

(Model.)

6 Sheets—Sheet 1.

J. H. PALMER.

BUTTON HOLE SEWING MACHINE.

No. 298,228.

Patented May 6, 1884.

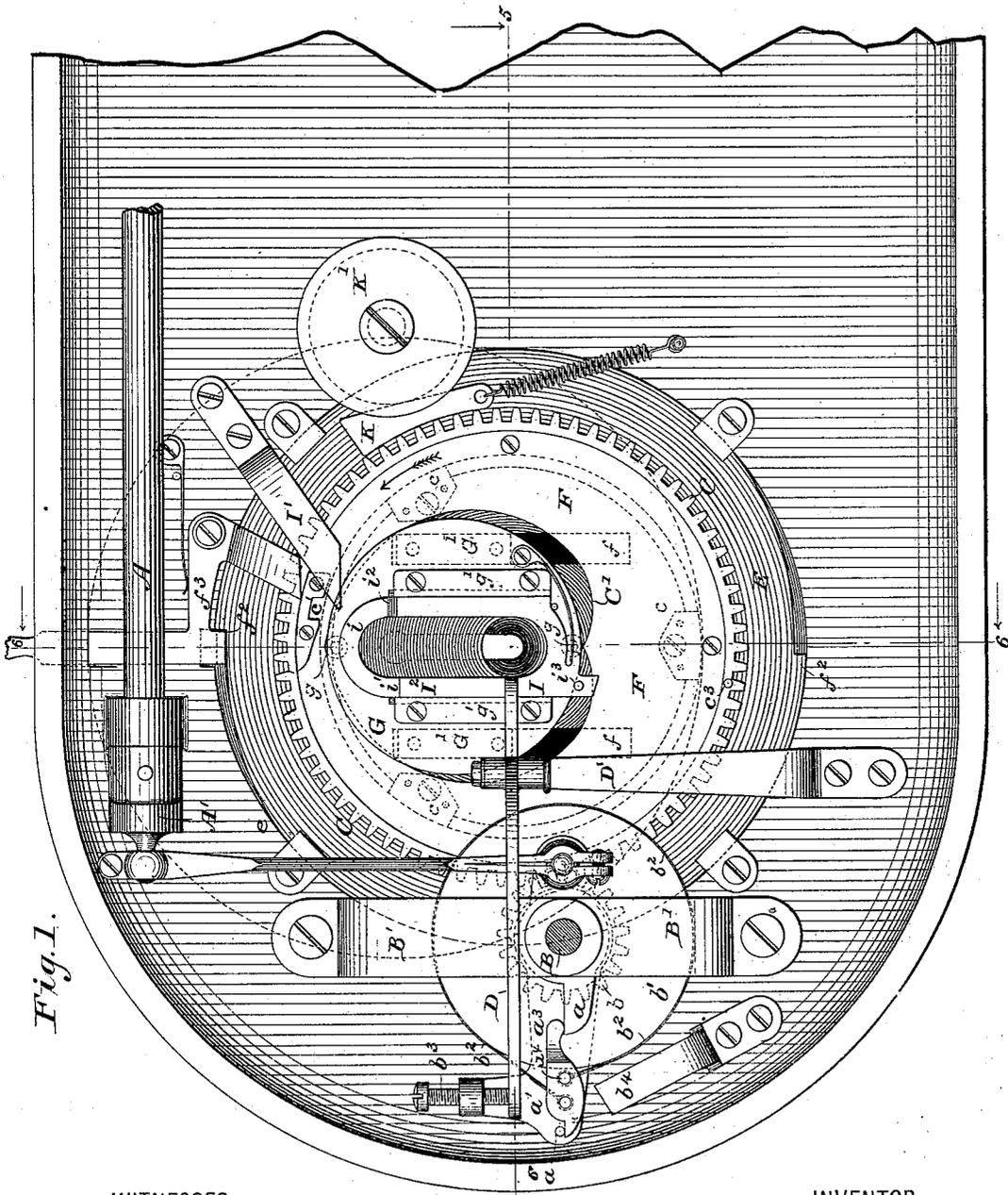


Fig. 1.

WITNESSES

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H. W. Elmore

INVENTOR

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By his Attorneys

Baldwin, Hopkins & Poffen

(Model.)

