

No. 791,977.

PATENTED JUNE 6, 1905.

W. A. CHURCH.
SNAP SWITCH.

APPLICATION FILED JUNE 17, 1903.

Fig. 1.

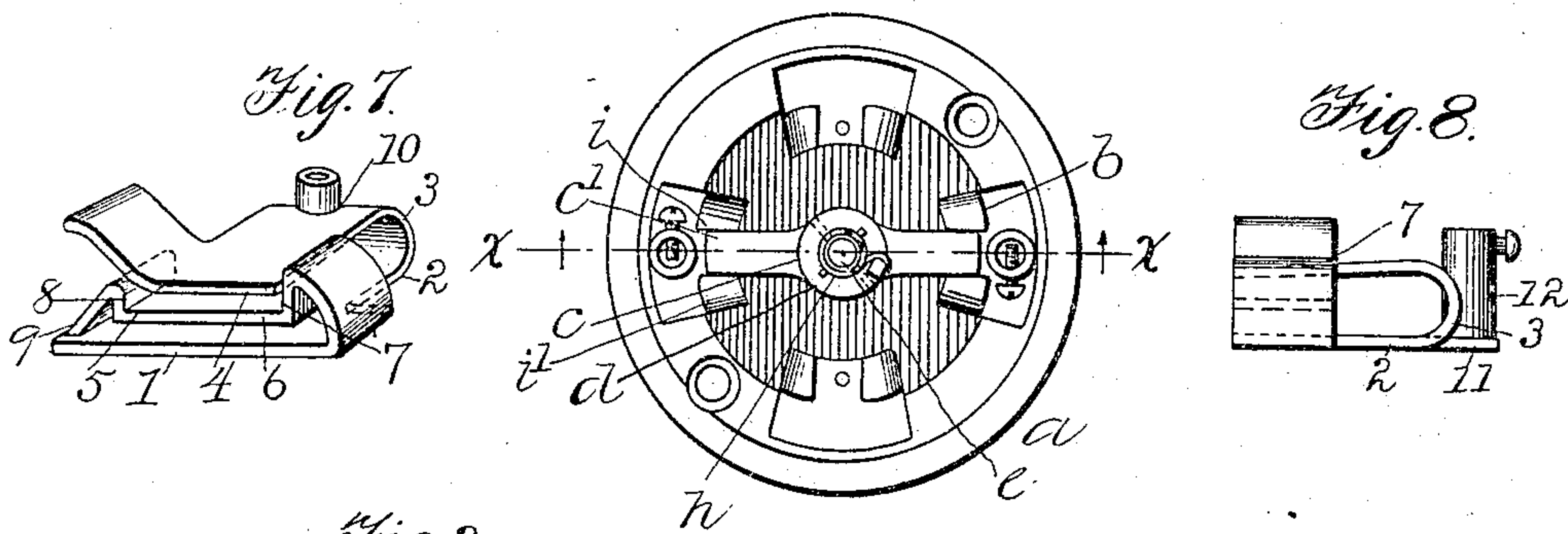


Fig. 2.

