

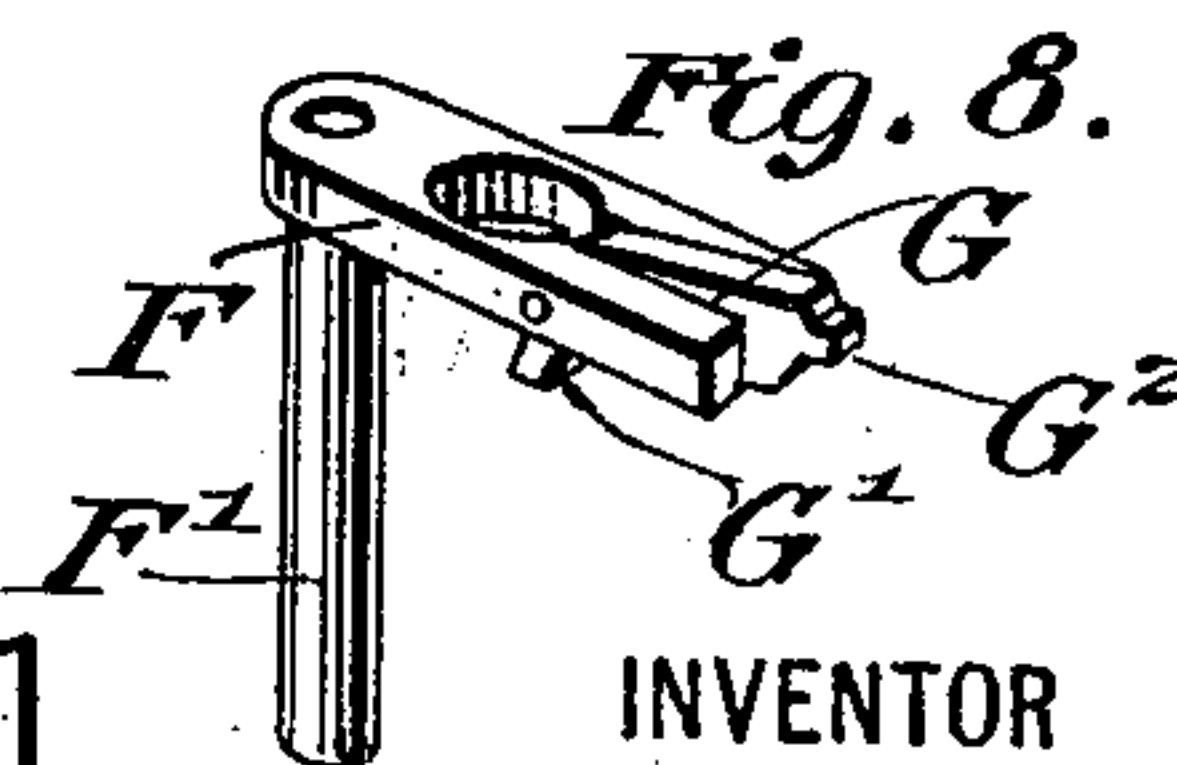
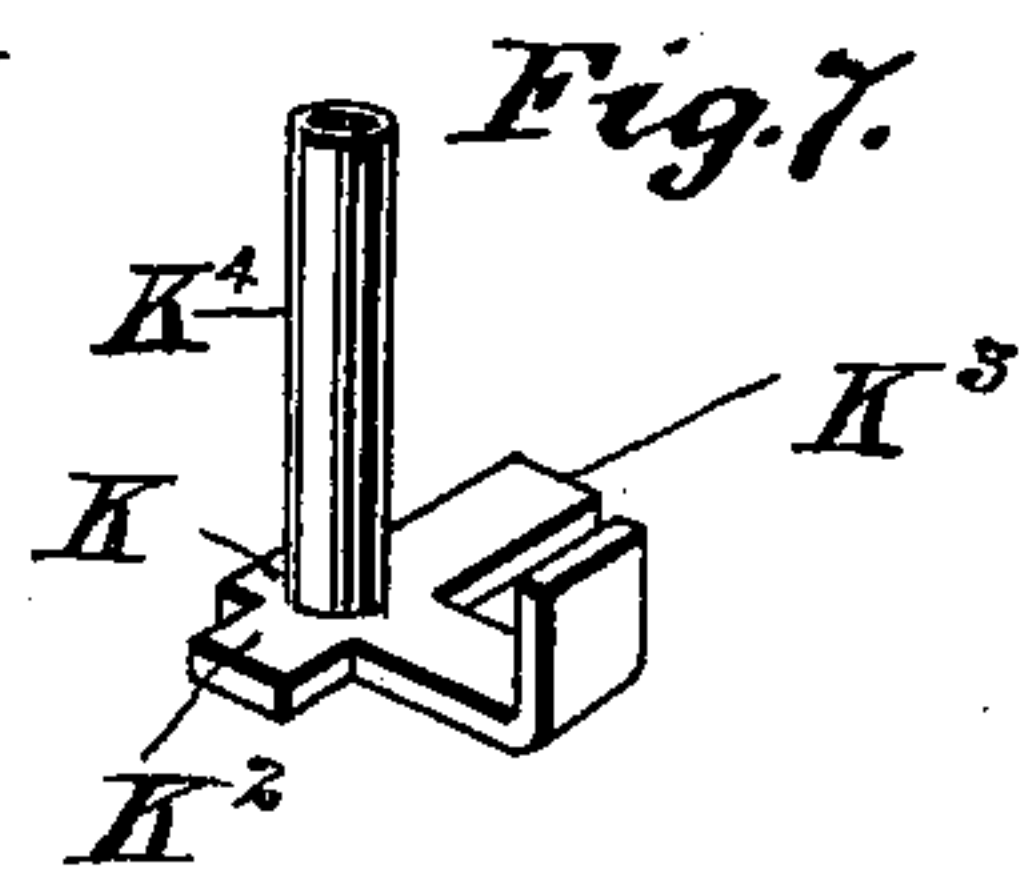
