Oct. 1, 1929. A. B. KENDALL 1,730,216

RELAY

Filed March 1, 1926

Fig. 1

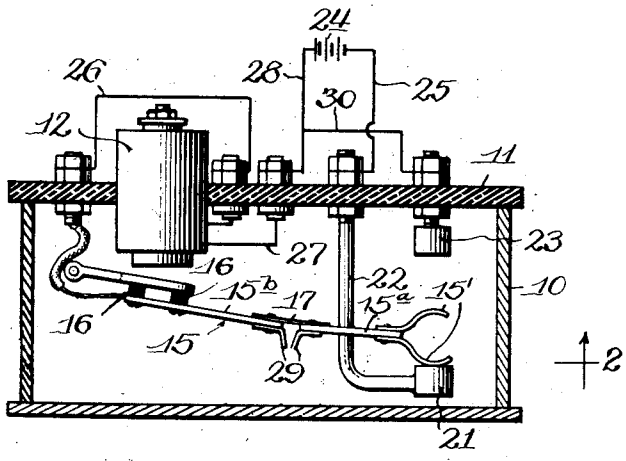
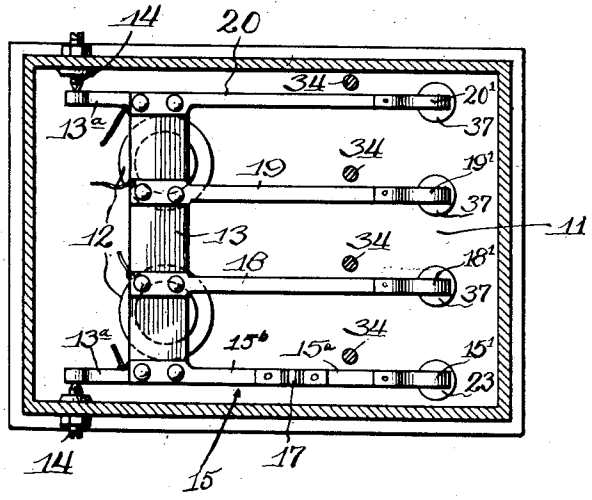


Fig. 2



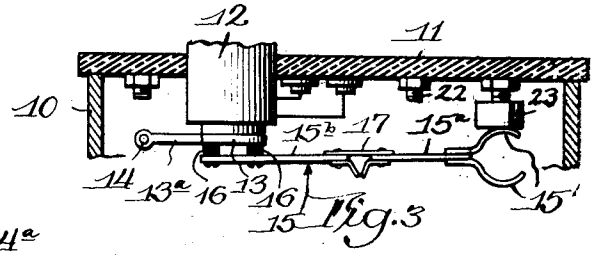
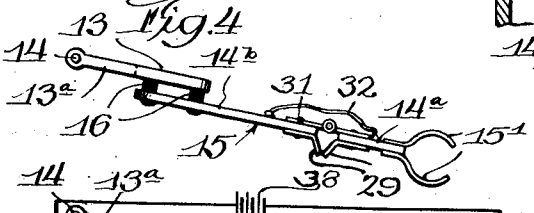


Fig. 3

Fig. 4



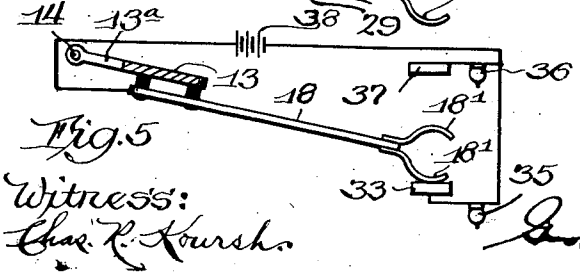


Fig. 5

Witness:
Chas. K. Kourshs.

Inventor,
Allen B. Kendall,
George Bagard Jones Atty.

Patented Oct. 1, 1929 1,730,216

UNITED STATES PATENT OFFICE

ALLEN B. KENDALL, OF MAYWOOD, ILLINOIS

RELAY

Application filed March 1, 1926. Serial No. 91,378.

