F. J. BERBERICH.

HYDROMETER.

APPLICATION FILED MAY 29, 1912.

1,074,039.

Patented Sept. 23, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

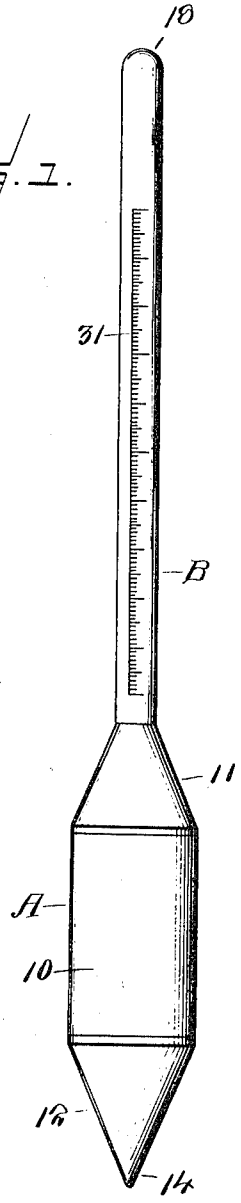



Fig. 2.

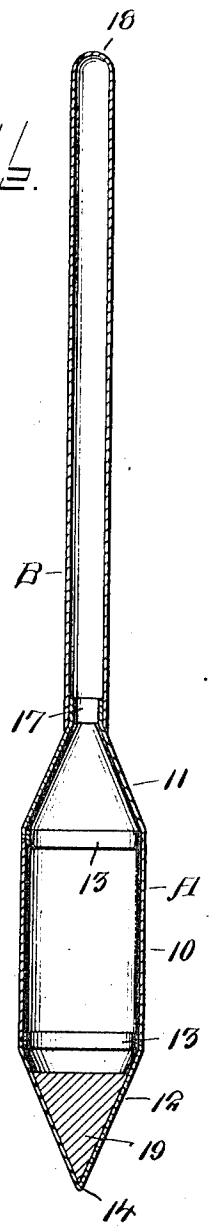



Fig. 4.

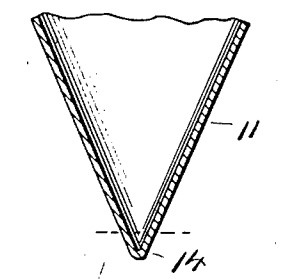



Fig. 3.

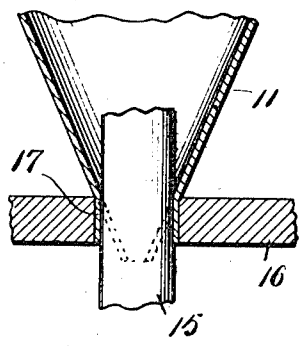
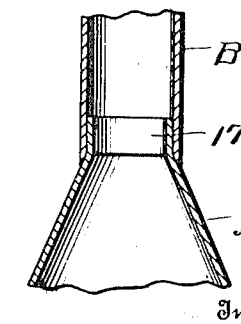



Fig. 5.




Witnesses

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1,074,039.

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2 SHEETS—SHEET 2.

Fig. 6.

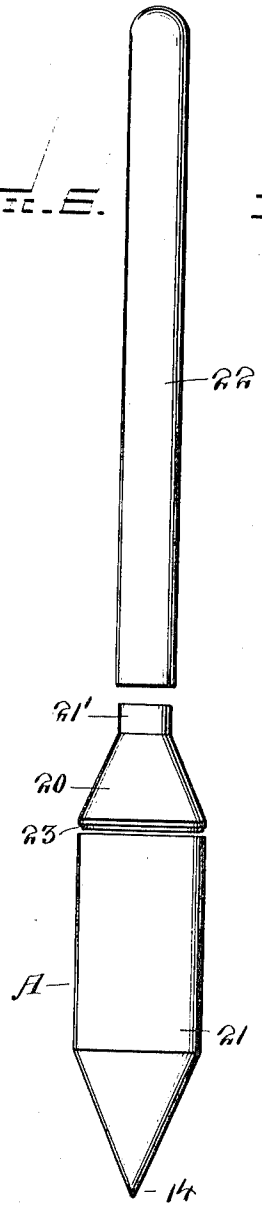



Fig. 7.

