(Model.) 4 Sheets—Sheet 1.

A. E. TURNBULL.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 300,742. Patented June 17, 1884.

Fig. 1.

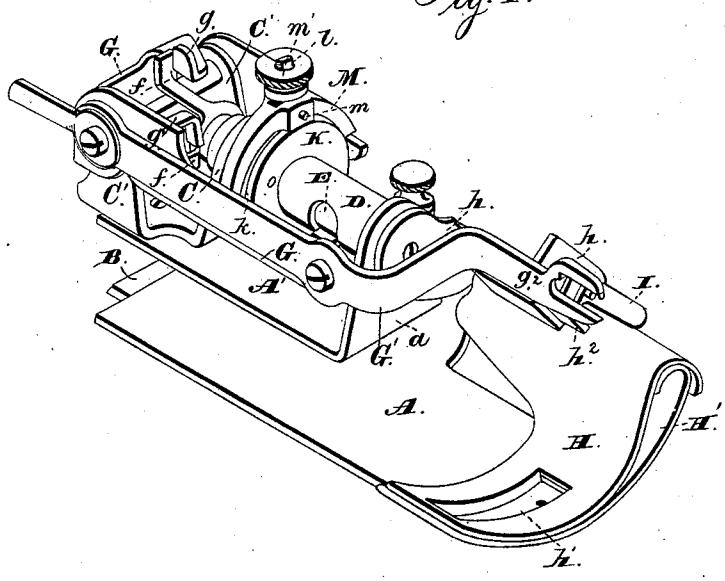
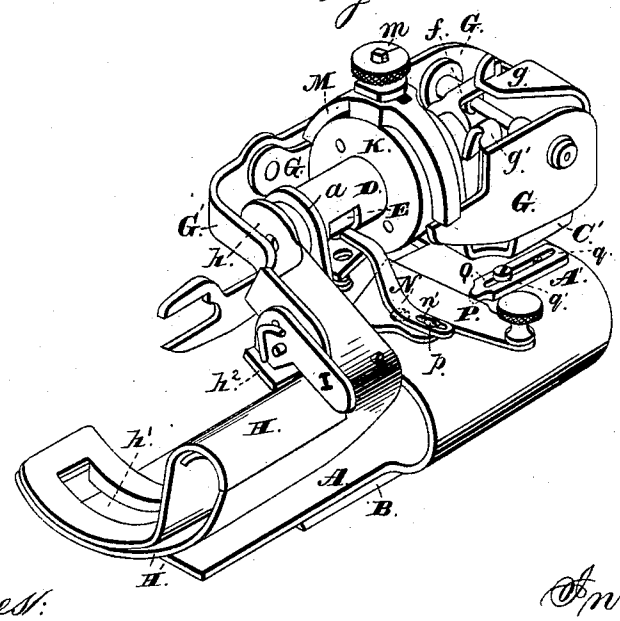


Fig. 2.



Witnesses:
Jas. E. Hutchinson
Henry C. Hazard

Inventors.
A. E. Turnbull by
Chindler & Russell, his Attys

(Model.) 4 Sheets—Sheet 2.

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No. 300,742. Patented June 17, 1884.

Fig. 3.