My invention relates to improvements in electrical relays, or the like.

The principal object of my invention is to provide a controlling member for use with the relay by means of which member the relay may be regulated or timed for intermittent actuation of signals, such as bells, lights, semaphores, or the like, or for other purposes.

An additional object is to provide a controlling member which can readily be installed in certain types of standard relays at present in general use, which member will control the action of the relay with minimum current consumption.

A further object is to provide a relay controlling member of simple and economical construction.

Other objects relate to features of construction and arrangement of parts which will be apparent from a consideration of the following specification and accompanying drawings, wherein

Figure 1 is a sectional elevation of a form of relay showing an embodiment of my invention.

Fig. 2 is a sectional plan view taken on line 2—2, Fig. 1.

Fig. 3 is a fragmentary view corresponding to Fig. 1, but showing the controlling member in horizontal position.

Fig. 4 illustrates a different form of controlling member, and

Fig. 5 is a diagrammatic illustration of a circuit embodying a standard relay arm adapted to be controlled by my improved controlling member.

In the drawings, a relay casing 10 is shown for housing the moving parts of the relay mechanism, the top of the casing being closed by an insulating cover 11. Electromagnets 12 are supported in the insulating cover 11 and have their lower ends extending into the interior of the casing. An armature 13 is pivotally mounted in the casing, and is adapted to be attracted by the magnets 12 when the latter are energized.

The armature 13 may be provided with rearwardly extending portions 13^a which are pivotally secured to the casing 10 by screws 14. To the armature 13 a contact arm or relay controlling member 15 is secured as by insulating screws 16, or the like. The arm 15 is formed in two sections 15^a and 15^b, as shown in Figs. 1 and 3, which sections are joined by means of a resilient strip of material 17, which is riveted or otherwise secured to the intermediate ends of the said sections, the free end of section 15^a being provided with curved or flaring contacts 15′. As shown in Fig. 2, additional contact arms 18, 19 and 20 are provided, which arms, however, are formed of one section each, as shown in Fig. 5. Each of said arms is provided, respectively, with contacts 18′, 19′ and 20′, and each is adapted for controlling separate circuits, as will be hereinafter explained.

Many relays in use at the present time are constructed similarly to the relay above described, except that in said standard relays the arm 15 is constructed similarly to arms 18, 19 and 20. In relays of such construction, when the magnets are energized by electric current, the armature 13 will be drawn toward the magnet which will lift the contact arms, thereby interrupting the circuit of the magnets, causing the armatures to drop back to lower position. The result of this construction is that the armatures tend to vibrate very rapidly, and the relay arms cannot therefore be used to cause the intermittent actuation of signals such as lights, as will be clearly understood. It is therefore necessary to employ with these standard relays some additional mechanism for causing the armature to be actuated more slowly. This slower action, I have effected by means of my regulating or controlling member 15, above described.

A back contact 21 is carried by an arm or bracket 22, depending from the insulating cover 11. A front contact 23 is also provided, and is supported by the cover 11, as shown in Fig. 1. When the series magnets 12 are energized by current flowing from battery 24, through wire 25, arm 22, thence through arm or controlling member 15, wire 26, and from the magnets through wires 27 and 28 to the battery, the armature 13 will be drawn upwardly. Due to the flexibility of the connecting strip or spring 17, the lower contact member 15′ will remain in contact with the con-

tact or terminal member 21 for an instant after the armature starts upwardly, thereby permitting the magnet to become thoroughly energized and the windings thereof saturated before the circuit is broken, as will be clear.

