No. 756,483. PATENTED APR. 5, 1904.

L. ECKER.

ATTACHMENT FOR BUTTONHOLE SEWING MACHINES.

APPLICATION FILED AUG. 4, 1902. RENEWED MAR. 2, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

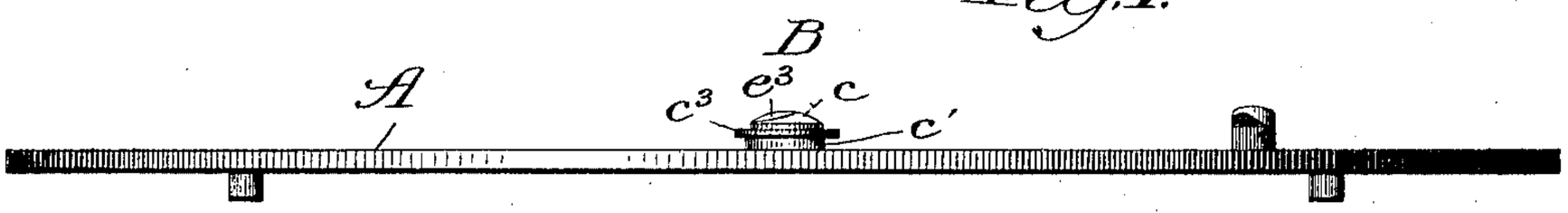


Fig. 2.

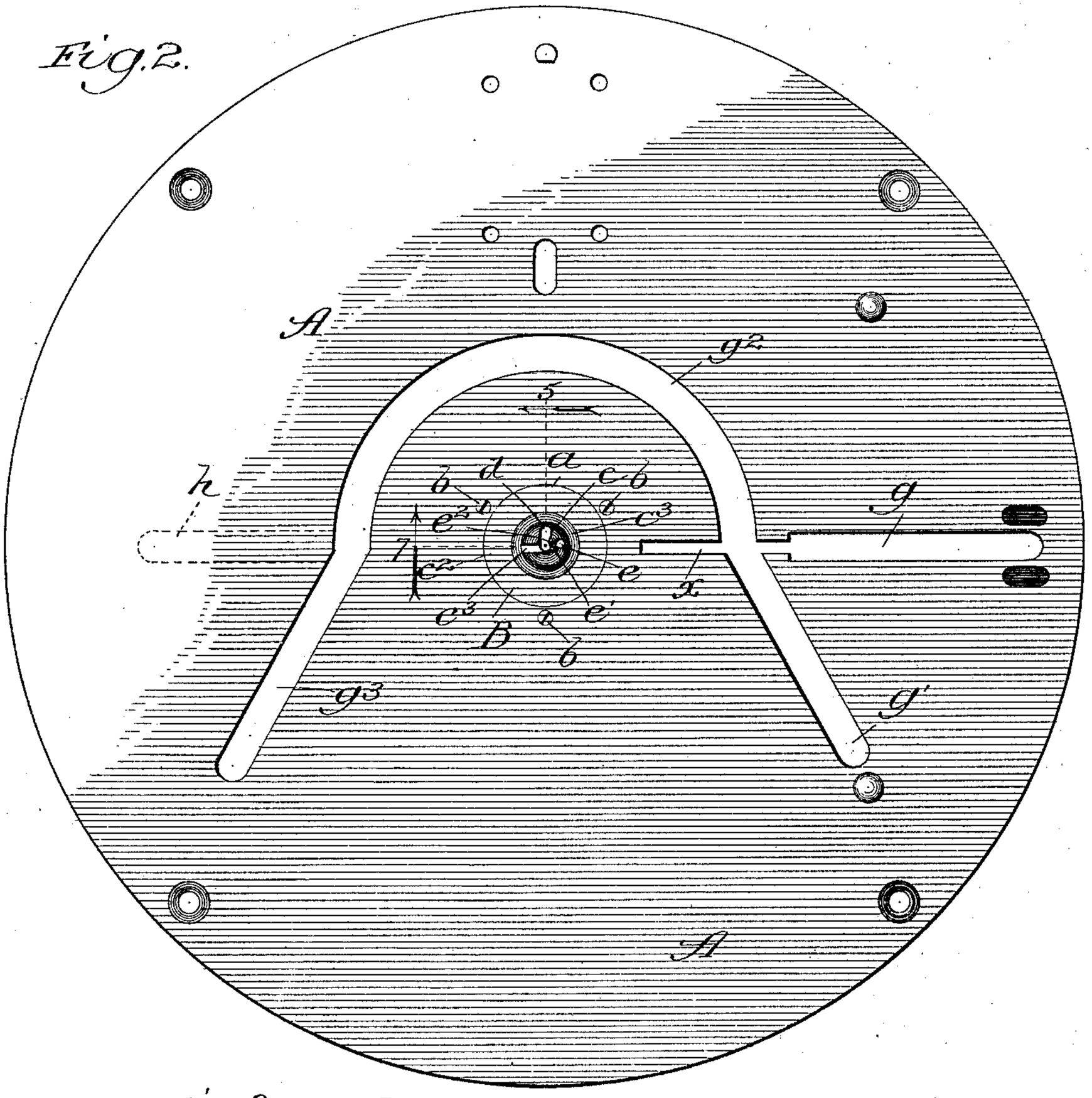


Fig. 3.

