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R. B. COLEMAN ETAL

3,266,312

LEVEL INDICATOR SENDING UNIT

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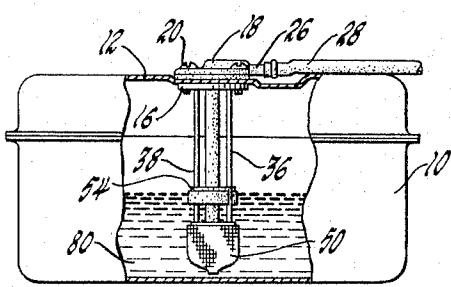


Fig. 1

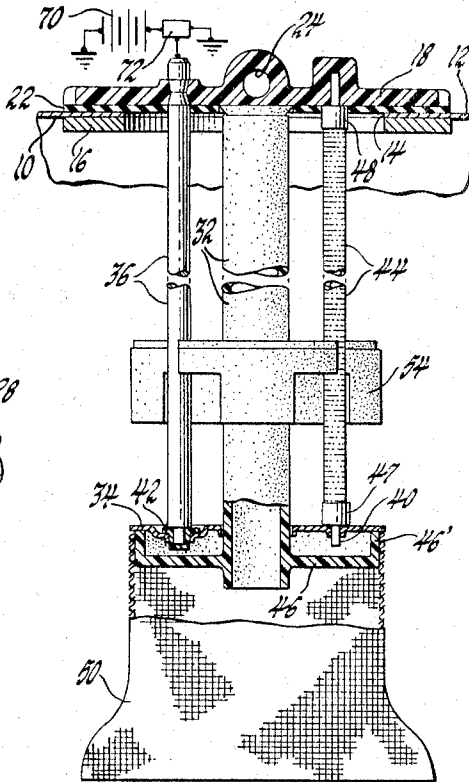


Fig. 5

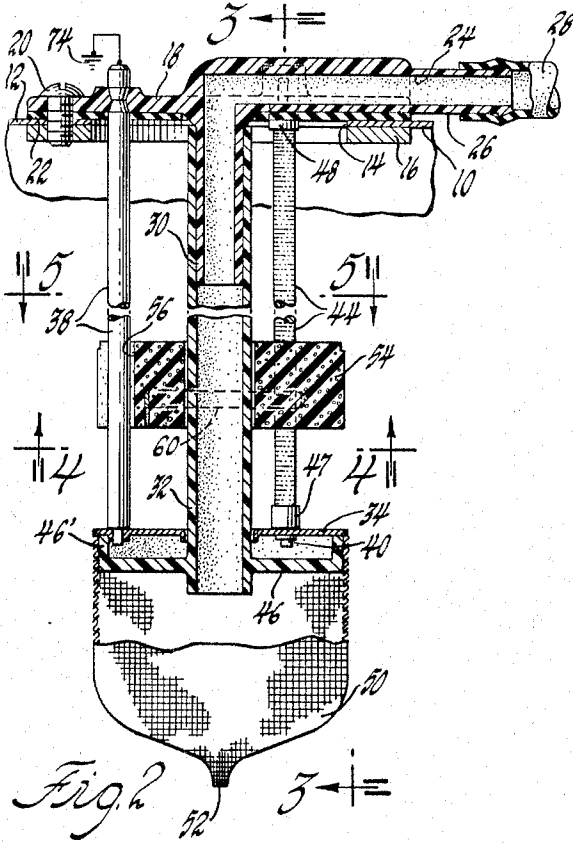


Fig. 2

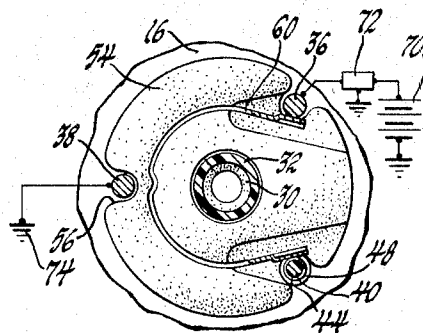


Fig. 4

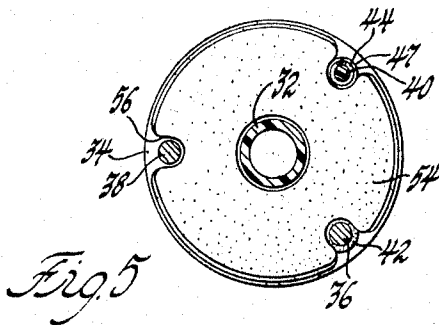


Fig. 5

INVENTORS
 Richard B. Coleman
 BY E. Neal E. Neese
 George E. Johnson
 ATTORNEY

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LEVEL INDICATOR SENDING UNIT

Richard B. Coleman and Neal E. Neese, Lansing, Mich.,
assignors to General Motors Corporation, Detroit,
Mich., a corporation of Delaware

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8 Claims. (Cl. 73-313)

This invention relates to liquid level indicators and more particularly to sending units suitable for use in liquid fuel tanks and by means of which signals may be imparted to liquid level indicators such as gages.

