

(Model.)

6 Sheets—Sheet 1.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 428,548.

Patented May 20, 1890.

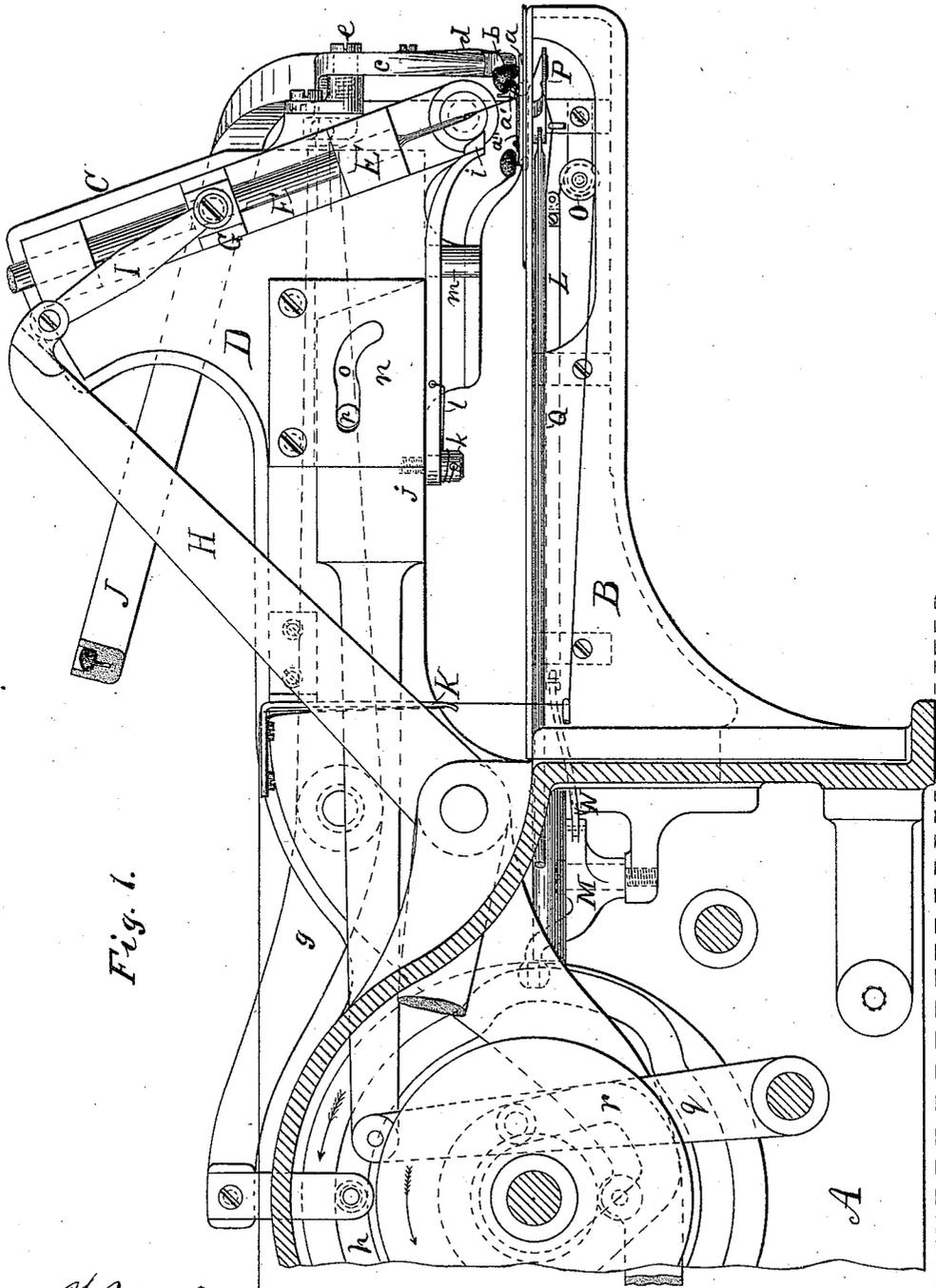


Fig. 1.

Witnesses;
William H. Pease.
Edward P. Merrin.

Inventor;
Walter E. Bennett,
By Rosewell Thompson,
Attorney.

(Model.)

6 Sheets—Sheet 2.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 428,548.

Patented May 20, 1890.

