Aug. 23, 1938. G. E. FORD 2,127,592

TEMPERATURE INDICATOR

Filed April 14, 1937

Fig. 1

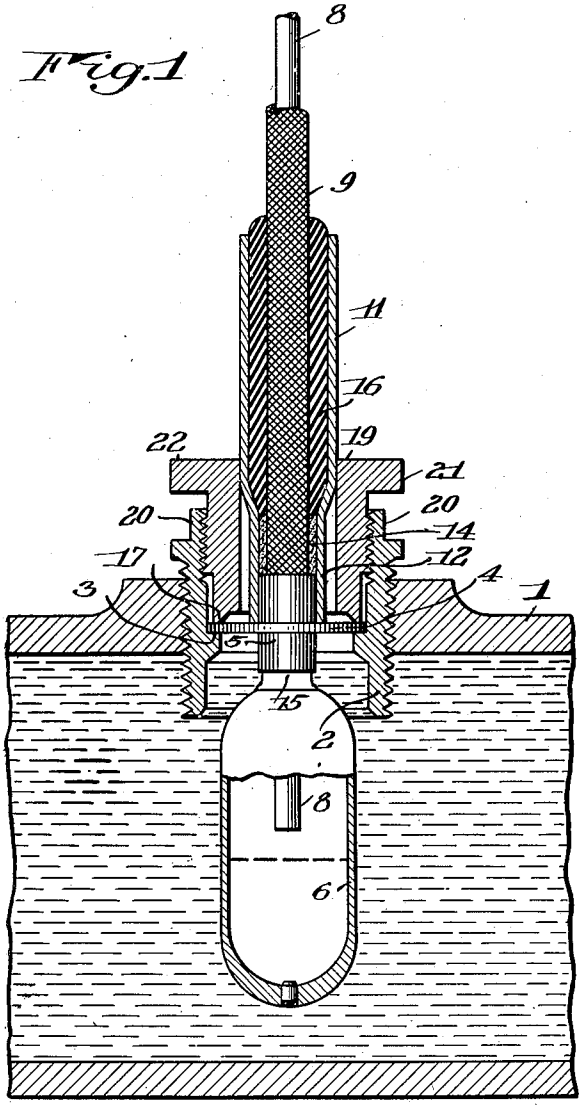


Fig. 2

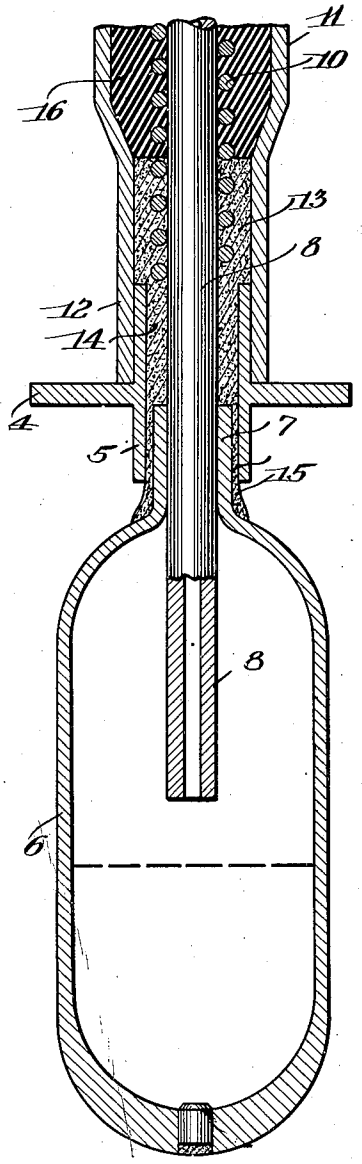
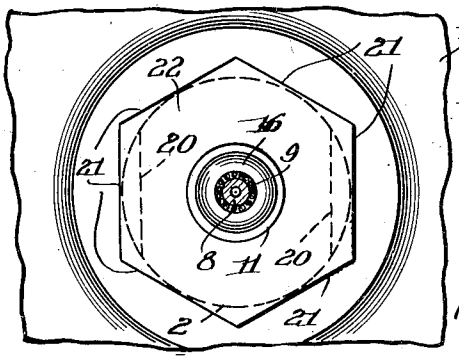


Fig. 3



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TEMPERATURE INDICATOR

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3 Claims. (Cl. 297—3)

This invention relates to a temperature indicator of the general type in which the indicating means is actuated by the effect of temperature changes upon liquid contained in a metal bulb that is immersed in a chamber where the temperature indications are to be taken, and has for its object to afford a novel construction for mounting the bulb and connecting the bulb with the fluid conductor, in order to attain greater efficiency and provide an instrument of increased durability.