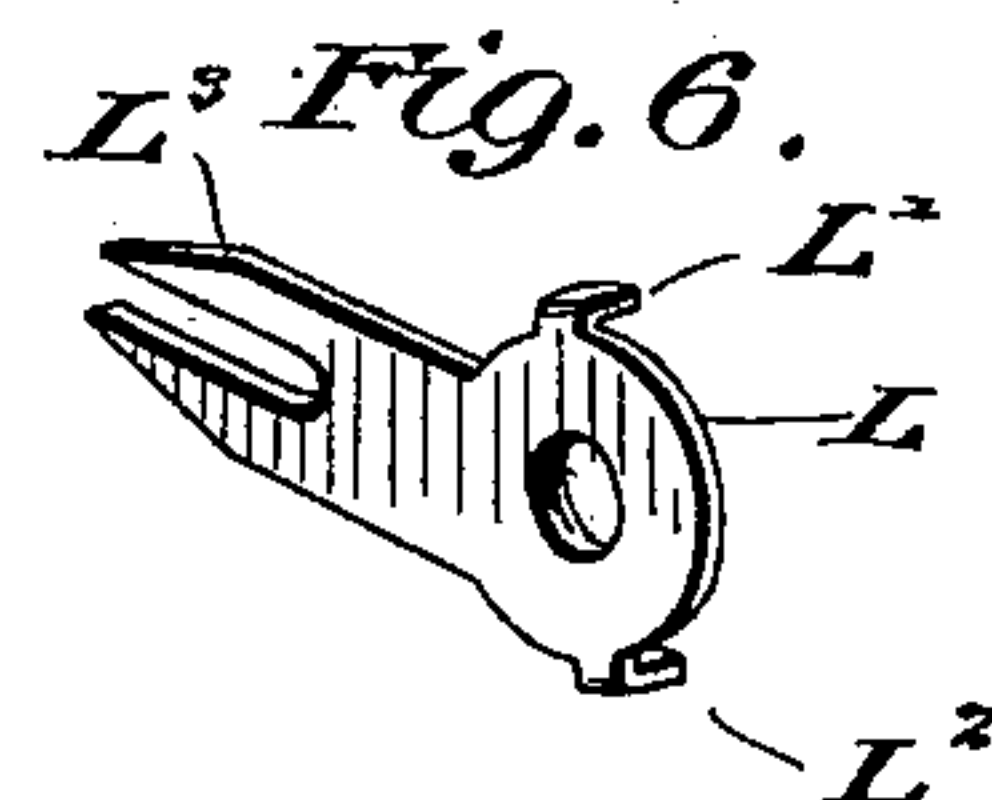
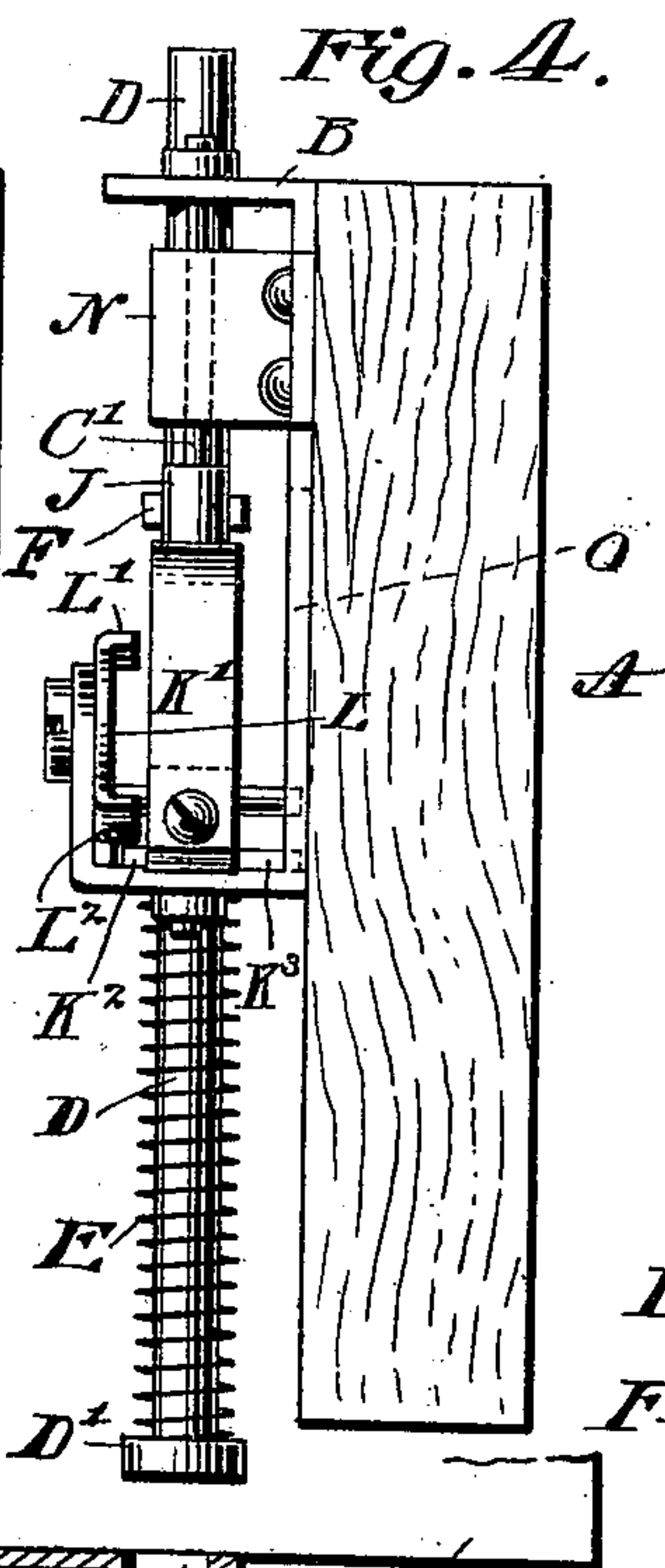