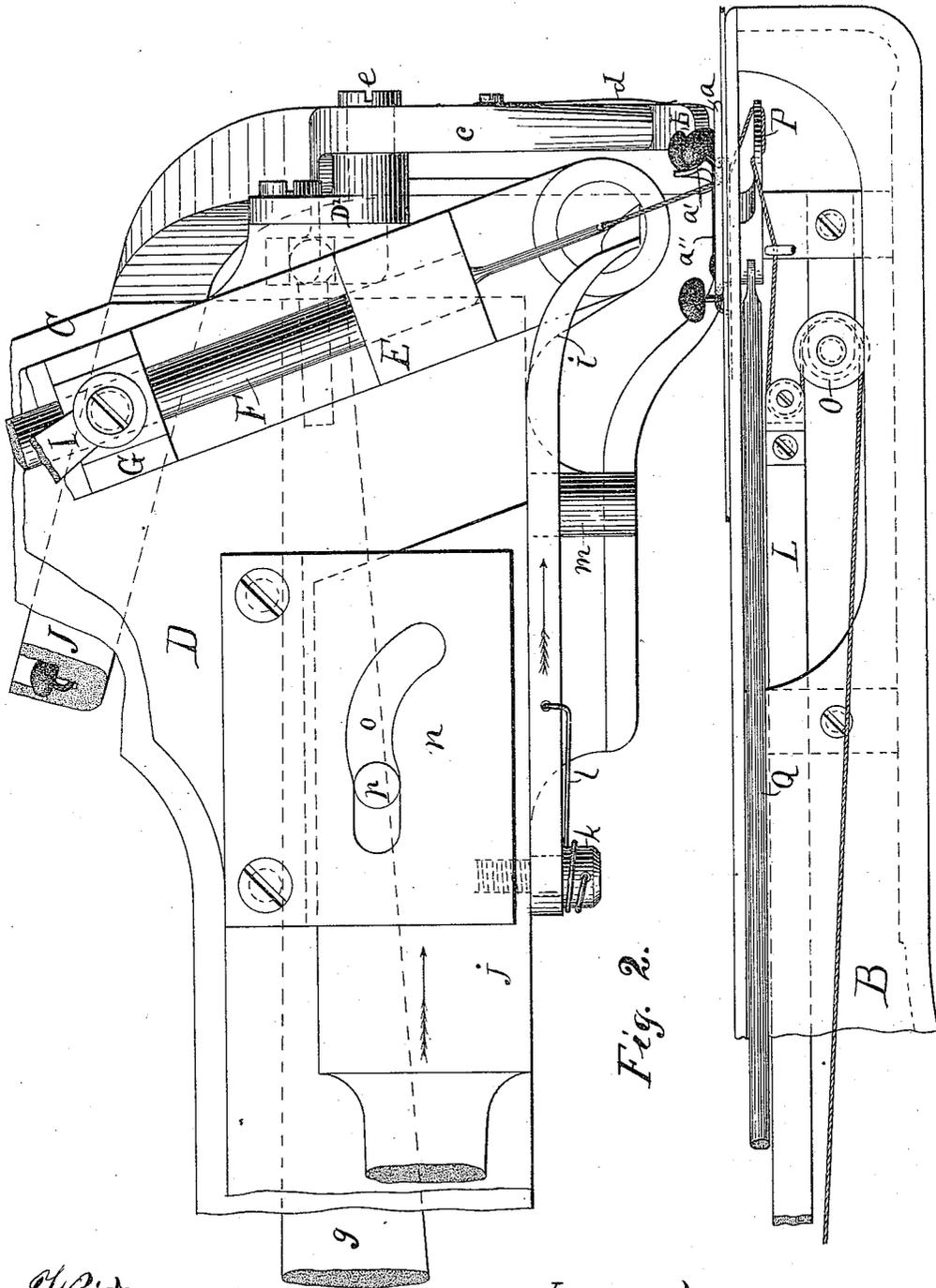


Fig. 2.

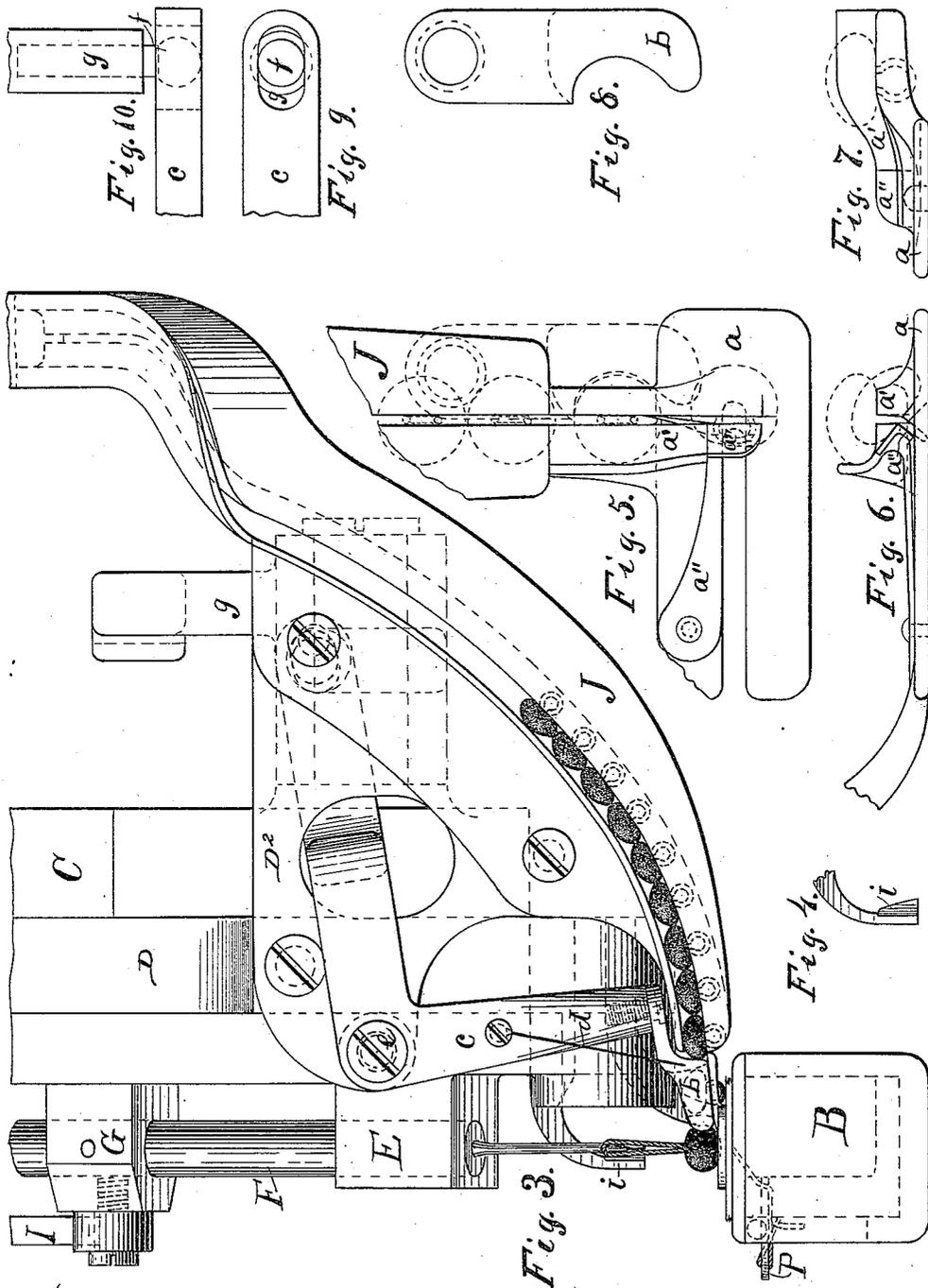
Witnesses;
William W. Lear.
Edward P. Merriam.

