

J. A. BIRSFIELD.
RELAY.

APPLICATION FILED JUNE 13, 1907.

1,088,870.

Patented Mar. 3, 1914.

Fig. 1

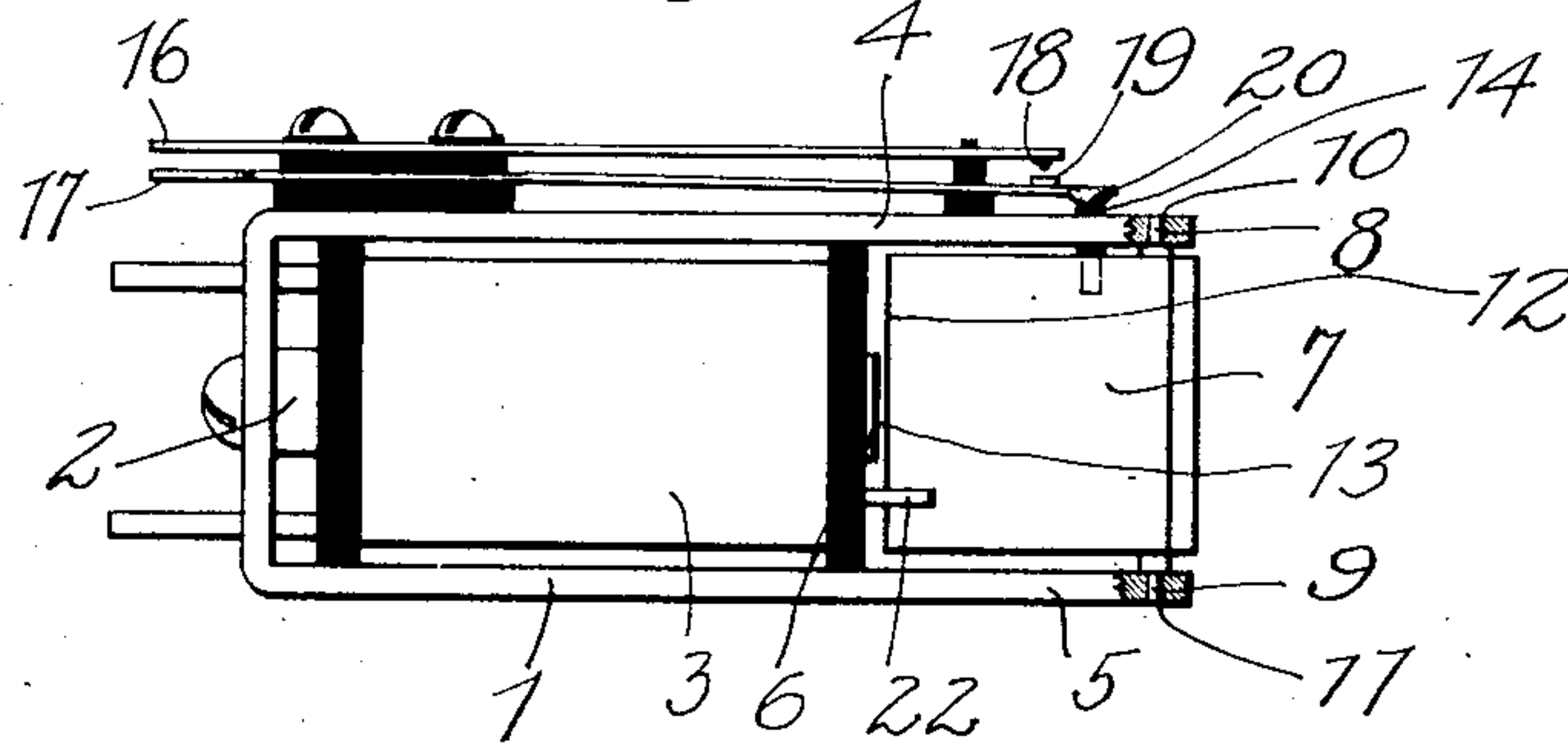


Fig. 2.

