

No. 717,227.

Patented Dec. 30, 1902.

H. & R. LOMAX & J. TOMLINSON.

ELECTRICAL SWITCH.

(Application filed Oct. 18, 1901.)

(No Model.)

Fig. 1.

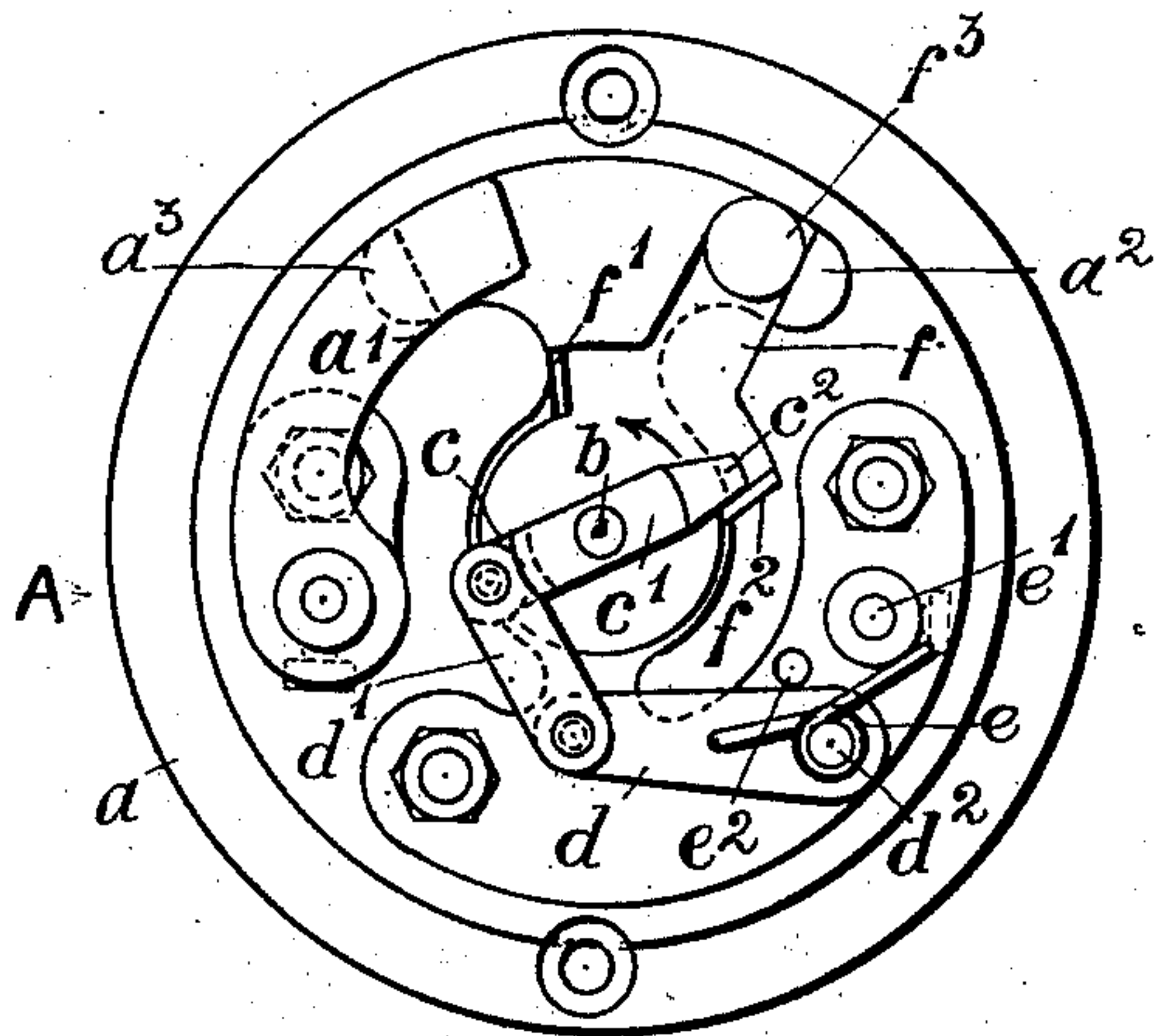


Fig. 2.

