

June 30, 1931.

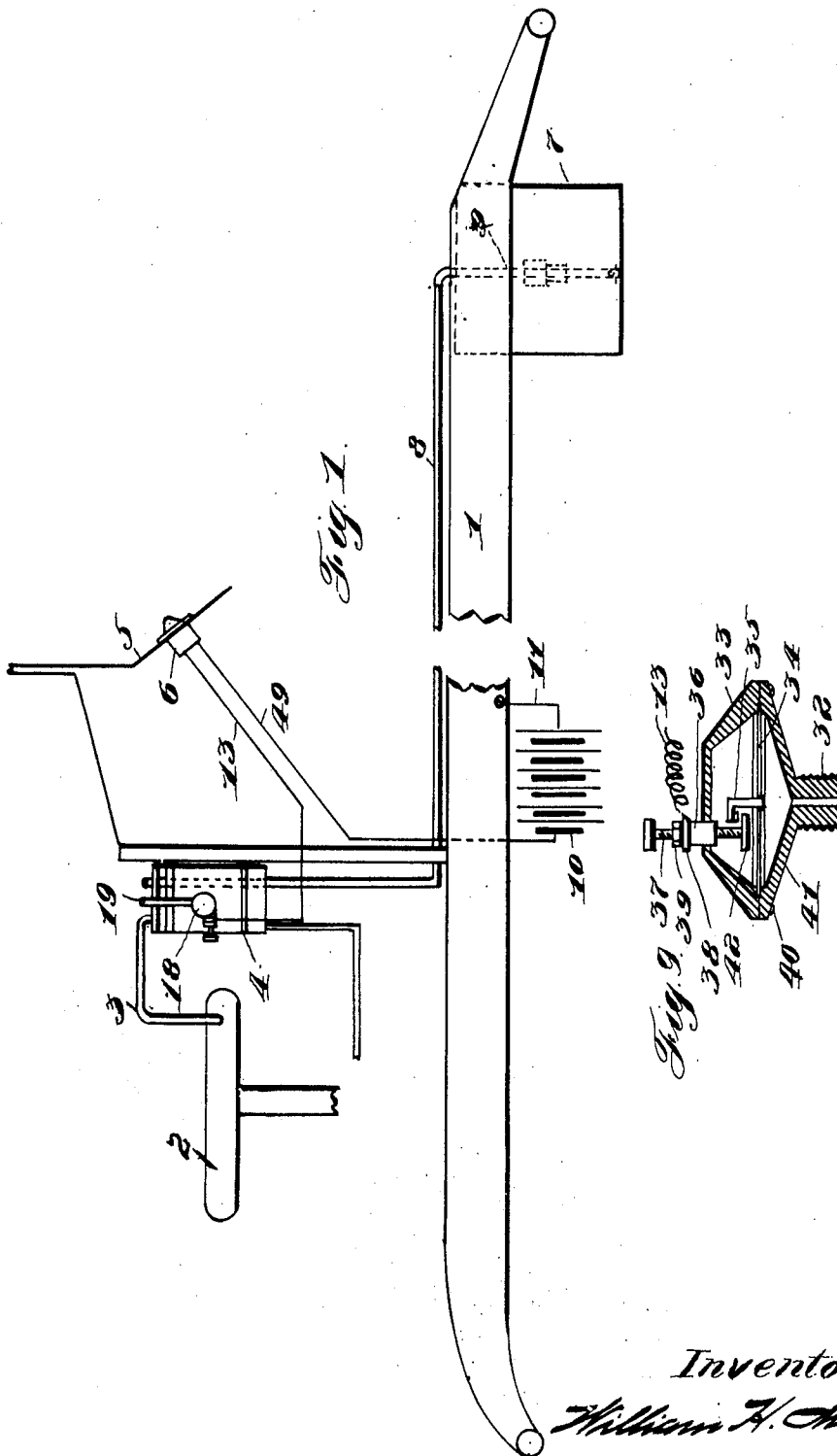
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GASOLINE RESERVE SIGNAL FOR AUTOMOBILES

