Nov. 14, 1933. H. E. CHRISTIE ET AL 1,935,564

HYDROMETER FLOAT

Filed Jan. 6, 1930

Fig. 1.

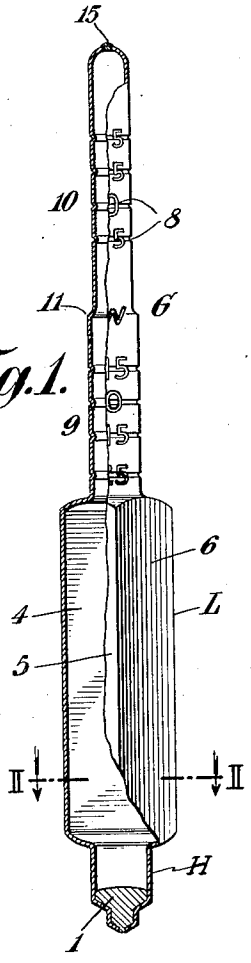


Fig. 2.

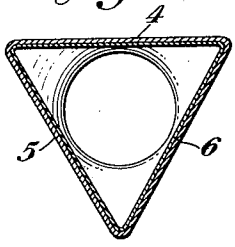


Fig. 3.

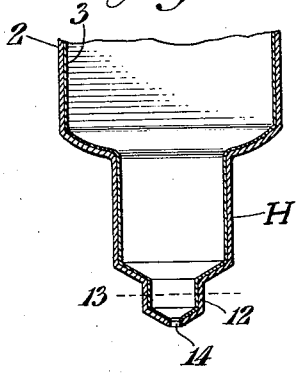
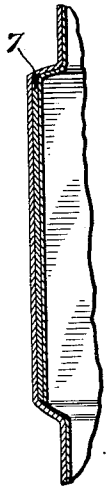


Fig. 4.



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HYDROMETER FLOAT

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Application January 6, 1930. Serial No. 418,735

2 Claims. (Cl. 265—45)

This invention relates to hydrometer floats, and an object of the invention is to provide a float made wholly of metal and which is hollow.

A further object is to so construct the walls of said float that they will be of great toughness and strength.

A further object is to so construct the device that in use it will automatically compensate for changes in temperature.

A further object is to provide a metallic hydrometer float having scale indications made up as permanent parts thereof.

A further object is to provide novel means by which to alter the weight of the float.

A further object is to provide a float of high efficiency and which may be handled without likelihood of breakage.

A further object is to provide a float of such construction that it may be manufactured in large quantities and in a manner which will insure that all such floats will have a high degree of uniformity one with respect to the other.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawing which is to be taken as a part of this specification, and in which we have shown merely a preferred form of embodiment of the invention:—

Fig. 1 is a side elevational view of a hydrometer float constructed in accordance with this invention, a part being broken away and shown in vertical section for the disclosure of details of construction.

Fig. 2 is an enlarged horizontal sectional view taken upon the plane of line II—II of Fig. 1.

Fig. 3 is a view similar to the lower portion of Fig. 1 but being enlarged and the weight element being omitted, and

Fig. 4 is a fragmentary sectional view illustrating a modification of the wall structure.

The float illustrated in the drawing is of the form and construction such as is produced by the method described and claimed in our co-pending application Serial No. 418,753, and it consists of a bulbular portion L, a stem portion G, and a lower or weight portion H within which is carried the weight element 1.

The entire structure, excepting the weight 1, is preferably formed as an integral shell of metal produced by depositing as by electro-plating over a molded core piece as set forth in said application referred to. Its walls throughout are of almost paper thinness yet they may consist of two distinct thicknesses of metal as illustrated in Figs. 2 and 3 there being an outer thickness as 2 of one metal, such as copper, and an inner thickness of a different metal such as tin or some composition thereof, the two thicknesses being intimately connected together and constituting in effect a single piece or sheet of metal the whole being seamless.

While it would be sufficient for most purposes to employ only a single thickness of metal for these walls, it has been found that the double thickness of wall structure is tougher and more efficient for its purpose and that it may be readily produced as by the method defined in said co-pending application.

The bulbular portion L may take any desired form but preferably is of triangular shape in cross section as best indicated in Fig. 2 as this form presents three broad flat wall sections as 4, 5 and 6 which constitute efficient diaphragm-like parts capable of flexing either inwardly or outwardly to a desirable extent for changing the outside dimensions, and hence the displacement, of the bulbular portion in response to changes in the temperature of the liquid within which the float may be submerged in use. The interior of the float is of course sealed and hence the air or other fluid confined therein will expand or contract in the presence of temperature changes, and the diaphragm-like walls 4, 5, and 6 are sufficiently sensitive to respond readily to all pressure changes. If the surrounding liquid is relatively cold the confined air will be contracted and the walls 4, 5 and 6 will bulge inwardly so that the displacement will be reduced and the float will stand at a relatively lower level than it would if the walls 4, 5 and 6 were non-flexible, whereas if the surrounding liquid be warmer the confined air will be correspondingly heated and expanded so that the walls 4, 5 and 6 will bulge outwardly thus increasing the displacement and causing the float to stand at a relatively higher level than it would if the walls 4, 5 and 6 were non-flexible.

