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CONTROL DEVICE FOR ELECTRIC CURRENTS

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Fig. 1

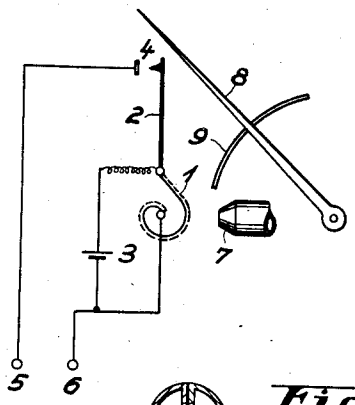


Fig 2

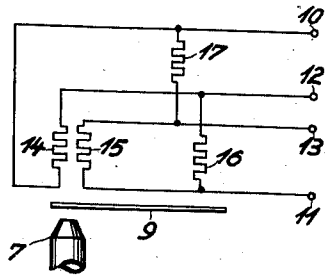


Fig. 4

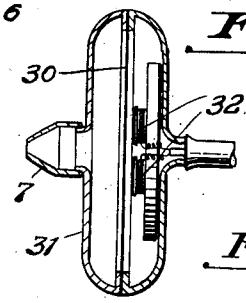


Fig. 3

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CONTROL DEVICE FOR ELECTRIC CURRENTS

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5 Claims. (Cl. 175—320)

The object of the invention is to provide a control device which will enable electric currents to be controlled by mechanically operated members. Such arrangements are, for example, very useful when the mechanically operated members are the hands of measuring instruments, and in particular such of small directing force.

Arrangements for this purpose are already known; however, they possess drawbacks which are avoided according to the present invention. The release of contacts direct by the hand of the instrument necessitates a great directing force and is, therefore, not always applicable. With the use of a falling stirrup it is impossible to effect continuous recording or contact releases, and when using members sensitive to light it is necessary to have a complicated and costly installation.

Now according to the invention the control of the electric currents is effected with the aid of currents of air, which by means of the mechanical members, for example screens or baffles attached to the hands, are partly screened off or released.

In the accompanying drawing a few working examples of the invention are shown.

Fig. 1 is a diagrammatic view of a device embodying the present invention and utilizing a spiral bimetallic heating coil; Fig. 2 is a modified embodiment of the present invention utilizing a bridge circuit containing a plurality of resistances affected by streams of air; Fig. 3 is another modified embodiment of the present invention in which a bridge arrangement containing resistances is utilized in conjunction with two streams of air, and Fig. 4 is an elevational view, partly in section, of a device for producing a stream of air.

In Figure 1 the current of air issuing from the nozzle 7 impinges upon a spiral 1 heated by means of a source of electric current 3 and upon which spiral the movable switch member 2 is mounted. If the current of air be prevented from striking said spiral, which is effected by the interposition of a screen 9, attached to the hand 8 of a measuring instrument, the temperature of the spiral traversed by the current will rise whereby the twist of this spiral changes and the contact 4 is closed. Consequently a potential applied to the terminals 5 and 6 results in a flow of electric current which in any suitable way may serve for the regulation of other units.

In the case of Figure 2 the current of air issuing from the nozzle 7 is intercepted at times by the movable screen 9. To the bridge arrangement consisting of the resistances 14, 15, 16 and 17 there is connected, for example at 12 and 13, a source of current. Now if the screen be so moved that it allows the current of air to come in contact with the resistances 14 and 15, cool them and the current derived at 10 and 11 alters its intensity. It is preferable to so arrange the resistances 14 and 15 that the current of air will sweep entirely over them.

This arrangement can be altered in such a manner that the nozzle 7 together with the means supplying the air current can be omitted and the resistances 14 and 15 arranged instead in the lower part of a vertically mounted tube open on both ends, of which the one opening can be covered by the screen 9. If the screen leaves the tube open on both ends then the current of air, which rises through the pipe acting like a chimney, cools the spirals 14 and 15, whilst when the pipe is closed the spirals are heated. The usual arrangement and method of operation is the same as in Figure 1. This principle of generating the air current can be used in all cases where electrically heated bodies are to be influenced by a current of air.

