

C. M. BANKS.
Button-Hole Attachment for Sewing-Machines.

No. 223,694.

Patented Jan. 20, 1880.

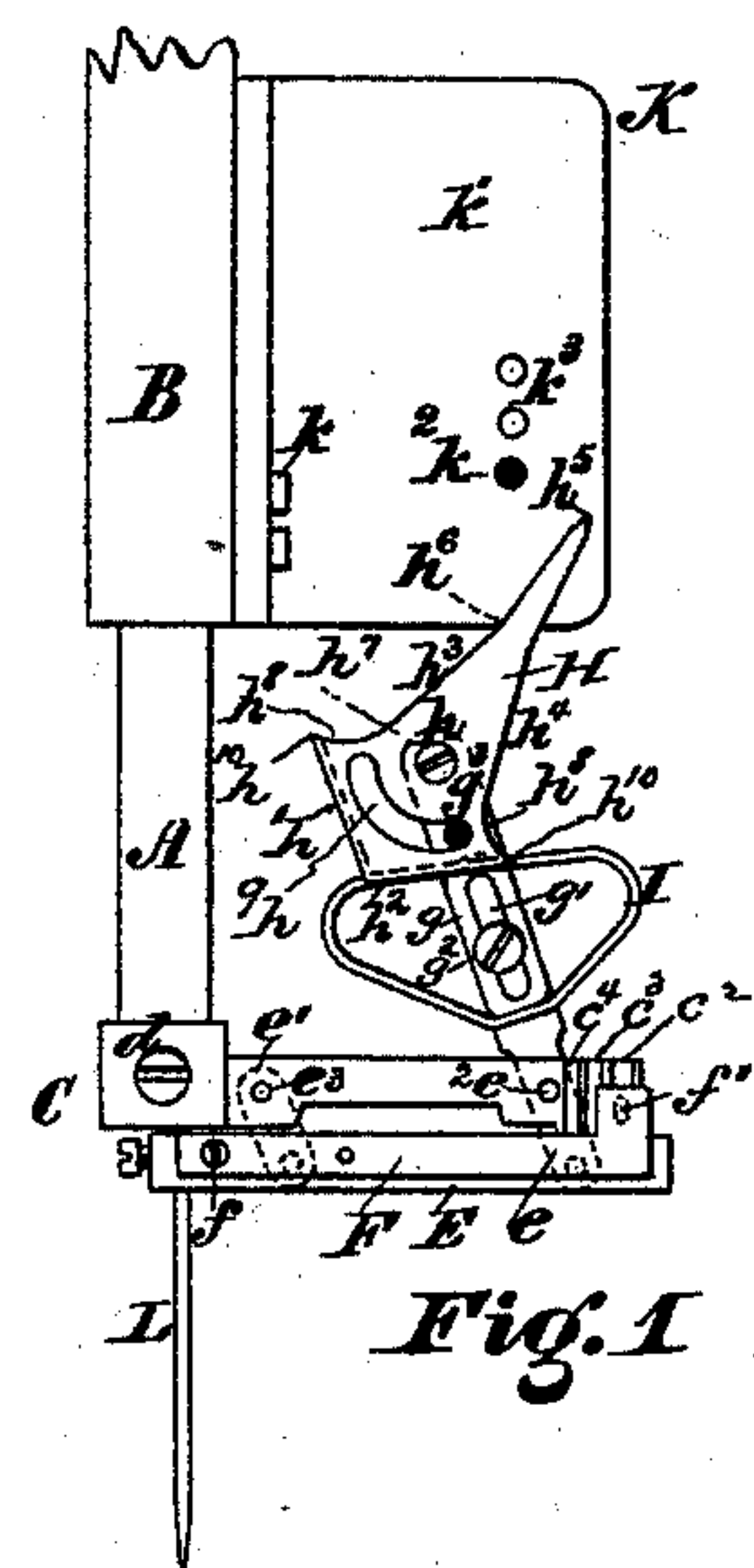


Fig. 1

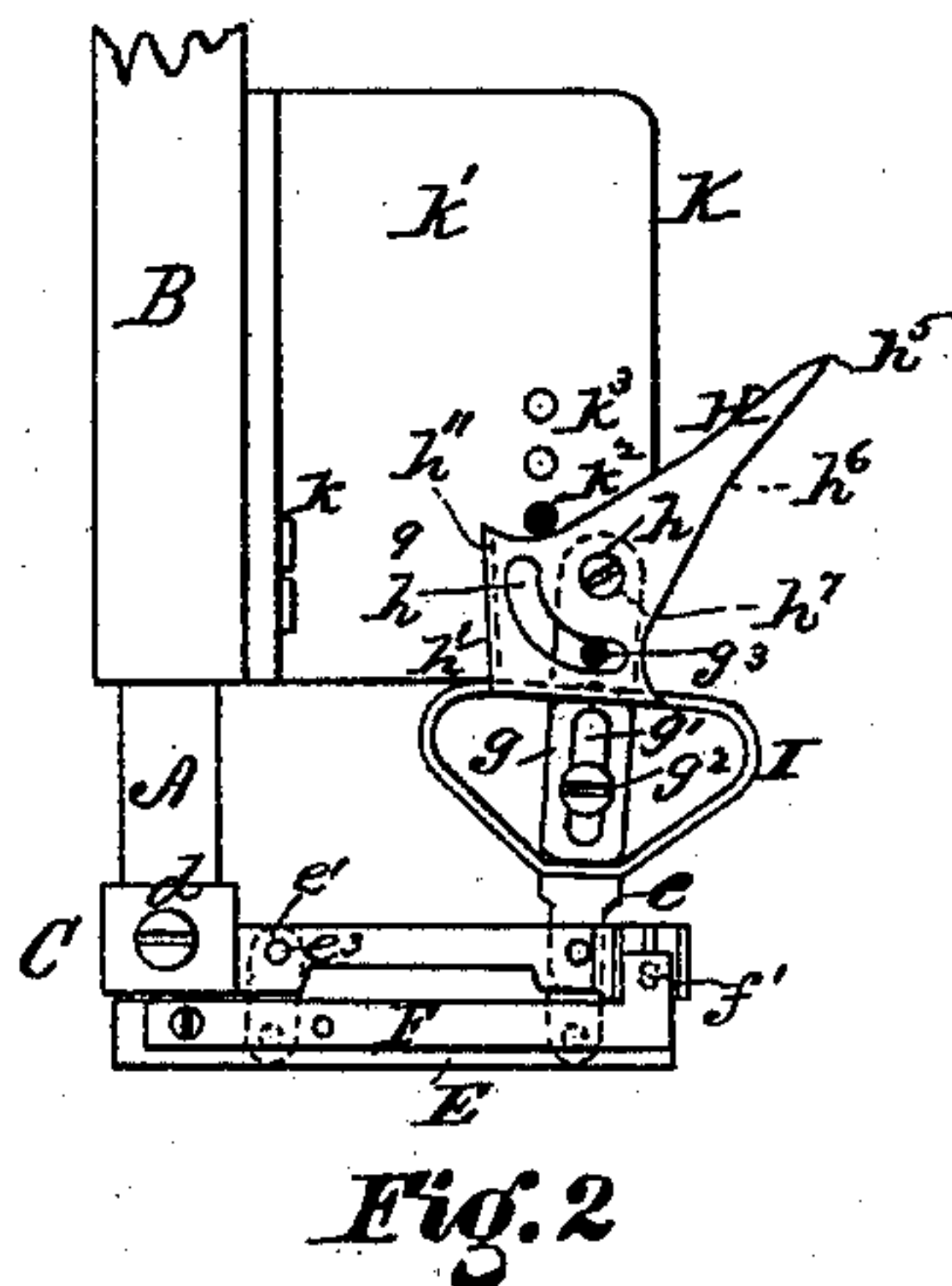


Fig. 2

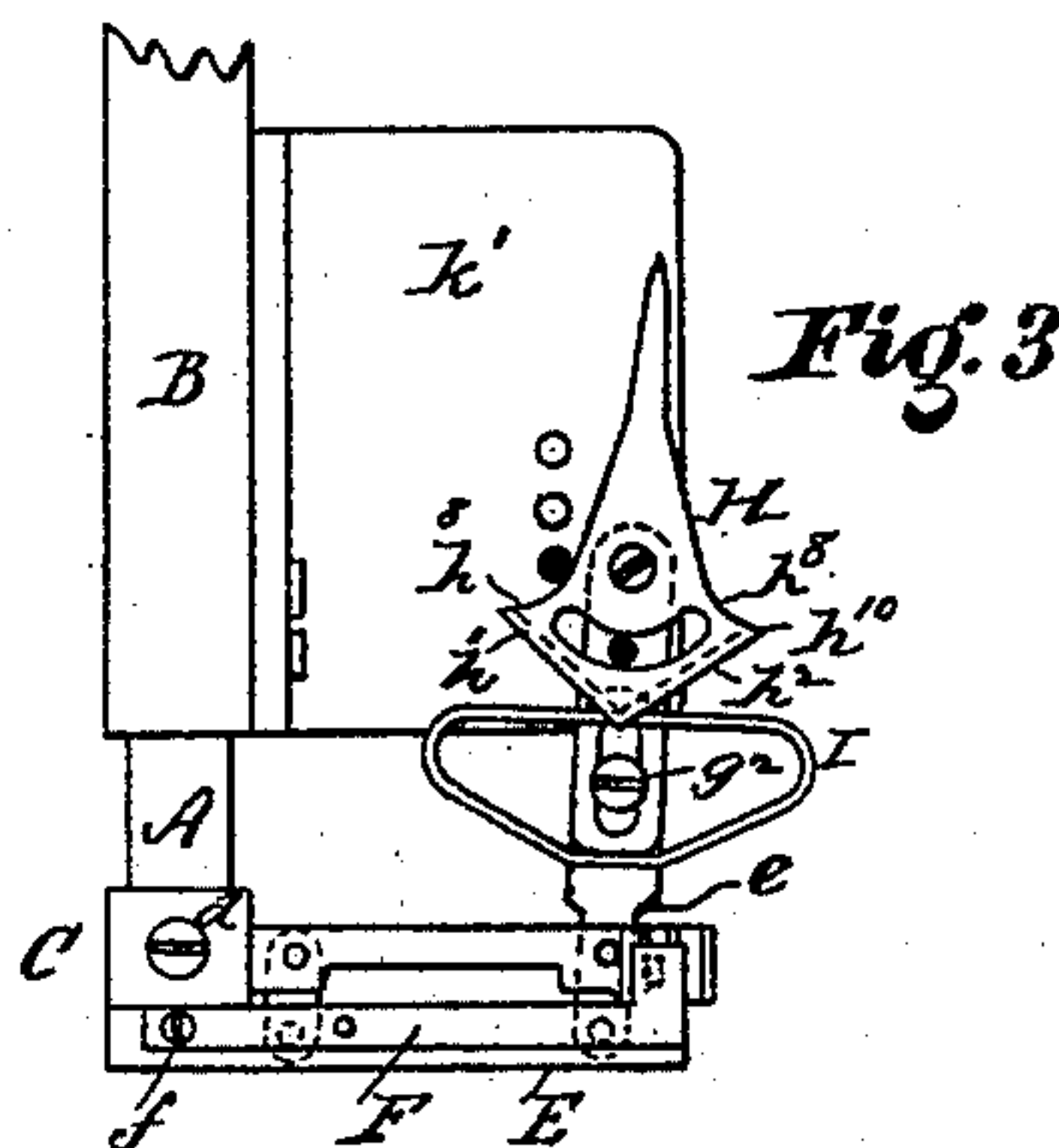


