No. 794,678. PATENTED JULY 11, 1905.

M. MARTIN.

FLUID GAGE.

APPLICATION FILED AUG. 19, 1904.

Fig. 1.

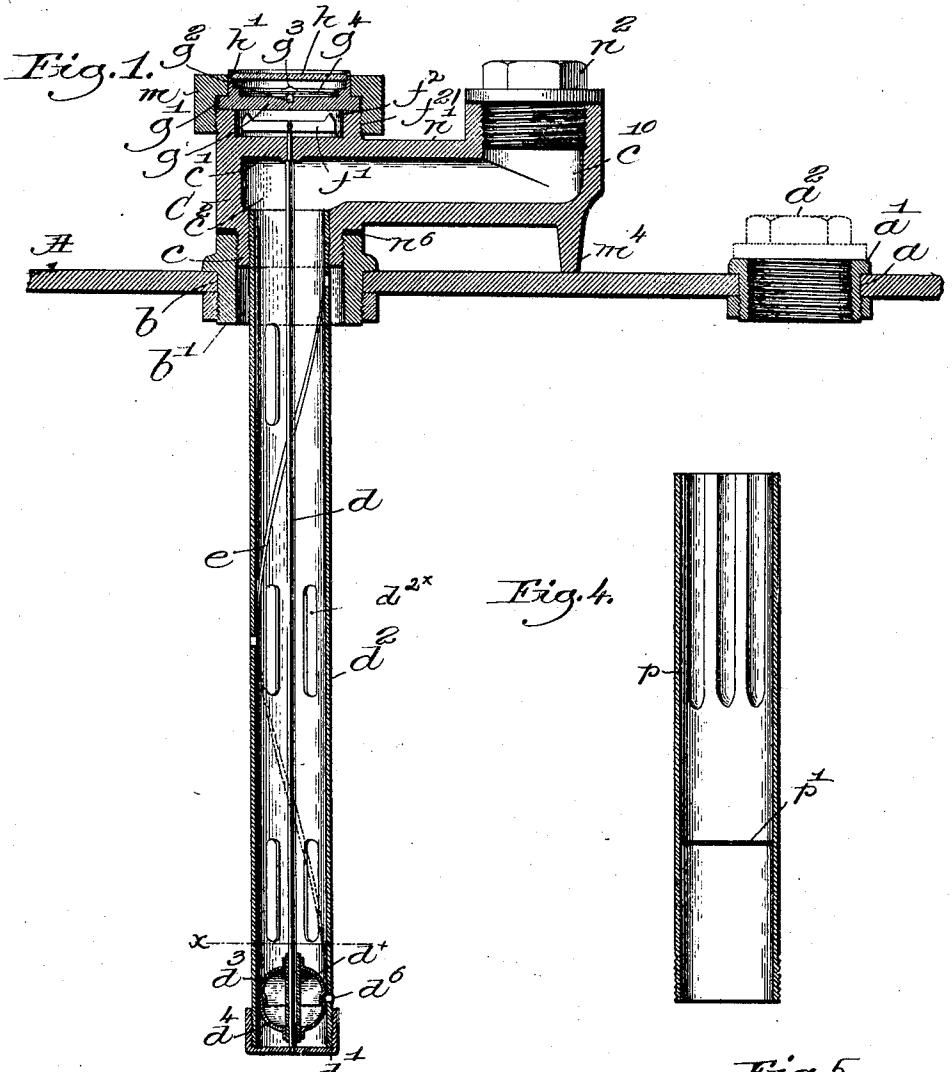


Fig. 4.

Fig. 2.

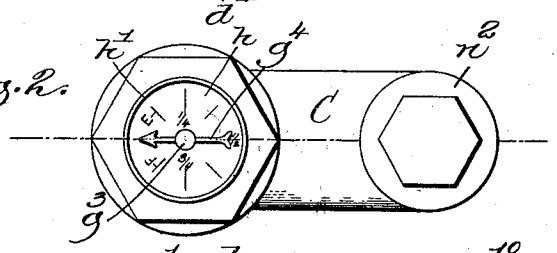


Fig. 5.

