

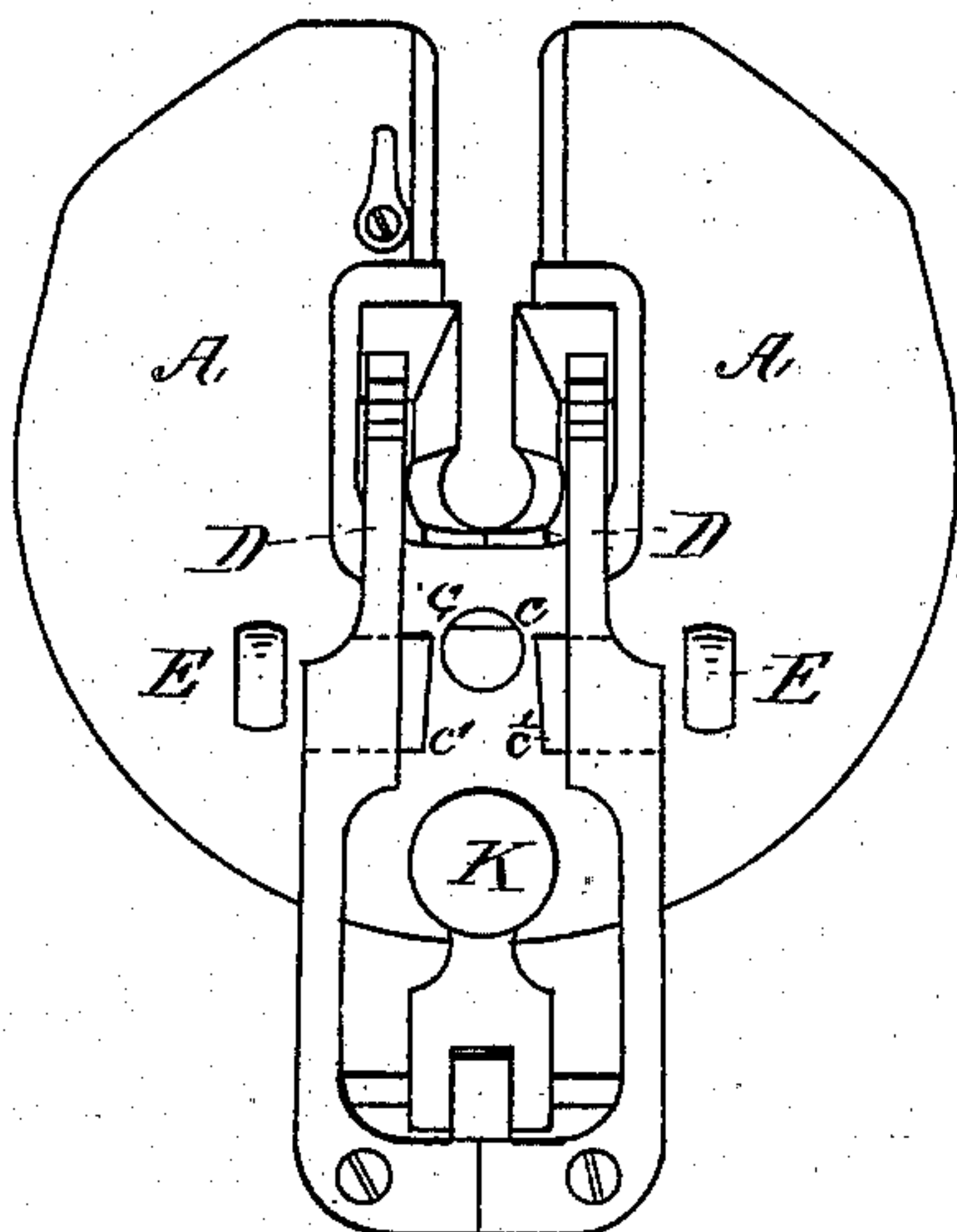
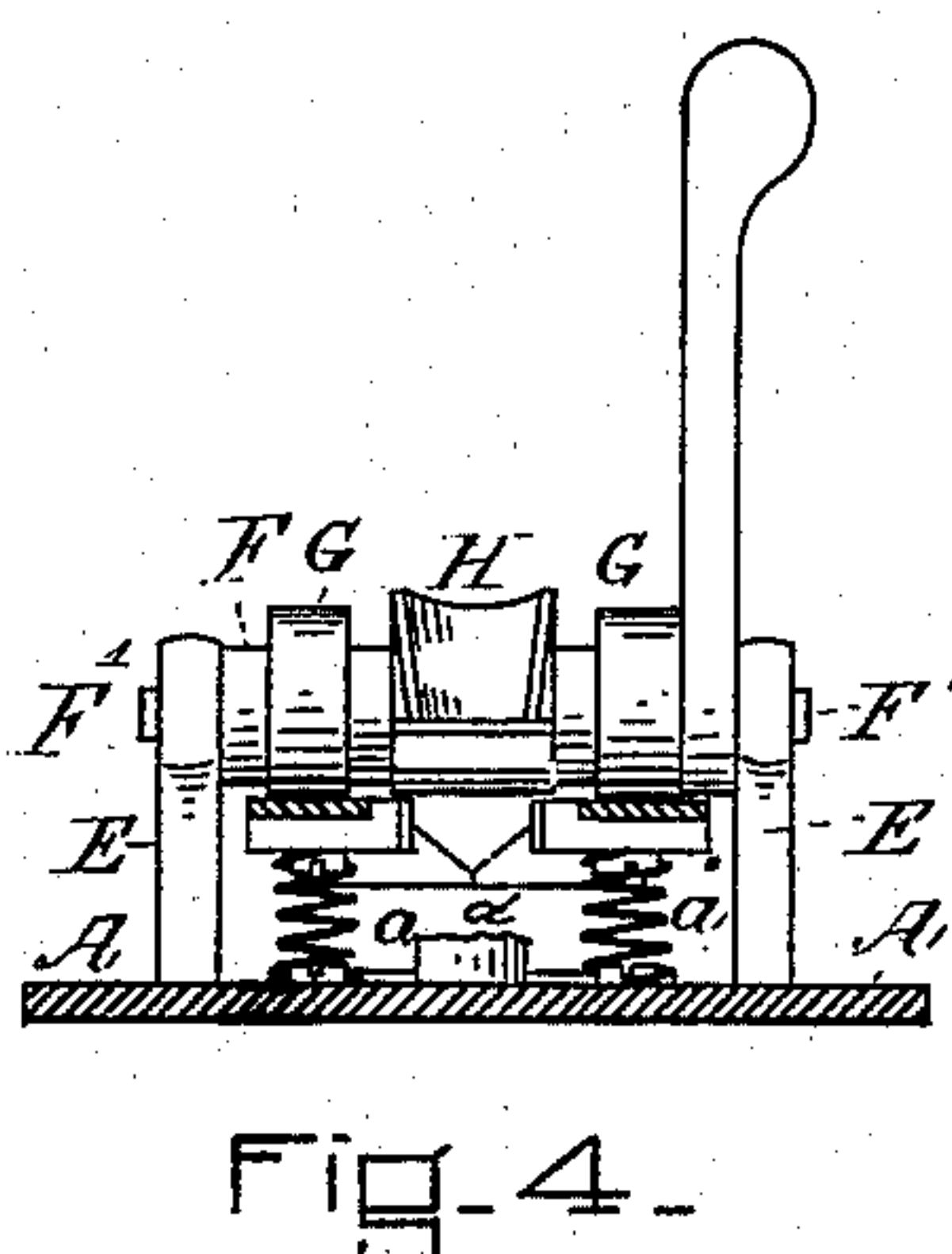
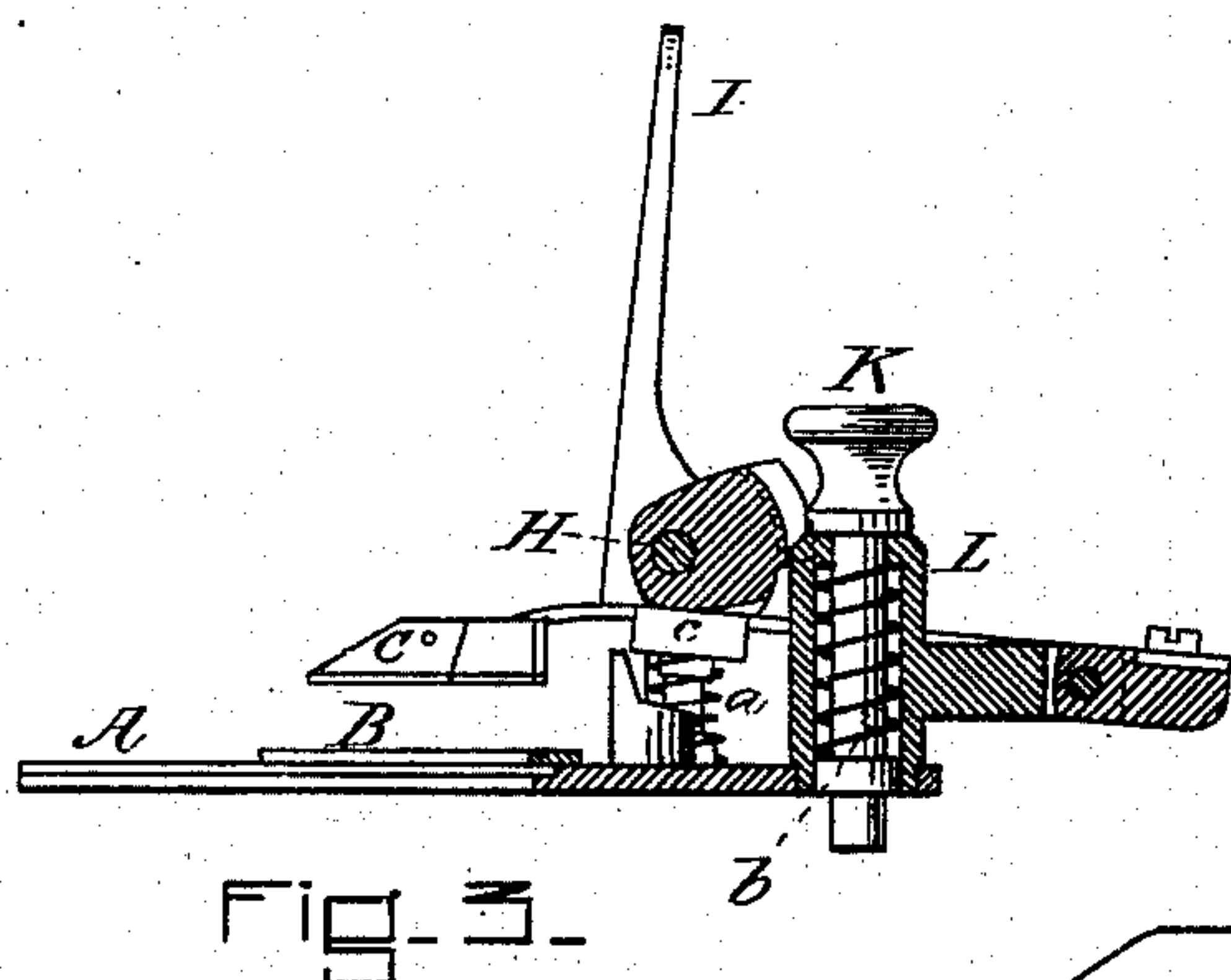
