

(Model.)

2 Sheets—Sheet 1.

T. POWELL.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 467,643.

Patented Jan. 26, 1892.

Fig. 1.

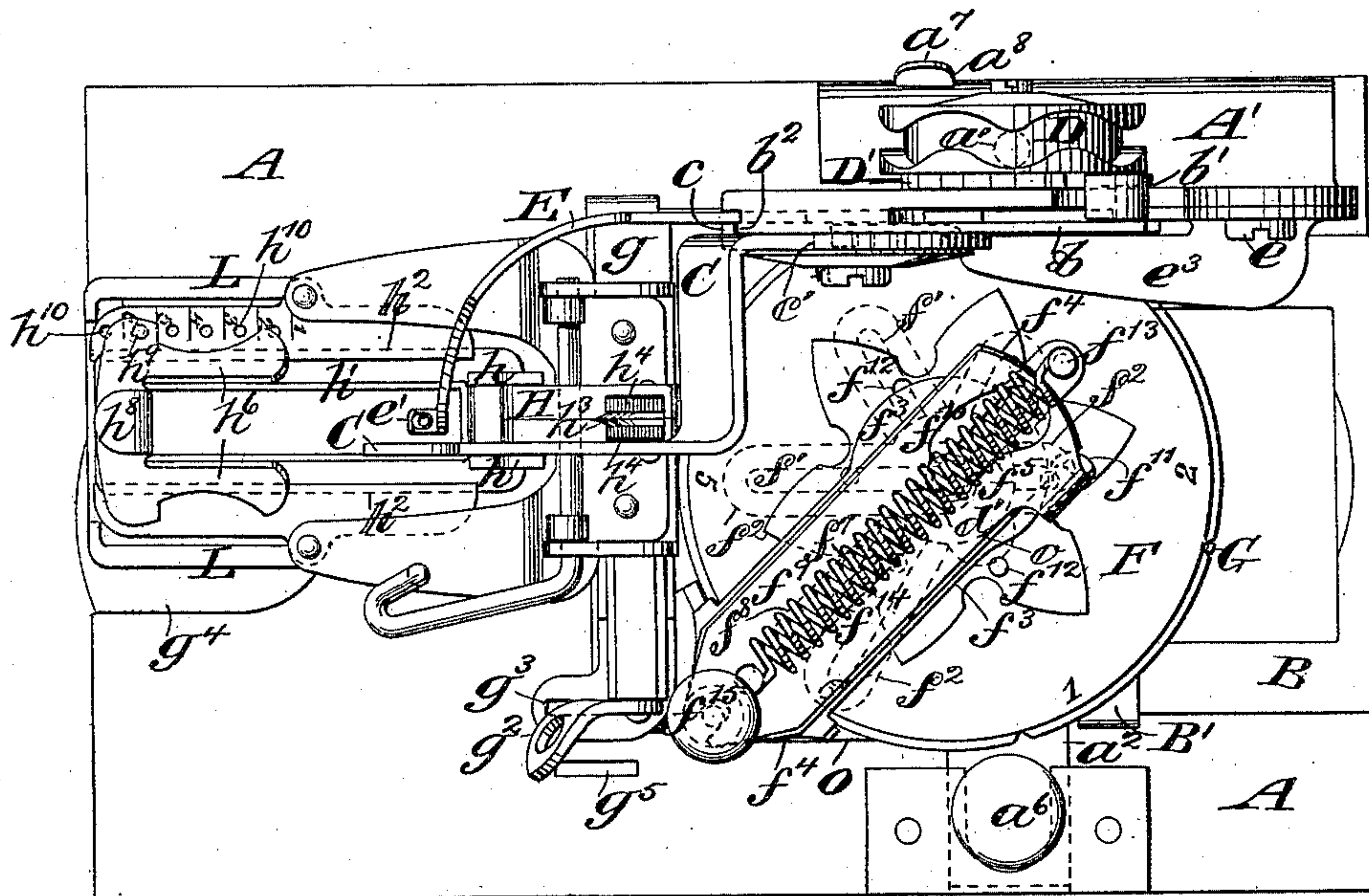
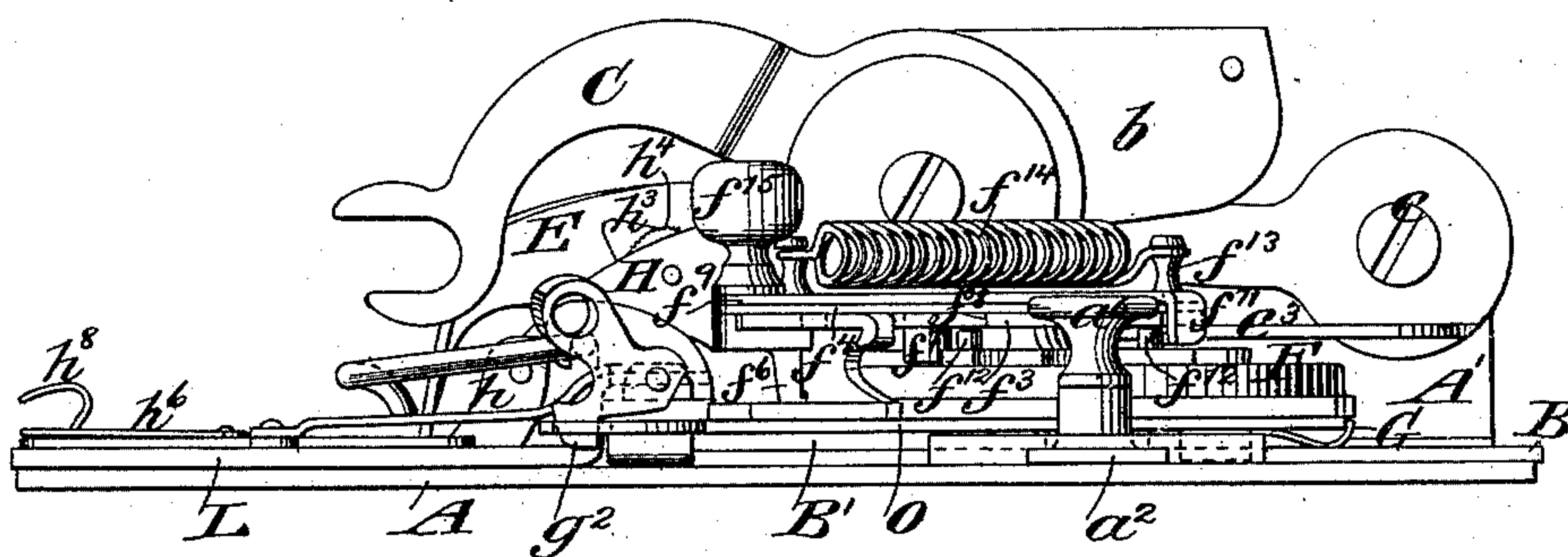