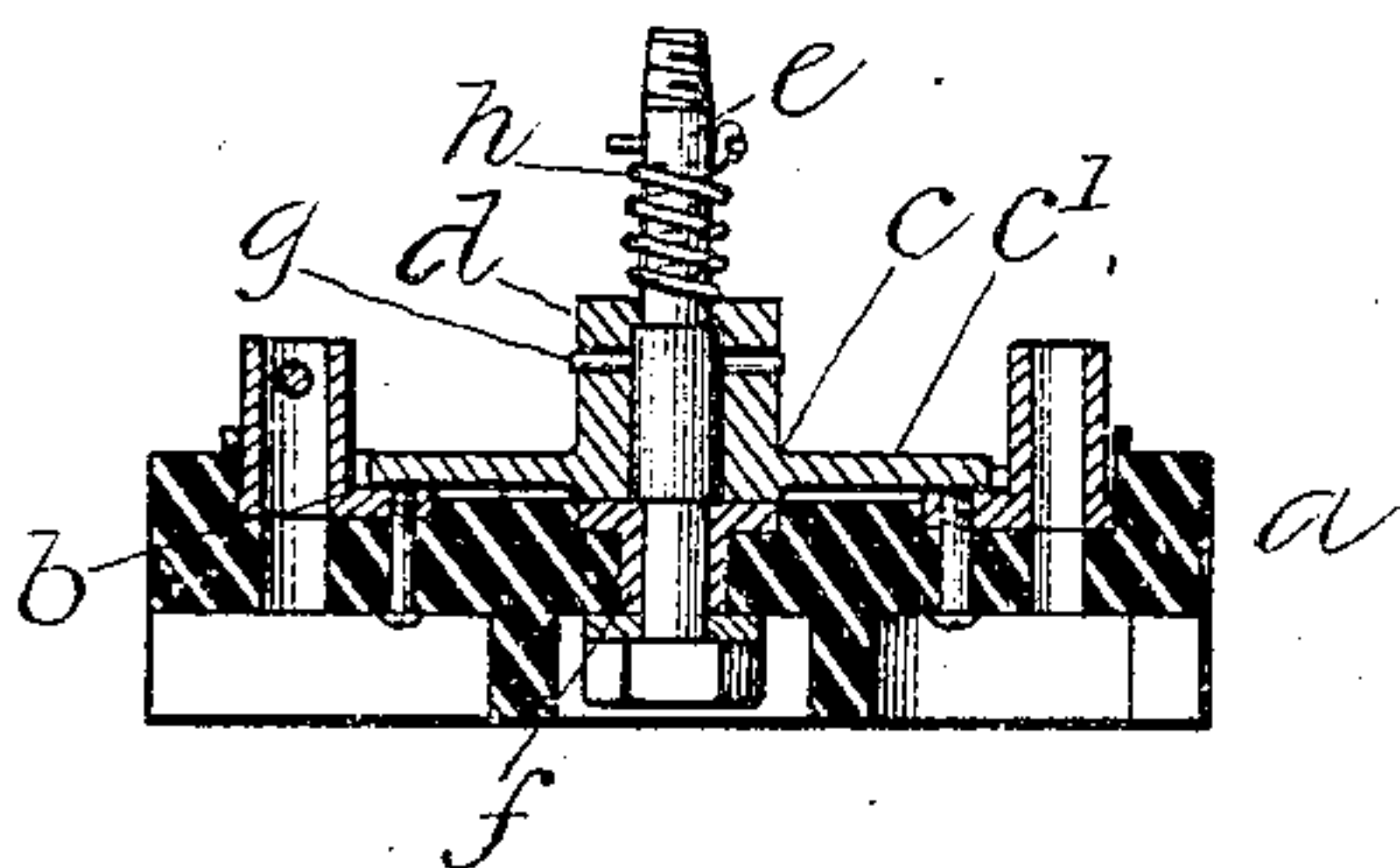


Fig. 3.

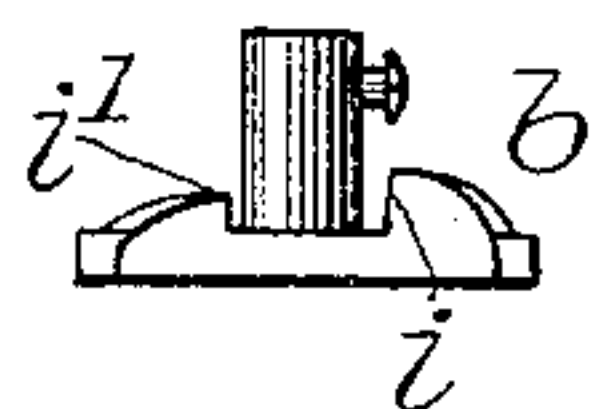


Fig. 4.

