

No. 871,139.

PATENTED NOV. 19, 1907.

F. ORZEL.  
ELECTRICAL SWITCH.  
APPLICATION FILED DEC. 19, 1904.

Fig. 1.

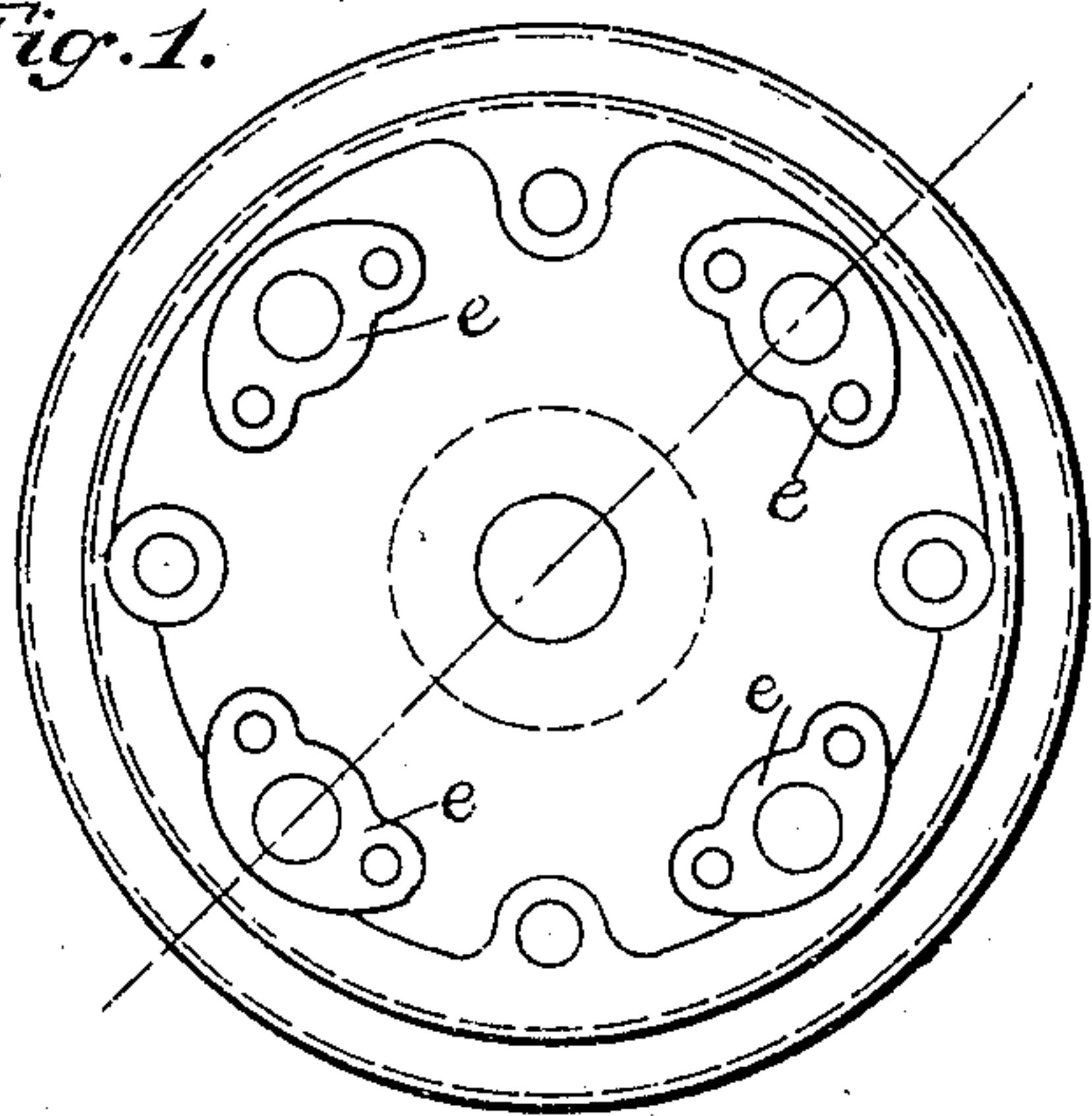


Fig. 2.

