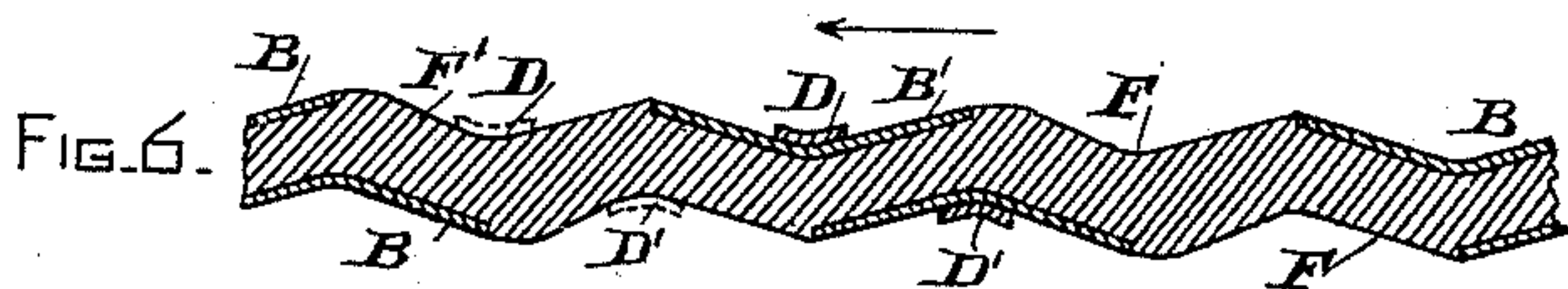