Inventor;
Walter E. Bennett.
By Rosewell Thompson,
Attorney.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 428,548.

Patented May 20, 1890.



Witnesses;
William M. Case.
Edward P. Merwin.

Inventor;
Walter E. Bennett.
By Rosewell Thompson,
Attorney.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 428,548.

Patented May 20, 1890.

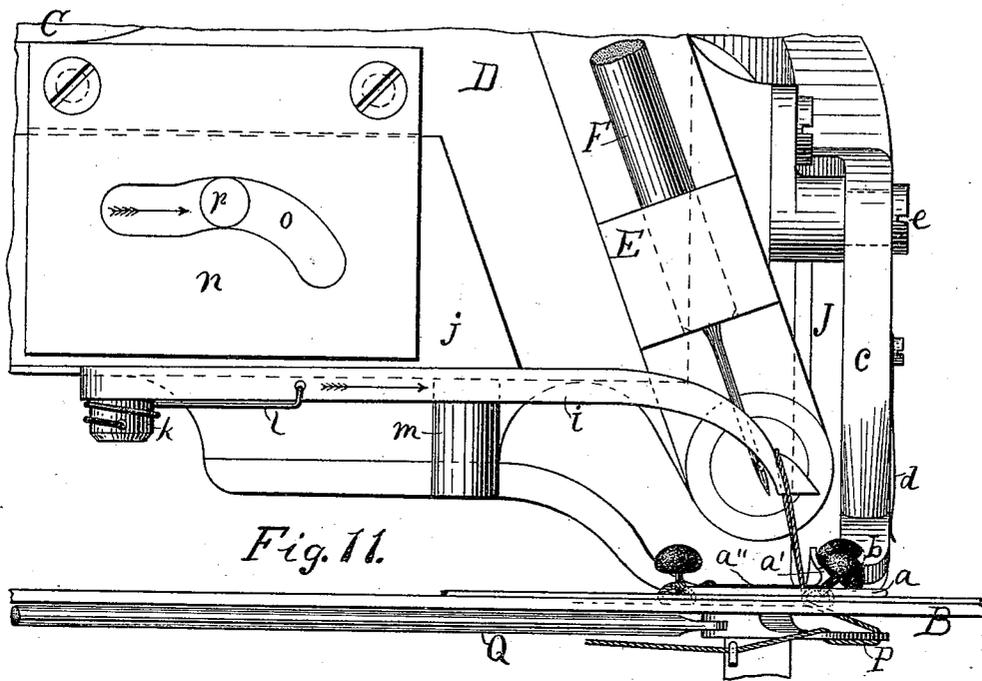


Fig. 11.

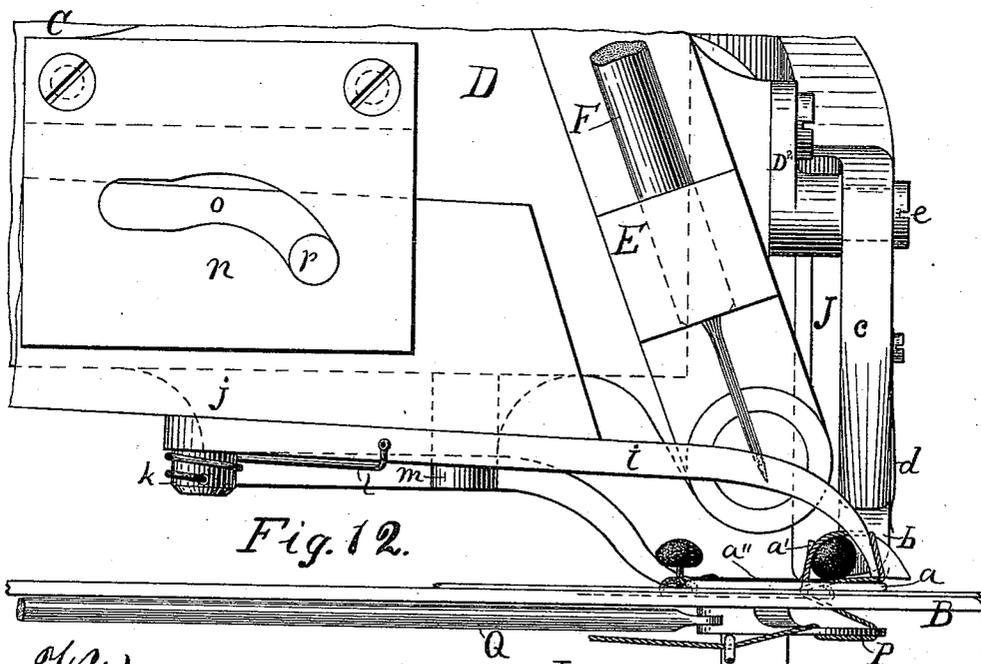


Fig. 12.