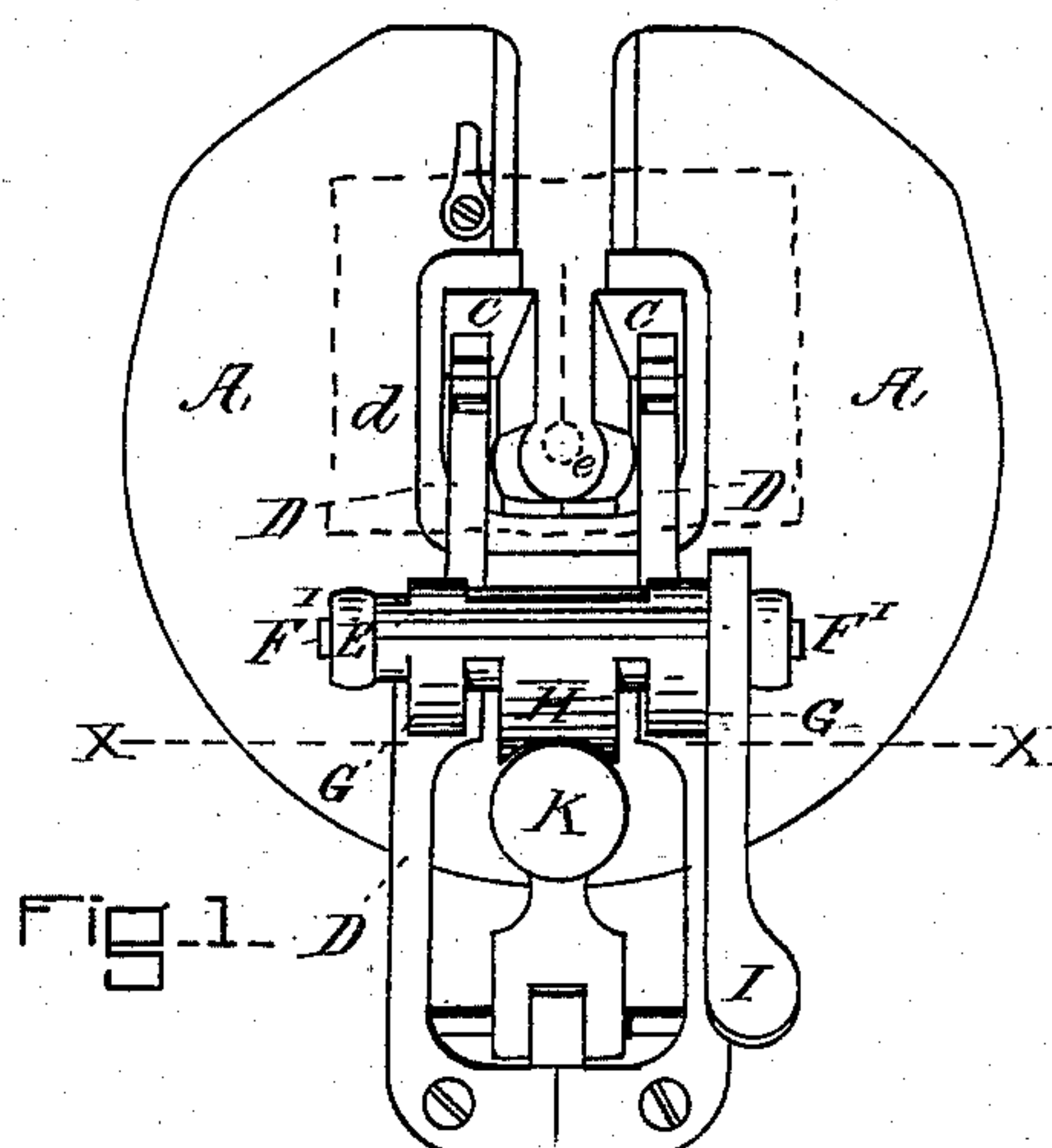
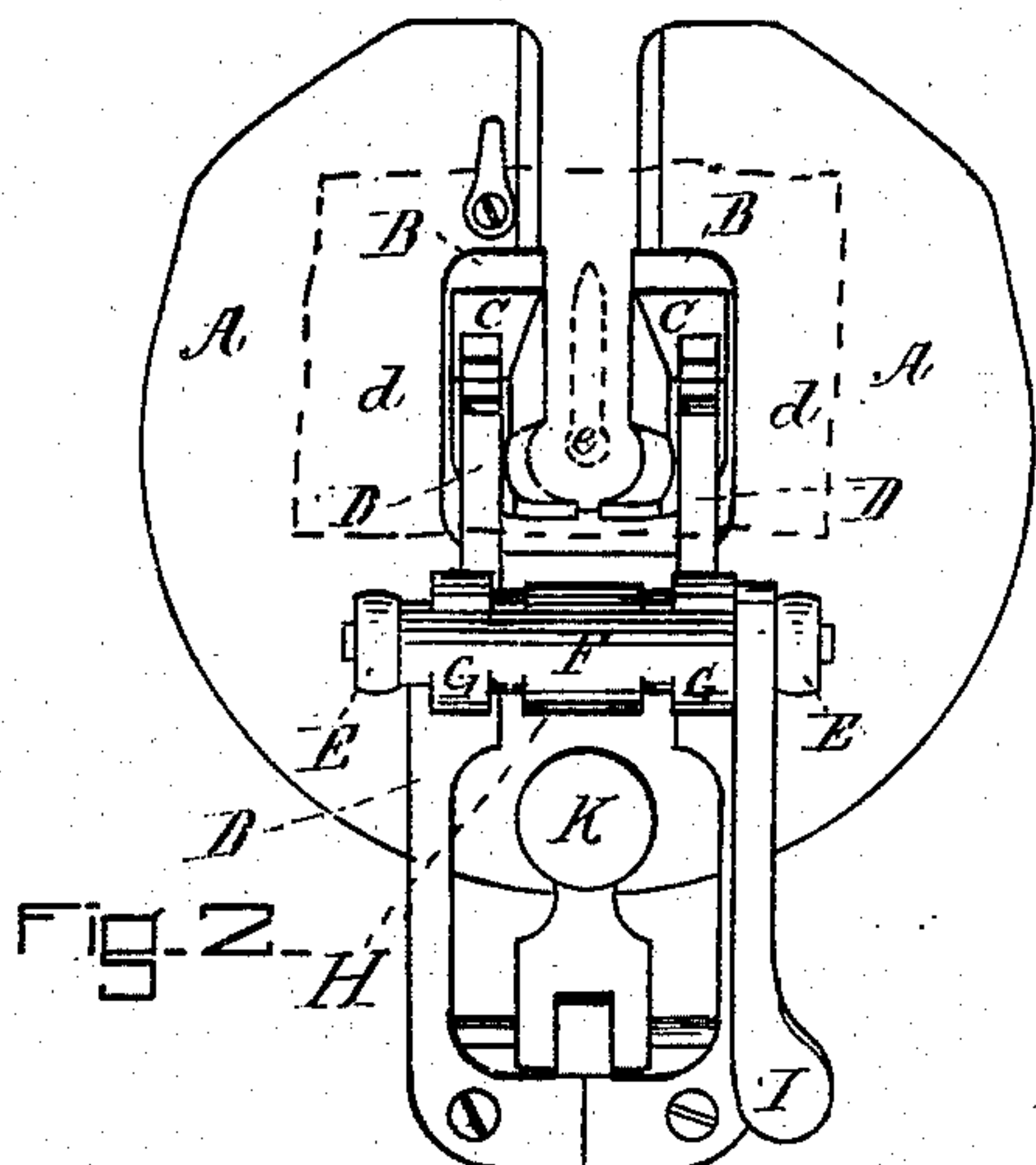
(Model.)

