(No Model.) 4 Sheets—Sheet 1.

# E. H. A. HABBERT & W. E. BECKMANN.

## MACHINE FOR SEWING ON BUTTONS.

No. 418,124. Patented Dec. 24, 1889.

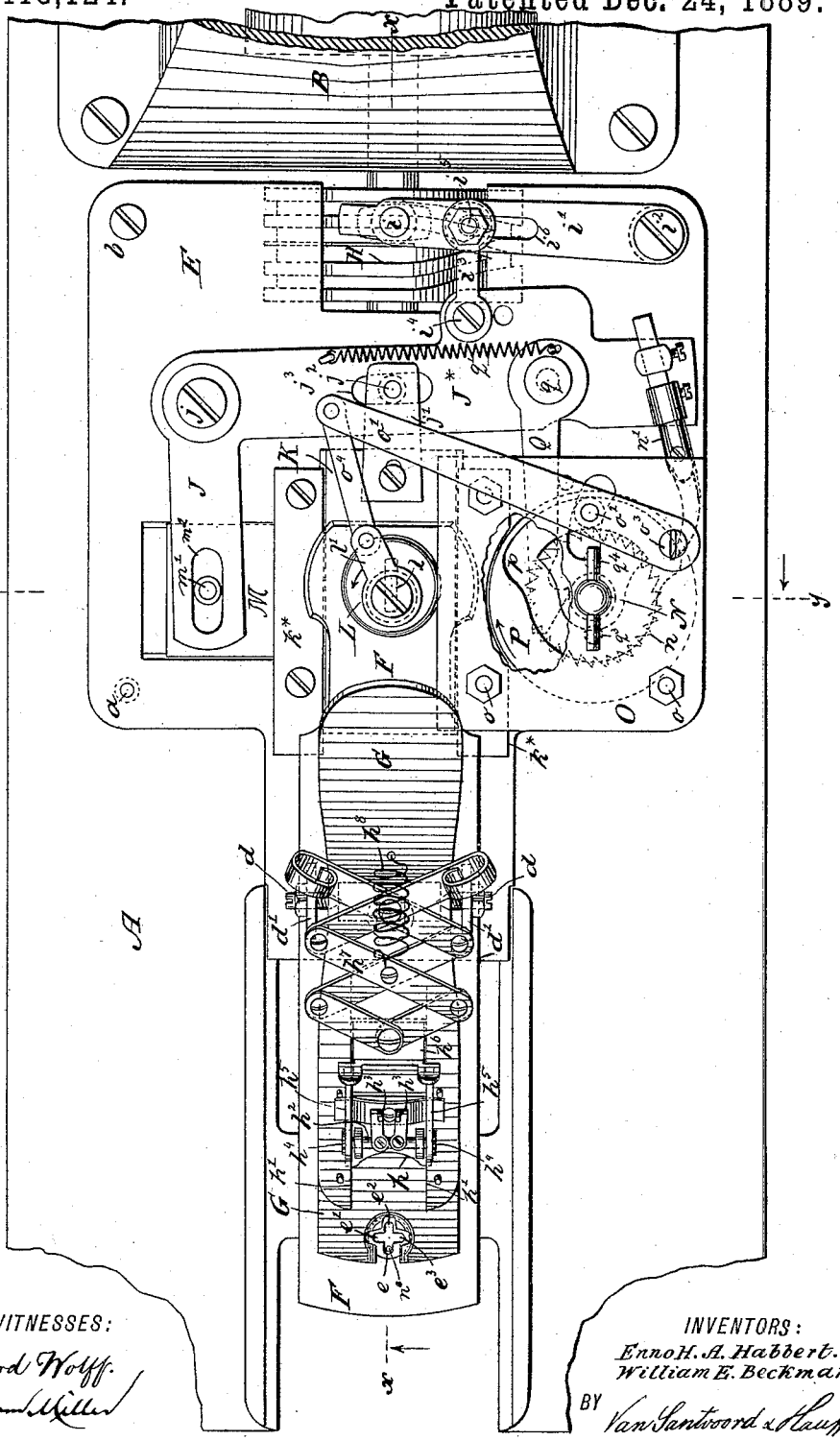

Fig. 1.