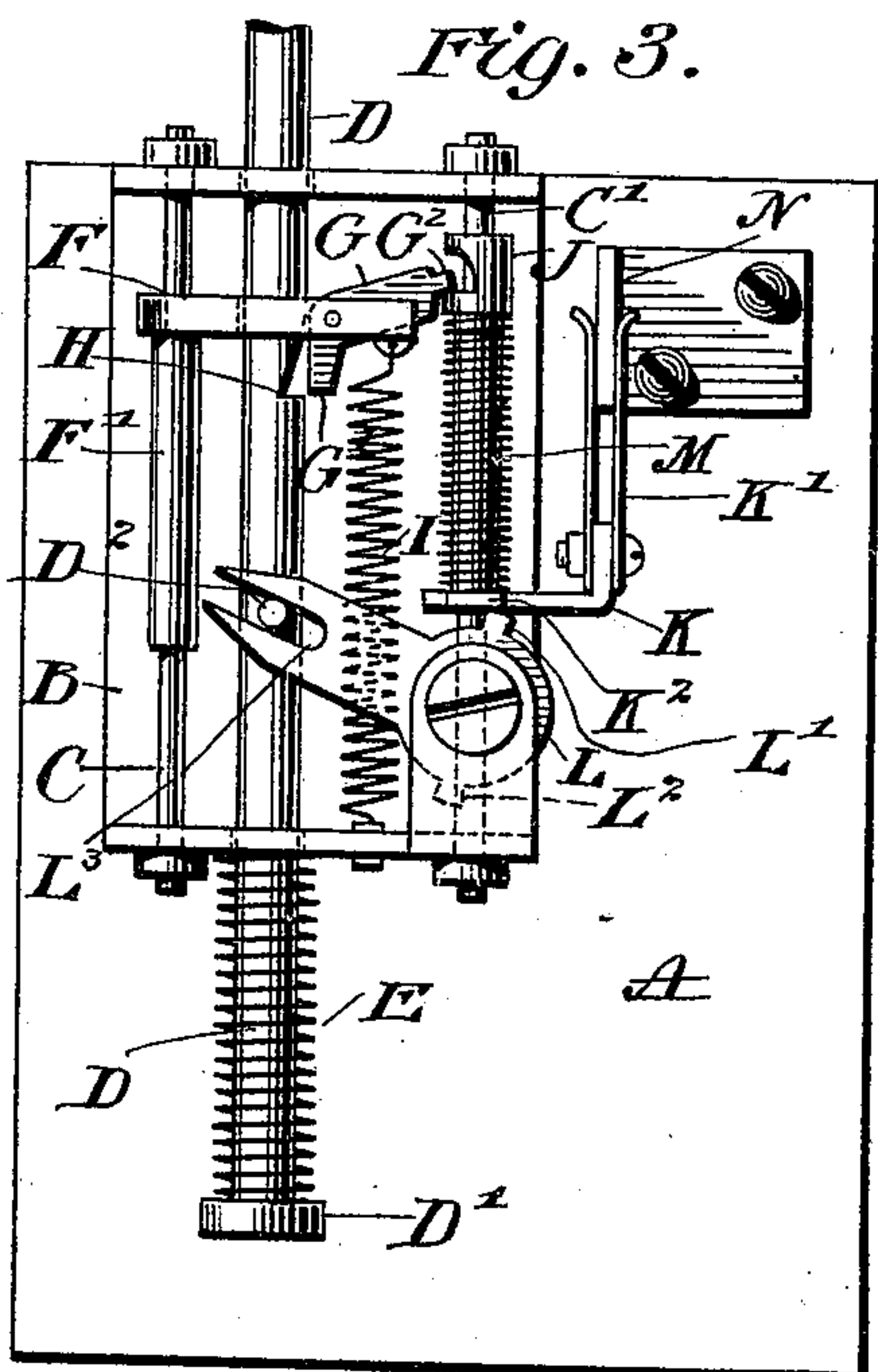