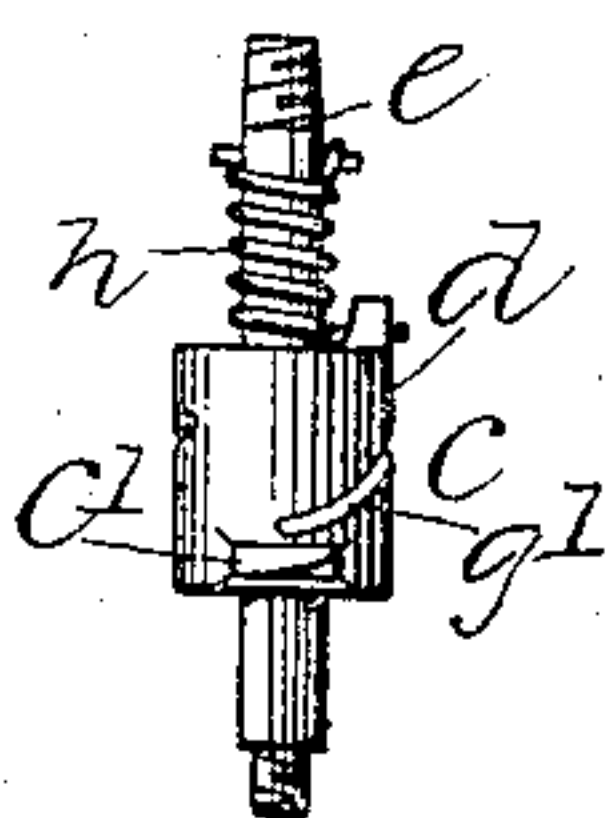
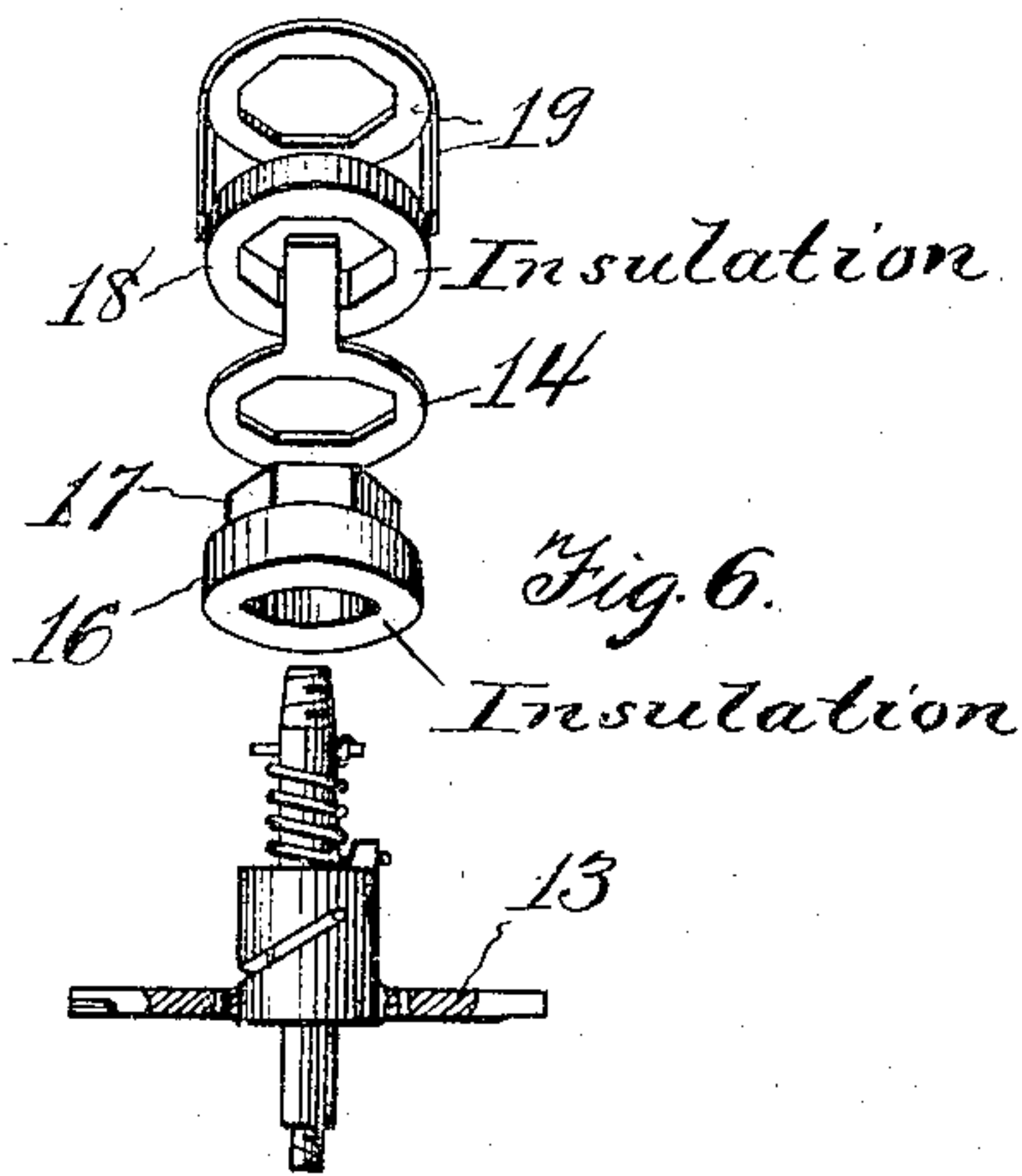