More particularly, the invention has for its purpose to support the bulb in such a manner that it can be entirely surrounded by the liquid, the temperature of which is to be indicated, and so that the bulb is less susceptible by conduction to temperature changes exterior of the chamber in which it is located, with the result that a more accurate reading can be had.

A further purpose of the invention is to afford a structure that permits a quick assembly of the bulb and conducting tube, and in which these parts are so mounted that the tube and bulb are protected against accidental turning or twisting, in case it becomes necessary to remove the parts from the chamber.

Still another object of the invention is to afford means for protecting the conducting tube and its surrounding protecting element against excessive bending relative to the bulb, and to afford simple and efficient means for rigidly locking such protecting means and the bulb in the mounting which supports them.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawing, the novel features being pointed out in the claims following the specification.

In the drawing:

Fig. 1 is a vertical sectional view showing the bulb portion of a vapor operated temperature indicator constructed in accordance with one embodiment of the invention, and illustrating its connection with the conducting tube, and the means for supporting it in a chamber;

Fig. 2 is an enlarged sectional view of the structure removed from the chamber, and illustrating a modified form of protecting element surrounding the conducting tube, and

Fig. 3 is a plan view.

Referring more particularly to the drawing in which like reference characters refer to the same parts throughout the several views, 1 designates a conventional motor block, or any chamber in which there is a liquid, the temperature changes of which are to be indicated, and 2 designates a fitting that is threaded into an opening in the chamber or motor block 1 and adapted to receive the bulb of the indicator and its connected parts, though it will be understood that the fitting 2 may be formed as an integral part of the chamber 1 instead of being threaded therein, or the bulb may be otherwise attached to the chamber 1.

3 designates an interior flange or shoulder on the fitting 2, said flange or shoulder 3 being adapted to have seated thereon supporting means in the form of an annular plate 4 which is preferably formed integral with a sleeve 5 intermediate the ends thereof, the sleeve 5 being united to the bulb and conducting tube in the manner that will appear presently.

The metal bulb is indicated at 6, and is provided with a reduced neck 7 located within the sleeve 5, the upper end of the bulb 6 being spaced substantially from the fitting 2 and shoulder 3, thereby permitting the bulb to be entirely surrounded by the liquid in which it is immersed, since the liquid may occupy the space between the fitting 2 and the upper end of the bulb, the sleeve 5, and the supporting plate 4.

Extending within the neck 7 of the bulb is the usual capillary or conducting tube 8 through which vapor passes to the indicating instrument, not shown, said tube 8 being surrounded and protected by a suitable element such as a braided armor, as indicated at 9 in Fig. 1, or by a continuous metal coil, as indicated at 10 in Fig. 2. Surrounding the conducting tube 8 and its protecting covering, in proximity to the bulb, is a protecting sheath preferably of metal, indicated at 11, spaced from the conducting tube at its outer end, and having a reduced portion 12 surrounding and closely engaging the outer end of the sleeve 5, as shown in Fig. 2.

The protecting sheath 11 is preferably secured in place and attached to the conducting tube and to the sleeve 5 by a body of solder as indicated at 13 between the protecting sheath and the conducting tube, and at 14 between the sleeve 5 and the conducting tube, and there is also a solder body as indicated at 15 between the sleeve 5 and the neck 7 of the bulb, these parts being suitably spaced to permit the solder to flow therebetween. The parts are assembled by placing a coil of solder at the upper end between the metal sheath and the conducting tube, and upon application of heat, the solder flows downwardly, fitting the spaces as indicated at 13, 14 and 15, and thus

causing a firm bond between the sleeve 5, the bulb, the conducting tube, and the protecting sheath.

Arranged within the outer enlarged portion of the protecting sheath, and surrounding the conducting tube and its covering, is a body of soft rubber 16 which may be suitably molded in place as shown in Fig. 1, or may be suitably formed and threaded into place around the metal coil 10, as shown in Fig. 2. The rubber body 16 affords a resilient protection for the conducting tube, permitting slight movement of the latter, but reducing or dampening vibration of the tube and effectually preventing excessive bending of the tube such as would otherwise loosen its connection with the bulb, or cause a fracture of the tube adjacent to the bulb.