An object of the present invention is to provide a combined suction line and signal sending unit which is low in cost, convenient to install in a tank and such as to present a base readily receiving a filter element as a part of the unit and adapted to clarify fluid to be discharged from the tank.

A feature of the invention is a combined suction line and sending unit having a cover or support for multiple rods and a conduit, the rods being utilized in conveying a signal current and cooperating with the conduit to guide a float. Another feature is a sending unit employing a resistance and having a conduit for guiding a float and a base forming a convenient attachment for filter means through which fluid may pass on its way to the conduit.

These and other important features of the invention will now be described in detail in the specification and then pointed out more particularly in the appended claims.

In the drawings:

FIGURE 1 is a side view of an automotive gasoline tank, a portion of which is broken away showing the installation of a sending unit representing one embodiment of the present invention;

FIGURE 2 is a view, drawn to a larger scale, of the sending unit shown in FIGURE 1 with portions of the sending unit broken away and a portion of the top wall of the tank shown in section;

FIGURE 3 is a view drawn partly in section as viewed in the direction of the arrows 3-3 in FIGURE 2;

FIGURE 4 is a sectional view looking in the direction of the arrows 4-4 in FIGURE 2; and

FIGURE 5 is a sectional view looking in the direction of the arrows 5-5 in FIGURE 2.

An automotive type fuel tank is shown at 10 having a top wall 12 with a discharge opening therein shown at 14 as being reinforced by a stiffening ring 16. A support 18 is formed as a cover for the opening 14 and is so made as to be attachable to the tank by means of screws 20 with a sealing gasket 22 interposed. The cover 18 is preferably injection molded of plastic material in such a way as to include a right angle portion 24 defining a right angle suction passage. One side of the cover 18 is formed to constitute a tube-like projection or nipple 26 suitable for the attachment of a suction line such as indicated at 28. Depending from the main body of the cover 18 is a tube portion 30. A conduit 32 is pressed on the tube portion 30 so that the passage from the portion 24 is thereby extended downwardly a substantial distance and below a metal base plate 34. This base plate surrounds the conduit 32 and is joined to the cover 18 and in spaced relation with the latter by means of three rods 36, 38 and 40.

The rod 36 is retained at one end within the cover 18 in such a way as to constitute a terminal insulated by the cover from the material of the tank 10. The other end of the rod 36 is reduced in diameter and held within an insulator bushing 42 pressed into the metal base plate 34. The rod 38 is also held by the cover 18 and insulated from the tank to constitute a terminal as is the case with the rod 36, but in this case the rod 38 is fixed in conductive relation with the base plate 34. The rod 40 is preferably made of glass filled nylon or plastic material and has its

upper end pressed into and concealed within the cover 18 and its lower end in a driving fit with the cover 34. The rod 40 also carries a resistance 44 which is in the form of a coil of spaced convolutions of resistance wire. One end is held in conductive relation with the base plate 34 through a nickel silver ferrule 47. A second ferrule 48 is used at the other end of the rod 40 to anchor that end of the wire 44.

Integral with the conduit 32 is a disk 46 having a peripheral flange 46' and made integral with the conduit and such as to provide a surface for closure and support of a Saran mesh bag-like filter element 50 which is pinched or closed at its base 52. Preferably the proportions are such that the element 50 just contacts the bottom of the tank 10.

Slidable on the conduit 32 is a plastic float 54 which bears peripheral notches such as at 56 slidably to receive the rods 36, 38 and 40. The float 54 carries contact means 60 in the form of a spring ribbon in such a way that one end of the contact means 60 slidably engages the rod 36 and the other end engages the resistance 44.

It will be noted that the structure permits the choice of plastic material for the making of the conduit 32 and the cover 18. This is conducive to low cost and yet provides a very satisfactory structure for firmly guiding the float 54 and most satisfactorily support the filter element 50.

