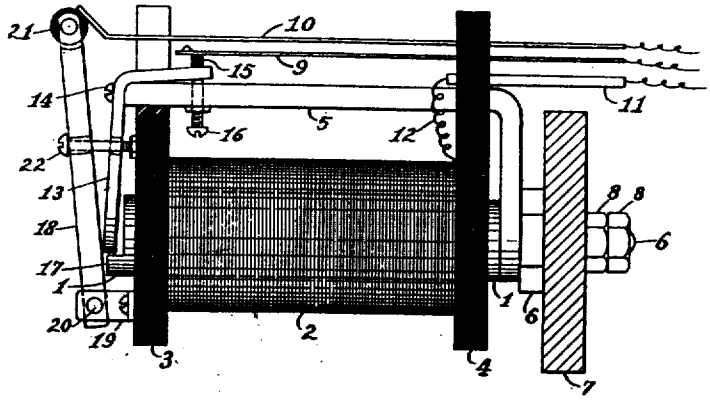
F. R. PARKER.

RELAY.

APPLICATION FILED MAY 29, 1914.

1,259,901. Patented Mar. 19, 1918.



WITNESSES:

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RELAY.

1,259,901. Specification of Letters Patent. Patented Mar. 19, 1918.

Original application filed February 19, 1904, Serial No. 194,392. Divided and this application filed May 29, 1914. Serial No. 841,729.

To all whom it may concern:

Be it known that I, FREDERICK R. PARKER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Relay, of which the following is a specification, reference being had to the accompanying drawing, illustrating same.

This application is a division of my co-pending United States patent application Serial No. 194,392, filed Feb. 19, 1904.

My present invention relates to that class of electrically-operable devices known as relays.

The principal objects of my invention are, to provide an improved relay or electrically-operable device as herein set forth; to provide improved switching mechanism for such a relay or electrically-operable device, and to provide improved means for operating the switching mechanism of such relays or electrically-operable devices.

Other objects will be apparent from the following specification.

The figure of the drawing is a side elevation of one preferred construction of my improved relay, showing the relay mounted to a mounting strip. In the figure a portion of one of the insulating spool heads is shown broken away to show the apparatus more clearly.

Referring to the drawing, 1 is a magnetizable core upon which an energizing coil 2 is wound. 3 and 4 are heads of insulating material which are forced onto the core 1 and form therewith a spool for containing the winding 2. 5 is an L-shaped member of magnetizable material, attached to the rear end of the core, preferably by a bolt 6 extending into the rear end of the core 1, and extending substantially parallel with the core 1 between the spool heads 3 and 4, preferably as shown, and being preferably attached to the heads 3 and 4 in any suitable manner. 7 is a mounting strip intended for mounting a number of relays thereon. The relay of the figure is held to the strip 7 preferably by nuts 8 8. 9 and 10 are switch springs which are preferably carried by the head portion 4. The springs 9 and 10 are insulated from each other in any suitable manner. 11 is one of a pair of terminals for the ends of the winding 2, which are extended through the head portion 4 and carried thereby. The end 12 of the winding 2 may be attached to the terminal 11 as shown, preferably being soldered thereto. 13 is an armature which is preferably made of comparatively thin magnetic material and mounted pivotally to the free end of the L-shaped member 5 preferably by a screw 14. The upper or inner end of the armature 13 preferably carries a pin 15 of insulating material adapted to bear against the switch spring 9 and operate it when the armature 13 is operated. 16 is an adjustment screw for limiting the backward movement of the armature 13. The front end of the core 1 is preferably cut out as shown to accommodate the armature 13 and provide a portion 17 extending forwardly to within a short distance from a second armature 18. The armature 18 is preferably made of comparatively thick magnetic material and is pivotally mounted at 20 between or on brackets 19 which are attached to the spool head 3. The armature 18 overlaps the armature 13 and carries an insulating roller 21 at its free end adapted to bear against the switch spring 10 and operate it when the armature 18 is operated. 22 is an adjustment screw for limiting the backward movement of the armature 18. Any other details of construction of the device are thought to be well understood without further description.

As to the operation of the relay, when a small energizing current of the proper intensity is sent through the coil 2, the magnetic circuit 1 5 13 becomes sufficiently magnetized to cause the core 1 to attract the armature 13 thereto, thus operating the spring 9 and causing it to engage the spring 10. The armature 18, however, will not be attracted by this weak energizing current. When a larger energizing current of the proper intensity is sent through the coil 2, the magnetic circuit 1 5 13 18 becomes sufficiently magnetized to cause the attraction of both of the armatures 13 and 18, provided the armature 13 was not already attracted, whereupon the armature 18 operates the spring 10 and either takes it out of contact with spring 9 which was previously operated, or keeps spring 9 from reaching it in case both of the armatures are operated

substantially simultaneously. The armature 18 therefore opens the switch 9 10 or else keeps it from closing.

