

# Saml J. Beard-Button Holing Attachment for Sewing Machines.

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PATENTED JUL 25 1871

Fig. 1

Fig. 3.

Fig. 6.

Fig. 8.

Fig. 4.

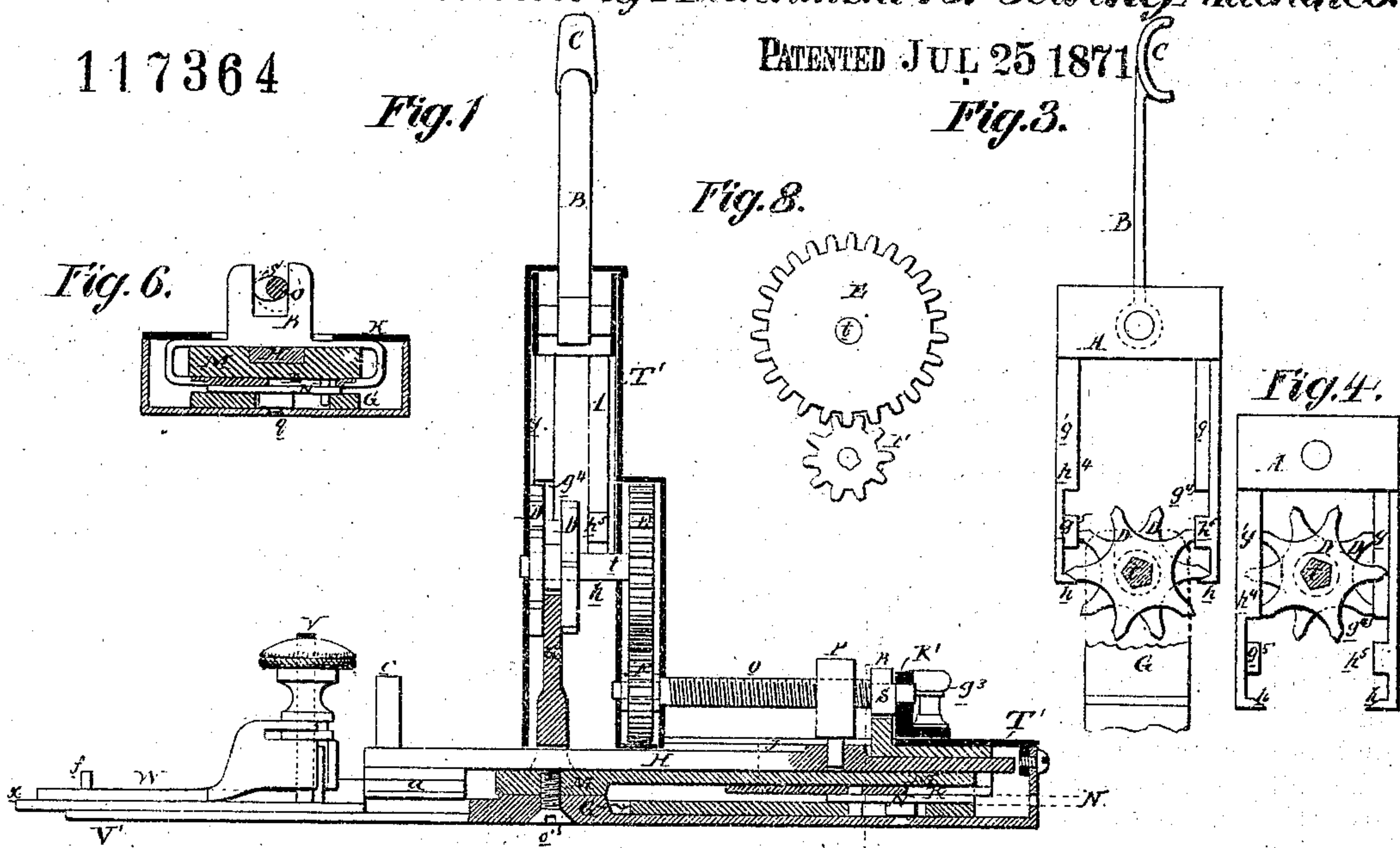


Fig. 2.

Fig. 7.