Filed July 2, 1925

2 Sheets-Sheet 1



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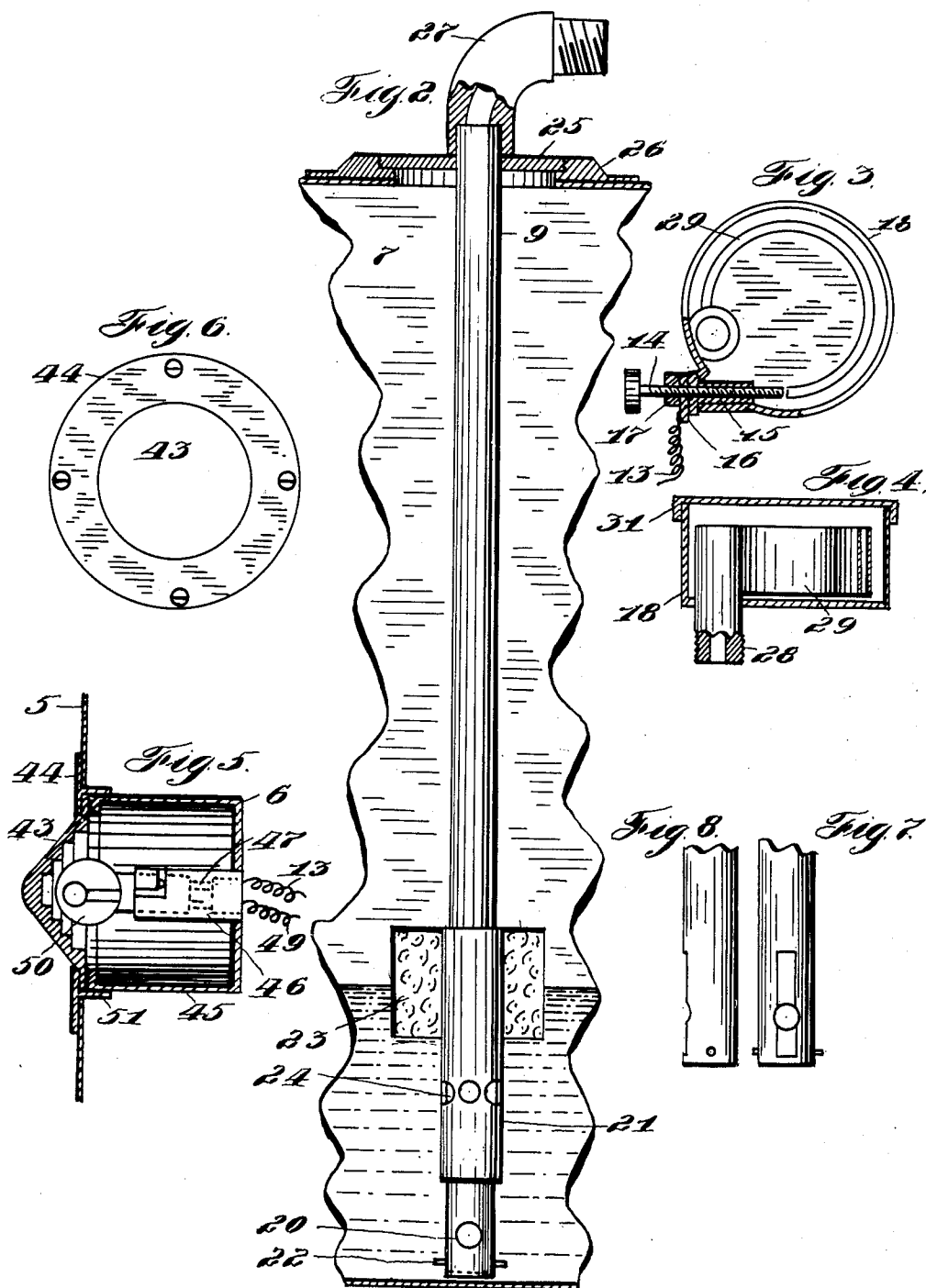
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GASOLINE RESERVE SIGNAL FOR AUTOMOBILES

Application filed July 2, 1925. Serial No. 41,141.

This invention relates to liquid level signals and has more particular relation to improvements in liquid level signals as applied to the fuel supply tanks of automobiles.

One of the several objects of the invention is to provide an improved and safe electric liquid level signal that will flash to the driver a signal as to the quantity of fuel remaining in the supply tank of the machine.

Another object of the invention is to provide an improved signal for informing the driver that he has reached the reserve level of the gasoline and at the same time inform him as to the operation of the vacuum tank which feeds the fuel.

A further object of the invention is to provide an improved liquid level signal electrically operated and so constructed that any disarrangement of the circuit or burning out of the lamp will be at once communicated to the driver.