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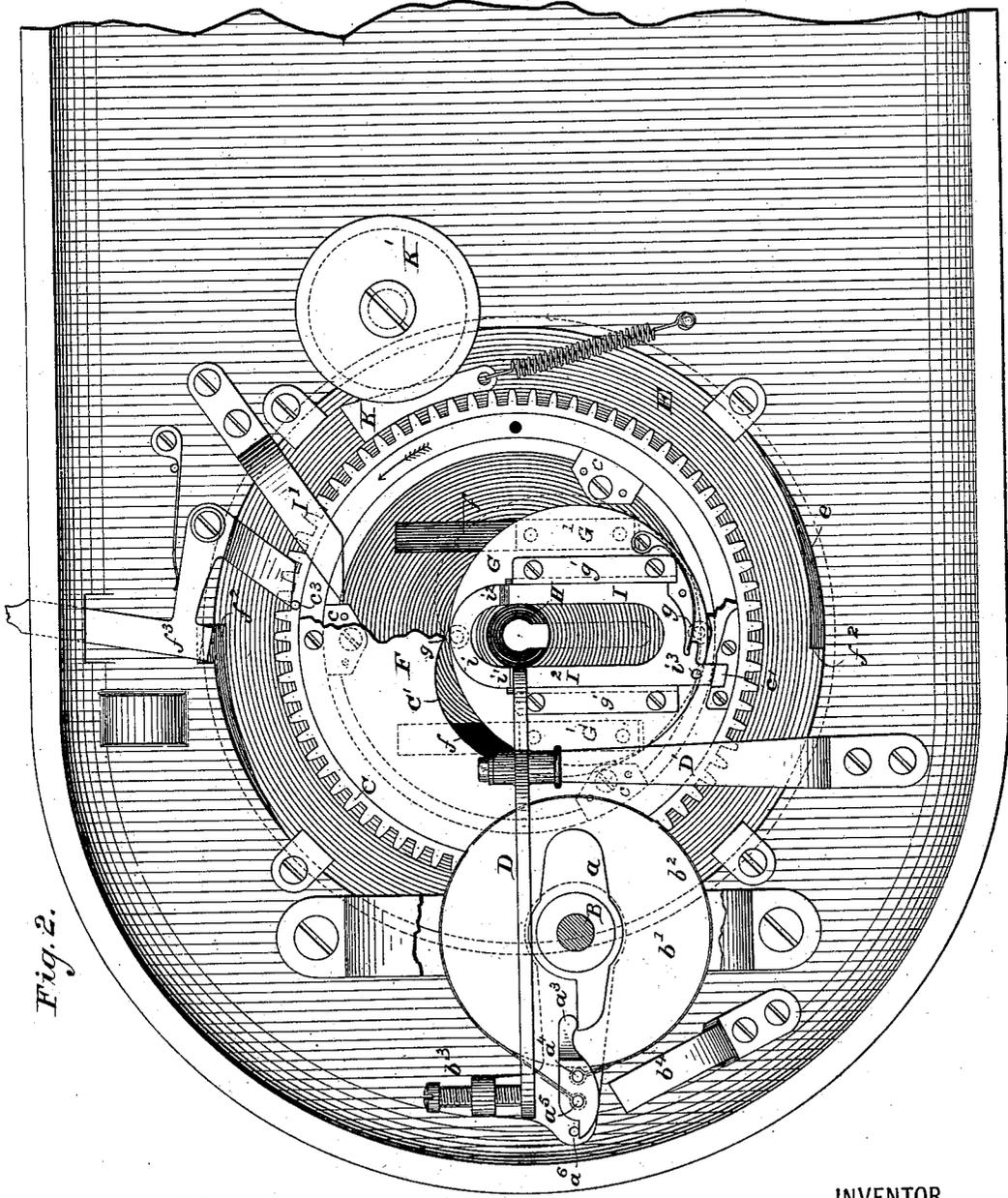


Fig. 2.

WITNESSES

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(Model.)

