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G. MUFFLY

CONTROL FOR ELECTRIC CIRCUITS

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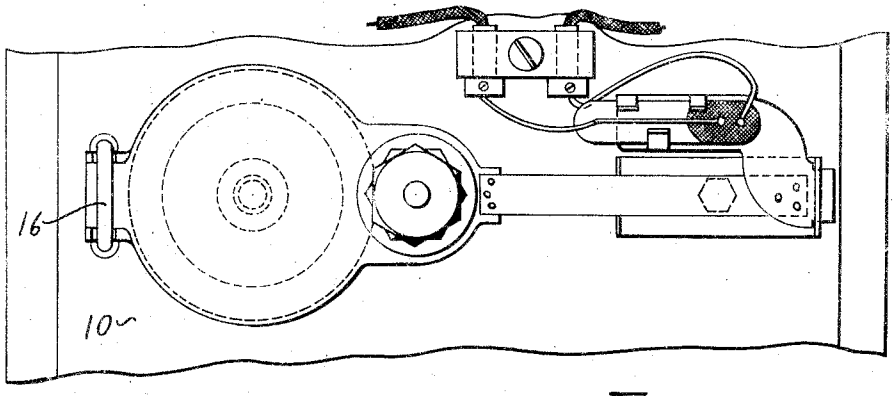


Fig 2

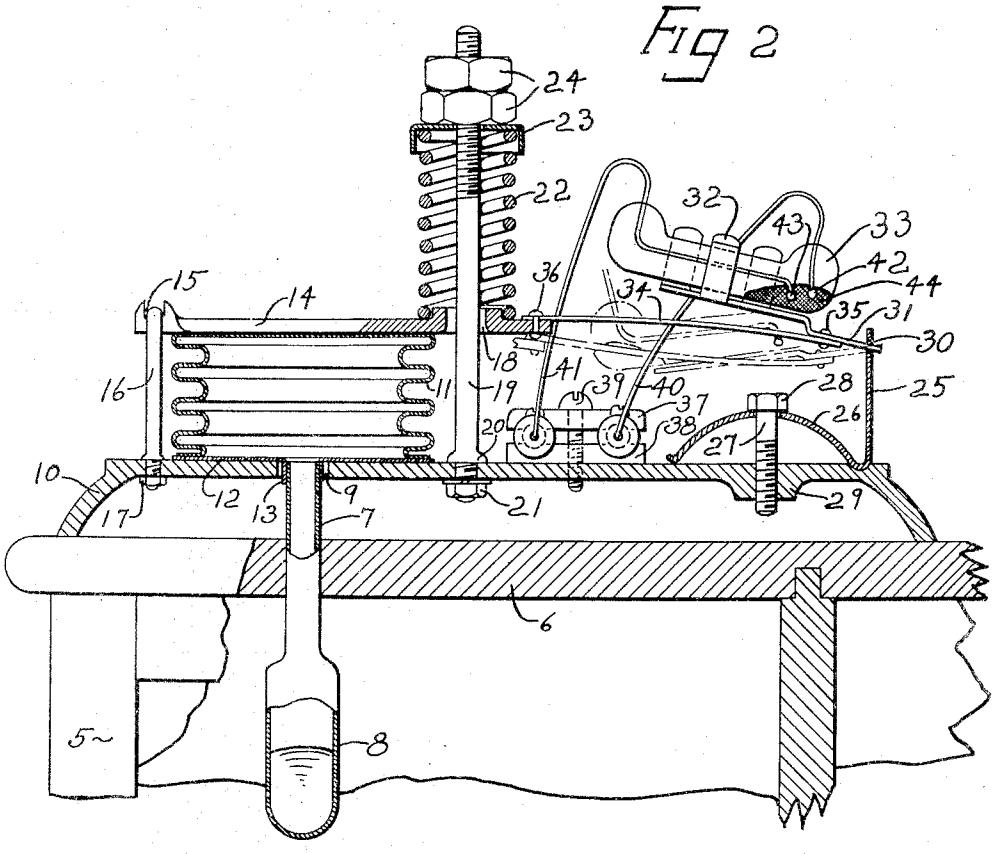


Fig 1

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CONTROL FOR ELECTRIC CIRCUITS.