Witnesses;
William W. Lease.

Edmund P. Merrin.

Inventor;
Walter E. Bennett.

By Rosewell Thompson,
Attorney.

(Model.)

6 Sheets—Sheet 5.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 428,548.

Patented May 20, 1890.

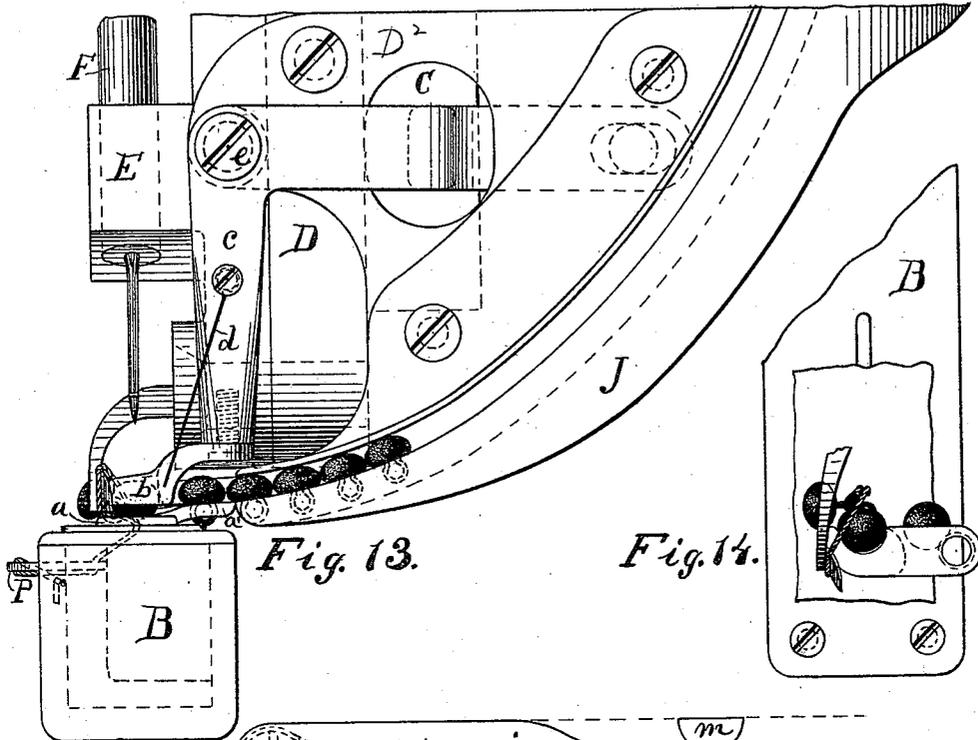


Fig. 13.

Fig. 14.



Fig. 15.

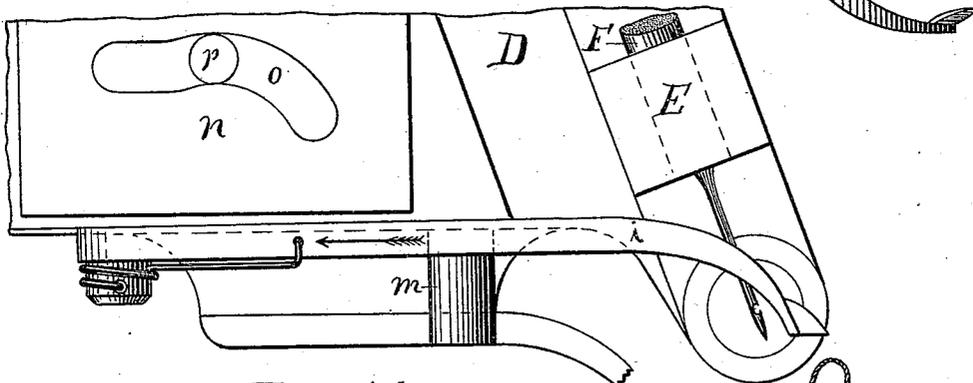
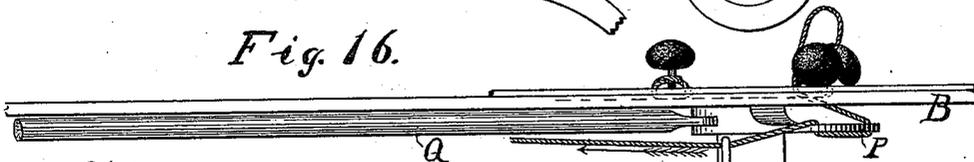


Fig. 16.



Witnesses;
William N. Case.
Edward P. Merwin.

Inventor;
Walter E. Bennett.
By Rosewell Thompson,
Attorney.

(Model.)

6 Sheets—Sheet 6.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 428,548.

Patented May 20, 1890.