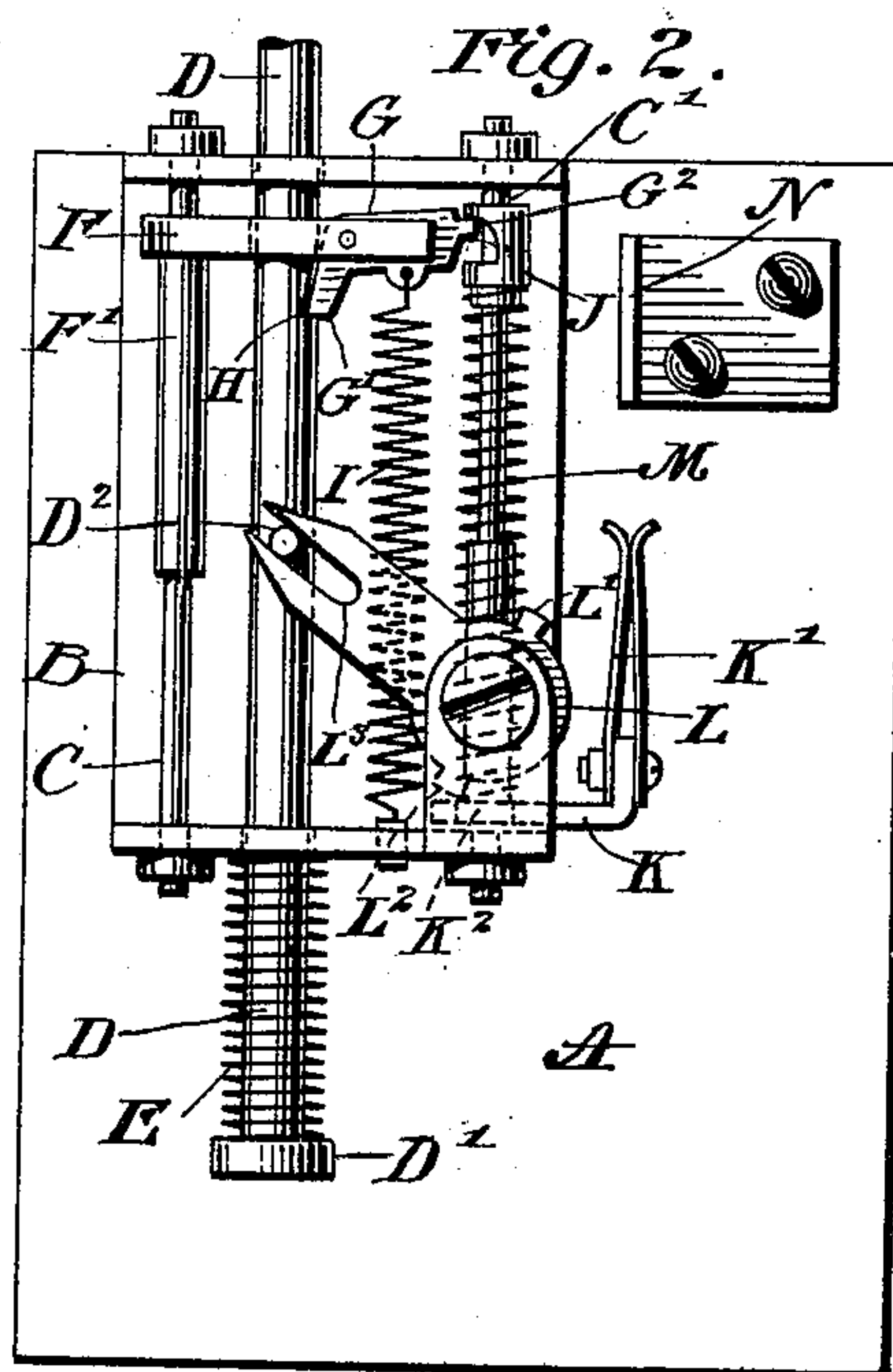
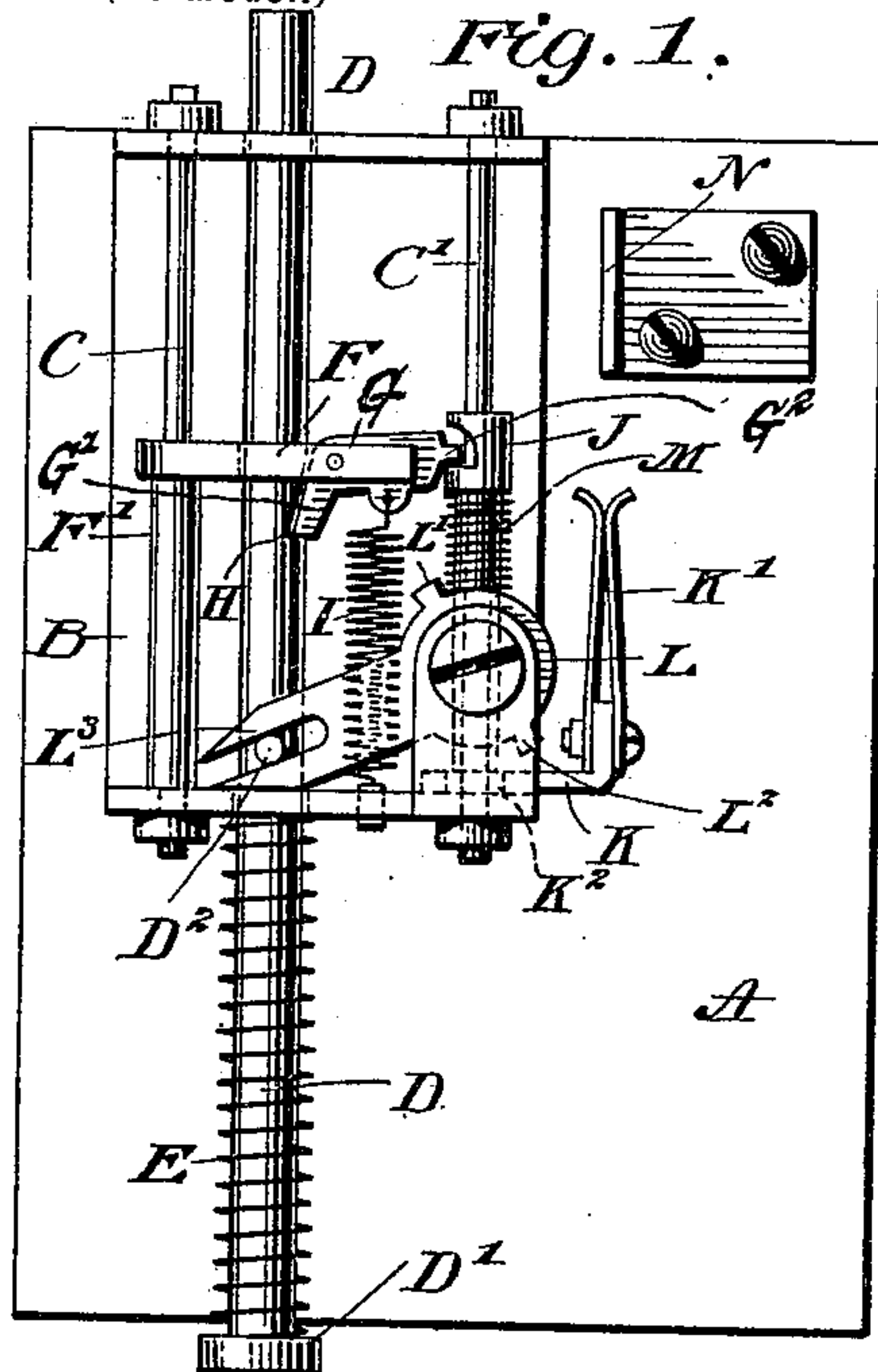
No. 631,303.