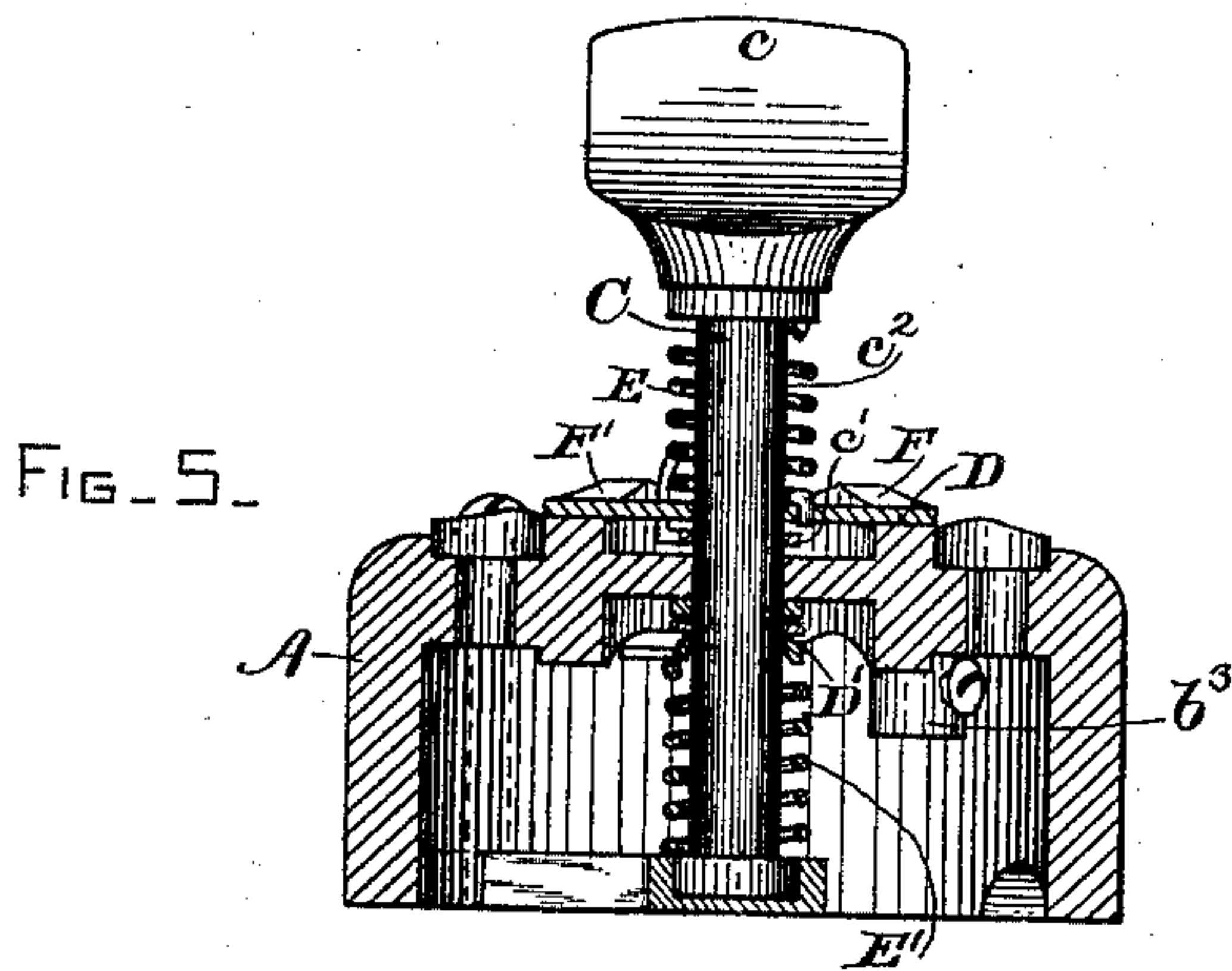
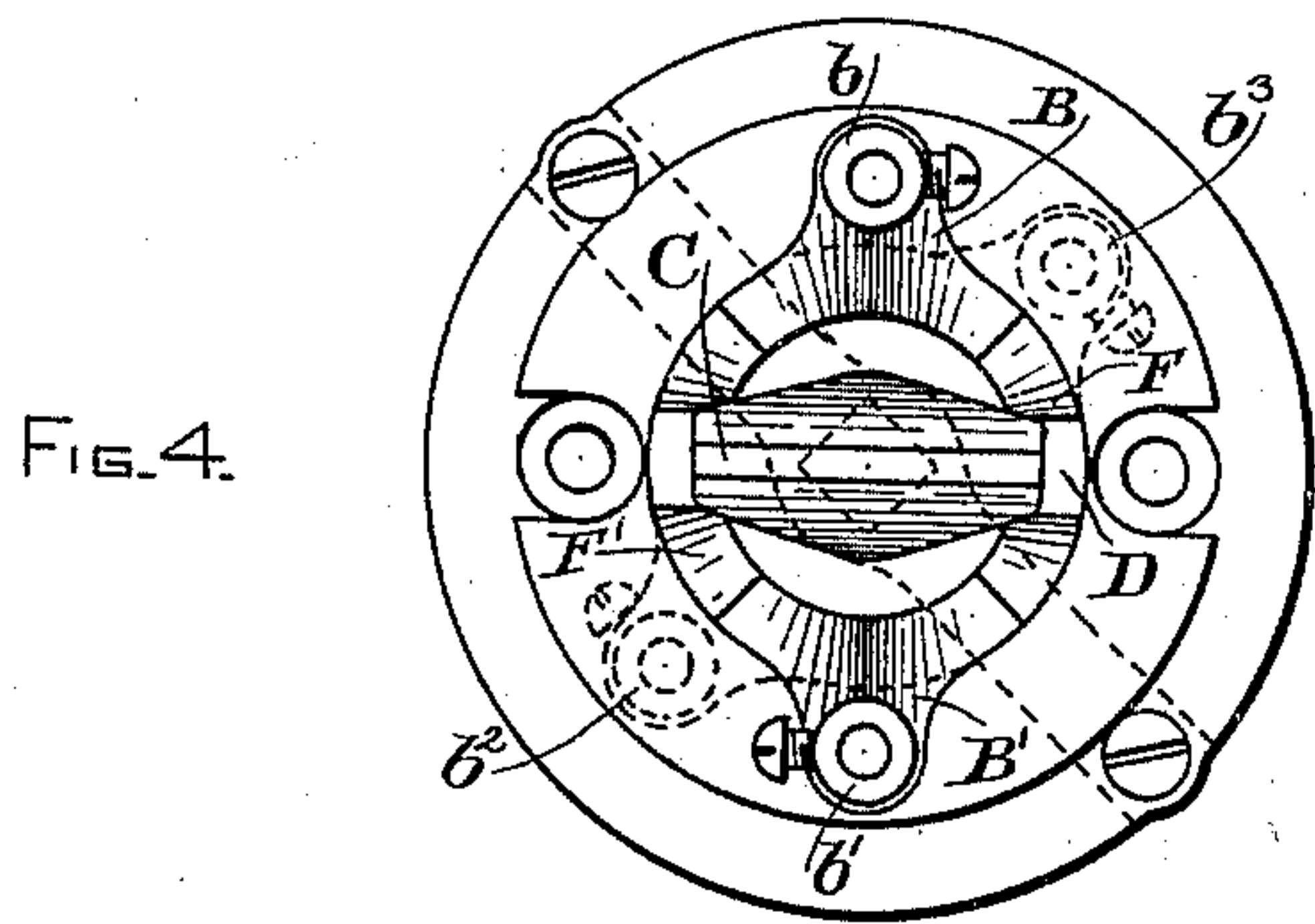
