

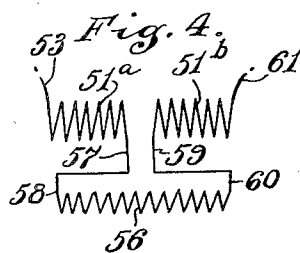
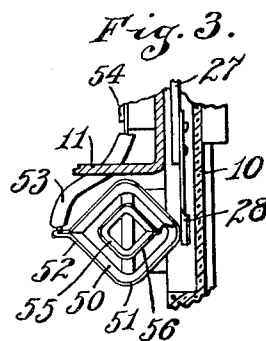
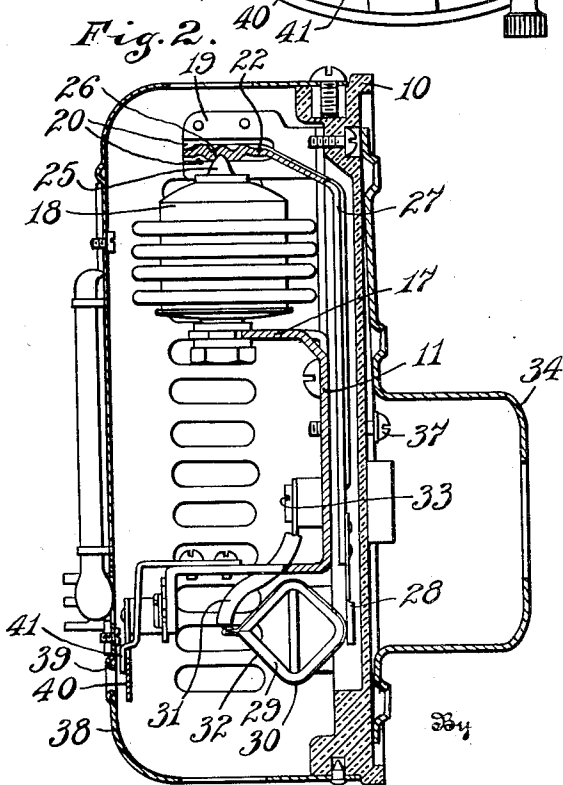
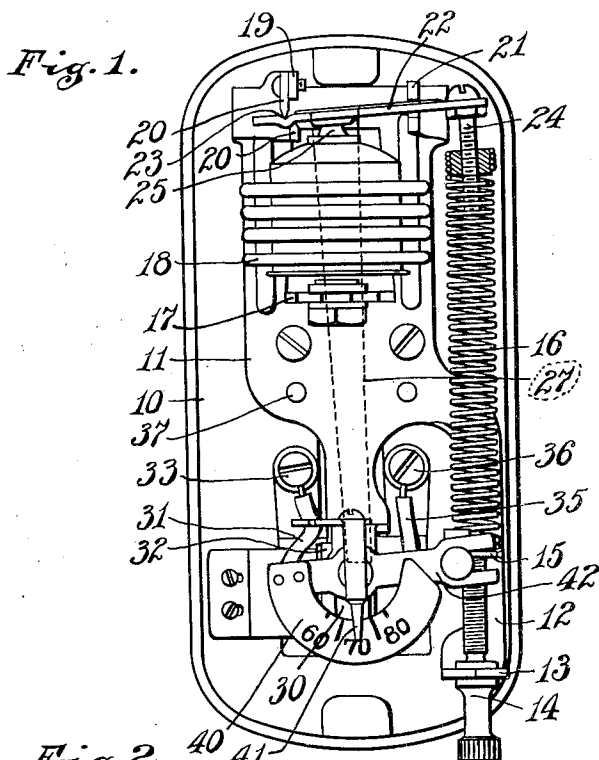
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POTENTIOMETER THERMOSTAT

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POTENTIOMETER THERMOSTAT

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4 Claims. (Cl. 201—48)

The present application relates to a potentiometer thermostat. The primary object of the invention is to provide an instrument responsive to temperature conditions impressed thereon and operable to control electrical circuits with which it is associated by minute variations. Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawing, attention being called to the fact, however, that the drawing is illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a front elevation of an instrument embodying the present invention, the cover being removed;

Fig. 2 is a vertical section through such an instrument.