When a small energizing current is first turned on through the winding 2 and then is increased sufficiently, the armature 13 first closes the switch 9 10 and then the armature 18 opens the same switch. Reversely, when there is a large energizing current passing through the winding 2 and it is then reduced sufficiently, the armature 18 first closes the switch 9 10 and then the armature 13 opens the same switch, this latter operation taking place when the energizing current is reduced practically to zero. I may utilize these operations of the armatures and this control of the switch in certain places to great advantage, as, for instance, in a telephone system for controlling signaling devices and especially supervisory signaling devices. The backward operations of the armatures 13 and 18 may be caused by the pressure of the springs 9 and 10 thereon, or by gravity, or both.

I desire it to be understood that I may control a great number of combinations of switch springs or members by means of the armatures of my relay, and I therefore do not wish to be limited in this invention to the particular switch shown.

I also wish it to be understood that I may use any number of coils or windings on the core 1 for magnetizing same.

While the construction of the relay herein shown provides a very sensitive and efficient device, I do not wish to be limited in this invention to the particular construction shown, as various modifications thereof may be made or utilized without departing from the scope of the appended claims.

What I claim as my invention is:

1. A relay having a switch, a plurality of armatures each mechanically associated with the switch for controlling same, and means whereby different degrees of energization of the relay operate the armatures separately.

2. A relay having a switch, a plurality of armature-controlled mechanisms each mechanically associated with the switch for controlling same, and means whereby different degrees of energization of the relay operate the said mechanisms separately.

3. A relay having a switch, a plurality of armatures each having means for opening and closing the switch, and means whereby different degrees of energization of the relay operate the armatures separately.

4. A relay having a switch, a plurality of armature-controlled mechanisms each having means for opening and closing the switch, and means whereby different degrees of energization of the relay operate the said mechanisms separately.

5. In a relay device having a magnetic structure and switching mechanism, means for controlling the switching mechanism comprising a plurality of overlapping armatures oppositely pivoted adjacent the respective poles of the magnetic structure.

6. In a relay device having switching mechanism and a magnetic structure comprising but a single core and an L-shaped member connected to one end of the core, means for controlling the switching mechanism comprising a plurality of armatures at least one of which is operably associated with the said L-shaped member, the said armatures requiring respective degrees of energization of the device to effect their operation.

7. In a relay device having switching mechanism and a magnetic structure comprising a core and an L-shaped member connected to one end of the core, means for controlling the switching mechanism comprising two armatures one of which is operably attached to the said L-shaped member, the other armature being pivoted on the opposite side of the core from the said L-shaped member, the said armatures requiring respective degrees of energization of the device to effect their attraction.

8. In a relay device having a switch comprising a pair of switch members mounted for stationary engagement with each other, a plurality of armatures normally in unenergized positions and each mechanically associated with the switch for controlling same, and means for utilizing different energizations of the relay device for exercising different controls over the armatures.

9. In a relay device having a switch comprising a pair of switch members mounted for stationary engagement with each other, a plurality of armature-controlled mechanisms each mechanically associated with the switch for controlling same, and means for utilizing different energizations of the relay device for exercising different controls over the said mechanisms.

10. In relay mechanism having a switch comprising a plurality of switch members, a plurality of armatures having means for operating the respective switch members to control the switch, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

11. In relay mechanism having a switch comprising a pair of switch members, a pair of armatures having means for operating the respective switch members to control the switch, each armature depending on the position of the other armature for its control of the switch, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

12. In relay mechanism having a switch comprising a pair of switch members, a pair

of armatures having means for operating the respective switch members to control the switch, one armature depending on the position of the other armature for its control of the switch, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

13. In relay mechanism having a switch, a plurality of armatures each having means for mechanically controlling the switch, one of the said armatures depending on the energized maintenance of another of the said armatures in an actuated position for its control of the switch, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

14. In relay mechanism having a switch, a plurality of armature-controlled mechanisms each having mechanical coöperation with the switch for controlling same whereby one of the said armature-controlled mechanisms depends on the energized maintenance of another of the said armature-controlled mechanisms in a certain position for its control of the switch, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armature-controlled mechanisms.