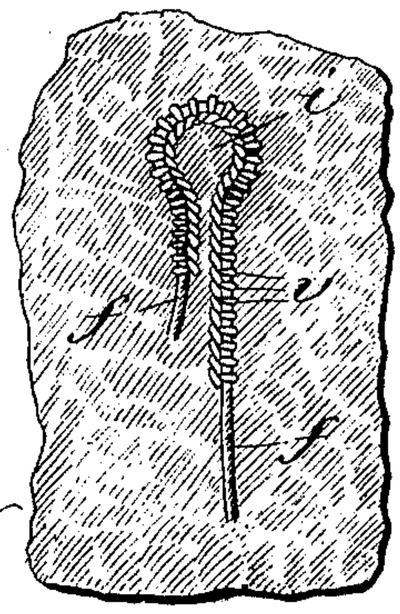
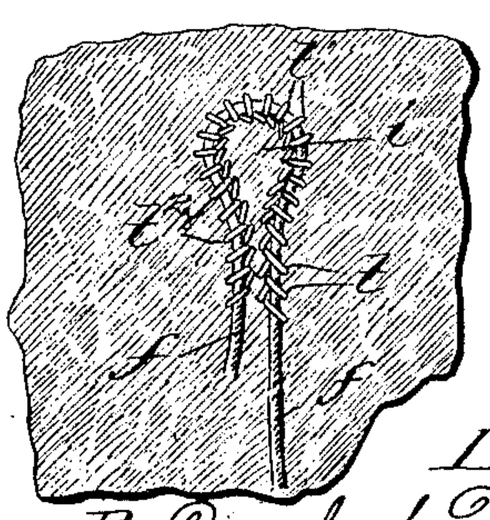


Fig. 4.



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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 6.

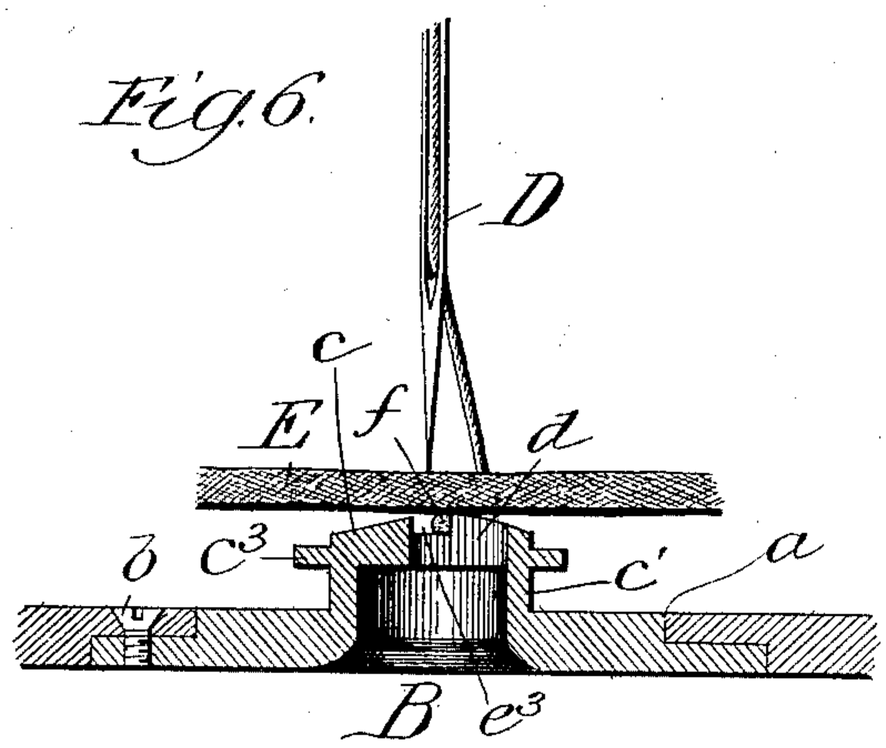


Fig. 5.

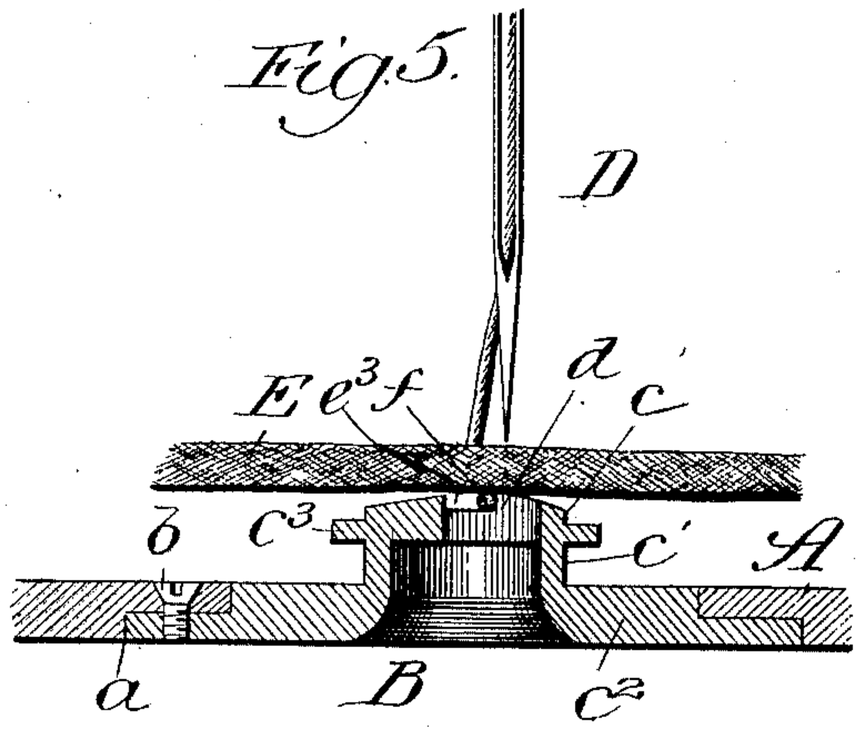


Fig. 7.