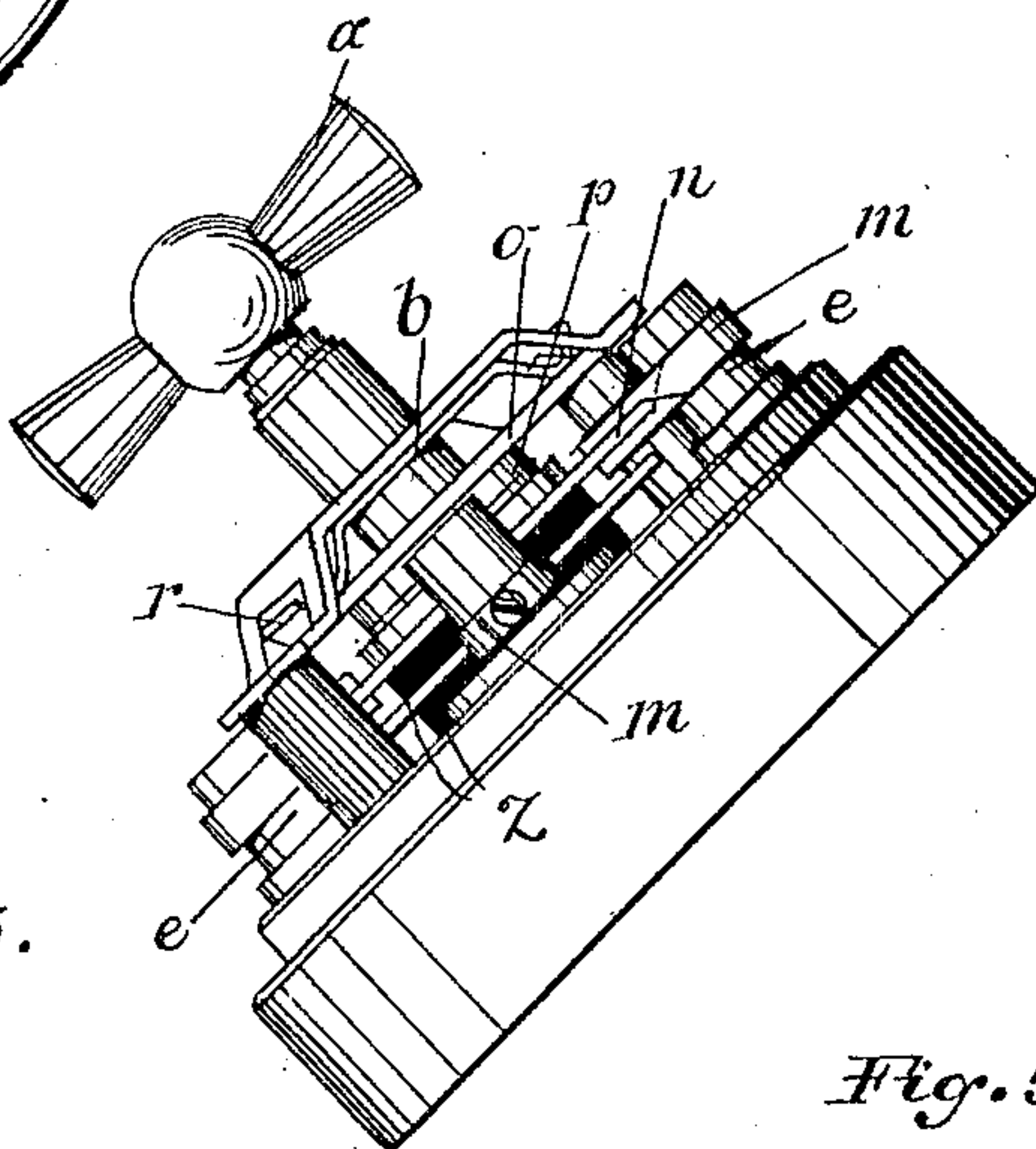


Fig. 3.