Patented Aug. 22, 1899.

G. W. HART.
ELECTRIC SWITCH.

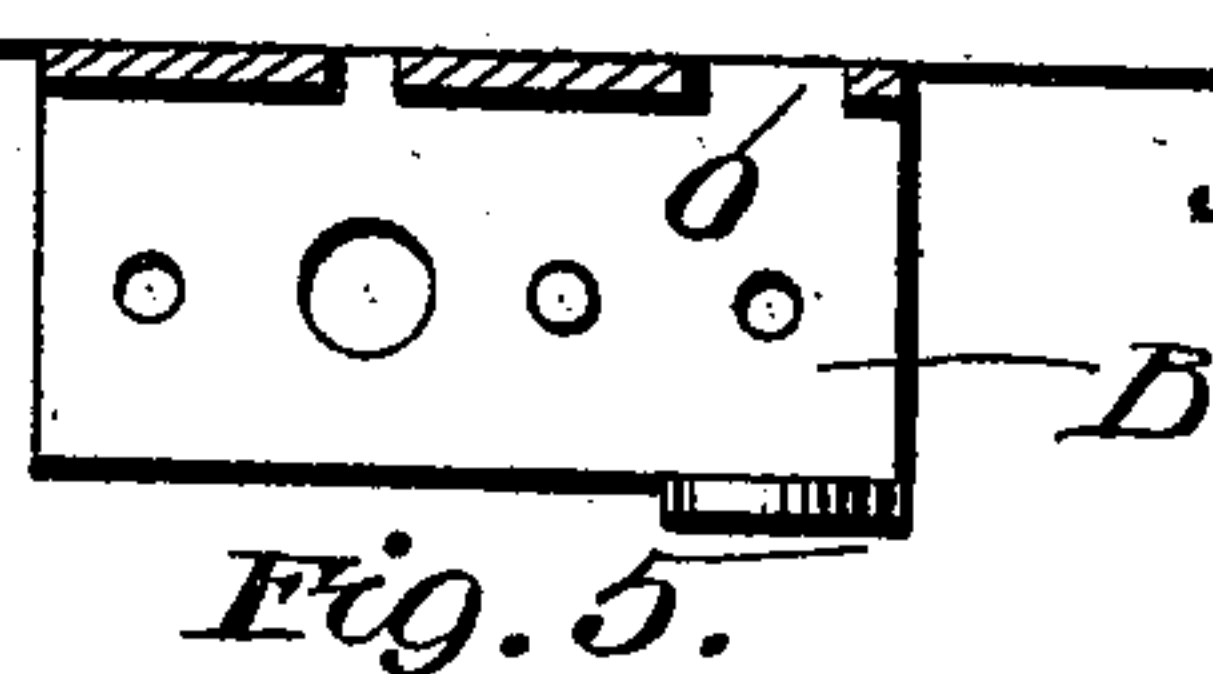
(Application filed Dec. 5, 1898.)

