PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in Liquid Level Indicators.

I, GEORGE CONSTANTINESCO, of Carmen Sylva, Beechwood Avenue, Oatlands Park, Weybridge, in the County of Surrey, a subject of the King of Great Britain and Ireland, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to devices for indicating the level of liquids in tanks, and is especially applicable to devices for indicating in a suitable position the level of fuel in the fuel tanks of motor cars or aeroplanes.

The invention is also applicable to other purposes where it is desired to indicate at a moderate distance the level of a liquid in a tank.

The indicating device to which the invention relates is of the type in which air pressure obtained by pumping air until it escapes through a pipe against the liquid pressure near the bottom of the tank is caused to actuate an air pressure indicator.

In the Specification No. 185,840 such a device is described comprising a gauge tube combined with a casing forming an air chamber and arranged so that the column of liquid in the gauge is held up by the air pressure in the chamber, which is in communication with a tank or with a vessel in which the liquid stands at the same level by way of a pipe opening near or below the general level of the bottom of the tank, the air pressure required to force the air from the chamber to the bottom of the pipe in the tank being obtained by pressing a flexible diaphragm with its edges held between the two parts of the casing and which forms part of the wall of the air chamber.

In the apparatus described in the said specification pressure is applied to the liquid in the gauge by means of a press button acting on the flexible diaphragm. When the button is pressed against a stop, air is expelled from the gauge chamber through a pipe opening at or near the level of the bottom of the tank and bubbles up through the liquid in the tank. When the flow of air has ceased the static pressure on the liquid in the gauge is equal to the pressure at the point at which the pipe opens into the tank, with the result that so long as the button is kept pressed in the height of the liquid column in the gauge is a measure of the depth of liquid in the tank. On release of the button the flexible diaphragm immediately returns to its original position so that the level of the liquid in the gauge falls and the indication of the liquid level on the gauge persists only so long as the button is kept pressed inwards.

The object of the present invention is to modify the construction of the gauge in such a manner that the liquid level in the gauge does not fall on release of the button so that the gauge gives a permanent indication of the level of the liquid in the tank after the button has been pressed.

The invention consists in providing an additional rubber diaphragm with a cut therein; operating as a non-return valve preventing the escape of air from that portion of the gauge chamber in communication with the gauge tube when the button is released, the two diaphragms thus forming a simple air pump held between the two parts of the casing.

The invention also consists in a liquid level indicator of the type described combined with an air pump consisting of two rubber diaphragms convex in opposite directions with their edges gripped between the parts of the casing of the instrument, one diaphragm having an aperture registering with an aperture in the press button and forming the inlet valve and the other having a clean cut and operating as a non-return valve.

Referring to the accompanying drawings:—

Figure 1 shows the general arrangement of the apparatus as applied to a

[*Price* 1/-]

device for indicating the level of petrol in the tank of an aeroplane or motor car;

Figure 2 is a sectional elevation of a gauge constructed in accordance with the invention;

In the form of the invention illustrated the gauge chamber *a* and gauge *b* are constructed exactly as described in the Specification No. 185,840 above referred to, and the passage *c* leading from the gauge chamber may be connected to a pipe passing through the top of the tank and opening near the bottom as described in the said specification, or it may be connected to a fitting *o* at the bottom of the tank of the type described in the Patent Specification No. 22,734 of even date herewith.

In the gauge chamber *a* there is provided a rubber diaphragm *e* having a clean straight cut in its centre, the diaphragm being placed with its convex side towards its connection to the tank, immediately at the rear of the diaphragm *e* there is provided a metal diaphragm *f* conforming in shape with diaphragm *e* when unstretched and supporting this diaphragm against excessive back pressure; a performation *g* is made in the centre of the diaphragm *f* registering with the cut in the rubber diaphragm *c*.

Immediately behind the diaphragm *f* there is provided a second rubber diaphragm *h* which has a perforation *k* in its centre convex in the opposite direction to the first and immediately behind this second diaphragm there is provided a circumferential brass or other washer *l* against which the cap *m* is screwed holding the diaphragms firmly against a shoulder in the casing of the gauge chamber.

The push button *n* is perforated, the aperture registering with the aperture *k* in the diaphragm *h* so that when the finger is removed from the end of the press button there is a free passage for air to escape from the space between the two flexible diaphragms *e* and *h*.