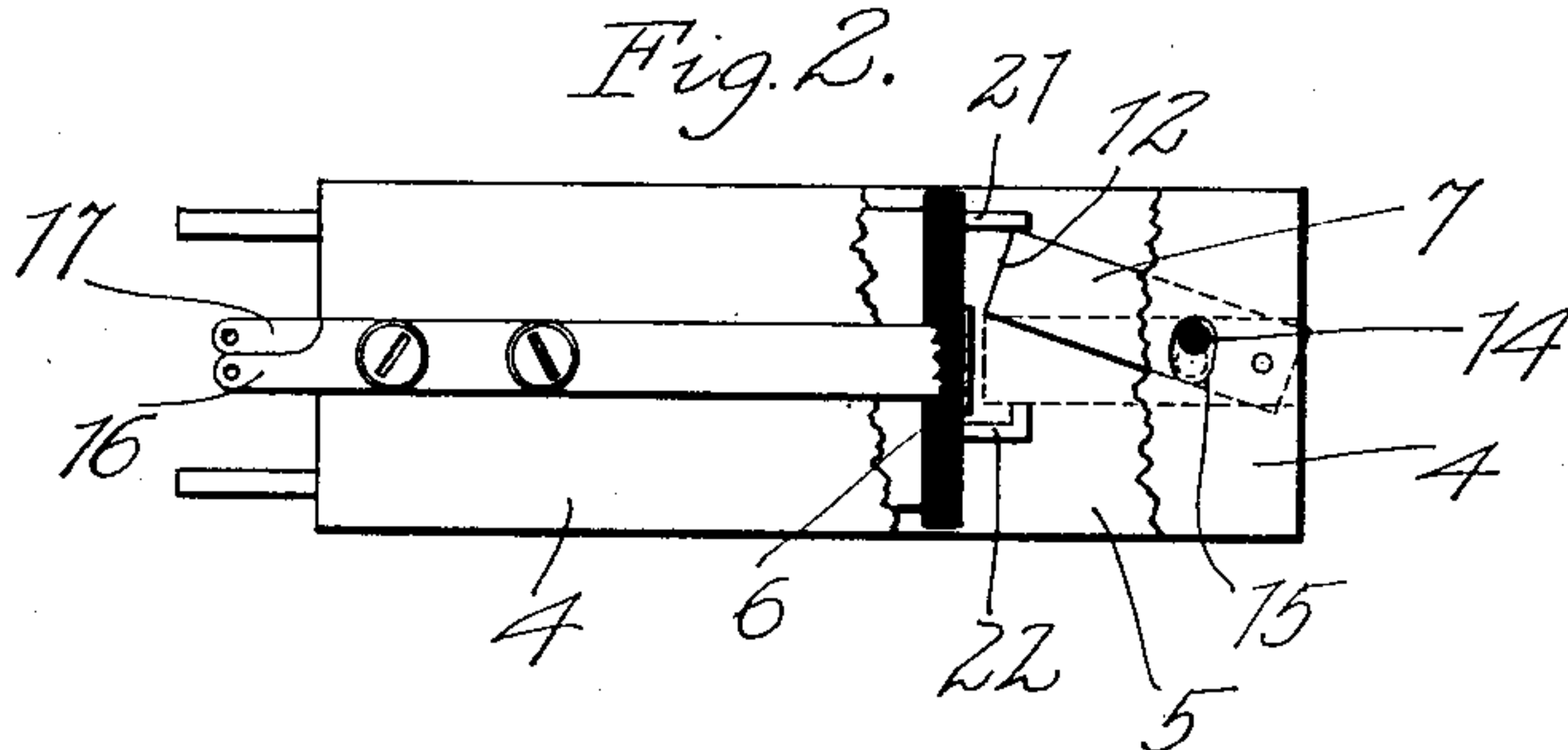