A still further object of the invention is to provide a liquid level signal that may be located at a distance from the supply tank without any other connection than the usual fuel feeding pipe.

Another object of the invention is to control an electric liquid level signal from the regular fuel feeding devices of the car.

Another object of the invention is to so control the electric liquid level signal that any chance of liquid fuel or gas being exploded through accidental crossing of high voltage wires is eliminated.

The invention also has other objects all of which will be hereinafter more particularly set forth and claimed.

In the accompanying drawings forming part of this specification:

Figure 1 represents a diagrammatic side elevation of the devices embodying my invention applied to the chassis of an automobile;

Figure 2 represents a broken vertical section through the main gasoline supply tank with my improvements applied thereto;

Figure 3 represents a broken top plan view, partly in section of the Bourdon tube

employed in one form of the circuit closing devices;

Figure 4 represents a vertical section through the same;

Figure 5 represents a detail vertical section through the dash lamp and its mountings;

Figure 6 represents a front elevation of the same;

Figure 7 represents a broken front elevation of the lower end of a modified form of fuel feeding pipe;

Figure 8 represents a side elevation of the same, and

Figure 9 represents a detail vertical section of a modified form of circuit closing device.

Described in general terms the invention consists in closing the lower end of the regular gasoline feed pipe in the main supply tank and forming a feeding opening in the side of the pipe. A cork and sliding sleeve is mounted loosely on the feed pipe to rise and fall with the gasoline. When the reserve level is reached, the cork has dropped so that the sleeve covers the feeding opening in the pipe but as the sleeve is a loose sleeve the gasoline continues to feed through the opening but at a much slower rate. The feed through the feed pipe is by vacuum tank in a manner well known in the art and the normal feed through the pipe opening when the sleeve is elevated requires about five seconds to fill the inner chamber of the vacuum tank. When the sleeve is over the opening the feed of gasoline requires about one minute to fill the inner chamber of the vacuum tank. The feeding operations also come much closer together. The cork is so positioned that when the sleeve covers the pipe opening about an inch of gasoline still remains to be fed from the tank. This gives about twenty five miles of running on the reserve.

The red signal light on the dash is connected in circuit with a Bourdon tube connected to the vacuum tank or the pipe line. The operation of this Bourdon tube closes and opens the circuit each time there is a pumping operation of the fuel by the vacu-

um tank. The circuit making and breaking devices may be so adjusted that with the normal operation of the vacuum tank the light will give practically only a flash to inform the driver that the devices are properly operating but when the reserve level is reached the lamp will burn practically for the duration of a minute and be out for only a slight interval. This will give the driver an unmistakable signal that he is on the reserve in the supply tank.

There may be many modifications to this structure but the obstruction of the gasoline feed and the lengthening of the period of feed gives an unmistakable signal as to when the reserve level is reached. This signal is also repeated again and again during the use of the reserve fuel and the operator reminded each time that he should renew the supply of fuel.

If the fuel pumps the signal must flash unless the lamp is burned out or the circuit disarranged or broken and in this event the driver knows this fact at once as the stopping of the flashing so informs him.

The form of vacuum tank preferably employed in connection with this invention is of the intermittent feed type generally in use today and fully shown and described in Reissue Patent No. 14,353, Sept. 11, 1917, patentee Webb Jay. As this tank is so well known in the art no detail description is given here.

In the aforesaid drawings the main fuel supply tank 7 is suitably mounted in the chassis frame 1 at the rear of the machine.

The gasoline feed pipe 8 is connected to the inner chamber of the vacuum tank in the usual manner at its forward end and the rear end of this pipe extends down through the top of the tank 7 to within a short distance of its bottom. This lower rear end of the pipe is closed but the pipe is formed in its side wall near this lower end with an opening 20 through which the fuel passes into the pipe. A thin metal sleeve 21 is mounted loosely upon the vertical part 9 of the pipe 8 and is raised and lowered on this pipe by a small cork float 23 through which it passes. The weight of the sleeve 21 and the size of the cork or float 23 are such that the point of flotation of the cork is about at the middle point of its height as shown in Fig. 2. The sleeve 21 is formed at about one inch above its lower end with a series of apertures 24 which prevent air being drawn down through the tube when the latter is in its lower position and the upper end of the tube uncovered by fuel. These apertures may be arranged at any point desired and might be located immediately above a line drawn through the opening 20 when the sleeve is in its lower position. The position of the cork may be also changed to give

any desired reserve by closing the opening 20 sooner or later.