In this way the flexing of the walls 4, 5 and 6 will cause the float to stand at a given level in its supporting medium notwithstanding changes in the temperature of said medium, as will be readily understood.

It may be mentioned here that the two different layers of metal of which the walls 4, 5 and 6 are

composed may if desired consist of such metals respectively that one layer will expand to a greater or less extent than the other under a given change of temperature and thus produce a sort of mechanical flexing of said walls irrespective of changes in pressure of the confined air, or if desired this mechanical flexing may be relied upon as an auxiliary to the air pressure.

As illustrated in Fig. 4 the walls 4, 5 and 6 may if desired be re-inforced by the addition of an extra thickness or layer as 7 of metal, such for instance as nickel or some combination thereof calculated to further toughen said walls so as to give them requisite strength and at the same time adapt them for their flexing movement as above described.

The stem portion G of the float may be provided with scale indications thereon in any approved manner but it is a feature of this invention to form said scale indications as a permanent part of the stem, preferably by forming them as surface depressions as 8 in the material of the stem, said depressions to be filled, if desired, with wax, enamel, or other coloring material so that they will be prominently visible at all times.

It is a further feature of this invention to make the stem G of two distinct sections, a relatively lower section as 9 and a relatively higher section as 10, the latter being of relatively smaller diameter than the former so that a pronounced shoulder as 11 is defined between them. Each section carries its own individual scale indications, as clearly illustrated, and the purpose of this arrangement is to enable the use of a given hydrometer float in connection with more than a single kind of supporting fluid. For instance, the section 9 may be used for testing fluids containing what is commercially known as Prestone, while the section 10 may be used in the testing of simple water or alcohol mixtures.

The section 9 being relatively larger than the section 10 not only provides a definite and easily recognizable distinction as between itself and the smaller section 10, but it also increases the displacement of the portion of the float which is submerged during the use of section 10.

The weight portion H projects a short distance below the bottom of the bulbular portion and at its lower end carries a reduced extension 12 within which a portion of the weight 1 is contained, said weight continuing upwardly more or less above the extension 12 as may be required but in any event being preferably carried at a suitable distance below the bulbular portion L so as to produce a proper balancing effect upon the entire float.

The purpose of the extension 12 is to provide a suitable portion of substantially solid structure consisting of weight material and surrounding shell walls adapted to be cut or ground off more or less as may be found necessary to alter or adjust the weight of the whole float and thus cause the float to stand at a given predetermined level in its supporting medium. The dotted line 13 suggests a plane at which said extension and weight material may be cut off if desired for this purpose, though it will be understood of course that this plane may be higher or lower according as may be found necessary by experiment with each individual float manufactured.

It is a further feature of this invention to make the weight 1 of metal introduced in molten form and then allowed to cool, the molten metal having adhered to the shell as a substantially integral part of the inner layer 3 of metal comprising the shell.

This metal may be introduced through a lower opening as 14 provided in the shell, as by suction through an upper opening as 15, as more fully explained in said co-pending application, the opening 15 being subsequently sealed by cement or solder, and the metal of the weight 1 serving to seal the opening 14.

It is noteworthy that the triangular shape of the bulbular portion not only provides wall expanses adapted for flexing as above mentioned but it also provides the so-called knife edge portions for engagement with the walls of a container within which the float may be used said edges being of such form as to not adhere to said walls, the result being that the float will at all times move freely within the container.

As many changes could be made in this construction without departing from the scope of the invention as defined in the following claims, it is intended that all matter contained in the above description, or shown in the accompanying drawing, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A hydrometer float having a bulbular portion and a stem portion, the bulbular portion having a weight at its lower end, the whole comprising a hollow metallic structure, the stem portion of said structure having cylindrical parts of different diameters providing a shoulder exteriorly of said stem portion to separate the parts thereof of different diameters, and separate scale indications provided upon said parts.

2. A hydrometer float having a bulbular portion and a stem portion, the bulbular portion having a weight at its lower end, the whole comprising a hollow metallic structure the walls of which throughout include a relatively inner layer of tin and a relatively outer layer of copper, and a wall of the bulbular portion including a layer of nickel intermediate said inner and outer layers, said layers throughout being substantially integrally connected together.

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