N. R. HAAS.

CIRCUIT CONTROLLER.

APPLICATION FILED SEPT. 6, 1916.

1,401,071. Patented Dec. 20, 1921.

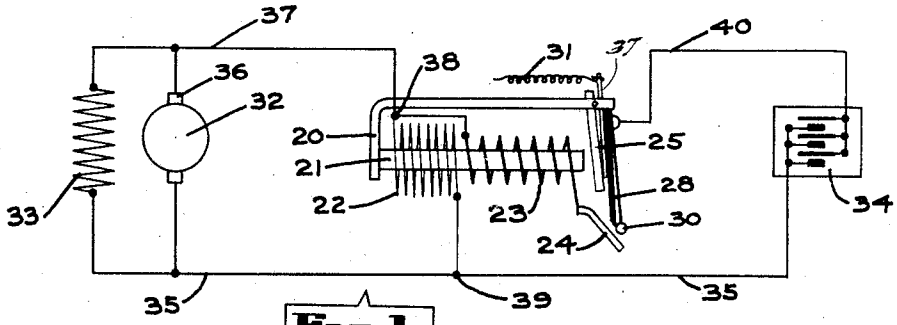


Fig. 1.

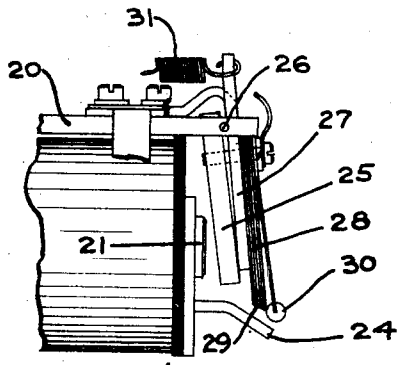


Fig. 2.

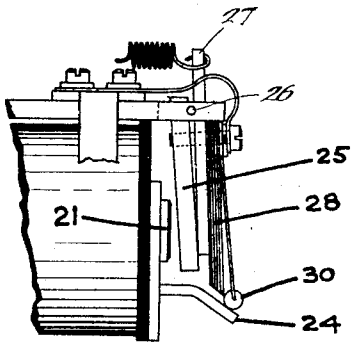


Fig. 3.

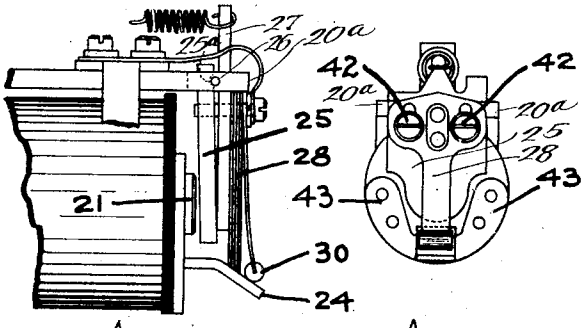


Fig. 4.

Fig. 5.

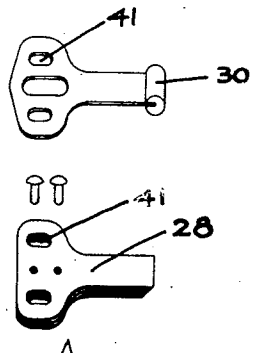


Fig. 6.

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UNITED STATES PATENT OFFICE.

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CIRCUIT-CONTROLLER.

1,401,071. Specification of Letters Patent. **Patented Dec. 20, 1921.**

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To all whom it may concern:

Be it known that I, NELSON R. HAAS, a citizen of the United States of America, residing at Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Circuit-Controllers, of which the following is a full, clear, and exact description.

This invention relates to improvements in electro-magnetic circuit controllers such as cut-out or reverse current relays, and more particularly to that type of relay used in connection with automobile starting, lighting and ignition systems.

One of the objects of the present invention is to so construct the movable contact of the relay as to eliminate the sparking and pitting of same.

One manner of carrying out the above object is to provide a solid contact element, rigidly secured to the relay, in combination with a movable contact element, including a plurality of conducting strips or laminations, one of which has a piece of high resistance material secured thereto, in such a manner that when the movable contact element is brought into engagement with the stationary contact, the piece of high resistance material, carried by one of the contacting strips, will be brought into engagement previous to the remaining contacting strips or laminations of the movable contact.

In order to compensate for variations in the operation of the system, suitable adjusting means are provided in connection with the movable contact element, so that the contact between the said movable contact element and the stationary contact, can be varied to suit conditions.

A further object of the invention is to so construct the stationary contact, that any excessive heat generated therein will be dissipated, thereby tending to prevent undue over-heating of the said stationary contact element.

Further objects and advantages of the present invention will be apparent in the following description, reference being had to the accompanying drawings, wherein a preferred form of one embodiment of the present invention is clearly set forth.

In the drawings:—

Figure 1 is a diagrammatic view of the relay and its electrical connections.

Figs. 2, 3 and 4 are side views of the contact carrying end of the cut-out relay, which show the movable contact element in various positions. Some of the parts of these views have been broken away for the sake of clearness.

Figs. 5 and 6 are detail views of the relay of the movable contact element.

Referring to the drawings, there is shown a relay having a frame 20 which carries a core 21. This core supports a fine winding 22 and a heavy winding 23, the functions of which are fully described hereinafter. A stationary contact element 24 is rigidly secured to the relay in any suitable manner. The frame 20 is bifurcated to form members 20^a which support pivot pin 26, upon which are mounted for oscillation the armature 25, clamping strip 27 and the movable contact element 28. Screws 42 serve to clamp these elements together with pin 26 between armature 25 and strip 27, said pin being seated in the groove 25^a formed in the armature 25. While the armature has a swinging movement it may be said to have movement substantially longitudinal of the magnet core. This contact carrying element 28 includes a plurality of strips or laminations 29, one of which has a high resistance element 30 of mediar metal or any other well known high resistance material secured at its outer extremity.