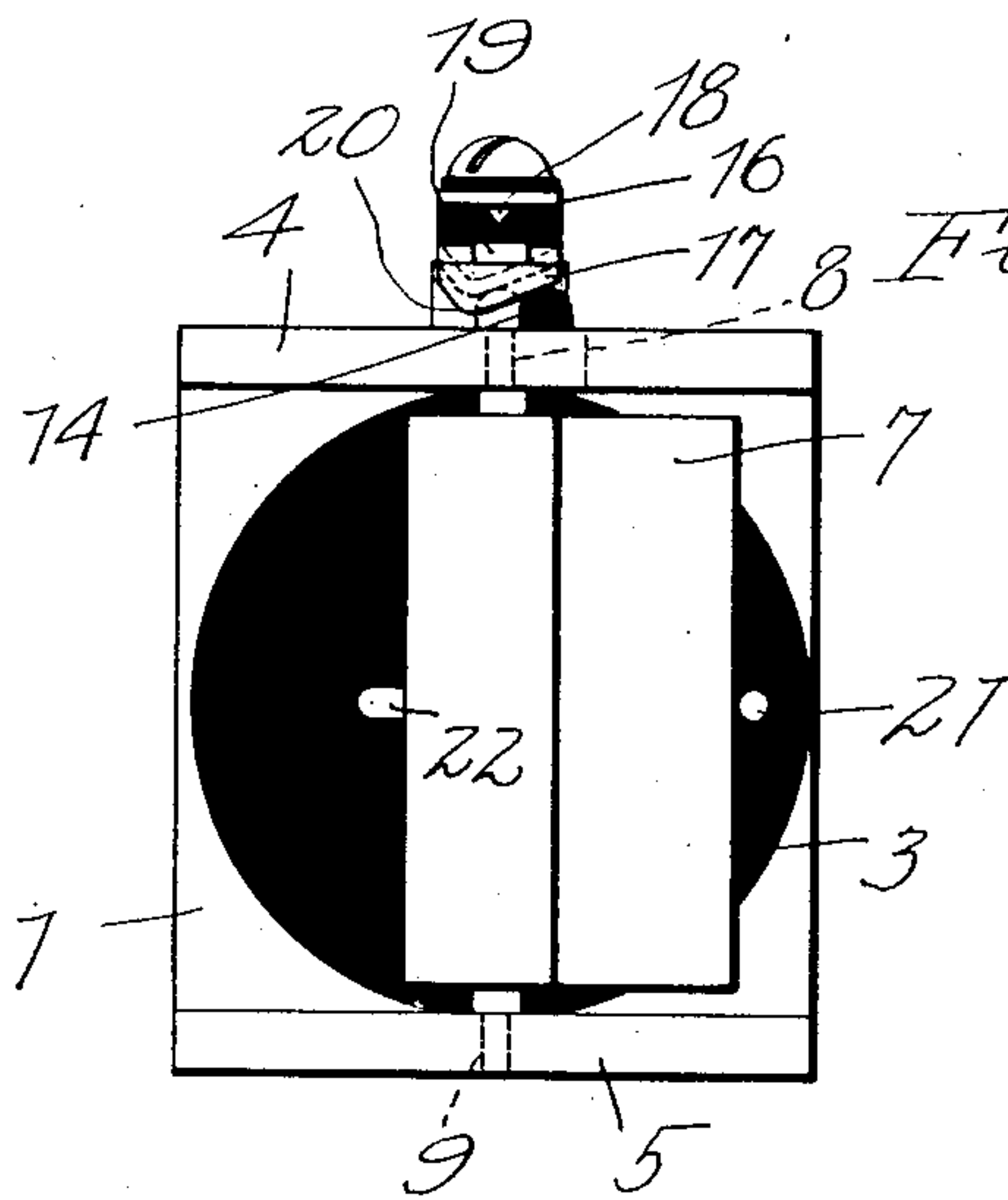


