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GAUGE FOR FLUIDS IN TANKS

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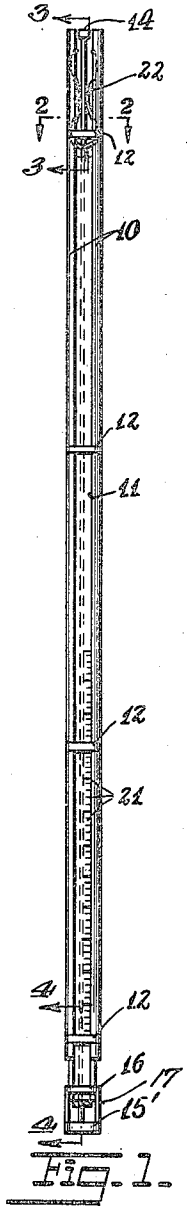


Fig. 1.

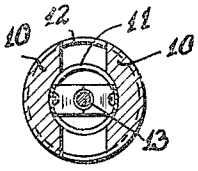


Fig. 2.

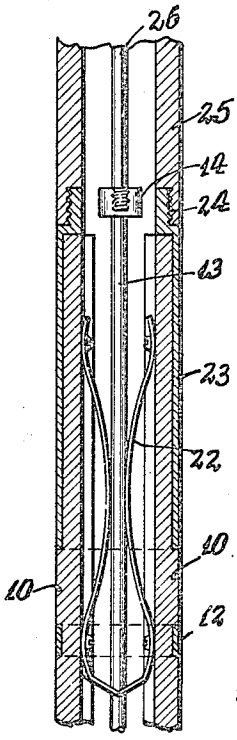


Fig. 3

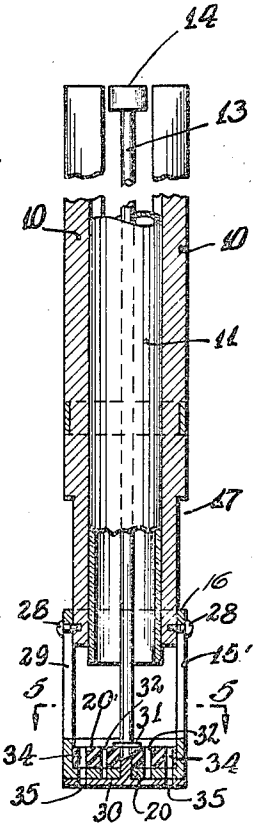


Fig. 4

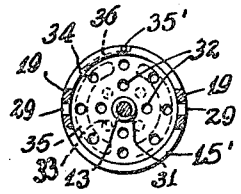


Fig. 5.

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GAUGE FOR FLUIDS IN TANKS

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9 Claims. (Cl. 73—120)

This invention relates to new and useful improvements in a gauge for fluids in tanks.

The invention has for an object the construction of an article as mentioned which is characterized by a longitudinal casing with a side opening supporting in fixed relation a transparent tube viewable through the opening and an arrangement for holding a fluid within the tube after its insertion within a fluid tank.

Still further, the invention contemplates constructing the casing from a pair of opposed longitudinal side elements joined by a plurality of rings spaced along the length of the casing.

Still further, the invention contemplates the provision of a cup-shaped valve slidably arranged upon the bottom of the casing and connecting with an operating rod extending through the transparent tube to the upper end of the casing.

As another object of this invention, an arrangement is contemplated whereby additional casing material and additional rod material is adapted for connection respectively with the casing and rod of the device so as to extend its length to adapt it for tanks of different heights.

Another one of the objects of this invention is an arrangement in conjunction with the cup-shaped valve for preventing excessive disturbance of the fluid when the gauge is inserted therein.

In particular, the objects mentioned in the previous paragraph, to be accomplished by the provision of a disc valve operating in conjunction with the cup-shaped valve and operated by rotation of said rod.

A still further object of this invention is the construction of an article as mentioned which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawing, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawing forming a material part of this disclosure:—

Fig. 1 is a side elevational view of a device of a type to which this invention relates.

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary enlarged sectional view of the upper portion of Fig. 1, taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary enlarged sectional view of the lower portion of Fig. 1, taken on the line 4—4 of Fig. 1.

Fig. 5 is a horizontal sectional view taken on the line 5—5 of Fig. 4.

The gauge for fluids in tanks to which this invention is to apply, comprises a longitudinal casing consisting of a pair of opposed side elements 10 clamped upon a transparent tube 11 by the provision of a plurality of holding rings 12 arranged along the length of the side elements 10.

Preferably the side elements 10 should be constructed of some cheap material such as wood and the rings 12 disposed within peripheral grooves in the sides so as to form a neat construction, in which each of the longitudinal sides 10 is positively held against longitudinal motion.