15. In relay mechanism having a switch, a plurality of armatures each having means mechanically coöperating with the switch for controlling same whereby one of the said armatures operates the switch while another of the said armatures is maintained in an actuated position, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

16. In relay mechanism having a switch, a plurality of armatures each having means mechanically coöperating with the switch for controlling same whereby one of the said armatures opens the switch only while another of the said armatures is in an actuated position, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

17. In relay mechanism having a switch, a plurality of armatures each having means for controlling the switch whereby one of the said armatures opens and closes the switch while another of the said armatures is in an actuated position, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

18. In relay mechanism having a switch, a plurality of armatures each having means for controlling the switch whereby one of the said armatures opens and closes the switch only while another of said armatures is in an actuated position, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

19. In relay mechanism having a pair of switch members coöperating with each other to provide an openable and closable switch contact, a plurality of armatures operable separately and acting conjointly to control the said contact, the said armatures having means for operating the respective said switch members, and means for utilizing different energizations of the relay mechanism to operate the armatures separately.

20. In relay mechanism having a pair of switch members coöperating with each other to provide an openable and closable switch contact, a plurality of armatures operable separately and acting conjointly to control the said contact, the said armatures having means for operating the respective said switch members both when attracted and released, and means for utilizing different energizations of the relay mechanism to operate the armatures separately.

21. In electromagnetic mechanism having a pair of switch members coöperating with each other to provide an openable and closable switch contact, a plurality of armature-controlled mechanisms operable separately and acting conjointly to control the said contact, the said armature-controlled mechanisms having means for operating the respective said switch members, and means for utilizing different energizations of the electromagnetic mechanism to operate the said armature-controlled mechanisms separately.

22. In electromagnetic mechanism having a pair of switch members coöperating with each other to provide an openable and closable switch contact, a plurality of armature-controlled mechanisms operable separately and acting conjointly to control the said contact, the said armature-controlled mechanisms having means for operating the respective said switch members both when operated by an energization of the electromagnetic mechanism and by a deënergization of same, and means for utilizing different energizations of the electromagnetic mechanism to operate the said armature-controlled mechanisms separately.

23. In a relay device having a switch comprising a pair of switch members mounted for stationary engagement with each other, a plurality of armatures each having means for controlling the opening and closing movement of the switch, and means for utilizing different energizations of the relay device for exercising different controls over the armatures.

24. In a relay device having a switch comprising a pair of switch members mounted for stationary engagement with each other, a plurality of armature-controlled mechanisms each having means for control-

ling the opening and closing movement of the switch, and means for utilizing different energizations of the relay device for exercising different controls over the said mechanisms.

25. In a relay device having a switch comprising a pair of switch members mounted for stationary engagement with each other, operable mechanism having means for mechanically controlling the switch, and means for causing the said operable mechanism to assume two operative positions besides normal position upon the proper energization of the relay device to control the said switch in different manners.

26. In a relay device having a switch comprising a pair of switch members mounted for stationary engagement with each other, operable mechanism having means for controlling the switch, and means for partially actuating the said mechanism at one time and completely actuating it at another time upon the proper energization of the relay device to control the said switch in different manners.

27. In relay mechanism having a switch, a pair of armatures each having means mechanically coöperating with the switch for controlling same whereby each armature depends on the position of the other armature for its control of the switch, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

28. In relay mechanism having a switch, a plurality of armatures each having means mechanically coöperating with the switch for controlling same whereby one of the said armatures opens the switch while another of the said armatures is in an actuated position, and means for utilizing different energizations of the relay mechanism for exercising different controls over the armatures.

29. A relay comprising a core and means for energizing the same, a pair of armatures mounted adjacent to said core, one of said armatures presenting to said core a magnetizable area of greater extent than the other, and switch springs controllable by said armatures.

30. A relay comprising a core and means for energizing the same, a plurality of armatures mounted adjacent to said core, one of said armatures presenting to said core a magnetizable area of greater extent than another, and switching mechanism under the control of at least one of the said armatures.

31. A relay having but a single core and means for energizing the same, and a pair of armatures mounted to be attracted by one end only of the core, one of the said armatures presenting for attraction by the core a magnetizable area of greater extent than the other, and switching mechanism under the control of at least one of the said armatures.

32. In a relay having a core and means for energizing the same, two overlapping armatures adapted and arranged to be attracted by the end surface of one end of the core, the said end of the core having a portion thereof cut away on one side thereof for accommodating one of the armatures whereby different portions of the end surface of the said end of the core are in close proximity to the respective armatures for attracting them and switching mechanism under the control of at least one of the said armatures.

As inventor of the foregoing I hereunto subscribe my name, this 26 day of May, 1914.

FREDERICK R. PARKER.

Witnesses:
RAYMOND WICKHAM,
THEODORE KIRCHEL.