Fig. 3.



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UNITED STATES PATENT OFFICE.

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RELAY.

1,088,870.

Specification of Letters Patent.

Patented Mar. 3, 1914.

Application filed June 13, 1907. Serial No. 378,715.

To all whom it may concern:

Be it known that I, JULES A. BIRSFIELD, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Relays, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to relays, particularly to relays for use in telephone systems, its object being to produce an efficient relay whose action is delayed and sluggish.

In the accompanying drawing my invention is plainly illustrated, Figure 1 being a side elevation view; Fig. 2 a top view, and Fig. 3 an enlarged front view.

The electromagnet frame comprises a U-shaped or horseshoe frame 1, from the center of whose yoke extends the core 2 on which is mounted the energizing coil 3. The ends 4 and 5 of the frame extend beyond the pole 6 of the core. Between these ends is pivoted the armature plate 7 by means of pins 8 and 9 engaging in pivot openings 10 and 11, respectively, these pins being at the front end of the armature plate at opposite edges thereof. The length of the armature plate from the pivot to its rear face 12 is such that when the armature is attracted into the plane of the core, there will be a sufficient air gap 13 to prevent sticking. Between the upper pivot point and the rear face and nearer the upper pivot point, a cam post 14 extends upwardly from the top of the armature and projects through the slot 15 in the upper end 4 of the magnet frame. Mounted at the rear end on top of the magnet frame and suitably insulated therefrom, are the contact springs 16 and 17 extending forwardly substantially parallel to the magnet frame. The upper spring 16 terminates in contact point 18, and the lower spring 17 has the contact plate 19 at its front end for engaging with the point 18. The spring 17 at its front end is also dished or punched downwardly to form a cam ridge 20 which is in the path of the grounded upper end of the cam post 14. As best shown in Fig. 2, the armature is normally deflected to one side and at rest against a stop 21, but upon sufficient current flow through the energizing winding, the armature is attracted toward the core and assumes a position in the plane of the core

and comes to rest against the stop 22. The cam post is normally to one side of the cam ridge 20 on the spring 17, and upon swinging of the armature toward the core the cam post engages under the ridge and raises the spring 17 to carry contact plate 19 against contact point 18. The spring effect of the contact spring 17 may be made sufficient to cause the ridge to act upon the cam post to restore the armature to its normal position upon deenergization of the winding, or other means may be utilized for restoring the armature.

Although the rear end of the armature travels rapidly upon magnetization of the core, the adjustment is such that the movement of the lower spring by the cam post is more or less sluggish and the engagement of contacts 19 and 18 more or less delayed, this being very desirable for certain purposes, as is well-known in the art.

I do not wish to be limited to the precise construction herein shown, as changes may readily be made without departing from the scope of the invention, and

I claim as new and desire to secure by Letters Patent:

1. In a relay, the combination of a U-shaped magnet frame, a core extending from the yoke of said frame, a winding on said core, an armature plate pivoted to the ends of said frame and normally disposed in a plane at an angle with the axis of the core, contact springs mounted on the magnet frame, and a cam post extending from the armature plate associated with one of the contact springs, energization of the winding causing the armature to be attracted and swung parallel to the axis of the core and engagement of the spring and cam post to cause a change in the contact conditions of said springs.

2. In a relay, the combination of a U-shaped magnet frame, a core extending from the yoke between the limbs of the magnet frame, an energizing winding on said core, the limbs of said frame extending a distance beyond the pole of the core, an armature plate disposed between the ends of the frame and pivoted at its outer end in the ends of the frame limbs, said armature being normally in a plane at an angle to the axis of the core, contact springs mounted on top of the magnet frame, a cam projection at the end of one of said springs, a cam post extending from the armature frame for en-

gaging with said cam projection, attraction of said armature toward the core causing engagement of the cam post with the cam projection to cause a change in the contact condition of the springs.