WITNESSES:

Eduard Wolff.

William Miller

INVENTORS:

Enno H. A. Habbert.

William E. Beckmann.

BY Van Santvoord & Hauff

ATTORNEY

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# E. H. A. HABBERT & W. E. BECKMANN.

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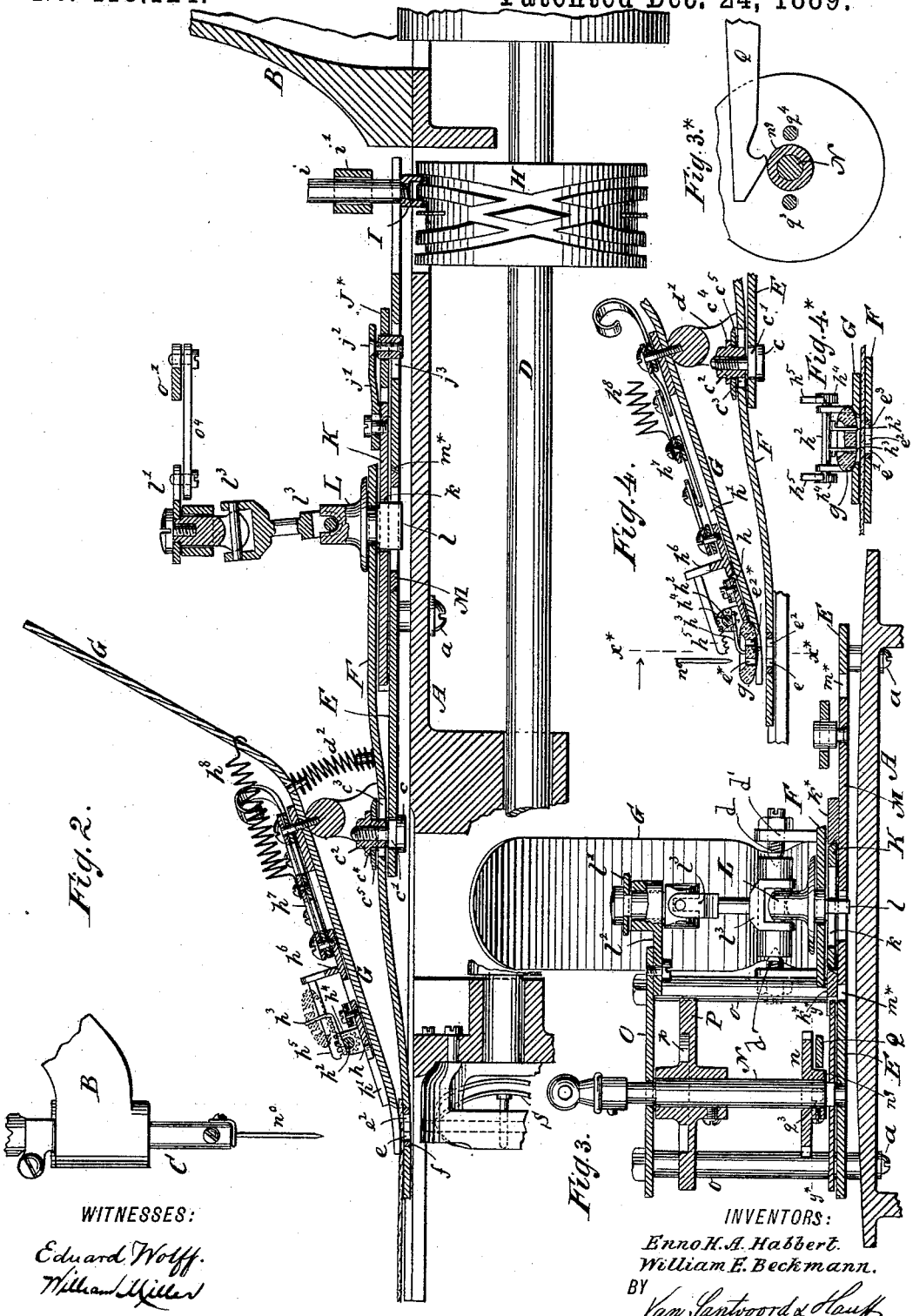

Fig. 2.

Fig. 3.