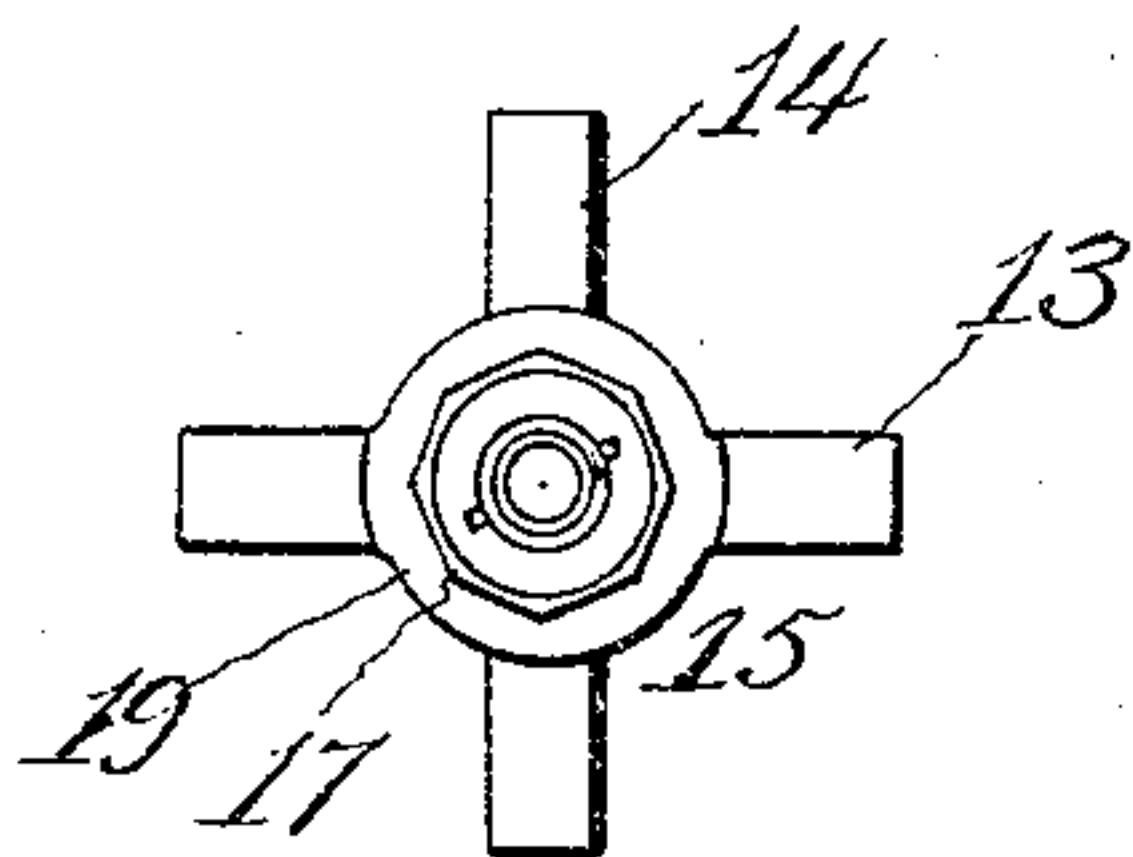