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It is the primary object of my invention to provide a control for alternately making and breaking an electric circuit in response to varying conditions. My device is particularly adapted for use in iceless refrigeration systems where it is desired to make and break the electric circuit to an electric motor in response to temperature variations.

My device embodies a tube containing mercury, which, when shifted, makes and breaks a circuit between two contact points and an important feature of my invention is the provision of means for snapping the mercury tube to on and off position so that the action of the device will be quick and positive.

Another object is to combine with the mercury tube or other make and break device and the snapping device a means for adjusting by spring tension the point at which the snapping device will make its snapover.

With the above and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device, as described in the specification, claimed in my claims, and shown in the accompanying drawings, in which:

Fig. 1 is a sectional view of my improved device mounted on the top of a refrigerator casing or box, with a portion thereof extended into the box.

Fig. 2 is a top or plan view of my improved device.

I have shown a refrigerator casing or box indicated generally as 5 having a top 6 through which a tube 7 is extended. The bottom of the tube 7 is enlarged as at 8 and is adapted to receive a quantity of material, such as sulphur dioxide which liquefies in the presence of cold and gasifies in the presence of heat.

The top of the tube 7 extends through an opening 9 in a base member 10 mounted on the top of the refrigerator box. A sylphon or bellows 11 is mounted on the base 10 having its lower end closed by a plate 12. The plate 12 is provided with a central flanged aperture, the flange being indicated at 13, which flange 13 surrounds the top of the tube 7 and is sealed thereto in any suitable manner such as by soldering. The top of the bellows 11 is integral with the sides thereof so as to provide a closed structure. A plate 14 is disposed over the bellows 11, said plate having a notch 15 in one end thereof engaged by the central portion of a U clamp 16 secured to the base 10 by nuts 17. Thus the U clamp 16 holds the plate 14 as at 15 at one end thereof against upward movement. The other end of the plate 14 is provided with an aperture 18 through which a bolt 19 extends. The bolt 19 is provided with a head 20 which bears on the base 10 and has a nut 21 on the lower end thereof for securing the bolt to the base 10 in co-operation with the head 20. A coil spring 22 is provided around the bolt 19 above the plate 14, bearing at its bottom on the plate and at its top against a cuplike washer 23 which is secured on the bolt 19 by means of nuts 24. Thus upward movement of the free end of the plate 14 is resisted by the spring 22 and the amount of resistance to such movement may be controlled by adjustment of the nuts 24.

A spring support member comprising an upright portion 25 and a bowed portion 26, integral with the upright portion, is positioned on the base 10, being secured by a stud 27 having a head 28 bearing against the bowed portion and having its shank threaded into the boss 29 on the base 10. Extended through an opening 30 adjacent the top of the upright portion 25 is a plate 31 which has secured to its other end by means of clips 32 a mercury tube 33. The plate 31 is secured intermediate its ends to a flat spring 34 by a rivet 35. The spring 34 is also secured by a rivet 36 to the movable end of the plate 14.

A pair of clamping plates 37 and 38 are secured to the base 10 by a screw 39 and a pair of electric lead lines 40 and 41 are secured between the clamping plates. These lead lines extend to and within the mercury tube 33 where the contact points 42 and 43 are formed thereon. These contact points are positioned in one end of the tube 33 so that a mercury drop 44 may connect them when the tube is so tilted so as to bring the mercury drop to that end of the tube in which the terminals are positioned.