Fig. 3 is a fragmental section, similar to that of Fig. 2, of a modified embodiment of the present invention; and

Fig. 4 is a diagram illustrative of the windings of the spools illustrated in Fig. 3.

Referring more particularly to the drawing, it will be seen that the instrument comprises a base 10 of insulating material to which is secured a bracket 11. Said bracket is formed with a downwardly extending leg 12 carrying an ear 13 in which a threaded spindle 14 is mounted for rotation, but held against reciprocation. On the threaded portion of the spindle 14 there is mounted a nut 15 to which is secured the lower end of a spring 16.

The bracket 11 likewise provides a table 17 in which is secured the lower end of a bellows 18 filled with a suitable volatile fluid.

Adjacent its upper end, the bracket carries a forwardly extending ear 19 carrying a pair of oppositely projecting knife edge plates 20. A forwardly projecting bifurcated plate 21 is likewise carried at the upper end of the bracket 11, and a lever 22 is operatively associated with said knife edges 20 and with said bifurcated plate 21.

The lever 22 is formed adjacent its one end with a concavo-convex portion 23 cooperating with the knife edges 20. At its opposite end, the lever 22 carries a pin 24 to which is secured the upper end of the spring 16. A portion of the lever 22 adjacent the last-mentioned end thereof is received between the furcations of the plate 21, said furcations therefore acting as stops limiting

the oscillation of the lever 22 about the knife edges 20.

It will be obvious that the spring 16, being under tension tends to move the lever 22 in a clockwise direction about its pivotal mounting on the knife edges 20. The upper end of the bellows 18 carries a stud 25 which is received in a socket 26 formed in the lever 22 adjacent the portion 23 thereof. Obviously, the bellows 18 tends to counteract the effect of the spring 16 and, when said bellows is expanded, it will move the lever 22 in a counter clockwise direction, overcoming the tendency of the spring 16.

The lever 22 carries an arm 27 which extends rearwardly and downwardly behind the bellows 18 and behind the bracket 11. To the lower end of said arm may be secured a spring contact finger 28 for a purpose later to be described.

A core 29 mounted on the base 10 has wound thereon a coil 30. One end of said coil is suitably connected to a conductor 31, and the connection may preferably be effected through the medium of a metallic collar 32 clamped upon the end of said coil and suitably secured to said conductor 31. The opposite end of the conductor 31 is suitably connected to a binding post 33 spaced from the bracket 11 and projecting through the insulating base 10 to terminate within an outlet box 34 which may be mounted on the rear face of the base 10. To the opposite end of the coil 30 there is connected a second conductor 35, the opposite end of which is connected to a second binding post 36, likewise extending through the base 10.

A third binding post 37 projects through the base 10 and into the bracket 11, thus making electrical contact with said bracket.

A cover member 38 may be suitably secured to the base 10 to house the mechanism above described, and said cover member is preferably formed with an arcuate aperture 39 through which an adjustable indicator plate 40 and a stationary indicator finger 41 may be viewed. The plate 40 carries an arm 42 operatively associated with the nut 15, so that rotation of the spindle 14 shifts the plate 40 as it varies the tension of the spring 16.

As will be obvious, if one side of a source of electrical energy is connected to the binding post 37, and if the other side of said source is connected, in parallel, through units to be controlled, and thence to the respective binding posts 33 and 36, and if the contact finger 28 is in a neutral position, the potentials impressed upon said units will be equal and opposite. Any variations in

the temperature impressed upon the bellows 18 will result in movement, in one direction or the other, of the lever 22; will result in consequent movement of the arm 27 and finger 28; and will thus change the position of the finger 28 on the coil 30. If it be presumed that such variation is a rise in temperature, then the finger 28 will be moved toward that end of the coil 30 to which the conductor 35 is connected, and the resistance in the following circuit will be reduced:—Power source, post 37, bracket 11, lever 22, arm 27, finger 28, coil 30, conductor 35, binding post 36, the unit connected to said post, and back to the current source; while the resistance to current flow through the circuit including the conductor 31 will be increased.