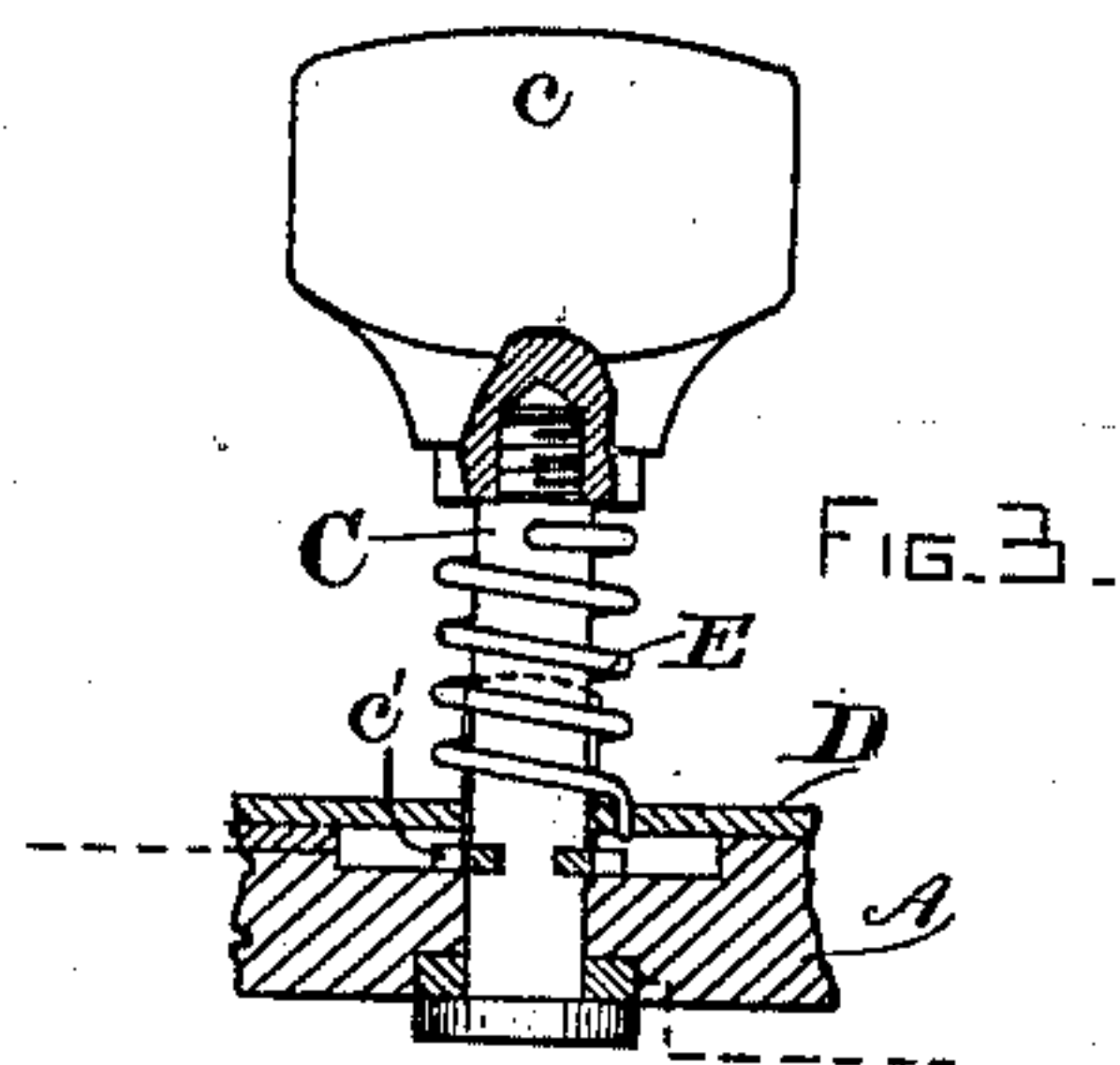