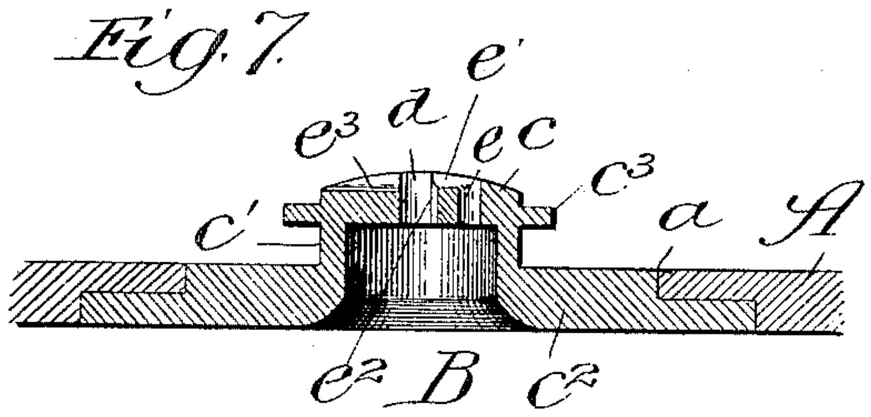


Fig. 8.

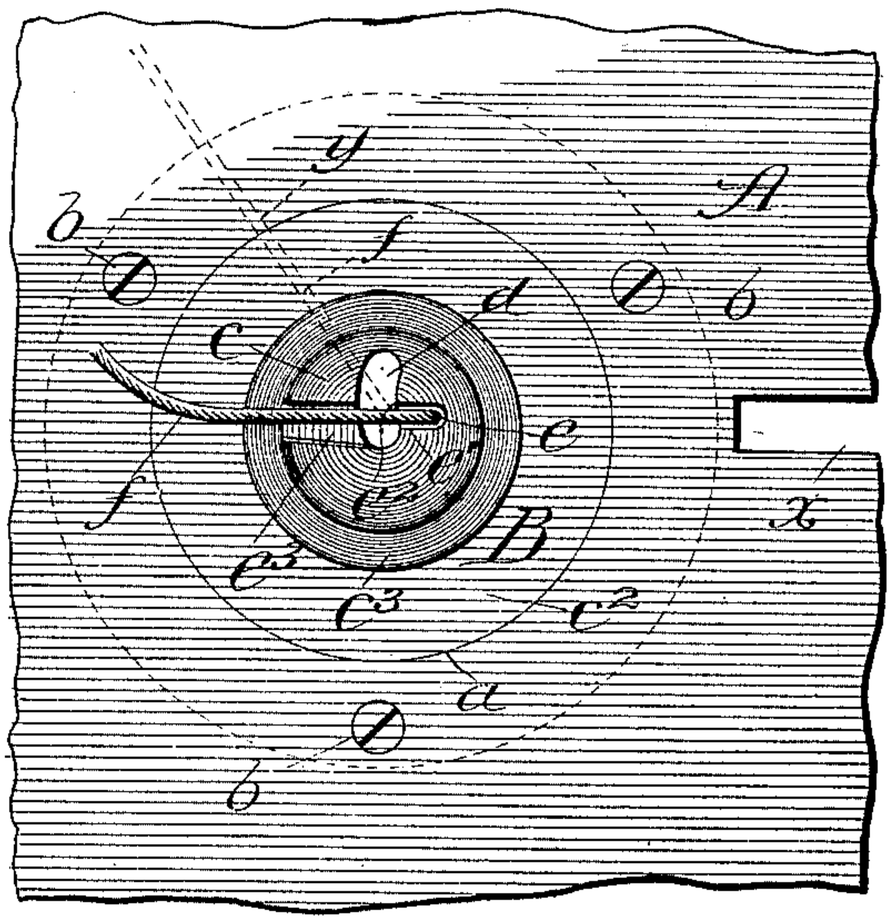
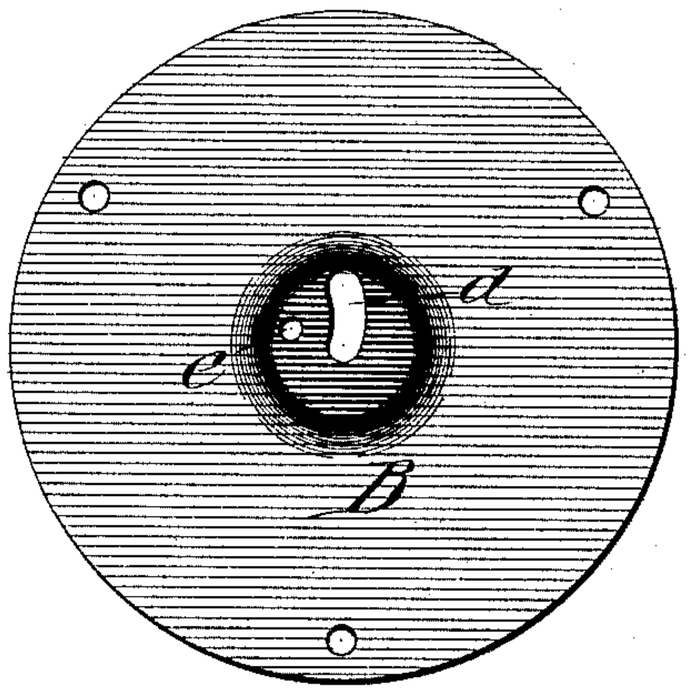


Fig. 9.



