

Feb. 11, 1930.

M. E. CHENEY

1,746,853

THERMOMETER BULB

Filed March 1, 1928

2 Sheets-Sheet 1

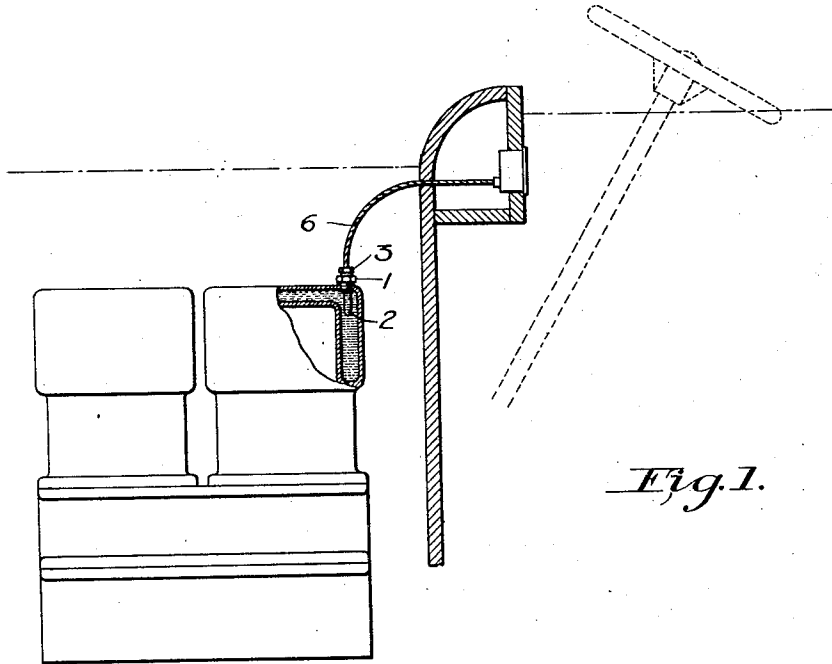


Fig. 1.

Fig. 2.

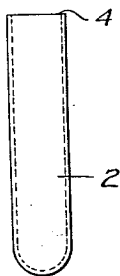


Fig. 3.

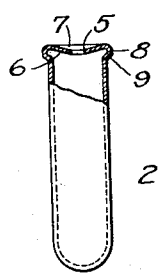


Fig. 4.

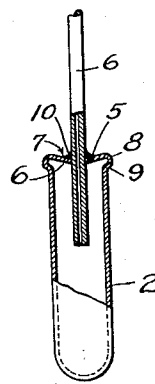
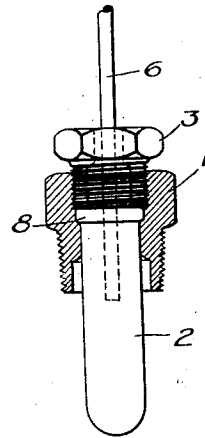


Fig. 5.



Inventor

Moses E. Cheney

By

Attorneys

Nathan & Bowman

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Fig. 8.

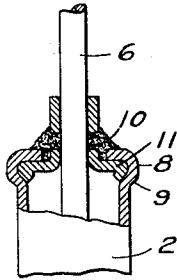


Fig. 7.

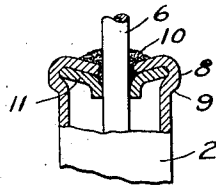
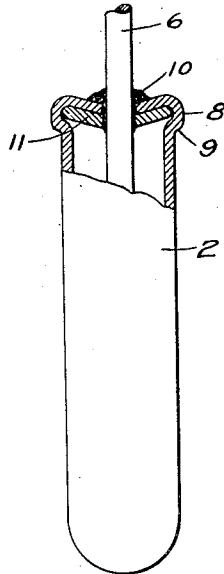


Fig. 6.



Inventor

Moses E. Cheney

By

Attorneys

Nathan & Bowman

UNITED STATES PATENT OFFICE

MOSES E. CHENEY, OF LA CROSSE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO MOTO METER GAUGE & EQUIPMENT CORPORATION, OF LONG ISLAND CITY, NEW
YORK, A CORPORATION OF DELAWARE

THERMOMETER BULB

Application filed March 1, 1928. Serial No. 258,290.