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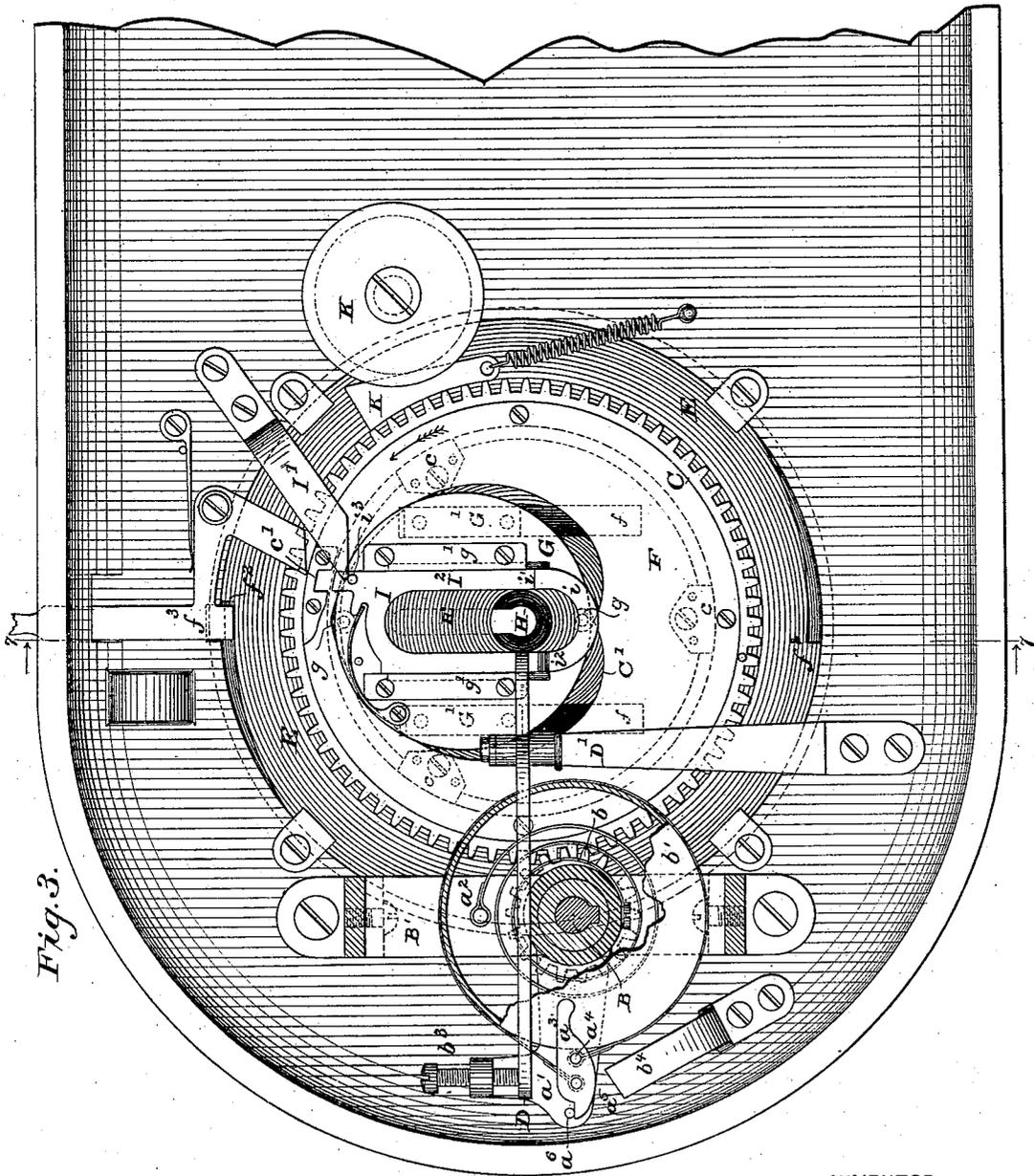


Fig. 3.

