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ELECTRIC SWITCH HAVING CONTACTS

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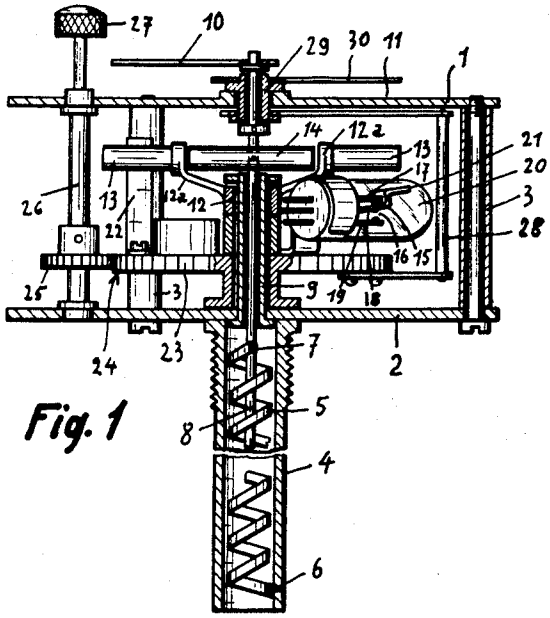
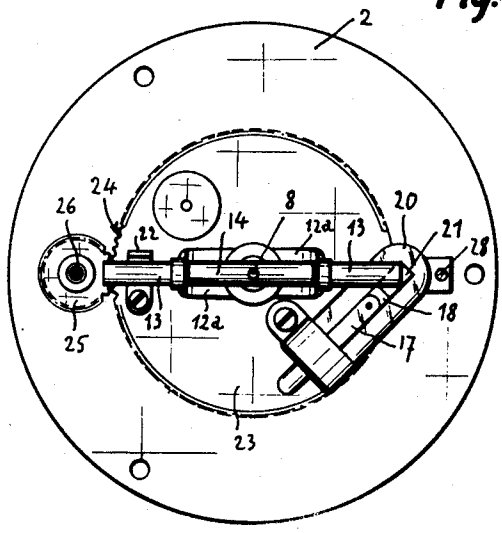


Fig. 1

Fig. 2



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ELECTRIC SWITCH HAVING CONTACTS

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2 Claims. (Cl. 200—87)

The present invention relates to an electric switch having contacts, and automatically controlled by fluctuations of variable magnitude.

This switch is characterised in that it comprises at least one permanent magnet freely rotatable about a spindle, an oscillatory member whose rotation in one or other direction is caused by the said fluctuations, and which constitutes the armature of the said magnet, which armature is intended to rotate the magnet magnetically, at least one pair of contact elements of which one is movable and moves when the said magnet arrives in its vicinity thereby producing instantaneous operation of the switch, and an abutment against which the magnet is then stopped thereby enabling its armature to continue rotating alone.

The accompanying drawing illustrates, by way of example, a constructional form of the invention.

Figure 1 is an axial section, along the line I—I of Figure 2, of a switch according to the invention, combined with a thermometer, and,

Figure 2 is a plan view, with certain parts removed.

The illustrated apparatus comprises two plates 1 and 2 which are spaced from one another by columns 3. The plate 2 carries at its centre a tube 4 inside which is housed a bimetallic, spirally bent strip 5. One of the ends of the strip 5 is fixed to the tube 4 at 6 and the other end is fixed at 7 to a spindle 8 rotating in a sleeve 9 carried by the plate 2. This spindle 8 extends beyond the plate 1 and carries at its end a needle 10 co-operating with a thermometric scale, not shown, of a dial 11 fixed on the plate 1. The part of the apparatus so far described thus constitutes a thermometer.

The sleeve 9 has mounted thereon for free rotational movement a stirrup 12 on each of whose branches 12*a* is fixed a magnetized bar 13. The bars 13 are positioned in spaced coaxial relationship and during rotation their common axis moves in a plane perpendicular to the axis of the spindle 8. The latter carries an iron bar 14 keyed thereon, whose axis is also contained in the said plane, and which is arranged between the magnets 13. During rotation of the bar 14 which is driven by the spindle 8 under the influence of temperature variations, the magnets 13 are magnetically entrained and rotate also.