"Mediar" is a trade name for a material having relatively high resistance and also the qualities of not easily corroding under the action of an electric spark.

By referring to Figs. 2, 3 and 4, it can be clearly seen that the high resistance element 30 projects beyond the extremities or contact faces of the strips or laminations 29. This permits the high resistance element 30 to come into contact with the stationary contact element 24, before any of the strips or laminations 29, of the contact element 28, as is clearly shown in Fig. 3.

A spring element 31 is secured to the one end of the strip 27, tending to pull or force the armature 25 away from the core 21.

By referring to Fig. 1, the system is shown including a generator 32, having field windings 33, and connected to the storage battery 34, by means of the relay and line connection 35.

Now, when the generator starts to gener-

ate, current will first start to build up in the field 33. As soon as this building up effect has reached a determined point, current will flow from the brush 36, through wire 37, to the point 38, thence through the fine winding 22 of the relay, to the point 39, back to the generator via the wire 35.

When the core 21 has become energized sufficiently to attract the armature 25, the tension of the spring 31 is overcome, causing the movable contact element to be brought into engagement with the stationary contact element 24 in the following manner.

First the high resistance element 30 will be brought into engagement with the stationary contact element 24 (see Fig. 3), and then further movement of the movable contact will bring the strips or laminations 29 into engagement with the stationary contact (see Fig. 4), at which time current will flow from the generator 32, through brush 36, wire 37, to the point 38, and thence through the heavy winding 23, across the stationary contact 24, movable contact 28, wire 40 to the battery 34, and back to the opposite side of the generator via the wire 35.

It will of course be understood that when the charging rate of the battery decreases, so that the core 21 is unable to hold the armature 25 in attracted position, the above described action of the relay reverses, that is, the strips or laminations 29 will first break engagement with the contact element 24, after which the high resistance element 30 will break away from the stationary contact, and owing to this decreased flow, on account of the relatively high resistance of the element 30, the sparking at this point will substantially be eliminated.

In order to compensate for different variations in the charging rate of the generator, the movable contact element 28 is provided with elongated slots 41, which are adapted to receive a screw 42 which clamps the movable contact element securely to the strip 27. Any variation or adjustment can be made by loosening said screws 42, and after proper adjustment has been obtained, said screws may again be tightened to clamp the movable element in the desired position.

The plane of contact of contacts 28 and 24 is oblique to the magnet core 21 and to the plane of the armature 25, and the adjustment of the contact 28 is a direction oblique to the plane of contact. Accurate adjustment of the gap between said contacts is thereby facilitated since a required change in gap requires greater movement of contact 28.

By referring to Fig. 5, the stationary contact element is shown having projections or ears 43. These projections are provided so that when excessive heat is generated at the contact points, through the continuous making and breaking of the circuit, this heat will be dissipated in this comparatively large body of material, thereby tending to overcome any undue heating of said stationary contact.

While the foregoing discloses a cut-out or reverse current relay, it will be understood that the application of the present invention is not limited to this particular type of electro-magnetic circuit controller, but may be applied as well to other types of electromagnetic circuit controllers.

While the form of mechanism herein shown and described, constitutes a preferred form of embodiment of the invention, it is to be understood that other forms might be adopted all coming within the scope of the claims which follow.

What I claim is as follows:

1. In a circuit controller, the combination with an electromagnet including a core and windings; of an armature; a stationary contact; a movable contact supported by the armature and associated with said stationary contact; a resistance element carried by the movable contact and adapted to be brought into engagement with the stationary contact previous to the movable contact, and means for adjusting the relative position of the movable contact and its resistance element to the stationary contact, said adjustment taking place in a direction which is transverse to the magnet core.

2. In a circuit controller, the combination with a magnet including a core and windings; of a stationary contact; a pivot pin and support therefor; an armature; a movable contact; and a common means to secure the movable contact upon the armature and in proper relation to the stationary contact, and also to clamp the armature upon the pivot pin in proper relation to the magnet core.

3. In a circuit controller, the combination with an electromagnet including an L-shaped frame, a core mounted on one leg of the frame and windings on the core; of a pivot pin mounted upon the other leg of the magnet frame; a stationary contact; an armature; a movable contact; and a common element for securing the movable contact upon the armature and in proper relation to the stationary contact, and to clamp the armature upon the pivot pin in proper relation to the magnet core.

4. In a circuit controller, the combination with an electromagnet having an L-shaped frame, and a core mounted on one leg of the frame, the other leg being bifurcated, and windings on the core; of a pivot pin mounted upon the said bifurcations of the magnet frame; a stationary contact mounted on the magnet; an armature provided with a groove; a movable contact; a clamping

strip; and a bolt passing through elongated holes provided in the movable contact, and through the clamping strip, and having threaded engagement with the armature in order to serve as a device for clamping the pivot pin between the armature and clamping strip, and as an element for adjustably securing the movable contact upon the armature.

5. In a circuit controller, the combination with a magnet, including a core and windings; of a stationary contact; an armature; means for supporting said armature for rotation with respect to said magnet; and common means for securing said movable contact upon said armature in proper relation to the stationary contact, and also for securing said armature upon said supporting means in proper relation to the magnet core.

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

NELSON R. HAAS.

Witnesses:
J. W. McDONALD,
J. E. JOHNSON.