Fig. 2.



Witnesses:

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S. W. Legendre.

Inventor:

Thomas Powell
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Fig. 3.

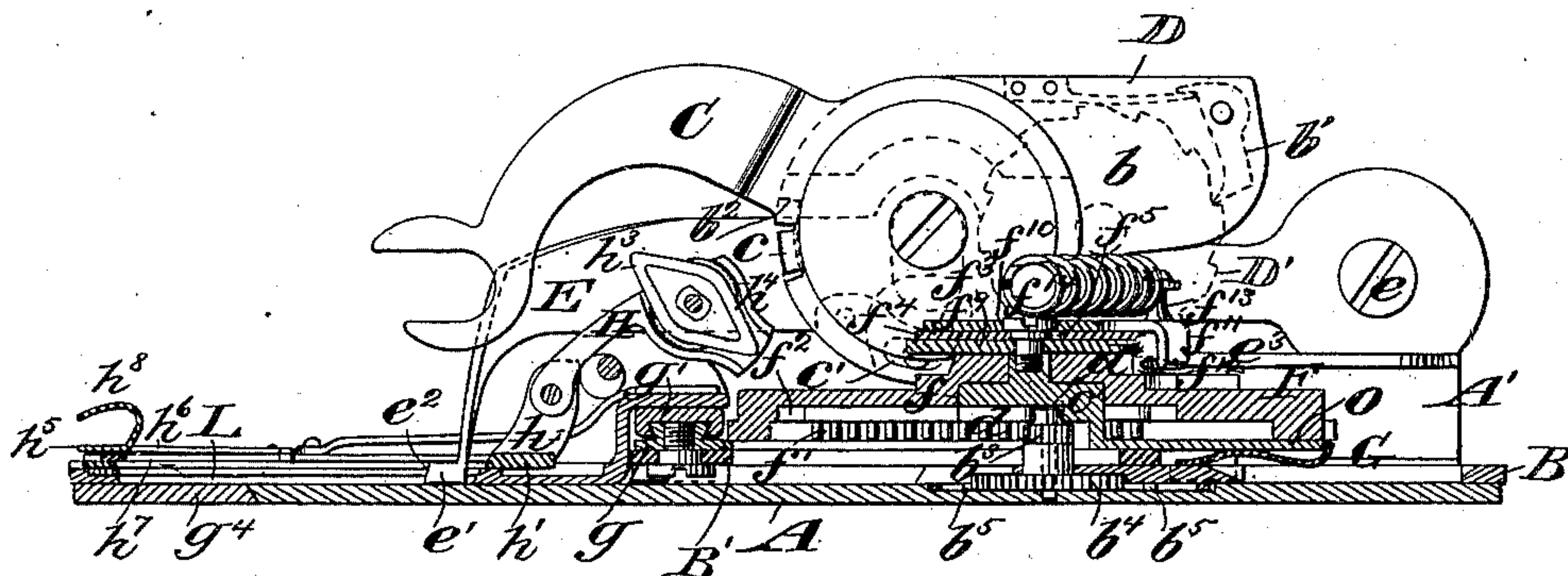
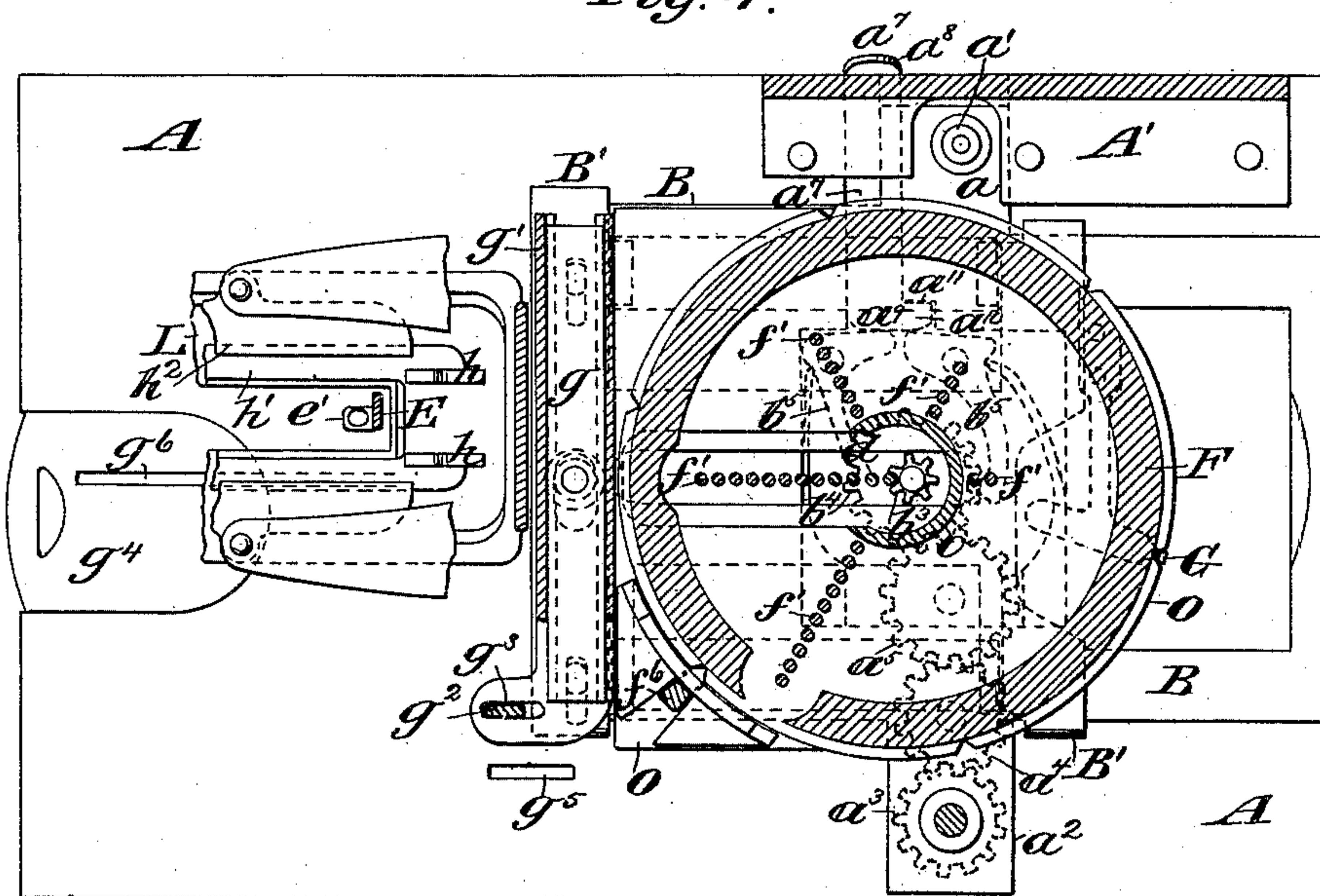