Fig. 3.*

Fig. 4.

Fig. 4.*

WITNESSES:

Eduard Wolff.

William Miller

INVENTORS:

Enno H. A. Habbert.

William E. Beckmann.

BY Van Santvoord & Hauff

ATTORNEY

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# E. H. A. HABBERT & W. E. BECKMANN.

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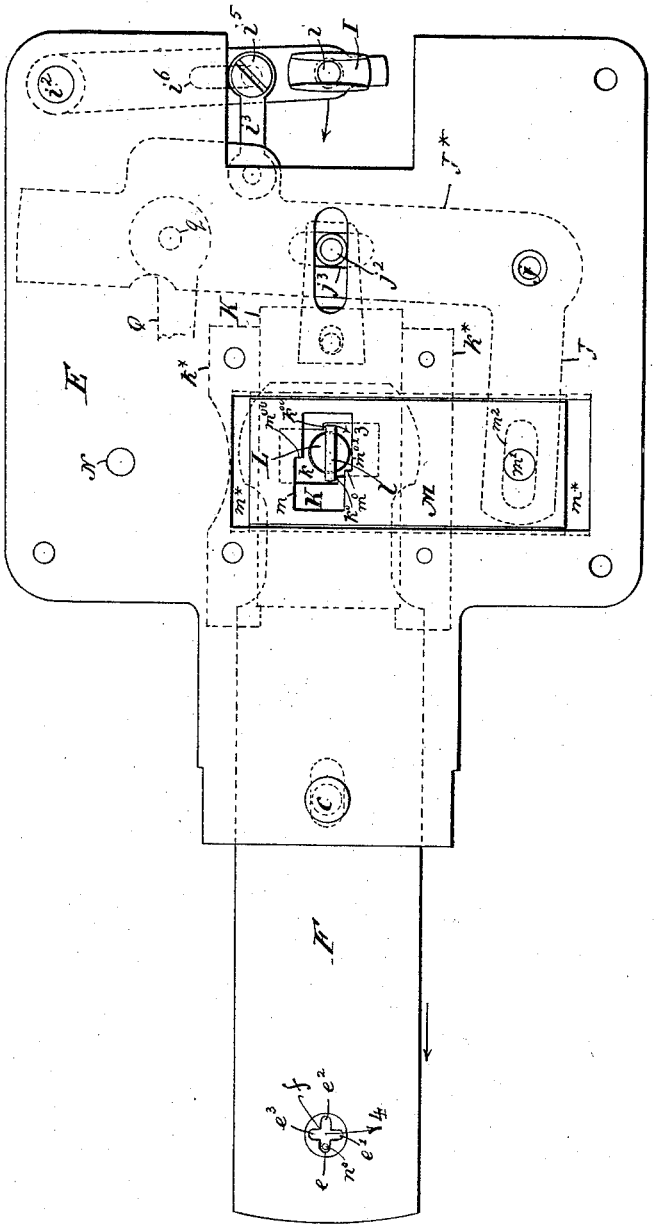

Fig. 5.

WITNESSES:

Eduard Wolff.

William Miller

INVENTORS:

Enno H. A. Habbert.

William E. Beckmann

BY

Van Santwood & Hauff

ATTORNEY

(No Model.) 4 Sheets—Sheet 4.

