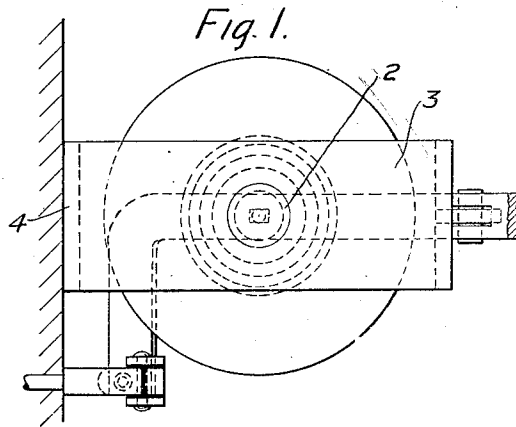
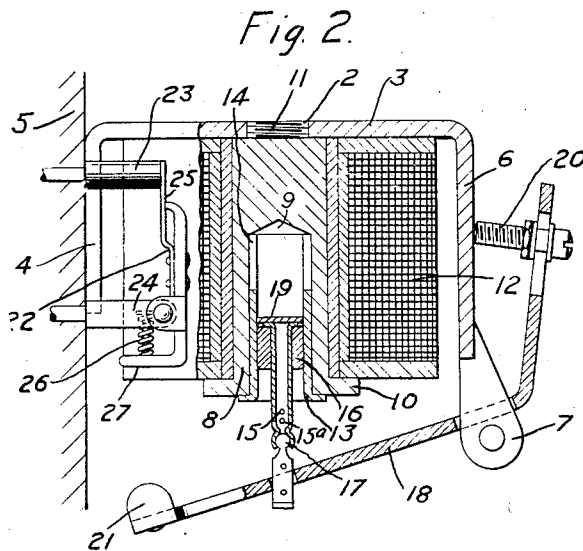


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RELAY.
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1,289,649.

Patented Dec. 31, 1918.



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RELAY.

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Specification of Letters Patent.

Patented Dec. 31, 1918.

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To all whom it may concern:

Be it known that I, RAY E. DE CAMP, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Relays, of which the following is a specification.

My invention relates to relays and particularly to time-element relays of the electromagnetic type.

One object of my invention is to provide a relay that shall have means for adapting it to operate at a rate that shall be inversely proportional to the amount of current traversing its winding for a part of its movement and at a relatively rapid rate for the remaining part of its movement and for permitting it to be quickly reset, under predetermined conditions.

Another object of my invention is to provide a relay of the above indicated character that shall be cheap to construct, easily assembled, readily adjustable and efficient in its operation.

I provide a magnetizable frame of substantially U-shape having a screw-threaded opening in its base portion. A cylindrical stationary magnetizable member is provided with an opening and a flange at one end and a screw-threaded portion at its other end and that is adapted to be received in the screw-threaded opening in the supporting member. A winding is disposed around the stationary magnetizable member and is held in position by the supporting flange at one end thereof. A non-magnetic tube, portions of which are cut away at one end, is disposed in the opening in the stationary magnetizable member and a second relatively small tube is disposed in the opening in the stationary magnetizable member to support a movable magnetizable member. The second tube is secured, through a ball-and-socket joint, to a member that is pivotally mounted on the supporting frame. A relatively movable disk is disposed adjacent the inner end of the movable magnetizable member to act as a piston for controlling the time of operation of the movable magnetizable member and for permitting it to be quickly reset.

In the accompanying drawing, Figure 1 is a top plan view of a relay embodying my invention, and Fig. 2 is a side view, partially in section and partially in elevation, of the relay shown in Fig. 1.