WITNESSES

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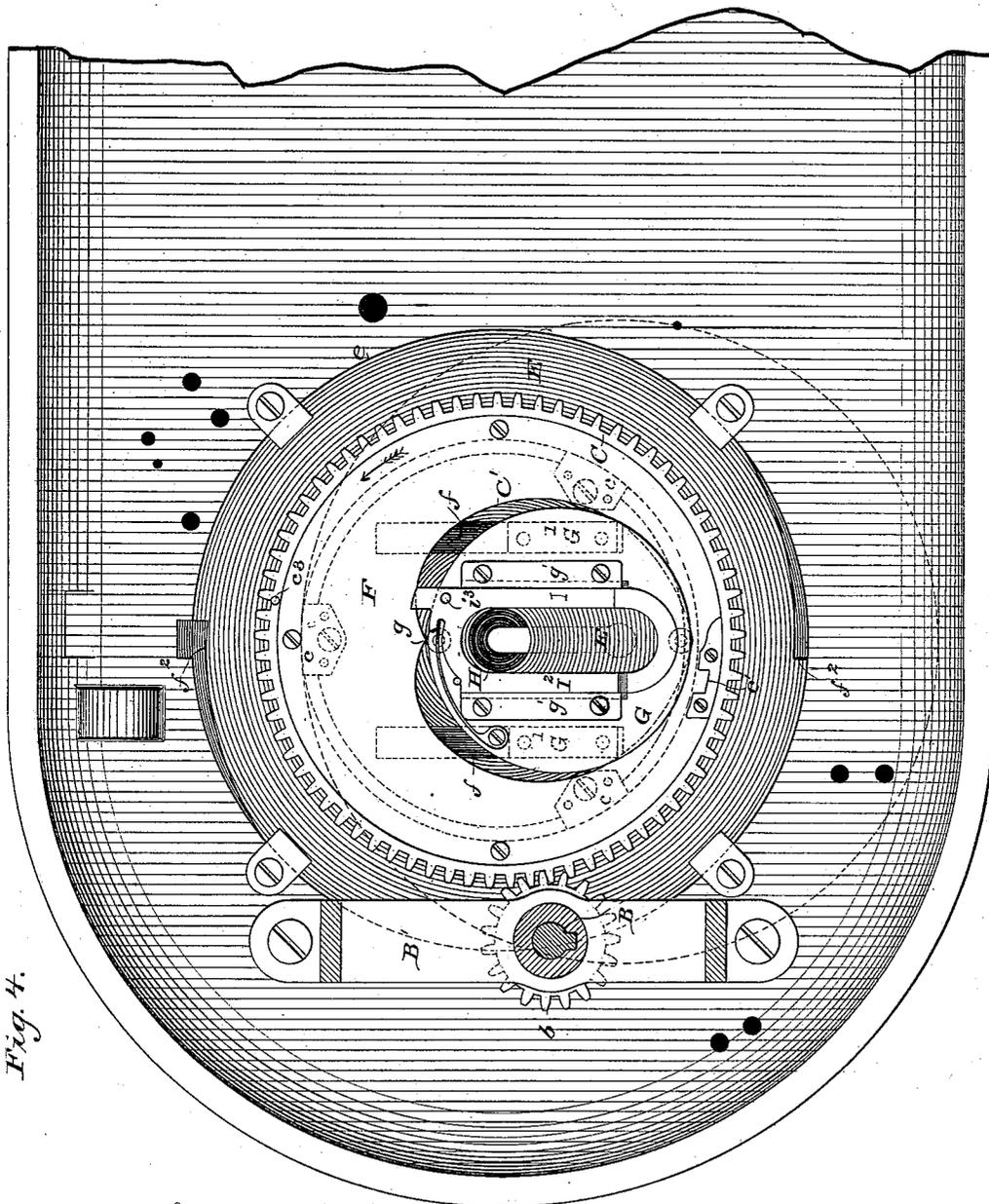


Fig. 4.

WITNESSES

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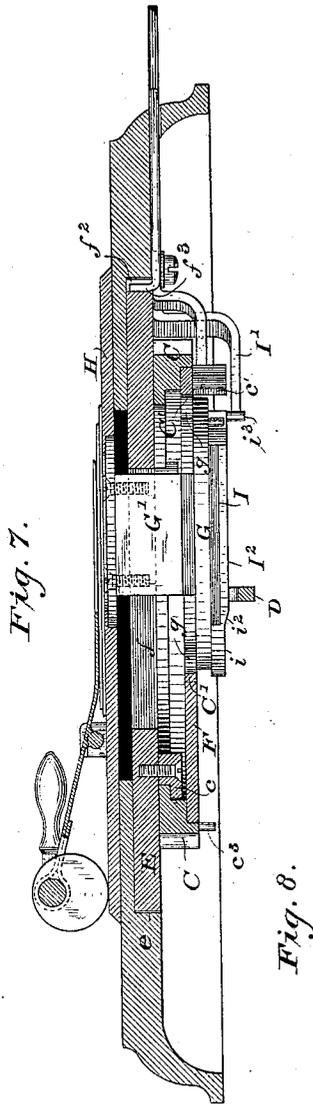


Fig. 7.

Fig. 8.

Fig. 12.

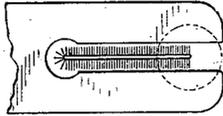


Fig. 11.

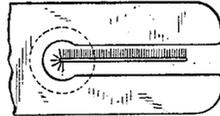


Fig. 10.