# E. H. A. HABBERT & W. E. BECKMANN.

## MACHINE FOR SEWING ON BUTTONS.

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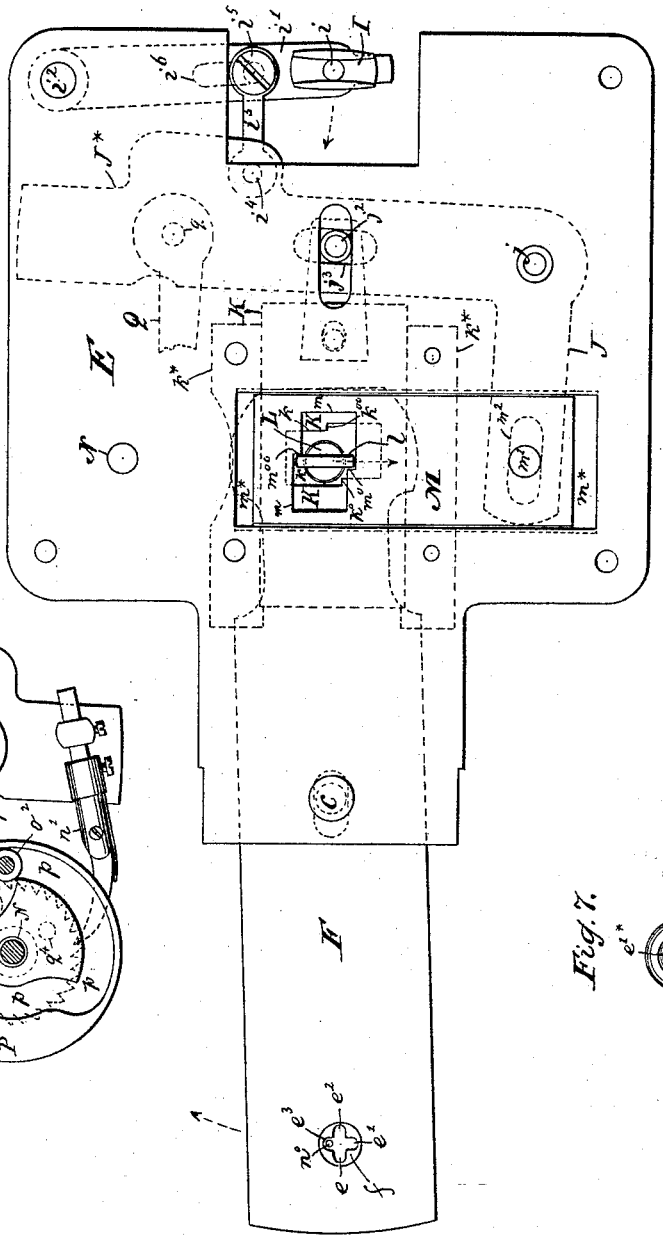

Fig. 6.

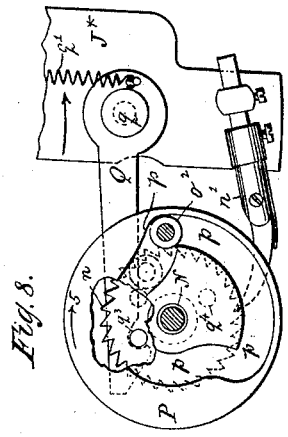

Fig. 8.



Fig. 7.

WITNESSES:

Eduard Wolff.

William Keller

INVENTORS:

Enno H. A. Habbert.

William E. Beckmann.

BY Van Santvoord & Hauff

ATTORNEY

# UNITED STATES PATENT OFFICE.

ENNO H. A. HABBERT, OF RUTHERFORD, NEW JERSEY, AND WILLIAM E. BECKMANN, OF NEW YORK, N. Y.

## MACHINE FOR SEWING ON BUTTONS.

SPECIFICATION forming part of Letters Patent No. 418,124, dated December 24, 1889.

Application filed February 19, 1889. Serial No. 300,465. (No model.)

*To all whom it may concern:*

Be it known that we, ENNO H. A. HABBERT, a citizen of the United States, residing at Rutherford, in the county of Bergen and State of New Jersey, and WILLIAM E. BECKMANN, a citizen of the German Empire, residing at New York, in the county and State of New York, have invented new and useful Improvements in Machines for Sewing on Buttons, of which the following is a specification.

