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G. E. FORD

2,147,021

TEMPERATURE INDICATOR

Filed April 14, 1937

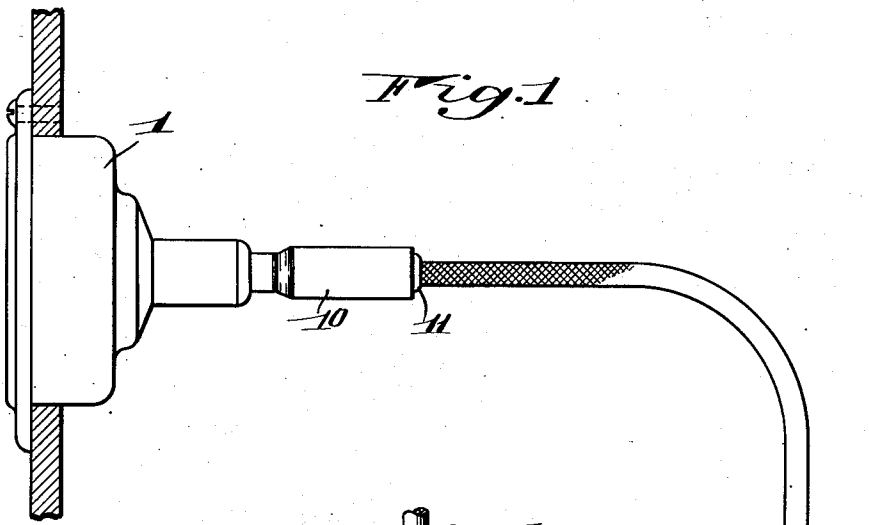


Fig. 1

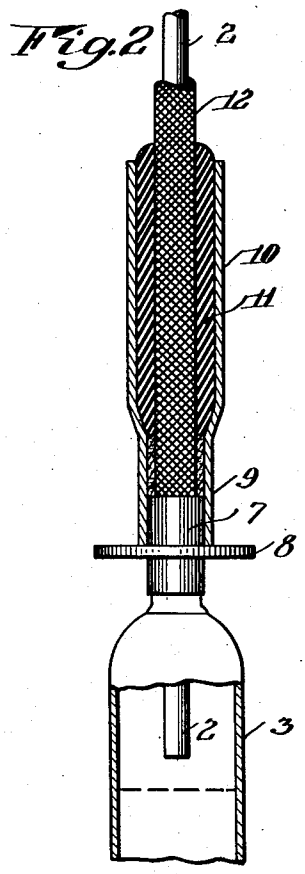


Fig. 2

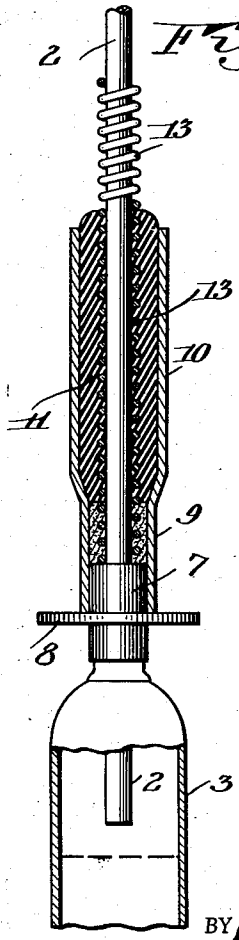
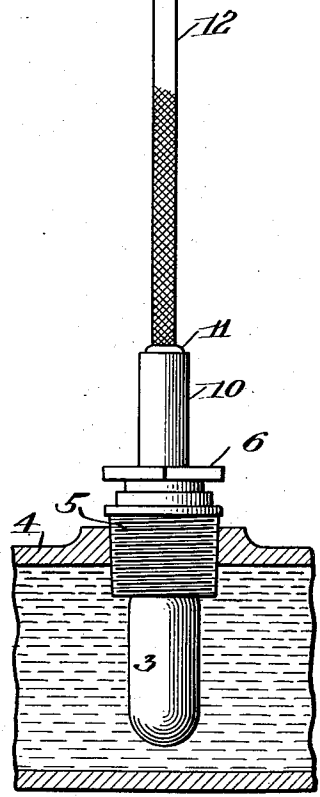


Fig. 3



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# UNITED STATES PATENT OFFICE

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## TEMPERATURE INDICATOR

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Application April 14, 1937, Serial No. 136,858

### 1 Claim. (Cl. 297-3)

This invention relates to a temperature indicator, with reference more particularly to the general type of construction in which there is a metal bulb containing a vaporizable liquid and connected with an indicating means by a capillary or conducting tube, and has for its object to afford a protecting means for the conducting tube at the points where it is joined to the fittings of the bulb and indicating instrument.

