

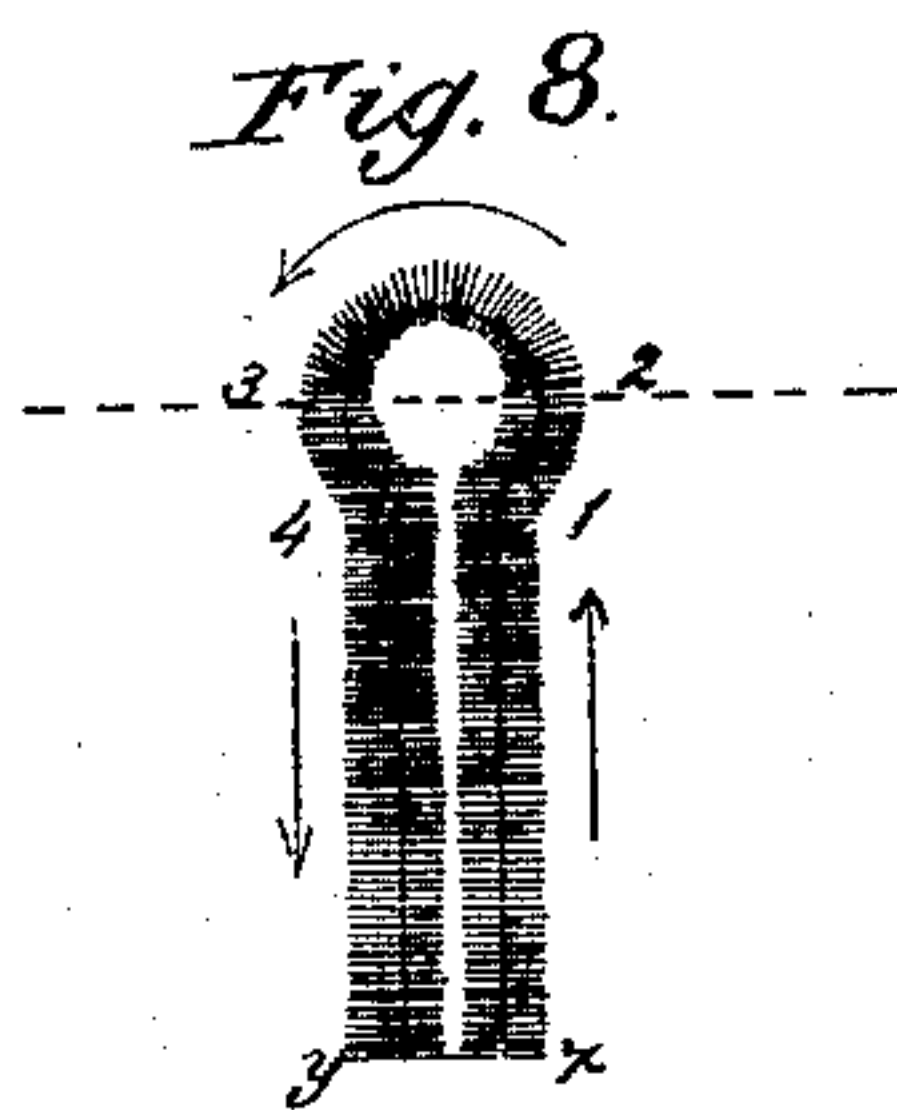
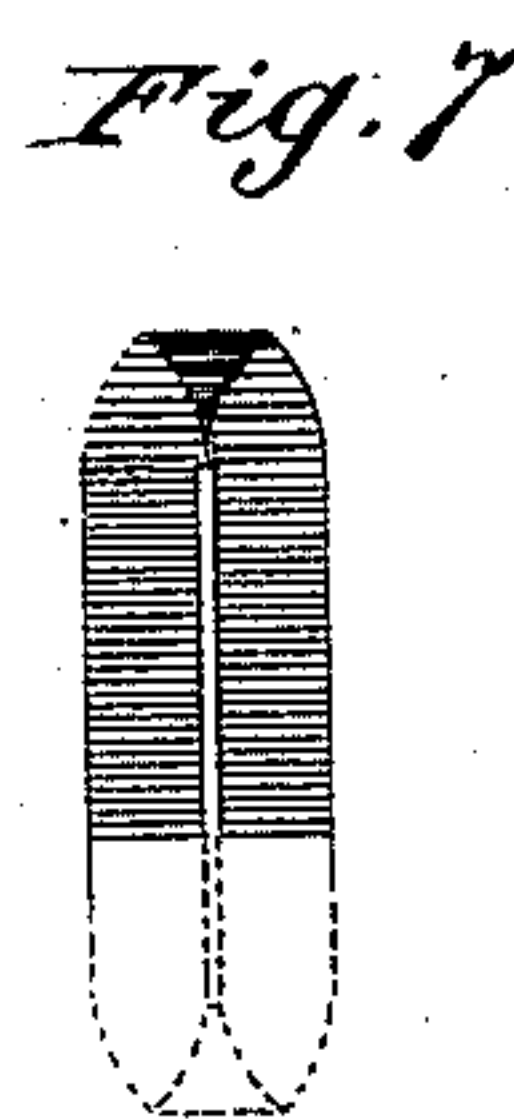