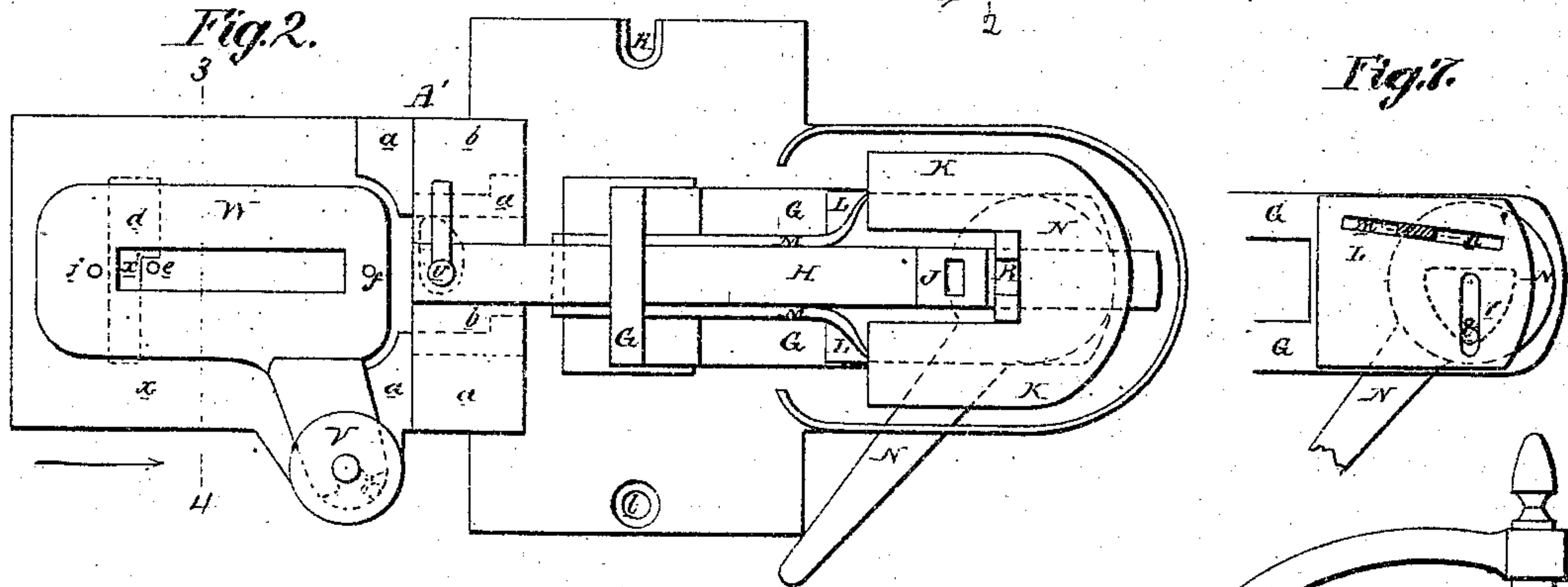
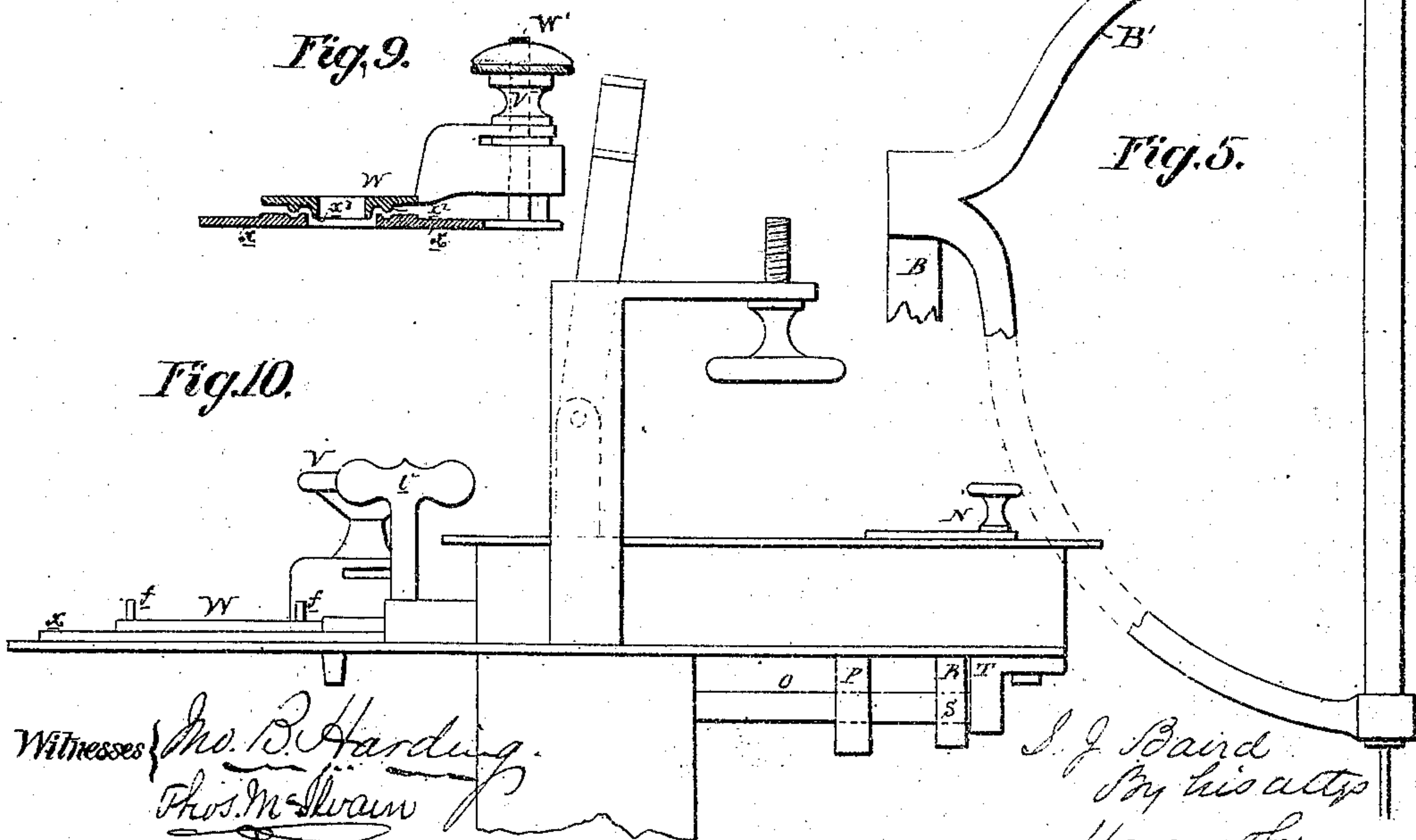