The bulb and conducting tube are held in place with the supporting plate 4 resting upon the shoulder 3, by means of a nut which has a bottom portion 17 that engages the plate 4, and an outer portion 19 that embraces the enlarged portion 11 of the metal sheath, thus holding the metal sheath in rigid relation to the sleeve. The nut referred to is threaded exteriorly and when turned into the fitting 2, locks the supporting plate 4 tightly on the shoulder 3 and thereby firmly retains the bulb and the conducting tube in position in such a manner as to prevent any bending or twisting of the parts.

The fitting 2 previously referred to is provided with the flat faces 20 by which it may be loosened and removed, and the nut previously referred to is provided with the flat faces 21 by which it can be loosened when it is desired to remove the bulb. If the fitting 2 were turned without first loosening the nut 19, the conducting tube and bulb would be turned at the same time with relation to the indicating instrument, and thus likely break or injure the parts. In order to prevent this, the nut has an enlarged head 22 on which the flat faces 21 are formed, and this head 22 overlies the portion of the fitting that carries the flat faces 20 so that it is difficult to insert a wrench and turn the fitting 2 without first removing the nut thereabove. This arrangement prevents the inadvertent turning of the fitting 2 by an operator when it is desired to remove the bulb. To accomplish this, it is only necessary to loosen and remove the nut by positioning a wrench in engagement with the flat faces 21 of the enlarged head 22, and thereupon the plate 4 and the bulb can be entirely withdrawn through the opening in the fitting 2. It will be understood that the fitting 2 can be held, if necessary, by applying a suitable wrench to the faces 20, though ordinarily there is no occasion for removing this fitting, and it is usually secured permanently in the motor block 1, due to the locking or wedging of tapered threads.

While the invention has been described with reference to certain details of construction, it is not limited to the precise arrangement shown, and this application is intended to cover any changes or departures that may come within the purposes of the improvement or the scope of the following claims.

I claim:

1. The combination with the bulb of a temperature indicator including an enlarged body portion and a reduced neck portion, of a conducting tube extending through said neck portion, a sleeve surrounding said neck portion and tube and secured thereto by a body of solder, the inner end of the sleeve being spaced from the enlarged body portion of the bulb, an annular supporting plate carried by the sleeve intermediate its ends and spaced substantially from the enlarged body portion of the bulb, a metal protecting sheath having a reduced end surrounding said sleeve and tube, the sheath also including an enlarged portion, a metal armor surrounding the tube and extending through the sheath to a point adjacent said sleeve, a body of solder securing the reduced end of the sheath to the tube and metal armor, and a body of resilient material filling the space in the enlarged portion of the sheath around said tube and metal armor and extending from the outer end of the sheath to said solder body.

2. The combination with the bulb of a temperature indicator having an enlarged body portion and a reduced neck portion, a conducting tube extending through said neck portion, a sleeve surrounding said neck portion and extending therebeyond around the conducting tube, an annular supporting plate carried by said sleeve spaced substantially from the body portion of the bulb, a protecting sheath having a reduced portion surrounding said sleeve abutting said annular plate and an outwardly extending enlarged portion, a metal armor surrounding the conducting tube and extending through the sheath to the outer end of said sleeve, a body of solder between the sleeve and the neck portion of the bulb, between the sleeve and the conducting tube, and between the reduced end of the sheath and the conducting tube and metal armor, and a body of resilient material filling the space between the enlarged portion of the sheath and said metal armor.

3. The combination with a chamber for receiving the bulb of a temperature indicator provided with a supporting shoulder, of a bulb having an enlarged body portion and a reduced neck portion, a conducting tube extending through said neck portion, a sleeve surrounding said neck portion and extending therebeyond around the conducting tube, an annular supporting plate carried by said sleeve spaced substantially from the body portion of the bulb and seated on the aforesaid shoulder, a protecting sheath having a reduced portion surrounding said sleeve abutting said annular plate and an outwardly extending enlarged portion, a metal armor surrounding the conducting tube and extending through the sheath to the outer end of said sleeve, a body of solder between the sleeve and the neck portion of the bulb, between the sleeve and the conducting tube, and between the reduced end of the sheath and the conducting tube surrounding said metal armor, a body of resilient material filling the space between the enlarged portion of the sheath and said metal armor, and a securing nut having an inner end which engages said plate and an internal surface at its outer end which engages the outer periphery of the enlarged portion of the protecting sheath.

GEORGE E. FORD.