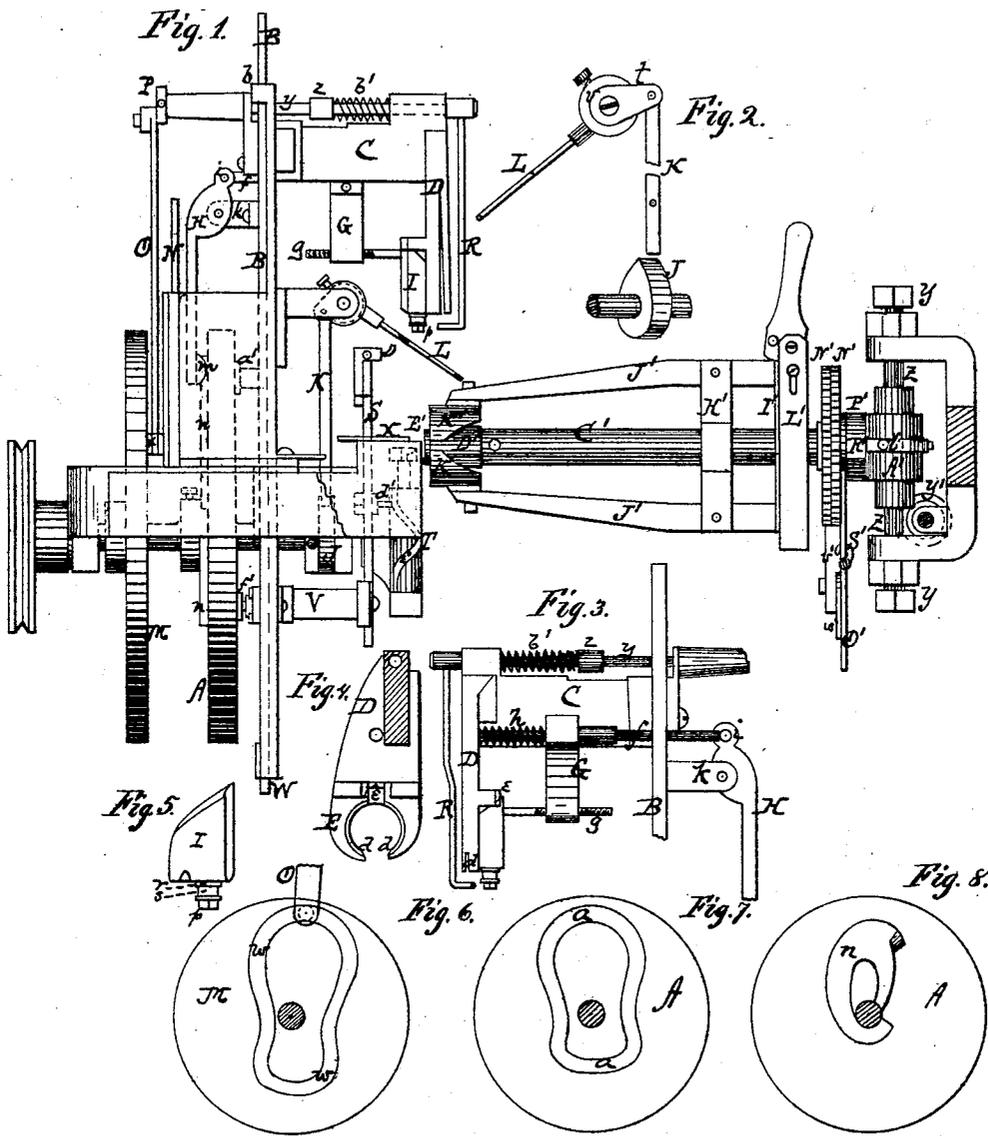


S. CLEMINSHAW.

Improvement in Button-Hole Sewing-Machines.

No. 128,363.

Patented June 25, 1872.



Witnesses:

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 C. L. Ewert.