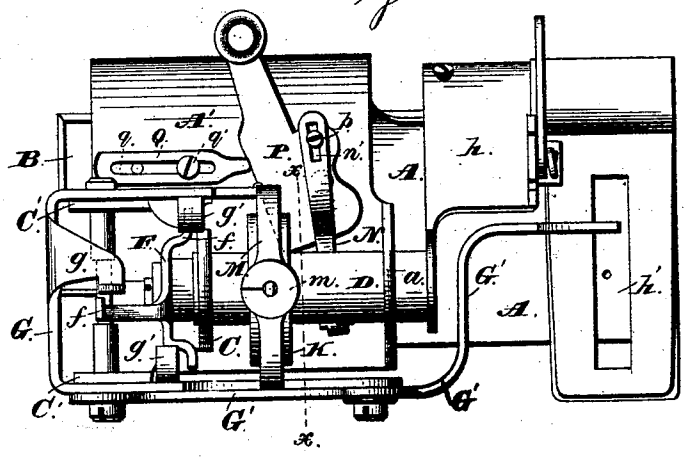
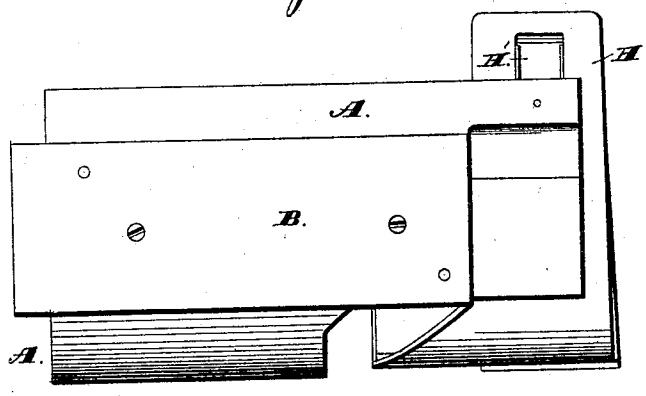


Fig. 4.



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(Model.) 4 Sheets—Sheet 3.

A. E. TURNBULL.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 300,742. Patented June 17, 1884.

Fig. 5.

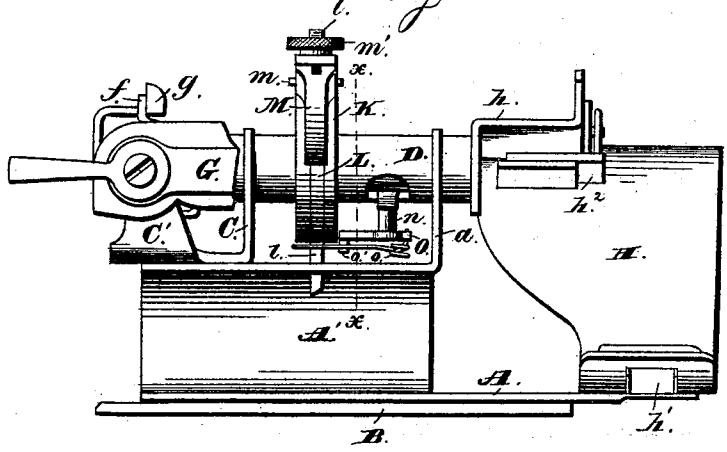


Fig. 6.

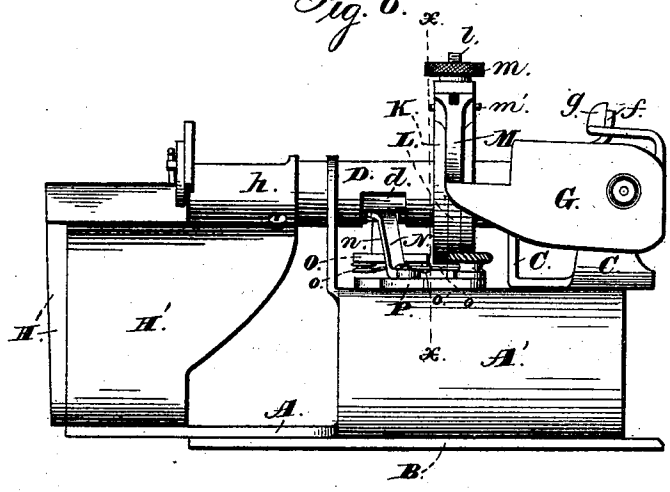
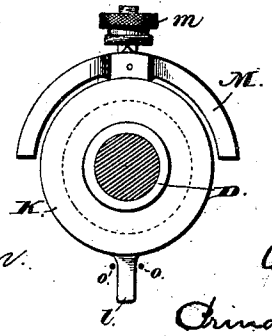


Fig. 7.



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(Model.) 4 Sheets—Sheet 4.