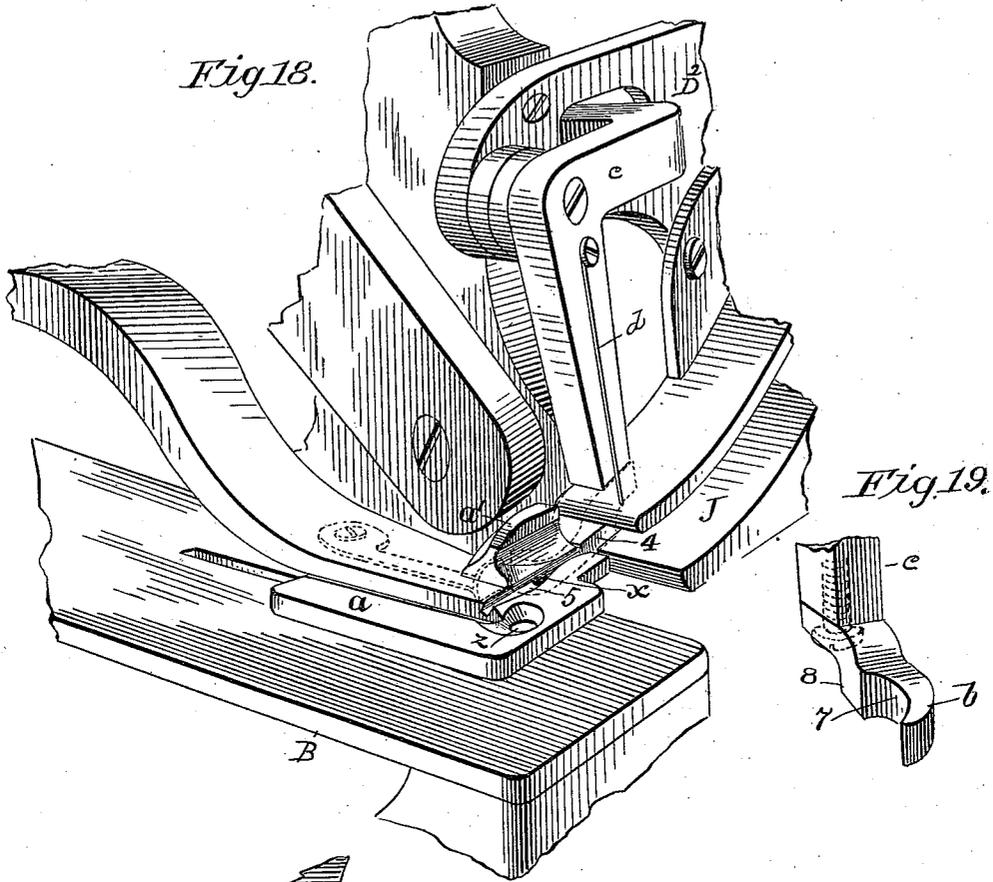


Fig. 18.

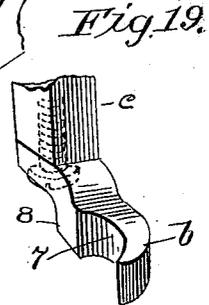


Fig. 19.

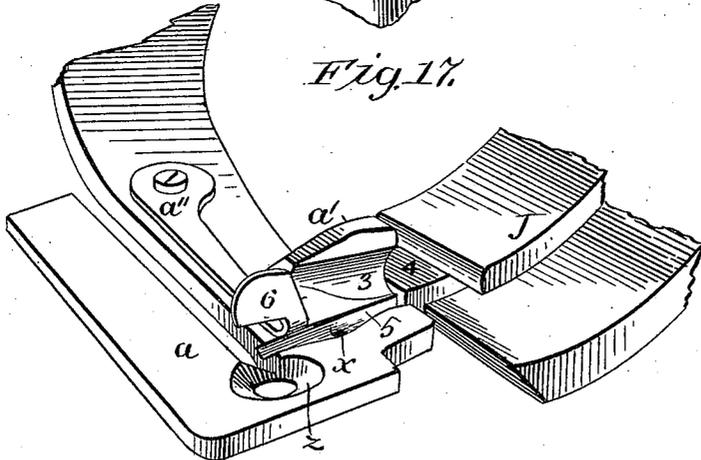


Fig. 17.

Witnesses:
J. P. Garfield
Wm. S. Pellomy

Inventor,
Walter E. Bennett
 by *Chapin*
 Attorneys

UNITED STATES PATENT OFFICE.

WALTER E. BENNETT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE MORLEY BUTTON SEWING MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR SEWING ON BUTTONS.

SPECIFICATION forming part of Letters Patent No. 428,548, dated May 20, 1890.

Application filed July 2, 1888. Serial No. 273,842. (Model.)

To all whom it may concern:

Be it known that I, WALTER E. BENNETT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and Improved Button Feeding and Holding and Loop Removing and Spreading Mechanisms for Shank-Button Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being made to the accompanying drawings, forming a part of this specification.

This invention relates to improvements upon the machine for which Letters Patent were granted to Rosewell Thompson, November 30, 1886, No. 353,609, the method of forming the stitch by said machine at the present time being that for which Letters Patent were granted to me July 26, 1887, No. 367,334; and one object of my invention is to hold the button which is to be sewed onto the fabric by means of certain devices which are a part of or attached to the presser-foot, instead of the end of the button-trough, as heretofore, and thus insure greater accuracy in the position of said button. I also avoid the swinging motion of the button-trough by employing a device I term a "button-pushing pawl" to operate with its driving mechanism in connection with said button-holding device instead of the button-trough proper.

Another object of my invention is to remove the secondary loop of thread from the open eye of the needle, then spread said loop with the same device which removed it from the eye sufficiently wide to allow a button-head to be forced through it by the button-pushing pawl above referred to when said device and loop are in a certain position, and then by means of the take-up and tension of the machine draw said loop of thread snugly around the shank of the button to complete the stitch, all of which will hereinafter be fully explained and described.

