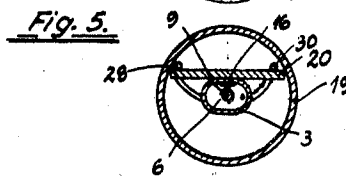
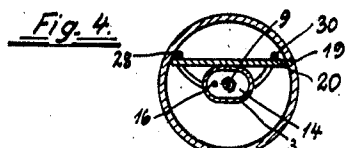
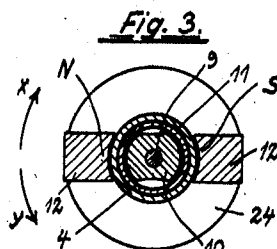
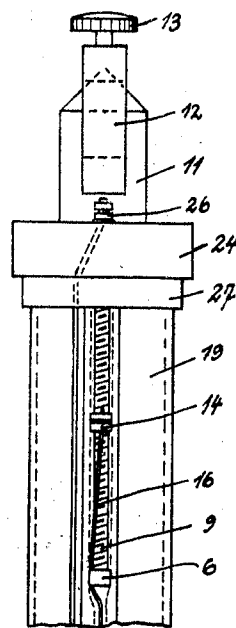
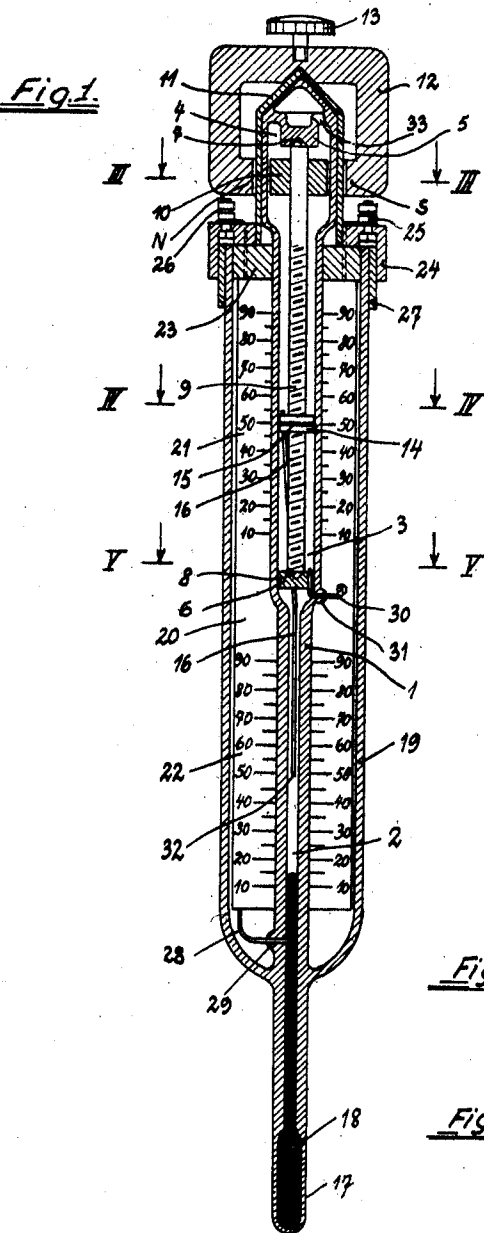


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THERMOSTAT

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THERMOSTAT

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6 Claims. (Cl. 200—141)

This invention relates to a thermostat in which a nut is mounted on a screw spindle and carries a contact of wire in a closed glass tube, said nut and consequently the wire are adjustable in the glass tube by turning the spindle by means of a magnet acting on an armature fixed on the upper end of the spindle.

The pitch of the spindle thread is so selected, that even if the thermostat is subjected to intensive vibrations it cannot rotate on and displace the nut. Further the interior of the glass tube and the extension of the same can be completely shut off from the outside, owing to the employment of the magnet drive. Such thermostats are absolutely reliable in service and can be produced as high-grade thermometers even if the filling is under pressure.

In a known construction of contact thermometers of the type described a travelling nut constructed as an armature or fitted with such an armature is adjusted by the magnetic field of a magnet rotatably arranged on the outer side of the extension of the thermometer tube in that the magnet is rotated, whereby a magnetic rotary field is produced which moves the armature.

The travelling nut moves on a stationary spindle; so that this nut or the armature connected with the same carries out a rotary movement during the adjusting of the contact of the thermostat and is axially displaced on the spindle. The armature does therefore not remain in the same plane during the adjusting of the thermometer but moves up or down the spindle.

This construction is open to the following objection:—

As the armature to be adjusted by the magnet moves up and down in the widened extension during the adjusting of the contact from the lowest up to the highest contact degree, the widened portion must be of comparatively large diameter on its whole length as the armature or the distance between the poles of the same must be as great as possible to enable the magnet to be turned through a sufficiently large angle to overcome the resistances caused by friction during the rotating of the magnet, that is in order to insure the up or down movement of the armature or of the nut connected therewith on the spindle.

The permanent magnet arranged on the outer side of the extension of the thermometer tube must either be moved up and down corresponding to the movement of the armature by means of a screw threaded drive or it must be of disproportionately large size if the contact wire is

displaced in the capillary tube a comparatively long distance, which is usually the case, as the contact point must be made adjustable for the largest possible range.

Owing to the inconveniences stated such a thermometer or the magnetic drive thereof are very complicated and inconvenient.

According to the invention a nut is guided in a longitudinal guide and secured against turning. This nut carries a contact wire and is moved up and down by a rotary spindle which is not shiftable in axial direction but rigidly connected with the armature rotatable by a magnet which when it is turned rotates the armature and the spindle in one plane causing the nut to displace on the spindle and adjust the contact wire of the thermostat.