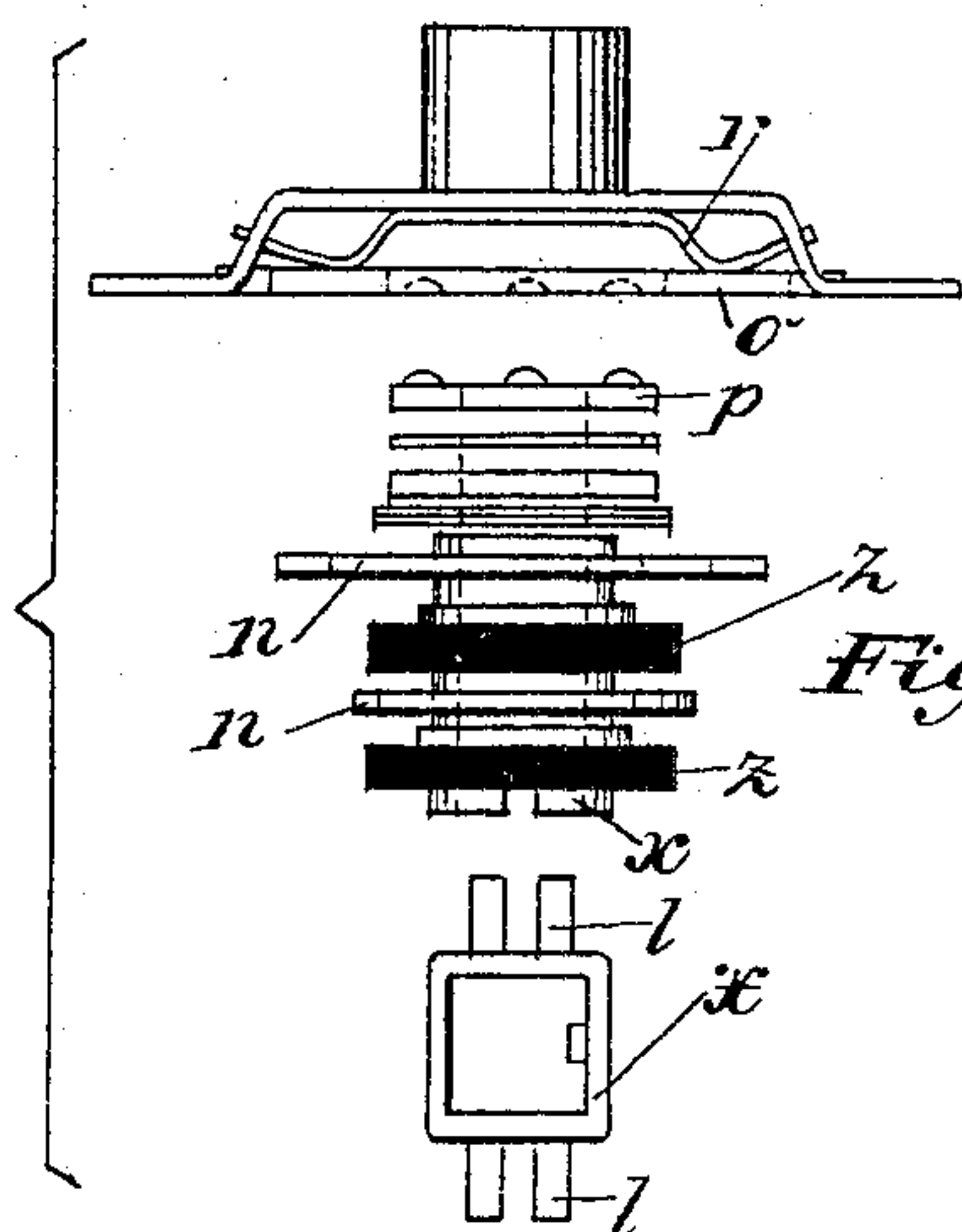


Fig. 5.