Fig. 5.



Witnesses:

F. B. Campbell.

Erna P. Loffin

Inventor:

Walter A. Church

By Jenkins & Backe.
Attorneys.

UNITED STATES PATENT OFFICE.

WALTER A. CHURCH, OF BINGHAMTON, NEW YORK, ASSIGNOR TO
EDWARD P. HATCH AND JONATHAN CAMP, OF HARTFORD, CON-
NECTICUT.

SNAP-SWITCH.

SPECIFICATION forming part of Letters Patent No. 791,977, dated June 6, 1905.

Application filed June 17, 1903. Serial No. 161,837.

To all whom it may concern:

Be it known that I, WALTER A. CHURCH, a citizen of the United States, and a resident of Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Snap-Switches, of which the following is a specification.

The invention relates to devices for controlling electric circuits, and more particularly to a device known in the art as a "snap-switch."

The object of the invention is to provide an extremely simple, compact, and inexpensive device of the class specified in which the number of parts is reduced to a minimum and with such an arrangement of the parts that a quick make and break of the circuit may be accomplished.

A further object is to provide coacting contact members which will practically interlock when the parts are in predetermined positions, thus absolutely precluding the switch being opened or closed accidentally by jars or from other effects.

Referring to the drawings, Figure 1 is a plan view of the device with the inclosing cap removed. Fig. 2 is a cross-sectional view on the line *x x* of Fig. 1. Fig. 3 is a detail view of one of the base-contacts and binding-posts. Fig. 4 is a detail view of the switch-blade and appurtenant cam. Fig. 5 is a detail view showing the application of the invention to a double-pole switch. Fig. 6 is a detail view of the several parts of the movable contact member. Fig. 7 shows a perspective view of the preferred form of stationary contact. Fig. 8 is a side view of the same.

In the accompanying drawings the letter *a* denotes a base of insulating material of proper form to receive stationary contacts *b* and suitable binding-posts and conductors for securing the lead-in wires and conducting the current of electricity to the desired points. As shown herein, the base is of circular form, provided with a plurality of contacts *b*, which are secured to the base in any desired manner, as by screws. A movable contact member *c* coöperates with these base-contacts and provides the necessary conductor for carry-

ing the current from one of said contacts to the other. Of course it is understood that two of the stationary contacts may be cross-connected, thus forming a two-way pole-switch, or two of the base-contacts may be left unconnected with the line-wires, providing an ordinary switch for controlling a single circuit. These variations may of course be made without varying the intent or purpose of the invention and are necessary in applying the device for the controlling of various circuits.

The movable contact *c* comprises a conducting-blade *c'*, secured to a lifting-cam *d*, consisting of a tubular hub provided with a helical slot. Through this hub and the conducting-blade and centrally arranged with relation thereto is the switch-spindle *e*, provided at its upper end with a thumb-button for turning the latter and rotarily mounted at its lower end in the base. The lower end of the spindle has formed upon it a shoulder which bears upon a bushing *f*, secured in the base, the lower end of the spindle projecting through the bushing and engaged by a nut to prevent axial movement of the spindle. A pin *g*, arranged upon the spindle, projects into the helical slot or opening in the lifting-cam and as the spindle is turned raises the cam and the contact until said contact is released from the stationary contacts, whereupon a spring *h*, secured to the spindle at one end and the lifting-cam at the other, gives a quick partial rotation to the movable contact.