(No Model.)



WITNESSES:

Paul S. Ober
L. V. Ueland



INVENTOR
Gerald W. Hart

BY *R. C. Mitchell*
ATTORNEY

UNITED STATES PATENT OFFICE.

GERALD W. HART, OF WEST HARTFORD, CONNECTICUT.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 631,303, dated August 22, 1899.

Application filed December 5, 1898. Serial No. 698,261. (No model.)

To all whom it may concern:

Be it known that I, GERALD W. HART, a citizen of the United States, residing at West Hartford, Hartford county, Connecticut, have
5 invented certain new and useful Improvements in Electric Switches, of which the following is a full, clear, and exact description.

My invention relates, primarily, to snap-switches and the like, chiefly useful in electrical service for quickly making or breaking
10 a circuit.

One of the main objects of my invention is to produce a snap-switch embracing the desirable features of simplicity, effectiveness,
15 durability, and economy, which device may be constructed to occupy a small space, preventing the disfiguring of the wall or wood-work upon which or in which such devices are ordinarily placed. Another advantage
20 that this switch possesses is that only one main operating part or handle may be employed to effect the making or breaking of the circuit. In case the operating part is a push-button the position of same indicates
25 whether the circuit is open or closed. For instance, if the button is in, the position of same indicates that the circuit is "on." If the button is out, its position indicates that the circuit is "off." This, it will be recognized,
30 is an important advantage, particularly when the switch is placed in a dark chamber or at a remote point from the device or devices to be thrown into or out of circuit. In the dark chamber, of course, it is of the
35 greatest value, as the sense of touch enables the operator to instantly detect whether the circuit is on or off, a thing it is impossible to do in the case of a two-button switch where the buttons are ordinarily of a contrasting
40 color, which must be seen in order that the operator may ascertain the condition of the circuit.

Another object is the provision of a mechanism which permits the switch being operated by successive movements of an operating part in the same direction or in opposite
45 directions, as desired. A switch constructed so as to be operated by successive movements of the operating parts in the same direction is of particular value when the position of the
50 operating part is to be relied upon for indi-

cating the condition of the circuit and also when a cord-pull is to be employed, in which latter case the switch is ordinarily placed at a point out of reach and a cord is attached
55 thereto leading down to a point within reach of the operator. The first downward pull closes the circuit. The second downward pull breaks and opens the circuit.

The switch hereinafter described possesses
60 other advantages which are not specifically mentioned, but which are the natural consequence of the construction and arrangement of the parts herein fully pointed out, and said advantages will be readily recognized and ap-
65 preciated by any one skilled in the art.

From the following description it will be seen that the moving parts of the switch may be arranged so as to be controlled either by a rectilinear movement or by a rotary move-
70 ment of the main operating part.

My invention is illustrated by the accompanying drawings, in which—

Figure 1 is a plan view of my switch, in which the parts are of such formation and in
75 such arrangement that the same may be operated by a rectilinear movement. Fig. 2 is a similar view, the parts being shown in what may be termed a "second" position. Fig. 3 is a similar view, the parts being shown in
80 what may be termed a "third" position. Fig. 4 is an end view of the parts shown in Fig. 1. Fig. 5 is a sectional view of the frame-support. Figs. 6, 7, and 8 are perspective views of separate details of the switch shown in the
85 preceding figures.

A represents the wall or other support for the switch.

B is a framework designed to support the operating parts.
90

C C' are guide-rods upon which moving parts reciprocate in the manner hereinafter described.

D is the main operating part in the form of a push-rod.
95

D' is a thumb-piece or press-button thereon.

E is a spring by preference provided to move the rod D in one direction.

F is a spring-actuated frame which may be in the form of a cross-head, through which
100 rod D passes, said cross-head having at one end a suitable sliding bearing F' on the guide-

rod C. For convenience of expression the frame F may be referred to hereinafter as the "spring frame."

G is a tilting detent pivoted to the spring-frame F to one side of its bearing F'. The inner end G' of this detent is when the parts are in the position indicated in Fig. 1 engaged in a notch or recess H in the side of the rod D. The detent G is by preference spring-actuated, as by the retracting-spring I, one end of which may be secured thereto, while the opposite end is secured to the frame B. At the outer end of the detent G is a nose G², which takes loosely into a notch in a collar J, which slides on the rod C', which collar is connected by means of a suitable driving-spring M to a contact-carrier K, which carrier is preferably provided with a tubular extension K⁴ and is arranged to slide upon the guide-rod C'.

K' is a contact-piece carried by K.

L is a rocking latch pivotally mounted in the supporting-frame B.

L' L² are shoulders carried by the latch L and adapted to perform the functions hereinafter described. At the opposite end of the latch L are suitable jaws or other connections L³, which engage with a pin or stud D², carried by the rod D, said connection being such that the said rod D may move freely in either direction. The carrier K has a shoulder K², adapted to be engaged by the shoulders L' L², as hereinafter described.

K³ is a downward extension from the carrier that may, if desirable, be provided, and the same may move in a suitable recess or slot O in the bed-plate of the frame B to prevent the said carrier from rolling on the rod C'.

N is the other contact-piece which in electrical service is insulated from the before-mentioned parts.