Fig. 9.

Fig. 5.



Witnesses { *Mo. B. Harding*  
*Phos. M. Swan*

*S. J. Beard*  
*By his attys*  
*Hanson & Co.*



# UNITED STATES PATENT OFFICE.

SAMUEL J. BAIRD, OF WAYNESBOROUGH, VIRGINIA.

## IMPROVEMENT IN BUTTON-HOLING ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. 117,364, dated July 25, 1871.

*To all whom it may concern:*

Be it known that I, SAMUEL J. BAIRD, of Waynesborough, in the county of Augusta and State of Virginia, have invented certain Improvements in my Button-Holing Attachment for Sewing-Machines patented December 14, 1869, of which the following is a specification:

My invention relates to improvements in a device heretofore patented by me for attachment to the work-plate of a sewing-machine to convert the latter into a machine for overseaming or working button-holes; and my improvements, which are too fully described hereafter to need particular explanation here, have been designed with the view of rendering the machine less expensive, more reliable, easily manipulated by unskilled persons, and more efficient.

Figure 1 is a sectional elevation of my improved attachment for sewing-machines; Fig. 2, a plan view of part of the machine; Figs. 3, 4, 7, and 8, detached views; Figs. 5 and 10, views, showing modifications; Fig. 6, a transverse section on the line 1 2, Fig. 1, looking in the direction of the arrow; and Fig. 9, section on the line 3 4, Fig. 2, looking in the direction of the arrow.

The attachment consists essentially of a frame or casing adapted for attachment to the work-plate of a sewing-machine, a carrier to which the fabric may be secured, and devices for imparting to the carrier (from some moving portion of the sewing-machine) the movements necessary to carry the entire edge of a button-hole in the fabric past or beneath the needle. In its general features this attachment is similar to that patented by me on the 14th day of December, 1869; but I have altered and improved the details to render the whole more efficient, as will appear from the following description:

The case T' is L-shaped, and its base is extended to form a projecting plate, V' in which is an opening,  $x^1$ , Fig. 2, for the passage of the feed-points, and a hole,  $e$ , for the passage of the needle of a sewing-machine, to the work-plate of which, in the present instance, the attachment is secured by screws passing through slots  $k$   $l$  in flanges projecting from the sides of the case. The carrier consists of a clamp, A', a sliding bar, H, to which the clamp is attached, a lever, M, in a groove of which the bar H slides, and which vibrates on a pin,  $o'$ , extending through the bottom of the case, and a box or sleeve, K, which