In the accompanying drawings, Figure 1 is a left-side view of the machine referred to with the body of the same in section, showing my improved devices in their proper positions, and also their operating cams and levers. Some of the stitch-forming mechanism,

and also some other devices belonging to the machine, are not represented in this view, as they have no direct connection with the operation of my present improvements. The loop removing and spreading device is shown in its extreme rear position. Fig. 2 is an enlarged left-side view of the front end of the fabric-supporting table and arm of the machine, the loop-removing device being represented moved sufficiently far forward to cause the point of the same to enter the secondary loop of thread, which has been drawn up through the fabric by the open-eyed needle. Fig. 3 is a front view of the latter-named figure with loop-removing device in same position. Fig. 4 is a view of the front end of the loop removing and spreading device, showing the triangular-shaped point of the same. Figs. 5, 6, and 7 are greatly-enlarged top, left-side, and front views, respectively, of the presser-foot and its button-holding devices, the extreme end of the button-trough being shown in the first-named figure. Fig. 8 is also a greatly-enlarged top view of the button-pushing pawl. Figs. 9 and 10 are front and top views, respectively, of the upper end of the button-pushing pawl-lever and the ball and end of its operating-lever. Fig. 11 is another left-side view of the front end of the arm of the machine and cover-plate of the fabric-supporting table, showing the loop-removing device raised and moved sufficiently far forward to cause the loop of thread to be removed from the open eye of the needle. Fig. 12 is also a view of the same parts of the machine, but with the loop-removing device occupying its extreme forward and lowest position, thus causing the loop of thread to be spread and allowing a button-head to be forced through it by the end of the button-pushing pawl, as represented. Fig. 13 is a front view of the latter-named parts with loop-removing device in same position and button-head forced through the loop of thread by the end of the button-pushing pawl. Fig. 14 is a top view of the front end of the cover-plate of the fabric-supporting arm, front end of loop-removing device and button-pushing pawl, showing a button-head forced through a loop of thread, the presser-foot and its button-holding devices being removed in this

view. Fig. 15 is a top view of the loop removing and spreading device and the semi-circular block which controls the side motion of said device, showing the irregular form of the edge which is pressed against said block by means of the spring around the pivot-pin. Fig. 16 is also a left-side view of the front end of the arm of the machine and cover-plate of the fabric-supporting table of the same, with presser-foot, button-pushing pawl, and its operating-lever removed, but showing a button-head passed through a loop of thread and the loop removing and spreading device moving back and the loop of thread removed from the point previous to being drawn around the shank of the button by means of the take-up and tension mechanisms to complete the stitch, as shown in the rear figure of the button upon the fabric in this and other drawings. Fig. 17 is a perspective view of the presser-foot and the lower end of the button-trough. Fig. 18 is a perspective view of a portion of the work-holding table, the presser-foot, the lower end of the button-trough, and of other detail parts hereinafter fully described, said Fig. 18 having indicated thereon in dotted lines a button-pushing pawl and a spring on the presser-foot. Fig. 19 is a perspective view of the button-pushing pawl and the lower end of the lever to which it is attached.

Similar letters and figures of reference indicate corresponding parts in the drawings.

Certain structural parts of the mechanism shown and described in the before-mentioned Letters Patent No. 353,609 are shown in this application, and my improvements are applied thereto. The said parts of said patented machine which are herein shown consist of the body or frame A, the fabric-supporting table B, a rigid arm C above and a little to one side of said table B, forming a support for certain operative parts of the machine below described.

D is the lifting-lever. E is the needle-bar bearing attached to said lifting-lever.

F is the needle-bar.

G is the needle-bar carrier, H the needle-bar lever.

I is a link connecting lever H and the needle-bar carrier G.

J is the button-trough.

K is the tension device.

L is the sliding take-up bar.

M is the take-up lever.

N is the take-up lever and bar connection.

O is a thread-roll.

P is the thread-controlling device, and Q its operating-rod.

My improvements consist of the presser-foot *a*, which is attached to the under side of the lifting-lever D, constructed with a button-guiding boss *a'* on its upper side, extending about half-way across the presser-foot from the rear edge thereof nearly to the longitudinal slot therein, through which the sewed-on button-shanks move rearwardly as the ma-

terial is moved along to space the buttons, said boss having on the front side thereof a groove 3, nearly semicircular in cross-section, as shown in Fig. 17, the said boss *a'* being located on the presser-foot at the lower end of the button-trough, but to one side of the button-shank groove 4 in the lower side thereof, so that one side of each button as it moves from the trough onto the presser-foot will be engaged by said groove, and thereby the button will be held in proper position until it reaches the center of the presser-foot, where the shank will receive the point of the needle. Said presser-foot has a shank-groove 5 in it extending in a line with and at the base of said boss *a'* from the rear edge of said foot to its said central longitudinal slot, said shank-groove being in a line with the button-groove 4 of the button-trough J, so that buttons from the latter may move freely therefrom to the center of the presser-foot. A spring *a''* is secured by one end to the upper side of the presser-foot and has a head 6 thereon, whose outer face is about on a line with the inner side of said groove 3 in the boss *a'*, (see Fig. 17,) said spring comprising a part of the button-holding devices, and is applied to the presser-foot so that its free end or head 6 may press upon the shank of the button while the latter is being sewed to the fabric and retain it in its angular position until it is removed from engagement with the spring by the button-pushing pawl *b*. The said pawl *b* is pivotally connected by one end to the lower end of the vertical arm of a bell-crank-lever *c*, to swing in a horizontal plane opposite the said grooved side of the boss *a'* on the presser-foot and the head 6 of the spring *a''*. Said pawl *b* has a button-head socket 7 (see Figs. 14 and 19) in its inner side to engage with a button when it emerges from the end of the button-trough and carry it over the presser-foot, and said pawl has also a heel or abutment 8 (see Figs. 3 and 19) on its under side to govern the exit of the buttons from said trough, as below described. The said bell-crank lever is pivotally connected at *e* to the front end of the bracket D², which supports the button-trough D. A spring *d* is secured to the side of said bell-crank lever, and its free end presses against the said pawl *b* to swing its free end toward said boss and spring-head. A horizontal lever *g* (see Figs. 1, 3, and 10) has a ball-head *f* on the end thereof adjoining the horizontal arm of said elbow-lever *c*, which enters a slot in said arm, and thereby, through connection with a path-cam *h*, imparts a vibratory motion to said elbow-lever.