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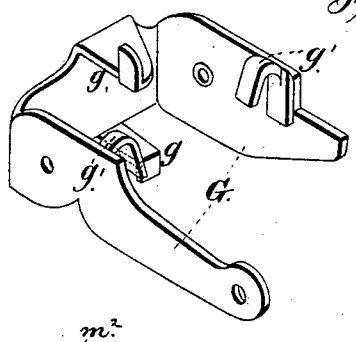
Fig. 8.



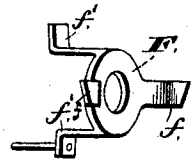


Fig. 9.

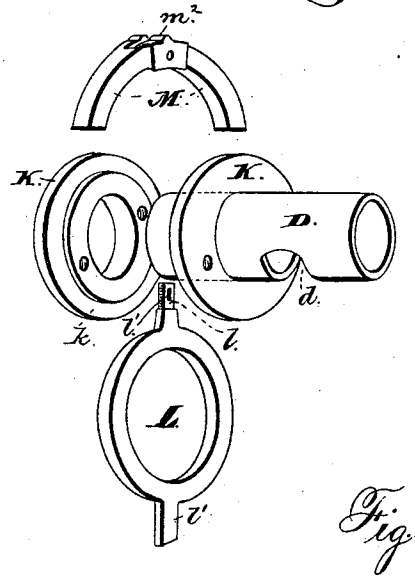


Fig. 10.

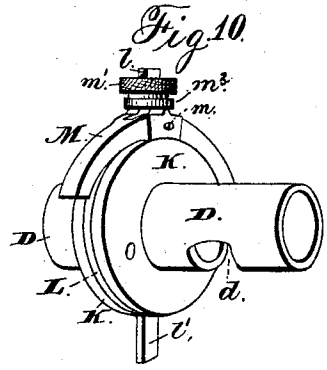


Fig. 11.

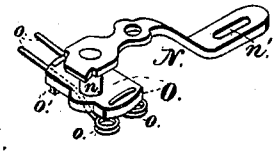


Fig. 12.

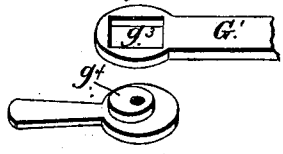
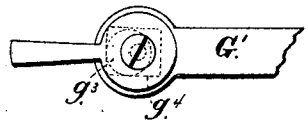


Fig. 15.



Witnessed:
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Crindle & Russell, his Attys

UNITED STATES PATENT OFFICE.

ALONZO E. TURNBULL, OF SPRINGFIELD, OHIO, ASSIGNOR OF SIXTY-FIVE ONE-HUNDREDTHS TO THE ST. JOHN SEWING MACHINE COMPANY, OF SAME PLACE.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 300,742, dated June 17, 1884.

Application filed September 15, 1883. (Model.)

To all whom it may concern:

Be it known that I, A. E. TURNBULL, of Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Button-Hole Attachments for Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my device from the front. Fig. 2 is a like view of the same from the rear. Fig. 3 is a plan view of the upper side of said device. Fig. 4 is a like view of its lower side. Fig. 5 is a front elevation of the same, a portion of the operating-lever being broken away to show more clearly the parts in its rear. Fig. 6 is a like view of the opposite side of said device. Fig. 7 is a sectional view upon line *x x* of Figs. 3, 5, and 6. Fig. 8 is a perspective view of the mechanism for moving the cloth-clamp laterally, the parts being separated from the balance of the device. Fig. 9 is a like view of the mechanism employed for producing the feed-motion of the cloth-clamp, the parts being separated from each other. Fig. 10 is a perspective view of the same combined. Fig. 11 is a like view of the parts of the feed-shifting mechanism separated from each other. Fig. 12 is a like view of the parts of the operating-lever separated from each other, and Fig. 13 is a side elevation of the same combined.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to furnish in a simple, efficient, and inexpensive form means whereby button-holes may be worked upon any part of a garment; and to this end said invention consists, principally, in the construction of the frame whereby abundant space is provided for containing the fabric while being operated upon, substantially as and for the purpose hereinafter specified.

It consists, further, in the construction and operation of the cloth-clamp, substantially as and for the purpose hereinafter shown.