Fig. 3

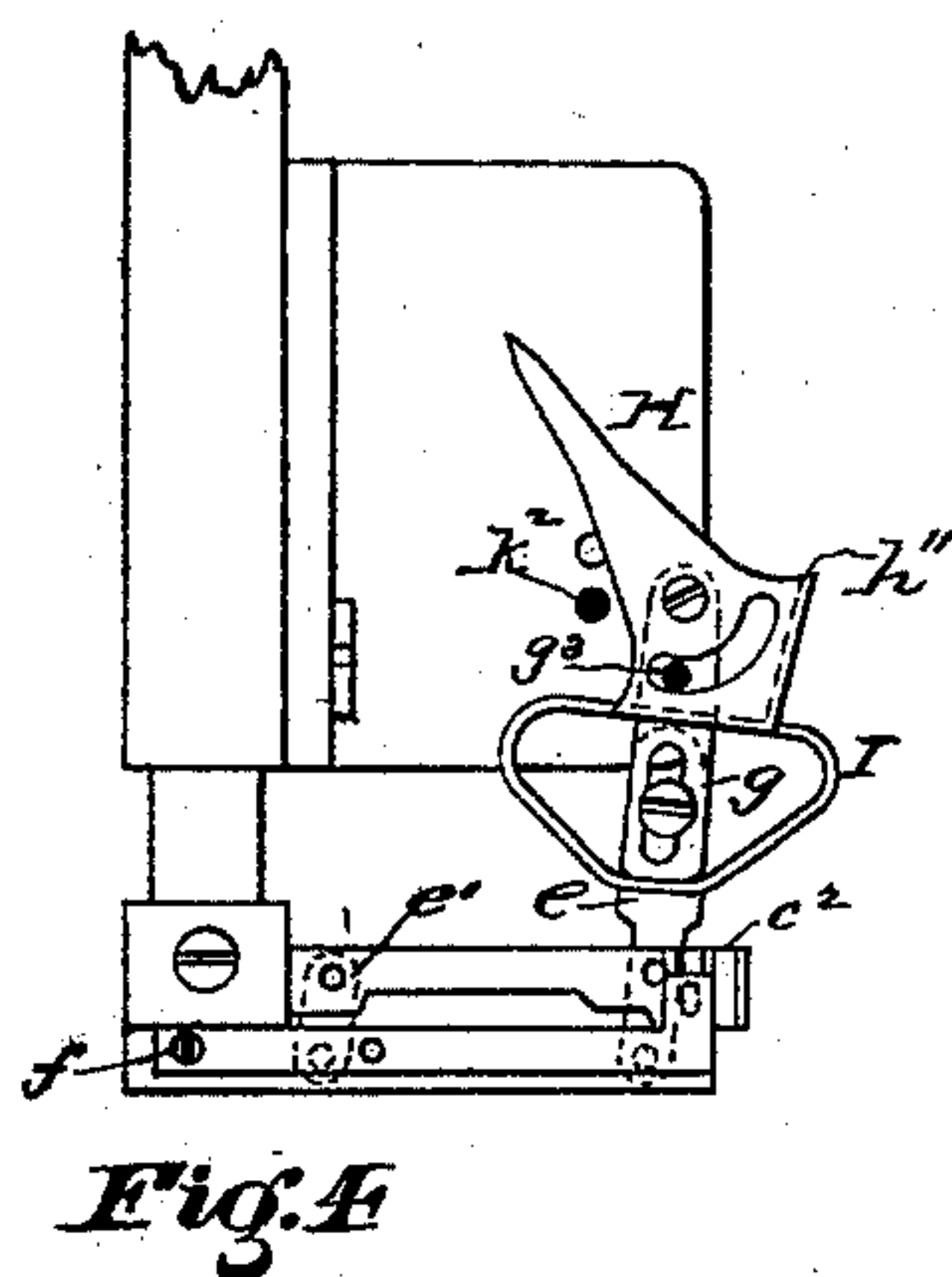


Fig. 4

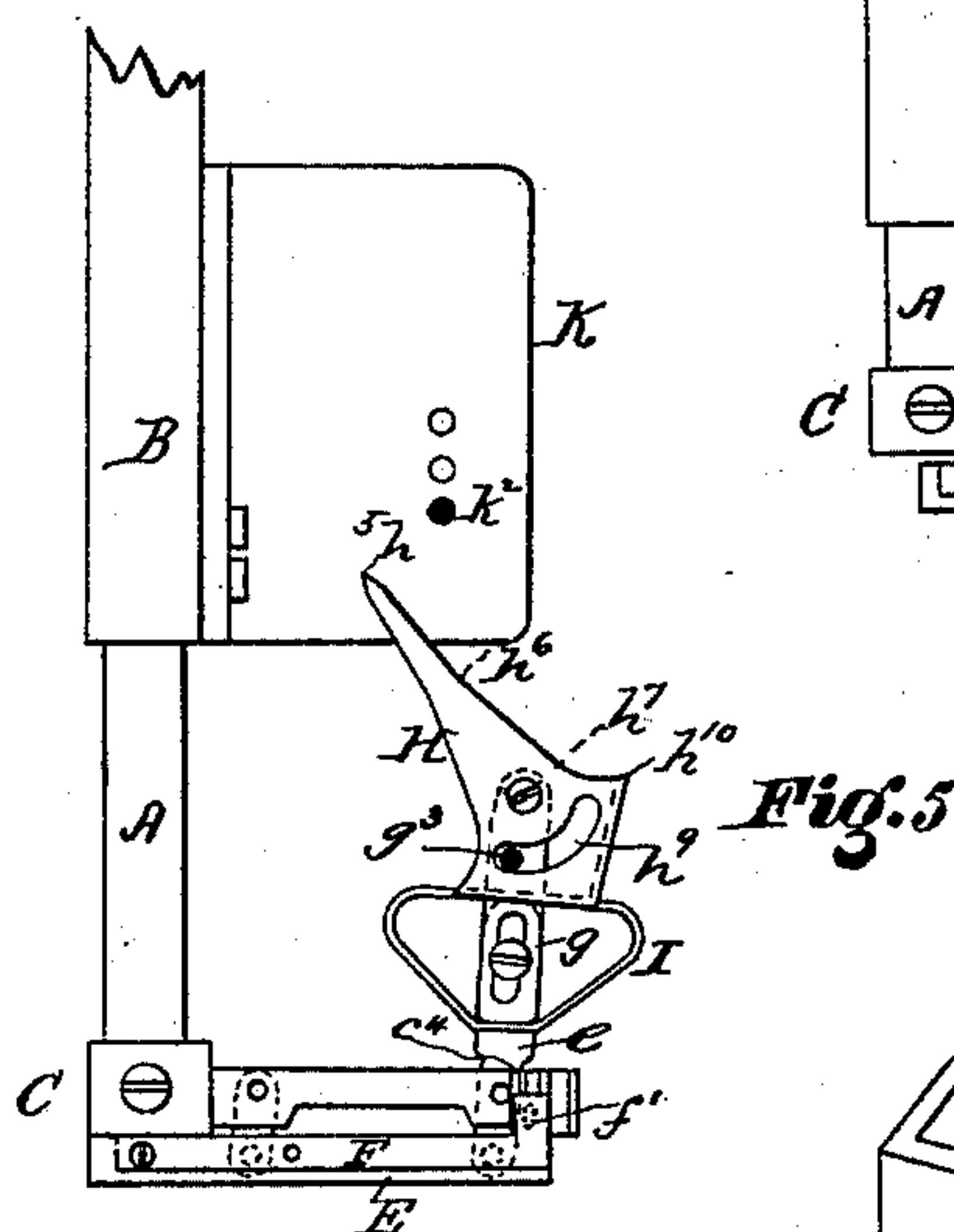