A loop removing and spreading lever *i* is pivoted by one end to the lower edge of a bar *j* by the screw-stud *k*, around which is wound the wire spring *l*, one end of said spring pressing against the side of said loop removing and spreading lever to cause its inner irregular-shaped edge to bear against a semicircular block *m*, which is fixed on the side of said

lifting-lever D, whereby the free end of said lever *i* has imparted to it a reciprocating horizontal motion when given an endwise movement by said sliding bar. The said sliding bar is attached to the side of said lifting-lever D by an inclosing-box, in the side of which is a cam-shaped slot *o*. A stud *p*, being fixed in said sliding bar, is given an endwise motion, and said loop-spreading lever is made to rise and fall. The said endwise motion is imparted to said sliding bar by the connection of its rear end with a vibrating lever *q*, as indicated in Fig. 1.

The operation of my improvements is as follows: The button-trough J being supplied with a quantity of shank-buttons, as indicated in Figs. 3 and 13, said buttons fall by gravity to the lower end of said trough, and their further movement is for the instant arrested by the presence of the said heel or abutment 8 of the button-pawl *b*, which stands before the end of the said trough, as shown in Fig. 3. Motion being imparted to the machine whereby the cam *r* is caused to rotate in the direction indicated by the arrows in Fig. 1, the elbow-lever *c*, by means of its connection with said cam, as above described, will be caused to vibrate, thereby swinging its vertical arm from the position shown in Fig. 3 to that shown in Fig. 13, whereby a button is allowed to slide onto the presser-foot at the side of said grooved boss *a'*, with one side of the button-head engaging in said groove, the latter being in the path of movement of said button-head while in said trough, the shank of the button passing along in the groove 5 in the presser-foot, said groove 5, as aforesaid, coinciding with the shank-groove in the button-trough. The vertical arm of lever *c* and the pawl *b* then swing back to the aforesaid position, bringing the heel of the pawl again in proximity to the end of the button-trough; the free end of the pawl, owing to the curved form of that side of the button-socket 7 therein, sliding by the side of the button, but held thereagainst by the spring *d* with a gentle pressure, the resistance of the line of buttons behind the one which lies on the presser-foot, as aforesaid, permitting the button-pawl to have such a movement without moving said foremost button from its said position. When said foremost button is permitted to move down onto the presser-foot, the whole line of buttons in the button-trough moves correspondingly, whereby a button is always presented at the end of the trough after one has been carried forward, as aforesaid. The said pawl *b*, after having moved backward, as just described, is caused by the spring *d* to swing toward the button-head and cause the latter to be inclosed in the button-socket 7, and in the groove 3 of the boss *a'* on the presser-foot, thus separating said button from the adjoining one at the end of the button-trough, as shown in Fig. 3, where the button so inclosed is indicated by dotted lines. The elbow-lever *c* then receives

again such vibratory motion as causes the lower end of its vertical arm and the button-pawl to again swing toward the presser-foot, whereby the said button, which is inclosed by the latter and the said abutment *a'*, is carried to the center of the presser-foot and brought to the position thereon, and over the fabric-supporting table B, indicated in Figs. 13 and 14. At the point in the presser-foot where said button is lodged to be acted on by the needle to attach it to the fabric a depression *z* is formed in the presser-foot to receive the head of the button and allow it (the button) to lie in an inclined position, whereby the shank of the button is caused to come under the lower edge of the head 6 of the spring *a''*, the opening through the shank which is to receive the thread lying in the path of movement of the needle. In order to direct the movements of the button whereby after it enters upon the presser-foot with its shank in the groove 5 thereof, the face of that portion of the presser-foot at *x* thereon (see Figs. 17 and 18) bordering on said groove 5 is depressed below the opposite side of the groove, whereby the button begins to turn on its side as it approaches the said concave depression *z*, and gradually is thus brought to the position on the presser-foot above described. The said groove 5 in the presser-foot is made of such form—that is, sufficiently wide opposite the said depressed side thereof—to permit the shank of the button to swing therein when the button is tilted or inclined, as aforesaid. Fig. 11 shows the inclined position of the button when brought under the needle, so that the latter, which operates in a line inclined to the plane of the table of the machine, as shown, may pass through the shank of the button. In the continued operation of the machine the elbow-lever *c* again vibrates, carrying the pawl *b* again toward the end of the button-trough, said pawl again slipping over the head of the button, which is in position in the center of the presser-foot, and leaving the shank of said button clamped or held in position by the spring *a''* while it is being sewed to the fabric by the needle and primary loop of thread, the free end of the pawl remaining to the right of said button, as shown in Fig. 3, until the secondary loop of thread is in a position to allow the head of the button being operated upon to be passed through it in the manner below described. After the needle of the machine has drawn a primary loop of thread up through the fabric outside the button-eye and forced it through the button-eye and fabric the secondary loop of thread is then drawn through the fabric by said needle outside the button-eye in the same place through which the primary loop of thread was drawn, and when said secondary loop of thread has reached its highest point above the fabric, as shown in Figs. 1 and 2, the loop-removing lever *i* is moved forward, whereby its free end is caused to enter the said sec-