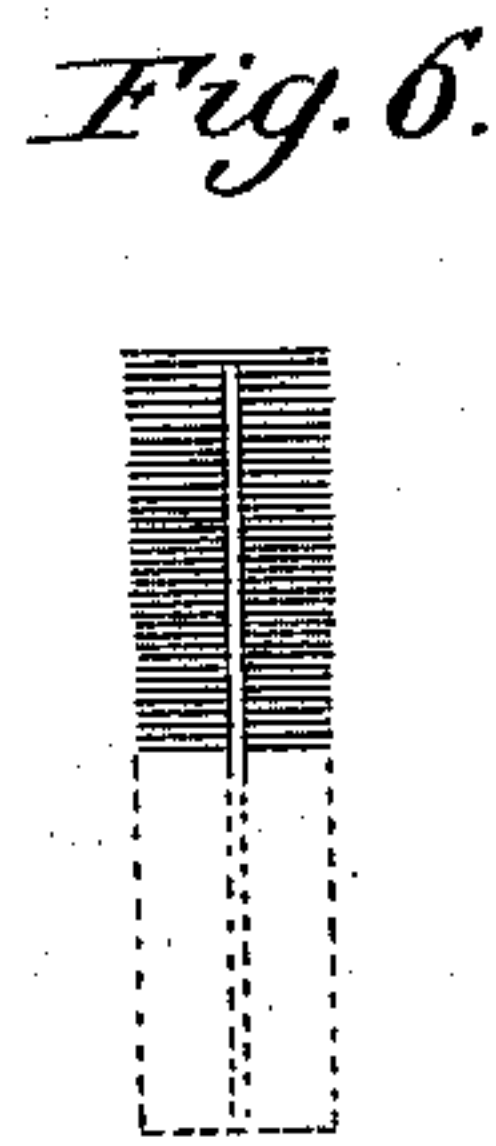
