

J. H. HUNT.
TEMPERATURE COMPENSATED REGULATOR.
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1,425,858.

Patented Aug. 15, 1922.

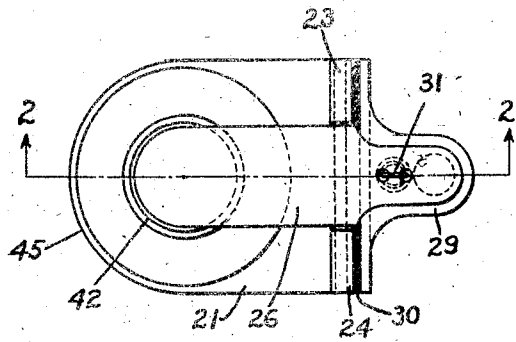


Fig. 1

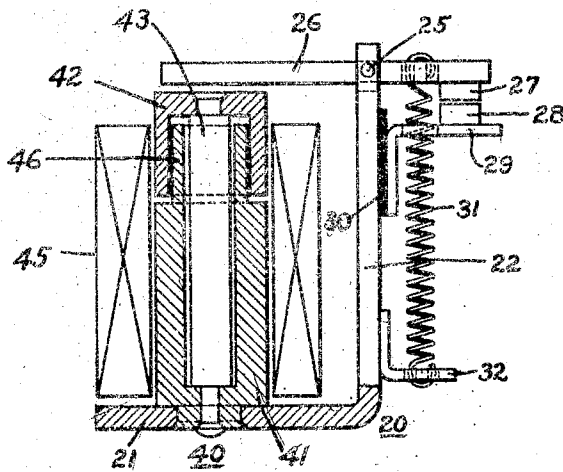


Fig. 2

Witnesses
Erwin A. Sauerwald
C. Dale Miller

By

Inventor
John H. Hunt
Forrest B. Mac Nab
Attorney

UNITED STATES PATENT OFFICE.

JOHN H. HUNT, OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON ENGINEERING LABORATORIES COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

TEMPERATURE-COMPENSATED REGULATOR.

1,425,858.

Specification of Letters Patent. Patented Aug. 15, 1922.

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To all whom it may concern:

Be it known that I, JOHN H. HUNT, 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 Temperature-Compensated Regulators, of which the following is a full, clear, and exact description.

This invention relates to electromagnetic regulating devices and has among its objects the compensation for the increase in resistance in the windings of the regulator due to increase in temperature.

Other and further objects of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:—

Fig. 1 is a plan view of a regulator embodying the invention; and

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Referring to the drawing, a frame 20 is provided with a base portion 21 and an upright portion 22 which is bifurcated at its upper end to provide ears 23 and 24. A rod 25 passes through ears 23 and 24 and supports an armature 26 which carries at one end a contact 27 cooperating with a fixed contact 28. Contact 28 is mounted upon a bracket 29 which is secured to the frame 20 but insulated therefrom by block 30. A spring 31 is connected at one end to a bracket 32 secured upon frame 20, and at the other end is attached to the armature 26. Spring 31 normally maintains contacts 27 and 28 in engagement.

Contacts 27 and 28 are connected in the regulating circuit. This regulating circuit may be any of the well-known forms. For example, contacts 27 and 28 may be connected in a short circuit around a resistance connected in series with a field circuit of a dynamo.

The base portion 21 of frame 20 supports a magnet core 40 comprising a main portion 41, a pole tip portion 42 and a temperature responsive portion 43 secured at one end to the main portion 41 and at the other to the pole tip portion 42. The magnet winding or windings which surround the

core 40 are designated by numeral 45. The main portion 41 is constructed of magnetizable material having a low coefficient of expansion. This material is preferably invar steel. The temperature responsive element 43 is constructed of material having a relatively high coefficient of expansion, preferably aluminum. The external diameter of the main portion 41 is reduced at its upper end as indicated by numeral 46, so as to be encircled by the cup shaped pole tip portion 42 having an external diameter substantially equal to the largest external diameter of the main core portion 41.

It is apparent that as the temperature surrounding the regulator increases, the rod 43 will expand faster than the main core portion 41, thereby increasing the overall length of the magnet core 40 and decreasing the air gap between the magnet core and the armature 26. This decrease of the air gap will compensate for the decrease in magnetomotive force of the magnet windings 45 which results from the increase in resistance thereof due to increase in temperature.

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 regulator, the combination with an armature for controlling a circuit; of a frame supporting said armature; an electromagnet including a controlling winding, and a magnet core member, and temperature responsive means for varying the position of the core with respect to the frame whereby to vary the air gap between the magnet core and armature.

2. In a regulator, the combination with an armature for controlling a circuit; of an electromagnet including a controlling winding, and a magnet core including a main portion and a separate pole tip portion and temperature responsive means for varying the position of the pole tip with respect to the main portion, whereby to vary the air gap between the magnet core and armature.

3. In a regulator, the combination with an armature for controlling a circuit; of an

electromagnet including a controlling winding, and a magnet core including a tubular main portion, a cup-shaped pole tip portion encircling one end of said main portion, and a temperature responsive rod having a greater coefficient of expansion than the main portion, located within said main portion and having one end secured thereto and the other end secured to said pole tip portion.

4. In a regulator, the combination with an armature for controlling a circuit; of an electromagnet including a controlling winding, and a magnet core including a tubular main portion of magnetizable material having a relatively low coefficient of expansion, a cup-shaped pole tip portion encircling one end of said main portion, and an aluminum rod located within said main portion and

having one end secured thereto and the other end secured to said pole tip portion.

5. In a regulator, the combination with an armature for controlling a circuit; of an electromagnet including a controlling winding, and a magnet core including a tubular main portion of invar steel, a cup-shaped pole tip portion encircling one end of said main portion, and an aluminum rod located within said main portion and having one end secured thereto and the other end secured to said pole tip portion.

In testimony whereof I hereto affix my signature.

JOHN H. HUNT.

Witnesses:

WALTER W. RIEDEL,
CHAUNCEY D. MILLER