No. 795,833. PATENTED AUG. 1, 1905.

H. A. HOUSE.

TANKOMETER.

APPLICATION FILED SEPT. 22, 1904.

Fig. 1.

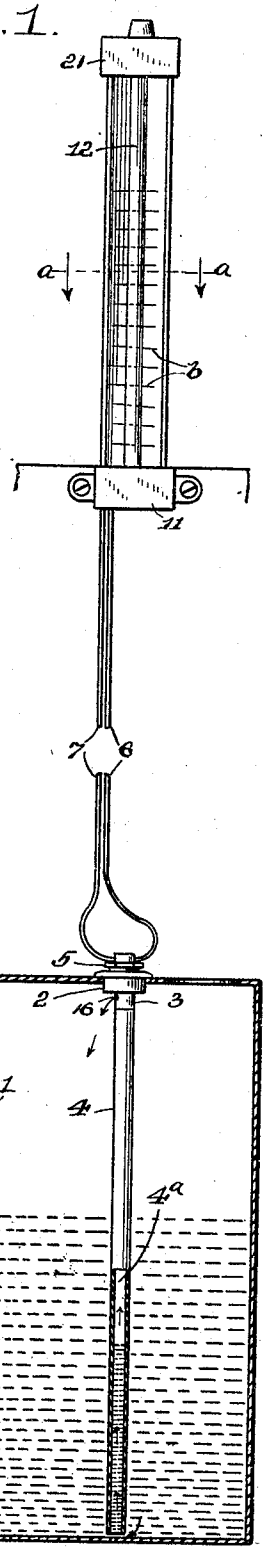
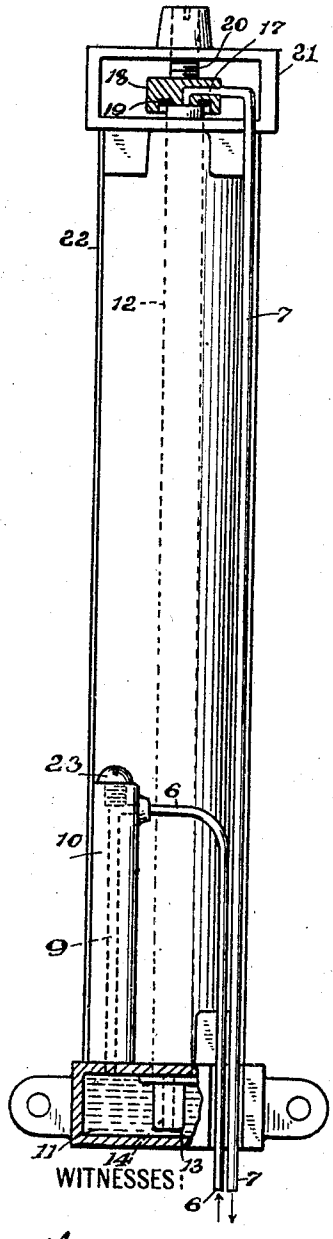


Fig. 2.



WITNESSES:

H. A. Lamb.

S. J. Chaffee.

Fig. 3.

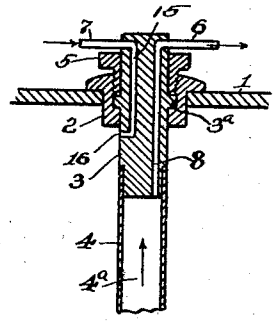


Fig. 4.

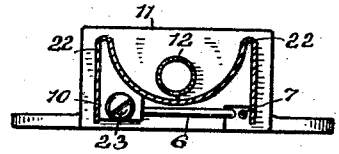


Fig. 5.

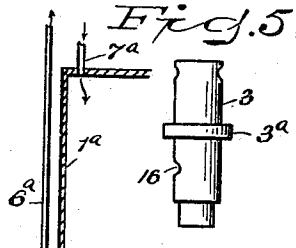
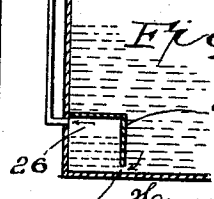


Fig. 6.



INVENTOR;

Henry A. House.

BY Geo. D. Phillips.

his ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY A. HOUSE, OF BRIDGEPORT, CONNECTICUT.

TANKOMETER.