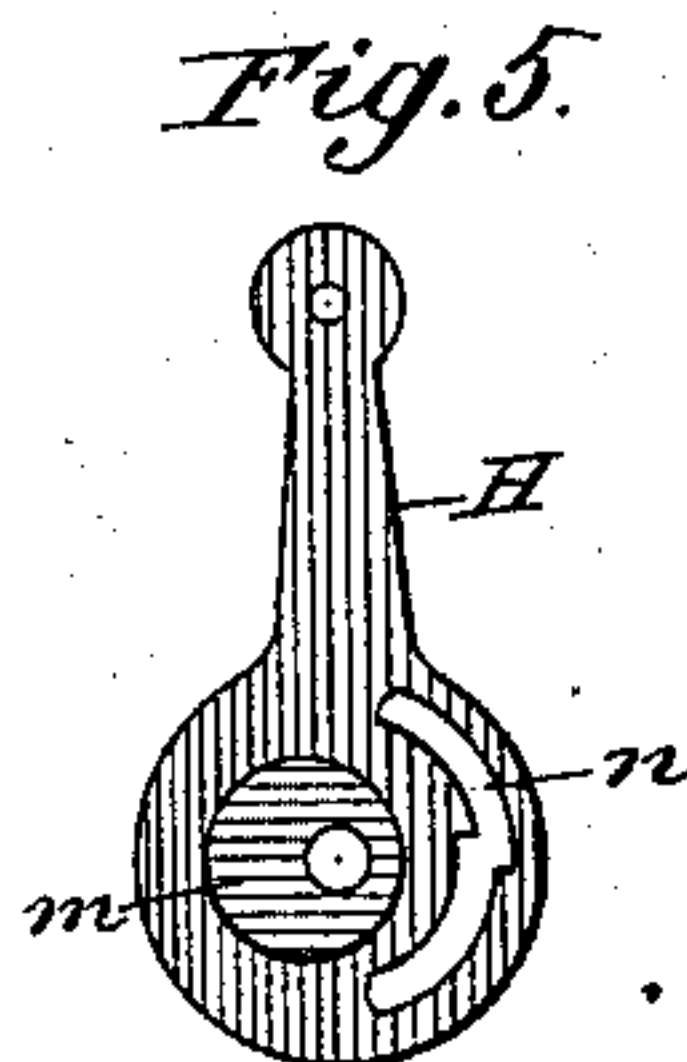
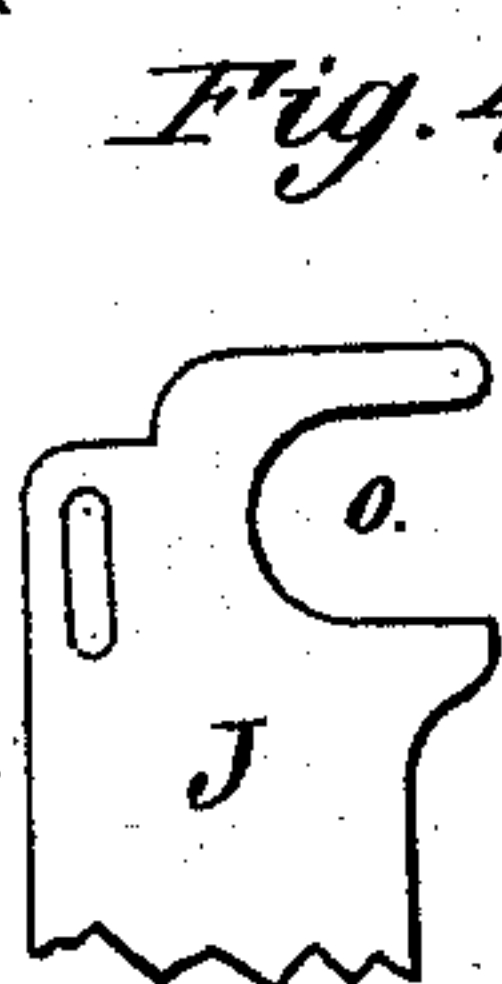
