

No. 829,460.

PATENTED AUG. 28, 1906.

T. D. BUNCE.
HYDROMETER.

APPLICATION FILED OCT. 14, 1905.

Fig. 1.

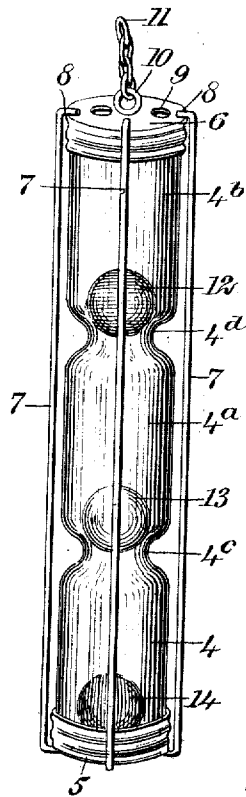


Fig. 2.

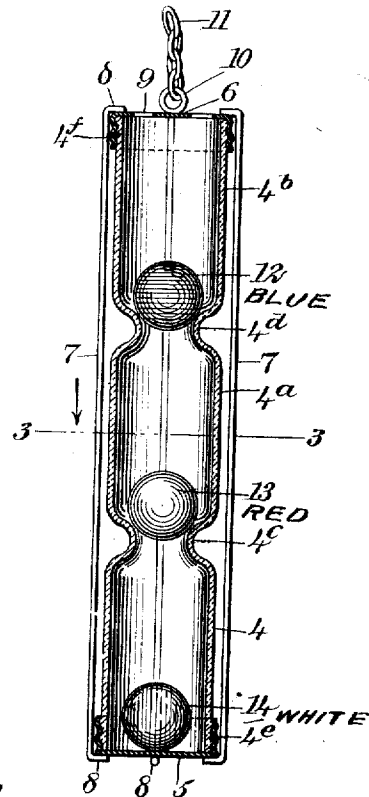
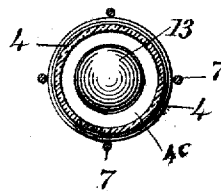


Fig. 3.



WITNESSES:

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HYDROMETER.

No. 829,460.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed October 14, 1905. Serial No. 282,749.

To all whom it may concern:

Be it known that I, THEODORE DWIGHT BUNCE, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Hydrometer, of which the following is a full, clear, and exact description.

My invention relates to hydrometers, my more particular object being to produce a type of hydrometer in which the reading may be made very quickly and in which the approximate density of the liquid may be indicated in such manner as to avoid the probability of mistakes.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view showing the hydrometer ready for use. Fig. 2 is a central vertical section through the same, and Fig. 3 is a horizontal section upon the line 3-3 of Fig. 2 looking in the direction of the arrow and showing one of the floats occupying its normal position.

A tubular member 4 of transparent material, preferably glass, is provided with sections 4^a 4^b, connected integrally therewith by means of constricted portions 4^c 4^d. The bottom of the member 4 is threaded externally at 4^e and fitted with a metallic cap 5, which is threaded for the purpose and screwed onto the same from below. The section 4^b of the tubular member 4 is also threaded externally at 4^f and is fitted with a metallic cap 6, threaded to fit upon the same. A number of metallic straps 7 are connected with the caps 5 6 and together with these members constitute a cage which protects the delicate portions of the device from injury. The cap 6 is provided with apertures 9, through which a liquid can readily pass. A ring 10 is secured firmly upon the cap 6, and connected with this ring is a chain 11, whereby the entire device may be lifted. A number of loose floats 12, 13, and 14, preferably of glass and of different colors, are made so as to have different specific gravity, that of the float 12 being less than that of the float 13 and the specific gravity of the float 13 being less than that of the float 14. The floats 12 and 13 rest, respectively, upon the constrictions 4^d 4^e when the device is in its normal position.

My invention is used as follows: Suppose

it is desirable to measure the approximate specific gravity of a liquid such as gasoline. The operator grasps the chain 11 and lowers the hydrometer into the liquid. If now all three of the floats 12, 13, and 14 rise from their respective seats or resting-places, the liquid is too dense. If none of the floats rise, the liquid is lighter than necessary. If only the top float rises, the floats 13 and 14 remaining down, the approximate intermediate degree of density of the liquid is thus indicated.

