

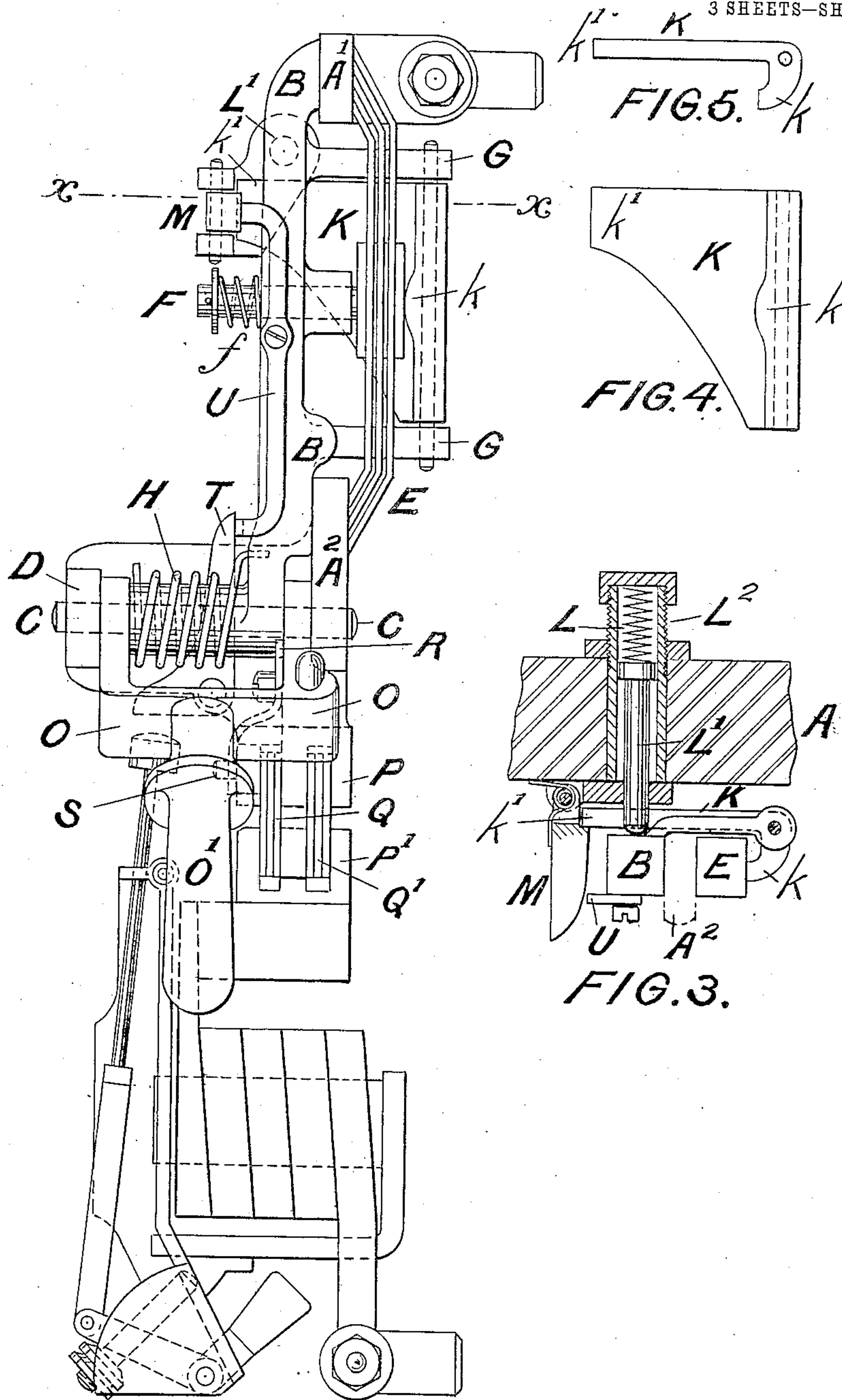
No. 818,614.

PATENTED APR. 24, 1906.

C. M. DORMAN, R. A. SMITH & H. G. BAGGS.
ELECTRICAL SWITCH AND CUT-OUT.

APPLICATION FILED MAR. 28, 1905.

3 SHEETS—SHEET 1.



WITNESSES.

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E. Howard

FIG. 1.