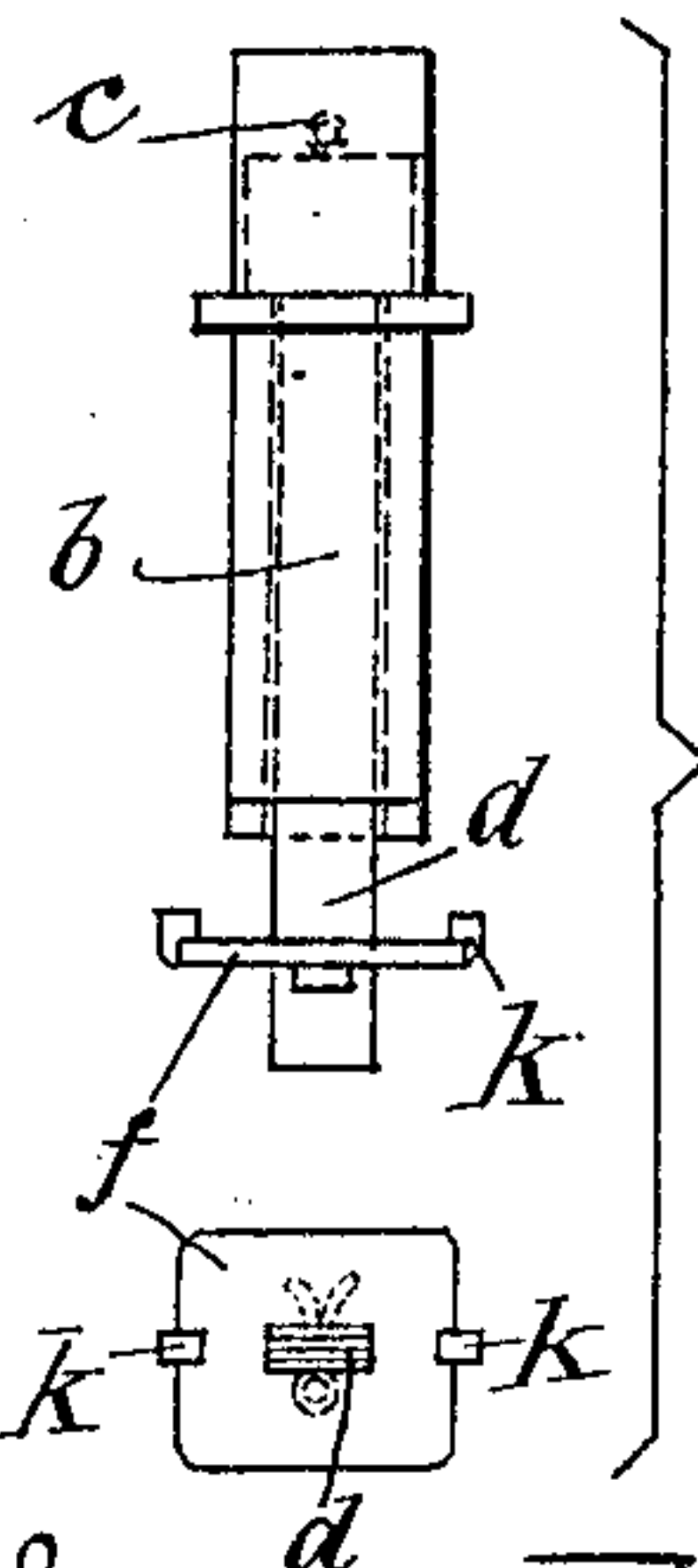
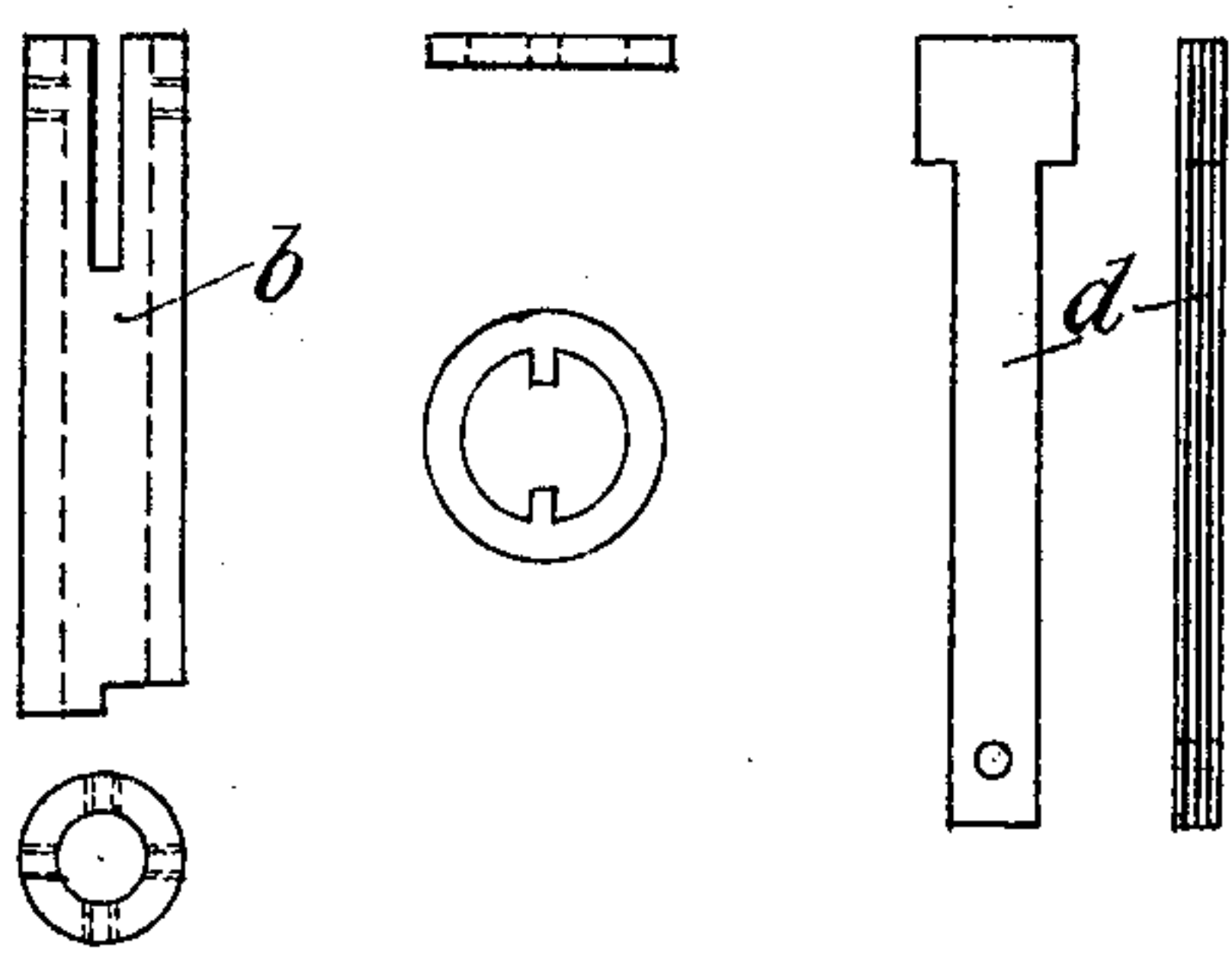