A further modification of the arrangement shown in Figure 2 is given in Figure 3. Upon the rotatable plate 18 there is mounted the bridge arrangement comprising the resistances 14, 15, 16 and 17. The bridge, to which potential is applied through the terminals 12 and 13, may be so equalized that in the measuring current circuit, in which the coils 21 and 22 are provided, no current flows when the resistances 14, 15 and 16, 17 are struck and cooled by the currents of air issuing from the nozzles 7 and 7' rigidly connected with the plate 18. The screen 9 attached to the hand 8 of a measuring instrument releases both currents of air when in a certain position of rest.

If, however the position of the hand changes either the one or the other current of air is shut off; the temperature and consequently the resistance either of the spirals 14 and 15 or of the spirals 16 and 17 changes and through the coils 21 and 22^a current flows in one direction or the other. This operates a polarized relay 20. According to the direction of the current flowing through the coils 21 and 22 the double point or switch 23 engages one or the other of the contacts 24, 25 also acting as stops and current can be taken off from the terminals 5 and 6 or 5' and 6. This current may be utilized to operate or control some other device in any suitable manner. To the plate 18 there may be

attached an auxiliary hand 19 which facilitates the regulation to any desired normal position. This arrangement proves especially advantageous if it is built into a casing or cap in such a manner that said casing can be placed upon any desired measuring instrument. For the generation of the air currents use can preferably be made of a diaphragm by employing the sound-nozzle-principle. In this case the diaphragm is vibrated by means of electromagnets fed with alternating current of 50 cycles for example.

An illustrative embodiment of a generator of an air stream is shown in Fig. 4. This generator consists essentially of a housing 31, which has a nozzle 7 located on the front thereof. A diaphragm is provided in the central portion of said housing and is mounted in such a manner as to be capable of vibrating. Behind the diaphragm 30 electromagnets 32 of well known construction are provided. By energizing the electromagnets 32 with an alternating current, or other periodically varying current, the diaphragm 30 vibrates in a well known manner. Due to the vibration of the diaphragm 30, air streams with sharply defined cross-sections are ejected from nozzle 7. In this manner, it is possible to produce streams of air for impinging or flowing against the thermally sensitive resistances.

The use of the invention is not, however by any means confined to the arrangements here described, which, of course, may be altered in their details as may be required and are only intended to serve as an explanation of the principle, as they can be extended to cover various kinds of apparatus.

The broad possibility of application of the invention is in particular given by the fact that with the aid of vibrating diaphragms it is rendered possible in a simple manner to generate easily regulatable constant air currents and although the generation of the air current is not a material point still the use of the vibrating diaphragms for this purpose is believed to be the most suitable.

The screen 9 moves edgewise between the nozzle 7 or the nozzles 7, 7' and the resistances or temperature-sensitive members against which said nozzles discharge air currents, and preferably the movement of the screen is substantially at right angles across the air current. In the constructions illustrated, the screen 9 is curved, its center of curvature being on the axis about which the pivoted hand 8 swings. By moving the screen edgewise across the stream or current of air, I secure very accurate results, since the screen will then cut off the jet or current very sharply from the adjacent quiescent body of air, and the appliance will be exceedingly sensitive, in fact its degree of sensitiveness will correspond to the sensitiveness of the instrument of which the hand 8 forms part.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A device of the character described, comprising means for giving a predetermined direction to a current of fluid, a temperature-sensitive member arranged to be struck by said current, a screen movable edgewise across said current to prevent its reaching said member, and means for moving said screen.

2. A device of the character described, comprising means for giving a predetermined direction to a sharply defined jet of fluid, a temperature-sensitive member arranged to be struck by said jet, a screen movable edgewise across said jet to intercept the same and prevent it from reaching the said member, and means for moving said screen.

3. A device of the character described, comprising means for giving a predetermined direction to a current of fluid, a temperature-sensitive member arranged to be struck by said current, a screen movable edgewise across said current substantially at right angles to the direction of said current, to prevent said current from reaching said member, and means for moving said screen.

4. A device of the character described, comprising means for giving a predetermined direction to a current of fluid, a temperature-sensitive member permanently in the same position relatively to said means, and arranged to be struck by said current, a curved screen adapted to intercept said current, and means for effecting a relative movement, about the center of curvature of said screen as an axis, between the screen on one hand and the said member and means on the other hand.

5. A device of the character described, comprising a pivoted hand, means for giving a predetermined direction to a current of fluid, a temperature-sensitive member arranged to be struck by said current, and a screen secured to said hand to move in unison therewith and arranged to intercept said current of fluid, said screen having a curvature centered on the pivot of said hand, and being adapted to move edgewise across said current.

HELMUT SELL.