected or piled one upon the other, forming a perfect barring without distributing the stitches along the goods at the end of the button-hole, as would be the case if the feed were permitted to continue at the time the barring-stitches were being put in.

The plate A (see Fig. 1) is not held fast by the plate screws $a' a'$; but the openings in the plate through which they pass are of sufficient size to accommodate the stitch or edgewise reciprocation, as will be understood from the dotted lines in Fig. 1.

The front feed-spiral, G' , and middle gear, G^2 , are the same and operated the same as in many well-known button-hole machines, and need no description here.

In order to stop the machine automatically when the staying or barring of the button-hole is completed, I attach to the machine the stop or brake mechanism next to be described, and arranged to be put in action by the reciprocating movement of the plate A, the same being accomplished by means of the bar J, Figs. 2 and 3, spring J' , placed thereon to constantly press the bar J to the left, the arm J^2 , attached to the under surface of the plate A, to reach down through the opening B' of the bed B, and bent to act against the end of bar J, and the pawl J^3 and spring J^4 , attached to outer end of the bar J for operating the locking pawl or trigger K, (shown clearly in Fig. 3,) and for purposes below described.

L is the brake-wheel, fixed upon the main driving-shaft M, and N is the hand-wheel, placed loosely upon the shaft M. The wheel L is grooved at its inner face, as shown at m , Figs. 3 and 5, in such a manner as to form an eccentric, m' , and at the outer surface it is by preference provided with a rubber or leather facing, O, against which the flat inner face, N' , of the wheel N is adapted to be pressed by the lever P for the purpose of clutching the wheel N with the wheel L and revolving the same and shaft M for operating the machine. The lever P is a bent or curved lever centrally fulcrumed on a pin at the outer end of the arm P' , formed upon or attached to the rear surface of the upper portion, B^2 , of the frame of the machine, and said lever P is attached to the hub n of the hand-wheel N by a claw, p , the members of which enter a small circumferential groove, n' , made in this hub n , as shown clearly in Fig. 3, so that the lever will not interfere with the free revolution of the hand-wheel, and by operating said lever P on its fulcrum the hand-wheel N may be made to engage with or be disengaged from the wheel L for operating or stopping the machine. The lower end of the lever P is held by spring p^2 in constant contact with a cam or eccentric, q , Figs. 2 and 3, on the transverse shaft Q, held in suitable bearings, $q' q'$, Fig. 2, formed at the rear of the frame of the machine. The transverse shaft Q has attached to it at one end the heavy torsional spring R,

Fig. 2, which is applied to the shaft to normally hold it in position to carry the cam or eccentric q to one side or off from the lower end of the lever P, so that the spring p^2 will elevate the lower end of said lever and cause its upper end to carry the wheel N outward upon the shaft M, and thus disconnect the power from the machine, leaving the machine free to be stopped, while the power runs on.

At the time the band-wheel N is disengaged from or moved out of contact with the wheel L a brake or (in this instance) a double-acting brake-lever, S, is applied to the wheel L for instantly stopping this motion of the machine.

The brake-lever S is applied by a cam or toe, s , formed on the transverse shaft Q, said toe being arranged to lift the vertical rod S' (to which the lever S is pivoted) at the time the cam or eccentric q is moved off from the lower end of the lever P by the action of the spring R. The vertical rod S' is constantly pressed downward by a spring, S^2 , placed thereon to act between the head s^2 and the bearing s^3 in which the rod is held.

The end of the transverse shaft Q opposite to that to which the spring R is applied is provided with the lever Q' , by which the shaft Q may be turned to the left, (to the position shown in full and dotted lines in Fig. 3,) in which position another toe, s' , on shaft Q is held by the pawl or trigger K, above mentioned, which holds the shaft Q against the tension of the spring R. In this position of the shaft Q the brake-lever S is lowered out of contact with the wheel L, and the wheel N is held in firm contact with the outer surface of said wheel L by lever P and cam or eccentric q , so that the power applied to revolve wheel N will revolve the main drive-shaft M.

The pawl or trigger K is pivoted upon stud t , and is provided with three notches, t' , at its lower end, with which the above-mentioned pawl J^3 , attached to rod J, is adapted to engage in succession when the plate A is reciprocated in moving the lower end of trigger K outward to cause its upper end to release the toe s' of the transverse shaft Q, so that the spring R may act to turn the shaft Q and disengage hand-wheel N from wheel L, and at the same time apply the brake to the wheel L for stopping the machine, as above described. When shaft Q is turned by the lever Q' when the machine is to be put in gear for operating, the pawl J^3 is held out of contact with the notches t' of the pawl K by means of a small plate, t^2 , placed above the outer end of the pawl J^3 , so that it will not interfere with the necessary backward movement of the lower end of the trigger K to cause the hook t' at the upper end of the trigger to pass fully over the toe s' .