The relay embodying my invention comprises a magnetizable supporting frame 1 of substantially U-shape having a screw-threaded opening 2 in the base portion 3 thereof. One of the arms 4 of the supporting frame 1 is adapted to be secured to a panel 5 or other structure, and the other arm 6 of the frame 1 is provided with a projection 7, for purposes to be hereinafter more fully set forth. A cylindrical stationary magnetizable member 8 is provided with an opening 9 and a flange 10 at one end and a screw-threaded portion 11 at the other end that is adapted to be received in the screw-threaded opening 2 in the supporting frame 1. A winding 12 is disposed around the stationary member 8 and is secured in position by the flange 10. A non-magnetizable tubular member 13, portions of which are cut away as indicated at 14 at one of its ends, is fitted into the opening 9 in the stationary member 8. A second tubular member 15, of relatively small diameter, is disposed in the opening 9 and has a magnetizable member 16 surrounding and secured to it. The tubular member 15 is secured, through a ball-and-socket joint 17, to a bell-crank lever 18 that is pivotally supported on the projection 7, and the member 15 is provided with a plurality of openings 15^a that are adapted to permit air to enter the opening 9 behind the core member 16 when it is moved downwardly.

A disk 19 is loosely supported at the inner end of the movable core member 16 and is adapted to closely fit within the tubular member 13. The bell-crank lever 18 is provided with an adjustable screw 20 in one arm thereof for the purpose of adjusting the initial position of the movable core member 16 and, consequently, the current or load setting of the relay. An insulating member 21 is mounted on the other arm of the lever 18 and is adapted to actuate a switch 22 when the relay operates.

The switch 22 comprises two stationary contact members 23 and 24, a pivotally mounted movable contact member 25 and a spring 26 for normally maintaining the contact members in engagement.

When a predetermined current traverses the winding 12, the movable member 16 will be moved upwardly, at a rate that is substantially inversely proportional to the amount of current traversing the winding

12, until the disk 19 reaches the point indicated by 14 in the tubular member 13. When this position is reached, the movable member 16 will quickly move to its final position and thus cause the insulating member 21 to so engage the supporting member 27 of the movable contact member 25 that the movable contact member will be disengaged from the stationary contact member 23. When no current traverses the winding 12, the movable core member 16 will move downwardly under the force of gravity, and the disk 19 will follow after the air that has been compressed in the opening 9 has been permitted to escape through the openings 15^a in the tubular member 15.

In order to regulate the operation of the relay, it is necessary only to adjust the position of the screw 20. The relay may be disassembled by removing the stationary member 8 from the frame-work 3.

While I have shown my invention in its preferred form, it will be understood that many changes may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. A relay comprising a stationary core member having an opening therein, a tubular member, a movable core member surrounding the tubular member and disposed in the opening in the stationary core member and a disk member loosely disposed adjacent the inner end of the tubular member.

2. A relay comprising a stationary core member having an opening in one end thereof, a tube disposed within the opening and having side openings near the inner end thereof, a second tubular member, a movable core member surrounding the second tubular member and disposed in the opening in the stationary core member, and means loosely disposed adjacent the inner

end of the second tubular member to retard the operation of the movable member in one direction only.

3. A relay comprising a stationary core member having an opening in one end thereof, a tube disposed within the opening and having side openings near the inner end thereof, a second tubular member, a movable core member surrounding the second tubular member and disposed in the opening in the stationary core member, and relatively movable means disposed adjacent the inner end of the second tubular member to retard the operation of the movable member in one direction only.

4. A relay comprising a stationary magnetizable member having an opening in one end thereof, a non-magnetizable tube disposed within the opening and having side openings near the inner end thereof, a movable magnetizable member disposed in the opening in the stationary magnetizable member and having an opening therethrough, and a disk member loosely disposed adjacent the inner end of the movable magnetizable member.

5. A relay comprising a stationary magnetizable member having an opening in one end thereof, a non-magnetizable tube disposed within the opening and having portions thereof cut away near the inner end, a movable magnetizable member disposed in the opening in the stationary magnetizable member and having an opening therethrough, and means disposed adjacent the inner end of the movable magnetizable member for cooperating with the non-magnetizable tube to retard the operation of the movable magnetizable member in one direction only.

In testimony whereof, I have hereunto subscribed my name this 28th day of Feb., 1917.

RAY E. DE CAMP.