This invention relates to certain improvements in machines for sewing on buttons, as pointed out in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 represents a plan or top view, some portions of the machine being broken away to expose the parts below. Fig. 2 is a longitudinal vertical section in the plane $x\ x$, Fig. 1. Fig. 3 is a transverse vertical section in the plane $y\ y$, Fig. 1. Fig. 3* is a horizontal section in the plane $y^*\ y^*$, Fig. 3. Fig. 4 is a partial longitudinal vertical section similar to that represented in Fig. 2, but showing the working parts in a different position. Fig. 4* is a transverse section in the plane $x^*\ x^*$, Fig. 4. Fig. 5 is an inverted plan of the work-supporting throat-plate and the mechanism for imparting motion to the same when this mechanism is adjusted to produce a rectilinear reciprocating motion. Fig. 6 is a similar view of the same part when the mechanism is adjusted to impart an oscillating motion to the work-supporting throat-plate. Fig. 7 is a plan view of a button. Fig. 8 is a plan view of the reversing mechanism detached, showing the same in a different position from Fig. 1.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the platform of a sewing-machine. From this platform rises the goose-neck B, the rear portion of which is shown in Figs. 1 and 2, and to the front portion of which is attached the needle-slide C, Fig. 2, in a manner well known to manufacturers of sewing-machines. In this needle-slide is secured the needle $n^0$. From the under surface of the platform A extend lugs, which form the bearings for the shaft D, from which motion is imparted to shuttle S and to the needle-slide C in the manner usually practiced by manufacturers of sewing-machines.

On the platform A is firmly secured a plate E, which carries the work-supporting throat-plate F, which hereinafter will be designated simply as the "throat-plate." In the example shown in the drawings the plate E is held in position by screws $a$, Figs. 1, 2, and 3, which pass up from below, and by a screw $b$, which extends down from above; but any other suitable means may be used for securing said plate to the platform A. The throat-plate F is secured to the plate E by a screw $c$, which is prevented from turning by a square $c'$, and which engages a nut $c^2$, that extends through a slot $c^3$ in the throat-plate F and is provided with a flange $c^4$, which bears upon a washer $c^5$, so that the throat-plate F can move back and forth to the extent of the slot $c^3$, and also oscillate on the body $c^2$, as will be hereinafter more fully explained.

On the throat-plate F is secured the presser-foot G, which swings on the center points $d\ d$, Fig. 1, extending through lugs $d'$, and is exposed to the action of a spring $d^2$, which serves to press the front end of the presser-foot down upon the throat-plate, so that a piece of cloth placed between the two is retained upon the throat-plate by the action of the spring $d^2$ upon the presser-foot. The throat $f$ in the throat-plate F is made in the form of a cross having four branches $e\ e'\ e^2\ e^3$, (see Figs. 1, 5, and 6,) corresponding to the four holes $e^*\ e'^*\ e^{2*}\ e^{3*}$, Fig. 7, in the buttons $g$ to be sewed on by the machine.

On the presser-foot G is mounted the button-feeder, which consists of a slide, which is fitted into guides $h'\ h'$, and the front end of which is concave. On the slide $h$ is mounted a rock-shaft $h^2$, which carries two fingers $h^3\ h^3$ and also two pinions $h^4\ h^4$, which mesh into rack-bars $h^5\ h^5$, extending from the pusher $h^6$. If this pusher is moved forward toward the front end of the presser-foot, the rack-bars $h^5$ $h^5$ operate the pinions $h^4$, and thus turn the rock-shaft $h^2$ to the position shown in Fig. 4, and the button $g$, previously adjusted on the fingers $h^3\ h^3$, (see Fig. 2,) is turned over, and, as the forward movement of the pusher $h^6$ continues, the button is carried out, (see Fig.

4,) so that it lies over the throat $f$ in the throat-plate, the holes in the button corresponding in position to the four branches $e$ $e'$ $e^2$ $e^3$ of the throat, Fig. 1. When the pusher $h^6$ is moved back, the fingers $h^3$ $h^3$ release the button; but the pusher must be retained in its forward position until one or more stitches have been made through those holes of the button which are not occupied by the fingers $h^3$ $h^3$, as will be presently more fully explained. In the example shown in the drawings the pusher $h^6$ is moved forward by a series of lazy-tongs $h^7$, and it is retracted by the action of a spring $h^8$. When the button has been brought into the position shown in Fig. 4, and while it is retained in this position, the needle $n$ passes down through the hole $e^*$ in the button and through the branch $e$ of the throat $f$, and after the first stitch has been completed the throat-plate F is moved forward, so that on its next downward motion the needle passes through the hole $e^{2*}$ in the button and through the branch $e^2$ of the throat, and, after one or more stitches have been made alternately through the holes $e^*$ and $e^{2*}$ of the button, the slide $h$ is moved back, causing the fingers $h^3$ $h^3$ to release the button and as many more stitches are made alternately through the holes $e^*$ $e^{2*}$ as may be desired, and then the position of the throat-plate F is changed so as to cause the needle to pass down through the holes $e'^*$ and $e^{3*}$ of the button.