No. 795,833. Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed September 22, 1904. Serial No. 225,471.

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Tankometers, of which the following is a specification.

My invention relates to a device for indicating the height of fluid in barrels, tanks, or other like storage vessels through the medium of air transmission from a chamber smaller than the storage-tank, wherein the fluid from the tank entering said chamber and partially filling the same will thus compress the air above the fluid in said chamber to actuate the fluid in the reservoir of the indicator and cause said fluid to pass up the glass tube of the indicator, and thus give a visible reading of the depth of the fluid in the storage-tank. The rise of the fluid in the glass tube will compress the air in the vacant space above said fluid, and the influence of this compression will be carried back or extended to the storage-tank and above the fluid therein, thereby establishing a perfectly-balanced pressure between the tank and indicator under all conditions and regardless as to where the indicator is located with respect to the fluid-storage tank.

Figure 1 represents a reduced front elevation of the indicator, reduced sectional view of the storage-tank, broken view of air-pipes connecting the two, and broken sectional view of the insertion-tube. Fig. 2 is an enlarged rear elevation of the indicator, broken view, partly in section, of its reservoir, and sectional view of the overlying cap at the top of the glass tube. Fig. 3 is an enlarged sectional view of the nipple connected directly with the tank, broken sectional view of the top of the tank, broken view of the air-pipes connected with said nipple, sectional view of the socket and clamping-nuts for securing the nipple to the tank, and broken sectional view of the insertion-tube adapted to be submerged in the liquid contained in the tank. Fig. 4 is an enlarged sectional view of the indicator through line *a* of Fig. 1. Fig. 5 is an enlarged detail view of the nipple. Fig. 6 is a reduced broken sectional view of the storage-tank, showing a modified construction of the insertion-tube feature.

Its construction and operation are as follows:

1 is the fluid-storage tank adapted for holding volatile and non-volatile liquids.

2 is a socket-nut having a flange adapted to rest upon and be secured to the top of the tank.

3 is a nipple having the flange 3^a adapted to be seated in said nut, as shown at Fig. 3. The lower portion of this nipple extends through a hole in said nut and into the tank, and to this lower portion is secured the insertion-tube 4, the lower end of which just clears the bottom of the tank, as shown at Fig. 1.

5 is a clamping-nut adapted to secure the nipple 3 within the socket-nut 2.

6 and 7 are small air-pipes connecting the nipple 3 with the indicator, presently to be more fully described. 8 is a channel in said nipple, communicating with the insertion-tube 4 and the pipe 6. The other end of this pipe communicates with the channel 9 in the column 10 of the indicator, as shown at Fig. 2. This channel 9 opens into the reservoir 11, adapted to hold alcohol, glycerin, or other like liquids for indicating in the glass tube 12 the height of liquid in the tank 1.

13 is a projection extending down from the upper wall of the reservoir to within a short distance of the bottom and is provided with the channel 14, through which the contents of the reservoir is forced up into the glass indicator-tube 12. The lower end of this tube is let into the upper wall of the reservoir and is suitably packed therein to prevent leakage.

One end of the pipe 7, which is a balance air-pipe, is connected with the upper end of the channel 15 in the nipple 3. The lower end of this channel opens into the tank through the small hole 16, located just below the socket-nut 2. The other end of pipe 7 communicates with the channel 17 in the cap 18, overlying the upper end of the indicator-tube 12. This channel communicates with the interior of said tube.

19 is a packing lying at the bottom of the recessed cap 17 to prevent leakage from the said tube.

20 is a screw extending through the head 21 and is adapted to retain the cap 18 in place.

22 is a recessed shield partially embracing the glass indicator-tube, which shield not only serves the purpose of protecting the glass tube from injury, but its recessed portion may be polished to serve as a reflector to enable the height of the recording liquid in said tube to be more easily seen. This reflector may be provided with the graduating-lines *b*, (shown at Fig. 1,) which are used to give a reading of the height of the liquid in the tank.

The channel 9, Fig. 2, is formed in the column 10 by drilling into the top of said column, and the screw 23 serves to close the opening thus made above the point where the channel communicates with the pipe 6. In shipping the indicator a longer screw (not shown) could be used to close or shut off the upper end of said channel to prevent the escape of the liquid in the reservoir.