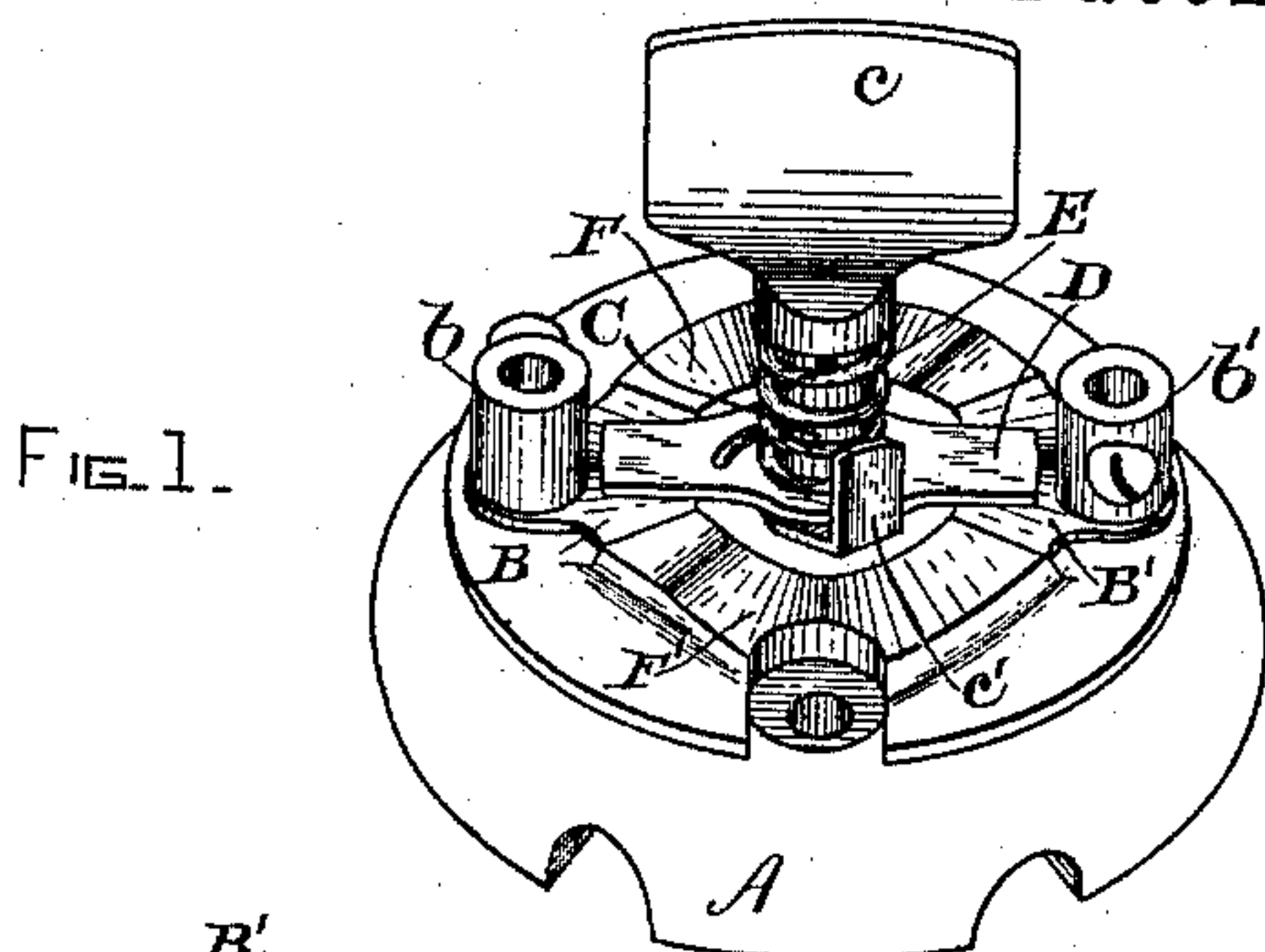