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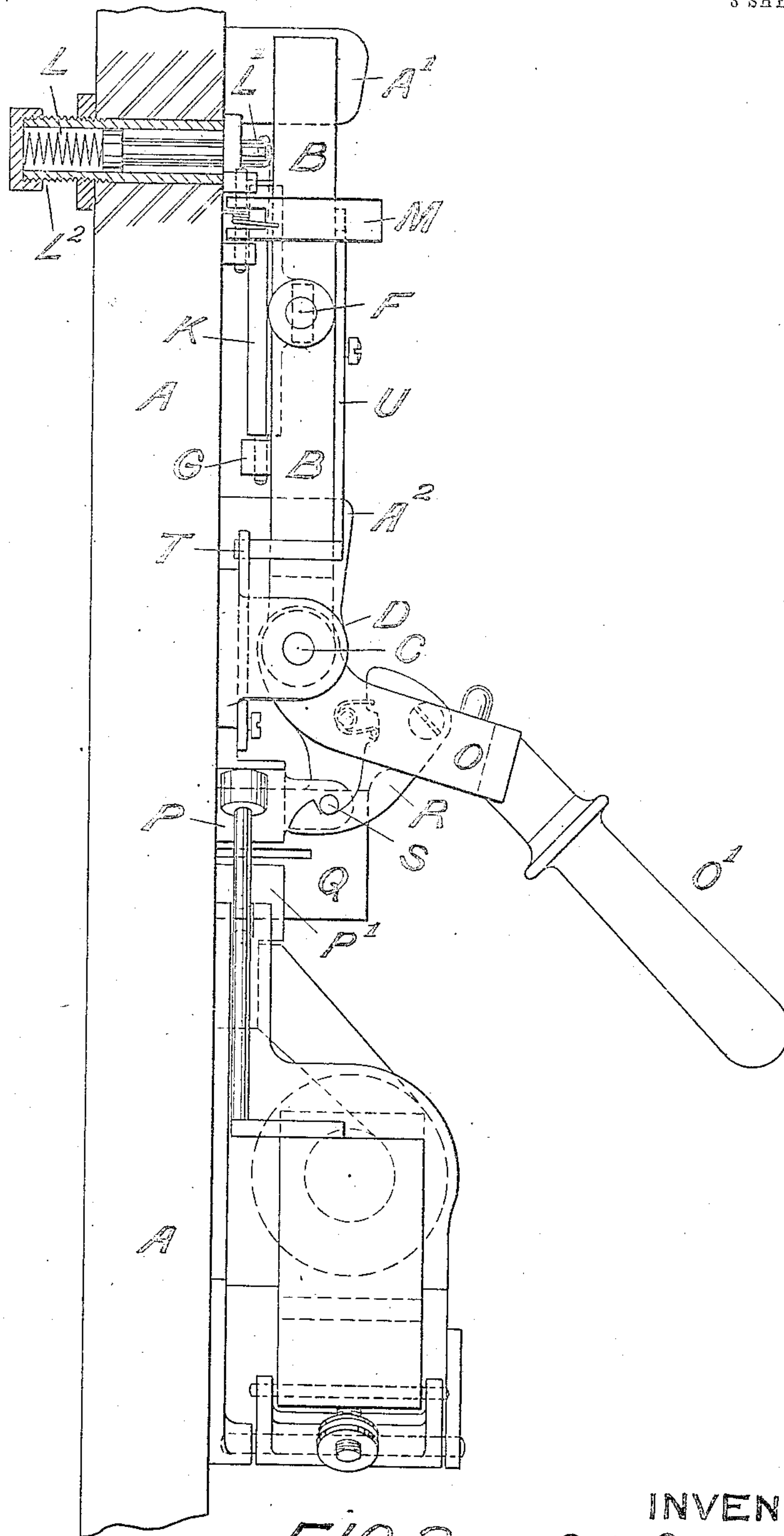
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3 SHEETS—SHEET 2.



WITNESSES.

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FIG. 2.

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APPLICATION FILED MAR. 23, 1906.