3 Sheets—Sheet 1.

J. W. FURBUSH.
BUTTON HOLE SEWING MACHINE.

No. 276,387.

Patented Apr. 24, 1883.



WITNESSES

Frank A. Parker
J. A. Tower,

Fig. 5.

INVENTOR

James W. Furbush
by attorney
J. L. Newton

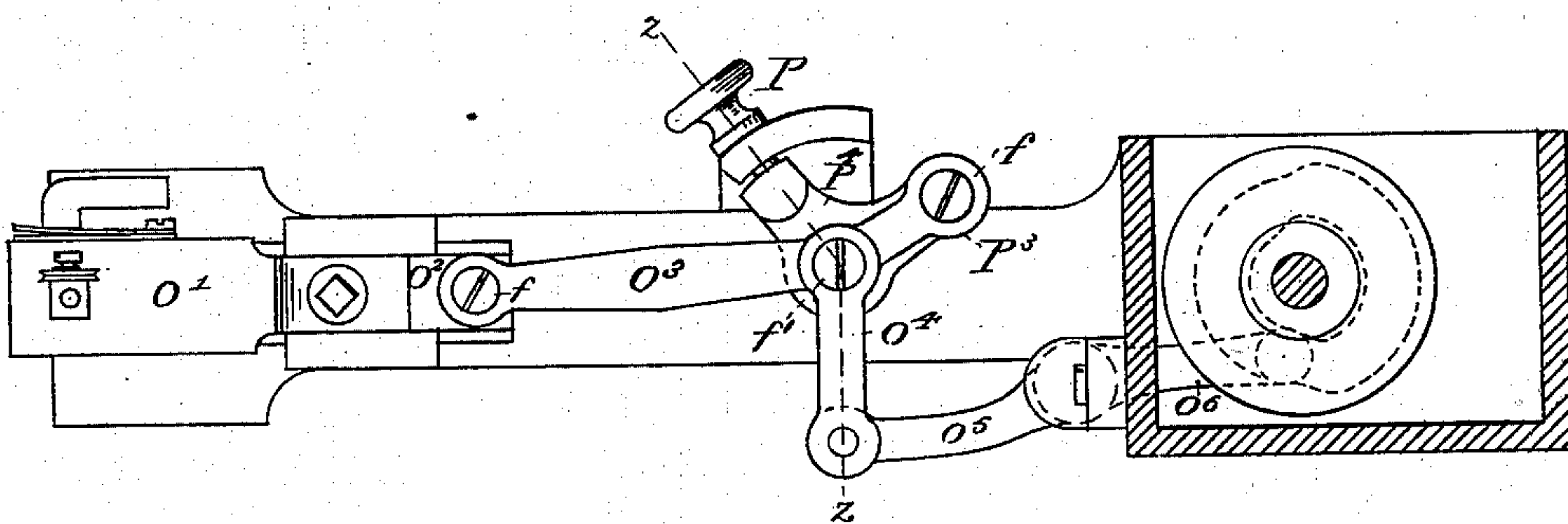
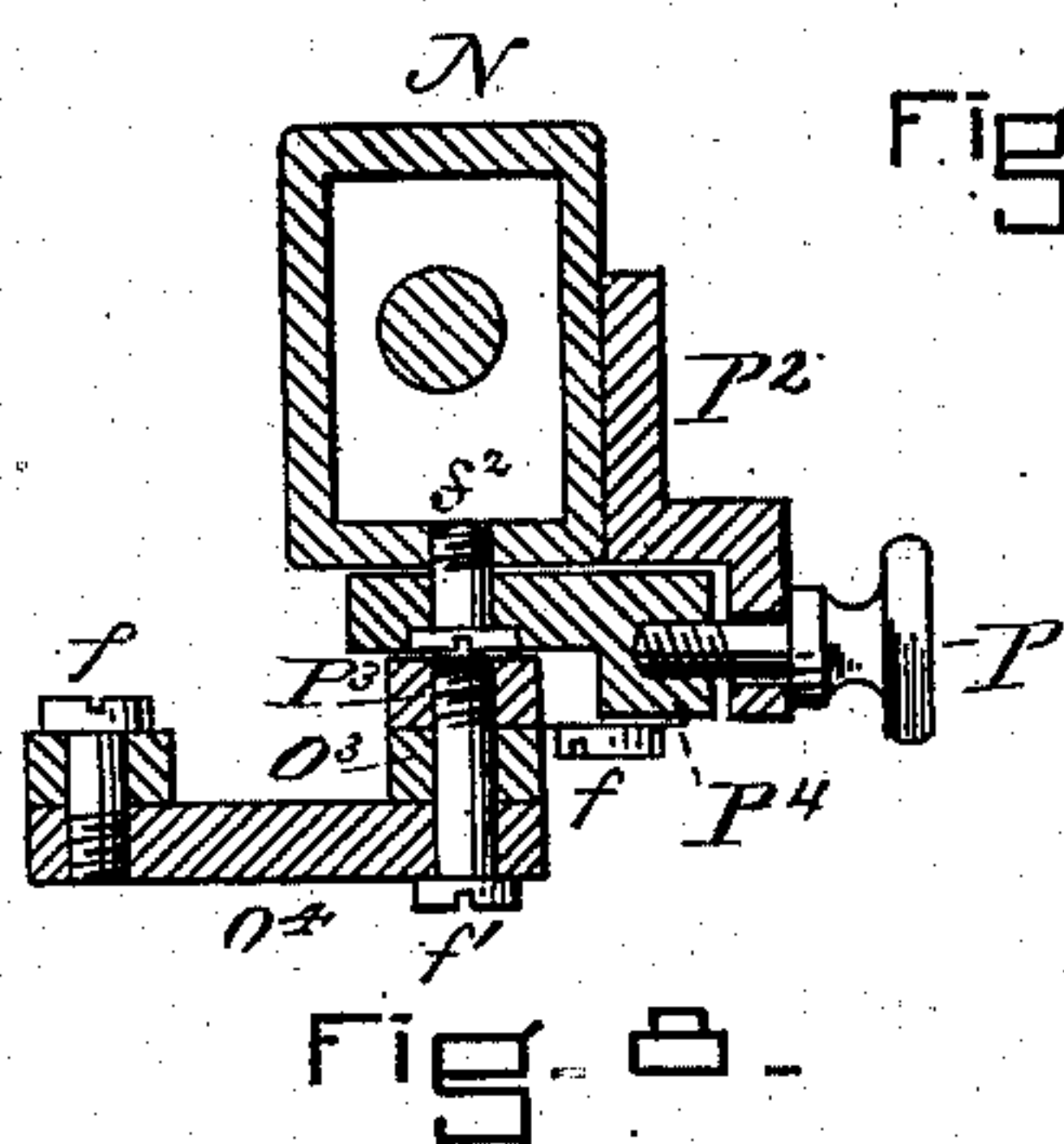
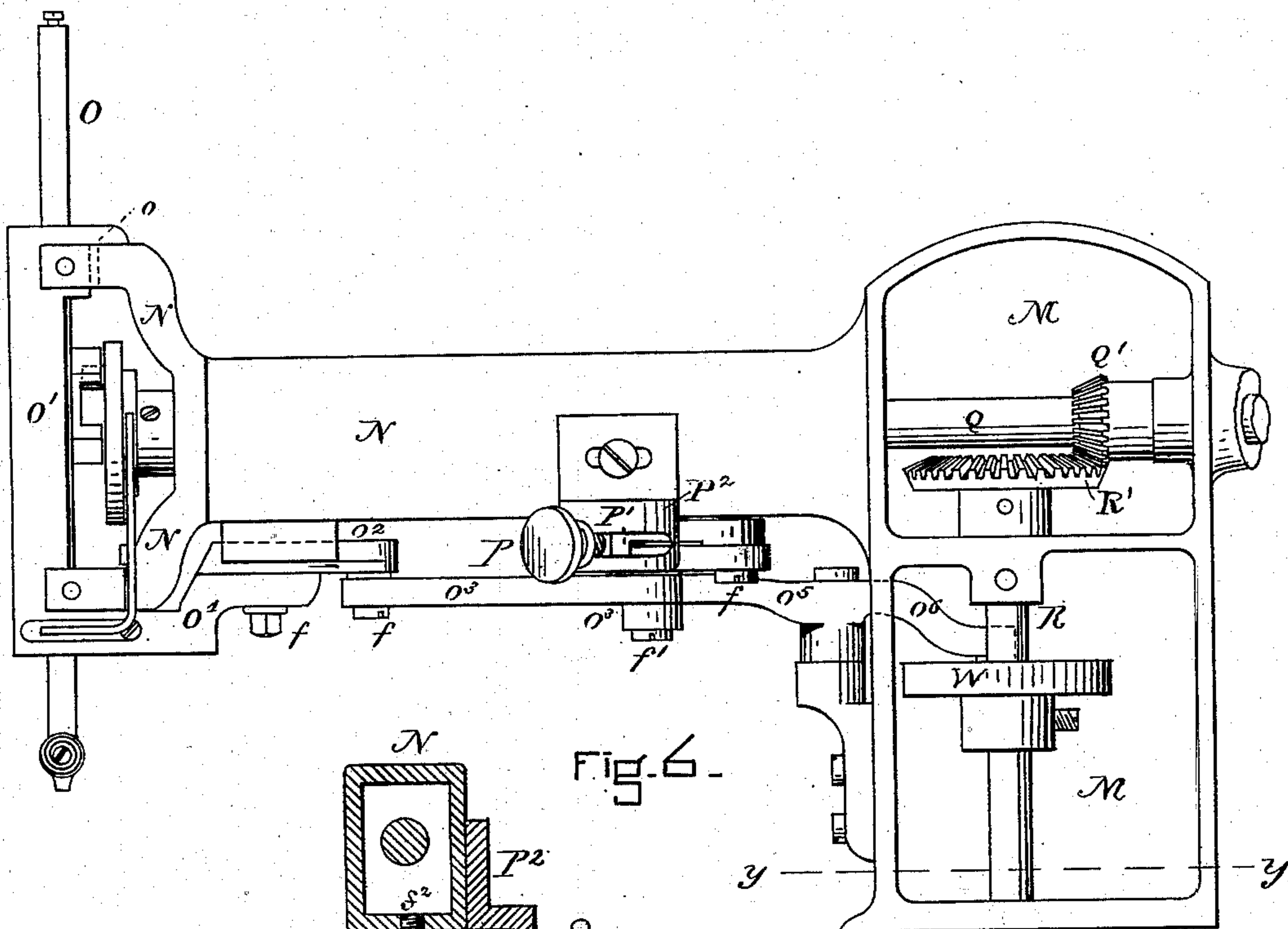
(Model.)

3 Sheets—Sheet 2.

J. W. FURBUSH.
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WITNESSES

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Fig-7-

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(Model.)

3 Sheets—Sheet 3.

J. W. FURBUSH.

BUTTON HOLE SEWING MACHINE.