The rod 36 has its upper end spaced to form a terminal for connection to a gage 72 which is connected to a source of voltage such as battery 70. The base plate 34 is in conductive relation with the rod 38 and the upper end of the latter presents an exterior terminal for connection to ground 74. A suitable fuel gage is disclosed in United States Patent No. 2,883,623, granted April 21, 1959, in the names of H. R. Hastings and C. A. Haut. Numerous equivalent instruments would serve to give an indication of float level in accordance with a correct signal imparted by the tank sending unit herein disclosed.

In the operation of the unit the variation in the supply of liquid fuel 80 in the tank 10 will cause the rising and falling of the float 54 and this will cause a variation of the current passing through the resistance 44 and influence the reading of the gage 72. It will be understood that the circuit will proceed from the gage 72, down the rod 36 to the ribbon or contact means 60, along the latter to the resistance 44 and then to the base plate 34 and to the second metal rod 38 and then to ground 74. In the claims as set forth below, the rod 38 is referred to as the second rod and the rod 36 as the one other rod.

When suction is applied by way of the inlet conduit 28 to the suction passage defined by the cover 18 and the conduit 32, gasoline will flow through the filter 50 and be suitably clarified simultaneously with the sending of the signal as to fluid level by the same unitary structure.

We claim:

1. A liquid level sending unit comprising a first cover at one end adapted to be fixed to the top wall of a tank, a second cover spaced from said first cover, filtering means at the other end of said unit and supported by said second cover for submergence in said tank, a conduit on said first cover and defining a suction passage leading through both covers to said filtering means, multiple rods fixed to said covers and extending along a length portion of said conduit, a resistance element extending along one of said rods with one end of said element electrically connected to a second of said rods, a float movable along said length portion of said conduit and carrying contact means slidable on said resistance and one other of said rods, and terminals on said second and one other rods.

2. A liquid level sending unit comprising a cover adapted to be fixed to the wall of a tank and a filtering means for submergence in said tank, said cover and filtering means being connected by a central conduit and mul-

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tiple rods spaced around the said conduit, the conduit defining a suction passage leading through the said cover, resistance means on one of said rods and having one end in electrically conductive relation with a second of said rods, a float slidable on said conduit, contact means on said float slidable on said resistance means and one other of said rods, and terminals on said second and one other rods.

3. A liquid level sending unit comprising a cover attachable to a tank and including a filtering unit supported in spaced relation on said cover by means of three rods and a conduit, said conduit and cover defining a suction passage leading from the interior of said filtering unit and through the cover, a resistance on one of said rods, said filtering unit including a metal plate in electrical conducting relation with one end of said resistance and a second of said rods, a float movable along said conduit and carrying contact means slidable on said resistance and one other of said rods, and terminals on said second and one other rods.

4. A liquid level sending unit comprising a plastic cover attachable to a tank and including a filtering unit fixed in spaced relation to said cover by means of multiple metal rods and a plastic conduit, said conduit and cover cooperating to define a suction passage leading from one side of said cover to the interior of said filtering unit on the other side of said cover, a resistance on one of said rods, one end of said resistance being connected to a second of said rods, a float movable along said conduit and rods, contact means carried by said float and slidable on said resistance and one other of said rods and terminals on said second and one other rods.

5. A liquid level sending unit comprising a cover attachable to a tank wall and including a base plate fixed in spaced relation to said cover by multiple rods and a central conduit, said rods and base plate cooperating in carrying a resistance whereby current may be conducted

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through the unit, a float movable on said conduit between said cover and base plate and carrying contact means slidable on said resistance to vary said current, and one end of said central conduit being open and terminating near said base plate.

6. A liquid level sending unit attachable to a tank wall and including a support and a metal base plate, multiple rods and a conduit connecting said support and base plate in spaced relation, a float slidable on said conduit and having grooves each in registry with one of said rods for guidance, a resistance on one of said rods and having one end connected to said base plate, a second of said rods having a terminal at one end and its other end in conductive relation with said base plate, contact means carried on said float and slidable on said resistance and one other of said rods, and a terminal on said one other rod.

7. A liquid level sending unit as set forth in claim 6 in which said support and conduit are made of plastic and which cooperate in defining a suction passage.

8. A liquid level sending unit as set forth in claim 6 including a bag-like filter element and in which said base plate and one end of said conduit form a closure for said bag-like filter element.

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LOUIS R. PRINCE, *Primary Examiner.*

DAVID SCHONBERG, *Examiner.*

DONN MCGIEHAN, *Assistant Examiner.*