M. E. MOELLER.

HYDROMETER SYRINGE.

APPLICATION FILED MAY 22, 1919.

1,331,165.

Patented Feb. 17, 1920.

Fig. 1.

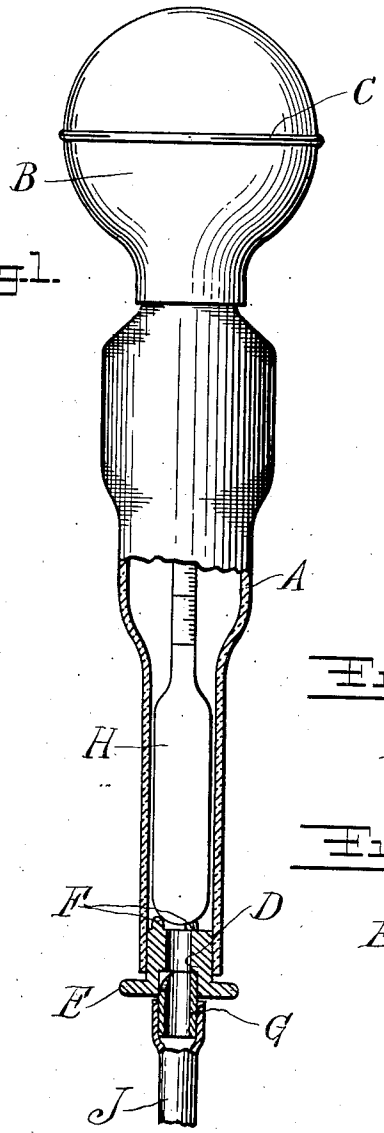


Fig. 2.

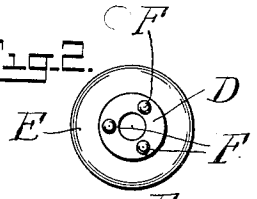


Fig. 3.

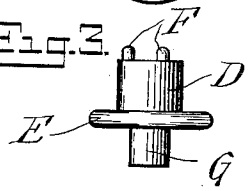
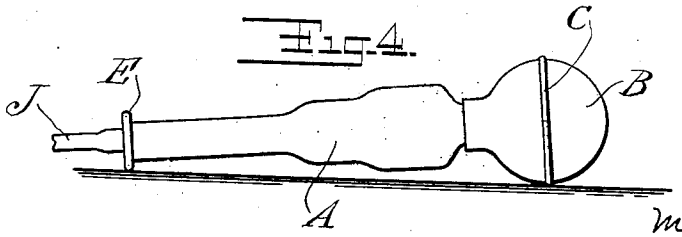


Fig. 4.



INVENTOR

Max E. Moeller

BY S. J. Cox.

ATTORNEY

UNITED STATES PATENT OFFICE.

MAX E. MOELLER, OF BROOKLYN, NEW YORK.

HYDROMETER-SYRINGE.

1,331,165. Specification of Letters Patent. Patented Feb. 17, 1920.

Application filed May 22, 1919. Serial No. 299,020.

To all whom it may concern:

Be it known that I, MAX E. MOELLER, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Hydrometer-Syringes, of which the following is a specification.

The improvements relate to syringes such as are used to extract fluid from batteries or other receptacles, for the purpose of testing such fluid by means of a hydrometer. In devices of this character a glass tube is provided with a compressible bulb at one end and a tube to be inserted in the liquid at the other end, and a hydrometer in the glass tube to test the liquid drawn in by the bulb. A device of this character is shown in United States Letters Patent No. 1,177,128, granted to me March 28, 1916.

Articles of this character are subject to a great deal of breakage, due to the fact that they are frequently used in garages, which are usually provided with cement floors, and are carelessly dropped or laid on metal parts of an automobile, and to other causes. Another disadvantage is due to the fact that when the liquid is expelled from the glass vessel the hydrometer therein will sometimes be forced against the outlet and close the outlet so that the liquid cannot pass therethrough. This sometimes results in the escape of the fluid, which is destructive to clothing and fabrics generally and to a careless shaking up of the hydrometer inside the tube sometimes causing breakage of the hydrometer or the tube. It is to overcome these disadvantages and others and to secure certain other advantages that the present improvements are designed.

The improvements are illustrated in the accompanying drawings, in which Figure 1 is an elevation partly in section of the hydrometer syringe embodying the improvements; Fig. 2 a plan of the plug at the outlet; Fig. 3 an elevation of the same, and Fig. 4 a diagrammatic view showing the position of the device when laid on a flat surface.

The vessel A has a narrow lower portion and enlarged upper portion, and in the lower part the bulb of the hydrometer H is loosely held, while its graduated stem extends upwardly into the enlarged part. These parts are preferably of the form shown in the patent above referred to. A collapsible bulb B has its neck expanded and passed over the open upper end of the vessel A. This bulb is provided medially with a horizontal annular bead C of the same material as the bulb and made integral therewith, and this bead not only strengthens the bulb and accelerates its expansive action after being compressed, but provides a point of contact and a shock resisting zone which enables the bulb to yieldingly resist a quick blow tending to collapse it, as when it is permitted to fall on the floor or some other surface. An open ball of rubber such as the bulb B will yield to a relatively slight blow, but when provided with a bead such as C its resistance will be greatly increased, and as the weight of the vessel and the other parts connected therewith is not great a bead of this character will be sufficient to prevent the bulb from collapsing to any material extent from impact with a rigid surface on falling from any height less than that of the average human being. By the provision of the bead therefore the instrument is provided with an effective cushion at one end, and the efficiency and durability of the bulb are increased.

