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J. D. PIRTLE

FLUID STAGE ACTUATED CIRCUIT CLOSER

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2 Sheets-Sheet 1

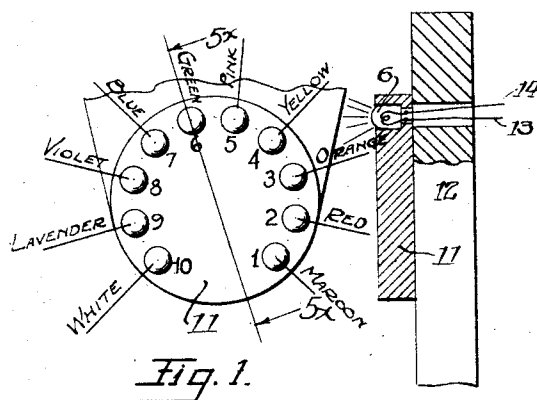
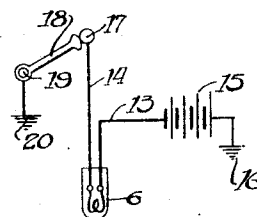


Fig. 2.



INVENTOR,

Joe Davis Pirtle,

BY

Wilkinson & Haskins
ATTORNEYS.

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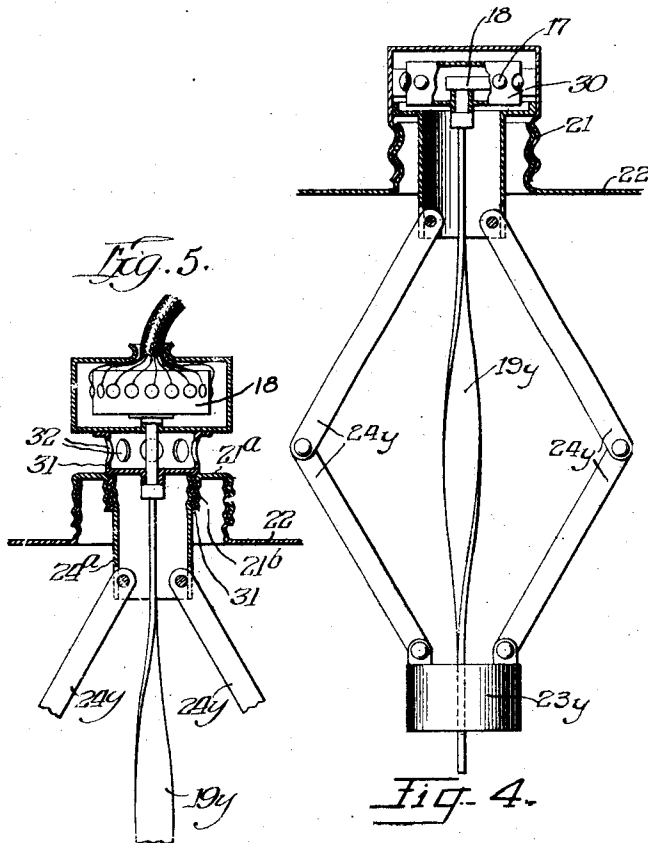
J. D. PIRTLE

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2 Sheets-Sheet 2



INVENTOR,
Joe Davis Pirtle
BY
Wilkinson, Husley, Ryan, & Knight
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOE DAVIS FIRTLE, OF CHICAGO, ILLINOIS.

FLUID-STAGE-ACTUATED CIRCUIT CLOSER.

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This invention relates to an indicator to be applied to a tank or container of fluid, preferably embodied in form for indicating at a distant point the stage or surface level of the fluid, and has for its object to provide means whereby the several stages to be indicated will be impressed upon the attention of the observer by an independent signal unit for each stage, the signal units being distinguishable either by position or by contrasting appearance of the several units, or by means of both of said characteristics, so that when any individual signal unit is affected the observer will at once realize by its position or contrasting appearance the relation of the surface level stage to extreme high and low stages in the capacity of the container, and thus be better enabled to avoid the error of permitting the supply of liquid to reach the stage of exhaustion before replenishment.

The invention relates primarily to means for developing indicating motion from changes in fluid level. It is designed primarily for use in a system in which a circuit closer having means controlled by changes in level of the liquid has an independent terminal for each stage to be indicated, and has at a distant point of observation a series of signal elements, preferably electric lamps, each of which is in circuit with a corresponding terminal; but the invention is useful with other types of indicating means. When lamps are used as signal elements, they will preferably be not only arranged in a series which will come to have a graphic significance of fluid level, but they will preferably also be of contrasting colors, for instance, colors varying from a deep or dark hue, indicating extreme low level, through the various shades up to a light or even no color for the higher levels, or the reverse of this order of coloring as may be desired.