The capillary or conducting tube is of such a character that it can be readily bent, resulting in injury or fracture of the tube if excessive bending takes place adjacent to the connections of the tube with the instrument or bulb, and it is more particularly an object of the invention to surround the conducting tube at these points with a means that permits a certain amount of bending of the tube, but effectually prevents excessive bending with relation to the fittings, and also reduces or dampens vibration of the tube.

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 claim following the specification.

In the drawing:

Fig. 1 is a general view in elevation, partially in section, illustrating the application of the invention to a temperature indicator, and showing it applied to the fittings at both the instrument and bulb ends of the structure;

Fig. 2 is an enlarged sectional view showing the application at the bulb end of the mechanism, and

Fig. 3 is a similar view showing a slightly modified arrangement.

Referring more particularly to the drawing in which like reference characters refer to the same parts throughout the several views, 1 designates in general the instrument or indicating means, and 2 is the conducting or capillary tube leading therefrom to the liquid-containing bulb 3 which is immersed in liquid in the engine block or other chamber 4, the latter being provided with a fitting 5 to receive and hold the bulb which is held in place by a suitable nut 6.

The conducting tube 2 may be united to the bulb 3 in any preferred manner, and in the construction shown, this connection is accomplished through a sleeve 7 provided with an annular supporting plate 8 which is adapted to be secured in the fitting 5, in accordance with the con-

struction disclosed in my Patent No. 2,127,592 of August 23, 1938.

In order to prevent the conducting tube from being bent excessively at a point adjacent to the fitting 5, or similarly with reference to the fitting at the instrument or indicating means 1, a metal protecting sheath is provided around the conducting tube, preferably including an inner reduced portion 9 closely fitting and fixedly attached to the sleeve 7, and an outer enlarged portion 10 that is spaced from the conducting tube 2 so as to permit a certain amount of lateral movement or bending of the tube with relation to the bulb, but preventing any bending at a sharp angle adjacent to the sleeve 7.

The reduced portion 9 of the protecting sheath may be secured to the sleeve 7 and to the conducting tube by solder suitably arranged therebetween, and there is preferably employed a body 11 of resilient material, such as soft rubber, interposed between the enlarged outer portion 10 of the protecting sheath and the conducting tube.

In Fig. 2, the conducting tube is shown provided with a braided armor 12, and the resilient or rubber body 11 may be moulded or vulcanized in place around the armor 12 in this form, or where the conducting tube is surrounded by a metal coil such as 13, as in Fig. 3, the rubber body 11 may be either moulded in place or suitably formed to thread it around the metal coil 13 within the protecting sheath 10, or cemented in position.

The rubber or resilient body 11 resists lateral movement of the conducting tube, but is sufficiently yieldable to permit a certain amount of bending, which is positively limited by the enlarged portion 10 of the protecting sheath, the amount of possible flexing of the conducting tube being determined by the space allowed between the conducting tube and the enlarged portion 10 of the protecting sheath.

It will be understood that a similar construction is employed also at the indicator end of the structure, surrounding the conducting tube and attached to the fitting which connects it to the indicating means.

While the invention has been disclosed with reference to a particular structural embodiment, it is not limited to the details herein set forth, and this application is intended to cover any modifications or departures coming within the intent of the improvements or the scope of the following claim.

I claim:

In a temperature indicator, the combination with a conducting tube and a fitting including a metal sleeve surrounding and fixed to the tube, of a metal protecting sheath including an enlarged portion and a reduced end portion, the said reduced end portion of the sheath surrounding and fixed to said sleeve and extending for a distance beyond the sleeve, a metal armor surrounding the tube and extending through the

enlarged and reduced portions of the sheath to the point of said sleeve, a body of solder surrounding said armor and located beyond said sleeve between the tube and the reduced portion of the sheath, and a body of resilient material filling the space in the enlarged portion of said sheath around said armor and located between the said solder and the outer end of the sheath.

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