The arrangement of the longitudinal casing is such that it is substantially formed with side longitudinal openings, that is, the space between the adjacent sides of the members 10 through which the transparent tube 11 may be clearly viewable. The tube 11 is arranged longitudinally within the casing and held in a relatively fixed position by the clamping action of the sides of the casing. A rod 13 is extended through the transparent tube 11 and at the upper end is provided with a head 14 by which it may be conveniently moved.

A cup-shaped valve 15' is mounted upon the lower end of the rod 13. This cup-shaped valve is formed with an upper ring portion 16 which slidably engages upon a reduced end 17 formed on the longitudinal casing. The graduated scale 21 is inscribed or in any other manner formed upon the transparent tube 11 so as to give the heights of contained liquid.

A means is provided for holding the cup-shaped valve in the opened or in the closed position. This means comprises a spring 22 attached upon the longitudinal casing within the hollow thereof and frictionally engaging against the sides of the rod 13. The arrangement is such that the cup-shaped valve may be moved to an opened or closed position and this position maintained by the action of the spring.

In Fig. 3, a further application of the device has been disclosed in which provision is made for adding additional sections upon the device so that it is operative for tanks of greater height.

More particularly, a collar 23 is fastened upon the upper end of the longitudinal casing and is formed with a threaded portion 24 adapted to be engaged by a tubular member 25 which necessarily extends the operative length of the casing. Similarly, an auxiliary rod 26 engages within the

threaded opening formed in the head 14 for extending the operative length of the rod 13. With the extended unit, its operation is similar to the operation described. First, the rods 26 and 13 must be adjusted so as to open the cup-shaped valve in the bottom of the device and thereafter, the casing moved downwards so as to close the bottom end of the tube against the seat of the valve.

Provision is made so as to reduce to a minimum agitation of the fluid within the tank when the device is inserted according to this invention. More particularly, a plurality of openings are formed in the bottom of the cup-shaped valve and an additional valve provided for closing these openings when desired. In detail, a cup-shaped valve 15' is shown slidably mounted upon the bottom of the casing 10. Screws 28 engage into the casing and through elongated slots 29 in the sides of the cup-shaped valve so as to limit motion along the longitudinal and prohibit turning of said cup-shaped valve.

A rod 13 extends through the transparent tube of the device and is rotatively mounted upon the bottom of the cup-shaped valve. A disc shaped valve 30 is fixed upon the extremity of the rod 13. A collar 31 is fixed upon the rod 13 immediately above the seat of the cup-shaped valve so as to hold the rod rotative relative to the cup-shaped valve. The cup-shaped valve 15' is provided with a seat washer 20'. A plurality of openings 32 are extended through the seat 20 in the bottom of the valve 15'. The disc valve 30 is formed with similar openings 33 adapted to register with the openings 32 in one position. This action provides for the opening and closing of the disc-shaped valve.

The openings 32 are arranged within an area bounded by the periphery of the transparent tube 11, when the tube is in contact with the valve of the seat. Other openings 34 outside of the periphery of the tube 11 are also provided which extend through the seat washer 20 and the bottom of the cup-shaped valve 15'. These openings 34 register with elongated openings 35 formed in the disc valve 30 so that in all positions of rotation of the disc valve passage through the openings is unrestricted. A peg 35' projects from the bottom of the cup-shaped valve 15' and extends into an accurate peripheral recess 36 formed in the disc shaped valve 30 so as to limit rotation thereof through approximately 90°, more particularly from a position in which the openings 32, 33 are in alignment to a position in which they are out of alignment. The angular motion of the disc-shaped valve 30 depends upon the distance between the openings 32.

The operation of the device will be readily understood from the description, but it is pointed out that first the rod 13 should be adjusted so that the disc valve 30 is opened in addition to the cup-shaped valve 15' being opened. Then the device is inserted down into the fluid of the tank. As the device moves downward, the fluid may pass out through the openings 33, 32, 34 and 35 and so insure a good sample for the gauge. After the cup-shaped valve 15' strikes the bottom of the tank, the longitudinal casing should be moved downwards so as to close the cup-shaped valve and entrap the sample. Then the rod 13 should be turned by turning the head piece 14 so as to close the disc valve 30. The gauge may then be removed and the sample inspected.

While we have shown and described the preferred embodiment of our invention, it is to be understood that we do not limit ourselves to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:—

1. A gauge for fluids in tanks, comprising a longitudinal casing with a side longitudinal opening, a transparent tube longitudinally fixed within said casing and viewable through said opening, a rod extending through said tube and having a head at the top disposed at the top end of said casing, a valve fixed upon the bottom end of said rod and adapted to close the bottom end of said transparent tube, said valve being of cup-shape and slidably mounted on the bottom end of said casing and having passages for fluid through its bottom, and another valve for closing said passages.