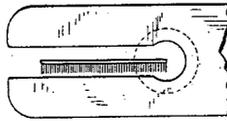
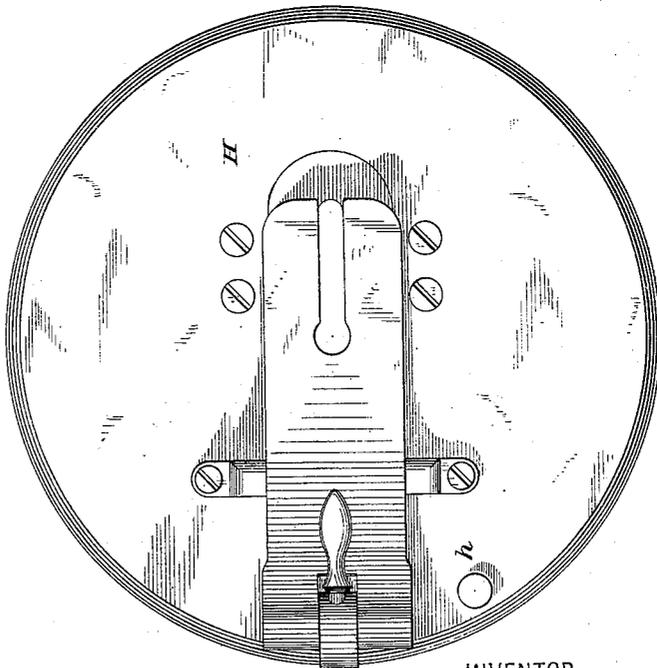
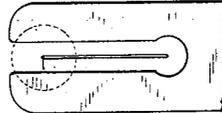


Fig. 9.



WITNESSES

Wm A. Skinkle

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INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN H. PALMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO AMERICAN BUTTONHOLE OVERSEAMING AND SEWING MACHINE COMPANY, OF SAME PLACE.

BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 298,228, dated May 6, 1884.

Application filed October 15, 1883. (Model.)

To all whom it may concern:

Be it known that I, JOHN H. PALMER, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Button-Hole Sewing-Machines, of which the following is a specification.

Figure 1 is an inverted or bottom plan view of a portion of the bed-plate of a sewing-machine embodying my improvements. Fig. 2 is a similar view with some of the parts removed, showing parts of the apparatus in a different position. Fig. 3 is a similar view, partly in section, showing the parts in still another position. Fig. 4 is a similar view showing the parts in another position. Fig. 5 is a longitudinal section, looking in the direction of the arrows, on the line 5 5 of Fig. 1; Fig. 6, a transverse section, looking in the direction of the arrows, on the line 6 6 of Fig. 1; Fig. 7, a similar view, looking in the direction of the arrows, on the line 7 7 of Fig. 3. Fig. 8 is a detail plan view of the surface-disk or cloth-plate, with the clamp for holding the material in place; and Figs. 9 to 12, inclusive, are detail views illustrating the stitching of the button-hole in different stages of completion.

The ordinary driving apparatus of the machine is entirely omitted, as it forms no part of my invention. I have also omitted any illustration of the needle-bar and presser-foot, as they form no part of my invention, are well known, and need no description.

Of course my improvements may be used in connection with various systems of stitching the button-hole in either single or double needle machines.

My invention is confined to the means for actuating the cloth-plate to bring the material into proper relation to the needle of the machine. The driving-shaft A carries the crank A', the pitman of which is coupled with a wiper or finger, *a*, loosely pivoted on a short shaft, B, which has its bearings in the upper and lower straps or cross-pieces, B' B', of a bearing-frame secured on the under face of the bed-plate. This shaft carries, fast upon it, a spur-wheel, *b*, which works in a large gear, C, and a flanged disk or friction-wheel, *b'*. A rocking arm, *a'*, turns loosely on the