It consists, further, in the means employed for giving to the cloth-clamp a laterally-vibratory motion, substantially as and for the purpose hereinafter set forth.

It consists, further, in the means employed for imparting a feeding-motion to the cloth-clamp, substantially as and for the purpose hereinafter shown and described.

It consists, further, in the means employed for varying the feeding-motion of the cloth-clamp, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for varying the lateral motion of the cloth-clamp, substantially as and for the purpose hereinafter shown.

It consists, finally, in the construction and combination of the parts of the device, substantially as and for the purpose hereinafter set forth.

In the annexed drawings, A represents the base of my device, which has a length of about five inches and a breadth of about two inches. Upon the bottom face of such part is secured a plate, B, which corresponds to the usual back slide of a sewing-machine, and may be inserted in place thereof, so as to firmly hold the device in place. From the rear side edge of the base A the plate of which it is formed extends in a curve rearward, upward, and forward, and thence horizontally forward parallel with said base, and about one and one-half inches above the same. Said raised portion or frame A′ has an equal width and about one-half the length of said base.

Extending upward from the inner end of the frame A′ is a Λ-shaped lug, *a*, which has within its upper end a bearing, and may form part of the same plate, or may be constructed separately and afterward attached to said frame. A second similar lug, C, is secured to said frame near its outer end, and, like the same, is provided with a bearing within its upper end.

Within the bearing-lugs *a* and C is journaled a tube, D, which loosely fills the same, and has a length about one-half inch greater than the distance between the outer faces of said lugs, so as to permit of such amount, or less, of longitudinal motion.

Fitted loosely within the tube D is a cylin-

drical piece, E, which extends from near the front closed end of said tube outward through the rear open end of the same, and upon its rear end has pivoted a four-armed spider, F, which spider, as seen in Fig. 8, has two of its arms, *f*, extended forward and then laterally outward from opposite sides of its center, while the other arms, *f'*, extend rearward and then upward or downward from the upper and lower sides of said center. The spider F is engaged by means of a U-shaped lever, G, which is pivoted to or upon two lugs, C', which extend upward from opposite sides of the base of the lug C at the rear end of the device. Said lever is provided with two arms or pallets, *g*, which extend inward from the upper and lower edges of its rear end, and have the shape shown in Fig. 7, whereby if said lever is caused to vibrate upon its bearing, the upper pallet, which extends around the upper arm *f'* will engage from the front with said arm and draw said spider and the piece E rearward, while the lower one of said pallets will engage from the rear with the corresponding arm *f'* and move said parts forward. It is necessary that the longitudinal movement of the piece E should be produced by the upward movement of the lever G, for which reason the spider F is oscillated upon its pivotal bearing, so as to alternately bring its upper and lower arms *f'* into position for engagement with the pallets *g*, by means of two additional pallets, *g'*, which project inward from opposite sides of each lever and engage with the lateral arms *f* of said spider. Said pallets *g'* are placed in such relation to the pivotal bearing of said lever as to cause one to engage with its arm *f* only when said spider F and piece E are at the front limit of their motion, and the opposite pallet, *g'*, to engage with its arm *f* when said parts are at the rear limit of their motion, such engagements being had upon the downward stroke of said lever. As thus arranged, it will be seen that at each downward movement of the lever G one of its pallets, *g'*, will engage with an arm, *f*, and turn the spider a sufficient distance to bring one of the arms *f'* into line with its pallet *g*, so that upon the upward movement of said lever the latter will engage with said arm *f'* and move said spider in one direction, while upon the next downward movement of said lever the position of said spider will be changed to bring its opposite arm *f'* into engagement, the result being that at each upward movement of said lever said piece E will be moved longitudinally in one direction to the limit of its motion. The lever G extends forward of the front end of the tube D, and at its end g^2 is adapted to engage with the needle-bar of a sewing-machine, from which bar the necessary motion is secured. In order that the stroke of said lever may be varied, the portion G', which engages with said needle-bar, is constructed separately, and at or near its longitudinal center is pivoted upon the front end, at the outer side of said lever G, and at its rear end is provided with an elongated opening, g^3, which passes over an eccentric, g^4, that is journaled upon the axial bearing of said lever. By the rotation of said eccentric the rear end of said part G' is raised or lowered with relation to said part G, and its front end correspondingly lowered or raised, the construction enabling the desired adjustment to be effected.