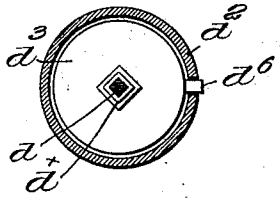
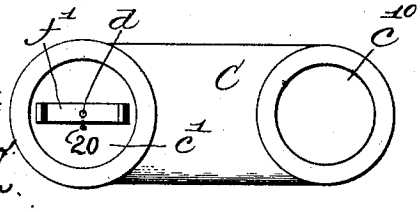


Fig. 3.



Witnesses:
Fred. S. Grumbo.
Warren B. Owen.

Inventor.
Morris Martin,
by Crosby Gregory,
Attys.

No. 794,678. Patented July 11, 1905.

UNITED STATES PATENT OFFICE.

MORRIS MARTIN, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO GEORGE W. GREGORY, TRUSTEE, OF BOSTON, MASSACHUSETTS.

FLUID-GAGE.

SPECIFICATION forming part of Letters Patent No. 794,678, dated July 11, 1905.

Application filed August 19, 1904. Serial No. 221,356.

To all whom it may concern:

Be it known that I, MORRIS MARTIN, a citizen of the United States, residing at Malden, in the county of Middlesex, State of Massachusetts, have invented an Improvement in Fluid-Gages, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a gage controlled by a float adapted to be applied to a tank, boiler, or vessel to hold gasolene, oil, water, or any fluid.

In new construction the tank holding the fluid, the depth or amount of which is to be measured, will have a filling-inlet provided with a removable closure and a gage-inlet through which the float on a shaft sustained in a head which when applied to the tank becomes a fixed or permanent part thereof and does not need to be removed for the purposes of refilling the tank as necessity requires.

When a gage embodying my invention is to be applied to a tank already made and in use—say in an automobile—said tank having but one filling-opening, I remove the cap constituting the removable closure for the filling-opening or fluid-inlet, and in this opening instead of said closure I screw the foot of a hollow head which when once applied to the bushing in the tank remains as a fixed part of the tank, and to fill the tank I detach temporarily from the head a removable closure. The head has depending from it a guide which is maintained in the tank, and the head sustains a shaft carrying an adjustable magnet which in the chosen form shown is of novel construction, the shaft being turned more or less by a float that rises and falls as the depth of the fluid in the tank varies.

The float shown is of peculiar construction, it comprising a thin hollow shell to leave an air-space of such size that the float may readily follow and rest on the surface of the liquid as its depth varies, the float containing air and being so made as to prevent liquid from entering the same.

Above the head and its fixed face, in which the rock-shaft referred to is journaled, and in a position where it may be easily inspected is a magnetic needle, said needle being sustained on a pivot erected in a compartment similar to a compass-box, into which it is impossible for any fumes, as of gasolene, to enter. I rest this compartment or box containing the magnetic needle on said head, turning the box in a horizontal plane on said head so that the scale-marks of the box over which the magnetic needle travels may be located in one or another position to accommodate the user who may wish to read the scale from one or the other side of the tank, and to provide for placing the box in any desired position I have made provision for adjusting the permanent magnet axially on the rock-shaft controlled by the float, so that the force of the magnet exerted through the compass-box on the magnetic needle turns the latter in unison with the magnet. The magnet shown concentrates its lines of force at its upturned edges directly on the extremities of the magnetic needle, and consequently the needle is more positively controlled than were the magnet made as a straight bar.

Figure 1 shows part of a tank with one of my novel gages in position thereon, the head and most of the gage being shown in section; Fig. 2, a top view of the gage alone; Fig. 3, a top view of the head with the compass-box and filling-closure removed. Fig. 4 shows the filling-tube detached; and Fig. 5 is a section below in the line x, the parts being enlarged.