3 SHEETS—SHEET 3.

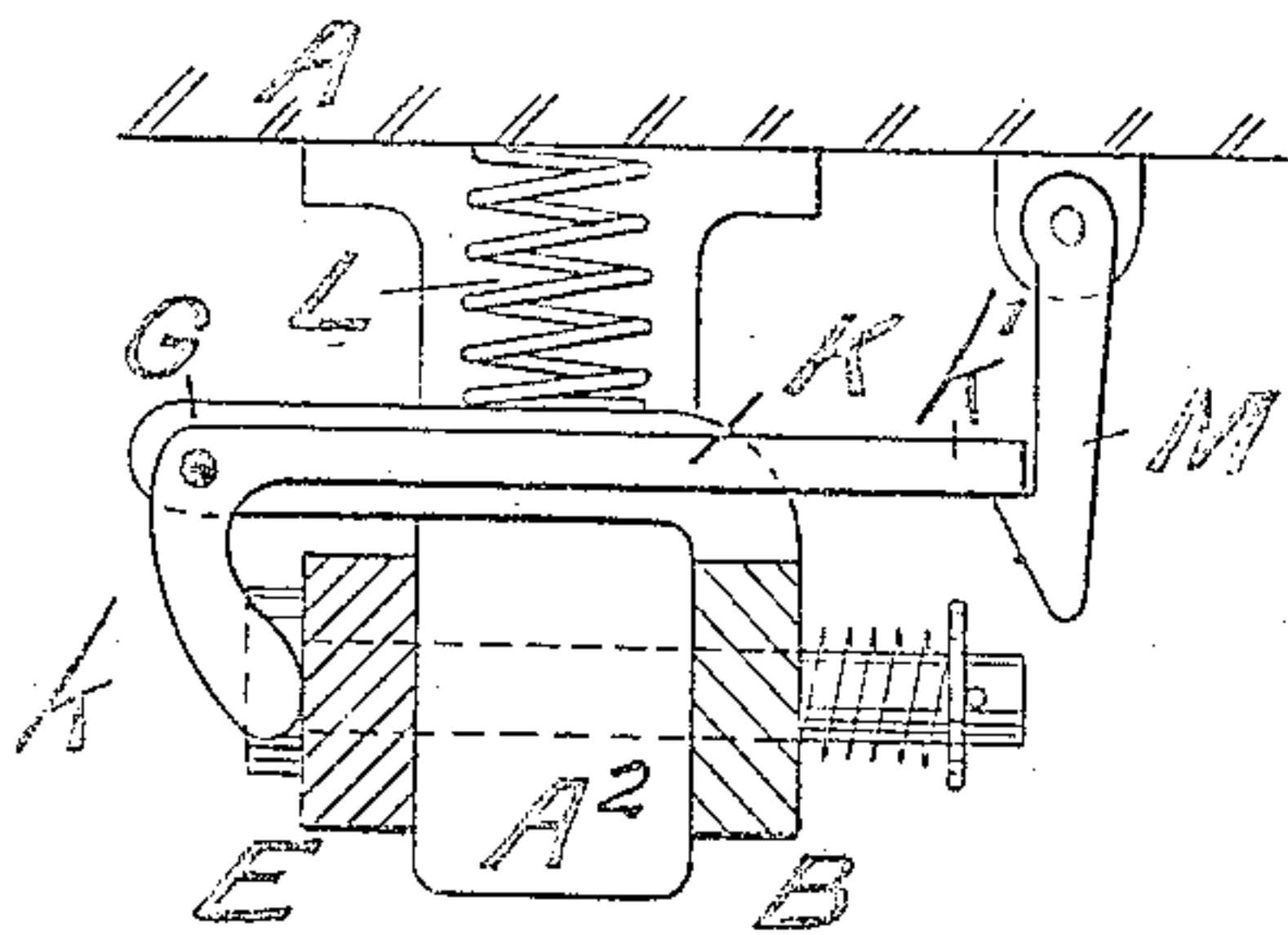


FIG. 6.