Suitable stop members 29 are secured to the lower sides of the sections 15^a and 15^b of arm 15 adjacent their intermediate ends, as shown, for limiting the flexing action of the spring 17 when section 15^b moves upwardly. The upward movement of armature 13 will bring the stop members 29 into contacting relation, whereupon further movement of the armature will lift the section 15^a and lower contact member 15′ from contact 21, thereby breaking the circuit of the magnet. The upper contact member 15′ will be moved into contact with member 23 with the result that the magnet 12 will be shunted, thereby delaying the release of the armature thereform. This shunting circuit comprises wires 27, 30, contact 23 arm 15 and wire 26. Upon release of the armature by he magnets 12 when the magnetic flux thereof has subsided, the arm 15 will drop to the lower position, shown in Fig 1. Upon the striking of the lower member 15′ with the contact 21 the lower section 15^a of the arm 15 will vibrate, the flexible member 17 being of such resiliency as to permit this action. The vibration of this member with reference to contact 21 will cause a pulsating current to pass through the magnets 12 which will prevent momentarily the energization of the magnets required for attracting the armature. When the vibrations have subsided a direct current will flow through the magnet attracting the armature, as above explained. It will be understood, of course, that the arm 22 may be provided with means which will permit the same to vibrate to accomplish the same result, if desired.

Another form of controlling member is shown in Fig. 4. This member 15 is constructed similarly to the corresponding member of Fig. 1, except that a hinge 31 is employed for connecting the two sections of the member. In this construction, it is desirable to connect the two sections electrically by means of a flexible wire 32 to afford an uninterrupted path for the flow of current as will be clear.

It will be understood that the arms 18, 19 and 20 will be actuated by the armature 13, and that each of said arms when in back position will engage a contact 33, corresponding to contact 21, and supported by brackets 34, similar to bracket 22. When in said position, each of said arms will close a circuit similar to that shown diagrammatically in Fig. 5. In each of said circuits there may be one or more signalling devices, such as lamps 35 and 36, or other apparatus, which it is desired to control intermittently. When the arms, such as arm 18 in Fig. 5, is in back position, lamp 35 will be in circuit with battery 37, thereby causing said lamp to light. Upon movement of the arm to front position into contact with the front contact member 37, the lamp 36 will be lighted. The battery 38 of Fig. 5 may, of course, be the same as battery 24 of Fig. 1, or the auxiliary circuits opened and closed by arms 18, 19 and 20 may be supplied with current from a generator or other source independent of the battery 24. By adjusting the contact members 15′ and contacts 21 and 23, the device can be timed so as to operate more slowly or more rapidly.

Although I have shown certain features of my invention for the purpose of illustration, it will be apparent that changes may be made therein without departing from the spirit thereof, and I do not wish to be restricted to the specific embodiments herein shown and described, except where limitations thereto appear in the appended claims.

What I claim is:

1. An electrical relay including a pair of contacts, one of which is adapted to be moved into and out of engagement with the other, one of said contacts being resilient and arranged for momentary vibration upon impact thereof with said other contact whereby a pulsating current of short duration is provided for delaying the action of the relay.

2. Means for regulating the action of a direct current magnet, comprising an armature, a pair of contact members, one of said members being secured to and movable by said armature, said members when in contact serving to close the magnet circuit for attracting said armature, said movable contact member being adapted upon breaking the magnet circuit and the releasing of said armature to impinge upon said other contact member to establish a momentary vibratory relation between said contact members, whereby a pulsating direct current is sent through said magnet for delaying the attraction of said armature until said vibrations have subsided.

3. A direct current relay comprising a magnet having an armature, a contact arm movable by said armature for opening and closing an electric circuit, and means for regulating the actuation of said armature, said means comprising a contact and a contact arm in circuit with said magnet, said arm being formed in two connected sections one of which is resilient and adapted to vibrate momentarily upon engagement thereof with said contact thereby converting the direct current into a pulsating current which is ineffectual to actuate the magnet until said pulsations have subsided.

4. The combination with a relay comprising a magnet, an armature actuatable thereby, a member movable by said armature for opening and closing an electric circuit, of front and back contacts, a contact arm movable by said armature from one to the other of said contacts, means comprising a vibratory mem-

ber for momentarily delaying actuation of said armature by said magnet upon engagement of said back contact with said arm, and means for delaying the release of said armature by said magnet upon engagement of said arm with said front contact, said last named means comprising a circuit shunting the magnet.

In testimony whereof, I have subscribed my name.

ALLEN B. KENDALL.