Secured to the front end of the hollow shaft or tube D is a cloth-holder, which consists of two curved plates, H and H', that are hinged or otherwise joined at their upper ends, and the lower one at such point is provided with a lug, *h*, which extends laterally toward said tube D, and thence downward across its end. Said plates or jaws are each provided with a longitudinal slot, *h'*, through which the fabric to be sewed may be operated upon, and the metal of the upper jaw, H, at the sides of its slot, is preferably turned downward through the slot in the lower jaw, H'. Above the slot *h'* the plates H and H' have oppositely outward and then inward curves, so as to produce at such point a considerable space for containing such portion of the fabric being operated upon as may be necessary. Said plates or jaws are closed together to clamp the work by means of a cam-lever, I, which is pivoted upon the lug *h*, and is arranged to impinge upon a lug, h^2, that projects outward from said upper jaw, H.

For feeding the work beneath the needle, I secure upon the tube D, near the rear bearing, C, a disk, K, preferably made in two sections, in the periphery of which is provided a circumferential groove, *k*, that receives a strap or yoke, L, which loosely fills said groove.

From the upper side of the strap L an arm, *l*, extends upward and furnishes a bearing for a semicircular tappet-piece, M, which piece is loosely fitted over said arm and is held in place thereon in a line with the periphery of the disk K by means of a pin, *m*, that passes transversely through said tappet-piece and arm. A slot, *l'*, is made through the arm *l*, to allow the passage of pin *m*. A nut, *m'*, fitted upon the upper threaded portion of said arm, operates to hold the tappet-piece in vertical position thereon. A rounded rib or projection, m^2, is provided on the top of the tappet-piece, and extending in a direction thereon parallel to the pivot-pin *m*. A washer, m^3, on the arm *l*, between the nut *m'* and the tappet-piece, bears upon the rounded rib or projection m^2. Such construction is to allow of the rocking of the tappet-piece.

Within the lower side of the tube D, between the disk K and front bearing, *a*, is provided an opening, *d*, which has a width of about one-third of an inch, and circumferentially extends about one-half way around said tube.

Pivoted to the lower side of the piece E, within the opening *d*, is a lever, N, which has the form shown in Fig. 11, and has attached to its lower side a vertical stud, *n*, that car-

ries a plate, O, upon its lower end. To the lower face of said plate are secured two springs, *o*, which extend beneath the strap L, and have their free ends in engagement with opposite sides of a lug, *l'*, that extends downward from said strap. Said springs are arranged so that their free ends have an inward pressure, and between the same, near their said ends, is a lug, *o'*, which extends downward from said plate O and limits such inward motion.

Pivoted at one end to or upon the raised portion A' of the frame A is a second lever, P, to which, between its free end and pivotal bearing, is pivoted the outer end of the lever N by means of a screw, *p*, that passes through an elongated opening, *n'*, in the latter and has its threaded end contained within a correspondingly-threaded opening in said lever P.

In order to regulate the throw of the lever P, and consequently the length of the stitch sewed, a plate, Q, provided with a longitudinal slot, *q*, is secured upon the frame-plate A' by means of a screw, *q'*, which passes through said slot into said frame-plate. The end of said plate Q adjacent to the side edge of said lever is rounded and forms a stop, against which said lever impinges, so that by moving said plate nearer to or farther from said lever the latter will have correspondingly less or more freedom of motion.