Fig. 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS POWELL, OF FORT SCOTT, KANSAS.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 467,643, dated January 26, 1892.

Application filed February 12, 1891. Serial No. 381,136. (Model.)

To all whom it may concern:

Be it known that I, THOMAS POWELL, of Fort Scott, in the county of Bourbon and State of Kansas, have invented a new and useful Improvement in Button-Hole Attachments for Sewing-Machines, of which the following is a specification.

My invention relates to an improvement in a button-hole attachment for sewing-machines, in which a cloth-clamp is adapted to carry the material in which the button-hole is to be worked in a path around the needle, so as to bring the margin of the button-hole into position to be stitched.

My present improvement has particular reference to the general form of attachment shown, described, and claimed in Letters Patent No. 442,695, granted to me on December 16, 1890, the particular objects in the present instance being to provide a convenient and effective arrangement of the movable rack-sections with respect to the supplementary stationary section for varying the size of the button-hole; to improve the presser-foot and its operating mechanism; to provide for removing the cloth-clamp out of the way to gain access to the shuttle; to provide for cutting the button-hole, and to provide simple and convenient mechanism for returning the cloth-clamp to the position of starting independently of the operation of the actuating-lever.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a plan view of the attachment. Fig. 2 is a view in side elevation. Fig. 3 is a longitudinal vertical section through line xx of Fig. 1, and Fig. 4 is a partial plan view with the top of the movable rack-section disk removed.

The bed-plate A, the overlying plate B, having an arm a extending laterally therefrom and provided with an upwardly-extending stud a' , the bracket A', provided with a recess for the reception of the arm a , the cam-wheel or disk D, with which the stud a' engages to give the overlying plate B its laterally-reciprocating movement, mounted on the uprising portion of the bracket A' and having the ratchet-wheel D' fixed to rotate therewith, the cloth-clamp L, mounted on the frame B'

and having a movement longitudinally of the laterally-reciprocating plate B, the laterally-shifting plate O, and the gear for imparting the longitudinal movement of the cloth-clamp by means of the lateral movement of the overlying plate B are quite similar in their form, arrangement, and function to the corresponding parts shown, described, and claimed in my former patent, hereinabove referred to.

A plate b is loosely mounted at the side of the bracket A', preferably upon the opposite side from that on which the cam-wheel D is located, and carries at one end a pawl b' , which is adapted to engage the ratchet-wheel D' and force the cam-wheel D around in a step-by-step movement. The plate b is actuated by means of the operating-lever C, which is pivotally secured to the side of the bracket A', concentric with the plate b , and is provided at its pivoted end with a lug c , projecting laterally therefrom and adapted to engage a recess b^2 in the plate b . The recess b^2 is made longer than the lug c , so that the plate b will be actuated by the operating-lever only at the limits of its up and down strokes; but such movement will be sufficient to advance the cam-wheel D one step at the completion of each upward stroke of the operating-lever and to return it to its position to again advance the wheel at the limit of the downward stroke of the operating-lever.