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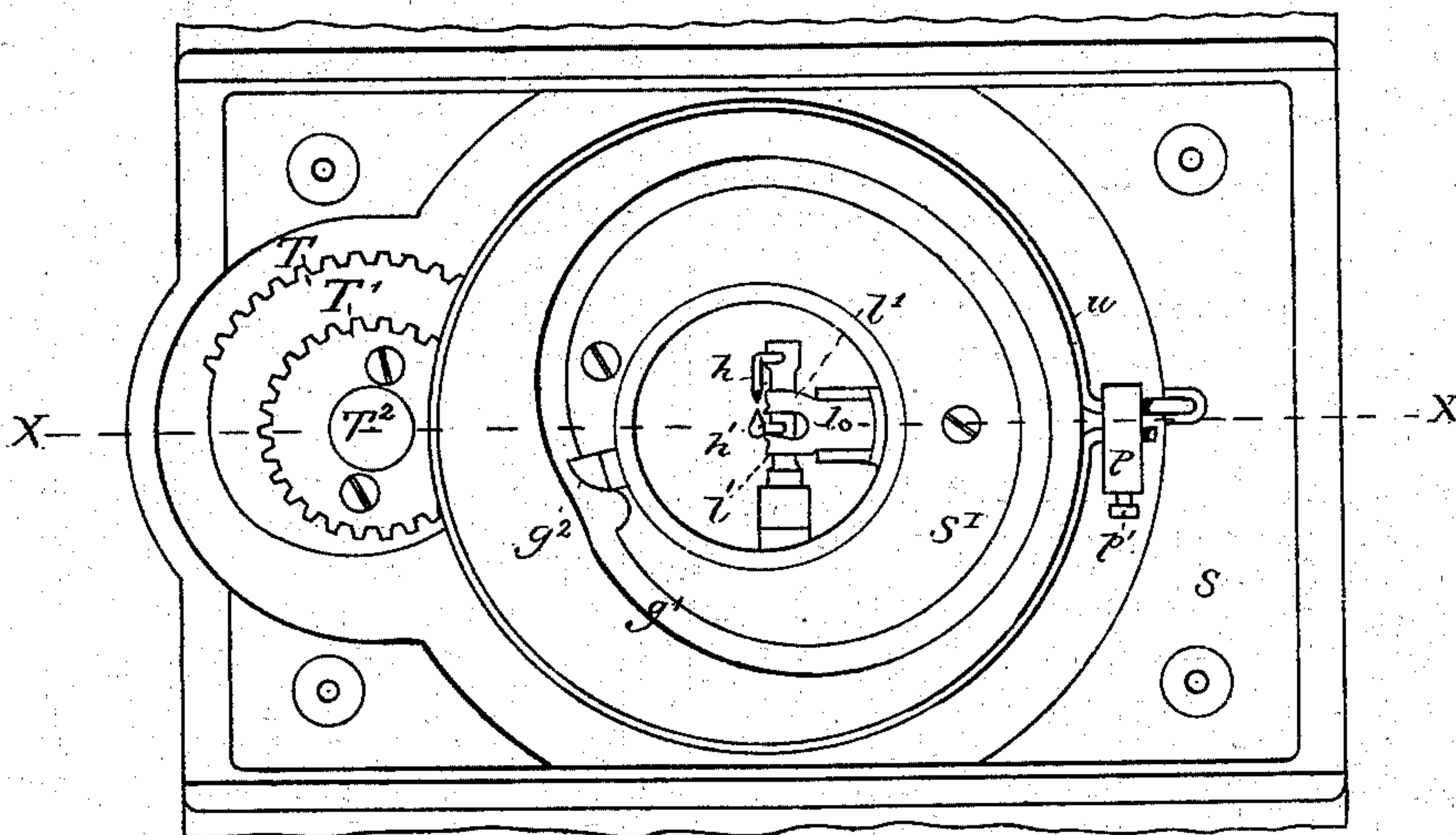