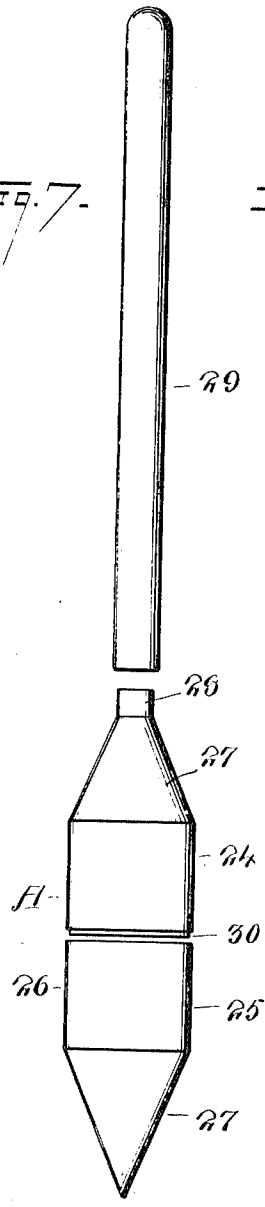
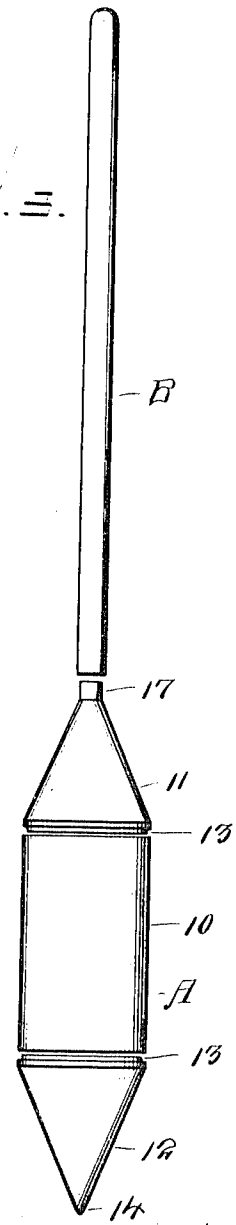



Fig. 8.




Witnesses

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# UNITED STATES PATENT OFFICE.

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## HYDROMETER.

1,074,039. Specification of Letters Patent. Patented Sept. 23, 1913.

Application filed May 29, 1912. Serial No. 700,455.

*To all whom it may concern:*

Be it known that I, FRANK J. BERBERICH, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Hydrometers, of which the following is a specification.

The invention relates to measuring instruments, and more particularly to the class of hydrometers.

The primary object of the invention is the provision of an instrument of this character wherein the same is constructed entirely from metal, and is formed with a flotation body which is made of two or more sections, which may be stamped or spun and readily and easily joined so as to afford a fluid tight bulb or body.

Another object of the invention is the provision of a hydrometer wherein the flotation bulb has reversely tapered end portions permitting the easy penetration thereof in the fluid without creating air bubbles therein and in event that the said air bubbles are formed they will readily escape to the surface of the fluid, and furthermore gives a neat and attractive appearance to the bulb, as well as facilitating the cleaning thereof.

A further object of the invention is the provision of a hydrometer wherein the flotation bulg carries a ballast which is held stationary therein, so as to properly balance the instrument when in the fluid and to prevent the displacement of the said ballast which would necessarily result in making the instrument ineffective for use.

A still further object of the invention is the provision of a hydrometer wherein the flotation bulb is so constructed as to permit the ready and convenient placing of a ballast therein which can be delivered thereto in a molten state, so that upon the hardening of the same it will become a part of the bulb and thereby obviate any possible displacement of the same within the bulb.

With these and other objects in view the invention consists in the construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

In the drawings: Figure 1 is a side elevation of a hydrometer constructed in accordance with the invention. Fig. 2 is a vertical, longitudinal, sectional view thereof. Fig. 3 is an enlarged fragmentary vertical sectional view through the upper end of the bulb, prior to the forming of a stem engaging flange thereon. Fig. 4 is a similar view showing the flange formed through the medium of a die and plunger. Fig. 5 is a fragmentary enlarged vertical sectional view showing the scale stem and upper end of the flotation bulb connected. Fig. 6 is a side elevation of a modified form of hydrometer, the scale stem being separated from the bulb, and likewise the upper end of the bulb separated from the remaining portion thereof. Fig. 7 is a similar view of a further modification showing the parts separated. Fig. 8 is a side elevation of a construction as shown in Figs. 1 and 2, but with the parts thereof in separated relation to each other.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings by numerals the hydrometer comprises a flotation bulb A, and a scale stem B, the same being formed from metal, the flotation bulb being constructed of intermediate and outer sections 10, 11 and 12 respectively. The intermediate section is of tubiform, while the outer sections 11 and 12 are outwardly tapered, and fitted within the ends of the intermediate section 10 are annular bands 13 which slightly protrude beyond the ends of the intermediate section whereby the outer sections 11 and 12 will telescope thereon, these bands 13 being soldered or otherwise fixed to the intermediate and outer sections, thereby uniting the same and forming a fluid tight joint therebetween.