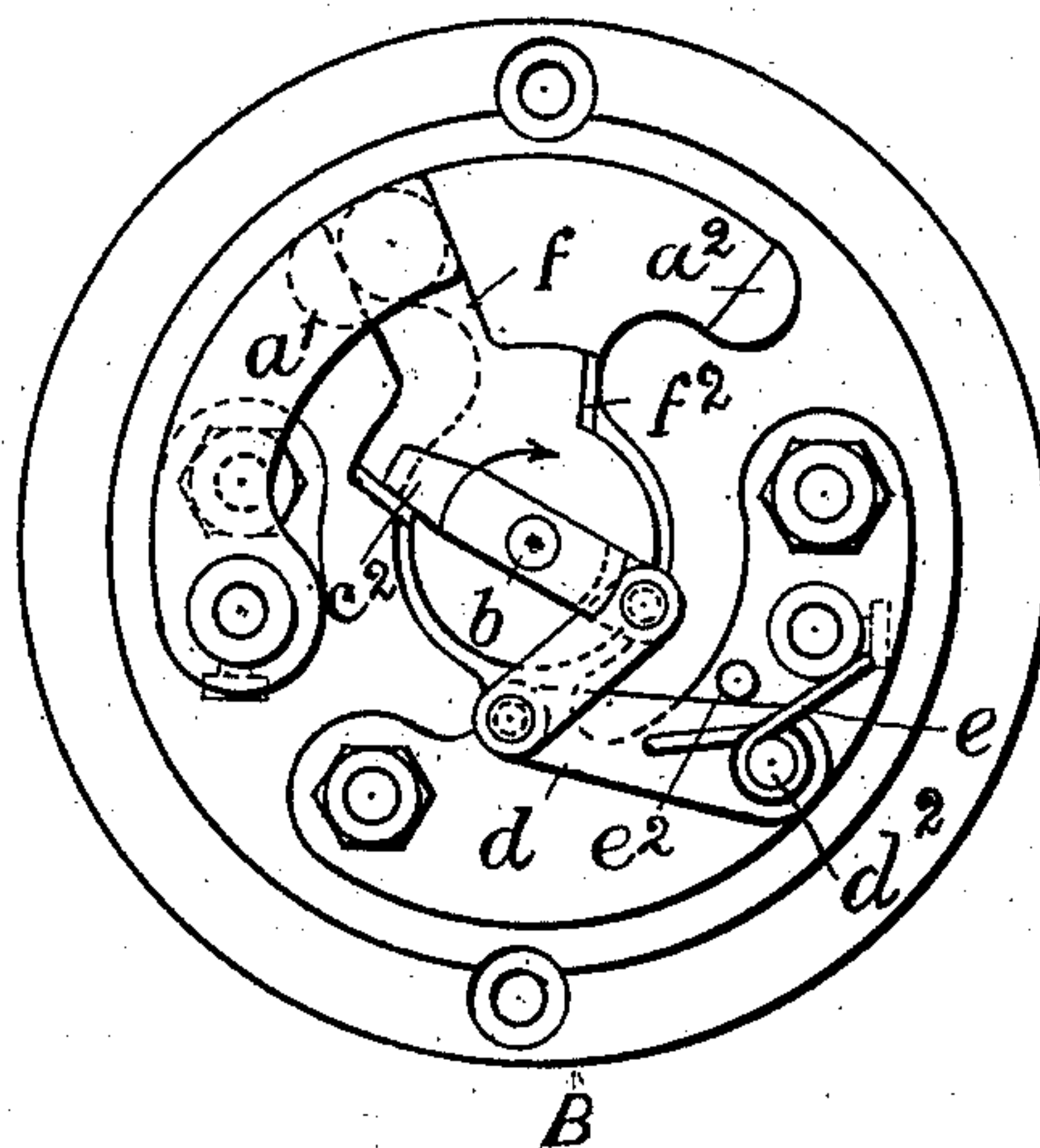


Fig. 3.