A further embodiment of my invention is illustrated in Figs. 3 and 4. The structure therein illustrated is designed to provide for a very material variation in the resistances of the controlled circuits in response to an initial very small movement of the contactor. Referring more particularly to Figs. 3 and 4, it will be seen that I have illustrated the base 10 upon which is mounted the bracket 11; and that I have likewise illustrated a portion of the arm 27 carrying the contact finger 28.

A core 50, corresponding to the core 29 of Fig. 2, is suitably secured to the base 10 and carries a coil 51, the opposite ends of said coil being connected, by straps 52, or the like, to conductors, one of which is illustrated at 53. The conductor 53 is connected to a binding post 54 corresponding to the post 33, and it will be understood that the other conductor is likewise connected to an independent binding post corresponding to the post 36.

A second core 55 is suitably mounted, in the illustrated embodiment, said core 55 being mounted concentrically within the core 50. Said core 55 carries a coil 56, as shown.

Referring now more particularly to Fig. 4, it will be seen that the coil 51 is broken substantially at its center, so that it forms two sections 51a and 51b. The conductor 53 is connected to one end of the section 51a, and a second conductor 61 is connected to the opposite end of the section 51b. The end of the section 51a adjacent the center of the coil 51 is connected, by a lead 57, to one end 58 of the coil 56, and the corresponding end of the section 51b is connected by a lead 59 to the opposite end 60 of said coil 56. In Fig. 4, the separation between the adjacent ends of the sections 51a and 51b is materially exaggerated. In actual practice adjacent ends of said sections will be so close together that the contact finger 28, when in its neutral position, will contact the adjacent ends of both of said sections.

Obviously, when the finger 28 is in said neutral position, the coil 56 will be shunted out of both circuits, so that the resistances in the two circuits will be substantially equal. An almost imperceptible movement of the finger 28, to the left, for instance, in Fig. 4, will effect a great variation in the resistances in the two circuits; since such movement will move the finger 28 out of contact with the section 51b. After such movement, only the section 51a will be in the circuit through the

conductor 53, while the coil 56 will be connected in series with the section 51b in the circuit through the conductor 61.

I claim as my invention:

1. A circuit-controlling instrument comprising a core of angular cross-section, two coils of resistance wire wound on said core and spaced longitudinally thereof, the adjacent ends of said coils being in close juxtaposition but out of electrical contact with each other, a third resistance element having its opposite ends connected, respectively, to the adjacent ends of said coils, at least a portion of said third resistance element being positioned within said core, and a contact member associated with an angular portion of said core and adapted to sweep said two coils and, at times, to bridge the adjacent ends of said coils, said contact member and the separated ends of said coils being connected in an electric circuit.

2. A circuit-controlling instrument comprising a core, two coils of resistance wire wound on said core and spaced longitudinally thereof, the adjacent ends of said coils being in close juxtaposition but out of electrical contact with each other, a second core mounted within said first core, a third coil of resistance wire wound on said second core, and having its opposite ends connected, respectively, to the adjacent ends of said two first-mentioned coils, and a contact member adapted to sweep said first-mentioned coils and, at times, to bridge the adjacent ends thereof, said contact member and the separated ends of said first-named coils being connected in an electric circuit.

3. A circuit-controlling instrument comprising a pivoted contact arm biased to move in one direction about its pivot, thermo-responsive means operable to move said arm in the opposite direction about its pivot, a pair of resistance elements arranged to be swept by the contact portion of said arm, and a third resistance element having its opposite ends connected, respectively, to one end of each of said first-mentioned elements, said third resistance element occupying a space within the space occupied by said pair of resistance elements, and the opposite ends of said first-mentioned elements being connectible in electric circuits.

4. A device of the class described, comprising, in combination, a base, a hermetically sealed bellows having one end anchored on said base, a temperature responsive expansible fluid in said bellows whereby the free end thereof is moved conformably to changes in the temperature of the medium to which said fluid responds, a pivoted lever associated with the free end of said bellows, an electric resistance unit, a contact arm controlled by said lever and adapted to sweep said resistance unit, said resistance unit and contact arm being connected in an electric circuit, spring means biasing said lever into engagement with the free end of said bellows whereby changes in the temperature of the medium to which said expansible fluid responds results in movement of the contact arm across said resistance unit, indicating means for indicating the temperature setting of said device, and means for simultaneously adjusting said spring means and indicating means.

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