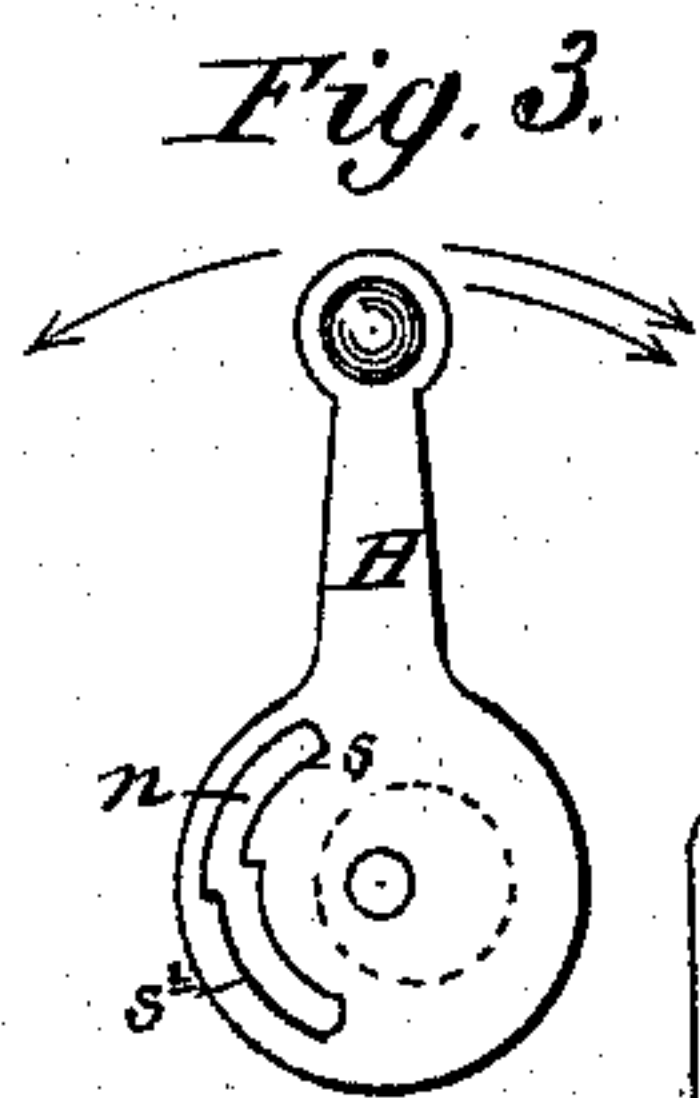
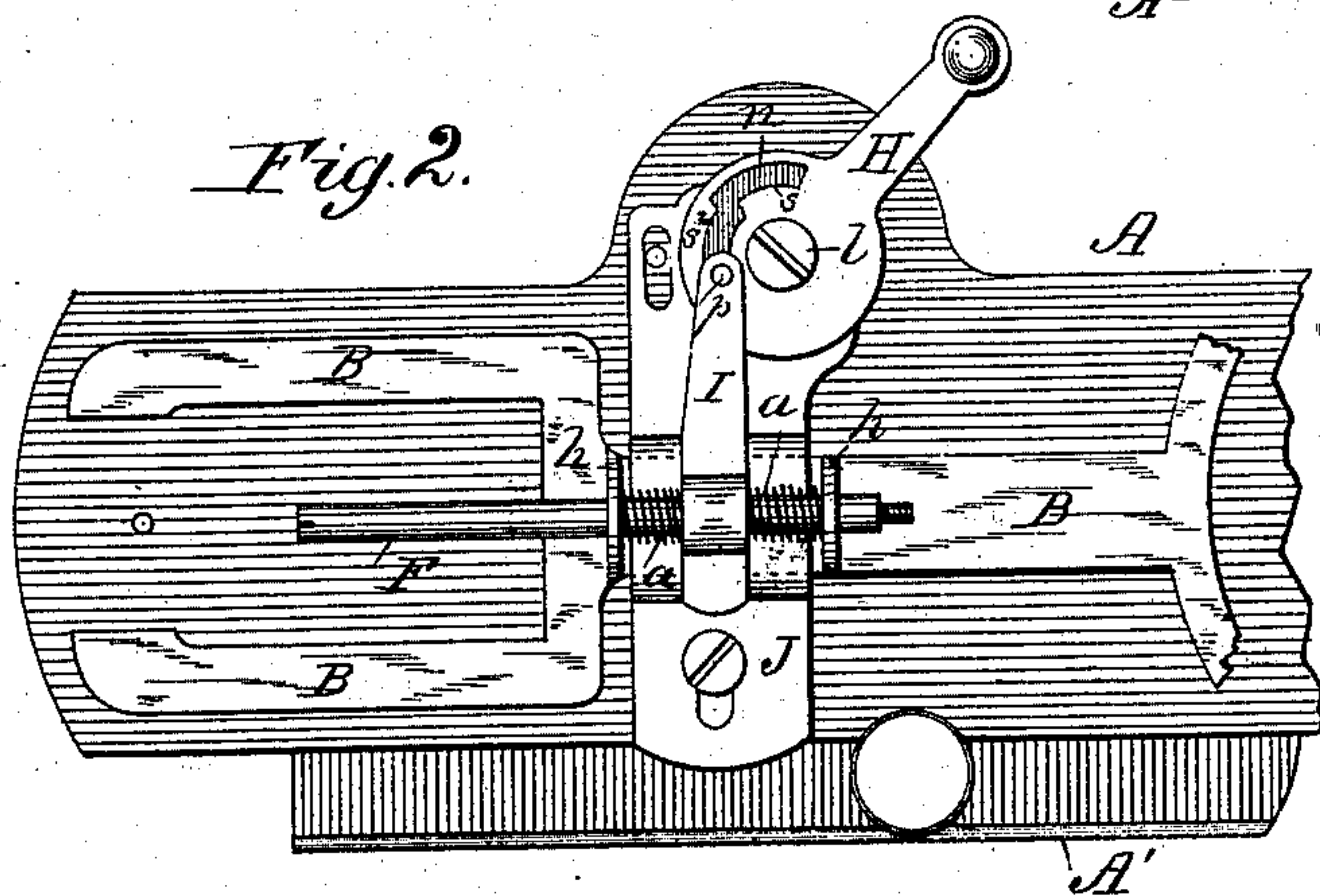