Operation: The indicator is secured in any convenient place where it may be readily seen without regard to the position of the tank. It may be located above or below said tank and at any distance therefrom. When the open end of the tube 4 is inserted into the liquid of the tank 1, the liquid will flow up this tube, compressing and moving the air above the liquid into the pipe 6, and thus force the liquid in the reservoir 10 up into the glass indicator-tube 12. The rise of the liquid in this tube will also compress and move the air in the tube above said liquid, which air will pass out at the top of said tube into the return or balance air-pipe 7 and from thence through the hole 16 of the nipple 3 and into the air-space of the tank, thus forming a perfectly-balanced pressure in both the tank and the glass indicator-tube. By this arrangement there can be no possibility of the recording liquid in the glass tube being forced out at the top of said tube, and therefore the exact height of the liquid in the tank will be indicated by the height of the liquid in said tube. It will be understood, however, that the height of the liquid in the glass tube does not necessarily represent a corresponding height of the liquid in the tank. If it did, it would be necessary to make the glass indicator-tube of equal height with the tanks, for the size and height of this glass tube will vary proportionally with the diameter of the insertion-pipe. Therefore all that is necessary is to make the height and diameter of the glass indicating-tube to conform to the most convenient size required and then make the insertion-tube to correspond. In other words, the smaller the insertion-tube the deeper can be the liquid in the tank, and the size of the glass tube will be varied accordingly.

When gasolene or other like volatile oils are stored in barrels, tanks, or other like storage vessels, it is necessary to vent them. Otherwise the expansion of said oils by evaporation will burst the vessels in which they are stored. With my method and apparatus no such danger exists, as it is made to vent automatically through the medium of the balance-pipe 7.

The device above described is particularly adapted for automobiles using gasolene as a motive power, in which case the indicator can be located directly in front of the driver, so that the contents of the gasolene-tank can readily be noted at any time. As before mentioned, the indicator can be located in any position most convenient for observation regardless of the location of the tank.

In Fig. 6 is shown the storage-tank 1^a, with the apartment 24 partitioned off from the tank with the exception of the small opening 25 at the bottom to admit the fluid from the tank. The fluid entering the chamber 26 will not, of course, entirely fill said chamber. The air therefore above the fluid in said chamber will be compressed to move the air in the transmission-pipe 6, leading to the liquid-reservoir of the indicator in the manner as previously described for the pipe 6. In this construction the return or balance-pressure pipe 7^a will connect with the tank at any point above where the liquid is liable to rise. In Fig. 6 this pipe enters at the top of the tank. The air-space 4^a above the fluid in the insertion-tube 4, Fig. 1, I also term the "air-compression chamber" and is the full equivalent of the air-compression chamber 26. (Shown at Fig. 6.) The latter may be a permanent fixture of the tank, while the former is adapted for use in any kind of a tank or barrel and may be removably secured thereto.

It will be understood that when the device is used in connection with vessels holding non-volatile fluids it is not necessary to employ the return or balance air-pipe; but an air-compression chamber similar to 4^a and 26 is an indispensable feature in both cases. When the chamber is a fixture of the storage-tank, as shown at Fig. 6, it can as readily be located outside of said tank.

While I mention the indicating-tube as being made of glass, it will readily be understood that the term "indicating-tube" will cover any transparent material whereby the height of liquid in the storage-tank is readily seen and indicated in the tube.

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

The combination with a liquid-storage tank, of a nipple removably secured to the tank, an insertion-tube secured to the lower end of said nipple and extending into the tank, said nipple having the air-transmission channel 8 opening into said tube, and the air-return channel 15 opening into the tank, a glass indicator-tube, a shield partially embracing the same, a base containing a liquid-reservoir, said indicator-tube supported on said base and

opening into said reservoir, a column rising from said base having a channel opening into said reservoir, the air-transmission pipe connecting said channel with the channel 8 of the nipple, head 21, to support the upper end of the indicator-tube, sealing-cap 18, retaining-screw 20 therefor, said cap having the channel 17 opening into said tube, balance air-pipe 7 communicating with and connecting said channel with the air-return channel 15 of the nipple, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 12th day of September, A. D. 1904.

HENRY A. HOUSE.

Witnesses:
GEORGE W. FINN,
S. J. CHAFFEE.