The invention consists in providing a depending shaft through which circuit closing motion is transmitted, a float bodily movable in a vertical direction and guided by and imparting circuit closing movement to said shaft, and toggle links located on either side of the shaft, connecting the float to the cap and opposing rotation of the float while permitting its vertical movement.

The circuit closing elements are hermetically separated from the container of the liquid, or any portion of the apparatus to which liquid has access and separated

therefrom by a well ventilated space, in order to avoid danger of ignition by arcing of the circuit closer when the indicator is used for explosive fluids.

In the accompanying drawings:

Figure 1 is a detail view of the multiple signal indicator.

Figure 2 is a section on the line 2^x—2^x of Figure 1.

Figure 3 is a schematic view of one of the several identical circuits of the device.

Figure 4 is a view showing the preferred method of relating the float to the circuit closer.

Figure 5 is a view corresponding to Figure 1, illustrating the means for isolating the circuit closer from the tank, and ventilating the physical connection between them; also the method of assembling the mechanism with the tank cap so that one and the same float-actuated circuit-closing mechanism can be associated with the size cap required to fit any particular make of tank.

Referring to Figures 1 to 3, the numerals 1 to 10 indicate a series of signal elements, for instance, electric lights, the glowing of which individually and separately is relied upon to indicate the respective stages of fluid level in the tank. These signal elements are mounted through the medium of a dial 11 (Fig. 1) upon any desired support 12, for instance, the instrument board or dash of an automobile. As shown in Figure 3, each signal is connected by conductors 13 and 14, respectively, with a source of current 15, which may be grounded at 16, and with one of a series of terminals 17 in position to receive a contact arm 18 which is revolvably mounted upon a shaft 19 which may be grounded at 20.

As shown in Figure 4, the shaft 19 with its circuit closer 18 is suspended from a screw cap 21 applied to a tank 22 containing the liquid to be indicated, and said shaft has fitted upon it non-rotatably, and with freedom of vertical movement, a float 23 which, by its rise and fall develops rotary movement in the contact arm 18 and brings it successively into contact with the terminals 17, each of which corresponds to and is connected with one of the signal elements 1 to 10.

While rising and falling float 23^y may be held against rotation through the medium of toggles 24^y (Fig. 4), and rotary movement of the contact arm 18 in relation to the ter-

minals 17 may be generated through the medium of the torsionally bent shaft 19^v which fits non-rotatably in the float 23^v.

An important feature of the present invention resides in the fact that the contact member and terminals through which the circuits are closed are completely isolated from the interior of the tank, in order to avoid possibility of ignition of explosive vapors from the contents of the tank; and this isolation is effected either by hermetically enclosing the terminals 17 and contact arm 18 in a housing 30 (Figures 4 and 5), or else by providing a neck 31 (Figure 5), or equivalent means, through which the circuit closer is supported, and having this neck amply provided with ventilating openings 32, or preferably by having both the hermetic housing 30 and the ventilated neck 31 as shown in Figure 5.

Another important feature of the preferred embodiment of the invention resides in the fact that, as shown in Figure 5, the attaching cap 21^a is made separate from but adapted for ready assembly with the circuit closing mechanism and its controlling float, as, for instance, by having an inner flange 21^b on the cap to receive the neck 31 of the

circuit closer and the float-suspending tube 24^a so that by merely substituting the proper cap 21^a, the device may be made appropriate to any tank.

I claim:

1. In a fluid stage actuated circuit-closer, adapted to be applied to a fluid container, a supporting cap, a circuit closer carried by said cap, a shaft depending from said circuit closer into the container, a float bodily movable vertically engaging and guided by said shaft, and toggle links on either side of said shaft connecting said float with said cap.

2. In a fluid stage actuated circuit-closer adapted to be applied to a fluid container, a supporting cap, a circuit closer carried by said cap, a shaft depending from said circuit closer into the container, a float engaging said shaft, and toggle links connecting said float with said cap; said shaft having a spiral form, said float engaging said shaft non-rotatably, and said toggle links holding said float against rotation while permitting it to rise and fall.

Signed at Chicago, Illinois, this 2nd day of June, 1922.

JOE DAVIS PIRTLE.