June 17, 1930. F. L. FREAS 1,764,254

SYRINGE HYDROMETER

Filed Oct. 23, 1925

FIG. I.

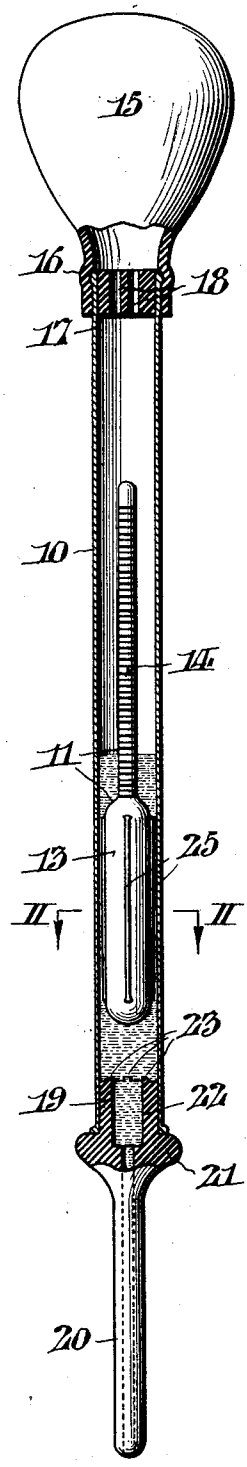


FIG. II.

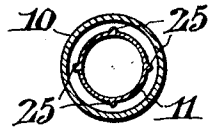


FIG. III.

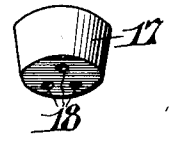


FIG. V.

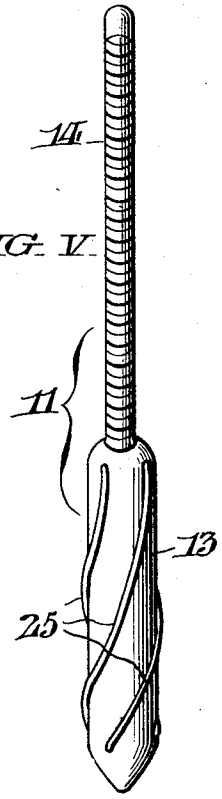


FIG. IV.

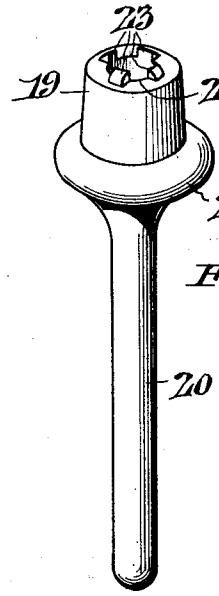
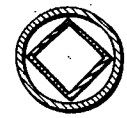


FIG. VI.



WITNESSES

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UNITED STATES PATENT OFFICE

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SYRINGE HYDROMETER

Application filed October 23, 1925. Serial No. 64,446.

This invention relates to hydrometer syringes, more particularly to the type ordinarily employed for testing the specific gravity of the electrolyte of storage batteries, or the like.

The present improvements are in the main directed toward preventing sticking or adherence of the recording hydrometer float against the side walls of the liquid chamber, and interference with correct registering of the instrument; to afford the ends of the hydrometer float ample protection against the possibilities of breakage, and at the same time to prevent its ends from entering either the compression bulb or the nozzle outlet; and, in general, to obtain the above advantages in a syringe hydrometer capable of ready and economic manufacture.

The drawings herewith show a hydrometer syringe conveniently embodying my invention, and whereby the foregoing advantages may be readily realized, Fig. I being for the most part a longitudinal sectional view of the organization;

Fig. II, a cross sectional view to a larger scale taken as indicated by the arrows II—II in Fig. I;

Figs. III and IV, perspective illustrations of the closures for opposite ends of the liquid and float chamber;

Fig. V, a perspective view of a modified form of recording float; and

Fig. VI, a cross sectional view similar to Fig. II showing still another modified float construction in accordance with my invention.