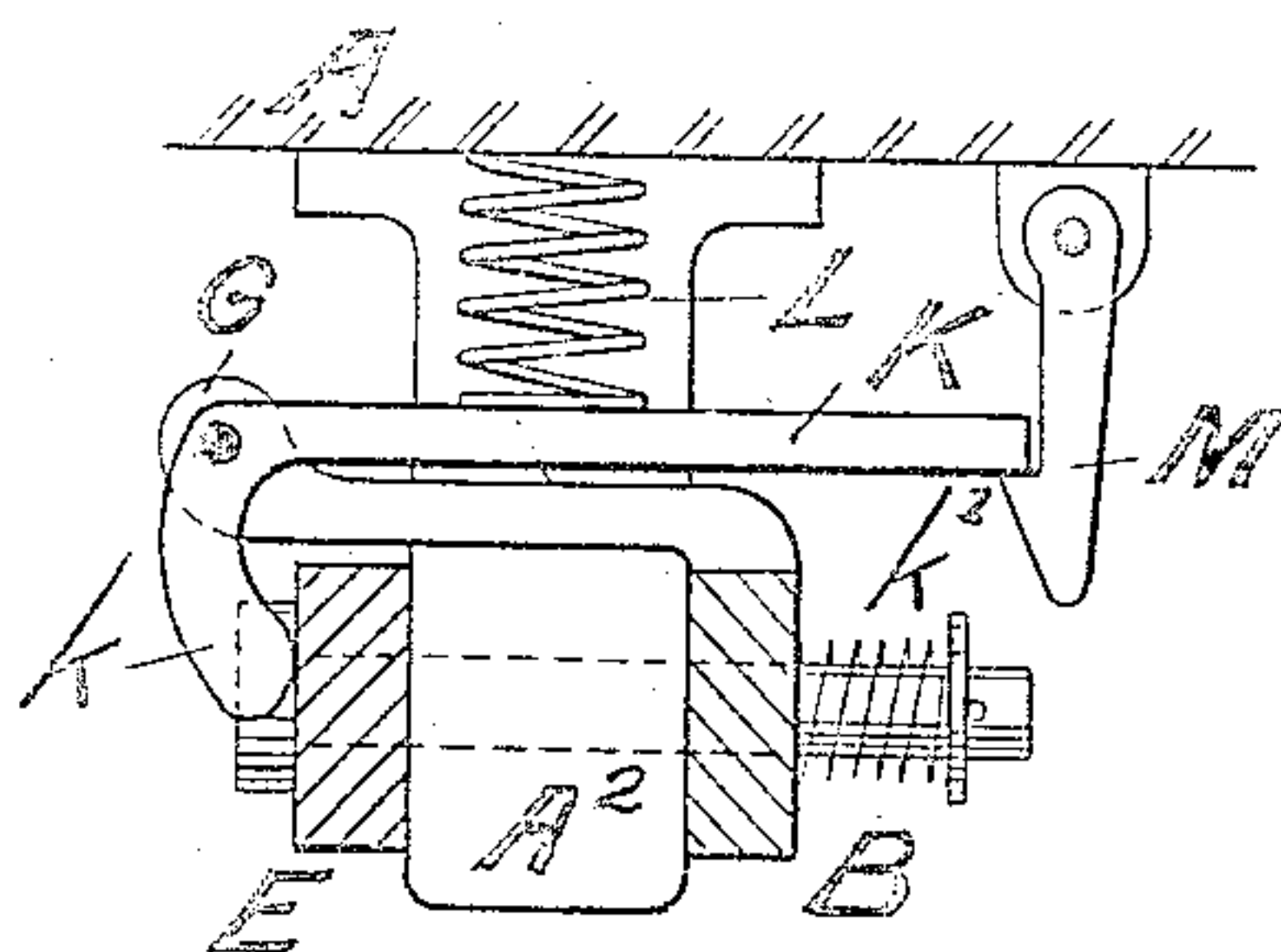


FIG. 7.

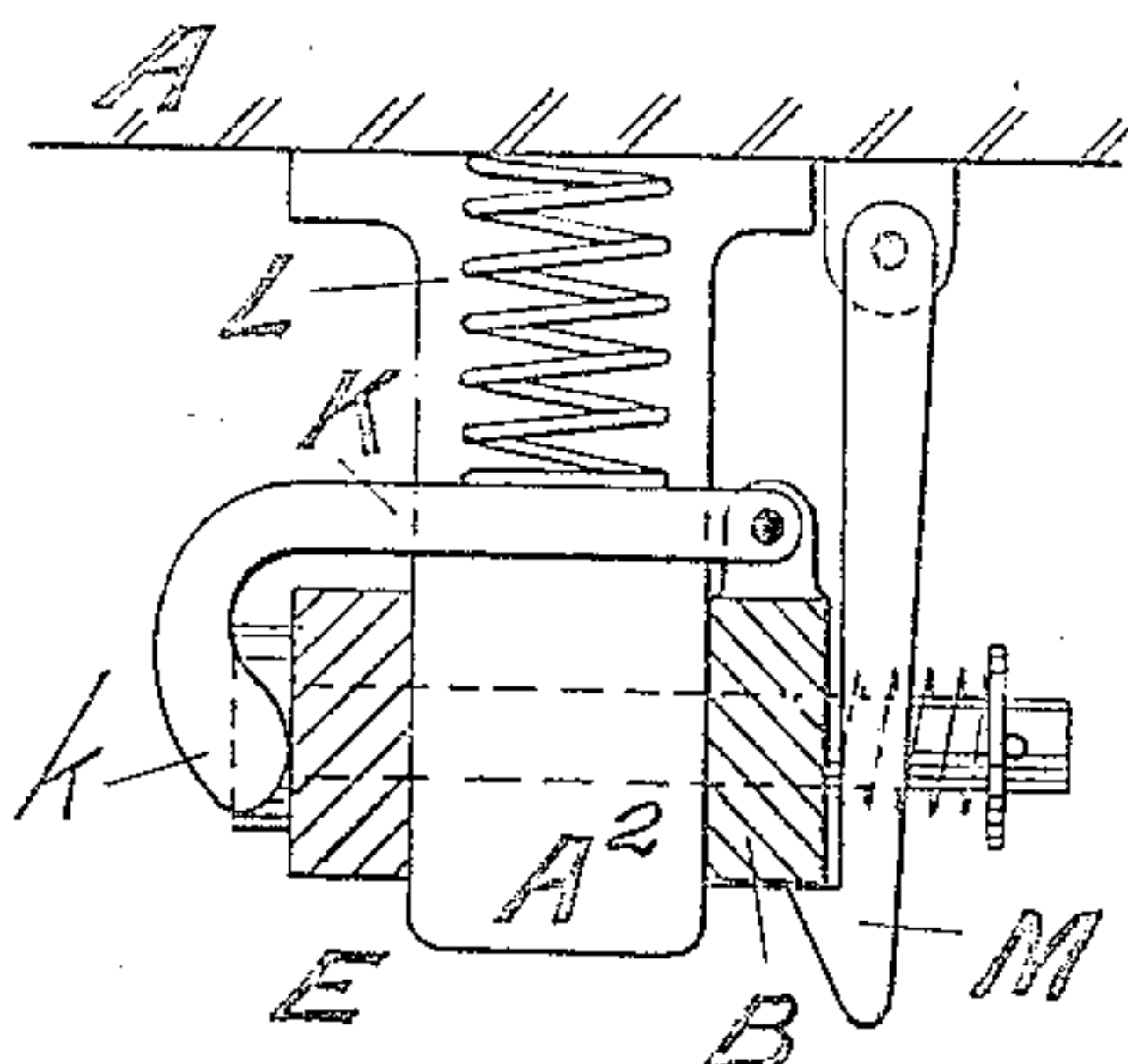


FIG. 8.