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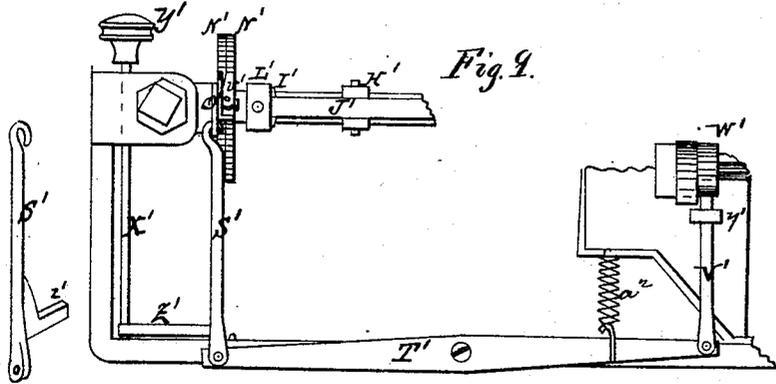


Fig. 9.

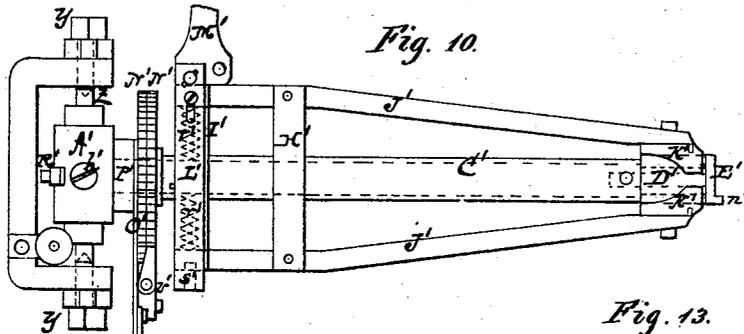


Fig. 10.

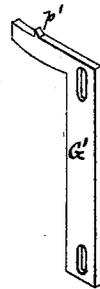


Fig. 14.

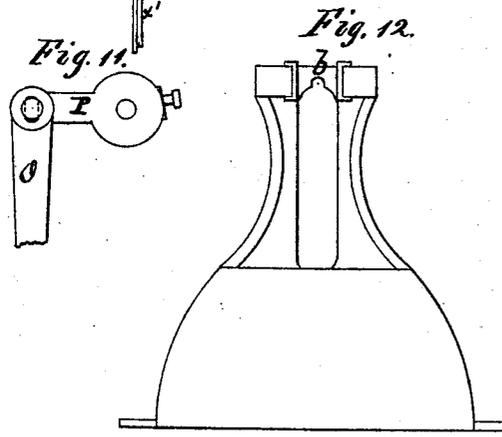


Fig. 11.

Fig. 12.

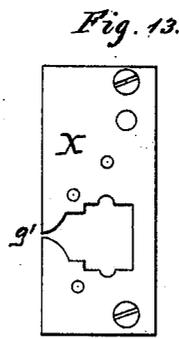


Fig. 13.

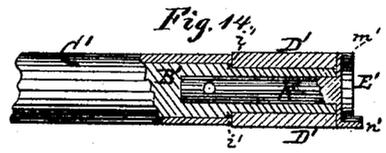


Fig. 14.

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# UNITED STATES PATENT OFFICE.

SHERMAN CLEMINSHAW, OF TROY, NEW YORK.

## IMPROVEMENT IN BUTTON-HOLE SEWING-MACHINES.

Specification forming part of Letters Patent No. 128,363, dated June 25, 1872; antedated June 15, 1872.

*To all whom it may concern:*

Be it known that I, SHERMAN CLEMINSHAW, of Troy, in the county of Rensselaer and in the State of New York, have invented certain new and useful Improvements in Button-Hole Sewing-Machines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of my invention consists in certain improvements upon the "button-hole sewing-machine" for which Letters Patent were granted to me January 3, 1871, and which machine uses one thread which passes from a shuttle having an eye-pointed needle, and carried and operated by the needle-bar, as will be hereinafter more fully set forth.