In the opposite end of the vessel A is a hollow elastic plug, which consists of a hollow body portion D adapted to close the lower end of the vessel, the annular flange E at its lower extremity and the lugs F surrounding the mouth of the bore. The flange E extends laterally beyond the end of the glass vessel to such an extent that a straight line drawn from the bead C to the extremity of this flange will pass outside the surface of the glass vessel, and as the plug and its flange, like the bulb and its bead are made of rubber or other elastic material, if the instrument is permitted to fall and strikes the floor or any other level surface horizontally the impact will be received by the bead and the flange and the shock will be absorbed without subjecting the glass of the vessel to any strain or permitting it to come in contact with the said surface. If in falling it strikes on one end or the other the shock will be absorbed by the bulb or the flange as the case may be. The manner in which the bulb and flange support the glass vessel is illustrated in Fig. 4, and this support is not only effective in case the instrument is permitted to fall but in case it is subjected to a shock or blow while lying horizontally, as the bead and flange protect the glass vessel in both instances.

The lugs F support the bottom of the hydrometer bulb above the bore of the plug, through which the liquid enters and escapes, and not only prevent the bulb from stopping the outlet but permit the fluid to flow into the vessel freely and without agitating the hydrometer.

The plug D also receives a short tube G of rigid material, over the outer end of which may be forced the end of a flexible tube J through which the liquid may be drawn from a receptacle.

What I claim is:

1. The combination of a glass vessel open at both ends, a hollow bulb of elastic material connected with one end and communicating therewith, an elastic member at the opposite end thereof and extending laterally beyond the said end to a point which is in a straight line drawn therefrom to the exterior of the bulb outside the surface of the glass vessel, said elastic member having a thick tubular portion fitted into the said end of the glass vessel.

2. The combination of a glass vessel open at both ends, a hollow bulb of elastic material connected with one end and communicating therewith, an elastic member at the opposite end thereof and extending laterally beyond the said end to a point which is in a straight line drawn therefrom to the exterior of the bulb outside the surface of the glass vessel, said elastic member having a thick tubular portion fitted into the said end of the glass vessel, and a bead extending laterally from the bulb.

3. A device of the character described, comprising an open ended tube of transparent material, a hollow bulb sealed on one end thereof and communicating with the interior, a hollow plug in the opposite end, a floating member in the vessel and projections on the inner portion of the plug formed and arranged to space the floating member from said plug, said projections being spaced from each other and from the hollow portion of the plug.

4. In a device of the character described, the combination of an open ended tube of transparent material, a hollow bulb secured to one end thereof and a member made of elastic material at the opposite end thereof, said member extending laterally beyond the tube to such an extend that a straight line drawn from the extremity thereof to the outer surface of the bulb at the opposite end will pass outside the surface of the tube and having a thick tubular portion fitted into the said end of the glass vessel.

5. The combination of an open ball of rubber forming a compressible bulb, having a bead extending around its greatest diameter and projecting laterally therefrom, said bead arranged to intercept contact between said bulb and any surface tangential thereto and forming a thickened reinforcing portion, a hollow glass tube secured to the open portion of the bulb and extending beyond the same in a direction substantially at right angles to the plane of the bead, a hollow plug in the outer end of said glass tube, said plug having an annular flange thereon extending laterally beyond the tube on all sides thereof and beyond a straight line drawn outside the tube to the said flange from said bead.

6. The combination with a flexible bulb and a glass tube having one end in communication with the interior thereof, of a plug of compressible material in the opposite end of said tube having a bore extending therethrough of greater diameter at the portion within the tube than at the portion outside said tube, and a tube of rigid material fitted into the portion of the bore of greater diameter.

7. The combination with a flexible bulb and a glass tube having one end in communication with the interior thereof, of a plug of compressible material in the opposite end of said tube having a bore extending therethrough of greater diameter at the portion within the tube than at the portion outside said tube, and a tube of rigid material fitted into the portion of the bore of greater diameter, the internal diameter of said last named tube being substantially equal to the diameter of the bore of lesser diameter, whereby a continuous conduit through said plug and tube of constant diameter is formed.

8. The combination with a hollow compressible bulb and an open-ended glass tube having one end connected with and communicating with the interior of said bulb, of a plug of compressible material in the other end of said glass tube, said plug having a bore extending therethrough, and projections spaced apart and from the inner end of said bore, and a float within said tube movable into contact with said projections and held thereby out of contact with the mouth of the bore.

Witness my hand this 2nd day of May, 1919, at the city of New York, in the county and State of New York.

MAX E. MOELLER.