

C. W. DUNHAM.
RELAY.
APPLICATION FILED NOV. 25, 1916.

Patented Nov. 18, 1919.

1,322,097.

FIG. 1

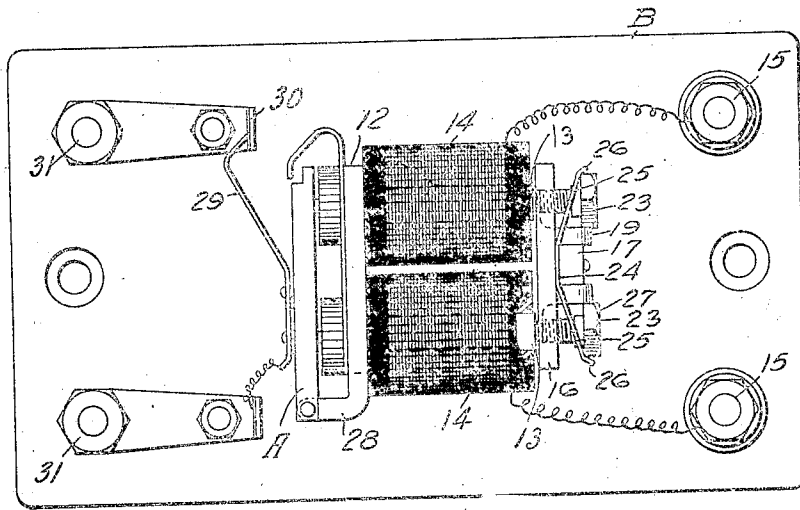


FIG. 2

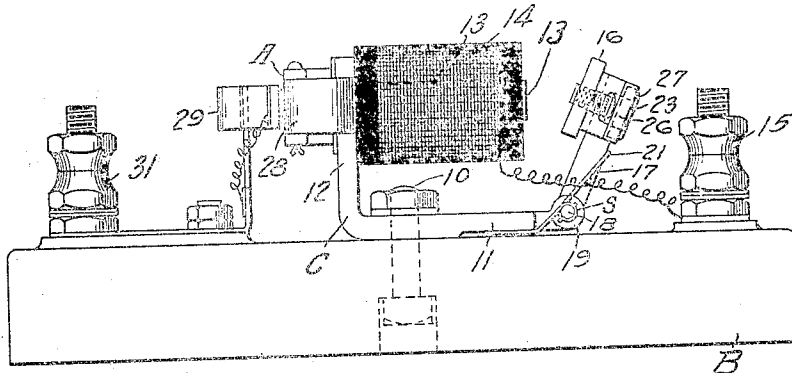
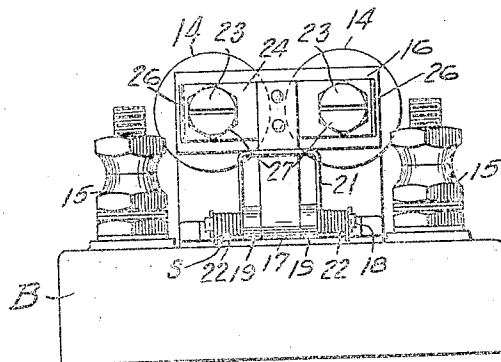


FIG. 3



WITNESSES

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RELAY.

1,322,097.

Specification of Letters Patent.

Patented Nov. 18, 1919.

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To all whom it may concern:

Be it known that I, CHARLES W. DUNHAM, a citizen of the United States, residing at Edgewood borough, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Relays, of which the following is a specification.

This invention relates to relays and more particularly to electromagnetic relays.

The chief characteristic of this invention resides in the provision of a relay of this character having an adjustable member in the magnetic circuit by means of which the reluctance of the circuit may be varied to insure proper operation of the relay under widely varying conditions.

Another characteristic of the invention is the provision of a relay having means for removably applying the windings or coils to permit the ready and convenient interchanging thereof, whereby windings of various resistances may be used in accordance with specific requirements.

A further characteristic resides in the provision of a relay in which the means for varying the reluctance of the magnetic circuit is employed for retaining the windings in position to prevent the accidental displacement thereof.

Other characteristics will appear from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that the embodiment illustrated, though practical, is by no means the only embodiment which the invention may assume, wherefore the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified in various particulars, so long as such changes and modifications make no material departure from the salient features of the invention.

In the drawings, Figure 1 is a view showing in top plan, one form of relay embodying my invention.

Fig. 2 is a view showing, in side elevation, the embodiment shown in Fig. 1.

Fig. 3 is a view showing, in end elevation, the right hand end of Figs. 1 and 2.

Similar reference characters designate similar parts throughout the several views.

Referring to the drawings, B designates

a base on which is secured, by means of bolts 10, a substantially L-shaped frame C, the same being formed of non-magnetic material such as brass or the like, whereby such frame will be excluded from the magnetic circuit, as will be hereinafter described. The frame C comprises a horizontal portion 11 and a vertical portion 12, the vertical portion 12 having extended therethrough horizontally disposed supporting studs or cores 13, a major portion of which are disposed upon the inner side of the vertical portion, as shown. These studs 13 are formed of magnetizable material, such as soft iron and in addition to forming supports, serve as cores for windings or coils 14. The cores 13 are of such a diameter as to loosely receive the coils to permit the ready removal thereof whereby they may be interchanged when coils of different resistance are required to operate the relay under certain conditions. The coils 14 are preferably connected in series and have the terminals thereof connected to the binding posts 15 secured to one end of the base B.

To confine the coils 14 upon the studs or cores 13 and to permit an adjustment of the permeability of the magnetic circuit, as will be hereinafter described, I provide an adjustable back strap 16, which is, in this instance, rigidly supported upon a movable member 17, the latter being hingedly mounted for outward swinging movement upon a pintle 18, the free end of the horizontal portion 11 being formed with spaced bearing 19 to receive the pintle, as shown.