2. A gauge for fluids in tanks, comprising a longitudinal casing with a side longitudinal opening, a transparent tube longitudinally fixed within said casing and viewable through said opening, a cup shaped valve slidably mounted on the lower end of said casing and having side openings and bottom openings, a disc valve on the bottom of said cup-shaped valve, a rod fixed upon said disc valve and rotatively mounted on said cup-shaped valve and extending through said transparent tube, said disc valve being adapted to close said bottom openings.

3. A gauge for fluids in tanks, comprising a longitudinal casing with a side longitudinal opening, a transparent tube longitudinally fixed within said casing and viewable through said opening, a cup shaped valve slidably mounted on the lower end of said casing and having side openings and bottom openings, a disc valve on the bottom of said cup-shaped valve, a rod fixed upon said disc valve and rotatively mounted on said cup-shaped valve and extending through said transparent tube, said disc valve being adapted to close said bottom openings, said bottom openings being within the area of said transparent tube for the passage of fluid into the transparent tube through said cup shaped valve as the gauge is lowered into a fluid tank.

4. A gauge for fluids in tanks, comprising a longitudinal casing with a side longitudinal opening, a transparent tube longitudinally fixed within said casing, and viewable through said opening, a cup-shaped valve slidably mounted on the lower end of said casing and having side openings and bottom openings, a disc valve on the bottom of said cup-shaped valve, a rod fixed upon said disc valve and rotatively mounted on said cup-shaped valve and extending through said transparent tube, said disc valve being adapted to close said bottom openings, said bottom openings being within the area of said transparent tube for the passage of fluid into the transparent tube through said cup valve as the gauge is lowered into a fluid tank, and other bottom openings outside of the area of said transparent tube, said disc valve being provided with openings so that said other openings are unrestricted in either position of the disc shaped valve for the passage of fluid through the cup valve but outside of said transparent tube as the gauge is raised or lowered into a fluid tank.

5. A gauge for fluids in tanks, comprising a longitudinal casing with a side longitudinal open-

ing, a transparent tube longitudinally fixed within said casing and viewable through said opening, a rod extending through said tube and having a head at the top disposed at the top end of said casing, a valve fixed upon the bottom end of said rod and adapted to close the bottom end of said transparent tube, and means for holding said rod in a position in which said valve is opened or in a position in which said valve is closed, comprising a spring attached upon said longitudinal casing and frictionally engaging against said rod.

6. A gauge for fluids in tanks, comprising a longitudinal casing with a side longitudinal opening, a transparent tube longitudinally fixed within said casing and viewable through said opening, a cup-shaped valve slidably mounted on the lower end of said casing and having side openings and bottom openings, a disc valve on the bottom of said cup-shaped valve, a rod fixed upon said disc valve and rotatively mounted on said cup-shaped valve and extending through said transparent tube, said disc valve being adapted to close said bottom openings, and means for limiting operation of said disc valve.

7. A gauge for fluids in a tank, comprising an open bottom casing having an open side, a transparent member closing said open side and provided with depth graduations, a valve projecting below the casing and adapted to contact with the bottom of the tank, guide means between the valve and lower end of the casing and in direct interengagement for guiding the valve for movement longitudinally of the casing into its position intercepting fluid flow into the open bottom of the casing as the casing is lowered onto the valve when engaging the bottom of the tank, a rod extending axially through the casing to actuate the valve and its upper end accessible at the top of the gauge for manually moving the valve to and from its closing position and means within the casing and engaging the rod adjacent its midlength for centering and guiding the same and thus assisting in guiding the valve at a point remote therefrom.

8. A gauge for fluids comprising a casing having an open side, a transparent closure for said open side, a disc-like member including a flexible gasket for engaging the lower edge of the transparent closure and for closing the bottom end of the gauge, telescopic means between the disc-like member and the lower end of the casing for guiding said member to and from its closing position, a rod secured to said disc-like member for manually moving the same to and from its closing position and frictional means engaging the rod and tending to secure it and the disc-like member in whatever position these may be set by the manual shifting of the rod.

9. A gauge for fluids including an open bottom container, provided with means at the open bottom forming a valve seat, valvular means guided on said container for movement longitudinally of the container to and from its closing position engaging said seat, said means including a seat washer provided with openings extending therethrough, a disc valve rotatably mounted in said valvular means and provided with an opening for registering with one of the openings in the seat washer and a rod extending through the container, secured to the disc valve to rotate the same and thus move the openings to and from mutual registration and said rod also secured to the valvular means to shift the same relative to its seat.

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