For the purpose of imparting to the throat-plate F the requisite movements the following mechanism is employed: On the shaft D is mounted a cam H, which engages a fork I, the cylindrical shank $i$ of which is fitted loosely into a hole in the end of a lever $i'$, which has its fulcrum on a stud $i^2$, secured in the plate E. This lever connects by a link $i^3$ with a bell-crank lever J J*, the connection of said link with the bell-crank lever being made by means of a pivot $i^4$, while its connection with the lever $i'$ is made by a screw $i^5$, which is adjustable in a slot $i^6$ formed in the lever $i'$. The bell-crank lever J J* has its fulcrum on a pivot $j$, secured in the plate E, and its arm J* connects by a bar $j'$ with a slide K, the connection between the bar $j'$ and the arm J* being made by a stud $j^2$, which engages a slot $j^3$ in the arm. The slide K moves in guides $k^*$, secured to the plate E, and it is provided with a slot $k$, (best seen in in Figs. 5 and 6; also seen in Figs. 2 and 3,) the walls of which engage a toe $l$, that projects from a vertical shaft L, which is mounted in the tail end of the throat-plate F and can be turned therein. By referring to Figs. 5 and 6 it will be seen that the slot $k$ in the slide K is oblong, and the toe $l$ of the shaft L is also oblong, so that if the latter is turned to the position shown in Figs. 2, 3, and 5 its narrow edges will bear against the long sides of the slot $k$, Fig. 5, and consequently if a reciprocating motion is imparted to the slide K this motion will be transmitted by the toe $l$ to the throat-plate F, and the button resting on this throat-plate is moved, so that the holes $e^*$ and $e^{2*}$ are alternately brought into the line of the needle $n^0$. By adjusting the screw $i^5$, which forms the connection of the link $i^3$ with the lever $i'$ in the slot $i^6$, the throw of the slide K can be accommodated to the distance between the holes $e^*$ and $e^{2*}$ in the button. After the requisite number of stitches—say eight or ten—have been passed through the holes $e^*$ $e^{2*}$ in the button, the throat-plate F is adjusted so as to bring one of the holes $e'^*$ $e^{3*}$ of the button into the needle-line. In order to accomplish this object, the branch $e'$ of the throat must be moved into the place occupied by the branch $e$, Figs. 1 and 5. For this purpose a second slide M is provided which is situated beneath the slide K and fitted into a guide-slot $m^*$ in the plate E. (Best seen in Figs. 2 and 3.) This slide is provided with a stud $m'$, which engages the walls of a slot $m^2$ in the arm J of the bell-crank lever J J*, so that when this bell-crank lever is oscillated both slides K M are actuated, but the slide M moves in a direction at right angles to the path of the slide K. In the slide M is an oblong slot $m$, which extends in a direction at right angles to the oblong slot $k$ in the slide K, Figs. 5 and 6, and the toe $l$ of the shaft L is so formed that it extends through the slots in both slides. (See Figs. 2 and 3.) If the toe $l$ is turned to the position shown in Figs. 2, 3, and 5, the motion of the bell-crank lever J J* is transmitted to the throat-plate F by the slide K, while the slide M moves without producing any action, or, in other words, has an idle motion; but if the shaft L is turned so as to bring the toe $l$ into the position shown in Fig. 6 the motion of the bell-crank lever J J* is transmitted to the throat-plate F by means of the slide M, while the slide K receives an idle motion. By means of the slide M, however, the throat-plate is oscillated on the nut $c^2$ of the screw $c$, so that if the branch $e^3$ of the throat has been brought into the needle-line the first movement of the throat-plate brings the branch $e'$ of the throat in the needle-line, and so on.