Fig. 9-

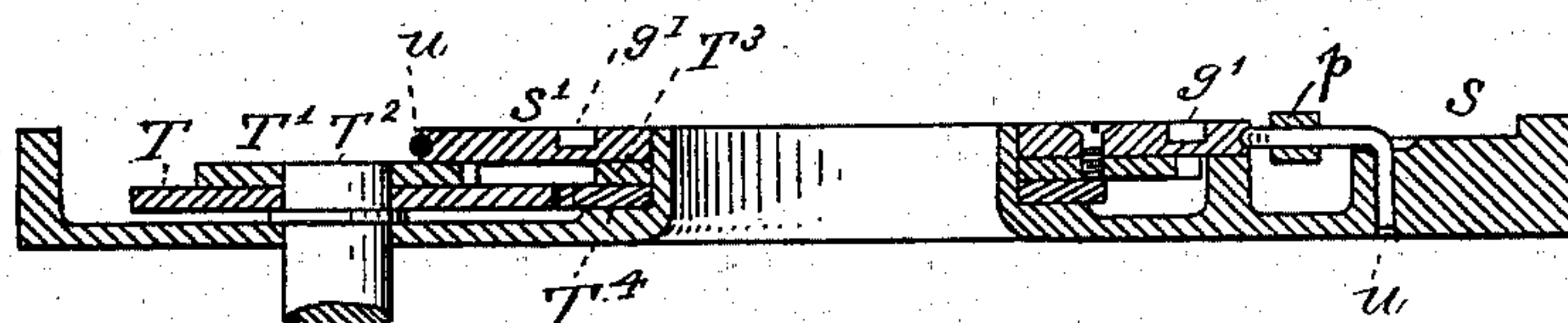
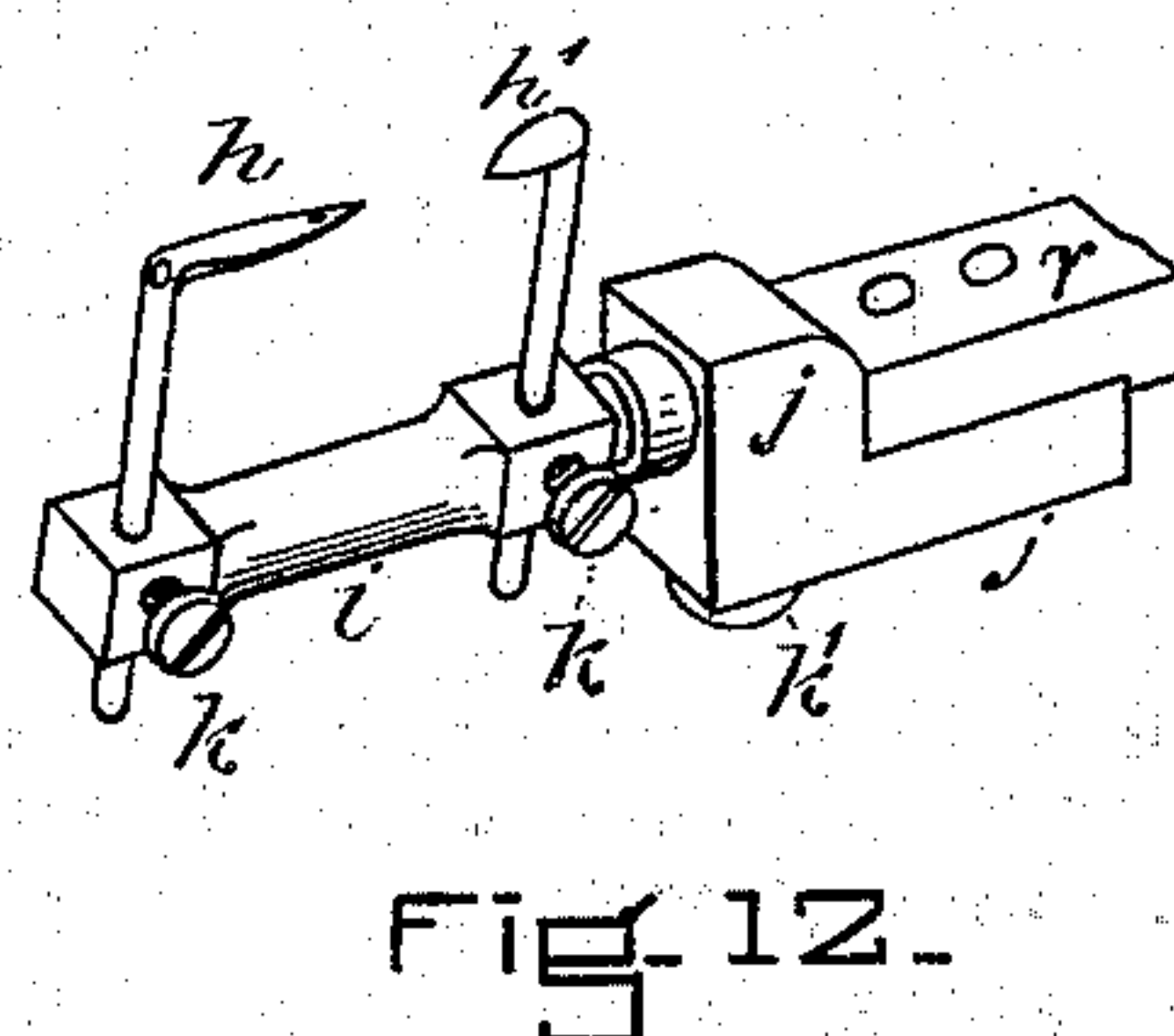