In the practical operation of my device heat contained in the refrigerator box 5 will gasify the sulphur dioxide or other suitable material in the enlarged portion 8 of the tube 7 with the result that the gas so formed will expand the bellows 11, causing the plate 14 to pivot about the head of the U clamp 16, raising the other end thereof against the pressure of the spring 22. Raising of one end of the plate 14 will likewise raise that end of the spring 34 which is connected to the plate 14 and tilt the mercury tube 33 as is

shown in Fig. 1. It will be seen that the spring 34 is buckled between the rivets 35 and 36 and when the temperature in the refrigerator box 5 is lowered the sulphur dioxide will be liquefied and pressure decreased in the bellows 11, with a consequent lowering of the plate 14 by the pressure of the spring 22 until a reverse buckle in the spring 34 is caused as is shown in dotted lines in Fig. 2. This reverse buckle is obtained by snapping the spring 34 from one position to the other, it being apparent that, because it is buckled, movement from one extreme position to the other cannot be a gradual one. The spring standard 25 and bowed portion 26 may be acted upon by the stud 28 for adjusting the amount of bow in the spring 34. Likewise adjustment of the amount of pressure required to move the plate 14 may be had by adjusting the tension on the spring 22.

I desire it to be understood that my invention may be employed in other than electric circuits for refrigeration systems and that other devices for making and breaking the circuit may be employed than mercury tubes.

It will be obvious that various changes may be made in the arrangement, combination and construction of the various parts of my improved device without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may be included within the scope thereof.

What I claim is:

1. A control of the class described comprising a bellows adapted to be expanded and contracted in response to pressure variations, a plate overlying one end of the bellows and adapted to be moved by it, a flat spring member connected at one end to said plate and at the other end to a standard, said spring being held in arched position and being snapped from an arch in one direction to an arch in the other as said bellows expands and contracts, and a circuit make and break device connected with the spring and adapted to be actuated by its change of arch.

2. A control of the class described comprising a bellows adapted to be expanded and contracted in response to pressure variations, a plate overlying one end of the bellows and adapted to be moved by it, a flat spring member connected at one end to said plate and at the other end to a standard, said standard being provided with an arched bottom extension, a stud extended through the arched extension, said stud being adjustable to exert varying pressures on the arched extension and thereby vary the angle at which the standard extends, said spring being held in arched position and being snapped from an arch in one direction to an arch in the other as said bellows expands and contracts, and a circuit make and break device connected with the spring and adapted to be actuated by its change of arch.

3. A control of the class described comprising a bellows adapted to be expanded and contracted in response to pressure variations, a plate overlying one end of the bellows and adapted to be moved by it, a flat spring member connected at one end to said plate and at the other end to an adjustably tiltable standard, said spring being held in arched position and being snapped from an arch in one direction to an arch in the other as said bellows expands and contracts, and a circuit make and break device connected with the spring and adapted to be actuated by its change of arch.

4. A control of the class described comprising a bellows adapted to be expanded and contracted in response to pressure variations, a plate overlying one end of the bellows and adapted to be moved by it, a flat spring member connected at one end to said plate and at the other end to a standard, said spring being held in arched position and being snapped from an arch in one direction to an arch in the other as said bellows expands and contracts, a circuit make and break device connected with the spring and adapted to be actuated by its change of arch, and spring means bearing against said plate to resist expansion movement of the bellows and follow contraction movement thereof.

5. A construction as set forth in claim 1 wherein said flat spring is connected to the plate on one side of the bellows and an anchor is connected thereto on the other.

6. A construction as set forth in claim 1 wherein said flat spring is connected to the plate on one side of the bellows, and an anchor is connected thereto on the other, said anchor comprising a U shaped member having its ends secured to a suitable support and its intermediate portion looped over a portion of the plate.

7. A control of the class described comprising a bellows adapted to be expanded and contracted in response to pressure variations, a plate overlying one end of the bellows and adapted to be moved by it, a flat spring member connected at one end to said plate and at the other end to a standard, means for applying adjustable spring tension on the standard, said spring being held in arched position and being snapped from an arch in one direction to an arch in the other as said bellows expands and contracts, and a circuit make and break device connected with the spring and adapted to be actuated by its change of arch.

GLENN MUFFLY.