A cross pin 22 passes through the lower end of the pipe 9 and acts as a stop or rest for the sleeve 21 when in its lower position. The sleeve when in its lower position passes far enough over the opening 20 so that any slight bobbing of the cork because of the agitation of the fuel will not uncover this opening. These proportions may be changed as desired for different makes of cars.

The upper end of the pipe 9 is fast in a screw threaded attaching plate 25 which is screwed into a casting 26 mounted fast on the top of the tank about a suitable aperture in the top of the tank. The upper end of the pipe 9 is connected to an elbow connection 27 to which the feed pipe 8 is attached.

A short length of pipe 19 is screwed into the usual tapped opening in the top of the vacuum tank, and this pipe is connected at its opposite end with a screw threaded nipple 28 forming part of the Bourdon tube or other vacuum controlled element shown in Figures 3, 4 and 9. The nipple 28 communicates with the thin hollow curved metal element 29, the free end of which acts as one of the electrical contact points. A casing 18 surrounds this element and is provided with a dust cover 31. A contact screw 14 is mounted in an insulating sleeve 15 which projects through the casing 18. A locking nut 17 is mounted on the screw and also a loose washer 16 to which the wire 13 is attached.

After the screw is adjusted to bring its end within a short distance of the end of the element 29 the nut is tightened and thus locks both the screw and the washer 16 in position. The nipple 28 is by its metal connection grounded on the metal of the machine.

The slightest contracting movement of the element 29 will cause its free end to contact with the end of the screw 14 and thus close the circuit. This movement of the element of course takes place each time a partial vacuum is formed in the upper chamber of the vacuum tank when its pumping cycle starts in a manner well known in the art. The points remain in contact as long as there is any vacuum in the upper chamber of the vacuum tank and the light on the dash of the machine thus remains lighted for this length of time. It will be observed that the contact of the two points takes place entirely exterior of any connection with the inside of the vacuum tank. With a small lamp used in the dash element the making and breaking of the circuit shows to the eye no spark at the contact points. With devices of this character however in the hands of careless workmen and inexperienced

enced users, some high voltage wire, as for instance one of the spark plug wires, may be accidentally brought into the circuit and this would cause a very intense spark at the contact points, but the worst that could happen under these conditions would be that the contact points would be pitted or corroded. There would be no danger of explosion as the sparking would be entirely away from any gasoline or gas and would be no more dangerous than the sparking at the make and break points of the ignition devices.

In the modified form of make and break devices shown in Fig. 9 the screw threaded nipple 32 is attached directly to the top of the vacuum tank so that the chamber below the flexible diaphragm 34 will be in communication with the upper chamber of the tank. The diaphragm is held in gas tight position by screws 40 which connect the lower member 41 with the spider 33, the diaphragm being clamped between the two with a sealing cork washer employed if desired. The diaphragm is provided with an angular contact arm 35 which when the diaphragm is drawn downward by the vacuum contacts with a contact disk 42 mounted on an adjusting screw 37. This screw is mounted in an insulating sleeve 33 which is mounted in the top of the spider 33. A locking nut 39 and a wire attaching washer 38 are provided as in the first form of contacts described.

As the circuit is grounded at the vacuum element the signal 6 mounted on the dash must be of the two contact type. This signal as shown in Fig. 5 comprises an attaching ring 44 having an annular flange 51 within which the barrel 45 is forced to anchor the parts in position. The red "Fresnal" lens 43 is held in position between the ring 44 and the turned edge of the barrel. The barrel supports a cylinder 46 having the usual bayonet slot for the attachment of the lamp 50. The cylinder is also provided with the usual insulating block and spring contacts 47 all of which is old and well known in the art. The wire 13 is connected to one of these contacts while a wire 49 is connected to the other. This wire 49, as shown in Fig. 1, is connected to one element of the storage battery 10 while the opposed element of the battery is grounded on the chassis frame by the wire 11.

The vacuum tank 4 is connected by a pipe 3 to the manifold 2 of the engine in a manner well known in the art. The tank is also connected to the carbureter.