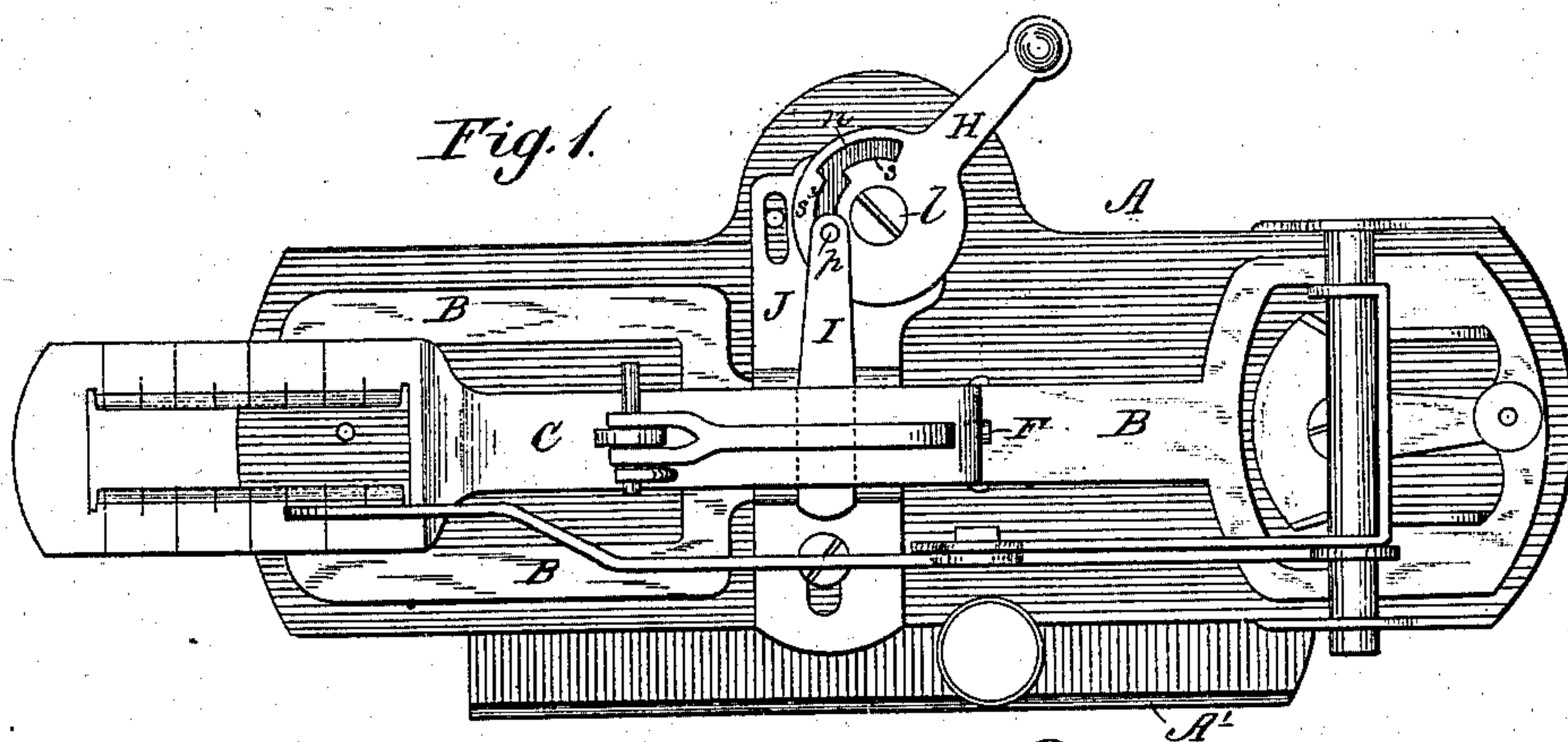
(Model.)