hub of the flanged disk *b'*, between the gear-wheel and disk, and is normally thrown downward, as viewed in the drawings, by a coiled spring, *a²*, one end of which is secured to a post on one of the cross-pieces B' B', and the other end to the hub of the rocking arm. A finger, *a³*, is pivoted upon a post, *a⁴*, projecting from the rocking arm *a'* across the periphery of the flanged friction-disk. One end of a metallic friction-strap, *b³*, which passes around the flanged friction-disk, is secured to this post, while the other end of the strap is secured to a post, *a⁵*, carried by the pivoted finger *a³*. One movement of the pivoted finger *a³* to loosen the strap on the friction-disk is limited by a stop, *a⁶*, on the rocking arm *a'*, as clearly illustrated in Figs. 1, 2, and 3. When the crank A' moves downward, as viewed in the drawings, the pivoted wiper *a* strikes the end of the pivoted finger *a³*, and binds the friction-strap on the flanged disk, thus causing the flanged disk and shaft, and consequently the pinion *b*, to be partially rotated at each stroke of the crank. Upon the reverse or upward movement of the pitman the pivoted wiper *a* is drawn away from the finger *a³* and the strap is loosened on the friction-disk, so that it slips on the flanged disk as the spring-actuated rocking arm *a'* is thrown down by the coil-spring *a²*. As the crank-shaft reciprocates, therefore, a succession of movements of partial rotation is imparted to the spur-wheel *b*, which drives the geared ring or wheel C. A set-screw, *b³*, carried in a bracket on the rocking arm *a'*, abuts against a stop-arm, D, pivoted on a post or support, D', and limits the movement of the rocking arm and the slip of the friction-strap on the flanged disk, so that on each stroke of the crank-shaft the spur-wheel *b* is rotated through a shorter distance than would otherwise be the case. When the right-hand end, as viewed in the drawings, of the stop-lever D rises, as herein-after described, so as to lift the opposite end clear of the set-screw *b³*, the rocking arm *a'* makes its fullest downward stroke, so that on the downstroke of the crank-pitman the flanged disk and gear-wheel *b* are rotated through a much greater distance. This causes the cloth-carrying device to be actuated more

quickly during a portion of the operation of stitching a button-hole. This device for actuating the geared ring or wheel C (not including the lever D and its operation) forms the subject-matter of another application filed by me on the 13th April, 1883, and serially numbered 91,535, and no claim is therefore made to such subject-matter herein. The geared ring C turns upon three bearing-blocks, *e*, bolted upon a disk, E, which turns in a bearing, *e*, in the bed-plate of the machine. A plate, F, is bolted to and forms the under or outer face of the geared ring C. This plate is cut out so as to form a substantially heart-shaped cam-face, *C'*, as clearly illustrated in the drawings. A disk, G, provided with anti-friction rollers *g*, which run upon the edge of the cam-plate F, is actuated, as presently described, by this cam as the geared ring is rotated. Two flat posts, *G'* *G'*, to which the cloth disk or plate H on the upper face of the machine and the disk G are bolted, project through elongated slots *f* in the disk E. The cam-actuated disk G is provided with parallel ribs or ways *g'*, in which a spring-actuated locking-latch, I, reciprocates. This latch engages at intervals in a notch, *c'*, on the geared ring C, so as to cause the rotation of the disk G, disk E, and cloth-plate H with the geared ring to turn the material in working around the outer end of the button-hole, as is presently described. The disk E is provided with notches *f²* *f²*, in which a spring-catch, *f³*, engages at each semi-revolution of the disk. This latch is tripped to release the disk at regular intervals by a pin, *c³*, on the geared ring C, and the locking-latch I is also withdrawn from the notch *c'* by a fixed finger, *I'*, which projects into the path of the pin *i³* on the sliding latch. The short end of the lever D rides upon a cam-track, *I²*, on the sliding locking-latch I. This camway or surface of the latch is cut away at *i*, abruptly at the point *i'*, and gradually at the point *i²*. When the parts are in the position illustrated in Fig. 2, the locking-latch is just about to be thrown into the notch *c'* by its actuating-spring, and the apparatus is just about to turn the material to stitch around the outer end of the button-hole. As the latch is thrown forward into the notch, the short end of the lever D rises suddenly against the reduced portion *i* of the sliding latch and drops the long end of the lever D out of the way of the screw *b³* on the rocking arm *a'*, so as to permit a greater movement of said arm, and a consequently greater speed of actuation of the apparatus. The purpose of this will be presently explained. The direction of rotation of the geared ring C is from right to left, as viewed in the drawings, and in order to prevent any rotation in the reverse direction I place a curved wedge-shaped locking-block, K, between a flanged pulley, K', and the periphery of the geared ring. This block is normally drawn between the pulley and the ring by a coiled spring, as shown. The free rotation of the geared ring in one direction is un-

interrupted; but any rotation in the reverse direction is prevented by the block K, which wedges between the pulley and the ring.