A presser-foot bar E is pivotally secured at one end to the bracket A', as shown, for example, at e , and projects forwardly between the plate b and the bracket A', and is provided at its forward end with a foot e' , through which there is an opening to receive the needle, as is usual, the toe of the foot being beveled, as shown at e^2 , for purposes which will hereinafter appear. Fixed to the pivoted end of the bar E is one end of a spring-bar e^3 , the free end of said bar projecting forwardly to a point substantially below the pivotal point of the operating-lever C, and provided with a laterally-projecting stud adapted to enter an angular-shaped slot c' in the pivoted end of the lever C. The slot c' is so disposed with respect to the end of the spring e^3 that when the operating-lever C is depressed and the needle is being forced through the fabric the end of the spring e^3 will be held in the lower

portion of the slot c' and the presser-foot thereby depressed to hold the fabric in position; but when the operating-lever C is raised the stud on the end of spring e^3 will be forced along the angular slot c' into the upper portion of said slot, thereby allowing the presser-foot to lift from the fabric while the needle is out of engagement therewith and the feed is taking place.

10 A pinion b^3 is fixed to rotate with the ratchet or toothed wheel b^4 , the latter located in a recess in the base-plate and carried by the laterally-reciprocating plate B, and adapted to engage pawls b^5 , fixed to the bed-plate, and
15 be thereby rotated in a manner similar to that shown in my former patent. The pinion b^3 projects upwardly into a hollow housing or hub o , fixed to the shifting plate O, and is adapted to engage a permanent rack-section
20 d located therein and extending radially toward the periphery of the hollow hub o . A section d' of a groove extends around the sides and inner end of the rack-section d within the hub, for the purpose of allowing the
25 pinion b^3 to travel around the rack-section.

A disk F is provided with a central recess f on its under side adapted to receive the hub o of the shifting plate, and said disk is further provided on its under side with one
30 or more—in the present instance, five—shallower recesses radiating from the margin of the central recess f and provided with rack-sections f' , of varying lengths, located central of the recesses, so that there is between the
35 rack-sections f' and the walls of the recesses a continuous groove f^2 around the sides and ends of the rack-sections. The several rack-sections f' and the grooves around them are intended to supplement the permanent rack-section d in the hub of the shifting plate, and
40 I shall find it convenient to refer to them as "temporary rack sections," for the reason that they may be changed by the rotation of the disk F, so that any one of them may at pleasure be brought into position to supplement
45 the permanent rack-section and form together with it a complete rack surrounded by a continuous groove. The function of these several racks is the same as that described in
50 my patent referred to—namely, to give the cloth-clamp a movement around the margin of the button-hole corresponding to its length.

A set of characters located upon the top of the disk F serves to indicate the relative
55 lengths of the several rack-sections, so that the disk may be set to correspond with the length of button-hole desired to be worked. A bearing-plate f^3 is secured to the pivot about which the disk F rotates and carries
60 thereon a radially-sliding plate f^4 , which is provided with an elongated slot f^5 near one end, which embraces the screw or pin which holds the bearing-plate to the pivot, and near its opposite end carries a depending stop f^6 ,
65 which is adapted to engage notches in the periphery of the disk F and hold the latter in the desired adjustment. The said sliding

plate f^4 is further provided with a depending stud f^7 , which engages an elongated slot f^8 in the bearing-plate for the purpose of giving
70 the sliding plate a true sliding movement. A superimposed plate f^9 is pivotally secured at its outer end to the sliding plate f^4 and is provided at its inner end with a slot f^{10} , adapted to loosely embrace the pin or screw
75 which secures the bearing-plate to the pivot, so as to give the said superimposed plate a limited lateral play upon said pin or screw. The superimposed plate f^9 is further provided at one side of its inner end with a
80 downwardly-projecting catch or lug f^{11} , which is adapted when the plate is slid outwardly to engage one of several pins f^{12} projecting upwardly from the top of the disk F, and thereby rotate the said disk one step.
85 The slot f^{10} in the superimposed plate is of such shape that as the plate is slid inwardly its catch will pass the fastening pin or stud and allow the end of said plate to swing into the curved path of the pin f^{12} , carried along
90 with the disk F. The bearing-plate f^3 is provided at its inner end with a post f^{13} for the attachment of a spring f^{14} , and the superimposed plate f^9 is provided near its outer end with a corresponding post for the attachment
95 of the outer end of said spring, the tension of said spring tending to hold the sliding plate normally drawn toward the center of the disk F. The sliding plate f^9 is further conveniently provided at its outer end with a knob
100 f^{15} for operating it.

A spring-catch G is secured to the outer side of the shifting plate O in position to engage the periphery of the disk F and lock it against possible rotation, excepting when the
105 clamp-holder is in position to begin its work. When in such position, which in the present instance is when it is advanced outwardly to the limit of its movement, the said spring G is brought into engagement with a projection
110 on the reciprocating plate B, which withdraws it temporarily from engagement with the disk F and permits the latter to be rotated by the sliding plate f^9 and its attachments to bring the desired rack-section into alignment with
115 the permanent rack-section.