Fig. 5

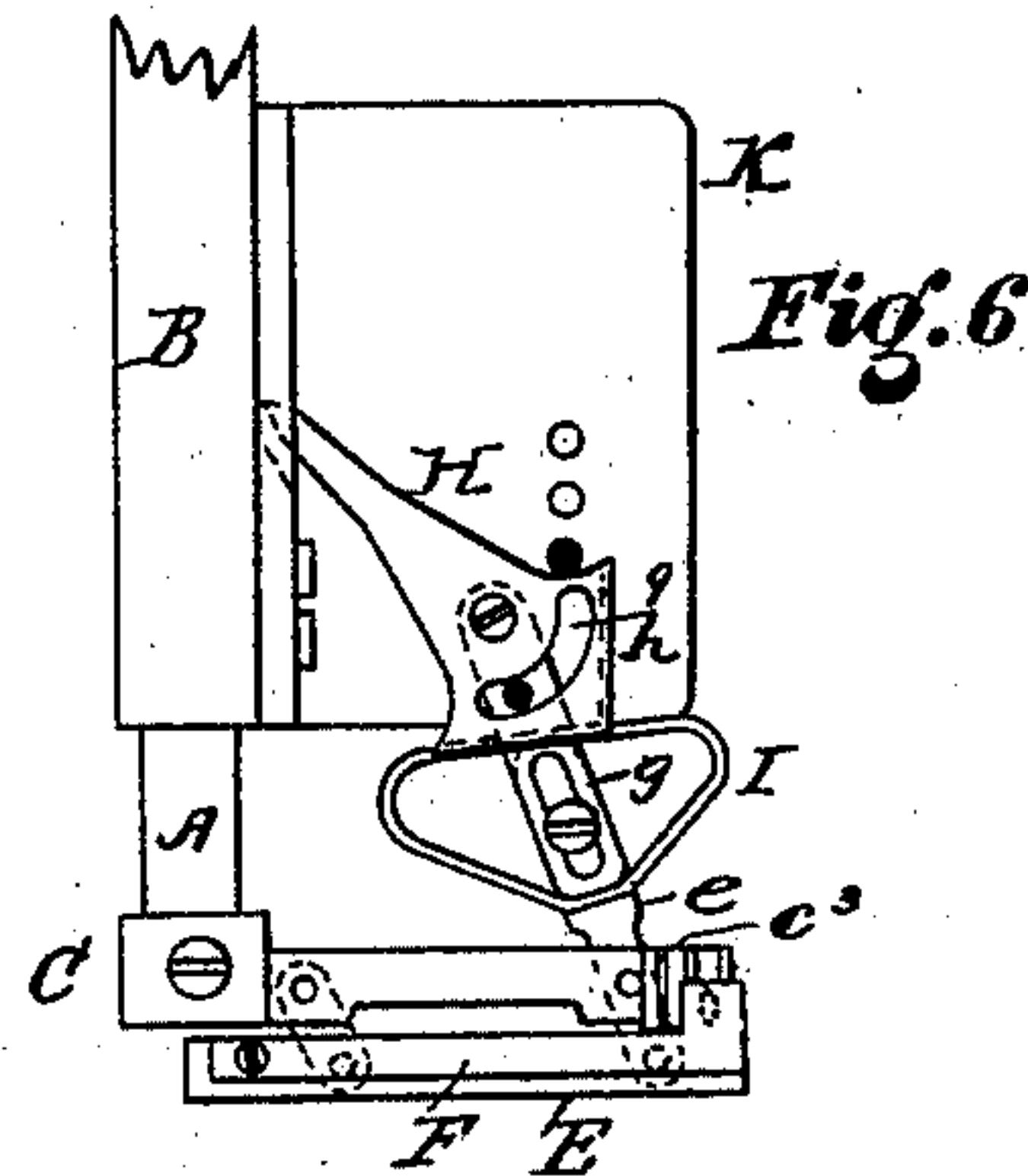


Fig. 6

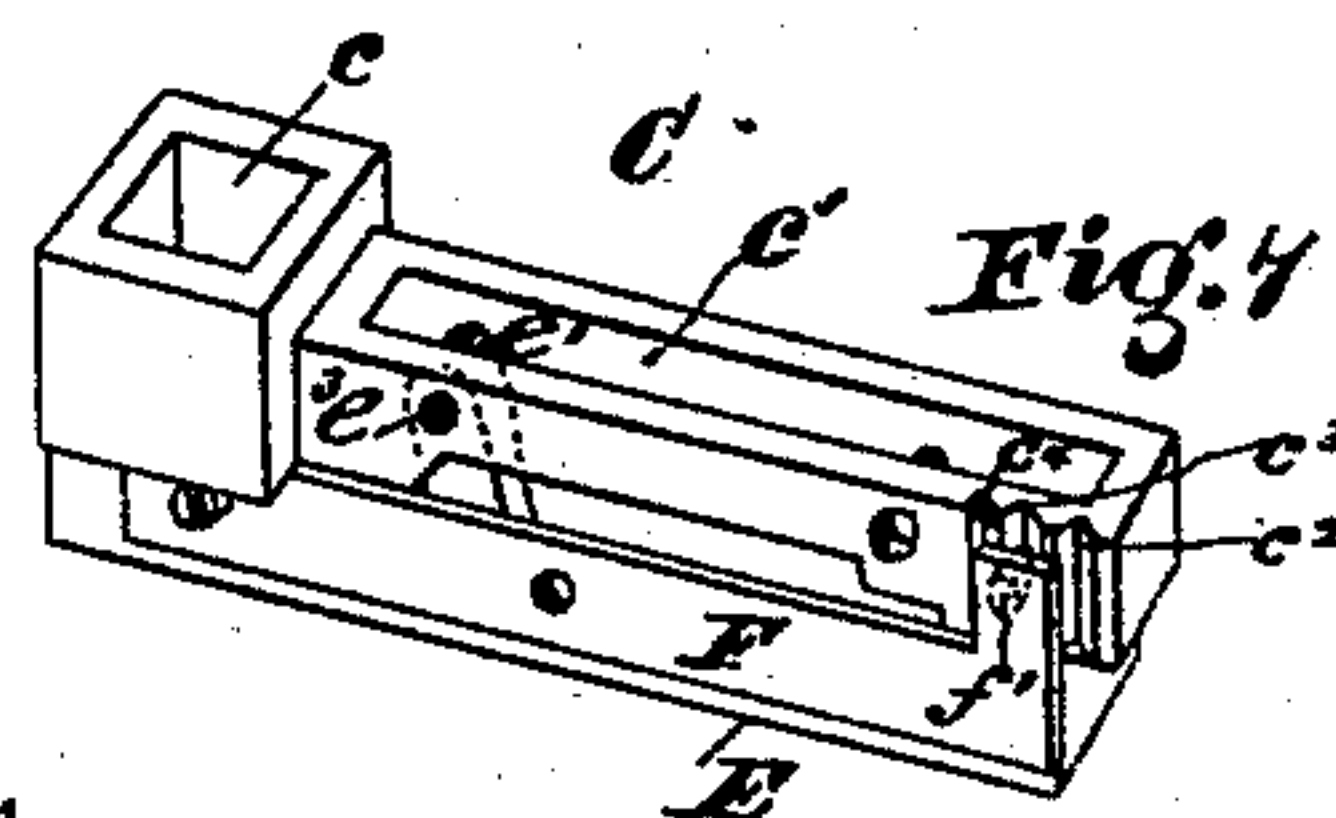