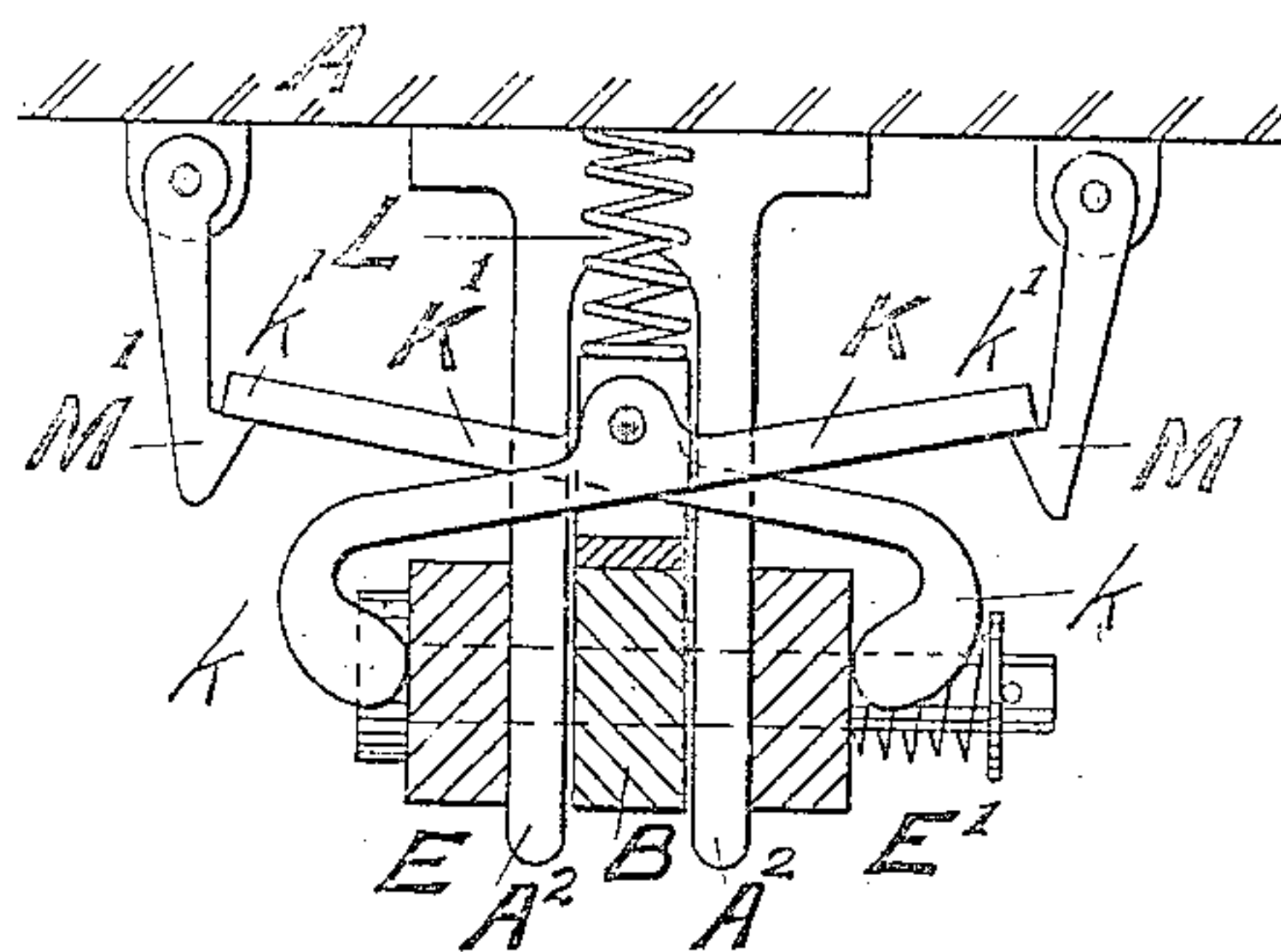


FIG. 9.