By referring to Figs. 5 and 6 it will be seen that the long sides of the slots $k$ and $m$ of the slides K and M are provided with offsets $k^0$ $k^{00}$ $m^0$ $m^{00}$, respectively, and if the toe $l$ is turned in the direction of arrow 3, Fig. 5, its advancing end strikes the edge $m^{0\prime}$ of the slot $m$, and since the slide M is held stationary the shaft L, which is secured on the inner end of the throat-plate, is forced away from the edge $m^{0\prime}$ and the outer end of the throat-plate swings in the direction of arrow 4, causing the branch $e^3$ of the throat to move to the center of the throat, and as the movement of the toe $l$ continues it strikes the offset $m^{00}$ and the throat-plate F is forced outward before the toe $l$ reaches the position shown in Fig. 6. By this outward motion of the throat-plate the branch $e^3$ of the throat is finally brought into the needle-line, and if the

movement of the entire mechanism is continued the throat-plate F is oscillated on the nut $c^2$ of the screw $c$ and the needle passes alternately through the holes $e^{3*}$ $e'^*$ of the button supported by the throat-plate. After the first button has been sewed fast the toe $l$ of the shaft L is moved back to the position shown in Fig. 5, and by this movement the throat-plate F is brought back to the original position, bringing the branch $e$ of the throat into the needle-line.

The movements of the toe $l$, as above described, are produced automatically by the following means: N is a vertical shaft, which is stepped in a hole in the plate E and has its bearing above in a plate O, supported by standards $o$. On this shaft is mounted a ratchet-wheel $n$, which is actuated by a pawl $n'$, secured on the arm J* of the bell-crank lever J J*, Fig. 1. This pawl is made adjustable, so that it can be set to take exactly one tooth of the ratchet-wheel $n$ for each stroke on the bell-crank lever J J*, or for each stitch of the needle $n^0$. On the shaft N is firmly mounted a disk P, having a cam-groove $p$, said disk being hereinafter designated as the "cam-disk" P, and on the plate O is secured a lever $o'$, which carries a stud $o^2$, that engages the cam-disk P. This lever has its fulcrum on a pivot $o^3$, secured in the plate O, and its free end connects by a link $o^4$ with the lever $l'$, secured on the upper end of the shaft L. This upper end has its bearing in a lug $l^2$ projecting from the plate O, and it connects to the lower end of said shaft by a universal joint $l^3$, allowing the lower end to move freely with the throat-plate F without breaking its connection with the upper end. The cam-disk P and the connections of the lever $o'$ with the shaft L are so arranged that during each complete revolution of the shaft N the shaft L with the toe $l$ is turned from the position shown in Fig. 5 to that shown in Fig. 6, and then back to the position shown in Fig. 5—that is to say, after the needle has completed, say, ten stitches through the holes $e^*$ $e^{2*}$ of the button the toe $l$ is turned to the position shown in Fig. 6, so as to bring the holes $e^{3*}$ $e'^*$ into the needle-line, and after the needle has completed ten stitches through these holes the toe $l$ is turned back to its original position and the working parts are in position for the next button. These movements of the toe $l$ are produced by the combined action of the pawl Q and of the cam-disk P. The pawl Q swings on a pivot $q$, secured in the arm J* of the bell-crank lever J J*, Figs. 1 and 8, and it is exposed to the action of a spring $q'$ which holds the same in contact with the hub $n^9$ of the ratchet-wheel $n$. From the under surface of this ratchet-wheel project two pins $q^3$ $q^4$, Figs. 3* and 8, and as the pawl $n'$ imparts to the shaft N a step-by-step movement in the direction of the arrow marked on the cam-disk P in Fig. 8, one of said pins—say the pin $q^3$—is thrown in gear with the pawl Q at the moment when the bell-crank lever J J* is in its forward position and the stud $o^2$ of the lever $o'$ has reached the position in the groove $p$ of the cam-disk P represented in Fig. 8. As the arm J* of the bell-crank lever J J* moves back in the direction of the arrow marked on it in Fig. 8, the pawl Q, by its action upon the pin $q^3$, turns the shaft N in the direction of arrow 5, and during this movement the stud $o^2$ is moved from the position shown in full lines, Fig. 8, to that shown in dotted lines, so that the lever $o'$ turns the toe $l$ from the position shown in Fig. 5 to that shown in Fig. 6. The ratchet-wheel $n$ is then moved step by step by the propelling-pawl $n'$ until the pawl Q engages the pin $q^4$ and moves the stud $o^2$ from the low position to the high position in the cam-groove $p$, thereby turning the toe $l$ back to the position shown in Fig. 5.