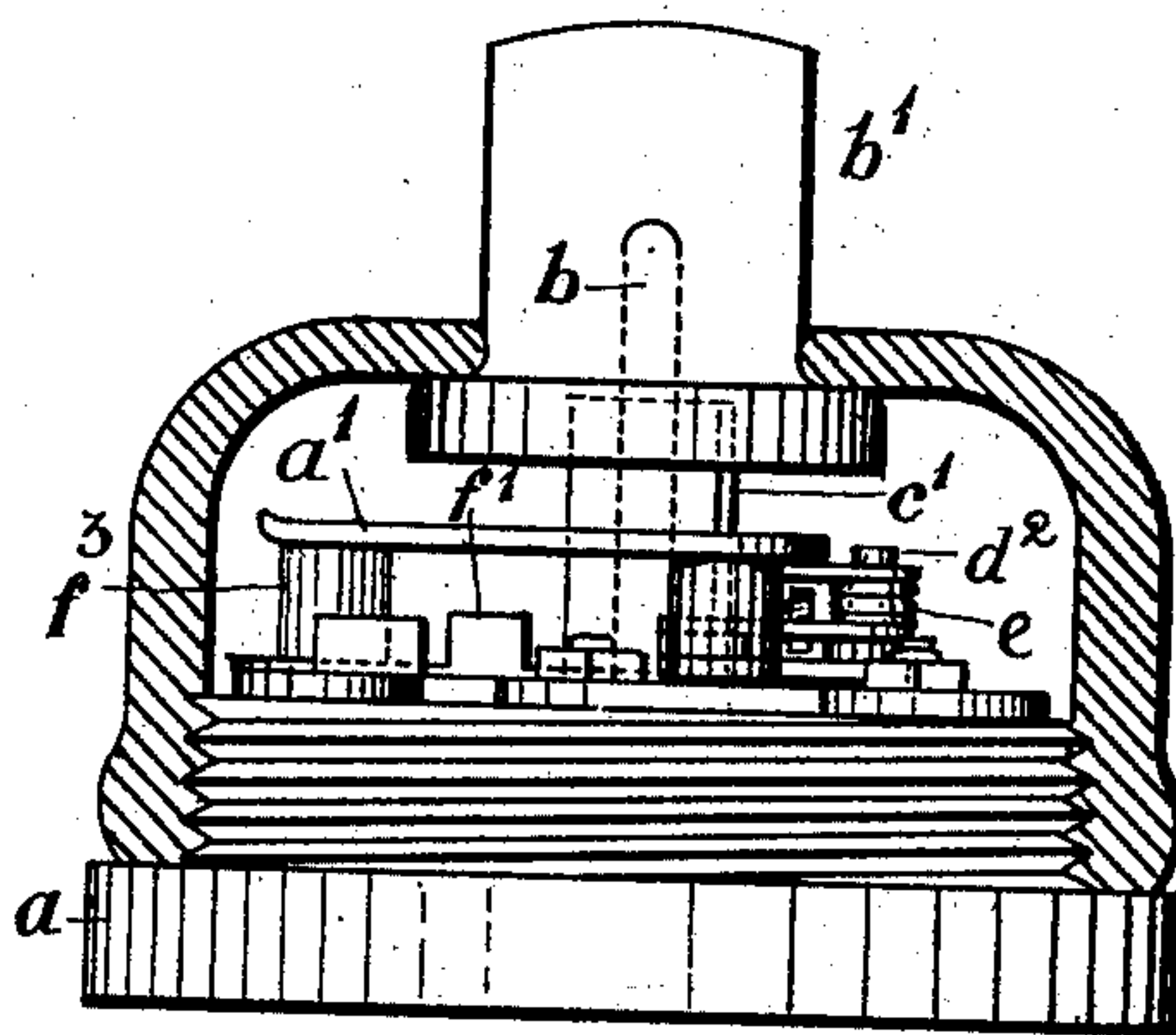