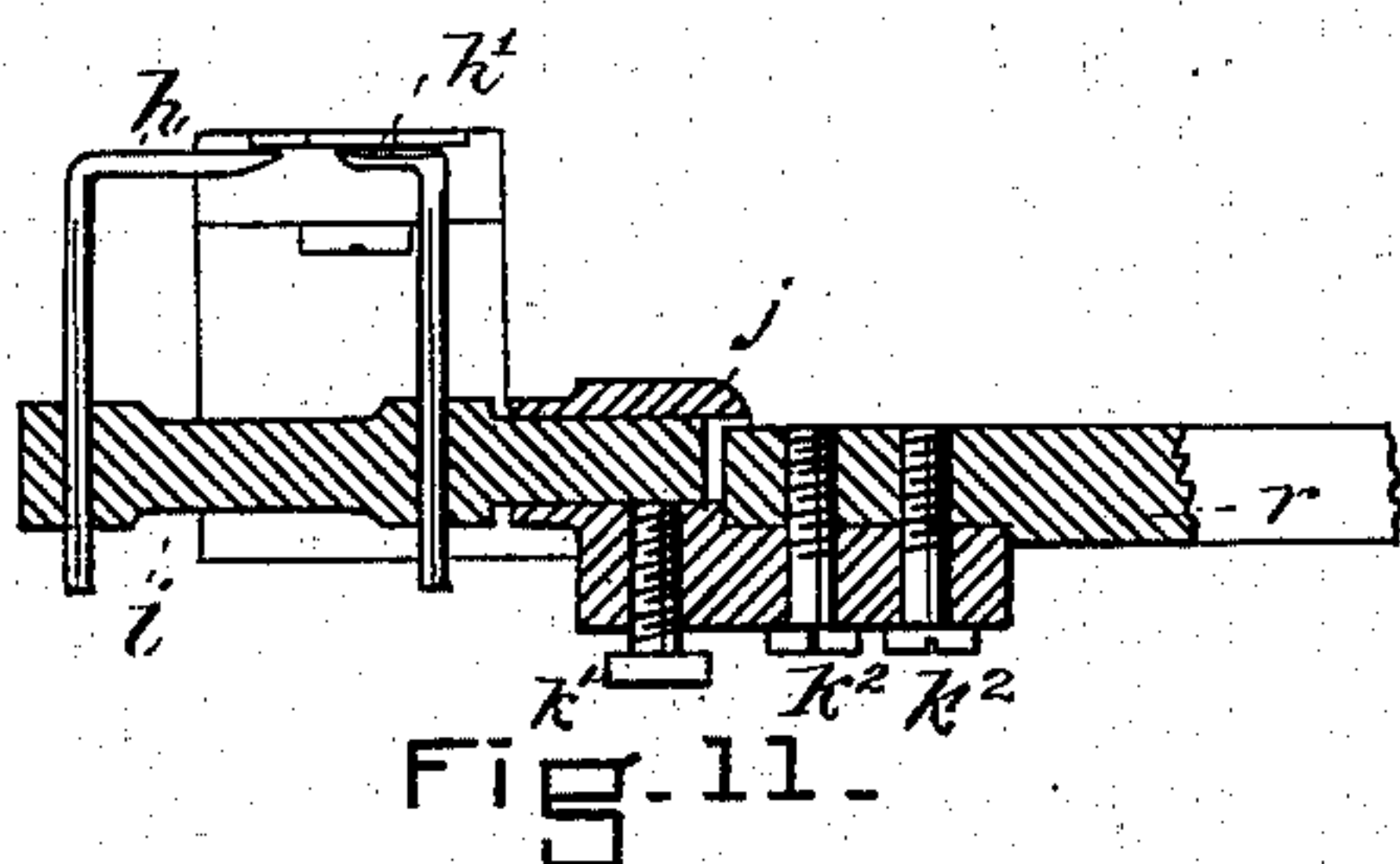
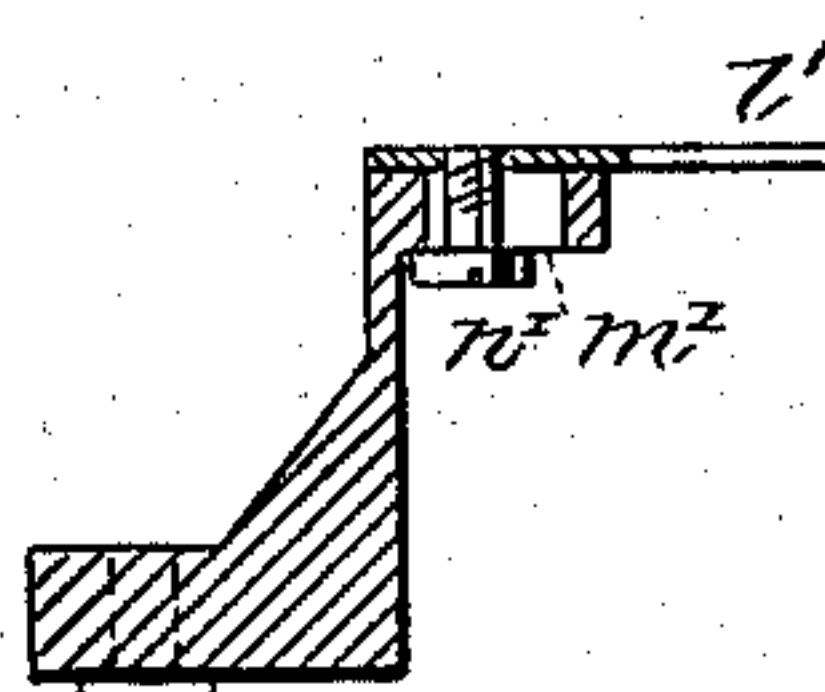
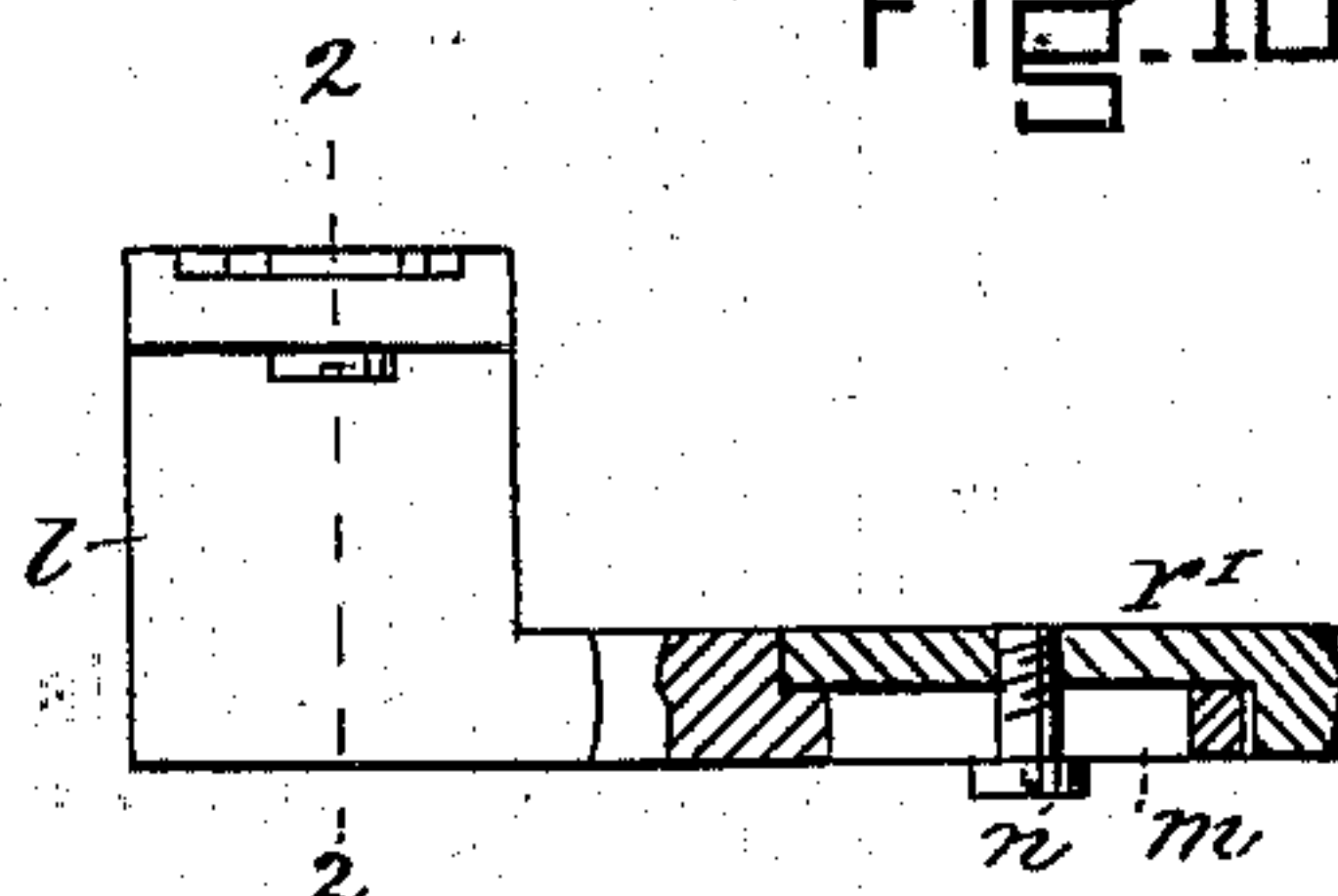