The device is of peculiar value in cases where it is desired to determine the approximate density of the liquid under conditions where no great volume of the liquid is available for the purpose. The usual method of doing this is to draw off a portion of the liquid into a hydrometer-jar and measure the specific gravity of this portion of the liquid by means of the usual hydrometer. When the instrument is lowered into the liquid, the latter enters through the apertures 9, and the tendency of the liquid is to lift the floats in succession, beginning with the uppermost. By the arrangement above described the floats, being some distance apart, are more readily observed than if they were grouped together, and being of different colors and otherwise readily distinguishable by the sight they may be observed with greater facility than if bunched together. Moreover, if any one of the floats happens to be of approximately the same specific gravity as the liquid, but unable to rise to the surface, it is easily rocked upon its seat, and this rocking movement is readily discernible by sight, so that the operator can, by a little experience, judge more accurately as to the density of the liquid.

The instrument is designed more particularly to indicate the fact that a given liquid is above or below a certain fixed value rather than to measure the exact specific gravity. For instance, in using gasoline it is necessary to ascertain whether it is too light or whether it is too heavy. The exact specific gravity of the liquid need not for most purposes be known.

The device shown is of peculiar value in testing gasoline to be used in the motors of automobiles and in explosive-engines generally.

I do not limit myself to any particular number of floats nor to any particular mode of distinguishing them one from the other.

prefer to make them hollow and of glass and to render them distinguishable by coloration.

Having thus described my invention, I claim as new and desire to secure by Letters
5 Patent—

1. In a hydrometer, the combination of a tubular member provided with constrictions, floats of unequal specific gravity disposed within said tubular member and normally
10 resting upon said constrictions, and means for admitting a liquid to said floats.

2. In a hydrometer, the combination of a tubular member of glass provided with constrictions whereby it is subdivided into sections, a plurality of floats of different specific
15 gravity resting normally upon said constrictions, and adapted to be lifted therefrom in succession by the buoyancy of a liquid, and means for permitting access of a liquid to the
20 interior of said tubular member.

3. In a hydrometer, the combination of a tubular member of glass, a plurality of caps closing the ends of said tubular member of glass, one of said caps being provided with
25 apertures for admitting a liquid, floats disposed within said tubular member of glass, wire members connecting said caps together and forming therewith a cage, and means for lowering said cage and said tube contained
30 therein into the body of liquid.

4. In a hydrometer, the combination of a tubular member of transparent material provided with threaded ends, caps threaded and fitted upon said ends, floats mounted within
35 said tubular member and spaced apart, said floats being of unequal specific gravity, and means for lowering said tubular member into a body of liquid, the density of which is to be tested.

40 5. The combination of a tubular member of transparent material provided with constrictions, floats disposed within said tubular member and resting loosely upon said constrictions, and means for lowering said tubu-

lar member into a body of liquid for the purpose of testing the specific gravity of the
45 liquid.

6. In a hydrometer, the combination of a tubular member provided with constrictions, floats mounted within said tubular member
50 and resting respectively upon said constrictions, said floats being of unequal specific gravity, and means for lowering said tubular member into a liquid, the specific gravity of which is to be tested by comparison with the
55 specific gravity of said floats.

7. In a hydrometer, the combination of a tubular member, floats of unequal specific gravity mounted therein and spaced apart so as to be readily observable, means for main-
60 taining said floats out of contact with each other and a suspension member for lowering said tubular member into the body of liquid, the specific gravity of which is to be tested.

8. In a hydrometer, the combination of a
65 tubular member of glass, metallic caps mounted upon the ends of said tubular member, wire members connecting said caps together and constituting therewith a cage for protecting said tubular member, floats
70 mounted loosely within said tubular member and adapted to be raised by the buoyancy of a liquid, and means for subjecting said floats to the buoyant action of said liquid.

9. The combination of a tubular member,
75 floats mounted therein and distinguishable from each other by sight, said floats being of different specific gravities, and means for maintaining said floats out of contact with
80 each other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEODORE DWIGI BUNCE.

Witnesses:

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FREDERICK S. TAGGART.