Consequently the widened portion of the thermostat need only be sufficiently large to allow the armature to rotate and the magnet can be relatively small as the armature does not displace relatively thereto.

For effecting the longitudinal guiding of the nut and securing it against rotation it is guided in an oval tube forming an extension of the thermometer tube and having a widened upper portion accommodating the armature. A contact thermometer according to the invention is illustrated by way of example in the accompanying drawing in which:—

Fig. 1 shows the contact thermometer in longitudinal section.

Fig. 2 shows the top part of the thermometer in side elevation.

Fig. 3 is a cross section on III—III.

Fig. 4 is a cross section on IV—IV.

Fig. 5 is a cross section on V—V of Fig. 1.

A tube 2 of a thermometer 1 has an upwardly directed tubular extension 3 of larger diameter than the tube 2. This extension has a widened top portion 4 in which a bearing 5, preferably of glass is provided. A second bearing 6 is fitted in the tubular extension 3 near the bottom end thereof.

A screw threaded spindle 9 has pointed ends 7 and 8 engaging in the bearings 5 and 6 respectively. An armature 10 is fixed on the spindle 9 in the widened top portion 4 of the extension. A protecting cap 11 of non-magnetic material, such as brass, artificial resin and the like covers the widened top portion 4. A permanent magnet 12 with poles N and S adjacent the armature 10 is rotatably mounted on the protecting cap 11 and adapted to be turned by means of a milled screw 13 in the direction x or y around

the widened top portion 4. The extension 3 is of oval cross section and the widened top portion 4 is of round cross section at the point at which the armature 10 rotates. In the oval extension 3 a nut 14 is mounted on the screw spindle 9 with indicating line 15. The contour of this nut corresponds to the oval shape of the extension 3 so that this nut cannot turn but must move up and down in this extension 3 if the spindle 9 is rotated. A contact wire 16 is fixed on the nut 14 and extends downwards therefrom into the thermometer tube 2. At bottom end of the thermometer tube 2 a mercury vessel 17 is arranged and filled with mercury 18. A protecting tube 19 enclosed the thermometer tube 2 and the extension 3. In this tube 19 a plate 20 is fixed. An adjusting scale 21 is provided at the upper end of this plate and a temperature indicating scale 22 at the bottom end thereof. A stopper 23 of cork closes the top end of the protecting tube 19. A connecting plate 24 with terminals 25 and 26 is mounted by means of a sleeve 27 on the top end of the protecting tube 19 and a wire 28 extends from the terminal 26 to the lower end of the thermometer tube 2 where it passes through the wall of this tube at 29 and is in contact with the mercury 18. A second wire 30 extends from the terminal 25 downwards along the widened part 3, passes through the wall thereof at 31 and is connected with the bearing 6.

An aperture 33 is provided in the bearing 5 for exhausting the air from the interior thereof or for filling the same under pressure during the manufacturing.

The permanent magnet 12 can be easily removed from the thermostat.

The operation is as follows:—

The terminals 25 and 26 are connected up in a circuit to be controlled.

The magnet 12 is then turned about the cap 11. This magnet effects the rotation of the armature 10 in the widened top portion of the thermostat and as the screw spindle 9 is rigidly connected with the armature 10, it also rotates, causing the nut 14 to move up or down in the extension 3 according to the direction of rotation. By this means the indicating line 15 on the nut 14 is brought opposite the division on the indicating scale 21 corresponding to the temperature at which the thermostat is to become operative. As this nut carries the contact wire 16, this wire is correspondingly shifted in the thermometer tube 2. The divisions on the adjusting scale 21 correspond with those on the indicating scale 22 and the position of the end 32 of the contact wire 16 relatively to the scale 22 corresponds with the position of the indicating line 15 relatively to the scale 21. Thus, when the line 15 is adjusted to the division on the scale

21, the end 32 will be opposite the corresponding division on the scale 22.

When the temperature acting on the thermometer increases, the mercury 18 will rise in the tube 2 until it reaches the end 32 of the contact wire 16. The circuit connected up with the terminals 25 and 26 will then be closed through terminal 26 connected with one pole of the circuit, the wire 28, mercury 18, contact wire 16, nut 14, spindle 9, bearing 3, wire 30 and terminal 25 connected to the other pole of the circuit.

I claim:—

1. A thermostat, comprising in combination a thermometer tube with mercury filling, an extension on the upper end of said tube, a widened portion on the upper end of said extension, a bearing in said widened portion, a second bearing in said extension, a screw spindle mounted in said bearings, an armature fixed on the upper end of said spindle and rotatable in said widened portion, a nut on said screw spindle secured against rotation in said extension, a magnet rotatable on said widened portion and adapted to turn said spindle through the intermediary of said armature to shift said nut axially on said spindle, a contact wire extending downwards from said nut into said thermometer tube and adapted to form an adjustable contact for mercury filling of said thermometer, and a circuit connected up with said mercury and with said contact wire through the intermediary of said nut, said spindle and the bearings in said extension.

2. A thermostat as specified in claim 1, in which the extension is of oval cross-section to secure the nut against rotation.

3. A thermostat as specified in claim 1, in which the magnet is removably mounted on the widened top portion of the tube.

4. A thermostat as specified in claim 1, in which the widened top portion of the tube is covered with a protecting cap of non-magnetic material.

5. A thermostat as specified in claim 1, in which the spindle has pointed ends engaging in the bearings.

6. A thermostat as specified in claim 1, in which the thermometer tube and extension are covered by a protecting tube accommodating a plate with two scales, the upper scale being situated outside the thermometer tube and the lower scale outside the extension, and the nut having an indicating line cooperating with the divisions of the upper scale to set the contact and the lower end of the contact wire being adjusted to the graduation of the lower scale corresponding to the position of the indicating line relatively to the upper scale.

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