Fig. 10.



WITNESSES

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Fig. 13 -

Fig14 -

INVENTOR

James W. Lusk
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J. L. Newson

UNITED STATES PATENT OFFICE.

JAMES W. FURBUSH, OF LYNN, MASSACHUSETTS.

BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 276,387, dated April 24, 1883.

Application filed November 27, 1882. (Model.)

To all whom it may concern:

Be it known that I, JAMES W. FURBUSH, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Button-Hole Stitching-Machines, of which the following is a specification.

The improvements in button-hole sewing-machines herein described relate to improvements in the clamping devices, the spreader-bar, the looper-bar, the adjustable gage, and the friction-band around the feed-cam; and the object of my improvements is, first, to provide clamping mechanism for holding the cloth to the cloth-plate and spreading mechanism for spreading the unsewed button-hole for sewing, by which mechanism both the clamping and the spreading are accomplished by a single movement of the hand of the operator of the machine; second, to provide mechanism by which the spreader-bar, holding the loop-spreaders, can be adjusted laterally and at right angles to lateral motion; third, to provide mechanism by which both the loopers and the looper-bar are adjustable laterally and vertically; fourth, to provide mechanism by which an adjustable gage is provided for taking more or less hold of the edge of the material to be stitched about the button-hole; fifth, to provide mechanism by which a friction-band is secured around the periphery of the feed-cam for the purpose of securing uniformity of the stitches about the eye of the button-hole; and I attain the objects by the mechanism shown in the accompanying drawings, in which—

Figure 1, Sheet 1, represents the clamp, and is a plan with the presser-feet upon the cloth, clamping it to the cloth-plate beneath. Fig. 2 is a plan of the same with the presser-feet spreading the button-hole apart. Fig. 3 is a longitudinal vertical section of the same through the middle of the clamp. Fig. 4 is a vertical section of Fig. 1 in line *x x*. Fig. 5 is a plan, the cam-bar and lever being removed. Fig. 6 represents the standard and arm of the machine and the needle-bar, and is a side elevation showing the operating devices of this part of the machine. Fig. 7 is a plan of the under side of Fig. 6, taken in section of the standard in line *y y*. Fig. 8 is a vertical section of Fig. 7 in line *z z*. Fig. 9 is a plan of

the table under the needle-bar, the upper plate being removed. Fig. 10 is a vertical section of Fig. 9 in line *X X*. Fig. 11 is a section of the looper-bar, a part of the spreader and bar being shown in the rear. Fig. 12 is a perspective view of the loopers, looper-bar, and a portion of an arm to which the looper-bar is secured. Fig. 13 is an elevation and part section of the spreader-bar, showing the slot for lateral adjustment. Fig. 14 is a section of the spreader-bar, showing slot for vertical adjustment.

The letter A represents the plate of the clamp on which rest the devices for clamping; B, a slotted plate attached to A; C, the presser-feet holding the cloth having a button-hole to be sewed, a presser-foot on each side of the button-hole; D, arms or bars, one end of which hold each a presser-foot, and the other ends of which are fastened to a cross-bar, as shown in the figures; E, upright standards bearing a cam-bar holder; F, movable cam-bar; F', cam-bar holder passing through said cam-bar, having its ends supported by the standards E; G, cams bearing upon the arms D to clamp the cloth to the plate A; H, a cam on bar F, operating to spread the arms D; I, a lever attached to the bar F, as shown in Figs. 1, 2, 3, and 4. When the clamp is not in use its position is shown in Fig. 3. When the cloth is to be clamped to the cloth-plate and the button-hole spread for sewing the lever is pressed backward into the position shown in Figs. 1 and 2. When the button-hole is sewed the lever is raised to the position shown in Fig. 3.

K is a cam-pin, its lower end fitting into a groove in the feed-cam, (shown in Fig. 9;) L, a cylinder in which is inclosed said cam-pin; *a a*, spiral springs under the arms D, upon which bear the cams on bar F; *a'*, a rest or stay under cam-bar F; *b*, a spiral spring in cylinder L; *c c*, plates or rests upon which the arms D rest, and which plates are attached to said arms; *c' c'*, the edges of the plates *c c*; *d*, a piece of cloth having button-hole; *e*, the button-hole; M, a standard, (shown in Fig. 9;) N, an overhanging arm joined to the standard M and bearing the needle-bar; O, the needle-bar; O', the needle-head, movable on the arm N and carrying the needle-bar laterally; O², a sliding bar moving laterally in the groove

of a lug which is secured to the under side of the arm N. (See Fig. 7.) One end of said sliding bar is secured firmly to the needle-head by its screw and its other end is joined to the link O^3 by a screw. $O^3 O^4$ are links; $O^5 O^6$, a lever. Said links and lever are movable at their connections, and in this way the needle-head O' is joined to the cam-wheel W, which revolves on the vertical shaft R, (see Fig. 7,) and thus the cam-wheel W, by means of the said sliding bar O^2 , the said links $O^3 O^4$, and the lever $O^5 O^6$ and screws f and f' , are connected with the needle-head O' for the purpose of moving said head and the needle-bar carried thereby laterally, that the needle may alternately descend in different vertical planes for forming the overseaming or button-hole stitch as the needle passes alternately through and over the edge of the material sewed in forming the button-hole stitch.

The outward throw of the needle is always the same; but in order to make the needle take more or less hold of the edge of the material about the button-hole the inward throw of the needle must be made adjustable. This I accomplish by the following-described mechanism, (see Figs. 6 and 7:) P is a thumb-screw passing through a slot, P' , in the slotted lug P^2 , which is attached by a screw to the side of the arm N. Said thumb-screw passes into the elbow P^4 , (see Fig. 7,) which elbow is held to the under side of the arm N by a screw, f^2 , (see Fig. 8,) and which is also joined to the link P^3 by another screw, f , on which it moves as a pivot. Said links O^3 and P^3 form at f' a toggle-joint, which is operated from the cam W by the lever $O^5 O^6$ and link O^4 , and said links O^3 , O^4 , and P^3 pivot on said screw f' . If, therefore, the thumb-screw P be moved laterally, motion is communicated by the elbow P^4 to the link P^3 , which operates on the toggle-joint. For example, take Fig. 7. The thumb-screw P is at the extreme left in the slot P^2 . Move the thumb-screw to the extreme right, the bent line $z z$ will become nearly straight and the link P^3 will be pushed laterally, so that the links P^3 and O^3 will also be in nearly a straight line in reference to each other, and the link O^3 and slide O^2 will push outward the head O' . So any change of P from left to right or right to left will, though slightly, change the position of the needle-head O' , carrying the needle-bar O, and consequently adjust the stitch with reference to the edge of the button-hole.

