W. C. NEAHR.

ELECTRIC CIRCUIT CONTROLLER.

APPLICATION FILED OCT. 21, 1915.

1,217,982. Patented Mar. 6, 1917.

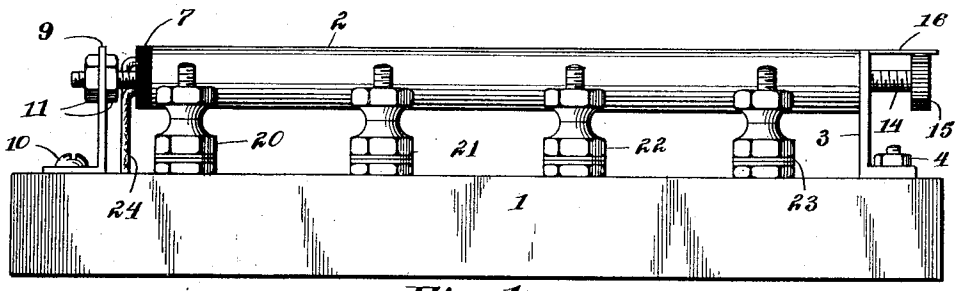


Fig. 1

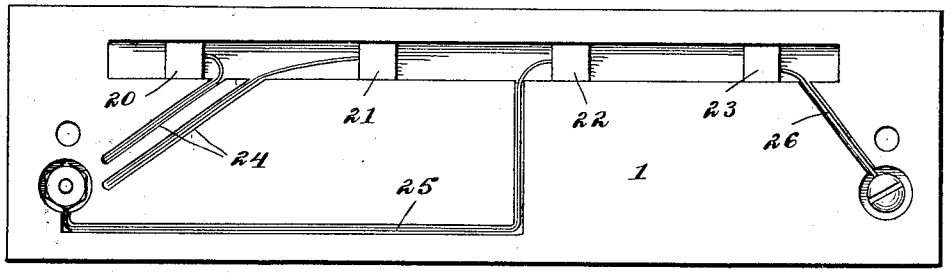


Fig. 2

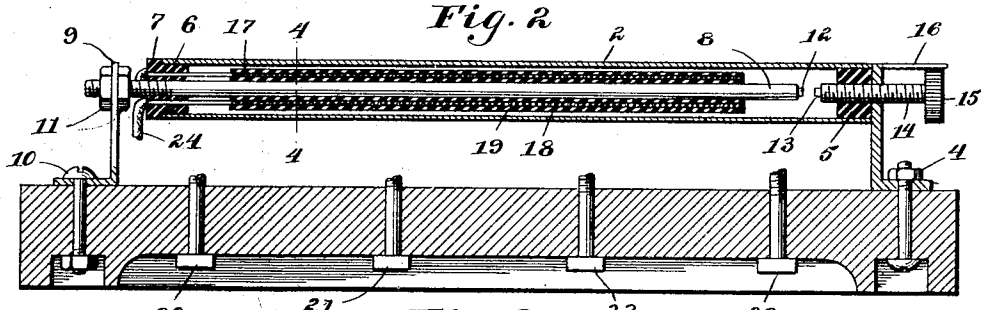


Fig. 3

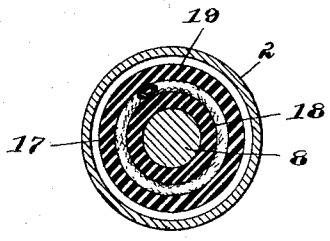


Fig. 4

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UNITED STATES PATENT OFFICE.

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ELECTRIC-CIRCUIT CONTROLLER.

1,217,982. Specification of Letters Patent. Patented Mar. 6, 1917.

Application filed October 21, 1915. Serial No. 57,185.

To all whom it may concern:

Be it known that I, WILL C. NEAHR, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Electric-Circuit Controllers, of which the following is a specification.

The present invention relates to thermostatic means for controlling electric circuits, and the primary object is to provide a structure of a simple but thoroughly practical character, which will withstand the deleterious influences of the elements to a material degree, so that it may be employed in relatively exposed places without danger of becoming inoperative.

A further and important object is to provide a novel structure of this character that will maintain a predetermined relation of its electrical contact elements without regard to the normal and usual variations of the temperature, so that danger of accidentally making or breaking the circuit, due to such causes, is eliminated, while the control of the circuit can be properly effected at any time by the means employed for that purpose.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the device.

Fig. 2 is a bottom plan view.

Fig. 3 is a longitudinal sectional view, and

Fig. 4 is a cross sectional view on a greatly enlarged scale in order to properly illustrate the different internal features or elements.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, a base 1 is employed, which is formed of suitable insulating material, and mounted thereon is the thermostatic controller proper which is constructed in the following manner.

A tubular member 2 is provided, one end thereof being fixed to a rigid support 3 in the form of a bracket bolted, as shown at 4, to the base, said bracket having a plug portion 5 fixed within the end of said tube 2. The opposite end of the tubular member 2 contains a plug 6 of insulating material having a flange 7 abutted against the end of said member, and threaded through the plug 6, is a rod member 8 which is thus supported longitudinally within the tubular member 2 and terminates short of the opposite end thereof. The tube 2 and rod 8 have substantially equal co-efficients of expansion and are of electrical conducting material. Aluminum has been found entirely satisfactory for the purpose.