J. K. HARRIS.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 255,622.

Patented Mar. 28, 1882.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN K. HARRIS, OF SPRINGFIELD, OHIO.

## BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 255,622, dated March 28, 1882.

Application filed October 21, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, JOHN K. HARRIS, of Springfield, in the county of Clarke and State of Ohio, have invented a new and Improved Button-Hole Attachment for Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is plan view of the entire button-hole attachment embodying my improvements. Fig. 2 is a plan view with the cloth-clamp removed and the devices for oscillating the cloth-clamp broken away. Fig. 3 is a top view of the ship-over lever. Fig. 4 is a top view of the end of the ship-over slide, which is acted upon by the ship-over lever. Fig. 5 is an underneath view of the ship-over lever. Fig. 6 is a form of button-hole heretofore worked by button-hole attachments. Fig. 7 is the form of button-hole made by my improved attachment, and Fig. 8 is a view illustrating the method of working an eyelet button-hole.

My invention relates to certain improvements upon the button-hole attachment for sewing-machines which were patented by me September 6, 1881, No. 246,764. The general method of working a button-hole by the means therein described is to make a series of short stitches in the cloth, upon one side of a center line, and then, after shifting the cloth laterally at the end of this line, to reverse the feed and make another series of stitches on the other side of the center line, which center line is then cut open to form the button-hole. In this method of working a button-hole the ends are not stayed or tied as substantially as hand-worked button-holes, and hence they are more or less liable to tear larger.

My present invention consists in such construction of devices as will, when combined with the devices described in said patent, completely tie and stay the ends of the button-hole, and even allow a circular opening or eyelet to be worked therein.

I will first describe so much of the devices covered by said patent as is necessary to a full understanding of my present invention, and

then describe more minutely the construction and operation of my said improvements.

In the drawings, A represents the base-plate, having a portion, A', adapted to fit in the grooves for the shuttle-race slide. About the middle of this base-plate, and in transverse position thereto, is the ship-over slide J, to which is pivoted, so as to oscillate horizontally, the guide-plate B, which carries the cloth-clamp C. This cloth-clamp is mounted upon a steel bar, F, which slides longitudinally through upturned brackets *h h*, carried by the guide-plate B. Upon this steel bar F is arranged a clutch-lever, I, having a tubular portion, which embraces the steel bar F, and upon each side of which tubular portion are located spiral springs *a a*, wound about the bar F, which normally hold the tubular clutch in a position which permits the rod F to slide freely through it. Co-acting with both this clutch I and the ship-over slide J is a ship-over lever H, which, as described in my said prior patent, serves two functions—first, to throw the ship-over slide and the attached guide-plate B, with the entire mechanism thereon, laterally from one side of the button-hole to the other, which was effected by a cam on its under side engaging with the ship-over slide; and, secondly, to co-operate with the clutch to cause it to bite the rod F and feed the cloth-clamp forward or backward, as the case might be. The particular manner in which the ship-over lever was made to coact with the clutch I was by a pin located eccentrically on the head of such lever and working in a slot in the extended end of the clutch, so that when the ship-over lever threw the ship-over slide to one side said pin came into position to be struck by the clutch, (when the clamp was oscillated,) straining the clutch in one direction and causing the same to bite the rod F, so that whenever the cloth-clamp was oscillated the contact of the clutch against this stop-pin gave a reactionary longitudinal feed movement of the rod F and attached cloth-clamp, and when the position of the ship-over lever was changed to the other side this pin was brought into position in the slot to be acted upon, on the reverse stroke of the oscillation, to cause the direction of the feed to be reversed, all of



which will be more fully understood upon reference to my said prior patent. In that arrangement of the lever H to slide J and the clutch I it will be seen that the stop-pin on the ship-over lever came into operative engagement with the sides of the slot of clutch I only at the ends of the movement of the ship-over devices, and hence the reverse feed movement did not commence until the entire lateral adjustment of the ship-over slide was effected, and this caused the two rows of stitching on opposite sides of the center line to terminate in independent square ends, connected by a single thread only, without tying or staying the ends of the hole, as shown in Fig. 6. To avoid this is one object of my invention, and I will now describe the device for accomplishing such result.