The operation of the parts thus far described is as follows: As shown in Fig. 1, the parts are in their "off" position. To close the circuit, the rod D is pushed inwardly and the frame F is caused to advance therewith, inasmuch as the detent G is in engagement with the notch H in said rod. As the nose G² at the opposite end of the detent is engaged with the collar J, the latter is also moved forward when said nose engages the upper edge of said notch therein. As these parts move forward, the tension of the springs I and M is increased, and at the same time the latch L is gradually turned. As soon as the operating handle or rod D has been advanced slightly from the position indicated in Figs. 1 and 4 the shoulder K² on the carrier K will be engaged by the shoulder L² of the latch. When said latch L has been turned sufficiently far, the shoulder L² is freed from the shoulder K² of the carrier, and the driving-spring M (then being under tension) causes the carrier K to jump ahead toward the frame F, bringing the pieces K' and N into contact and closing the circuit. In this position the

further forward movement of the carrier K is prevented by the tube K⁴, which abuts the collar J. Of course the spring M might perform this function of this tubular check, provided it were compressed so that its turns are brought together, thus forming, in effect, a tube. From the above and what follows it will be seen that the circuit is not closed and opened by a single continuous stroke of the operating part in one direction. Fig. 2 illustrates the position of the parts the instant before the shoulder L² is freed from the shoulder K² and just before the circuit is established. Upon withdrawing the pressure from the end of the rod D immediately after the circuit has been closed the tension of the retracting-spring I retracts the detent G, frame F, and the rod D, and the rod D on said rearward movement throws the latch L so that the shoulder L' will engage the shoulder K² on the carrier K, holding it from further rearward movement and at the same time holding the collar and frame F forward. Then the other parts continuing their rearward movement cause the nose G² of the detent G to engage with the lower surface of the notch in the collar J, into which it projects, so that said continued retraction of the parts will trip said detent into the position shown in Fig. 3, in which the end G' is removed from engagement with the notch H in the rod D. Thus the carrier (shown in Fig. 3) is locked in a position where the circuit is established through the medium of the contact-pieces K' and N. To break the circuit, it is only necessary to advance the push-rod D until the latch L is turned sufficiently to free its shoulder L' from the shoulder K² of the carrier K, at which instant the retracting-spring I (which is under tension) returns the frame F, the detent G, collar J, driving-spring M, carrier K, and the contact-piece K' to their original position. (Indicated in Fig. 1.) By releasing the pressure against the end of the rod D the spring E will cause the same to return to its original position, and the end G' of the detent will again drop into the notch H in said rod, all of the parts then assuming the position shown in Fig. 1.

Obviously the spring E might be dispensed with and the rod D drawn back by hand.

I have thus far described the switch as operated by successive movements in the same direction. It will be seen upon reference to the drawings that the switch may be operated by successive movements in the opposite direction. Thus when the operating part D is pushed in it will free the carrier, so that the contact-points will be brought together and the circuit closed. Instead of again pushing the rod D in the same direction to break the circuit said rod may be retracted, in which event the shoulder L' will travel across the rear face of the shoulder K² of the carrier and will pass the opposite edge of said shoulder, at which instant the spring I will retract the reciprocating parts to the position indi-

cated in Fig. 1. Other modifications and changes in the particular structures herein shown and described might be availed of without departing from the spirit and scope of the invention.

I have thus far described a switch embodying a unique principle, which switch may be actuated by a rectilinear movement of the main operating part.

It is manifest that the parts of the mechanism hereinbefore described may be altered in form and proportion without departing from the principle involved. Therefore I desire to have it understood that I contemplate that this invention is susceptible of many modifications and changes in the construction, proportion, and arrangement of the parts thereof without departing from the spirit and scope of the invention. For instance, the moving parts or some of them may be arranged to turn or rotate instead of being arranged to move in a rectilinear path, and such a modification will be found to be the subject-matter of my divisional application, Serial No. 707,399, filed March 1, 1899. While I have shown tension-springs in the drawings herein, it is obvious that any other suitable form of spring not technically a tension-spring may readily be substituted in lieu thereof.

What I claim is—

1. In a device of the character described, an operating part, a spring-frame separate therefrom, but cooperating therewith, a carrier, a latch operated by said operating part and coacting with the carrier, a spring for advancing the carrier when released, and a spring for returning the said frame and carrier, when the latter is again released.

2. In a device of the character described, an operating part, a spring-frame detachably engaged by said operating part, a carrier, a latch operated by said operating part and coacting with the carrier, a spring for advancing the carrier when the latch is released, and a spring for returning the spring-frame when the carrier is again released by said latch.

3. In a device of the character described, an operating part, a spring-frame separate therefrom, but coacting therewith, a detent detachably engaged with said operating part and means for tilting said detent, a carrier, a latch controlled by said operating part and coacting with said carrier, a driving-spring and retracting-spring.

4. In a device of the character described, an operating part, a contact-carrier, driving and retracting springs, means controlled by said operating part to store power in both of said springs, and means to release the driving-spring near the limit of the first advance movement of the operating part, and means to release the retracting-spring by a successive movement of said operating part.

5. In a snap-switch, a contact member, a latch therefor, an operating part, means for automatically throwing the contact member

in one direction by a movement of the operating part in one direction, and means for automatically throwing said contact member in a reverse direction by a succeeding movement of said operating part in the initial direction.