Fig. 4.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

FRANZ ORZEL, OF FRANKFORT-ON-THE-MAIN, BOCKENHEIM, GERMANY, ASSIGNOR TO THE FIRM OF VOIGT & HAEFFNER, AKTIENGESELLSCHAFT, OF FRANKFORT-ON-THE-MAIN, BOCKENHEIM, GERMANY.

## ELECTRICAL SWITCH.

No. 871,139.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed December 19, 1904. Serial No. 237,517.

*To all whom it may concern:*

Be it known that I, FRANZ ORZEL, a subject of the German Emperor, and residing and having his post-office address at Frankfort-on-the-Main, Bockenheim, Germany, Landgrafenstrasse 10, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification.

10 This invention relates to electric switches of the quick break kind in which the switching in and out operations are effected by rotatory movement and are caused to take place instantaneously so as to avoid the formation of an arc between the contacts, that is to say the movable contacts are moved from one extreme position to the other by means of a spring device so arranged between the switch handle and the contacts that, after the friction of the contacts has been overcome, the contacts are suddenly separated from each other and break the spark and prevent the formation of an arc.

Rotary switches as usually constructed with springs to act, or slide, on flat surfaces on the switch pivot require a large space in the switch for the accommodation of the springs and consequently such switches are bulky and helical springs, as generally used, have the disadvantage that they can only be worked in one direction (generally to the right) for if the switch be turned in the contrary direction the spring is unwound or relaxed or the unwinding or relaxation has to be prevented by more or less complicated and delicate mechanism and moreover in such switches, as hitherto made, it is necessary, in order to operate the switch, to turn the handle, or knob, through an angle of about  $90^\circ$ , and this is according to the position of the switch relatively to the hand of the operator, generally more, or less, troublesome. The aforesaid disadvantages are obviated in switches constructed in accordance with the present invention in which is used instead of a helical spring for effecting the snapping action, a blade spring consisting of one blade, or of several blades preferably arranged in a hollow switch spindle the torsional strength of the spring blade or blades being employed to actuate the switch. As the blade spring can be subjected to both right handed and left handed torsional stress

switches made according to this invention can be turned either to the right or to the left which is an important advantage as according to the way doors (near which switches are usually situated) open, the operator can put the switch on, or off with either hand, and another advantage of the improved switch is that the handle, or knob need not be turned through more than  $60^\circ$  or  $70^\circ$  to cause the switch to move from one position to the other, this being of importance when the operator has something to carry, and it would be difficult for him to turn the switch handle, or knob, through an angle of  $90^\circ$ .