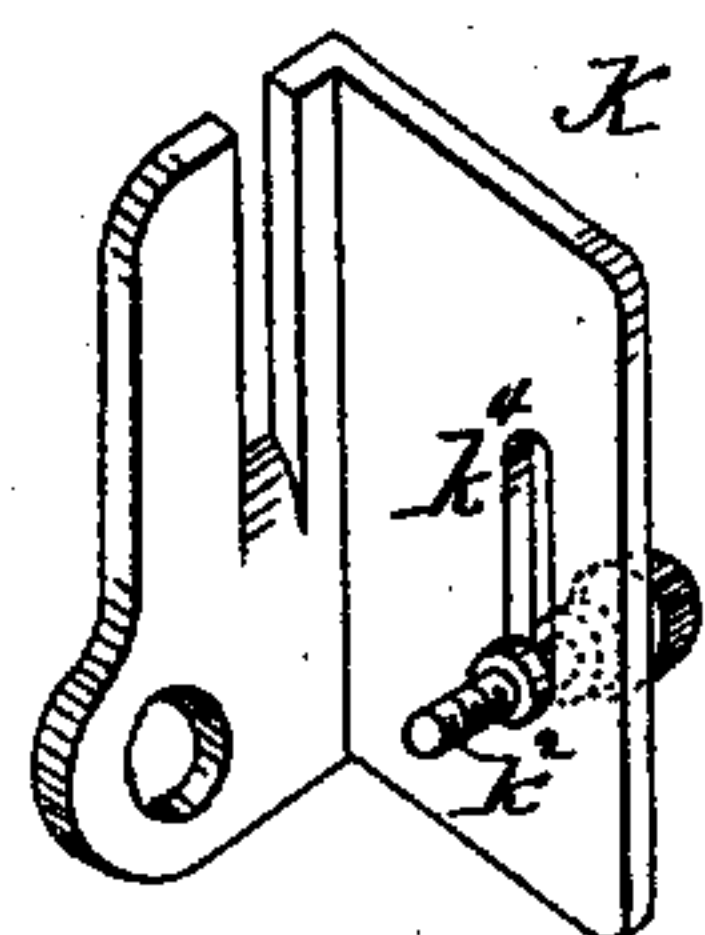


Fig. 8

WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES M. BANKS, OF PHILADELPHIA, PENNSYLVANIA.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 223,694, dated January 20, 1880.