The plate t^2 is fixed to the frame of the machine, and thus, being stationary, it serves as a guard to keep the pawl J^3 away from the notched pawl or trip K, except when the rod J is moved far enough to the right, Fig. 3, to permit the curved outer end of the pawl J^3 to

be pushed upward above the said plate t^2 . Thus the inner notches of the pawl or trip K are not acted on by the operating-pawl J² until they are successively forced outward by the
5 said operating-pawl.

The hook t^1 is made of considerable length, so a relation will exist between the hook, the length of the trigger, and the distance of the side movement of the plate A, so that one, two,
10 or three movements of the plate A will be required to move the hook t^1 off from the toe s' . In this manner, when the plate A causes the last barring-stitch to be put in the button-hole, the trigger K will disengage the toe s' and cause
15 the machine to stop just at the proper time.

The brake-lever S is bent to form two arms, s^4 and s^5 , the former of which runs in the groove m of the wheel L, while the latter is adapted to run in contact with the outer surface of the
20 said wheel L. When the shaft Q is turned to the position shown in full lines in Fig. 3 and held by the trigger K, the rod S' will be lowered, as above described, and this will lower the brake-lever S, so that the arms s^4 s^5 will
25 not be in contact with the wheel L; but when the shaft Q is released by the trigger K and turned by the action of the spring R the rod S' will be forced upward by toe s^4 of the brake-lever S into contact with the eccentric m' of
30 the wheel L, which eccentric will press downward this arm s^4 and bring the arm s^5 into firm contact with the outer surface of the wheel L and cause the machine to stop in less than one complete revolution of the wheel L after the
35 application of the brake.

I do not claim in this application the needle-bar a and means for reciprocating it vertically and means for giving it an in-and-out motion, in combination with the plate A and
40 means for reciprocating it edgewise at right angles to the line of feed and alternately to the in-and-out movement of the needle-bar for increasing the length of the overlay-stitches formed by the in-and-out motion of the said
45 needle-bar for barring the button-hole; or the needle bar and means for reciprocating it vertically and means for giving it an in-and-out motion, the plate A, the feed-spirals G G', clamp b , moved on the plate A by the feed-spi-
50 rals, in combination with means for reciprocating the plate A edgewise at right angles to the line of feed for increasing the length of the overlay-stitches, and means for automatically stopping the feed movement of the clamp b while the plate A is being reciprocated for
55 causing the barring overlay-stitches to be piled one upon the other to perfectly bar the button-hole; or the combination, with a work-clamp having two straight feeding movements and a
60 semicircular rotary feeding movement between the same, of an automatic mechanism for reciprocating said work-clamp across the line of the said straight feeding movements to automatically bar a button-hole after it has been
65 worked; or the combination, with a needle-bar having an in-and-out or horizontal reciprocating movement, of a work-clamp having two

straight feeding movements and a semicircular rotary feeding movement between the same, and automatic mechanism for reciprocating
70 said work-clamp horizontally in opposition to the horizontal or in and out movements of the said needle-bar; or the needle-bar a and means for reciprocating it vertically and means for giving it an in-and-out motion, in combination
75 with the plate A and automatic mechanism connecting the plate A with the cam on the shaft of the machine for reciprocating the plate A edgewise at right angles to the line of the feed for increasing the length of the over-
80 lay-stitches formed by the in-and-out motion of the needle-bar a for barring a button-hole; or, in a button-hole sewing-machine, the combination, with the needle-bar and its operating mechanism, of a work-clamp and a movable
85 supporting-plate for the said work-clamp, provided with a guiding-slot having straight and curved portions, as shown, and being adapted to be reciprocated transversely to the longitudinal movements of the said clamp when the
90 end of the button-hole is reached for the purpose of barring said hole; or, in a button-hole sewing-machine, the combination, with a work-clamp having a straight movement to permit
95 one side of a button-hole to be worked, a turning or rotary movement to permit the eye of the button-hole to be worked, and a second straight movement to permit the other side of the button-hole to be worked, of a movable
100 plate by which the said work-clamp is supported and mechanism for automatically reciprocating said plate horizontally to bar the button-hole at the completion of the working of the second side of the latter, these features
105 of my invention being embraced by my application No. 170,486, filed July 2, 1885, of which this application is a division.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The back feed-spiral, G, provided with a
110 flange arranged to be moved by the guide-pin of the cloth-clamp, the plate A, connecting mechanism H, and the reciprocating lever E', in combination with means, substantially as described, for operating the connecting mech-
115 anism H from the feed-spiral flange for connecting the plate with and disconnecting it from the power to move it edgewise, substantially as described.