3. In a relay, the combination of a U-shaped magnet frame, a core extending from the yoke of the frame and between the limbs thereof, the ends of said limbs extending a distance beyond the pole of the core, an energizing winding on the core, an armature plate disposed between the ends of the frame and pivoted at its outer end in the ends of the frame limbs, whereby it may swing toward and from the core pole, switch mechanism mounted on the magnet frame, an actuating spring for the switch mechanism having a cam projection at its end, a cam post extending upwardly from the armature and associated with the cam projection, said armature being normally inclined relative to the axis of said core, attraction of the armature toward the core causing said cam post to engage the cam projection to raise the actuating spring to thereby change the contact conditions of the switch mechanism.

4. In a relay, the combination with a U-shaped frame, a core extending from the yoke and between the limbs thereof, an energizing winding on said core, the ends of said frame extending a distance beyond the pole of the core, an armature plate between the ends of the frame and pivoted at its outer end in the ends of the magnet frame, whereby it may swing toward and away from the core, switch mechanism mounted on the magnet frame, an actuating spring for said switch mechanism having a cam projection at its end, a cam post extending upwardly from the armature frame and normally engaged by the cam projection to hold the armature at one side, energization of the core causing attraction of the armature toward the core whereby said cam post engages the cam projection to raise the actuating spring to thereby change the contact conditions of the switch mechanism.

5. In a relay, the combination of a magnet frame, an energizing winding, an armature pivoted to be swung upon energization of the winding, switch springs for said relay lying in a plane at right angles to the axis of the pivots for said armature, and spring actuating means carried by the armature and arranged to move crosswise of said switch springs in the actuation of the armature, and an inclined plane formed on one of said switch springs and engaged by the actuating means, whereby a delayed or slow movement of the switch springs results.

6. In a relay, the combination of an electromagnet frame, an energizing winding, a core therefor, an armature pivoted to swing

from a normal position into alinement with said core, switch mechanism mounted on the magnet frame and associated with the armature, movement of the armature to its attracted position causing actuation of the switch mechanism thereby, such switch mechanism constituting means for controlling the movement of said armature whereby it may be returned to its unattracted position when the magnet is deenergized.

7. In a relay, in combination, a frame, an electromagnet, switch springs mounted upon said frame, an armature swinging upon an axis perpendicular to the planes of said switch springs into and out of parallel relation with the core of said electromagnet, and a stud carried by said armature and adapted to move crosswise under said springs to actuate them.

8. In a relay, in combination, a frame, an electromagnet, an armature swinging into and out of parallel relation with the core of said electromagnet, and a cam shaped spring switch mechanism mechanically engaged by said armature and tending to maintain said armature out of parallel relation with said core.

9. In a relay, in combination, a U-shaped frame, an electromagnet between the limbs of said frame, an armature swinging upon pivots extending into each of the limbs of said U-shaped frame, said armature lying adjacent said frame at its edges whereby the magnetic circuit is completed between the limbs of the frame and the armature, one end of the armature being arranged to pass before the end of the core of said electromagnet, switch springs mounted upon the outside of one of the limbs of said U-shaped frame and an actuating stud extending from said armature and adapted to slide sidewise under said switch springs to actuate them.

10. In a relay, in combination, a frame, an electromagnet, an armature swinging on a vertical axis near one end thereof, the other end of said armature being arranged to pass before the end of the core of said electromagnet, a contact spring mounted on said frame, an actuating spring mounted on said frame and arranged for engagement with said contact spring, a cam on said actuating spring, and a stud on said armature near the axis for engagement with said cam to actuate said actuating spring upon movement of the arm when the electromagnet is energized.

In witness whereof, I hereunto subscribe my name this 10th day of June A. D., 1907.

JULES A. BIRSFIELD.

Witnesses:

CHARLES J. SCHMIDT,
CHARLES A. BROWN.