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APPLICATION FILED AUG. 4, 1902. RENEWED MAR. 2, 1904.

NO MODEL. 4 SHEETS—SHEET 3.

Fig. 10.

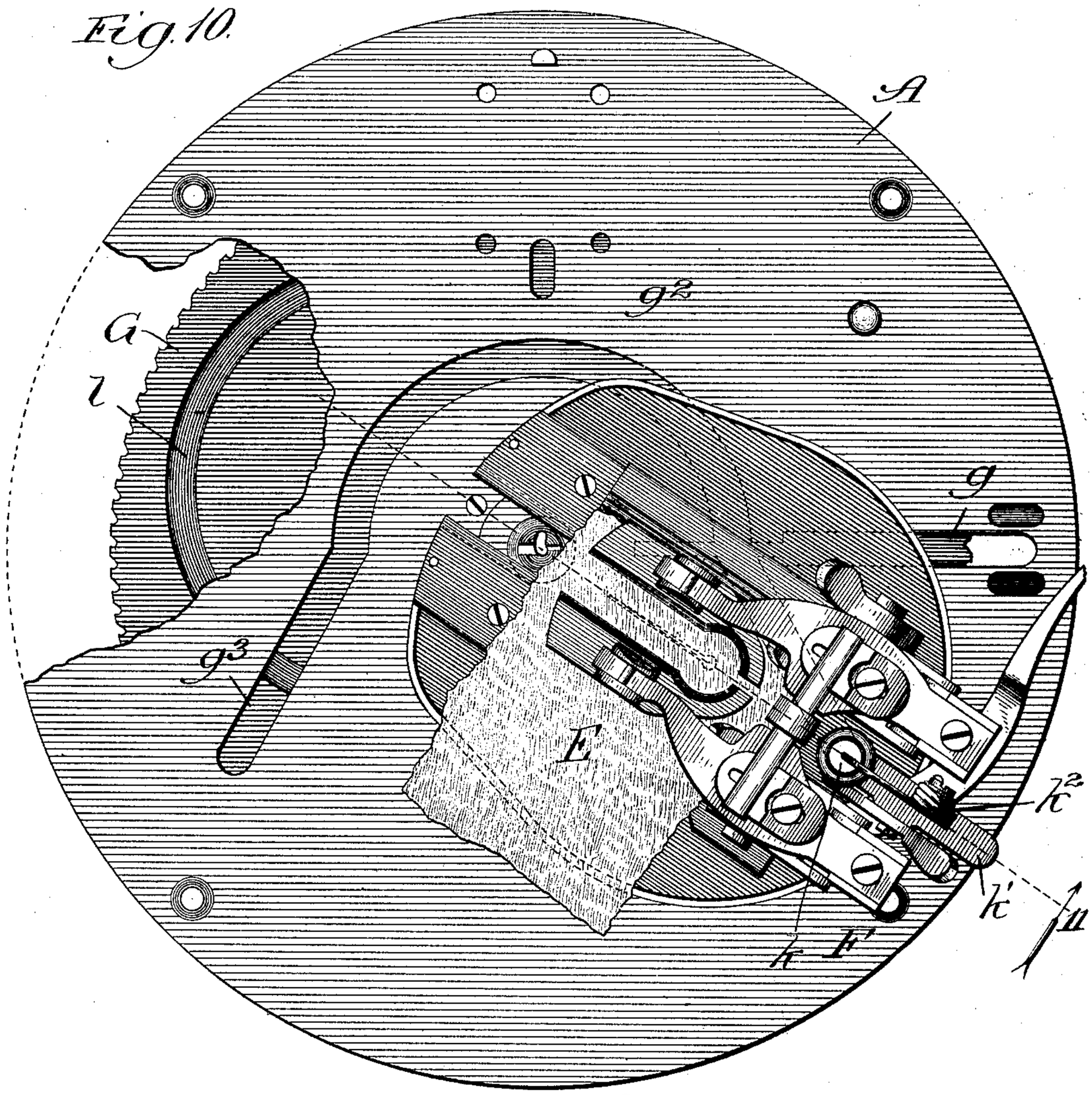
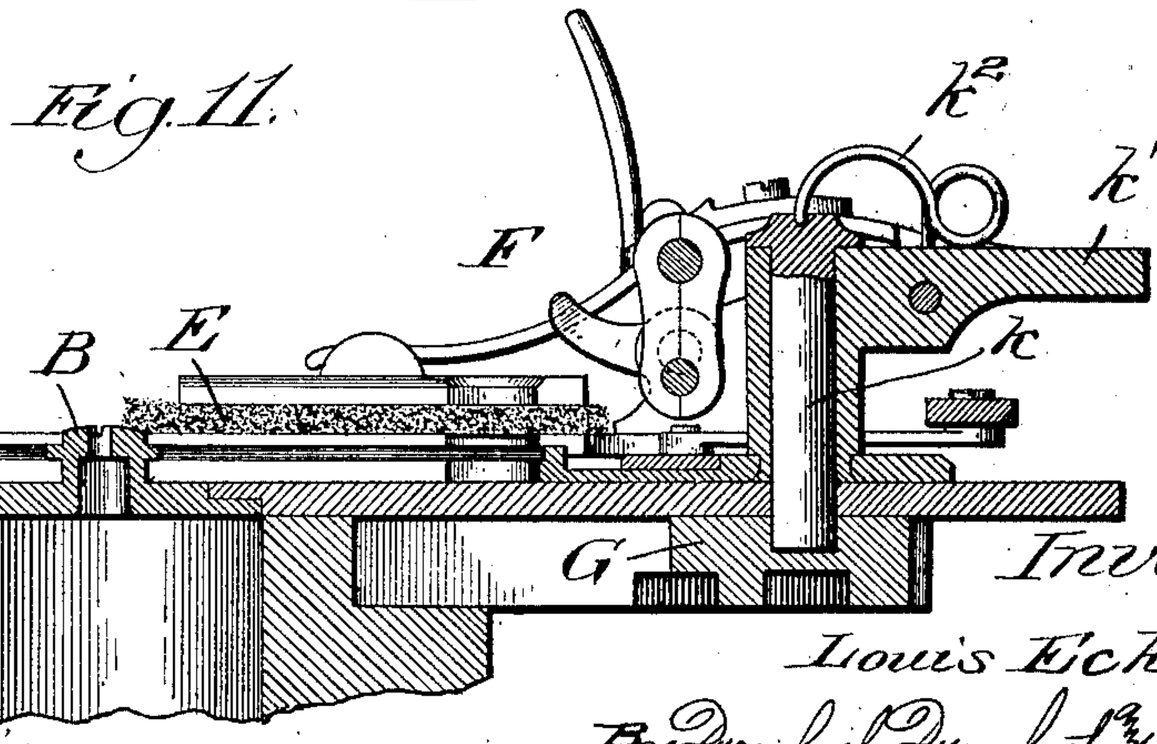