2. The combination, with the plate A and
120 means for reciprocating it edgewise at right angles to the line of feed, of the cloth-clamp b , feed-pin c' , and feed-spiral G, formed with the true curve g' for stopping the feed at the time the plate A is reciprocated, substantially
125 as described.

3. The feed-spiral G, formed with the true curve g' and provided with the sliding plate F, in combination with the plate A, cloth-clamp b , feed-pin c' , and means, substantially
130 as described, for reciprocating the plate A edgewise at right angles to the line of feed, substantially as and for the purposes set forth.

4. The lever h^5 , provided with the arm j^2 ,

the flange attached to the feed-spiral G, the rod h^4 , spring h^6 , connecting mechanism H, and spring F^v , in combination with the reciprocating rod E and lever E^v , all arranged to operate substantially as and for the purposes set forth.

5. The plate A and means for reciprocating it edgewise at right angles to the line of the feed for lengthening the overlay-stitch at the finish of the button-hole for barring the button-hole, in combination with automatic brake mechanism and rods connecting the brake mechanism with the plate A, so that its edgewise reciprocation will release the brake mechanism, substantially as and for the purposes set forth.

6. The combination, with the automatic brake mechanism applied to the machine for stopping it at the completion of the barring of the button-hole, of the plate A, the clamp b , feed-pin c' , feed-spiral G, means for reciprocating the plate A edgewise at right angles to the line of the feed, and means for connecting the plate A to the brake mechanism, so that the side reciprocation of the plate A will release the brake mechanism when the barring of the button-hole is completed, substantially as and for the purposes set forth.

7. The transverse shaft Q, provided with the spring R, cam or eccentric q , and toes s and s' , the lever P, the band-wheel N, operated thereby, the vertical rod S' , the brake S, the wheel L, and the pawl or trip K, hooked at one end and notched at the other, in combination with the reciprocating plate A, the rods J and J^2 , and the pawl J^3 , all arranged to operate substantially as set forth.

8. The connecting mechanism H, the lever h , connected therewith and provided with the arm j^2 , extending up through the bed of the machine and having opposite projections or shoulders, $j^3 j^6$, and the bed-plate B, having the recess or opening j^7 , combined with the reciprocating plate A and the feed spiral or cam G, provided with the sliding plate F, substantially as set forth.

9. The combination, with the driving-shaft, of the wheel L, attached thereto and having the cam or eccentric m , the two-armed brake-lever S, and mechanism for throwing the said lever into action to stop the machine when the driving-wheel is unclutched, substantially as set forth.

10. In a button-hole sewing-machine, the combination, with a supporting-plate, as A, loosely attached to the bed-plate of the machine and provided with a guiding-slot having straight and curved portions, as shown, of a work-clamp having an operating-pin, as c' , a feed-spiral or cam-wheel, as G, for moving said pin and work-clamp, and mechanism, substantially as described, adapted to be thrown in operation by the said pin for reciprocating said plate when the last side of the button-hole is completed, substantially as set forth.

11. In a button-hole sewing-machine, the combination, with a work-clamp having two straight movements and a semicircular rotary movement between the same, of a movable plate by which the said work-clamp is supported, mechanism for automatically reciprocating said plate to bar the button-hole after the latter has been worked, and mechanism for automatically stopping the machine when the bar is completed, substantially as set forth.

12. In a button-hole sewing-machine, the combination, with the driving-shaft and the work-clamp, of the reciprocating supporting-plate A, by which the latter is carried and by which the barring of the button-hole is effected, a clutch mechanism for applying power to the said shaft, a brake mechanism for stopping said shaft when the power is disconnected therefrom, and a tripping mechanism operated from said reciprocating plate and adapted to disconnect said clutch mechanism and apply the brake to stop the machine after a predetermined number of reciprocations of said plate A, substantially as set forth.

13. In a button-hole sewing-machine, the combination, with a work-clamp having two straight feeding movements and a semicircular rotary feeding movement between the same, of an automatic mechanism for reciprocating said work-clamp across the line of the said straight feeding movements to bar a button-hole after it has been worked, and mechanism for automatically stopping the machine when the bar is completed, substantially as set forth.

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

CHARLES S. JORDAN.

Witnesses:

J. G. GREENE,
S. A. BENNETT.