incloses the rear end of the lever M and vibrates horizontally in the horizontal portion of the case T'. The clamp A' consists of a lower slotted plate,  $x$ , and an upper slotted plate, W, having ribs  $x^2$ , adapted to the grooves or recesses in the plate  $x$ , and parallel flanges  $x^3$ , which extend into the slot in the lower plate so as to press the fabric (clamped between said plates) down upon the work-plate of the machine. Through a projection of the plate W passes a square standard, W', on the lower plate, and on the threaded upper end of this standard turns a nut,  $v$ , into an annular recess in which extend lugs on the projecting portion of the plate W, so that, as the nut is raised or lowered, the plate W will be carried with it, the said plate W being maintained always in a position parallel to the lower plate, so that the fabric will be firmly clamped at every part instead of at one side only, as is the case when the upper plate does not move parallel to the lower. The plate W has hooked projections  $a$   $a$ , adapted to L-shaped recesses in the enlarged end of the bar H; and to the latter is hung a cam-lever,  $u$ , by which the clamp may be secured in its position when adjusted, as shown in Fig. 2, or may be released when desired. On the face of the plate W, near each end of the slot, are pins  $f$   $f$ , for a purpose described hereafter.

It is necessary to impart to the carrier two movements, and for it to be capable of one adjustment.

The first or reciprocating movement is that by which the fabric is carried first beneath the needle, so that the latter will penetrate it near the edge, and then laterally, so that the needle will descend opposite the said edge. This movement of the carrier is derived from the screw-shaft  $o$ , which has its rear bearing in an adjustable block, R', hung to the horizontal portion of the case T', and secured in its position by a set-screw,  $g^3$ , and its front bearing in the vertical portion of said case, within which are devices (described hereafter) for imparting to the shaft an intermittent rotary motion. Near the rear end of the shaft is a cam-projection,  $s$ , which, as it strikes first one side and then the other of a forked projection, R, on the box K, imparts to the latter a lateral reciprocating movement, causing the lever M to vibrate on its pin  $o'$  and the fabric to move first beneath and then to one side of the path of the needle, as before described. After one edge of



the button-hole has been bound it is necessary to move the carrier laterally so as to bring the opposite edge within the path of the needle. This is accomplished by adjusting the lever M to one side or the other of the box K, which adjustment may be effected in various ways. In the present instance a pin, *n*, projects from the lever M into a diagonal slot, *m*, in a plate, L, (sliding in or forming a part of the lower side of the box K,) so that, as the said plate is moved longitudinally, the lever M will be adjusted to one or other side of the box. The sliding movement of the plate L is effected by means of a cam-lever, N, a pin, *q*, of which projects into a slot, *r*, of such a form that the lateral play of the lever is not interfered with.

The second or longitudinal movement of the fabric is effected by imparting to the bar H a sliding motion on the lever M, the said bar being carried forward or backward with nut P, fitted to and operated by the screw-shaft *o*, and extending into a recess in the bar H. The slot into which the nut P projects is of such a shape as to permit the free lateral vibration of the bar H without allowing the latter any longitudinal movement independent of the nut.

The devices for imparting the desired movements to the screw-cam and shaft *o* are contained within the vertical portion of the case T', and are as follows: A shaft, *t*, extending across the case, has at one end a toothed wheel, E, which engages with a pinion, F, on the inner end of the screw-shaft *o*. A double-toothed wheel, D, turns with but slides on the shaft *t*, and is operated by teeth on a slide, A, the latter being provided with an arm or pitman, B, by which it may be connected to the needle-arm, or to a lever operated from some moving part of a sewing-machine, a reciprocating vertical motion in the case being thus imparted to the slide. Each section of the double wheel has an odd number (five in the present instance) of arms or teeth, and the two sections, which are connected by a hub, are arranged so that the teeth of one section shall be opposite the spaces between the teeth of the other. On arms *g g'*, extending from or forming part of the slide A, are teeth *g<sup>4</sup> g<sup>5</sup> h<sup>4</sup> h<sup>5</sup>*, and when the wheel D is adjacent to the front side of the case T' the tooth *g<sup>5</sup>*, (on the upward movement of the slide,) striking the under side of one of the arms of the adjacent (front) section, will turn the wheel until another arm of the same section is in nearly a horizontal position, so as to be struck by the tooth *g<sup>4</sup>* when the slide descends, thus carrying the wheel further round in the same direction, the constant reciprocating movement of the slide imparting thus to the wheel (and to the shaft *o*) an intermittent rotary motion. When one side of a button-hole has been bound and the opposite side has been brought in the path of the needle, the fabric must be moved in a horizontal direction, the opposite to which it has been carried by the action of the screw-shaft *o*, the rotary motion of which must, therefore, be reversed. To do this the wheel D is slid on the shaft *t* to the opposite side of the case, when the teeth of its rear section will be brought into action with the