The operation of the devices thus far described is as follows: Fig. 1 of the drawings represents the parts in a position for the commencement of the stitching of the button-hole. The material being placed under the clamp on the cloth-plate, as is usual, the driving-shaft A is rotated. The geared ring C is actuated in the direction of the arrow by the spur-wheel *b*; but the disk E is locked, as shown, by the spring-catch *f³*. Upon the rotation of the ring C the heart-shaped cam *C'*, carried thereby, acts upon the disk G, which is rigidly connected with the cloth disk or plate H, and causes said disk and plate to travel away from the operator at the machine, or downward, as viewed in Fig. 1, in a straight line, so that the button-hole is stitched along one side, as illustrated in Fig. 10. During this movement of the disk G and plate H the posts *G'*, which rigidly connect them, travel in the elongated slots *f* in the disk E, which is held stationary by the catch *f³*. When the disk G has reached the end of the first movement just mentioned, or its lowest position, as viewed in Fig. 2, the parts of the apparatus will be in the position illustrated in that figure. The next step in the formation of the button-hole is to cause the cloth-plate to rotate so as to stitch around the outer end of the button-hole, as illustrated in Fig. 11. This is effected in the following manner, reference being had to Fig. 2: The pin *c³* on the geared ring C has just thrown the catch *f³* out of engagement with the notch *f²* in the disk E. At the same time the recess or notch *c'* on the geared ring has come opposite the nose of the sliding locking-latch I, and the latch is just about to be thrown into it by its actuating-spring. As the geared ring continues to rotate, the locking-latch engages in the notch *c'*, and the disk G and ring are locked together. At the same moment the disk E is released and is turned in its bearing by the flat posts *G'*, which bear upon the walls of the slots *f*. The cloth-plate is therefore rotated so as to cause the button-hole to be stitched around the outer edge, as seen in Fig. 11. If the stitches, in turning the end of the button-hole, are placed as close together as at the side of the button-hole, the threads will bunch at the end of the button-hole so thickly as to spoil its appearance and be objectionable for other reasons. In order to prevent this and increase the distance between the stitches, as clearly shown in Fig. 11, I cause the geared ring C to rotate more rapidly during this turning movement, so as to make the stitches farther apart. This is effected by the pivoted lever D.

Referring to Fig. 2, at the moment the latch I is thrown forward into engagement with the notch *c'* the short or right-hand end of the lever D rises abruptly at *i'* against the reduced portion of the track *I²* on the sliding latch,

and moves the opposite end of the lever out of the way of the stop-screw b^3 , so that the movement of the friction-strap b^2 around the flanged disk b^1 is greater, and the spur-wheel b is rotated through a greater distance at each reciprocation of the crank-pitman A' , as has been described. When the end of the lever D is lifted out of the path of the screw b^3 , the movement of the rocking arm a' is limited by a stationary stop, b^4 . A semi-revolution of the parts brings the apparatus into the position illustrated in Fig. 3, and brings the opposite side of the button-hole into proper position to be stitched. (See Fig. 11.) When the apparatus has reached the position shown in Fig. 3, the latch f^3 drops into the opposite notch, f^2 , so as to lock the plate E against further rotation, while the stationary finger I is simultaneously struck by the pin i^3 on the latch I , and the latch is drawn out of engagement with the notch c' on the geared ring. At the same time the lever D rides up the incline e^2 on the cam-track I^2 , so as to reduce the rotation of the apparatus to its initial speed. The cam C' , now acting on the disk G , causes it to travel downward again, as viewed in the drawings, or away from the operator, so as to stitch the opposite edge of the button-hole, as illustrated in Fig. 12. At the end of this movement the apparatus has reached the position illustrated in Fig. 4, and the button-hole is completed. The apparatus is not, however, left in a position to commence the stitching of another button-hole; but it must be brought into the position shown in Fig. 1. This is done by pulling the latch f^3 out of the notch in the disk E by means of a projecting handle or extension, and then giving a semi-rotation to the entire apparatus by turning the cloth-plate H by taking hold of the clamp or a button, h , on the plate.

With the parts in the position shown in Fig. 4 the latch I is not in engagement with the notch c' on the geared ring; but in imparting to the apparatus the motion last described, to bring it into position for the stitching of another button-hole, the disk G binds against the walls of the cam C' and causes the cam and geared ring to rotate with it.

The center of rotation and the point where the needle reciprocates are represented by the black circles in the several figures at the end of the button-hole slot.

Of course I am aware that it is common in most button-hole machines to impart the general movements above described to the material being stitched; but my mechanism for accomplishing the result is materially different from anything which has heretofore been proposed, and possesses many advantages in operation and mechanical structure.