Application filed April 15, 1879.

To all whom it may concern :

Be it known that I, CHARLES M. BANKS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Button-Hole and Overseaming Attachments for Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figures 1 to 6, inclusive, are front elevations, showing different positions of parts of attachment in operation. Fig. 7 is perspective of stock and needle-carrying bar. Fig. 8 is a group showing perspectives of various modifications.

My invention has relation to means for converting the vertical reciprocating motion of the needle-bar of a sewing-machine into a laterally-swinging motion for button-hole, overseaming, embroidering, and other like attachments.

My improvements consist in the peculiar construction and combination of parts hereinafter fully set forth.

Referring to the accompanying drawings, A indicates the needle-bar, and B the head, of a sewing-machine, the former having a vertical reciprocating motion when in operation and the latter being stationary, as usual.

C represents a stock, rigidly but detachably fastened on the bar A by a set-screw, d . Said stock consists of an oblong bar, having a vertical opening, e , at one end for the reception of the needle-bar and a central longitudinal slot, e' .

E represents a needle-carrying bar or slide hung upon link-lever e and link e' , which are pivoted at e^2 e^3 in the slot e' to the stock C.

F is a plate or leaf spring fastened at f to the bar E, and having a turned-in end or tooth, f' , adapted to enter notches c^2 c^3 c^4 in the stock A. Said spring thus acts as a dog to the bar E, as will be hereinafter more fully described.

The link-lever e is extended above its pivot e^2 , and has secured to it an extension-piece, g ,

which is formed with a slot, g' , and held in place by a set-screw, g^2 .

H represents a vibrating head, secured by a pivot, h , to the extension-piece g . Said head H is of the peculiar shape shown, having two straight sides, h' h^2 , which form an obtuse angle at their intersection, and two tapering sides, h^3 h^4 . Said tapering sides have each but a slight inclination from the point h^5 to the line h^6 , a greater inclination from said line to another line, h^7 , which is drawn transversely through the pivot h , curving thence, as shown at h^8 h^9 , to intersection with sides h' h^2 .

h^9 is a curved slot in the head H, concentric with pivot h , and g^3 is a stud on the extension-piece g , which enters said slot and forms a stop to limit the extent of vibration of said head H.

I is a spring secured to the extension-piece g , and exerting its action against the head H by bearing alternately against the sides h' h^2 , as hereinafter set forth.

K is a bracket or angle plate, rigidly fastened by a screw, k , to the machine-head B, and bearing on its projecting wing k' a pin or stud, k^2 . L is the needle fastened in the bar or slide E.

The operation is as follows: On the downward motion of the needle-bar A the bar E has no lateral movement, so that the needle enters the cloth perpendicularly. On the ascent of the needle-bar A, and after the needle has left the cloth, the head H meets the stud k^2 , the contact being with one of the sides h^3 h^4 on or about the line h^6 . The needle-bar A continuing to ascend with the stock C, the side h^3 or h^4 of the head H is kept pressed against the stud k^2 , thereby swinging the lever composed of link-lever e and extension-piece g on the fulcrum e^2 , the bar E being thus swung longitudinally on its links or laterally across the line of feed of the machine. As the bar E is thus moved the dog F travels with it, and its tooth f' is transferred from one of the notches c^2 c^3 in the stock C to the other, thus holding said bar in its new position until a reverse movement of the actuating link-lever is effected on the next ascent of the needle-bar A. During the swinging of the link-lever e , or while the side of the head

H is in contact with the stud k^2 from h^6 to h^7 , the angle of inclination of said head with respect to said link and its extension g remains unchanged; but as soon as the head H has ascended sufficient to bring the center of its pivot h above the stud k^2 the pressure of said stud against the curve h^8 , with which it is then in contact, causes said head H to vibrate on said pivot h . Such vibration causes said head to first assume the vertical position shown in Fig. 3, and on passing that the action of the spring I throws it over until its side h' or h^2 comes in line with said spring. Said head H now inclines in the direction contrary to that in which it inclined on the ascent of the needle-bar, so that when said bar next ascends the stud k^2 will meet the opposite side of said head, and, the operation just described being repeated, the link-lever e and needle-carrying bar or slide E will be moved in a reverse direction.

On the downward motion of the needle-bar A the side of the head H then adjacent to the stud k^2 meets and presses against said stud, thus slightly deflecting said head from its normal angle of inclination with reference to the link-lever e or its extension-piece g . This deflection is compensated by the spring I, which yields so as to prevent any lateral or swinging movement on the part of the link e or bar E; and when the head H, in its descent with the stock C and needle-bar A, clears said stud k^2 , said spring restores said head H to its proper angle of deflection, and keeps it there until it again ascends and its pivot h passes said stud k^2 , as already described.