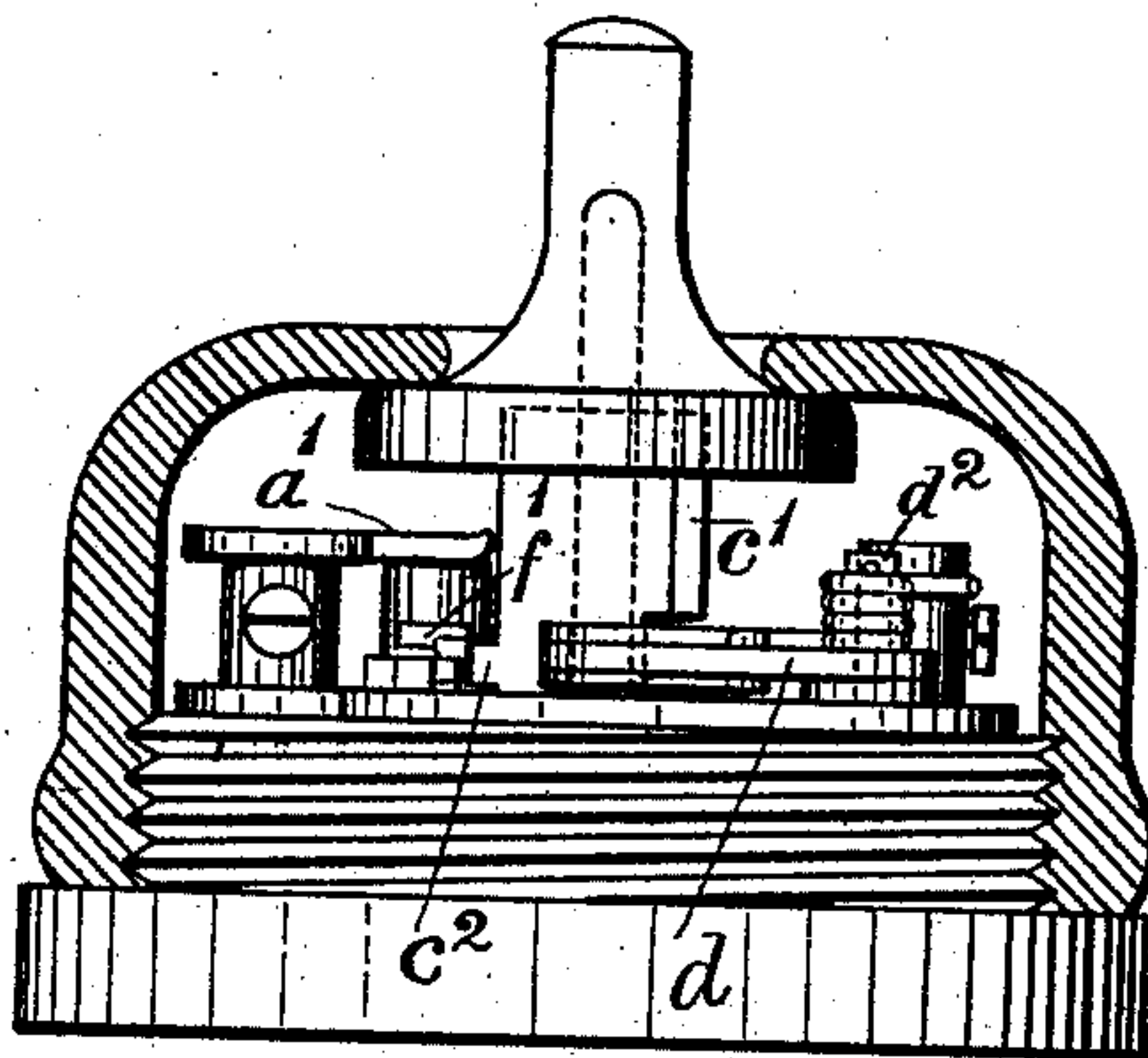