Referring to the drawings, A represents part of a tank, boiler, or vessel that is to hold gasolene, oil, or any fluid and in the use of which it is desirable to know the amount of liquid therein. The tank may be placed on an automobile or in any position where the fluid is to be used to do work. In new construction, as stated, the tank will have an inlet-orifice a, (shown by dotted lines,) in which will be secured a threaded bushing a', that will be provided with a removable closure a^2 and also a gage-receiving opening b, in which will be secured a threaded bushing b'. I have herein chosen to illustrate by full lines my invention as applied to a tank of, say, an automobile

having but one opening in its shell—say the opening b—and having removed the usual closure from said opening I screw thereon the threaded leg c at the lower side of the hollow head C, said head having a fixed or permanent face or diaphragm c' covering the hollow space c^2 in line with the open lower end of said leg. The face or diaphragm c' is integral with the head and serves to journal the upper part of a rock-shaft d, the lower end of which is represented as sustained by a step d', shown as applied to the lower end of a tube d^2, depending from the head and entering said tank, said shaft serving as a guide for a float comprising a short tube $d^\times$ and a shell composed of two parts d^3 d^4, said tube and shell being of very thin impervious material—such, for instance, as celluloid or metal—and so connected as to trap any air between the walls of the shell and the tube and prevent the entrance of liquid into the hollow interior of the float. The tube d^2 is provided with a series of openings $d^{2\times}$ to thereby enable the gasolene or other fluid in the tank to readily enter the tube.

The shaft d, as shown in cross-section, preferably has one or more flat faces, (see Fig. 5,) and the tube $d^\times$ is so shaped as to coact with said shaft as the depth of the liquid in the tank varies, the float in its movement turning the shaft more or less by reason of an arm d^6, extended from the float that engages a spiral guide e, shown as a slot in the tube d^2, said slot starting from near one end of said tube and being extended substantially once about the tube as the slot approaches the other end of the tube. This invention is not, however, limited in all instances to the particular float-guiding means so long as the float turns the shaft on its axis once during each complete rise or fall of the float.

The top of the head is shown as recessed at f for the reception of the magnet, and the bottom wall of this chamber constitutes the fixed or permanent face c', and the journal at the upper end of the shaft d is passed upwardly through a hole in the face and has adjustably secured thereto by a set-screw 20 (see Fig. 3) the permanent magnet f', said magnet, as shown, being capable of being turned in said recess and also being adjustable axially on said shaft to thereby enable the magnet to be adjusted exactly to the position of the scale-marks on the dial over which the magnetic needle is to be turned by the magnet. The outer portion of the head C is shown as threaded at f^{21}. Above the face c' I set the bottom of a compartment or compass-box g, having, preferably, a flange g', said bottom having an upwardly-extended pivot g^2, on which is mounted the hub g^3 of a magnetic needle g^4. With a compass-box and head of brass it will be understood that the magnetic needle will be turned in unison with the magnet through the force of the magnet exerted on said needle through the non-magnetic box, and at the same time any fumes of gasolene that might possibly escape through the face at the upper side of the head cannot enter the space in which the magnetic needle is moved by the magnet.

The compass-box inside under the magnetic needle may be marked or have a scale, as "F" and "E," to indicate full or empty and other marks, as "¾," "½," and "¼" full, to indicate quantities of fluid in the tank less than full. The box will have a glass cover h, that may be retained in position by a ring h'.

The head shown presents two chambers c^2 and c^{10}, connected by a passage-way made in a neck n'. The metal at the upper end of the chamber c^{10} is threaded for the reception of a closure or plug n^2, that will be removed when the tank is to be filled, it being understood that when the head C has once been fixed to the tank that the head and connected gage, rock-shaft, and magnet do not need to be removed for filling the tank. When the tube and rock-shaft are properly mounted in the head and the float occupies a position at the lower end of the tube, the magnet is secured to the upper end of the rock-shaft, and then the compass-box is set on the head above the face c', with the letter "E" or the letter "F" over one of the poles of the magnet, and the compass-box is then clamped in position on the head. Thereafter as the rock-shaft is rotated the magnetic needle will be rotated in unison with the magnet and this same relation will be maintained.