(No Model.)

E. W. RICE, Jr.  
ELECTRIC SWITCH.

No. 466,802.

Patented Jan. 12, 1892.



WITNESSES.

Alec F. Macdonald.  
H. L. Hayes.

INVENTOR.

Edwin W. Rice Jr.  
by Rutledge Knight  
Attorney



# UNITED STATES PATENT OFFICE.

EDWIN WILBUR RICE, JR., OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 466,802, dated January 12, 1892.

Application filed February 13, 1891. Serial No. 381,277. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN WILBUR RICE, Jr., a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Electric Switches, of which the following is a specification.

My invention relates to electric switches of the class known as "snap-switches," which break the circuit by quick or snapping action, so as to avoid the injurious effects of sparking or arcing. It is desirable that the make as well as the break of such switches should be effected quickly and in such manner that the operator cannot draw an arc by bringing the switch just to the closed position and then slowly withdrawing it.

I have devised a switch which fulfills the above requirements, and is at the same time simple, and therefore cheap and compact.

In the accompanying drawings, Figure 1 is a perspective view of a single pole-switch embodying my invention. Fig. 2 is a vertical section through the line of contact of said switch as developed on a plane. Fig. 3 shows the spindle and adjacent parts in vertical section. Figs. 4 and 5 are respectively a plan view and a vertical axial section of a double pole-switch embodying my improvements, and Fig. 6 is a development of the lines of contact thereof.

The base A of the switch, preferably molded of insulating material, carries the circuit-terminals or binding-posts *b b'*. To these are connected the switch-terminals proper B B'. Centrally mounted in the base is a rotatable spindle C, having a handle *c*, preferably insulated, and provided with a lug or stop *c'*. Loosely mounted on this spindle is a cross-arm or contact-plate D, which is adapted to bridge the terminals B B'. The lug or stop *c'* is adapted to engage the contact-plate D with considerable play or lost motion and may be defined as a lost-motion stop device. A spring E is secured at one end to the spindle and at the other end to the cross-arm, and serves both to cause the contact-plate to tend to follow the spindle in its rotary movement and to hold said contact-plate against the circuit-terminals or against the interposed insulating-surfaces, as the case

may be. These insulating-surfaces F F' are preferably molded directly on or with the base A. Their form and that of the terminals B B' is such as to produce a series of double-inclined surfaces, as shown in Fig. 2. The contact-plate D rides over these surfaces, and, as shown in Fig. 2, is preferably shaped so as to fit the hollows thereof.

The operation of the switch is as follows: Supposing that the contact-plate is placed so as to connect the terminals B B', on turning the handle *c* the spring E is put under tension and tends to drag the contact-plate around. Such motion is, however, resisted to some extent by the aforesaid inclined surfaces over which it has to ride; but on continuing to turn the handle the contact-plate is caused to slide up over the incline by the tension of spring E or the engagement of the lug *c'* with the cross-bar, and having reached the top of the incline is thrown quickly by the force of the spring into the next hollow. In order to insure a quick make of the circuit, I prefer to make the top or ridge of the insulating inclined surfaces slightly in advance of the metal terminals B B'. In order that this may be effected it is necessary that the switch should be turned always in the same direction; but by making this top portion *f* comparatively flat the switch is enabled to work in either direction, although especially adapted to turning in the said one direction.

Of course the spindle could form one terminal of the circuit, as indicated by dotted lines in Fig. 3. In that case one of the terminals B' would be dispensed with or at least not connected in circuit.