Fig. 4.



WITNESSES

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HENRY LOMAX, RALPH LOMAX, AND JOHN TOMLINSON, OF DARWEN,
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ELECTRICAL SWITCH.

SPECIFICATION forming part of Letters Patent No. 717,227, dated December 30, 1902.

Application filed October 18, 1901. Serial No. 79,069. (No model.)

To all whom it may concern:

Be it known that we, HENRY LOMAX, RALPH LOMAX, and JOHN TOMLINSON, subjects of the King of Great Britain, and residents of Darwen, in the county of Lancaster, England, have invented new and useful Improvements in Electrical Switches, of which the following is a specification.

Our invention relates to electrical switches; and it consists in improvements in the construction thereof, the object of our invention being to secure the switch perfectly in either of its end positions and to effect the breaking and closing of the circuit completely and suddenly.

In the switches ordinarily made the contact or switch lever is held in the circuit-closing position by means of friction between the contacts, while a spring is used to draw the lever quickly out of contact when the switch handle or knob is turned to break the circuit. In consequence of this arrangement the spring is in tension when the circuit is closed and tends to break it, and the friction between the contacts must be sufficient to resist the pull of the spring. If the friction becomes reduced by wear of the contacts, the circuit may be unintentionally broken by the spring when the latter is exposed to vibration, as is the case especially in factories and works. The friction between the contacts also makes the switch-lever hard to turn home, and frequently, especially in switches for house lighting, the users only turn it so far that the light appears and the contacts only touch on a small surface, which not only enables the spring easily to break the circuit, but also frequently leads to an excessive heating of these surfaces, causing injury to the switch, or accidents. In two-way or turn-over switches two springs are generally used, one of which pulls against the other, whereby similar difficulties are produced. As the springs are loaded to their fullest extent when the circuit is closed, they are also liable to become fatigued and slow in action when the circuit is broken, causing sparking. The attempts to remedy these defects hitherto made by so arranging the spring and connections that the spring holds the switch-lever in either of its end positions and effects the change from one to the other sud-

denly and completely have not proved successful, because the short helical springs employed in all these cannot support the repeated elongation or compression without taking a permanent set and becoming feeble, as the small compass into which the mechanism has to be arranged does not allow of the helical springs being made long, and also because the shock of the sudden arrest of the switch-lever is transmitted through all the joints of the connections, causing the small pins or pivots used for them to break.

The object of our invention is to remedy these defects, which we attain by using a torsional spring to operate the switch-lever and a suitable stop to relieve the joints from shock by arresting the spring action at its starting-point.

On the drawings annexed hereunto a break-and-make switch for electric lighting with our improvement applied thereto is shown as an example of the manner in which our invention may be carried out, Figure 1 showing a plan of the switch with the cover removed and with the switch-lever in the position it occupies when the circuit is broken. Fig. 2 is a plan with the lever in its circuit-closing positions; Fig. 3, a side view with the cover in section as seen from A on Fig. 1; Fig. 4, a similar side view as seen from B on Fig. 2.

On the base a a contact a' , connected to one pole or wire, and an insulated stop a^2 are fixed, as usual, the other wire being in conductive connection with the switch-spindle b . On the spindle a tumbler or crank c is mounted, connected by a link d' to a lever d , fulcrumed upon a stud d^2 . The tumbler c is formed with a cross-bar c' , by means of which and the knob or handle b' , which has the usual sectoral recesses and is loose upon the spindle, the tumbler can be turned in either direction. A torsional spring e is placed upon the stud d^2 and bears at one end on the stud e' and with its other straightened end against the lever d , so as to press it toward the center, or the straightened end may replace the lever and the link d' may be directly attached to it. The spring e thus holds the tumbler c , link d' , and lever d either in the positions shown on Fig. 1 or in those shown on Fig. 2.