6. In a device of the character described, an operating part, a contact-carrier, a latch controlled by said operating part and cooperating with said carrier, a spring-frame controlled by said operating part, springs connecting said spring-frame with a frame-support and with the carrier.

7. In a snap-switch, a contact member, a latch therefor, an operating part, the position of said contact member being shifted by the first stroke of the operating part in one direction where said contact is locked until the second stroke of said operating part in the same direction whereby said contact member is unlocked and thrown in a reverse direction into its original position.

8. In a device of the character described, an operating part, a contact-carrying device, springs, a latch controlled by said operating part and cooperating with said carrying device, a spring-frame and means cooperating therewith to increase the power of said springs, and means for detachably holding the carrier and spring-frame in the forward position against rearward spring action.

9. In a snap-switch, a movable contact member normally locked in one position, an operating part, said contact member being unlocked and shifted into another position by a stroke in one direction of the operating part and there locked by a slight retractive movement of said operating part, and means to unlock said contact member and shift it into its original position by a second stroke of said operating part in the initial direction.

10. In a device of the character described, a main operating part, a carrier, a driving-spring therefor, a latch controlled by the movement of said operating part to engage and release said carrier, and means controlled by the further movement of said operating part after the carrier is released to move said carrier in a direction opposite to that induced by the driving-spring.

11. In a device of the character described, a main operating part, a carrier, a spring to advance said carrier, a latch operated by the movement of said operating part to alternately engage and release said carrier, and means operated by a successive movement of said operating part after the carrier is released, to move said carrier in a direction opposite to that induced by the first-named spring.

12. In a device of the character described, an operating part, a contact-carrier, a latch for detachably engaging said carrier near the end of its stroke, a spring-frame in detachable engagement to said operating part, means for advancing said carrier when first released by said latch, and means for retracting said carrier when again released by said latch.

13. In a device of the character described, an operating part, a spring-frame carrying a tilting detent, a spring for retracting said spring-frame and actuating said detent, a latch operated by said operating part, a carrier engaged by said latch, a driving-spring between said spring-frame and said carrier.

14. In a device of the character described, an operating part, a sliding spring-frame co-acting therewith, a sliding contact-carrier, a spring connection between said spring-frame and contact-carrier, a swinging latch operated by said operating part and adapted to engage the carrier, and a spring for retracting said spring-frame and carrier.

15. In a device of the character described, an operating part, a sliding spring-frame co-acting therewith, a sliding carrier, a sliding collar, a swinging latch controlled by said operating part and coacting with the carrier, a spring connecting said carrier and collar for advancing the carrier when said collar has been advanced by said spring-frame and when said latch is released, and a spring for returning the spring-frame, the collar, the first-mentioned spring and the carrier, when the latter is again released by said latch.

16. In a device of the character described, an operating part, a sliding spring-frame co-acting therewith, a detent, detachably engaged by said operating part, and means for tilting said detent into and out of engagement with said operating part, a carrier, a swinging latch controlled by said operating part, and coacting with said carrier, a spring connected to the spring-frame for retracting said carrier, and a spring connection between said spring-frame and carrier for advancing said carrier.

17. In a device of the character described, an operating part, a sliding contact-carrying device, a driving and a retracting spring, means controlled by said operating part to store power in both of said springs and means controlled by said operating part to release the driving-spring near the limit of advance movement of said operating part, and means to release the retracting-spring by a successive movement of said operating part.

18. In a device of the character described, an operating part, a contact-carrier, a plurality of springs, a latch controlled by said operating part and coöperating with said carrier, a sliding spring-frame, means for detachably engaging said spring-frame with said operating part to permit the power of the springs

to be increased, and means to detachably engage the spring-frame in its forward position and release it from engagement with said operating device when the carrier is advanced and before it can be retracted.

19. In a device of the character described, an operating part, a sliding contact-carrying device, springs, a swinging latch controlled by said operating part for engaging said carrier near the limit of its movement, a sliding frame and means coöperating therewith to increase the power of said springs.

20. In a device of the character described, an operating part, a contact-carrier, a latch having a plurality of projections each of which alternately engage and release said carrier, said latch being controlled by said operating part, means for advancing said carrier when released by one of said projections, means for retracting said carrier when released by the other projection.

21. In a device of the character described, an operating part, a contact-carrier, a spring-frame held in detachable engagement with said operating part, a latch having a plurality of shoulders, said shoulders alternately engaging said carrier, said latch being controlled by said operating part, means for advancing said carrier when released by one of said shoulders and means for retracting said carrier and spring-frame when released by the other shoulder.

22. In a device of the character described, an operating part, a sliding contact-carrier, a latch for alternately engaging said carrier near each end of its stroke, a spring-frame in detachable engagement with said operating part, means for advancing said carrier when first released by said latch, and means for retracting said carrier when next released by said latch.

23. In a device of the character described, an operating part, a sliding spring-frame carrying a tilting detent, a spring for retracting said frame and actuating said detent, a latch controlled by said operating part, a sliding carrier alternately engaged in its forward and rearward position by said latch, a driving-spring between said frame and said carrier, and means for tripping said detent.

Signed at Hartford, Connecticut, this 29th day of November, 1898.

GERALD W. HART.

Witnesses:

W. M. CORKINS,
ALBERT S. HOWE.