With reference more particularly to Fig. I, the numeral 10 indicates the body portion of the instrument, the same being shown as tubular, and sectioned conventionally to represent transparent material such as glass or the like. This tubular body portion 10 provides the chamber for the liquid to be tested, as well as accommodations for the recording hydrometer float indicated comprehensively by the numeral 11. Generally speaking, the float 11 has the usual or customary form, i. e., embodies a cylindrical lower portion 13 with a hemispherical end, and a reduced axial stem 14 that is calibrated as shown for direct reading.

A pneumatic bulb 15 of suitable compressible material such as soft rubber, has its neck 16 engaged about one end of the body portion 10; and a plug 17 of like material is inserted within said end to afford a shock absorbing cushion for the calibrated stem 14 of the float 11, and to prevent it from entering the compression bulb hollow, the plug 17 being, however, perforated as at 18 for communication into said bulb.

The opposite end of the body portion 10 is closed by a plug 19 also preferably of soft rubber, which, in the instance shown, has an integral nozzle extension 20, and also a circumferential protuberance 21 to determine its position in assembly. The plug 19, furthermore, has an axial bore for communication into the liquid and float chamber, said bore being enlarged at the inner end as shown at 22, and there surrounded by a series of radially-arranged projections 23 that serve to cushion the bulbous end of the float 11 without entailing complete closure of said opening against passage of liquid.

In order to prevent adherence of the hydrometer float 11 to the side walls of the liquid chamber within the body portion 10, I provide its bulbous portion 11 with a series of parallel spaced outwardly-projecting ridges or ribs 25. Such ridges may be either straight and longitudinally extensive with the bulb 13, as shown in Fig. I; or spirally curved to surround the bulb in accordance with the alternative form of Fig. V; or produced in the shape of corner angles as a result of fashioning the bulb to polygonal cross section after the manner of Fig. VI. Incidental to drawing the charge to be tested into the body portion 10 of the instrument, the ridges 25 prevent direct contact of the bulbous portion 13 of the float 11 with the chamber walls, thus allowing said float to rise freely with the fluid. The ridges 25, when spirally curved, function in an anti-frictional directive-capacity and effectively prevent tangential declination of the float while affording slight streamline channels that facilitate flow of the liquid, thereby avoiding the turbulence, or frothing

usually associated with straight ribs, and which is liable to obscure the graduations on the stem 14 while readings are being taken. The float 11 may be blown with either a spherical or conical bottom end as shown respectively in Figs. I and V. When the ridges 25 are spirally curved, with an over-all diameter and "easy-fit" in the bore of the body tube 10, frictional engagement between said parts is effectively prevented; while such spiralizing of the ridges 25 causes the flow of liquid up the tube to follow a circuitous or stream line course, whereby the float 11 is steadied and maintained in axial equilibrium relative to said tube.

By constructing the hydrometer float 11 as described, I secure, in addition to the advantages already pointed out, reinforcement of the bulbous portion 13 whereby it is rendered more sturdy to better withstand shocks incidental to careless handling. A further advantage will be remarked in that the several alternative forms of the float 11 herein typified are very easy to manufacture as compared to those provided with nipple projections such as heretofore employed for a similar purpose.

Having thus described my invention, I claim:—

In a hydrometer syringe, the combination of a transparent tubular body portion affording a liquid chamber, and a hydrometer float within said chamber having its bulb characterized by parallel-spaced longitudinally-extending spiral ridges serving to prevent adherence to the side walls of said body portion, to maintain said float in axial equilibrium within the tubular body portion and also to obviate interference with correct reading of the instrument.

In testimony whereof I have hereunto signed my name at Philadelphia, Pennsylvania, this 15th day of October, 1925.

FRANCIS L. FREAS.