In the example shown in the drawings the ratchet-wheel $n$ has thirty teeth, and during the time the stud $o^2$ occupies the high portion of the cam-groove $p$ the needle $n^0$ makes ten stitches through the holes $e^*$ $e^{2*}$ of the button. Then the stud $o^2$ is moved from the high portion of the cam-groove $p$ to the low portion of the same by the action of the pawl Q, which turns the ratchet-wheel for the space of five teeth and moves the toe $l$ to the position shown in Fig. 6. Then the needle produces ten stitches through the holes $e'^*$ $e^{3*}$ of the button and the stud $o^2$ is moved from the low portion of the cam-groove $p$ back to the high portion, and the ratchet-wheel is turned for the space of five teeth, thus completing an entire revolution and bringing the toe $l$ back to the position shown in Fig. 5. It is obvious, however, that the number of teeth in the ratchet-wheel can be changed without departing from our invention.

The devices set forth constitute mechanism for reversing or changing the position of the toe $l$ to throw either of the slides K and M in gear with the throat-plate F.

From the above description it will be seen that the button is adjusted in position upon the throat-plate F by the fingers $h^3$, which engage two of the holes in the button. By these means the holes of the button are brought into the needle-line without fail, which is not the case if the button is adjusted from its periphery.

The cam H is so formed that the movements of the throat-plate are produced during the time the needle is out of the cloth, while the throat-plate remains stationary at the time when the needle is in the cloth. To accomplish this purpose the operating-surfaces of the cam-grooves in said cam (see Fig. 2) extend about half-way round the cam, while the cam-grooves on the other half of the cam are parallel to each other, as indicated in Fig. 1, so that they impart no motion to the bell-crank lever J J*.

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

1. The combination, with the stitch-form-

ing mechanism, the movable throat-plate, and the presser-foot, of swinging button-retaining fingers constructed to engage the holes of the button, and means for swinging the fingers at intervals in the arc of a circle, substantially as described.

2. The combination, with the stitch-forming mechanism, the movable throat-plate, and the presser-foot, of a slide fitted on the presser-foot, a rock-shaft mounted on the slide, button-retaining fingers secured to the rock-shaft, and a pusher constructed to act on the rock-shaft and on the slide, substantially as described.

3. The combination, in a machine for sewing on buttons, of a movable throat-plate, two slides extending approximately at right angles to each other, a driving-shaft having a cam, means for transmitting motion from the cam to the two slides, a reversible toe, and mechanism, substantially as described, which automatically reverses the toe at regular intervals to throw one or the other of the two slides in gear with the throat-plate for moving the latter into the required position.

4. The combination, with the stitch-forming mechanism and the movable throat-plate, of two slides extending approximately at right angles to each other, and each being provided with an oblong slot having offsets $k^0$ $k^{00}$ $m^0$ $m^{00}$, respectively, on the long sides of said slots, a cam on the driving-shaft, mechanism, substantially as described, for transmitting motion to the two slides, and a reversible toe secured to the throat-plate and constructed to act on the long sides of the slots in the slides, whereby the throat is adjusted in the needle-line, substantially as described.

5. The combination, with stitch-forming mechanism, of the movable throat-plate, the two slides, a driving-shaft for transmitting motion to the slide, a reversible toe engaging the slides, and means, substantially as described, for automatically reversing or changing the position of the toe at regular intervals to throw either of the slides in gear with the throat-plate.

6. The combination, with the stitch-forming mechanism, of the movable throat-plate, the two slides, a driving-shaft for transmitting motion to the slides, a reversible toe engaging the slides, the shaft N, having the cam P and ratchet-wheel $n$, provided with pins $q^3$ $q^4$, the propelling-pawl $n'$, the pawl Q, for engaging said pins, the lever $o'$, having the stud $o^2$ and connections between the lever and the toe for reversing or changing the position of the latter to throw either one of the slides in gear with the throat-plate, substantially as described.

In testimony whereof we have hereunto set our hands and seals in the presence of two subscribing witnesses.

ENNO H. A. HABBERT. [L. S.]
WILLIAM E. BECKMANN. [L. S.]

Witnesses:
G. P. H. McVAY,
IDA H. KELLY.