The switch made in accordance with this invention possesses over ordinary switches the important advantages that it does away with any inoperative turning of the switch in one direction and loosening of the handle or knob; the switch can be operated by turning the handle either to the right, or to the left; and the angle through which the handle or knob, has to be turned is considerably decreased.

I will describe with reference to the accompanying drawings an arrangement according to this invention as applied to a two pole switch but it will be understood that the invention can be also applied to a single pole switch or to a three pole switch or to a reversing switch for one, or more than one circuit.

Figure 1 is a plan of the base of the switch. Fig. 2 shows the complete switch and the other figures show details as hereinafter described.

The base of the switch is provided with terminals *e* carrying split springs projections *m* (Figs. 1 and 2) with which tongues *n* on the rotating contact-carrying part can engage. These tongues *n* are arranged on a metal tube *x* with layers of insulating material *z* interposed, the number of the tongues corresponding to the number of the poles (these tongues *n* are shown separated from one another in Fig. 3). The metal tube *x* carries, at its upper part, a disk *p* provided with projections capable of engaging with recesses in a disk *o* above it and pressed down by a spring *r*. The said tube surrounds the hollow spindle *b* provided with the handle *a* and containing a blade spring *d* (shown as



having three blades) connected at its upper end to the spindle *b* by a pin *c* (Fig. 5) or by other suitable means while the lower free end of the said blade spring carries a disk *f* which is provided with prongs *k* engaging with notches in side flaps *l* on the tube *x*. By this means the torsional forces communicated by the handle *a* to the spindle *b* and thereby to the blade spring *d* are transmitted to the whole switching mechanism which tends to move round and actually does so as soon as the torsional strain of the blade spring exceeds the force that keeps together the aforesaid disks *o* and *p* provided with engaging recesses and projections. At this moment the recessed disk *o* is raised and the switching mechanism moves round, but the motion is arrested by the projections on the one disk *p* engaging again with the recesses in the other disk *o* when the switch will be in a position corresponding with another operative position in a multipolar switch or with the making or breaking position in a single pole switch. The quick motion of the switch is independent of the direction in which the switch handle is turned as it acts as a quick break switch either in the right hand, or in the left hand, direction. The invention is not necessarily limited to circular rotatable switches as it can also be applied to other electric switches which have a switching arm capable of turning round an axis.

Various modifications of apparatus may be employed without departing from the spirit of the invention, and therefore the invention should not be limited to the construction shown.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed I declare that what I claim is

1. The combination with stationary switch contacts, of movable contacts, a disk connected to said movable switch contacts and movable therewith, a stationary disk, and means for moving said movable contacts, the said disks being spring-pressed together, and having engaging projections and depres-

sions having inclined surfaces in both directions of the travel of said movable disk. 50

2. The combination with a rotatably mounted tube, of a handle for rotating the same, a second tube inclosing the aforesaid tube, movable contacts carried by said second tube, a torsional spring connected at one end to said handle and at the other end to said second tube, a disk fixed to said second tube, a stationary disk, said disks being spring pressed together and provided with engaging projections and depressions, and stationary contacts adapted to engage with said movable contacts, substantially as described. 55 60

3. The combination with stationary switch contacts, of rotatably mounted contacts adapted to engage therewith from either direction, a rotatably mounted handle, a torsional spring connected at one end to said handle and at the other end to said rotatable contacts, a disk fixed to said contacts, and a stationary disk, said disks being spring-pressed together and provided with engaging projections and depressions, having inclined surfaces in both directions of the travel of the rotatable contacts. 65 70 75

4. The combination with a rotatably mounted tube, of a handle for rotating the same, a second tube inclosing the aforesaid tube, movable contacts carried by said second tube, a torsional spring passing through the first mentioned tube and secured to the top end of the same, a disk fixed to said second tube, a stationary disk, said disks being spring pressed together and provided with engaging projections and depressions, and stationary contacts adapted to engage with said movable contacts, substantially as described. 80 85

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 90

FRANZ ORZEL.

Witnesses:

FRANZ HASSLACHER,  
ERWIN DIPPEL.