In order to enable those skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a rear elevation of my machine, and Figs. 2 to 14 are views of various detached parts of my machine, which will be fully described in this specification.

In this I do not deem it necessary to describe those parts to which I now lay no claim, as they have been fully described in my former patent, above referred to.

A represents a large cam-wheel, provided on one side with a groove, *a*, substantially of the formation shown in Fig. 7. In this groove works a stud, *a'*, upon the side of a vertical slide-bar, B, which moves in grooves *b b* made for that purpose in the frame-work of the machine. The upper one of these grooves, with a portion of the frame, is shown in Fig. 12. To the slide-bar B is attached a cross-bar, C, which extends through a vertical slot in that part of the frame in which the slide B moves. At the outer end of the cross-bar C is the shuttle-bar D, having at its lower end the shuttle-holder E, with its points *d d* and bearing-surface *e*. The shuttle rests against the bearing-surface and upon the points *d d*, and is held rigid while the needle passes through the cloth, but is loose while the needle is above

the cloth, the needle being attached to the shuttle in the same manner as in my former patent.

It will be seen that by the arrangement of the vertical sliding bar B, cross-bar C, and shuttle-bar D with the shuttle-holder E the needle and shuttle are carried up and down without the intervention of jointed levers or other devices that would require the use of oil, and also makes the connection between the needle-bar and cam direct.

Through the shuttle-bar D and slide-bar B passes a rod, *f*, upon which is a thumb-piece, G, with a rod, *g*, passing through its lower end parallel with the rod *f*. Surrounding the rod *f*, between the thumb-piece G and the shuttle-bar D, is a spiral spring, *h*, as shown in Fig. 3. The rear end of the rod *f* bears against a pin, *i*, in the upper end of a lever, H, which is pivoted to a projection, *k*, on the rear side of the slide-bar B. Upon the lower end of the lever H is a button, roller, or other suitable device, *m*, which bears against a raised cam-surface, *n*, on the opposite side of the wheel A, of substantially the construction shown in Fig. 8. This cam-surface presses back the button and lever against the rod *f*, causing the steady-rod *g* to make the shuttle and needle rigid while passing through the cloth, and relieves it again just before the loop is ready to pass over the shuttle. The thumb-piece G and spring *h* are to allow the shuttle and needle to be taken out and replaced by lifting it up or drawing it toward the operator, the said thumb-piece being so arranged as to turn on the rod *f*, but not move endwise on the same. In the lower end of the shuttle I is a tension-stud, *p*, with steel washer *r* and rubber ring *s*, as shown in Figs. 1 and 5. The thread is passed between the lower surface of the shuttle and the steel washer *r*, and by means of the stud *p* the tension of the thread is readily regulated. On the same shaft which has the wheel A is a cam, J, which operates a bar, K, the upper end of which is pivoted to an arm, *t*, on a collar, *v*, placed on a short shaft in a bearing attached to the frame. To the same collar is attached the beater-bar L. The cam J, pushing up the bar K, throws down the beater-bar L in the right time, and beats or lays the looped

stitch over the edge of the goods. M is a wheel placed on the main shaft, and provided with a cam-groove, *w*, of the peculiar formation shown in Fig. 6, or substantially the same. In this groove works a stud, *x*, on the side of a sliding bar, N, and on the same stud, between the bar and wheel, is placed a pitman, O, the upper end of which is slotted and placed on a crank, P, attached to a rod, *y*. This rod passes through the vertical sliding bar B and the upper end of the shuttle-bar D, and has at its front end the vertical take-up bar R. This rod or bar *y* is placed horizontally, as shown in Figs. 1 and 3, and made to rock by the motion of the crank and pitman. Upon the rocking-bar *y* is an adjustable collar, *z*, between which and the shuttle-bar is a spring, *b'*, surrounding the rocking-bar. The parts here described operate to take up the slack thread and hold onto it until the proper time to let it go, the spring *b'* and collar *z* regulating the degree of tension with which the beater-bar L lays the stitch over the edge of the goods, for it will be noticed that the take-up bar R will yield slightly by means of the pin in the crank P working in the slotted hole in the upper end of the pitman O, as shown in Fig. 11. S represents the lifting-bar, which moves the twister T by means of its pin *d'* working in the spiral groove *e'* on said twister, the lifting-bar lifting up the loop from the hook of the twister. The lifting-bar S is by a bar, V, connected with a vertical sliding bar, W, which moves in the frame, and has a stud, *f'*, working in the groove *a* of the cam-wheel A.