Fig. 11.



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APPLICATION FILED AUG. 4, 1902. RENEWED MAR. 2, 1904.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 12.

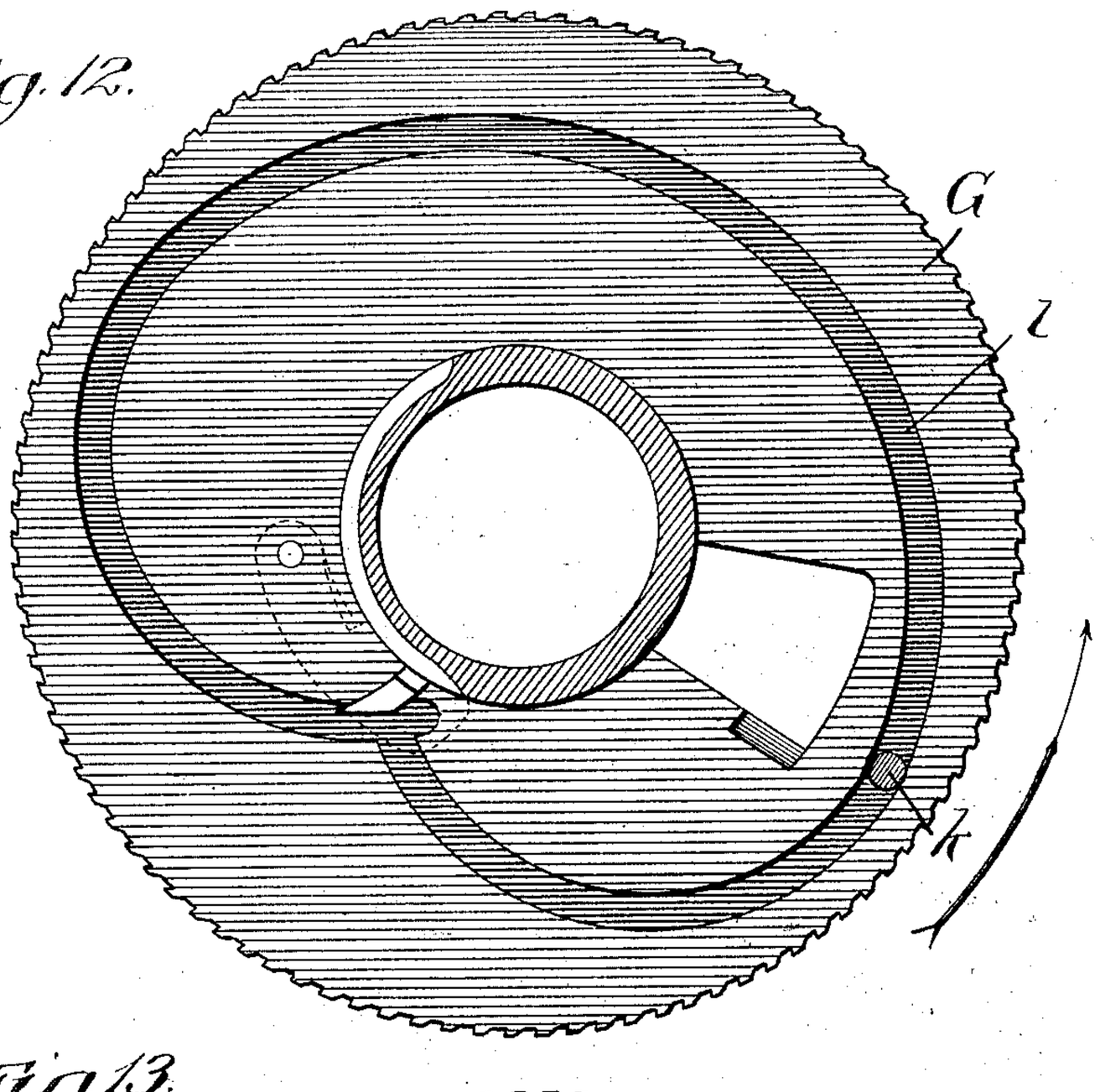
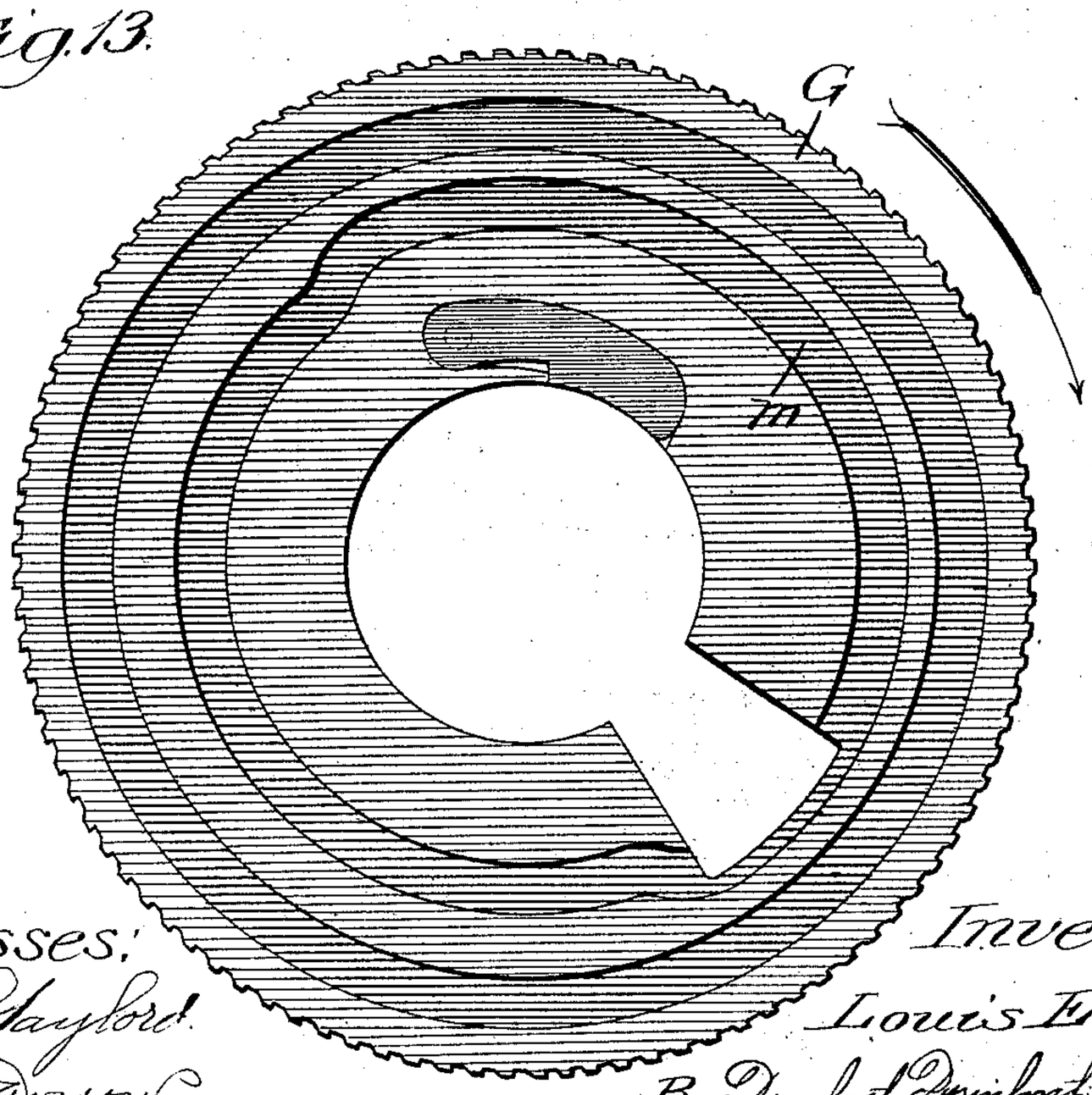


Fig. 13.



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No. 756,483. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

LOUIS ECKER, OF CHICAGO, ILLINOIS, ASSIGNOR TO H. ECKER & SONS, OF CHICAGO, ILLINOIS, A FIRM.

ATTACHMENT FOR BUTTONHOLE-SEWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 756,483, dated April 5, 1904.

Application filed August 4, 1902. Renewed March 2, 1904. Serial No. 196,240. (No model.)

To all whom it may concern:

Be it known that I, LOUIS ECKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Attachments for Buttonhole-Sewing Machines, of which the following is a specification.

My invention relates to an improved construction of the device known as the "bed-plate button" and also of the attachment known as the "bed-plate," in which the button is centrally fastened, the purpose of the button being to direct the cord threaded through it, which cord is employed as an edge-reinforcing medium for the buttonhole, and the purposes of the slotted plate besides its use in supporting the button being to guide the work and to present a guide through which to cut the buttonhole between the marginal stitches formed about the line to be cut.

The attachments in the class referred to upon which the constructions of my invention are more immediately designed as improvements are those employed in the machine known as the "Singer" type of buttonhole-machine. As that machine is well known in the art and since my improved devices are adapted to be substituted upon that machine for the corresponding attachments commonly used therewith to coöperate with the other mechanism of the machine, I deem it unnecessary for the purposes of my application to illustrate in the drawings thereof such other mechanism.