Usually when the gage is applied to a tank the tank will be empty and the tube will be inserted in the tank and the head turned, so that its threaded leg will enter the bushing b'. Where the tank is oval or curved at its top, the longest part of the head should point in the direction of the longest part of the curved part of the tank, and that this position of the head may be secured I employ a washer n^6, usually of lead, which is laid on the upper end of the bushing b'. Washers of any desired thickness may be used to insure the exact position of the head and the making of a tight joint. In some carriages it would be more convenient to read the dial from the left-hand side and on others from the right-side of the carriage. To provide for this, the ring-nut m will be removed from the compass-box, and the permanent magnet will be removed from its journal by releasing the screw, and then to change the reading position of the compass-box dial—say from the right to the left side of the carriage—I replace the permanent magnet on its journal, with the north pole, marked "N," pointing to the left-hand side of the carriage, and fasten it firmly by the screw. The compass-needle is also so charged that its indicating end is the north pole of the needle, and consequently it will be understood when the compass-box containing the needle is placed in position over the permanent magnet that the north pole of the compass-needle will be re-

pelled by the north pole of the permanent magnet, thus turning the indicating end of the compass-needle to the right-hand side of the carriage. I then revolve the compass-box until the letter "E" on the dial is under the indicating end of the needle, after which the ring-nut will be applied to clamp the compass-box in its adjusted position. Now when standing at the left-hand side of the carriage and facing the same the letters "E F" and the rest of the scale on the dial of the compass-box will be read from the left-hand side of the carriage.

By applying permanently to the tank a gage comprising a head having a tube, a magnet, and a float all liability of injury to said gage is done away with, injury being liable to occur when the rock-shaft, tube, and magnet are disconnected from the tank for filling the same. In my invention the tank may be filled by removing the closure w^2.

To prevent loss of gasolene when filling and also to materially aid the operator, I have provided a filling-tube p, threaded at its lower end to engage the screw-threads employed to hold the removable closure n^2 in place, so that when said closure is taken out the tube may be readily inserted. The upper end of this tube is corrugated that any air in the tank may readily escape without throwing out the oil, which is liable to get over the woodwork of an automobile, damaging the same, and, further, the tube is provided with a strainer p' to prevent any chips, dirt, or refuse matter entering the tank.

When the head is once seated properly in the position it is desired that the head occupy, I may solder the same in place by applying solder to the junction of the foot m^4 of the head with the exterior of the tank.

Further, by filling the tank through an orifice from which has been withdrawn the removable closure, leaving the float and other parts in the tank, enables the person filling the tank by watching the gage to see when the tank is full, or substantially so, which prevents at times running the gasolene over. The magnet f' herein shown is composed of a steel bar having rising from its upper side at its end V-shaped toes f^2, the length of said toes extending, preferably, transversely the length of the bar. These toes enable the magnet to more thoroughly and readily control the magnetic needle than though the magnet were a plain bar without the V-shaped toes, for the reason that the magnetic lines of force leave the sharp edges of the toes and focus at the ends of the magnetic needle, thereby enabling the magnetic force to have, as it were, a greater influence in turning the magnetic needle.

This application shows one form of my application, and another form is shown in my companion application Serial No. 233,329, filed November 18, 1904. The broad and generic claims covering both forms have been placed in this latter application.

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

1. In a gage of the class described, a head, a vertical shaft adapted to be turned in said head and having an attached permanent magnet, a separate compass-box having a magnetic needle and sustained at the top of said head, a tube having a spiral guide and depending from said head, and a float located within said tube and guided thereby, said float in its rising-and-falling movement turning said shaft and magnet.

2. In a gage of the class described, a head, a vertical shaft adapted to be turned in said head and having a permanent magnet, a separate compass-box having a magnetic needle adapted to be sustained by said head and to be rotated thereabove, and means to confine the compass-box in its position on said head.

3. In a gage of the class described, a head having a fixed face, a vertical shaft journaled in said face and having a permanent magnet, a compass-box having a flange and sustaining a magnetic needle, and means to clamp the compass-box in position on said face.