This improvement relates to the manufacture of thermometers and more particularly to the metallic bulb of thermometers that may be subjected both to high temperatures or to severe mechanical strains.

The improvement is one resulting in a thermometer more easily and more cheaply constructed.

In this metal type of thermometer the bulb is often subjected to severe mechanical strains and may sometimes be subjected to excessive temperatures and consequently the parts should be secured together in a way to withstand the severe mechanical strains and also any high temperatures to which it may be subjected.

Solder has often been used as a medium for securing some of the parts together but the difficulty has been that it required expert skill and the use of an expensive solder to secure the proper connections, such as to withstand the usage set forth above. By the improved method and arrangement of parts as good or better joints can be secured with ordinary skill and at a minimum of expense.

Heretofore, an accepted method of construction has been to insert within the open end of the metal casing of the bulb a block preferably of brass which is soldered to the casing and for this purpose it has been necessary to use a hard solder, such as silver, which is expensive, and the capillary has been inserted within a central opening in the block and it also has been soldered to the block. By reason of the large joint surface considerable care has to be exercised to make an effective sealing against leakage under pressures developed during the functioning of the instrument. In many uses the twisting and turning of the capillary during installation of the instrument, the occasional withdrawal and replacing of the bulb and in the case of bulbs installed in water jackets of motor cars the vibration to which the bulb is subjected to endangers the joints making it desirable to have the most secure bonding of the parts. Where a re-inforcing and supporting member was used, a brass block was inserted within the bulb, to which the capillary was secured, and the block was also secured to the

bulb, but the soldering of the joints required expert skill and made it desirable to use the more expensive alloys such as silver solder, and even with expert skill the time required made the job expensive.

This improvement not only simplifies the construction by dispensing with the brass block and eliminating the expensive labor item but it results in an instrument as good, if not better, than prior devices. It also effects material economies by dispensing with large joint surfaces thereby reducing material and labor items of cost, and a base metal solder may be employed in lieu of the expensive silver solder.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawings.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, drawings depicting a preferred typical construction have been annexed as a part of this disclosure and, in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:—

In the drawings Figure 1 is an elevational view of a motor cylinder and indicating device, parts of the cylinder being in section; Figs. 2, 3 and 4 are detail views of the bulb; Fig. 5 is a detail of the cap and nut for securing bulb in motor cylinder; Figs. 6, 7 and 8 are details of modifications having an insertable re-inforcing plate within the bulb.

Like figures of reference indicate like parts throughout the different views.

Referring to Fig. 1 the bulb, which is preferably of copper, is shown applied to the water jacket of a motor cylinder and a capillary tube is shown extending to the dash or cowl of a motor car having an indicating device in the line of vision of the operator of the car. The arrangement of the bulb and indicator is covered by the patent to O. J. Williams No. 1,220,150. It is apparent, however, that this bulb may be applied to various appliances where it is desired to indicate high temperatures.

Referring to Fig. 5, the fitting for the bulb for insertion into the cylinder wall is clearly shown. Preferably a hole is made in the outer wall adjacent the water jacket and a screw threaded fitting marked 1 is inserted into said wall and the bulb marked 2 is inserted within said cap, while a screw threaded nut 3 locks said bulb 2 in its proper position in said cap, there being an opening in the cap for the capillary tube hereinafter described.

The bulb 2 has a closed and an open end, and the open end 4 is bent or turned inwardly by a spinning process or by any other ordinary and usual way. The inturned extensions or portions 5 extend inwardly towards the axial center of the bulb, and there is formed at said axial center an opening of proper dimensions through which the capillary 6 is inserted, the edges of the opening lying adjacent to the sides of the tube. There is preferably formed in the inner portions of the inturned extensions 5 of the bulb re-entering angles 6 which form with the exterior wall of the capillary, pockets 7 and there are also formed at the outer edge of the inturned portions shoulders 8 which have lower faces 9 formed on the shoulder or flange 8 will in conjunction with the recessed seat in fitting 1 constitute a leak proof seal when the face 9 is pressed into engagement with the recessed seat by the locking nut 3.