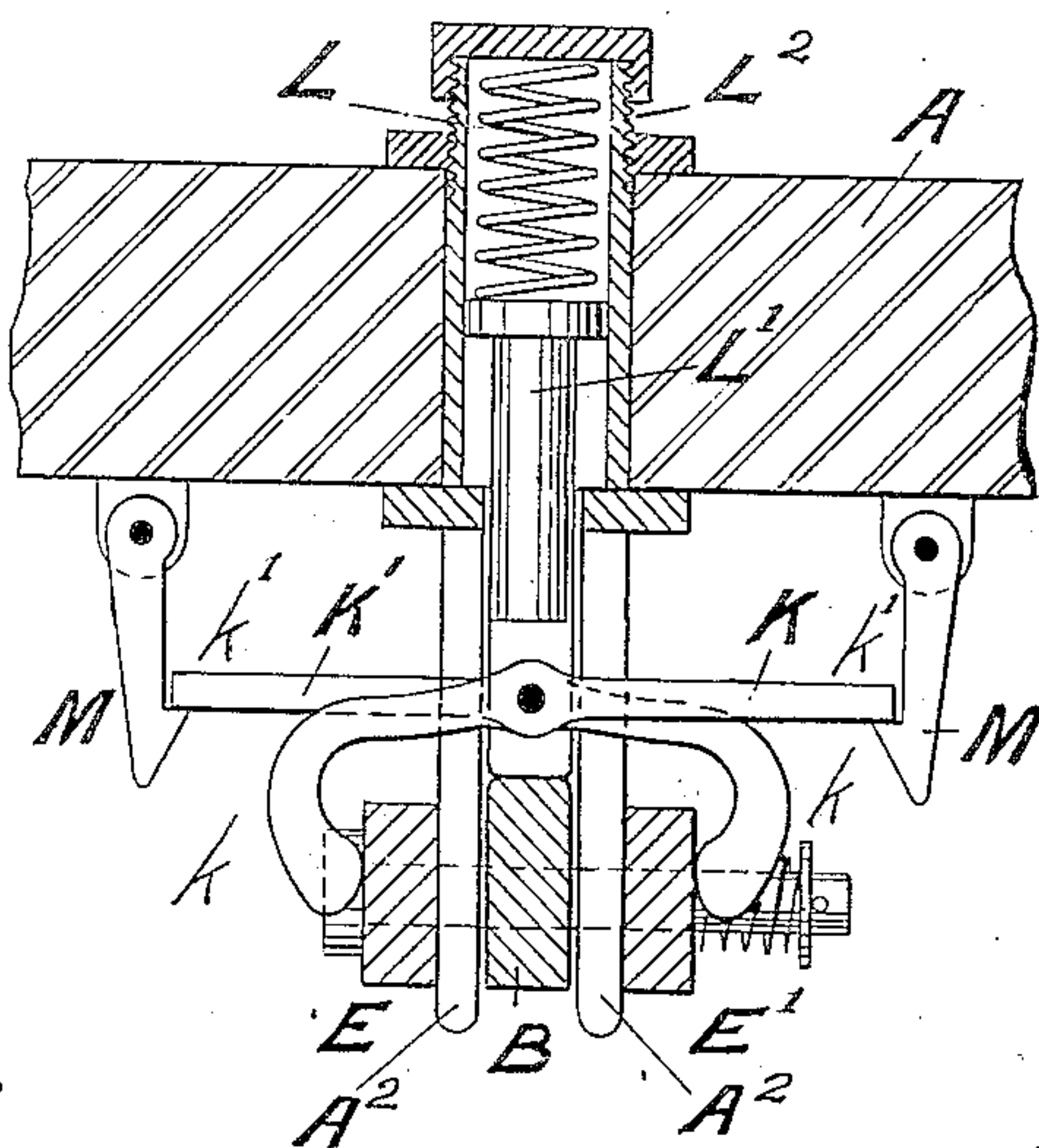


FIG. 10.

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UNITED STATES PATENT OFFICE.

CHARLES MARK DORMAN, REGINALD A. SMITH, AND HERBERT G. BAGGS,
OF SALFORD, ENGLAND.

ELECTRICAL SWITCH AND CUT-OUT.

No. 818,614.

Specification of Letters Patent.

Patented April 24, 1906.

Application filed March 28, 1905. Serial No. 252,589.

To all whom it may concern:

Be it known that we, CHARLES MARK DORMAN, REGINALD ARTHUR SMITH, and HERBERT GEORGE BAGGS, British subjects, and residents of Salford, in the county of Lancaster, England, have invented certain new and useful Improvements in Electrical Switches and Cut-Outs, of which the following is a specification.

The invention relates to automatic electrical switches or cut-outs, and is designed to provide means whereby the contact-surfaces are firmly pressed together and locked when the switch is in the "full on" or working position, but which shall allow the parts to relax and move with freedom when the switch is moving into position to make or unmake contact, and also in means connected therewith for the interlocking of the primary switch with a secondary switch, so that the secondary switch is closed independently after the primary switch is closed, but cannot be opened until the primary switch is open.

The invention consists, essentially, in so constructing the switch as to translate the pressure or force of the spring or springs which actuate the movable contact-pieces to draw them clear of fixed contact-blocks when the former are released, that when the switch is fully closed and locked such pressure will be by a system or series of levers grip or force the movable contact-pieces tightly against the fixed contact-blocks to insure a good electrical connection between the two, and also the combination therewith of a loose handle and a second pair of switch-blades and contact-blocks operated by this loose handle, which is also provided with a trigger or pivoted catch which engages when the second switch is closed with a projection or detent fixed to the base and which can only be disengaged from this detent by opening the primary switch.