The sides of the lever G are extended forward beneath and adapted to engage with the ends of the tappet-piece M, when the operation of the feed mechanism is as follows, viz: The lever P, being moved to one side, carries with it the lever N and turns the plate O so as to cause its springs *o*, operating upon the lug *l'*, to turn the strap and cause one of the ends of the tappet-piece M to be lower than the opposite end, and to be in position for engagement by the adjacent side of the lever G. As thus arranged, at each upward movement of the lever G the lowest arm of the tappet-piece M will be engaged, and the latter, together with the strap L, will be turned a short distance around the axis of the tube D, and in consequence of the rocking of said tappet-piece upon the arm *l* its central part will bite upon the periphery of disk K and move the same, said tube D, and the cloth-holder H in the same direction. To reverse the feed, the lever P is moved in an opposite direction, so as to depress the other arm of the tappet-piece M, when the parts will operate as before, but in the reverse direction.

In consequence of the U form of the frame of the device, so much space is left between the base and the operative mechanism as to enable a large quantity of cloth to be contained within said frame in rear of the needle, and to render practicable the operation upon portions of a garment which have heretofore been beyond the reach of button-hole sewing-machines.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In a button-hole attachment for sewing-machines, the elevated frame, upon which is carried the operative mechanism supported from and above the base-plate by a standard extending upward from the plate, so that a clear space is left between the frame and plate for the fabric being operated upon, substantially as specified.

2. In a button-hole attachment for sewing-machines, the frame upon which the operative mechanism is carried, supported upon the base-plate of the attachment by a curved U-shaped standard or flange arising from the said base-plate, and forming thereby a construction adapted to allow free passage of the fabric being operated upon between such frame and plate, substantially as and for the purpose described.

3. In a button-hole attachment for sewing-machines, a cloth-clamp curved longitudinally upon a circular line, in combination with means for moving it lengthwise around the axis of its curvature, substantially as and for the purpose set forth.

4. In a button-hole attachment for sewing-machines, a cloth-clamp composed of two plates, which at one end are hinged or otherwise connected together, and at such end are curved outward and away from each other to furnish space for the reception of the fabric to be operated upon, and toward their free ends are curved inward toward each other, in combination with means for bringing their free ends together to clamp the fabric, substantially as and for the purpose shown.

5. The hereinbefore-described cloth-clamp, consisting of the plates H H', hinged or otherwise connected together, curved outward from each other at their connected ends, and then inward toward each other, and provided with slots *h'* near their free ends, in combination with the cam-lever I, adapted to bring their free ends together to clamp the cloth, substantially as and for the purpose described.

6. In combination with the cloth-clamp described, the axial bearing-tube D, the cylindrical piece E, the spider F, having the arms *f* and *f'*, and the lever G, provided with the pallets *g* and *g'*, substantially as and for the purpose set forth.

7. As a means for feeding the cloth-clamp longitudinally, the tube D, provided with the opening *d*, the grooved disk K, the strap L, having the radial arm *l* and lug *l'*, the tappet-piece M, the lever N, provided with the stud *n*, the plate O and spring *o*, the lever P, and the lever G, all combined to operate substantially as and for the purpose shown and described.

8. In combination with the grooved disk K, the strap L, having arm *l*, the tappet-piece M, pivotally attached to and adapted to rock on the arm, and to bear against the periphery of the disk as it is rocked, and the nut *m* on the arm above the tappet-piece, substantially as and for the purpose set forth.

9. In combination with the grooved disk K,

the strap L, having arm l, the tappet-piece M, pivotally and movably attached to the arm by means of a pin passing through a slot, l', in the arm, and provided with a rounded projection or rib, m^2, on its top, a washer on the arm l above the tappet-piece, and a nut on the arm above the washer, substantially as and for the purpose described.

10. As a means for varying the relative angles of the lever G and the supplemental part G', which is pivoted thereon, and is provided at its inner end with the elongated opening g^3, the eccentric g^4, journaled upon said lever G, and working within said opening g^3, substantially as and for the purpose shown.

11. The hereinbefore-described button-hole attachment for sewing-machines, in which the frame, the cloth-clamp, and the vibrating and feeding mechanism are constructed and combined to operate in the manner and for the purpose substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of September, 1883.

ALONZO E. TURNBULL.

Witnesses:
WM. M. ROCKEL,
CHAS. L. BOGLE.