teeth *h<sup>4</sup> h<sup>5</sup>* on the slide, which will operate in the same manner as the other teeth, but will turn the wheel and its shaft (and, therefore, the shaft *o*) in the opposite direction. The wheel D is moved on the shaft *t* by an L-shaped slide, G, the vertical portion of which extends between the two sections of the wheel and embraces the hub, while the horizontal portion rests on the base of the case and is slotted to receive a pin on the lever N, by which it is adjusted, so that when the said lever is moved (after one edge of a button-hole is bound) to carry the opposite edge beneath the needle it will also reverse the longitudinal movement of the carrier. By employing a wheel, D, having an odd number of teeth, the teeth to be operated on after each movement of the wheel will occupy nearly a horizontal position, so as to be more readily operated by the teeth of the slide than when left at an angle, which results when a wheel having an even number of teeth, as shown in my aforesaid patent, is used. At the lower ends of the arms *g g'* are bars *h h'*, so arranged that when the parts are in the position shown in Fig. 3, prior to the wheel D being moved on the shaft *t*, the bars, by bearing on the teeth of the wheel, will so adjust the latter that, on being transferred to the opposite side of the slide, it will not strike the sides of the operating-teeth, but will be brought in its proper position adjacent to the latter. The bars *h*, adjusting the wheel at each stroke of the needle-arm, will also insure a complete movement of the wheel, which is important in view of the fact that any variation in the movement of the wheel D would result in a variation in the length of the stitches. The distance between the stitches depends upon the pitch of the screw *o*, and may be altered by replacing one screw and its nut by another of a different pitch. This is readily effected by loosening the screw *g<sup>3</sup>* and turning back the rear bearing-plate R', when the shaft and its nut may be withdrawn, the pinion F, which is provided with an angular or flattened socket, being retained in the case. It will be seen that various ways for adjusting the block R' may be employed.

Before beginning to bind the button-hole the loose ends of the threads from the needle and shuttle are passed first round one pin, *f*, Fig. 2, and then round the other, and twisted so as to remain in this position, one thread parallel to each edge of the button-hole, so as to be covered, and bound to the said edge by the binding-stitches, the binding being thereby strengthened. By altering the position of the fulcrum-pin *o'* the throw of the lever M and length of the stitch may be altered at pleasure. This pin may be arranged to slide, or may be adapted to a series of holes in the lever and base-plate. Instead of connecting the slide A to the operating-arm by a pitman, it may be connected by a forked arm, B', Fig. 5, to the needle-bar of the machine; or it may, as before described, be connected to a lever or slide operated by any moving part of the machine.

In some classes of machines—such, for instance, as the Wheeler & Wilson machine—there is so little space between the needle-arm and work-



plate that it is best to arrange the vertical part of the case T' below instead of above the work-plate, as shown in Fig. 10.

The button-hole may be worked before cutting; but, should it be desirable, the clamp may be detached and the button-hole cut before working.

I claim—

1. The combination of the shaft *o* and the wheel D geared with said shaft, and consisting of two sections, each having an odd number of teeth and arranged with its teeth opposite the spaces between the teeth of the opposite section, the whole being operated from a toothed slide, A, substantially as specified.

2. The shaft *o*, provided with a nut, P, and adapted to bearings so as to be detachable therefrom, for the purpose set forth.

3. The clamp adapted for attachment to the fabric, in combination with the sliding and vibrating bar H, and with the cam or its equivalent, for securing the clamp to the said bar, as specified, and secured to the operating-slide and lever so as to be detachable, substantially as and for the purpose described.

4. The combination, with the plate W, of the pins *f f*, arranged as and for the purpose described.

5. The combination, with the shaft *o*, its cam *s*, and the lever M, of the box K operated by

the cam, and in which the lever is adjustable, as described.

6. The combination of the shaft *o*, nut P, and sliding bar H, carried by but vibrating independently of the nut, as described.

7. The combination, with the vibrating carrier, of a fulcrum-pin, *o'*, adjustable as described.

8. The arrangement described of the case T', containing the within-described devices, with its vertical portion below the horizontal portion, for the purpose set forth, and as illustrated in Fig. 10.

9. The combination, with the box K and lever M, of the plate L, its diagonal slot receiving a pin on the lever, and the lever N, or its equivalent, for operating the plate, as specified.

10. The combination of the lever M, adjustable laterally, the slide G, or its equivalent, adjusting the wheel D, and the lever N, connected to the lever M and slide G so as to adjust them simultaneously, substantially as set forth.

11. The combination of the lower and upper plates of the clamp and devices described, or their equivalents, for raising and depressing the upper plate while maintaining it parallel to the lower, as set forth.

SAMUEL J. BAIRD.

Witnesses:

F. H. ANTRIM,  
CHARLES BROOKS.