4. In a gage of the class described, a head, a depending spirally-slotted tube having a step, a vertical shaft inside said tube and journaled in said step and also in said head and having a permanent magnet connected therewith, a float in engagement with said shaft and having a pin entering the slot of the tube and turning said shaft as the float rises and falls, a compass-box sustained loosely at the outer side of said head and having a magnetic needle, and means to clamp said compass-box in its adjusted position on said head.

5. In a gage, a hollow head adapted to be connected with a tank, a guiding-tube depending from said head, a vertical shaft inside said tube and journaled at its upper end in said head and provided at its upper end with a magnet, a hollow impervious float located in said tube and loose with relation to said shaft, means for rotating said float as it rises and falls in said tube said float comprising a tube and a thin hollow shell connected therewith to prevent liquid entering the space between the shell and its tube, and having a pin to engage the tube to rotate said shaft.

6. In a gage, a tank, a head having a hollow space and a fixed face and adapted to be attached permanently to said tank, said face being arranged opposite the space in said head that leads into said tank, a separate removable closure to enable the tank to be filled without removing said head, a rock-shaft journaled at one end in said fixed face and provided with a magnet, a hollow float sealed against the entrance of fluid thereinto, a pivot erected vertically above said face, a magnetic needle mounted on said pivot, and means to

insure the partial rotation of said shaft as the float rises and falls due to variation in quantity of liquid in said tank.

7. A tank having a hole for the reception of a gage comprising a head provided with a permanent face and a tube depending from said head opposite said face, said head having a screw-thread by which to fix said head to said tank, a rock-shaft within said tube and journaled at one end in said head, a permanent magnet attached to said rock-shaft, a hollow float sealed against the entrance of fluid into the hollow part thereof and coacting with said rock-shaft and tube in a manner to turn said shaft and magnet, combined with an independent closure removable for filling the tank, and a magnetic needle pivoted outside said face and rotated by said magnet.

8. In a gage of the class described, a head having a closure and a connected slotted tube, means to sustain the same on a tank with the tube in the tank, a shaft rotatably supported within the tube and having a permanent magnet adjustably attached thereto, a hollow float inside said tube, said float having a pin to enter the slot of the tube, said float, shaft and tube coacting in a manner substantially as described whereby as the float rises and falls due to change of fluid in the tank, the shaft and its magnet are turned, and the magnetic needle sustained above said head and rotated in unison with said magnet.

9. A tank having a curb connected therewith gas and fluid tight, combined with a gage comprising a head, a pivoted magnetic needle, a spirally-slotted tube depending from said head, said tube being of smaller diameter than the opening in the curb that the tube may be readily inserted in the tank when the gage is to be put in working position, a shaft inside said slotted tube and journaled to said head, a permanent magnet attached to the upper end of said shaft, and a hollow metallic float wholly within said tube and provided with a pin extended into said slot, said float as it rises and falls under the action of the fluid in the tank turning said shaft and its magnet, the latter turning in unison with it said magnetic needle.

10. In a gage of the class described, a head having two openings connected by a passage-way, a removable closure for one of said openings, fluid-indicating means connected with the other opening of said head, and comprising a tube, a rock-shaft thereon provided with a magnet, and a float inside said tube, combined with a magnetic needle exposed at the other side of said head and rotated by said magnet.

11. In a fluid-gage, a head adapted to be engaged with a bushing sustained by a tank, said head having a passage-way, the open end of which is normally stopped by a removable closure, a tube in communication with the passage in said head, a permanent magnet and a float inside said tube and connected with said magnet in a manner to rotate the same and cause said magnet to revolve, and a magnetic pointer physically unconnected with said magnet and pivotally sustained above said magnet whereby, as said magnet is rotated by said float, the pointer is caused to take positions corresponding therewith and thereby indicate variations in the level of the fluid in the tank.

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

MORRIS MARTIN.

Witnesses:
GEO. W. GREGORY,
MARGARET A. DUNN.