The invention will be fully described with reference to the accompanying drawings, in which the complete switch or cut-out is shown in order to fully illustrate the invention as applied thereto.

Figure 1, front elevation; Fig. 2, side elevation; Fig. 3, transverse section; Fig. 4, front elevation of the gripping-lever detached from the switch; Fig. 5, plan of gripping-le-

ver. Figs. 6 to 10 are sectional plans showing modifications of the gripping-levers.

The switch to which the invention is applied is constructed in the ordinary way with the fixed contact-blocks A' and A^2 of the primary switch affixed to a slate or base A, a primary switch-arm B, pivoted upon the spindle C in a bracket D, a contact-maker or brush E, carried on a peg F, passing through the arm B and resting on the lugs G, projecting from the arm, the brush being free to move to and from the arm B, the spring f drawing it toward the arm, and the torsion-spring H, one end of which is attached to the switch-arm B and the other to the fixed base of the switch to cause the switch-arm when released to rise out of contact with the contact-block A' .

The switch-arm B is raised by the torsion-spring H and by the spring L, which presses forward the plunger L' against the under side of the switch-arm, and it is to translate the pressure of these springs and utilize such pressure to hold the brush E tightly pressed against the contact-blocks A' and A^2 that the present invention is in part designed. In carrying out the invention on the switch-arm B, preferably to the lugs G thereon, a lever K is pivoted, the end k of which engages the side of the brush E, carried by the switch-arm. It will be seen by drawing back the end k' of the lever K the end k forces the brush E inward toward the arm B. On the base A of the switch a latch or spring-catch M is pivoted which catches or engages the end k' of the lever K and retains or holds the switch-arm B in working position, as shown in the drawings. When, therefore, the switch B is in this position, the springs H and L are acting to force it away from the base A, but being held by the catch M, engaging the lever K, the force is translated through the lever against the brush E to cause it to grip the contact-blocks A' and A^2 .

Referring to Fig. 6, an arrangement is shown of the gripping device with one lever K and one catch M. This is the same arrangement as that shown on the complete cut-out, Figs. 1 to 5; but the position of the parts is shown reversed from right to left and from left to right. The lever K takes the form of a bell-crank and is pivoted to the end

of the lug G on the switch-arm B. The action of the gear is similar to that last described, the pressure of the spring L, acting through the switch-arm B and bell-crank lever K, tending to shorten the distance between the arm B and the brush E so long as the lever engages with the latch M.

Referring to Fig. 7, an arrangement is shown of the gripping device very similar to that shown in Fig. 6; but in this the compression-spring L acts between the base A of the switch and the bell-crank lever K instead of between the base of the switch and the arm B of the switch. The action is the same as previously described; but the pressure on the contact-block A' A² is not quite so intense.

Referring to Fig. 8, an arrangement is shown of the gripping device which varies somewhat from those previously described. The latch or catch M engages with the switch-arm B and not with the lever. When the switch-arm is pushed home, the spring L presses on the hooked lever K and forces it inward against the brush E, drawing the brush and arm B together, the pressure on the contacts gradually increasing until the latch engages with the switch-arm. When the latch is withdrawn, the spring L forces the switch-arm and brush back off the contact-blocks; but the pressure on the blocks is not fully relieved until the brush and arm have traveled some appreciable distance over the blocks.

Referring to Fig. 9, an arrangement is shown of the gripping device with two levers K K', adapted to be applied when two brushes E E' are carried by the switch-arm B. The levers K and K' are pivoted to the switch-arm B. The compression-spring L acts between the arm B and the base A, to which the switch is attached. Two latches or catches M M' are hinged on the base of the switch and which when turned on their hinges are returned to the position shown by springs.

In all the gripping arrangements previously described the spring L may be attached either to the base of the switch or to the moving arm or parts connected thereto. The spring is most conveniently arranged in a casing L², fitted with a plunger L', as clearly shown in Fig. 3, the casing either being sunk in the switch-base or attached to the moving parts of the switch.

Referring to Fig. 10, an arrangement of gripping device is shown very similar to that shown in Fig. 9, except that the levers K K' instead of being pivoted on the arm B are pivoted on the plunger L', which is actuated by the spring L. In this arrangement the spring L must necessarily be attached to the switch-base. The action of this arrangement is similar to the action of the arrangement shown in Fig. 9, except that when the switch-arm and brushes have been pushed by the

spring L clear of the fixed contacts the levers are left attached to the base of the switch instead of being carried right away on the switch-arm. In this arrangement the brushes E E' are locked in the "on" position by friction only.

The switch-arm B and the contact blades or brushes E are moved into the on or closed position against the pressure of the springs H and L by the handle-lever O and the insulated handle O', which is preferably pivoted on the spindle C. The handle-lever O is provided with switch contact-blades Q Q', which can engage in electrical contact with the contact-blocks or jaws P P'. The secondary switch-blades Q Q' and contact-blocks or jaws P P' are electrically in series with the primary switch-brush E and contact-blocks A' A².