The illustrated switch comprises two pairs of contact studs 15 and 16 carried by three blades 17, 18 and 19, all of which are housed in a protective glass bulb 20 (to make the drawings clearer, this bulb has not been shown in section in Figure 1). The blade 18 is formed with a cranked iron extension 21 so that when one of the magnets 13 passes in its vicinity, it is attracted and closes the pair of contacts 15 (position shown in the drawings), whereas it is the pair of contacts 16 which is closed when the blade 18 is at rest and lies outside the magnetic field of the magnet 13. The closing of one or other of the pairs of contacts is thus instantaneous and occurs at a predetermined temperature.

In order that the contacts which close when the critical temperature has been reached do not reopen when this temperature has been exceeded, the switch comprises an abutment 22 against which the bar 13 opposite that which controls the blade 18 is stopped, thereby preventing these bars from continuing their rotation, the intermediary bar 14 continuing its rotation alone. When the temperature decreases, the magnets 13 are entrained when the bar 14, acting as an armature, passes by, and the blade 18 returns to its position of rest thereby reopening the contacts 15 and closing the contacts 16.

The temperature at which the switch operates can be regulated by altering the position of the contacts and of the abutment 22. To that end, the glass bulb 20 enclosing the contacts, as well as the abutment 22, are mounted on a disc 23 rotatably mounted on the sleeve 9, which disc is formed along its other periphery with teeth meshing with a pinion 25. The latter is mounted on a spindle 26 carrying a control knob 27. When this knob is actuated, the bulb 20 and the abutment 22 are rotated concentrically with the spindle 8, thereby altering their angular position relatively to the bar 14. Finally, the disc 23 is linked by means of a stirrup 28 to a sleeve 29 which is rotatably mounted on the plate 1 and which carries an index 30. This index co-operates with the thermometric scale of the dial 11 and thus indicates at what temperature the switch will operate.

By way of variation, the switch may carry two sets of contacts studs each set being mounted on a different support. The switch could then operate between two temperature limits, an upper limit and a lower limit.

It is to be noted that the index 30 is a simple indicator and acts neither as an abutment nor as a contact element as is the case in most known thermometers or manometers having contacts.

The invention is not limited to a switch controlled by temperature variations, but extends to any switch responding to fluctuations of variable magnitude as, for example, fluctuations in pressure, weight, flow, speed, slope, the level of a liquid in a reservoir, the luminosity of a space, the degree of humidity, etc.

What I claim is:

1. In an electric switch having contacts, and which is automatically controlled by fluctuations of variable magnitude, a frame, two magnetized bars positioned in spaced co-axial relationship, mounted as to rotate freely on said frame, an oscillatory iron bar arranged between said magnetized bars and which rotates about an axis perpendicular to its longitudinal axis, and whose rotation in one or other direction is caused by the said fluctuations, and which constitutes the armature of the said magnetized bars, intended to rotate them magnetically, at least one pair of contact elements of which one is made at least partially of magnetic material and is movable so as to be moved when the said magnetized bars arrive in its vicinity, thereby producing instantaneous operation of the switch, and an abutment against which the said bars are then stopped whereby enabling their armature to continue rotating alone.

2. In an electric switch having contacts, and which is automatically controlled by fluctuations of variable magnitude, a frame, at least one permanent magnet mounted as to rotate freely on said frame, an oscillatory member whose rotation in one or other direction is caused by the said fluctuations, and which constitutes the armature of the said magnet, intended to rotate it magnetically, a support movably mounted on said frame, coaxially with said magnet, at least one pair of contact elements on said support, of which one is made at least partially of magnetic material and is movable so as to be moved when the said magnet arrives in its vicinity, thereby producing instantaneous operation of the switch, and an abutment on said support, against which the magnet is then

stopped thereby enabling its armature to continue rotating alone, the angular position of said support, which is adjustable, enabling to regulate the angular position of the magnet, and consequently the value of the said variable magnitude, for which the switch operates, a dial, a graduated scale on said dial, an indicator rigid with said oscillatory member and cooperating with said scale, whereby the value of the variable magnitude can be read, and an index rigid with said support and cooperating with said

scale, whereby the value of the variable magnitude for which the switch must operate can be read.

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