The ship-over lever H is fulcrumed upon a pin or screw, *l*, held in the base-plate, and has upon its under side a cam, *m*, (see Fig. 5,) which rests in the fork *o* (see Fig. 4) of the ship-over slide to give it its longitudinal movement transversely to the bed-plate, to ship the cloth-clamp laterally, substantially as before used. Instead, however, of making a slot in the clutch-extension and placing the pin in the ship-over lever, as in my said patent, I place the pin *p* in the clutch-extension and form the slot *n* in the ship-over lever. This slot I make in curved form, of about the extent of a semicircle, and representing the entire ship-over movement. One half of the slot is also of a certain radius, and the other half of a less radius, and at the middle the two ends of the sections of different radius run into each other. Now, when the clutch-extension oscillates in conjunction with the cloth-clamp its pin has a movement equal to the width of the slot at the middle, where the two curves run together, and when the pin is oscillating in this place there is no strain on the clutch and no feed to the cloth-clamp. When, however, the lever H is turned so that the pin *p* is in the slot of greater radius the side *s* acts as the stop or resistance to the oscillation of the clutch, and by straining it in one direction gives the reactionary feed in one direction, and when the pin of the clutch is in the other part of the curved slot the other side, *s*<sup>2</sup>, acts as the stop or resistance and causes the clutch to be strained in the other direction, and by biting the bar F reversely to the first position causes it and the cloth-clamp to be fed in the opposite direction. The result of all this is that instead of making the engagement between the ship-over lever H and the clutch to take place at the ends of the ship-over movement, I make the reversal of the feed to occur exactly in the middle of the ship-over movement—that is to say, when the lever H is turned the ship-over movement commences, but the feed goes on in the same direction, making a curve in the line of stitching, as shown in diagram Fig. 7. Then, when the half-movement of the lever H is completed and the pin *p* goes into the other part of the curved slot, the re-

versal of the feed instantly commences and continues while the other half of the ship-over movement is being accomplished. The result is, as shown in the diagram Fig. 7, that the triangular portion at the end of the button-hole has double the amount of stitching, which makes a perfect tie, stay, or double bar for the end of the button-hole.

The movement imparted to lever H is controlled by hand at the will of the operator, and is made slow enough to allow the machine to form the requisite number of stitches in staying the end of the button-hole.

In defining the scope of my invention more clearly I would state that I do not limit myself to the particular form of lever H, nor the means of connecting the lever H and the clutch for effecting the result described; but I claim broadly any equivalent of the lever H which ships over the cloth-clamp and reverses the feed in the middle of such ship-over movement.

In relation to a further value that my invention has I would state that I find by the improved arrangement for curving the seam that I can by proper manipulation of the ship-over lever work a good substantial eyelet button-hole—such as is required in the heavy woolen goods that are used for ready-made clothing, &c.

For working an eyelet button-hole (see Figs. 2, 3, and 8) the button-hole is started at *x*, Fig. 8, with the pin *p* resting, not in the end of slot *s*, but about the middle of the same, as at *n*, Fig. 3. The button-hole is then worked straight up to 1, Fig. 8. The lever H is then swung gradually in the direction of the single arrow, Fig. 3, which makes the pin *p* go to the end of the slot *s*, and causes the cam to bend the line of stitches to the right or away from the center until the point 2, Fig. 8, is reached. Then the lever H is swung slowly in the direction of the two arrows over the full length of slots *s* and *s*<sup>2</sup>, which causes the stitching to proceed from 2 to 3, Fig. 8, reversing the direction of feed in the middle of this movement. Then, when the point 3 is reached, the lever H is swung in the direction of the single arrow again until the pin reaches the middle of slot *s*<sup>2</sup> on the backward movement, which causes the line of stitching to be bent from 3 to 4, at which latter point the pin is held by the lever until the other parallel side of the button-hole is worked and the needle reaches the point *y*.

From the foregoing description it is obvious that a single eyelet may be worked without the parallel portion of the button-hole.

Having thus described my invention, what I claim as new is—

1. The combination, with a base-plate, a ship-over slide carrying an oscillating cloth-clamp, and a feeding device for said cloth-clamp arranged to be adjusted with said ship-over slide, of a device connected to the base-plate, ship-over slide, and feeding device, and constructed, as described, to effect the reversal

of the feed in the middle of the ship-over movement, as and for the purpose described.

2. The combination, with the feed-clutch I for the cloth-clamp, having pin *p* and the ship-over slide J, of a lever, H, having a cam for working the said slide, and a groove or slot, *n*, having its end sections described about dif-

ferent radii and running into each other in the middle, substantially as and for the purpose set forth.

JOHN K. HARRIS.

Witnesses:

J. F. MCGREW,  
W. McDONALD.