The operation of the above described apparatus is as follows:—

On pressing the push button *n* the finger closes the aperture and the button also closes the aperture *k* in the flexible diaphragm *h* so that the inward movement of the button and diaphragm *h* forces air through the cut in the rubber diaphragm *e* which is in communication with the gauge tube. The pressure in the chamber *a* is accordingly increased and the pressure is also communicated to a pipe or socket which opens near the bottom of the tank in which it is desired to know the liquid level.

The pressure on the button accordingly forces air through the diaphragm *e* and into the pipe leading to the pocket at or near the level of the bottom of the tank, and the pressure on the button, repeated several times if necessary, will force air from the chamber in the gauge down to the level of the opening by which air can escape through the liquid in the tank.

When this is the case the level of the liquid in the gauge will remain constant after the button has been pressed, and the gauge will then register the exact level of the liquid in the tank, a suitable scale being provided on the gauge tube for the purpose of indicating the liquid level.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A liquid level indicator of the type described having an additional rubber diaphragm with a cut therein, operating as a non-return valve preventing the escape of air from that portion of the gauge chamber which is in communication with the gauge tube when the button is released, the two diaphragms thus forming a simple air pump held between the two parts of the casing of the gauge chamber, substantially as described.

2. A liquid level indicator of the type described combined with an air pump consisting of two rubber diaphragms convex in opposite directions with their edges gripped between the parts of the casing of the instrument, one diaphragm having an aperture registering with an aperture in the press button and forming an inlet valve, while the other has a clean cut and operates as a non-return valve, substantially as described.

3. In a liquid level indicator as claimed in Claims 1 and 2 a metal or other rigid support placed immediately behind the valve diaphragm, substantially as described.

4. The improved liquid level indicator hereinbefore described and illustrated in the accompanying drawings.

Dated this 27th day of August, 1921.

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Fig. 1.

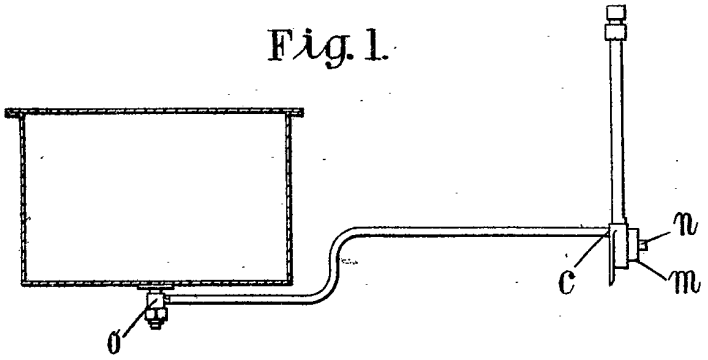
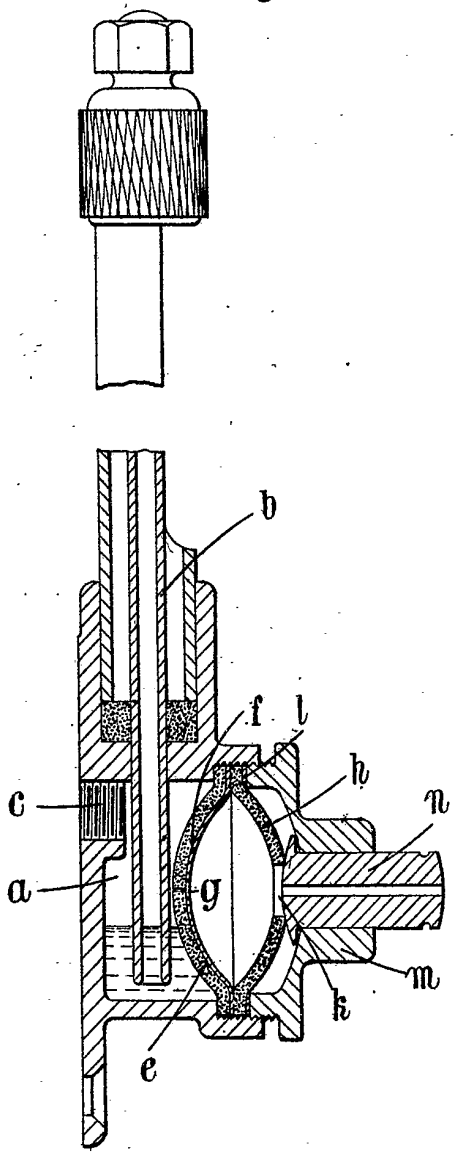


Fig. 2.



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