The cam W has a circular groove in its upper side, into which fits a pin (see dotted lines, Fig. 7,) in the end of the lever O^6 , and the lever $O^6 O^5$ is pivoted at f . Consequently the spaces occupied by the links O^4 , O^3 , and P^3 , movable at their connection, are lengthened and shortened alternately as the cam revolves on the shaft R, thereby causing the needle-bar to descend in different planes.

Q is the main shaft by which the needle-bar is moved up and down; Q' , bevel-gears on the

main shaft; R, vertical shaft, whose bevel-gears R' engage the bevel-gears Q' . f represents the screws uniting and holding the arms and levers.

S represents a table or table-bed under the needle-bar, (see Fig. 9;) S' , the feed-cam covering segmental gears; T, a sector of the driving segmental gears; T' , a spur or driving wheel geared and attached to a driving-shaft, T^2 ; T^3 and T^4 , segmental gears, partly shown in Fig. 10. The action of this gearing is fully explained in Patent No. 207,173.

U is a friction-band in the groove of the edge of the feed-cam S' ; g' , a groove in the face of said feed-cam; h and h' , loopers; i , looper-bar; j , holder of looper-bar; k , set-screws to adjust loopers; k' , set-screws holding looper-bar to the holder; k^2 , screws holding the looper-holder to an arm, r ; l , a spreader-bar; l' and l'' , prongs to the spreader; m , a slot in the spreader-bar, in which the position of the spreader is changed; m' , slot in spreader-bar, through which the spreader is adjustable horizontally; n , set-screws, by which the position of the spreader, when changed, is set fast; r , an arm, to which the looper-bar holder is fastened by the screws k^2 , and said arm is attached to and actuated by a cam-wheel on the vertical shaft R. (Said cam-wheel is not shown in drawings.)

r' is an arm, to which the spreader-bar l is attached, and which is actuated by a cam-wheel on shaft R. (Not shown in the drawings.)

Having thus designated and explained the drawings and the letters thereon, I will now more particularly point out the use and operation of my improvements, and first illustrate the clamping of the cloth to the table by means of presser-feet by a single cam motion. Fig. 4 in the drawings shows the cam-bar F, which moves upon a bar, F' , passing through the said cam-bar F, and the ends of which extend through and are supported by the standards E. Upon said cam-bar are the cams G G, and between them is a cam, H, of peculiar form, shaped somewhat like a truncated wedge, and the face of which is concave. When the lever I, standing as shown in Fig. 3, is depressed backward in the position shown in Fig. 1, the cams G G strike upon the arms D D, which carry the presser-feet C C. This pressure brings the presser-feet upon the cloth, as shown in Fig. 1, and the cloth is clamped to the cloth-plate A, and by continued depression of the lever the cam H (see Fig. 3) enters between the plates or rests $c c$ at the edges $c' c'$, (see Fig 5,) and thus spreads the arms D D, which carry the presser-feet, spreading the button-hole e of the cloth d , as shown in Fig. 2. A rest, a' , will be observed in Fig. 4 under the cam-bar. When the cam-bar strikes upon this rest the lever cannot be depressed farther, and the danger of breaking the arms D D is avoided.

Fig. 9 shows the bed of a table and the feed-

cam under the needle-bar, the plate covering the screw being removed, and shows the sector T and the driving geared wheel T'. These engage the segmental gears T³ and T⁴, partly shown in section, Fig. 10; also the friction-band *u*, which lies in the groove around the rim of the feed-cam S', and is keyed by a slotted block, *p*, said slot not being shown in the drawings, and screw *p'* and one end of the band is secured in the bed S. (See Fig. 10.) The band is immovable.

The machine in operation goes three times as fast around the eye of the button-hole as down its sides, and this tends to throw or to speed too fast, and is likely to make too long stitches. The friction-band checks the speed and steadies the cam, and the friction is regulated by the slotted block *p* and set-screw *p'*. The shaft T² and the groove *g* in face of feed-cam S' are also seen.

Fig. 12 is an enlarged view of the loopers and looper-bar and the screws adjusting the same, and Fig. 11 shows how the parts are joined and secured. The loopers can be moved and set in any desired direction, and the looper-bar *i* is round where it enters the bar-holder *j*, so it can be turned in any direction desirable in operation and secured by the set-screw K'. Fig. 13 shows a part elevation and part section of the spreader-bar *l* and the arm *r'* united to the bar by screw *n*, and Fig. 14 is a vertical section through the spreader *l'* in line 2 2, and the slot *m'* in the bar. This allows the spreader to be adjusted, and when thus adjusted it is secured by the set-screw *n'*. The slot *m*, also in Fig. 13, enables one to lengthen or shorten the spreader-bar *l* and secure the same by screw *n*.

The object of having the loopers and spreader adjustable is as follows: When the machine is put together there is always more or less variation in the holes in the castings, it being almost impossible to get two machines exactly alike. The slots and set-screws above describe enable the machinist quickly to adjust the loopers and spreader-points in their relation to each other. Again, when it is necessary to narrow the gage or take a less deep stitch in the material the position of the looper and spreader-points must be changed, at least in extreme changes—as from cloth to kid work, the cloth requiring a deeper stitch than kid-work. The arms *r* and *r'* are arranged and operated in the same manner as in the Union button-hole machine.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a button-hole sewing-machine, the combination of the plates A and B, the standards E, the cam-bar holder F', the cam-bar F, having thereon cams G G, the lever I, the arms D, the presser-feet C, the spiral springs *a*, and the rest *a'*, substantially as shown, and for the purpose specified.

2. In a button-hole sewing-machine, the combination of the plates A and B, the standards E, the cam-bar holder F', the cam-bar F, having thereon a cam, H, the arms D, the presser-feet C, the spiral springs *a*, and the plates *c*, whose adjacent edges *c'* form a truncated wedge-shaped opening, whereby by depressing the lever I said cam H enters said truncated wedge-shaped opening and spreads the arms D, substantially as shown and described.

3. In a button-hole sewing-machine, the combination of the plates A and B, the standards E, the cam-bar holder F', the cam-bar F, having thereon the cams H and G G, the lever I, the arms D, the presser-feet C, the spiral springs *a*, and the plates *c*, whose adjacent edges *c'* form a truncated wedge-shaped opening, substantially as shown, and for the purpose described.

4. In a button-hole sewing-machine, the combination of the overhanging arm N, the needle-bar O, the needle-head O', the sliding bar O², the arms O³ and O⁴, the lever O⁵ O⁶, the cam-wheel W, the screws *f*, the thumb-screw P, the slotted lug P², the lever P⁴, and link P³, substantially in the manner and for the purpose shown and described.

5. In a button-hole sewing-machine, the combination of the looper-bar *i*, having adjustable loopers *h* and *h'* and set-screws *k*, and the arm *r*, joined to the bar-holder by the screws *k*², substantially in the manner and for the purpose described.

6. In a button-hole sewing-machine, the combination of the spreader-bar *l*, having therein slots *m* and *m'*, the spreader *l'*, the arm *r'*, to which the spreader-bar is united by set-screw *n*, and the set-screw *n'*, substantially in the manner and for the purpose shown and described.

JAMES W. FURBUSH.

Witnesses:

J. L. NEWTON,

J. C. LITTLEFIELD.