I am aware that, broadly, a heart-shaped cam-track arranged in a revolving disk for actuating the cloth-carrying clamp of a button-hole machine is old.

What I claim as my invention is—

1. The combination, substantially as set

forth, in a sewing-machine, of the geared ring, its bearing and supporting blocks, the disk E , cloth-carrying devices actuated by the rotation of the ring, and mechanism for actuating the ring. 70

2. The combination, substantially as set forth, of the rotating ring or wheel, mechanism for rotating it, the camway carried thereby, the disk or plate which travels in and is actuated by said cam, and the cloth-carrying plate connected with said actuating-disk. 75

3. The combination, substantially as set forth, of the geared ring, its bearing, the face-plate F , the open cam C' , formed in the face-plate, the disk or plate actuated by the cam-face C' , and cloth-carrying devices actuated by said disk. 80

4. The combination, substantially as set forth, of the wheel C , mechanism for rotating it, the cam C' , the disk or plate acted on by the cam, the slotted plate E , the cloth-plate, and the connections between the disk G and the cloth-plate. 85

5. The combination, substantially as set forth, of the rotating wheel or ring C , mechanism for actuating it, a cam carried by said wheel or ring, the disk or plate acted on by the cam, the pivoted stop-lever, a cam way or track which travels against one end of said lever, and a stop on the actuating mechanism which works against the other end of the lever. 90

6. The combination, substantially as set forth, of the bed-plate, the friction-clutch-driving mechanism, the rocking arm a' , a stop carried thereby, the pivoted lever arranged entirely beneath the bed-plate of the machine, the cam way or track on which one end of said lever works, also arranged entirely beneath the bed-plate of the machine, and the clutch-carrying and actuating mechanism, the arrangement being such that the material being stitched may be handled freely without interfering with the pivoted lever or its controlling-cam. 100

7. The combination, substantially as set forth, of the rotating ring or wheel, mechanism for actuating it, the cam carried thereby, the disk or plate acted on by the cam, cloth-carrying mechanism actuated by said disk, the sliding latch on said plate which engages with a notch on the ring, and means for throwing the latch out of engagement with the notch at intervals. 110

8. The combination, substantially as set forth, of the geared ring, the cam carried thereby, the disk acted on by the cam, cloth-carrying mechanism actuated by said disk, the sliding latch on the disk, the cam-track on said latch, the pivoted stop-lever, the mechanism for actuating the geared ring, and means for controlling the speed of said mechanism by the position of the pivoted lever. 115

9. The combination, substantially as set forth, of the geared ring, mechanism for actuating it, the cam carried thereby, the plate acted on by the cam and rigidly connected with the cloth-carrying plate, the sliding latch 120

125

130

on said plate, the slotted disk E, the catch *f*³, which controls the disk E, and the devices for tripping said catch and the sliding latch, as described.

5 10. The combination, substantially as set forth, in a button-hole sewing-machine, of the ring or wheel C, cloth-carrying devices actuated by the ring, the pulley K, the wedge-block, and the spring which normally draws
10 the wedge-block between the ring and pulley.

11. The combination, substantially as set forth, of the ring C, mechanism for actuating it, the cam carried by the ring, the disk G, actuated by said cam, the slotted plate E, the cloth-
15 plate, which is connected with the disk G by the posts which pass through the slots in the disk E, a cam-track carried on the disk G, a pivoted stop-lever, one end of which bears against said cam-track, and mechanism for controlling the speed of the actuating mechanism
20 by the position of the pivoted stop-lever.

12. The combination of the bed-plate, cloth-carrying devices located on the upper face of

the bed-plate, mechanism for actuating the cloth-carrying devices to bring the material
25 into proper position for stitching, a pivoted lever horizontally disposed below and being entirely beneath the bed-plate of the machine, mechanism, substantially such as described, by
30 which the motion of the cloth-carrying devices is increased or decreased according to the position of the lever, and a horizontal cam face or track, also arranged entirely beneath the bed-plate of the machine, by which the
35 position of said lever is changed, for the purpose set forth, whereby the horizontal pivoted lever and its controlling-cam are removed from any possible interference with the material being stitched.

In testimony whereof I have hereunto subscribed my name this 11th day of October, A.
40 D. 1883.

JOHN H. PALMER.

Witnesses:

W. E. STEEN,
C. WAUNEMACHER, Jr.