The inturned portions 5 of the bulb having the reentrant or reverse angles 6 at the free ends thereof have been found sufficient to support the capillary tube, although there are shown modifications in Figs. 6, 7 and 8, wherein insertable re-inforcing plates 11 are shown. The sides of the capillary tube, which is also preferably formed of copper, form with the reverse angles 6 (Figs. 2, 3 and 4) pockets 7 of such shape and capacity to enable solder or alloy of a suitable kind to be inserted therein for holding the tube securely within the opening. The solder is indicated as 10 and, as the capillary and bulb are both preferably formed of copper, an expensive hard solder is unnecessary, a base metal solder being sufficient for the purpose. In this manner a support for the capillary is secured of integral character with the bulb itself (dispensing with soldering between the support and bulb) and the pockets formed by the sides of the tube itself and the re-entrant angles are adequate to insure a sufficient soldering at that point with a base metal solder or other solder.

When it is desired to re-inforce the support of the capillary, there may be employed an insertable plate 11 (Figs. 6, 7 and 8) which fits within the end of the bulb. In Figs. 6 and 7 pockets are formed to contain the solder, while in Fig. 8 a further modification is shown wherein the pocket is dispensed with by reason of the inserted plate being formed

with an extension having lateral openings for the solder, and in these modifications the construction is such that the solder will act to bind the capillary to the support and also bind the support to the bulb.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various utilizations by retaining one or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention and, therefore, such adaptations should be, and are intended to be, comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed this invention, I claim as new and desire to secure the following combinations and elements, or equivalents thereof, by Letters Patent of United States:—

1. The combination of an open ended thermometer bulb of metal with a capillary tube, the sides of the bulb adjacent the open end, being bent to close partially said openings, having re-entering angles formed near the inner ends of the bent portion and near a central opening formed by said bent portions, the capillary being inserted within said central opening and forming together with the re-entering angles pockets, solder inserted within said pockets for securing the capillary to the bulb.

2. In an instrument of the character described the combination of a metal bulb with a capillary tube, the bulb having the sides at one end bent to form a central restricted opening for the insertion of the capillary tube, the bent portions and the capillary forming pockets about the central opening and solder inserted within said pockets for holding the capillary securely within said opening.

3. In an instrument of the character described the combination of a metal bulb with a capillary tube, the bulb having an open end, the sides of which are turned in, forming a shoulder and a contacting face at the outer edge and an opening at the inner edge for the capillary tube, pockets formed by the tube and the inturned portions and solder placed within the pockets.

4. In an instrument of the character described the combination of a metal bulb having an open end, the sides of which are turned in to form a support with a capillary fitted into said opening, and insertable re-inforcing plate adjacent said inturned end portion and solder securing said plate, capillary and inturned end portion together.

5. As an article of manufacture, a thermometer bulb comprising an open ended metal casing having the sides turned inwardly, a capillary near the center of the inturned

portion, pockets formed by the capillary and inturned end portions, solder within said pockets binding the capillary to said inturned portions of the bulb.

5 6. As an article of manufacture a metal bulb having a closed end and an open end, the sides of which are turned inwardly, a capillary, a re-inforcing plate adjacent the inturned portion of said bulb and solder binding the re-inforcing plate, capillary and inturned sides together.

7. The combination of a container with a socket member secured to the container wall, a thermometer bulb having a bulged portion and a perforated integral end portion, a capillary positioned in the perforated end portion and a clamping member engaging the bulged portion of said bulb and forcing same against the inner wall of said socket member with the lower portion of the bulb positioned inside the container.

8. The combination of an engine cylinder with a water jacket, a socket member inserted in the wall of said cylinder, a thermometer bulb having a perforated end portion, a capillary positioned in said end portion, said end portion being depressed to form a pocket, a fusible medium in said depressed portion leaving exposed the peripheral portion of said bulb and a clamping member engaging said peripheral portion of said bulb, thereby positioning said thermometer in the said water jacket.

9. In a motor cylinder characterized as having a jacket with a cooling medium therein, the jacket wall being perforated and a fitting inserted therein, the combination of a thermometer bulb having a projecting face on its outer wall and a recessed perforated end, with a capillary positioned in said perforated end, a binding medium in said recess engaging the walls of the capillary and leaving untouched peripheral portions of said end and a clamping member engaging the portion of said end untouched by said binding medium whereby the said projecting face of the bulb will be forced against the fitting to seal the opening in said wall.

10 In witness whereof, I hereunto subscribe my name.

MOSES E. CHENEY.