To give sufficient metal to make the slot h^9 long enough to permit suitable vibration of the head H the said head widens so as to produce shoulders h^{10} at the junction of the sides h^1 h^2 with the curves h^3 ; but these shoulders do not come in contact with the stud k^2 , the head H being vibrated or thrown over, after passing the vertical position, by the action of the spring I. Said spring may be a flat spring and the sides h' h^2 be correspondingly formed; or said spring may be of round wire and rest in a groove, h^{11} , in the sides h' h^2 .

The purpose of the extension g is to render the throw of the needle-carrying bar E adjustable, and thereby to increase or diminish the width of the stitch formed by the needle L, the length of such stitch being adjusted by the feed of the machine. To shorten the throw of said bar, and thereby to diminish the width of the stitch, the extension g is slid outwardly or upwardly on the link e . The position of the stud k^2 must at the same time be correspondingly elevated, and this may be accomplished by the provision of adjusting-holes k^3 in the wing k' , or by an equivalent slot, k^4 , in which said stud can be moved up and down and firmly secured in any adjusted position.

Where adjustability of the width of the stitch is not desired the extension-piece g may be dispensed with and the head H pivoted directly to the link-lever e , the stud g^2 then

springing from and the spring I being fastened to said link.

Instead of forming the head H with the slot h^9 , the slot may be made in the extension-piece g or link e and a pin on the back of said head enter and work therein, as shown at L L in Fig. 8; or limiting pins or studs may project backward from the head H on either side of the extension g or link-lever e , as shown at M in said figure.

The object of suspending the needle-carrying bar on links, instead of having it slide back and forth between guides, is to avoid the friction incident to the sliding movement. Suspended on links, the bar E in its to-and-fro movement is out of contact with the stock C, and hence avoids frictional contact therewith, thus moving more easily than if it were caused to slide, and reducing the strain on the needle-bar. Still, if desired, the bar E may be arranged as a slide, in which case the link-lever e would be constructed as an actuating-lever and have a slotted connection with said bar.

The pointed portion of the head H, being that between the line h^6 and the point h^5 , operates merely as a feeler or guide to insure the accurate presentation of the right side of the head H to contact with the stud k^2 —that is, to insure the meeting of alternate sides of said head with said stud at each ascent of the needle-bar A. Said pointed portion does not effect the swinging of the link-lever e or bar E, that being accomplished, as already stated, by contact of the stud k^2 with the inclined portion between the lines h^6 h^7 .

The spring F, which forms the dog for the needle-carrying bar, should be of greater power than the spring I, so as to hold said bar in position when the needle-bar is making its downward motion, and when the contact of the pointed end of the head H (or the inclined edge between the point h^5 and line h^6) causes a deflection of said head and a depression of said spring I, as already described.

In my application of August 31, 1878, the feature of a swinging needle-carrying bar suspended from the stock by links is shown and described; but the same is disclaimed in said application and the claim thereon withdrawn in favor of the present one.

What I claim as my invention is—

1. The combination, with the stock C, of the swinging needle-carrying bar E, connecting-links e e' , and means, substantially as shown and described, whereby said bar E is reciprocated during the ascent and descent of the needle.

2. The combination, with a needle-carrying bar, E, and dog F secured thereto, of a stock, C, serrated or notched at c^2 c^3 for the engagement of said dog, and means for connecting said bar and stock, substantially as set forth.

3. The combination, with the plate K, holding the stud k^2 , the stock C, and the needle-carrying bar sustained thereby, of the link-lever, and vibratory head or tappet H, the said vibratory head or tappet being prismoidal in

shape, as shown, and pivoted at or near its base to link-lever *e*, whereby it shall alternately, on opposite sides of the stud *k*², both ascend and descend, substantially as set forth.

5 4. The combination, with needle-carrying bar *E*, stock *C*, sustaining the same, link-lever *e*, and pivoted vibratory head *H*, of spring *I*, attached to the link-lever, substantially as shown and set forth.

10 5. The combination, with pierced or perforated plate *K*, link-lever *e*, and vibratory head *H*, of the adjustable stud *k*², reciprocating needle-carrying bar *E*, and stock *C*, substantially as set forth.

15 6. In combination with reciprocating needle-carrying bar *E*, stock *C*, and link-lever *e*, having stud *g*³, the pivoted vibratory head *H*,

having slot *h*⁹, said head being secured to and moving with said link-lever, combined with the needle-carrying bar *E* and sustaining-stock *C*, substantially as shown and described.

7. The combination of stock *C*, notched as described, needle-carrying bar *E*, link *e e'*, dog *F*, extension-piece *g*, head *H*, spring *I*, and plate *K* with stud *k*², constructed and designed 25 for operation substantially as shown and set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of April, 1879.

CHARLES M. BANKS.

Witnesses:

M. D. CONNOLLY,
CHAS. F. VAN HORN.