It may here be remarked that all the studs mentioned as working in grooves are provided with friction-rollers.

X represents a plate, through which the lifting-bar S moves up and down and under the front edge of which the twister T operates. From the hole in this plate in which the lifting-bar moves to the front edge immediately over the twister is a slot, *g'*, which guides the loop and contracts it while being drawn up, and also prevents the thread from falling off the forks of the lifting-bar until the forks have raised high enough to keep the thread from falling off. At the end of the machine-frame are two center-pointed screws, *y y*, between which is placed a short vertical shaft or bar, Z. On this shaft is placed a sleeve or collar, A', which is adjusted and held at any desired height on the swinging bar Z by means of a screw, *h'*, shown in Fig. 10. From this collar A' extends a horizontal arm, B', Fig. 14, which is tubular for a certain distance at its outer end, and has a shoulder, *i'*, formed around its outer circumference, as shown in Fig. 15. Over the arm B' is placed a hollow sleeve, C', extending from close to the collar A' to and flush with the shoulder *i'* on the arm. On the outer end of the arm is placed a short tube, D', coming at its inner end close to the shoulder

*i'* and outer end of the sleeve, and its outer end is flush with the outer end of the arm. In the tubular end of the arm B' is inserted a rod or pin, *k'*, upon the outer end of which is formed the needle-hole tip E'. This tip consists of a steel disk with a flange around its edge extending outward from the outer face of the disk. In the upper side of the tip is a hole and slot, *m'*, for the needle to pass through, while on the under side the flange forms a lip, *n'*, with a notch or groove on its under side, which is to catch on the steady-point *p'* formed on the plate G', as shown in Fig. 14. This plate, with point, is made adjustable up and down for a purpose that will be hereinafter described. At suitable points on the sleeve C' are two arms, H' and I', both extending on both sides of the sleeve, as shown in Figs. 1 and 10. The ends of both of these arms are slotted, and in each end of the arm H' is pivoted a lever, J', the inner or rear end of which is placed in the end of the arm I', while on the outer end is attached a clutch or jaw, K'. The jaws K' are each held by a pin and screw, or other suitable means, and their under sides are at the outer edge toothed or corrugated to hold the cloth to the tube D', the outer edges of the jaws being at or nearly at the outer end of said tube. Under the inner end of each lever J', in a hole or recess made in the arm I', is placed a spring, *v'*, which springs throw the outer ends of the levers inward, so that the jaws will grasp the cloth or other material with sufficient firmness. Around one end of the arm I' is placed a stirrup, L, with an inward-projecting pin, *s'*, fitting in a recess made in the inner end of the lever on that side. The sides of the stirrup are held to the sides of the arm I' by means of screws passing through slots in the stirrup, thus allowing the same to slide up and down. Between the ends of the stirrup L', at the opposite end of the arm I', is pivoted an eccentric dog or lever, M', which bears against the inner end of the other lever J'. By the use of the eccentric dog or lever the outer ends of the levers J' J' may be turned outward from the tube D'. Upon the inner end of the sleeve C' are attached two ratchet-wheels, N' N', side by side, and on the inner side thereof is first placed loosely a plate or bar, O', and then firmly attached a small wheel, P'. Upon this wheel P' operates a brake, R', attached to the collar A', and the tension of the same regulated by means of the screw *t'*, shown in Fig. 1. To the side of the plate or bar O' is pivoted a pawl, *v'*, pressed by a spring, *w'*, against the ratchet-wheel N'. This pawl is made in two parts—one part pivoted to the plate and the other pivoted to the first—so that it can be turned to engage with either one of the ratchet-wheels. To the plate O' is also pivoted a stop-bar, *x'*, which may be turned so as to throw the pawl away from the ratchet-wheels. The plate O' is, by a rod, S', connect-