The end of the rod 8, which extends through the plug 6, projects beyond the tube 2 and is suitably threaded. It passes through a supporting bracket 9 bolted to the base, as shown at 10. The rod is fixed to said bracket 9 by nuts 11 threaded thereon and abutting against opposite sides of said bracket. This bracket, it will be noted, is of relatively thin material, being preferably spring brass, so that it will yield to the expansion and contraction of the rod and tube thus connected thereto.

Mounted upon the inner free end of the rod 8 is a contact element 12 preferably of platinum or similar substance, and coacting therewith is another contact element 13 carried by the inner end of a screw 14 having a very fine pitched thread, said screw being threaded through the plug 5 and bracket 3 and having a knurled operating head 15. A spring 16, secured to the bracket 3 and bearing against the periphery of the head 15, holds the same, and consequently the screw 14 against accidental rotation.

The greater portion of the rod 8 within the tube is surrounded by an electric heating coil 17 of insulated resistance wire having a predetermined number of wraps or lengths, said coil being preferably insulated from the rod 8, as shown at 18. This coil, in turn, is surrounded by a layer or tube of electrical and heat insulating material 19 which prevents the radiation of heat to the tube or casing 2.

Located on the base alongside the above described structure are four binding posts 20, 21, 22 and 23. The leads 24 from the coil 17 pass through the insulator plug 6 and are respectively connected to the binding posts 20 and 21. The binding post 22 has an

electrical connection 25 with the bolt 10, which in turn is electrically connected through the bracket 9 with the rod 8, and said rod, as already explained, is insulated from the tube 2 by the plug 6. The binding post 23 has an electrical connection 26 with the bolt 4, and consequently through the bracket 3 with the screw 14 and the contact element 13.

It will thus be obvious to those skilled in the art that if the electrical terminals of the circuit to be controlled are connected to the binding posts 22 and 23, said circuit will be controlled by the engagement and disengagement of the contact elements 12 and 13, and it will also be evident that if a source of electrical energy is connected with the binding posts 20 and 21, whenever the circuit through such source is completed, it will include the heating coil 17. When said circuit is closed the heat generated in said coil 17 will cause the expansion of the rod 8, and since this heat is not transmitted to the tube 2, an expansion of said rod will cause the contact element 12 to engage the contact element 13, thereby closing the controlled circuit, which includes the binding posts 22 and 23. The time of completing the circuit through the contact elements 12 and 13 can be varied by adjusting the screw 14, and the length of the contact can also be controlled by the length of time the circuit through the heating coil remains closed.

It will be evident that this structure is very simple, and that the tubular element 2 constitutes a casing which closes and protects the contact elements, the rod and the heating coil. An important result moreover secured by the present arrangement resides in the fact that the contact elements 12 and 13 will maintain their predetermined relation regardless of the expansion and contraction of the parts, due to the usual changes in temperature. That is to say, as the rod 8 expands or contracts under ordinary atmospheric conditions, the tubular member 2 will correspondingly expand or contract. Thus, for example, the expansion of the tubular casing 2 will cause the spring support 9 to yield outwardly or rearwardly, and the expansion of the rod 8 will thus correspond to the expansion of the tube 2, so that the space between the elements 12 and 13 will remain constant. It is therefore only when the rod 8 is heated to a higher degree of temperature by the heating coil that contact will take place between the elements 12 and 13.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In apparatus of the character set forth, the combination with a tubular member, of a rod member mounted longitudinally therein, coacting contact elements located in one end of the tubular member, one being carried by the rod, an electric heating coil mounted on the rod, and a sleeve of insulating material surrounding the rod and coil within the tubular member.

2. In apparatus of the character set forth, the combination with coacting members having substantially equal coefficients of expansion, of coöperating contact elements carried thereby, yielding means to which said members are secured for supporting said members to permit their substantially equal expansion and contraction, and means for heating one of the members to a higher degree of temperature than the other.

3. In apparatus of the character set forth, the combination with coacting longitudinally expansible and contractile members having substantially equal coefficients of expansion, of coöperating contact elements carried thereby, yielding means secured to said members for supporting the same to permit their substantially equal longitudinal expansion and contraction, and means for heating one of the members to a higher degree than the other.

4. In apparatus of the character set forth, the combination with coacting longitudinally expansible and contractile members having substantially equal coefficients of expansion, of coöperating contact elements carried thereby, spaced supports to which said members are secured, one of said supports yielding toward and from the other support, to permit the substantially equal expansion and contraction of the members, and means for heating one of said members to a higher degree than the other.

5. In apparatus of the character set forth, the combination with a tubular member, of a rod member located longitudinally therein, said members having substantially equal coefficients of expansion, supports for said members secured to the ends thereof, one of said supports being yielding, contact elements respectively carried by the members, and means for heating one of said members to a higher degree of temperature than the other.

6. In apparatus of the character set forth, the combination with a tubular member, of a rod member located longitudinally therein, a substantially fixed support for one end of the tubular member, a yielding support to which the other end of the tubular mem-

ber and the rod are secured, contact elements carried respectively by one end of the rod and the tubular member, and means for heating the rod to a higher degree of temperature than the tubular member.

7. In apparatus of the character set forth, the combination with a tube, of a rod located longitudinally therein, a rigid support for one end of the tube, a contact element adjustably mounted in said end, a coacting contact element carried by the adjacent end of the rod, a yielding support for the opposite end of the rod, an electric coil surrounding the rod, and means for insulating said coil from the tube, said means constituting also a heat insulator for said tube.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILL C. NEAHR.

Witnesses:
ARCHIE M. ADAMS,
JAMES R. ELMENDORF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."