The plate B is provided upon its opposite side from the arm a with a laterally-projecting arm a^2 , in the under side of which is an intermeshing train of gear a^3 and a^4 , the latter of which intermeshes with a gear-wheel
120 a^5 , which is located in a recess in the bottom of the plate, and also intermeshes with the ratchet or toothed wheel b^4 , so that as the wheel b^4 is rotated by its engagement with
125 the pawls as it is reciprocated with the plate B the train of gearing a^3 , a^4 , and a^5 will also be rotated. On the other hand, the said train of gear is always in mesh with the operating-wheel b^4 , and by means of a thumb-wheel a^6 ,
130 fixed to the spindle of the gear-wheel a^3 , the train of gear, and hence the wheel b^4 and its pinion, may be rotated at pleasure when the wheel b^4 is released from the pawls, and the

cloth-clamp may be thereby advanced or returned to its place of beginning at pleasure. The releasing of the wheel b^4 from its pawls is effected by means of a push-piece a^7 , seated in the bed-plate and having its outer end a^8 provided with an upwardly-turned portion and its inner end a^9 in engagement with the short arms of the pawls, so that when forced inwardly it will throw the ends of the pawls out of engagement with the teeth of the wheel b^4 and leave it free to rotate. To hold the push-piece a^7 against displacement, its inner end is conveniently provided with a short lug or nose a^{10} , which overlaps a shoulder a^{11} on the bed-plate.

For the purpose of sliding the cloth-clamp laterally to expose the cover of the shuttle-box and to further carry the cloth into position to have the button-hole cut, I connect the said cloth-clamp with its carrying and supporting plates by means of a laterally-sliding joint composed of the stationary way g and the slide g' , the latter fixed to the rear end of the clamping-plate. On the end of the slide g' I provide a vertically-swinging latch g^2 , the nose of which is adapted to engage a slot g^3 , formed in a forwardly-extending portion of the plate, which supports the way g , so that when the latch is turned down into engagement with the said slot the clamping-plate is firmly locked to its support and carrying-plates, so as to partake of the forward and lateral motions of said plate to carry the cloth around the needle. When, however, the latch is disengaged from the slot g^3 the said clamping-plate may be slid laterally to the left so as to expose the shuttle-cover g^4 in the bed-plate, or it may be slid to the right, so that the latch may be depressed into a slot g^5 in the bed-plate, and when in such position the opening in the center of the cloth-clamp through which the needle works will be brought centrally over an elongated narrow slit g^6 in the bed-plate or in the cover of the shuttle-box for the purpose of cutting the button-hole.

The means which I provide for cutting the button-hole when the cloth-clamp is adjusted for the purpose as above stated consist of a swinging arm H , hinged at one end to a pair of ears h , secured to a sliding frame h' , mounted in grooves h^2 in the cloth-clamp and extending along on opposite sides of the opening in the cloth-clamp, the said swinging arm being provided at its head or free end with a cutting-blade h^3 , which, when the arm is swung over and downwardly into position within the opening in the cloth-clamp, is adapted to project downwardly through the plane of the cloth and into the slit in the bed-plate. By swinging the arm downwardly and piercing the cloth when its support is in its rearward adjustment, and then sliding the cutter and its frame forwardly, the button-hole will be cut. When out of use, the cutter may be swung back out of the way. In the present instance I have shown milled disks h^4 located one on each

side of the cutting-blade to prevent the cloth from creeping away from the edge of the blade as it is slid forward. For the purpose of determining the desired length of cut I have provided a stop consisting of a cross-head h^5 and a pair of spring-arms h^6 , which extend from the cross-head rearwardly along the edges of the opening through the cloth-clamp, and secured at their rear ends to a pair of slides h^7 , which engage the grooves in which the cutter-support slides. The cross-head is provided with a handle-piece h^8 and with a depending pin or tooth h^9 , which is adapted to spring into engagement with a series of holes or notches h^{10} in the top of the cloth-clamp and hold the said stop in the desired adjustment. The several holes or notches h^{10} are numbered to correspond with the lengths of the button-holes determined by the different lengths of racks, so that the cross-head of the stop, when the latter is adjusted to a number corresponding to that to which the rack-carrying disk is set, will stop the cutter in the proper position to form a hole of the desired length. The said stop should be adjusted to correspond (by number) with the particular rack-section that for the time being is in position for use; but should the operator forget to make the necessary adjustment of said stop, and in case the new size of hole is to be greater than that for which the stop was set, it will be caused to automatically assume the correct position by the action of the presser-foot, the beveled end of the latter lifting said stop and driving it toward the operator till it arrives at the point at which it should have been set before beginning the work.