Contact is made between the blocks P P' when the hand-lever O is in its lowest position. When the hand-lever is raised for the purpose of closing the primary switch, the circuit is broken between the blocks P and P'.

On the hand-lever O a latch or catch R is hinged which when turned on its hinge is always returned by a small spring to the position shown. When the hand-lever is turned to its lowest position, the latch R engages with a fixed peg S and locks the secondary switch in the closed or on position. When the switch-arm B is released from the catch M and is thrown into the "off" position by the springs L and H, it depresses the latch R and holds it clear of the peg S, unlocking the secondary switch. The result of the combination is that the secondary switch must be closed after the primary switch and can only be opened when the primary switch is already open. The principal object of the secondary switch is to insure in the case of automatically-released switches that the hand-lever and the hand of the operator shall not be in such a position as to interfere with the free automatic working of the primary switch at the moment when the electrical circuit is completely closed.

The latch or latches M M' may be operated by hand or by any gear in general use for such purposes, or by springs or weights released by electromagnets or solenoids. The illustrations, Figs. 1 and 5, show an electromagnetic releasing mechanism which operates the latch M by means of the levers T and U.

The whole apparatus described constitutes an automatic electrical cut-out.

The action of the gripping-gear is as follows: When the switch is open, the switch-arm B, with the contact-brushes E and levers K K' attached, is farther from the base A of the switch than shown in the drawings and is all clear of the contact-blocks A' A². When the switch-arm is pushed home, the brushes E rub lightly over the surfaces of the

contact-blocks A' A², the spring L is compressed, and the ends of the levers K or K' engage with the latches M or M'. If the switch-arm is now left free, its motion is reversed by the pressure of the spring L, but it is quickly brought to rest by the latches M M', which hold the straight ends k' of the levers K or K' and cause the curved ends k to close on the brushes E like a pair of pincers and grip them hard down on the contact-blocks A' and A². If the latches M or M' are now pulled outward and the levers K released, the pressure on the brushes will be instantly relieved, and the arm B, brushes E, and lever K will be pushed clear of the contact-blocks by the springs L and H.

What we claim as our invention, and desire to protect by Letters Patent, is—

1. In an electric switch or cut-out, the combination with the base A contact-blocks A' A² switch-arm B, brush E and springs for raising the switch-arm, of means for translating the force and pressure of the springs to cause the brush E to press tightly against and grip the contact-blocks when the switch-arm is in the on or working position substantially as described.

2. In an electric switch or cut-out, the combination with the base A contact-blocks A' A² switch-arm B brush E, and springs for raising the switch-arm, of a lever pivoted to the switch-arm B one end of which presses against the brush, and a latch pivoted to the base A to engage the lever substantially as described.

3. In an electric switch or cut-out, the combination with the base A contact-blocks A' A² switch-arm B brush E, and springs for raising the switch-arm, of a lever pivoted to the switch-arm one end of which presses against the brush E, a latch pivoted to the base A to engage the lever, and means for releasing the pivoted latch substantially as described.

4. In an electric switch or cut-out, the combination with the base A contact-blocks A' A² switch-arm B brush E, and springs for raising the switch-arm, of a lever K pivoted to the switch-arm one end of which presses against the brush E, a latch M pivoted to the base A to engage the lever K, a lever T pivoted to the switch-arm to release the latch M,

and an electrically-operated lever U by which the lever U is moved substantially as described.

5. In an electric switch or cut-out, the combination with the base A, contact-blocks A' A² switch-arm B, brush E, springs for raising the switch-arm, and a lever K pivoted to the switch-arm, one end of which lever presses against the brush E and the other end of which engages with a latch M pivoted to the base A, with which the end of the lever K engages, a handle O with contact-blades Q and secondary contact-blocks P P' with which the contact-blades Q engage after the switch-arm B and brush E have been engaged with the primary contact-blocks A' A² substantially as and for the purpose described.

6. In an electric switch or cut-out, the combination with the base A contact-blocks A' A² switch-arm B, brush E, springs for raising the switch-arm, a lever K pivoted to the switch-arm one end of which lever presses against the brush E, and a latch M pivoted to the base A with which the other end of the lever K engages, of a handle O with switch contact-blades Q a latch R pivoted on the handle O and engaging at one end with a projection S attached to the base A, and actuated at the other end by the switch-arm B and the projection S substantially as and for the purpose described.

7. In an electric switch or cut-out, the combination with the base A contact-blocks A' A² switch-arm B brush E, springs for raising the switch-arm and a handle O, of a lever K pivoted to the switch-arm one end of which presses against the brush E, a latch M pivoted to the base A to engage the lever K, means for releasing the latch M, and lever R pivoted to the handle O and a pin S to secure the lever in position substantially as described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

CHARLES MARK DORMAN.
REG. A. SMITH.
HERBERT G. BAGGS.

Witnesses:

J. OWDEN O'BRIEN,
B. TATHAM WOODHEAD.