The stationary contacts *b* are of special form designed to permit a free movement of the movable contact as it comes into engagement with them, but restraining the separation of the contact members until a considerable tension has been placed upon the spring *h*. This spring not only acts to turn the movable contact member, but also insures, through coöperation with the helical slot, the proper engagement of said contact with the stationary contact. The helical slot of the lifting-cam, which coöperates with the pin, really provides two cam-surfaces—one for raising the contact member and the other for depressing it. Either of these acts positively and insures

proper rise and fall of the movable contact member. Of course the spring tends to force the upper cam-surface against the pin; but the lower cam-surface insures positive action of the parts during rotation and insures the proper fall of the rotary contact member. The contacting faces of the stationary contacts are recessed, and one wall *i* of the recess extends somewhat higher than the opposing wall *i'*. The outer surfaces of the contact adjacent to the recess are angularly disposed with relation to the walls of the recess to permit a free movement of the switch-blade and insure its proper engagement with the recesses of the stationary contacts.

In the operation of the device the rotary movement of the spindle places the spring *h* under tension and at the same time raises the movable contact out of engagement with the wall *i* of the stationary contact, the latter movement being effected by the pin *g* traversing the helical slot *g'* of the lifting-cam. As soon as the switch-blade is raised a sufficient distance to clear the top of the wall *i* the blade flies forward under the influence of the spring *h* and is also pressed downward to engage the higher wall of the next succeeding contact member and comes to rest in the recess of the contact.

Figs. 7 and 8, which show the preferred form of stationary contact, illustrate a contact member formed from a single piece of material bent to form. It comprises a base 1, having a rearwardly-projecting portion 2, which is upturned, as at 3, and projects forward, forming a spring contact member 4, which is arranged to overlie the movable contact when it is in place in the recess 5, formed in the leaf of the spring contact member 6. This spring contact member 6 is also formed from the metal turned up from the base 1 and has one wall 7 of its recess higher than the opposing wall 8. The upper contact portion 4 has its edge adjacent to the wall 8 turned upward to insure proper engagement of the movable contact member as it flies forward into the recess 5, and from the wall 8 there is a depending portion 9, which, coöperating with the upward portion of the part 4, also serves as a guide for the movable contact member. A part of the upturned loop 3 is cut away, as at 10, and forms a base 11, to which is secured the binding-post 12.

In Figs. 5 and 6, showing a modification, the two movable contacts 13 and 14 are carried upon a sectional block of insulating material 15, this block of insulating material having upon its lower section 16 a projection of irregular cross-section 17, upon which fits the upper section 18, the contact-blade 14 being formed to fit over the projection of the lower section and rest between the two sections when the parts are assembled. A clamp 19, passing over the upper section and into the lower blade 13, secures the parts in place. This clamp

comprises a disk-like member having a perforation of irregular outline, which encircles the end of the sleeve 17 and rests flat against the upper surface of the insulating-block 18. It is provided with dependent arms which project downward beyond the insulating-blocks 16 and 18 and through the perforations in the switch-blade 13. These ends after being passed through the perforations may be bent at an angle to hold the parts securely in place. The block of insulating material has centrally arranged and secured to it a cam of the same form as that described in Figs. 1 and 2, and the switch-spindle is arranged to operate this cam substantially as above described. The modified form of the device shows the application of the parts to a double-pole switch.

Obviously various changes might be made in the detailed construction of the various parts without departing from the spirit or intent of the invention.