My invention is capable of application to double pole-switches, as illustrated in Figs. 4, 5, and 6. For this purpose the base A is made hollow or chambered, and on its upper and lower sides are mounted contact and intervening inclined surfaces, substantially as shown in Fig. 1. Co-operating with these contacts and surfaces are two cross-arms D D', both actuated by means of spindle C through the springs E E'. To prevent the spindle from short-circuiting the switch, I insulate the contact-levers D D' therefrom by means of a shell or sheath *c''* of insulating material on said spindle.



$b$   $b'$   $b^2$   $b^3$  are the binding-posts required for a double pole-switch. The contact-plates D D' being loosely mounted on the spindle and engaging the lugs thereon as before, the operation is precisely similar as that above explained in connection with the single pole-switch.

It will be noticed that the spring E has two functions. One is to throw the contact-plate with a snap action and the other is to press the plate against the metal and insulating incline surfaces, producing efficient contact and aiding in the snap action.

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

1. A circuit making and breaking switch having a circular track with a series of double inclines and a rotary cross-arm for connecting the contacts.

2. The combination, in a circuit making and breaking switch, of a circular track having a series of double inclines, contact-plates in alternate depressions, a cross-arm, a spindle for moving the same, and a spring connecting the spindle and arm.

3. In an electric switch, the combination of an actuating-spindle, a rotary contact carried by such spindle, double incline cam-surfaces in the path of said movable contact, and contacts in the depressions of such cam-surfaces and engaging with such movable contact.

4. In an electric switch, the combination of an actuating-spindle, a rotary cross-arm actuated by said spindle, double incline cam-surfaces in the path of said cross-arm, and contacts in the depressions of such inclines and connected by the cross-arm.

5. In an electric switch, the combination of an actuating-spindle, a rotary cross-arm, a spring connecting said spindle and arm, and double incline cam-surfaces in the path of such arm and having in their depressions contacts engaging with said arm.

6. In an electric switch, the combination of an actuating-spindle, a rotary contact having endwise and rotary play on said spindle and connected thereto by a rotary lost-motion stop device, double incline cam-surfaces with contacts in the path of said movable contact, and a spring pressing the movable contact against said double incline surfaces.

7. The combination of an actuating-spindle, a moving contact loosely mounted thereon and engaging therewith by a rotary lost-motion stop device, a fixed contact, and rigid

insulating inclined surfaces in the path of such moving contact, and a spring rotatively connected with said actuating-spindle and moving contact and pressing the moving contact against the said fixed contact and surfaces.

8. In an electric switch, the combination of a series of double inclined surfaces, substantially as described, with contacts in the hollow of one or more of said surfaces, a moving contact passing over said surfaces, an actuator on which the moving contact is loosely mounted, and a spring connecting the actuator to the moving contact and pressing the latter against the inclined surfaces.

9. In an electric switch, the combination of a circular series of inclined surfaces alternately of metal and insulating material, a rotary cross-arm traveling over said surfaces, an actuating-spindle on which said cross-arm is loosely mounted, and a spring connecting the spindle to the cross-arm and pressing the same against the inclined surfaces.

10. In an electric switch, the combination of a series of double inclined surfaces with contacts in the alternate hollows thereof, a contact-plate traveling over said surfaces, an actuator on which the contact-plate is loosely mounted, and a spring connecting the actuator to the moving contact-plate and pressing the same against the inclined surfaces, the portions of said inclined surfaces immediately in advance of the fixed contacts being flattened as described, for the purpose set forth.

11. The combination of a rotary actuator, a moving contact having limited axial and rotary play with respect to said actuator and engaging therewith by a lost-motion stop device, a spring having rotative connection with the actuator and moving contact, and a fixed contact and rigid insulating surfaces against which the moving contact is pressed by said spring.

12. A double pole-switch having two series of contacts on opposite sides of and separated by the switch-base, a rotary actuator passing through the base and carrying rotary contacts also separated by said base and co-operating, respectively, with said two series of contacts.

In testimony whereof I have hereto set my hand this 9th day of February, 1891.

EDWIN WILBUR RICE, JR.

Witnesses:

JOHN W. GIBBONEY,  
HENRY N. SWEET.