ondary loop of thread a short distance below the point of the needle, as shown in Figs. 2 and 3. Said motion being continued, the end of said lever *i* enters farther into the loop, and at the same time is raised as it moves forward, so as to remove the loop from the open eye of the needle, in the manner shown in Fig. 11, said rising motion of the removing-lever being caused by the pin *p* and cam-slot *o* through plate *n*, and the upper right face of the end of said lever is sufficiently inclined to pass the left side of the needle without springing the latter. (See Fig. 4.) The loop being thus removed from the eye of the needle, the lever *i* has a further forward motion, while retaining the loop, and also a downward motion caused by the cam-slot *o*, before referred to, and said lever has also a lateral motion caused by the engagement of said lever with the semicircular block *m*, the wire spring *l* serving to hold lever *i* against said block during the entire endwise motion of said lever, the forms of said lever and block *m* being shown in Fig. 15. Thus when the loop is lowered and spread it is to the left of the button-head, and in a position to allow said button-head to be forced through it by the free end of the button-pawl *b*, when the latter moves toward the center of the presser-foot, as shown in Figs. 12, 13, and 14, the said loop, through which the head of the button is carried, as aforesaid, being hung upon and spread by the end of said lever *i*, as clearly illustrated in Fig. 12. The pushing-pawl also moves the button around the edge of head *6* on spring *a''*, thus placing it in position to be moved along by the feed. After the button-head is thus forced through the loop the loop removing and spreading lever *i* is raised and drawn back by its above-described operating mechanism, the pin *p* following the cam-slot *o*; but as the loop of thread is now under the button-shank said loop slides off the end of lever *i* when it is about in the position shown in Fig. 16, and while said lever is moving backward the take-up mechanism, with the assistance of the tension device, draws said loop of thread snugly around the shank of the button to complete the stitch and gives it the appearance represented at the rear button in Fig. 16 and other figures. The fabric is then moved back by the feeding mechanism of the machine sufficiently far to allow another button to be placed in proper position upon said fabric, and the operations of forming the stitch and the movements of my improved devices are again repeated, as above described.

Having thus fully shown and described the construction and operations of my improved button feeding and holding and loop removing and spreading mechanisms, what I claim as new, and desire to secure by Letters Patent, is—

1. In a button-sewing machine, the combination, with the work-table, a stationary button-trough, an open-eyed needle moving in a

path inclined to the plane of said table, and stitch-forming and tension mechanisms, of a button-pushing pawl having a reciprocating movement over the presser-foot, mechanism, substantially as described, for operating said pawl, a presser-foot having a button holding and guiding boss thereon co-operating with said pawl to guide the button in its movement from said trough, and a shank-groove therein coinciding with that in the button-trough, substantially as set forth.

2. In a button-sewing machine, the combination, with the work-table, a stationary button-trough, an open-eyed needle moving in a path inclined to the plane of said table, and stitch-forming and tension mechanisms, of a loop removing and spreading lever having independent reciprocating longitudinal, lateral, and vertical movements, and a free end to enter a loop of thread held by said needle and spread the same and remove it from said needle, substantially as set forth.

3. In a button-sewing machine, the work-table, a stationary button-trough, an open-eyed needle, moving in a path inclined to the plane of said table, and stitch-forming and tension mechanisms, combined with a presser-foot having a button holding and guiding boss thereon, a spring secured on said presser-foot, having a head with a face substantially in line with the side of said boss, a button-pushing pawl having a reciprocating movement over said presser-foot opposite said boss and spring-head, mechanism, substantially as described, for operating said pawl, a loop removing and spreading lever having reciprocating longitudinal, lateral, and vertical movements and a free end to enter a loop of thread held by said needle and spread the same and remove it from said needle, substantially as set forth.

4. In a button-sewing machine, the combination, with a presser-foot having a button holding and guiding boss thereon, substantially as described, and a button-shank groove therein at the foot of said boss, of a button-trough terminating at the edge of said foot, having a button-shank groove communicating with the groove in said foot, combined with a vibratory lever, substantially as described, a button-pushing pawl pivoted on an arm of said lever to swing in a horizontal plane opposite said boss and to reciprocally move by means of said lever toward and from the end of said trough, and a spring to swing said pawl toward said boss, substantially as set forth.

5. In a button-sewing machine, a presser-foot having a button holding and guiding boss thereon, and a button-shank groove at the base of said boss, combined with a button-trough communicating with said button-shank groove, a vibratory lever, substantially as described, having a vertical arm terminating near the end of said trough, a button-pushing pawl pivoted by one end to said lever to swing in a horizontal plane, having a but-

ton-socket in its inner side and an abutment thereon to move against the end of said trough, and a spring to swing said pawl toward said boss, substantially as set forth.

5 6. In a button-sewing machine, an open-eyed needle, substantially as described, combined with a loop removing and spreading lever having independent reciprocating longitudinal, lateral, and vertical movements and

a free end to enter a loop drawn up by said needle and spread the same and remove it from the needle, and mechanism, substantially as described, for operating said lever, substantially as set forth.

WALTER E. BENNETT.

Witnesses:

ROSEWELL THOMPSON,
WILLIAM W. PEASE.