ed with one end of a lever, *T'*, which is pivoted to the rear part of the frame, as shown in Fig. 9. The other end of this lever is pivoted to a rod, *V'*, which moves in a guide, *y'*, and is operated upon by a cam, *W'*, on the main shaft. This cam drives or pushes out the rod *V'* at the proper time, moving the lever and connecting-rod so as to cause the pawl on the ratchet-wheel to produce a rotary motion to the cloth-holder. In the extreme left end of the frame is a cross-shaft or rod, *X'*, with a knob or handle, *Y'*, on its outer end and an arm, *Z'*, on its inner end. This shaft may be turned so as to cause the arm *Z'* to drop down between the rear part of the frame and an upright arm, *z'*, on the connecting-rod *S'*, for a purpose that will be hereinafter described. A spring, *a<sup>2</sup>*, is attached to the lever *T'* to bring it back in place after the cam *W'* has passed the rod *V'*. The button-hole is placed on the tip-end *E'* of the cloth-holder, the edges being even with the edge of the tip. The two levers *J' J'* are then let down by the eccentric lever or dog *M'*, the clutches or jaws *K' K'* gripping the goods tight and preventing the cloth or other material from being pulled out while the button-hole is being worked. The whole cloth-holder is then swung in under the needle until the clutch or notch on the under side of the lip *n'* drops onto the steady-point *p'*, and remains firmly in its place while the needle is passing through the cloth or other material. The movement of the connecting-rod *S'* rotates the cloth-holder two notches in the ratchet-wheel at each revolution of the machine, thus producing the stitch. The pawl *v'* can be turned so as to work on either wheel—one wheel containing a greater and the other a less number of teeth—thus allowing the length of the stitch to be varied. The tip *E'* is to be removed and a larger or smaller tip put on for different-sized holes, the loose tube *D'* being at the same time removed and replaced by another corresponding to the size of the tip. Upon changing the tip the whole rotating holder is raised or lowered, as the case may be, upon the swinging shaft or bar *Z'*, and the steady-point *p'* is adjusted so as to work into the notch on the under side of the tip *E'*. The jaws *K' K'* are also to be taken off and replaced by others corresponding to the size of the tip every time the tip is changed. The stop-bar *x'* is to throw off the pawl to allow the cloth-holder to be moved backward. The rod *X'* is turned so as to cause the arm *Z'* to fall behind the arm *z'* on the rod *S'* for the purpose of reducing the length of the stitch to one-half while passing the corners of the button-hole, thus making a more compact bar. The brake *B'* and wheel *P'* are to steady the revolving cloth-holder at each stroke of the pawl on the ratchet-wheels.

The work being placed on the cloth-holder in the manner above described and the cloth-holder locked in position, the machine is ready for work. As the needle descends it becomes