The outer section 11 is initially formed with a closed smaller end 14 and likewise the outer section 12 is similarly formed with a closed smaller end, but the closed smaller end of the outer section 11 is subsequently acted upon through the medium of an ordinary plunger 15 and die 16, whereby an annular connecting neck or flange 17 is struck from the said section for the connecting of the scale stem B thereto.

It will be noted that by reason of the tapered formation of the closed end 14 of

the outer section 11 an annular neck or flange 17 may be struck therefrom of any desirable size to connect the scale stem of various diameters thereto.

The scale stem B is of uniform tubular formation in cross section throughout its length and has a rounded closed outer end 18, while its opposite open end is adapted to telescope upon the neck or flange 17, whereby the said stem B can be joined thereto in any desirable manner, preferably by soldering the flange and stem together.

The outer rounded end 18 of the stem B is formed by spinning the same and thereby closing said stem to render the same fluid tight.

Located within the outer end 14 of the flotation bulb A is a ballast 19 preferably formed from solder, which when introduced into the said end 12 is in molten state, so that on the hardening of the lead, the same will become integral with the wall of the end 12, and thus stationarily mount the ballast so as to avoid any possible displacement thereof during the use of the instrument.

Should the ballast 19 be excessive in weight, so as to effect the proper displacement of the instrument, it will only be necessary to file or otherwise cut away the closed tapered end 14 of the outer section 12 of the flotation bulb to the required degree, so as to assure accuracy of the scale upon the scale stem 10, the scale being hereinafter more fully described.

In Fig. 6 there is shown a slight modification of the invention wherein the flotation bulb is formed of two sections 20 and 21, respectively, and the same may be either stamped or spun in the ordinary well-known manner, the section 20 being formed at its outer smaller end with an annular neck or flange 21′, over which telescopes the open end of the scale stem 22, while the opposite larger end of the section 20 has fitted therein an annular connecting band 23 over which telescopes the open end of the section 21 for the joining of the two sections 20 and 21 together, this being accomplished through the use of solder or otherwise. It is of course to be understood that the ballast employed in this construction of instrument is the same as has been hereinbefore described.

In Fig. 7 there is shown a still further modification wherein the flotation bulb is formed of two sections 24 and 25 respectively, each being formed with a tubular inner portion 26 and an outer tapered portion 27, the smaller end of the outer tapered portion 27 of the section 24 being formed with an annular flange 28, over which telescopes the open end of the scale stem 29 which is soldered or otherwise secured to the said flange for the uniting thereof. The tubular portion of the section 24 is fitted therein with an annular connecting band 30, over which telescopes the tubular portion 26 of the section 25, which is joined to the band 30 by means of solder or otherwise.

The scale stems B, 22 and 29 are each provided with a graduated scale 31, the same being formed on the said stem by first covering the stem with non-conducting and acid proof material, then at fixed points the degree marks of the scale are traced thereon by any suitable machine or by hand, so as to expose the metal of the stem lying beneath the non-conducting and acid proof material. After this operation the stem thus traced is placed within an acid bath, so as to etch out the exposed metal to a desired depth, after which the stem is placed within an ordinary plating solution, preferably a black nickel, which will become deposited within the etched crevices, thus rendering the degree marks of the scale clearly distinguishable from the metal forming the stem, thereby enabling the quick reading of the scale during the use of the instrument.

It is of course understood that after the scale has been formed as heretofore described the non-conducting and acid proof material is removed from the stem, thereby giving the original appearance to the same with the addition of the scale thereon. However, it is to be understood that the scale can be formed in any other manner upon the stem, and therefore, the invention is not limited to the particular method of applying the scale as hereinbefore set forth.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction and operation of the invention will be clearly understood, and therefore, a more extended explanation has been omitted.

By reason of the formation of the scale in the manner as heretofore stated, it will be obvious that the degree marks of the scale will be permanent and cannot possibly be obliterated.

What is claimed is:—

1. A hydrometer comprising a flotation bulb formed with an inner tubular section and outer reversely tapered sections, rings fixed in the ends of the inner section and telescoped within the ends of the outer sections for uniting the same together, the smaller end of one of the outer sections being perforated and extended to provide a neck, and a hollow scale stem telescoped upon the said neck and having a graduated scale exteriorly thereon.

2. A hydrometer comprising a flotation bulb formed with an inner tubular section

and outer reversely tapered sections, rings fixed in the ends of the inner section and telescoped within the ends of the outer sections for uniting the same together, the smaller end of one of the outer sections being perforated and extended to provide a neck, a hollow scale stem telescoped upon the said neck and having a graduated scale exteriorly thereon, and a ballast anchored within the other outer section of the bulb.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK J. BERBERICH.

Witnesses:

FRANK O. CARTER,

BENNETT S. JONES.