The movable member 17 normally assumes a vertical position under the biasing action of a spring S, the spring, in this instance, being formed from a single length of wire having its intermediate portion engaging the member 17, as at 21, while the opposite ends thereof are coiled about the pintle 18, as at 22, and are extended to engage the horizontal portion 11 of the frame C, as shown, thus tensioning the intermediate portion of the spring to force the member 17 and consequently the back strap 16 into engagement with the pole faces or adjacent ends of the cores 13. This action, however, is controlled by means of transversely extending screws 23 threadedly mounted in the opposite ends of the back strap 16 in such manner as to have the points thereof engaging the ends of the cores 13. It will be apparent from

this construction that by adjusting the screws within the back strap, the back strap and its mounting will be accordingly spaced from the cores 13.

5 In order to prevent accidental movement of the screws within the back strap, I provide the back strap 16 with a locking means which is, in this instance, a leaf spring 24. The spring 24 has its medial portion secured between the free end of the member 10 17 and the back strap while the opposite ends thereof are inclined outwardly to form the resilient arms 25. The arms 25 have their free ends bent outwardly at an angle to provide the locking members 26, while ad- 15 jacent the locking members, the arms are formed with suitable openings which loosely receive the screws 23. The heads of the screws 23 have their peripheries formed with a plurality of facets, any one of which are adapted to be engaged by the locking mem- 20 bers 26 for preventing rotation of the screws. It is to be understood, however, that the screws may be turned to adjust the back strap 16 with relation to the cores 13 by de- 25 pressing the arms 25 to a position parallel with respect to the back strap, thus moving the locking members so as to disengage the facets.

30 A designates an armature of any suitable construction which is pivotally mounted on an arm 28 formed on the vertical portion 12 of the frame C, the armature being disposed within the magnetic field of both of the cores 13 and adapted to be actuated thereby, as 35 will be understood. This armature is, in this instance, provided with an insulated contact 29 for controlling a circuit through a contact point 30, the terminals of the circuit being 40 connected to the binding posts 31 and to the contact 29 and post 30, as shown.

It will be evident from the foregoing description, that when the coils 14 are energized, the magnetic circuit of the relay in- 45 cludes armature A, wires 13 and the back strap 16. Therefore, when the back strap is arranged in spaced relation to the adjacent pole faces of the cores 13, the magnetic lines of force are compelled to traverse the air 50 gap between the back strap and cores, thus reducing the permeability of the magnetic circuit and consequently the pull exerted on the armature A. It will therefore be seen that by varying the distance between the 55 back strap and cores by means of the screws as has been described, the permeability of the circuit and the pull on the armature will be correspondingly varied, that is to say, with a given number of ampere turns in the 60 relay coils, by increasing or decreasing the air gap, the pull exerted on the armature of the relay will be correspondingly decreased or increased. Thus, if the actuation of the 65 current of a predetermined voltage, the back

strap may be adjusted to cause movement of the armature at this predetermined voltage. In the event that different resistances are required, the coils 14 may be readily removed to permit the substitution of other coils by 70 swinging the member 17 outwardly whereby the back strap will be moved to unobstructing position. Thus the coils may be interchanged without disturbing the adjustment of the relay.

Having thus described my invention, what I claim is:

1. A relay comprising an electromagnet, an armature, a back strap adjustable with relation to the cores of the electromagnet to vary the magnetic flux in said cores, means for adjusting the position of said back strap and for locking the same in adjusted position, and a contact controlled by said arma- 80 ture.

2. In a relay, an electromagnet and an armature therefor, a movable back strap, means for adjusting the back strap with relation to the core of the electromagnet to vary the magnetic flux of said core, and a 85 contact controlled by said armature.

3. A relay comprising a magnetic circuit having a portion thereof pivoted and arranged in spaced relation to the remaining portion of the circuit, means for varying the 90 relation of the pivoted portion to the remaining portion, an armature, and a contact controlled by said armature.

4. In a relay, a winding, a movable back strap capable of assuming locking and re- 100 leasing positions, a support, a core for the winding carried by the support and removably supporting said winding, the back strap being so arranged as to lock the winding upon said core when in locking position 105 and to permit removal thereof when in releasing position, an armature, and a contact controlled by said armature.

5. A relay comprising a core, a winding removably mounted upon said core, means 110 on one end of said core for preventing removal of said winding in one direction, a movable member adjustable with relation to said core for varying the permeability of said core, said member being biased to one 115 position for retaining said winding upon said core but capable of being moved to a releasing position against the action of said biasing means to permit removal of said winding, an armature, and contact con- 120 trolled by the armature.

6. A relay comprising an electromagnet having a removable core, a support carried by the core and adapted to prevent removal of the core in one direction, a back strap 125 pivoted to the support and biased to such a position with respect to said electromagnet as to prevent removal of said core, said back strap being adjustable in its biased position to vary the permeability of said 130

core, an armature controlled by said core, and a contact governed by said armature.

7. A relay comprising an electromagnet having a removable core, means carried by
5 said core for locking the same within said winding, said means being formed of permeable material and mounted for movement to a releasing position to permit removal of said core, means for spacing the
10 said means variable distances with relation to said core to vary the permeability of the core, an armature for the electromagnet, and a contact controlled by said armature.

8. A relay comprising an electromagnet
15 having a sectional core including a fixed

section and a movable section arranged in spaced relation to the fixed section, means for adjusting the movable section with respect to the fixed section to vary the distance therebetween, means for locking the
20 movable member in adjusted position, an armature controlled by said electromagnet, and a contact governed by said armature.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. DUNHAM.

Witnesses:

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EDWIN H. JONES.