

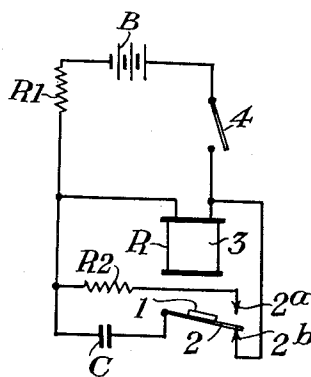
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ELECTROMAGNETIC APPARATUS

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ELECTROMAGNETIC APPARATUS

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7 Claims. (Cl. 175—320)

My invention relates to electromagnetic apparatus, and particularly to apparatus of the type involving a direct current magnet having an operating winding and an armature.

One object of my invention is the provision of novel and improved means for delaying the operation of the armature when the operating winding becomes connected with a source of current.

I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claims.

The accompanying drawing is a diagrammatic view showing one form of apparatus embodying my invention.

Referring to the drawing, the reference character R designates an electromagnetic device, which, as here shown, is a direct current relay having the usual operating winding 3, armature 1 operated thereby, and contact finger 2 operated by the armature 1. This contact finger 2 co-operates with a lower contact member 2^b to form a back contact 2—2^b, and with an upper contact member 2^a to form a front contact 2—2^a.

The winding 3 may be connected with and disconnected from a battery B by means of a contact 4. A resistance R1 is interposed between the battery and one terminal of winding 3, although if the internal resistance of the battery is high enough this resistance may be omitted.

Connected in multiple with the winding 3 is a condenser C, and, as here shown, the branch path including this condenser also includes back contact 2—2^b of relay R. When front contact 2—2^a is closed, condenser C is connected with a discharge path, which, as here shown, includes a second resistance R2.

When contact 4 becomes closed, current from battery B charges the condenser C until the voltage across this condenser is above the pick-up voltage of relay R, at which time relay R operates armature 2 to open the back contact and to close the front contact. The opening of the back contact 2—2^b opens the branch path around winding 3, and the closing of front contact 2—2^a closes the discharge path for condenser C, so that the charge in the condenser is immediately dissipated. When contact 4 again becomes opened, the armature 1 of relay R will immediately release, whereupon the parts of the apparatus will be restored to the positions in which they are shown in the drawing.

Condenser C may be connected directly across the terminals of winding 3 without the interposition of contact 2—2^b, but when this is done, relay R will be slow to release its armature upon the

opening of contact 4, because of the slow decay of energy in the condenser C through winding 3. Furthermore, slow pick-up will not be obtained immediately after release, because condenser C will not then be fully discharged. By interposing the back contact in the branch path for this condenser, and by providing a discharge path through the front contact, I have accomplished quick release of relay R and also slow pick-up if contact 4 becomes closed immediately after relay R has released.

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, a source of direct current, an electromagnetic device having an energizing winding and an armature operated thereby as well as a back contact operated by said armature, means for connecting said winding with and disconnecting it from said source, and a condenser connected in multiple with said winding through said back contact for delaying operation of said armature when said winding becomes connected with said source.

2. In combination, a source of direct current, an electromagnetic device having an energizing winding and an armature operated thereby as well as a back contact operated by said armature, means for connecting said winding with and disconnecting it from said source, a condenser connected in multiple with said winding through said back contact, and a resistance connected in series with said condenser for delaying operation of said armature when said winding becomes connected with said source.

3. In combination, a source of direct current, an electromagnetic device having an energizing winding and an armature operated thereby as well as a front and a back contact operated by said armature, means for connecting said winding with and disconnecting it from said source, a condenser connected in multiple with said winding through said back contact for delaying operation of said armature when said winding becomes connected with said source, and a discharge path for said condenser including said front contact.

4. In combination, a source of direct current, an electromagnetic device having an energizing winding and an armature operated thereby as

well as a front and a back contact operated by said armature, means for connecting said winding with and disconnecting it from said source, a condenser connected in multiple with said winding through said back contact, a resistance connected in series with said condenser for delaying operation of said armature when said winding becomes connected with said source, and a discharge path for said condenser including said front contact.

5. In combination, a source of direct current, an electromagnetic device having an operating winding, means for at times energizing said winding from said source, a contact controlled by said device and closed when said operating winding is deenergized, and a circuit connected with said winding and including a condenser as well as said contact for delaying the operation of said device.

6. In combination, a source of direct current, an electromagnetic device, a contact controlled by said device and closed when the device is deenergized, means for at times energizing said device from said source, and a circuit including a condenser and said contact for delaying the energization of said device.

7. In combination, a source of direct current, an electromagnetic device having an energizing winding and an armature operated thereby as well as a back contact operated by said armature, means for at times energizing said winding from said source, and a circuit including a condenser and said back contact for delaying the energization of said winding.

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