What I claim is—

1. The combination, with a fabric-carrier and means for giving it the desired movement with respect to a needle, of a permanent rack-section and a horizontally-rotating disk provided on its face with a series of supplemental rack-sections adapted to be brought into alignment with the permanent rack-section at pleasure, a pinion in engagement with the rack, and means for actuating the pinion, substantially as set forth.

2. The combination, with a cloth-carrier and means for imparting to it a laterally-reciprocating movement, of a permanent rack-section, a disk carrying in its flat face a series of supplemental rack-sections, a reciprocating slide having an engagement with the disk to impart to it a step-by-step rotary movement, a pinion adapted to engage the rack, and means for operating the pinion, substantially as set forth.

3. The combination, with the cloth-carrier and the permanent rack-section, of the disk provided with a series of supplemental rack-sections located in its flat face and radiating from its central portion, the said disk having a traveling movement, together with the cloth-carrier and a step-by-step rotary movement, a spring-catch having a normal engagement with the rotary disk to lock it

against rotation, a releasing device adapted to automatically release the spring at a predetermined point in the travel of the disk with the cloth-carrier, a pinion in engagement with the rack, and means for actuating the pinion, substantially as set forth.

4. The combination, with the reciprocating plate, the cloth-clamp carried thereby, the toothed wheel carried by the reciprocating plate, and means for engaging the toothed wheel and causing it to rotate as the plate reciprocates, of mechanism for imparting a traveling movement to the cloth-clamp in a direction transverse to that in which the reciprocating frame moves, gear and a gear-actuated spindle for rotating the said toothed wheel independently of the movement of the reciprocating frame, and means for releasing the toothed wheel at pleasure to allow it to be turned by the gear-actuating spindle, substantially as set forth.

5. The combination, with the vibrating actuating-lever and the presser-foot supporting-bar pivotally secured to a fixed support, of a spring-arm fixed to the presser-foot bar and extending forwardly from its pivotal connection, and a loose connection between the actuating-lever and the end of said spring-arm, whereby the presser-foot is depressed and released as the actuating-lever vibrates, substantially as set forth.

6. The combination, with a vibrating actuating-lever provided near its pivotal point with an angular slot, of the presser-foot bar pivotally secured to a fixed support, and a spring-arm fixed at one end to the presser-foot bar and having a loose engagement at its opposite end with the angular slot in the vibrating actuating-lever, whereby the presser-foot is depressed and released as the actuating-bar is vibrated, substantially as set forth.

7. The combination, with the bed-plate pro-

vided with a slot to receive a button-hole cutter, the laterally-reciprocating and forwardly and backwardly traveling plates, and means for imparting to the forwardly and backwardly traveling plates a lateral movement at intervals, of the cloth-clamp secured to its support in laterally-sliding adjustment relatively to the slot in the bed-plate, and the latch for securing it in position, substantially as set forth.

8. The combination, with the bed-plate provided with an elongated slot, the cloth-clamp, and its support, the said clamp being secured in laterally-sliding adjustment to its support, and means for giving said clamp a laterally-sliding movement relative to the slot in the bed-plate, of a button-hole cutter carried by the cloth-clamp, the said cutter being adapted to penetrate in the slot in the bed-plate, substantially as set forth.

9. The combination, with the cloth-clamp, of the vertically-swinging button-hole cutter and its sliding support, the said support when the cutter is depressed in position to cut having a sliding movement in the direction of the length of the button-hole, substantially as set forth.

10. The combination, with the cloth-clamp provided with a scale corresponding to the different lengths of button-holes and a sliding stop having an adjustment to each of the divisions of the scale, of a sliding cutter-support carried by the cloth-clamp, and a swinging arm carrying the cutter and hinged to the cutter-support, the said arm when in position to cut having an engagement with the said adjustable stop to limit its movement, substantially as set forth.

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Witnesses:

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