The primary object of my improvements is to cause the machine-sewed buttonhole produced by them to closely resemble a hand-sewed buttonhole, first, by raising the circumferential line of stitches, and thus causing it to stand out firmly in relief by causing the cord to lie lengthwise directly under the central line of loops formed by the stitches, and, second, by forming the stitches bias or causing them to extend diagonally with relation to the line of the buttonhole. Both of these results are necessary to produce by a machine a close imitation of a hand-sewed buttonhole.

Referring to the accompanying drawings, Figure 1 is a view in edge elevation of a bed-plate and the button centrally fastened therein of my improved construction. Fig. 2 is a plan view of the same, having indicated upon it an old construction of the plate by a dotted representation of a guide-slot therein. Fig. 3 is a broken representation, exaggerated as to the stitches, of a common machine-made buttonhole, illustrating defects therein which prevent its desired close resemblance to a buttonhole produced by hand-sewing. Fig. 4 is a similar view of a machine-made buttonhole produced by my improvements. Fig. 5 is an enlarged broken section taken through the plate and button at the line 5 on Fig. 2 viewed in the direction of the arrow and showing diagrammatically the threaded needle about to make the initial stroke of its oscillating stitch through the work at the outer side of the cord. Fig. 6 is a similar view showing the needle about to make its stroke at the opposite or inner side of the cord. Fig. 7 is a section like that presented in Figs. 5 and 6, but taken at a right angle thereto through the button-plate and button at the line 7 on Fig. 2 and viewed in the direction of the arrow. Fig. 8 is a broken plan view of the plate, showing, greatly enlarged, the button fastened in it and the cord passing through the button and with a dotted diagram of the line of extension of the cord after its initial fastening to the work when the button is employed with the illustrated slotted construction of the button-plate. Fig. 9 is a bottom plan view of the button; Fig. 10, a broken plan view of the plate with the feeding-clamp upon it and the work in place; Fig. 11, a section taken at the line 11 on Fig. 10 and viewed in the direction of the arrow; Fig. 12, a top plan view of the cam-disk for actuating the clamp, and Fig. 13 a bottom plan view of the same.

A is the disk-shaped bed-plate, adapted to be fastened in place, as usual, on a buttonhole-sewing machine. In the central stepped opening *a* of the plate is fastened, as by screws *b*, the button B. The button comprises an annular base c^2, shaped to fit the plate-opening *a*, a hollow neck *c'*, and a head *c*, provided with a circumferential flange c^3. In the top of the button-head is formed an elongated opening *d*, extending from near one edge of

the head diametrically across it to or somewhat beyond its center for the usual oscillating play of the machine-needle D. Beyond the center of the needle-opening *d*, near its inner end or that farthest from an adjacent edge of the button-head, is formed through the head at a right angle to the needle-opening a cord-feed orifice *e*, having a cord-guiding groove *e'* extending from its upper end into one side of the opening *d* and forming at one side of its junction therewith a nose e^2. The groove *e'* should be of a width to afford a snug fit to a cord *f* within it, and an extension e^3 of the groove *e'* is formed in the top of the button-head at the opposite side of the needle-opening *d* of a width causing it to aline with the inner extremity of said opening.

It is customary to provide in the plate A a diametrically-extending slot *g* at one side of the button in alinement with the cord-orifice *e* in the button-head and provided with a narrower cutter-guide extension *x* and a slot (indicated at *h* by dotted lines in Fig. 2) at the opposite side of the button in line with the slot *g*, these slots being joined from the extension *x* to the inner end of the slot *h* by an arc-shaped slot g^2. The slots referred to afford guides for the movable clamp, Figs. 10 and 11, which embraces the button-neck *c'* and is confined under the button-flange c^3 to hold the work (represented at E in Figs. 5, 6, and 10) down upon the plate and guide it across the path of the needle over the button B, and the slot extension *x* is provided for the protrusion through it and through the work covering it of the knife which cuts the buttonhole after the circumferential sewing has been performed about the line through which the cut must be made to produce the hole, all in a usual manner. The described arrangement of the slots in the plate, however, produces in the oscillation of the needle between the ends of the needle-opening *d*, always at right angles to the feed of the work under guidance of the slots, a stitch at right angles to the edge of the buttonhole like that represented at *v* in Fig. 3, whereas it is my desire for the purpose of more closely producing resemblance to a hand-made buttonhole to provide a diagonal stitch according to the representation in Fig. 4. This I accomplish by providing in the plate the clamp guide-slot *g'* to extend from one end of the curved slot g^2 at an acute angle with relation to the needle-opening *d* to one side thereof and a clamp guide-slot g^3 to extend from the opposite end of the curved slot g^2 at an acute angle with relation to the needle-opening *d* to the opposite side thereof, omitting entirely from the plate the slot indicated at *h*.