The contact or switch lever f is mounted

loose upon the spindle b and formed with two pallets f' f^2 , between which the backward extension c^2 of the tumbler c moves. The angle formed by the pallets f' and f^2 is such that the tumbler can be turned, by means of the handle b' , in the direction indicated by the arrow on Fig. 1 till it is on the dead-center and the link d' in line with it before the backward extension b^3 comes into contact with the pallet f' . In that position the spring is tightened or cocked, and when the tumbler c is turned a little farther by the handle the spring will suddenly turn it into the position shown on Fig. 2, the recesses in the handle allowing this advance. During this movement the extension c^2 of the tumbler c will push the pallet f' , and thereby turn the switch-lever f , into the positions shown on Fig. 2, thereby suddenly bringing it into conductive connection with the contact a' and closing the electric circuit. As the spring a now holds the tumbler and the switch-lever f in this position, the contact a' needs only to bear upon the boss f^3 of the lever f sufficiently to assure conduction, so that there is very little friction, and the spring e does not need to be very strong. The position of the parts may be determined by the switch-lever f coming against a stop a^3 under the contact a' or preferably by a stop e^2 , arresting the lever d , whereby the joints of the connection are relieved from shock and strain. To break the circuit, the tumbler is turned by the knob b' from the position on Fig. 2 in the direction of the arrow till it passes its dead-center, when the pressure of the spring will turn it farther into the position shown on Fig. 1, the backward extension c^2 pushing the pallet f^2 and the lever f before it till it is arrested by the stop a^2 or the lever d is arrested by the stop e' . The circuit is in this way rapidly broken and sparking reduced to a minimum, while it is also rapidly and always fully closed and held by the spring in its closed position, so that the faults of the switches hitherto made and pointed out above are obviated.

By replacing the stop a^2 by another contact, like the contact a' , the switch will be converted into a two-way throw-over switch. By repeating the switch-lever d and the contact a' on the diametrically opposite side of the center a double-pole switch is obtained.

Obviously the tumbler or crank and its connection to the spring may be replaced by their mechanical equivalents, producing the same effect of turning the switch-lever suddenly from one terminal position to the other and holding it there.

We claim as our invention—

1. In electrical switches the combination of a switch-lever loose on the switch-spindle, a tumbler adapted to seize the switch-lever only

after passing its own dead-center, a torsional spring adapted to pull the tumbler-lever into either of its end positions and a handle adapted to turn the tumbler in either direction past its dead-center and then to liberate it.

2. In electrical switches, the combination of a switch-spindle, a tumbler on said spindle, a spring-pressed lever, a switch-lever adapted to be turned by the tumbler in either direction only after said tumbler has passed its own dead-center, a torsional spring connected up to said switch-lever for operating the same, a link connecting said tumbler to said spring-pressed lever, which is pressed toward said spindle by said spring, and a handle adapted to turn the tumbler in either direction past its dead-center, and then to liberate it.

3. In an electrical switch the combination of a base-plate and a spindle thereon, a contact fixed to said base-plate, a tumbler on said spindle, a torsional spring adapted to hold said tumbler in both end positions of the same, a handle adapted to turn said tumbler till it passes its dead-center and then to liberate it, a switch-lever on said spindle adapted to come into touch with said contact, and to be turned by said tumbler only after it has passed its dead-center.

4. In an electrical switch the combination of a base-plate a , a spring-contact a' and a stop a^2 fixed thereon, a spindle b , a tumbler c on said spindle, a link d' connecting said tumbler with a lever d fulcrumed on a stud d^2 fixed to the base-plate a , a torsional spring bearing with one straightened end upon said lever d and with the other upon a stud e' fixed to said base-plate, a switch-lever f mounted loose on said spindle b , pallets f' and f^2 on said lever f adapted to be engaged by said tumbler c only after it has passed its dead-center, and a handle b' loose on the spindle and adapted to turn said tumbler in either direction and allow it to advance before the handle.

5. In an electrical switch, a switch-lever, a tumbler-lever for controlling the same, a switch-handle for turning the tumbler-lever, and a torsional spring for pulling the switch-handle to one side or the other as soon as the tumbler-lever has passed over its dead-center, the tumbler being so disposed that it does not move the switch-lever before passing its dead-center.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

HENRY LOMAX.
RALPH LOMAX.
JOHN TOMLINSON.

Witnesses:

C. BOLLÉ,
RIDLEY JAMES URQUHART.