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

1. In combination with a base of insulating material, a movable contact and a stationary contact, said stationary contact provided with a recess having one wall of said recess forming a positive stop to prevent rotary movement of the movable contact, means for raising said movable contact above the stop to free it for rotary movement, and a spindle-spring connected with the movable contact whereby the latter is rotated upon a predetermined rotation of the spindle.

2. In combination in a snap-switch, a base or support, stationary contacts mounted thereon, said contacts being provided with a recess having one wall of said recess forming a positive stop to prevent rotary movement of a movable contact, a rotary operating-spindle, a movable contact member rotarily arranged with reference to said spindle, two cam-surfaces operatively arranged with reference to the movable contact member, one arranged for positively lifting said member out of the recess of the stationary contact and the other for positively depressing said member into engagement with said recess, means for coöperating with said cam-surfaces for causing said lifting and depressing movements upon the rotation of the spindle, a spring operatively arranged with reference to the contact, and means for tensioning said spring to rotate the movable contact upon a predetermined movement of the operating-spindle.

3. In combination in a snap-switch, a base or support, stationary contacts mounted thereon, said contacts provided with a recess having one wall forming a positive stop to prevent rotary movement of a movable contact, an operating-spindle, a movable contact member rotarily arranged with reference to said spindle, a cam provided with two cam-surfaces secured to said movable contact, a pin secured to the spindle and extending between said cam-

surfaces and coöperating therewith to positively raise and depress the movable contact for engagement with and disengagement from the recess of the stationary contacts, a spring
 5 operatively arranged with reference to the cam, and means for tensioning said spring to rotate the movable contact member.

4. In combination in a snap-switch, a base or support, stationary contacts mounted thereon,
 10 an operating-spindle rotarily secured with respect to the base, a movable contact member including a pair of contact-bars adapted to be actuated by said spindle, a sectional insulator having one section provided with a recess
 15 adapted to fit an extension upon a second section, one of said contact members being arranged to encircle the extension and to be clamped between the two sections, and means for clamping the parts together.

20 5. In a snap-switch in combination with a movable contact and means for actuating it, a stationary contact having oppositely-disposed spring-walls, a recess in one of said walls having one of its walls extending be-
 25 yond the other and means for raising the movable contact out of the recess to permit a rotary movement thereof.

6. In a snap-switch in combination with a movable contact member and means for actu-
 30 ating it, a stationary contact member having two spring members one disposed above the other, a recess in one of said members and adapted to receive the other spring member whereby the stationary contact will be clamped
 35 between the spring members when in place in the recess and means for raising the movable contact member against the uppermost spring member of the stationary contact whereby it is freed from the recess for a rotary move-
 40 ment beyond it.

7. In a snap-switch in combination with a movable contact member, a stationary contact member having a recess provided with walls

of different heights, a spring member secured to the contact and overlying the recess, and
 45 means for attaching a line-wire to said contact member.

8. In combination in a snap-switch, a spring contact member having two leaves arranged substantially at right angles to each other, one
 50 of said leaves being provided with a recess and the second-named leaf lying within said recess and having one of its edges projecting therefrom.

9. In a switch in combination with a mov-
 55 able contact member, a stationary contact member having a recess provided with walls of different heights, a spring member secured to the contact and overlying the recess, means
 60 for attaching a line-wire to said contact member and means connected with the movable contact member for disengaging it from the recess of the stationary contact member.

10. In a switch in combination with a mov-
 65 able contact member adapted for rotary movement, means for rotating said member, a stationary contact member having a recess, one wall of the recess forming a positive stop to prevent a rotary movement of the movable
 70 contact member and means for raising said movable contact member out of engagement with the stop-wall of the recess whereby it is permitted to rotate beyond it.

11. In a switch in combination with a mov-
 75 able contact member, a stationary contact member having a recess provided with walls of different heights, a spring member secured to the contact and overlying the recess, said
 80 member having one of the edges projecting beyond the recess and means for attaching a line-wire to said contact member.

WALTER A. CHURCH.

Witnesses:

E. P. COFFRIN,
 WM. H. BARKER.