To operate a sewing-machine equipped with my improved devices, the work E is adjusted over the button B on the plate A and held by the usual feeding-clamp, which is started in its course from the outer extremity of the slot *g'*. The needle D being properly threaded and the core *f* being threaded through the button-orifice *e* and laid in the groove *e'* for guidance and also in the groove extension e^3, while the machine is running the feeding of the work begins along the line of the groove *g'* across the needle, which in its up-and-down movements oscillates as usual in the opening *d* lengthwise thereof to stitch across the cord *f*, which is laid in proper position on the work, and to which it is fastened by the initial stitch or stitches of the needle. By thus feeding the work along the line of the oblique groove *g'* it is necessarily moved at the line thereon which is covered by the cord *f* and across which the needle oscillates obliquely with relation to the path of oscillation of the needle in the opening *d* or, in other words, obliquely across the said needle-opening, so that the looped stitches along one edge *t*, Fig. 4, of the buttonhole to be produced, which is the edge first stitched, are of the illustrated bias nature across the cord. When the clamp in following the groove *g'* enters the curved groove g^2, it is moved about the latter, as usual, to stitch the eye *i* for the buttonhole, whereby the stitches are looped across the cord about the eye, substantially as shown at *t'* in Fig. 4, and when the feeding-clamp leaves the slot g^2 after the buttonhole-eye has been stitched it enters and is moved to the outer end of the slot g^3, thereby guiding the cord-covered line on the work obliquely to the needle-opening *d* in the button B, the same as in forming the stitched buttonhole edge *t*, and the bias stitches are looped across the cord to form the stitched edge t^2 in Fig. 4. Thereupon the clamp is removed from the groove g^3 and introduced into the groove *g*, thereby bringing the cloth between the stitches *t* t^2 into coincidence with the slot extension *x*, and the cutter (not shown) is then actuated through the slot extension to cut the buttonhole, all in the usual manner.

It will be noted that the cord-orifice *e* and the groove *e'*, extending from it in the button-head *c*, are provided nearer to the inner end of the needle-opening *d* than to the outer end thereof. This position of the cord-orifice guides the cord *f* to lie just inside the plane of the line of needle-strokes that cause the oscillating needle to penetrate the work in forming the outer edge of the line of oblique stitches, so that in each downstroke of the needle through the needle-opening *d* at its inner end its point just clears the outer edge of the cord, (thus without penetrating the latter;) but the wider portion of the needle bears against the edge of the cord, as will be seen by following out the downstroke of the needle D on inspecting Fig. 5, and this position of the cord brings it directly under the loops of the stitches, thereby centralizing it and causing the stitches to stand out freely and solidly. While the cord should initially lie not only in

the groove e' in the button-head, but also in the groove extension e^3, after the first action of the needle in fastening the cord to the work, the feed along the lines of the grooves in the plate A of my improved construction will of course extend the cord f obliquely across the needle-opening d in the direction indicated by the dotted lines at y in Fig. 8, thereby taking it out of the groove extension e^3 and deflecting it across the nose e^2 into the oblique position referred to, whereby it will coincide with the line across which the stitches t t' t^2 are to be formed bias.

The feeding-clamp hereinbefore referred to and the mechanism for actuating it are old and well known in the art, those employed by me being in common use on the Singer type of buttonhole-machine. Such a clamp is represented in Figs. 10 and 11. It carries a stud k, adapted to be raised by a thumb-lever k' against the resistance of a spring k^2 and which passes through the slots in the plate A into the cam-groove l in the upper side of a peripherally-toothed cam-disk G, Figs. 10, 11, 12, and 13, having also a cam-groove m on its under side. The initial position of the clamp is that in which it is represented in Fig. 10, with its stud k in the outer end of the plate-slot g' and entering the cam-groove l in the rotary disk G, Fig. 12, the clamp embracing the button B, about which it moves in the travel of the stud k through the slots g', g^2, and g^3. The first movement of the stud is along the slot g', thence through the slot g^2, wherein it turns to turn the clamp about the button B, and thence through the slot g^3 to produce the sewing operation for the buttonhole, as hereinbefore described. When the stud k in the course of the clamp reaches the outer end or other desired point in the slot g^3, it is raised out of the latter by depressing the thumb-lever k to release the clamp, when the latter is adjusted by hand to introduce the stud into the cutting-slot g in the plate B. The clamp, with its feeding mechanism and their functions, are so old and well known in the art that more minute description of their constructions and operation are unnecessary.

What I claim as new, and desire to secure by Letters Patent, is—

1. The attachment for a buttonhole-sewing machine, comprising the button-carrying plate provided with the curved clamp-guiding slot, the guide-slot extending from one end of said curved slot and having a cutter-slot extension, and clamp-guiding slots extending divergently from the opposite ends of said curved slot, substantially as and for the purpose set forth.

2. The attachment for a buttonhole-sewing machine, comprising, in combination, the button having an elongated needle-opening in its head and provided in said head with a cord-orifice adjacent to said needle-opening and nearer to the inner than to the outer end thereof, and the bed-plate carrying centrally said button and provided with the curved clamp-guiding slot, the guide-slot extending from one end of said curved slot and having a cutter-slot extension, and clamp-guiding slots extending divergently from the opposite ends of said curved slot, substantially as and for the purpose set forth.

3. The attachment for a buttonhole-sewing machine, comprising, in combination, the button having an elongated needle-opening in its head and provided in said head with a cord-orifice having a cord-groove extending from it into said needle-opening nearer to the inner than to the outer end thereof, and the bed-plate carrying centrally said button and provided with the curved clamp-guiding slot, the guide-slot extending from one end of said curved slot and having a cutter-slot extension, and clamp-guiding slots extending divergently from the opposite ends of said curved slot, substantially as and for the purpose set forth.

4. The attachment for a buttonhole-sewing machine, comprising, in combination, the button having an elongated needle-opening in its head and provided in said head with a cord-orifice having a cord-groove terminating at one side in a cord-deflecting nose, and extending from said orifice into the needle-opening nearer to its inner end than to its outer end, and the bed-plate carrying centrally said button and provided with the curved clamp-guiding slot, the guide-slot extending from the end of said curved slot and having a cutter-slot extension, and clamp-guiding slots extending divergently from the opposite ends of said curved slot, substantially as and for the purpose set forth.

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In presence of—
ALBERT D. BACCI,
JOHN H. LEE.