rigid by the action of the lever *H*, as above described, just as it is to penetrate the goods. After the needle has passed through the goods the necessary length it rises a short distance so as to allow the thread to form the loop below the cloth. The loop thus formed by the thread is caught by a small hook on the upper end of the twister *T*, which, when the twister turns, as it does immediately after said hook has caught the thread, deposits the thread or lets the thread fall into a horizontal circumferential groove on said twister. On the upper end of the lifting-bar *S* is a plate with two wire hooks or carriers. As this bar descends and turns the twister, and as the thread is deposited in the circumferential groove mentioned, the hooks or carriers pass down in vertical grooves on the outside of the twister until they are below the thread, when they at once rise again, catching the thread and lifting it up above the twister. As soon as the thread has been cleared from the twister the twister resumes its original position, the carriers rising with the thread, and as soon as the twister has been brought back to its first position the needle descends to its lowest point, the carriers continuing to rise until they are above the rear end of the shuttle. The shuttle and needle having, immediately after the needle penetrates the goods, become loose, the thread is, during the upward movement of the carriers and downward movement of the needle, just described, brought as a loop over the upper side of the shuttle. As the needle now ascends the take-up bar *R* and beater-bar *L* operate to lay and tighten the stitch. As the loop is carried upward by the hooks, forks, or carriers on the lifting-bar *S* it is guided by the slot *g'* in the plate *X* and prevented from falling off the carriers.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the cam *A a*, vertical sliding bar *B*, cross-bar *C*, and shuttle-bar *D*, having shuttle-holder *E*, with its points *d d* and bearing-surface *e*, all substantially as and for the purposes herein set forth.

2. The combination of the cam *A n*, button *m* or its equivalent, lever *H* with pin *i*, sliding rod *f*, thumb-piece *G*, spring *h*, and steady-rod *g*, all substantially as and for the purposes herein set forth.

3. The tension-stud *p*, steel washer *r*, and rubber ring *s*, arranged, as described, on the under side of the shuttle *I*, substantially as and for the purposes herein set forth.

4. The combination of the cam *J*, bar *K*, collar *v*, with arm *t* and the beater-bar *L*, all substantially as and for the purposes herein set forth.

5. The combination of the cam *M w*, vertical sliding bar *N*, pitman *O* with slotted hole in its upper end, the crank *P*, horizontal rock-bar *y*, collar *z*, spring *b'*, and vertical take-up bar

R, all substantially as and for the purposes herein set forth.

6. The combination of the lifting-bar S, connecting-bar V, vertical sliding bar W, and cam A *a*, all substantially as and for the purposes herein set forth.

7. The shaft X' with arm Z', used in combination with the arm *z'* on the rod S', substantially as and for the purposes herein set forth.

8. A horizontally-rotating shaft-like cloth-holder capable of being swung out and in, in the manner described, to remove and put on the cloth, substantially as herein set forth.

9. The collar A', provided with the horizontal arm B' having shoulder *i'*, and adjusted up and down on the vertical shaft Z, which swings or turns on the center-pointed screws Y Y, substantially as and for the purposes herein set forth.

10. The tip E', consisting of a flanged metallic disk having needle-hole *m'* and notched or grooved lip *n'*, and provided with the rod *k'*, to be inserted in the tubular end of the arm B', substantially as and for the purposes herein set forth.

11. The sleeve C', provided with arms H' and I' and the tube D', both placed upon the swinging arm B', substantially as and for the purposes herein set forth.

12. The levers J' J' pivoted in the ends of the arm H', and provided at their outer ends with the clutches or jaws K' K', substantially as and for the purposes herein set forth.

13. The combination of the stirrup L' with pin *s'*, the springs *r' r'*, and the eccentric lever M, all constructed and arranged as described, to operate the levers J' J' for the purposes herein set forth.

14. The combination of the wheel P' and brake R', when constructed and arranged upon a swinging and revolving cloth-holder, substantially as and for the purposes herein set forth.

15. The pawl *v*, made in two parts so as to be adjusted to either of the ratchet-wheels N' N', substantially as and for the purposes herein set forth.

16. The combination of the ratchet-wheels N' N' having unequal number of teeth, the adjustable pawl *v'*, spring *w'*, and stop-bar *x'*, all constructed and arranged substantially as and for the purposes herein set forth.

17. The adjustable plate G', provided with the steady-point *p'* and working in the notch of the lip E', substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 25th day of October, 1871.

SHERMAN CLEMINSHAW.

Witnesses:

C. L. EVERT,  
A. N. MARR.