In ordinary practice and for ordinary speeds of the engine the loose sleeve 21 allows sufficient gasoline to pass between it and the pipe 9, when the sleeve is in its lower position, to feed the engine at all speeds but if an excess of fuel is desired the

pipe 9 is slightly flattened in proximity to the aperture 20 to allow more gasoline to be drawn between the sleeve and the pipe when the sleeve is in its lower position as clearly shown in Figures 7 and 8. The agitation of the gasoline when the car is in motion also increases the amount of the feed as it moves the float from side to side and rocks the sleeve 21 away from the opening 20 to which it is normally drawn by the suction in the pipe 9. Also if an increased feed is desired the internal diameter of the sleeve 21 may be slightly increased to leave a greater clearance between it and the pipe.

If so desired the contact points may be so adjusted that the signal of the lamp will not be given during the regular feeding operation of the tank and will only be given when the reserve level is reached. This is possible as the degree of vacuum in the vacuum tank when the opening 20 is unobstructed does not reach as high a point as it does when the opening is obstructed and the flow of the gasoline retarded. This retarding of the gasoline causes the vacuum in the tank to build up to a high point as it cannot be relieved fast enough by the inflowing gasoline. On the other hand the vacuum in the tank is relieved so fast when the opening 20 is unobstructed that it has no chance to build to a high point during the very short duration of the feed (about five or six seconds).

It will of course be understood that the opening 20 may be enlarged or decreased in size as desired or that two opposed openings on opposite sides of the pipe might be provided so that the sleeve 21 would not be drawn against the openings at all but would be balanced in a neutral position allowing a greater flow of gasoline.

Should the driver run entirely through the reserve it will be seen that the red light will burn continuously when no more gasoline will pass up the pipe 9 and until all of the reserve gasoline in the vacuum tank is used. This is a final warning signal. The red light may be brought up into the line of vision by attachment to the wind shield if desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an automobile the combination with an engine and the main fuel tank, of an intermittently operating vacuum fuel feeding system including a fuel feeding pipe extending into the fuel tank, a reserve fuel signal device for the driver connected to the fuel feeding system to be operated when the fuel feeding takes place, and a float operated device in the fuel tank for obstructing the entrance of gasoline into the fuel pipe and thus increasing the duration of the fuel feeding period when a low level of fuel in the tank is reached.

2. In an automobile the combination with an engine and the main fuel tank, of an intermittently operating vacuum fuel feeding tank, a pipe connecting the main fuel tank with the vacuum tank, a reserve fuel signal device for the driver, float operated devices in the supply tank for obstructing the flow of fuel to the pipe and thus increasing the period of each fuel feeding operation when a low fuel level in the tank is reached, and devices connected to the vacuum tank for operating the reserve fuel signal during the operation of feeding the fuel.

3. In an automobile the combination with an intermittently operated vacuum fuel feeding tank and connections, of a main fuel supply tank, a feed pipe extending into the supply tank and having a port for the passage of the fuel, a float in the supply tank, a valve operated by the float for partially obstructing the fuel port and thus increasing the duration of the feeding period of the vacuum tank, and a reserve fuel signal for the driver connected to the vacuum tank and operated during the fuel feeding operation.

4. In an automobile the combination with an intermittently operated vacuum fuel feeding tank and connections, of a main fuel supply tank, a feed pipe extending into the supply tank and having a port for the passage of the fuel, a float actuated sleeve valve mounted on the feed pipe for partially obstructing the fuel port and thus increasing the duration of the feeding period of the tank, a hollow contractable element mounted in communication with the vacuum chamber of the vacuum tank and adapted to be operated by the vacuum therein, and a reserve fuel signal device for the driver operated by the contractable element.

5. In an automobile, in combination with an engine and main fuel tank, an auxiliary fuel receptacle and a fuel supply line from the main tank to the auxiliary receptacle, intermittently operated fuel feeding means for moving fuel from the main tank to the auxiliary receptacle, a reserve fuel warning signal for the driver including means operated by the fuel feeding means, for controlling the signal so that the occurrence and duration of the signal corresponds to the occurrence and duration of the intermittent fuel feeding periods; means for affecting the duration of said feeding periods consisting in means for partially obstructing the flow of fuel from the main tank through the supply line, said means consisting of a float in the main tank and flow-obstructing means associated with the intake of the fuel supply line arranged to be operated for limitedly obstructing the flow at a predetermined low level of the fuel in the tank.

In testimony whereof I affix my signature.

WILLIAM H. MUZZY.