W. H. MUZZY.

AUTOMATIC GAS RESERVE FOR AUTOMOBILES.

APPLICATION FILED FEB. 11, 1921.

1,435,653.

Patented Nov. 14, 1922.

Fig. 1.

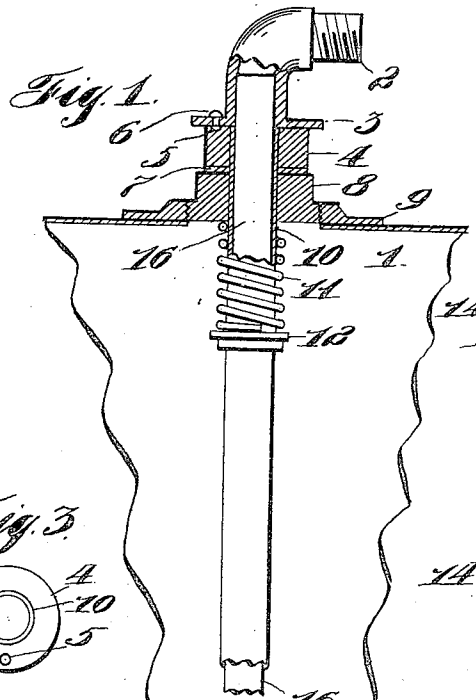


Fig. 2.

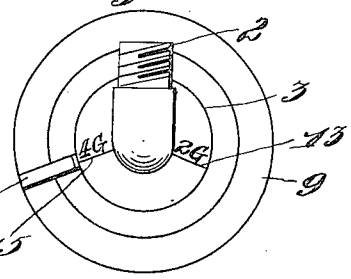


Fig. 3.

Fig. 4.

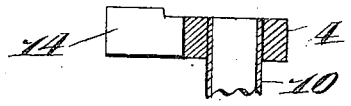


Fig. 5.

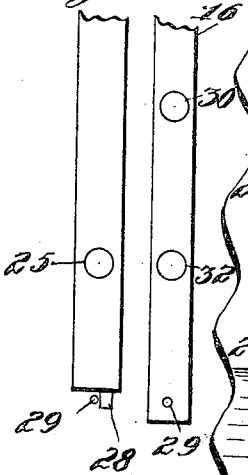


Fig. 6.

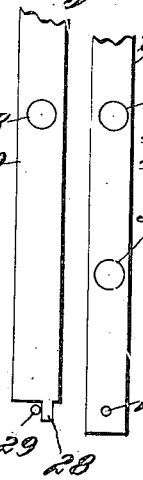
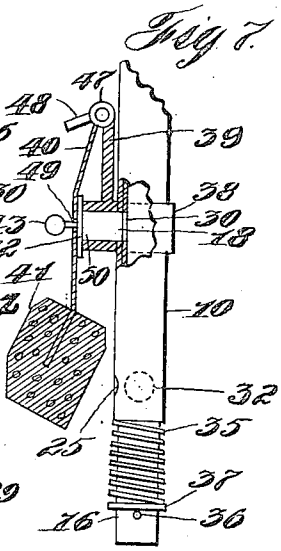


Fig. 7.



INVENTOR.

William H. Muzzy

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UNITED STATES PATENT OFFICE.

WILLIAM H. MUZZY, OF CHICAGO, ILLINOIS.

AUTOMATIC GAS RESERVE FOR AUTOMOBILES.

Application filed February 11, 1921. Serial No. 444,157.

To all whom it may concern:

Be it known that I, WILLIAM H. MUZZY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Automatic Gas Reserve for Automobiles, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in reserve supply devices for the fuel feeding systems for automobiles or the like and has more particular relation to such devices as suspend the operation of the engine when the main supply of the fuel is exhausted and permit the engine to resume its operation upon the adjustment of certain parts which bring the reserve supply of fuel under the action of fuel feeding devices such for instance as the vacuum tank now in general use as a means for feeding fuel.

One of the objects of the invention is to provide improved devices for reserving a reserve supply of fuel in a single undivided tank.

A further object of the invention is to make the devices practically "fool proof" so that any forgetfulness on the part of the operator will not result in the reserve becoming exhausted without previous warning to him.

A further object of the invention is to provide devices that will automatically seek the proper adjusted positions and snap into place, when moved.

A further object of the invention is to provide different reserves according to the adjustment of the same parts.

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 vertical section, partly in elevation of the devices embodying my invention applied to a gasoline tank, the latter being broken away;

Figure 2 represents a top plan view of the said devices;

Figure 3 represents a detail top plan view of the adjusting handle, its hub and the valve sleeve carried and moved thereby;

Figure 4 represents a detail side elevation, partly in section of the same;

Figure 5 represents a diagram of the lower part of the fuel feeding tube and the valve sleeve with the parts in the two gallon position;

Figure 6 represents a similar view with the parts in the four gallon position; and

Figure 7 represents a detail side elevation, partly in section, of a modified form of my invention.

The present invention is an improvement on the devices shown and described in my co-pending applications and patents as follows:

Patents Nos. 1,407,798, 1,407,799, 1,407,800, all issued Feb. 28, 1922, and pending applications No. 371,982, filed Apr. 7th, 1920, No. 439,203, filed Jan. 22nd, 1921.

Described in general terms the invention may be said to comprise a gasoline feed pipe extending down vertically into the main fuel tank and connected to a fuel feeding system, such for instance as the well known vacuum fuel feeding devices. The feed pipe is unbroken and the control of the reserve is entirely from the exterior of the pipe and at the respective reserve levels previously determined by the adjustment of the parts. This peculiar control at the level corresponding to the reserve level permits of very loose fits of the valve or controlling sleeves. When the gasoline in the tank has reached the desired reserve level, air will enter the feed pipe at this point and thus destroy the suction and the feed of the fuel will cease. The adjustment of the loose sleeve valve now closes the open air port at one level and opens another port at a lower level. When the gasoline reaches this lower level the feed of the fuel ceases again and the lower air port is then closed and the upper port again opened. This would destroy any further feed of the fuel but that the upper air port in the meanwhile has been automatically closed by the descent of a float carrying a valve to its seat over the upper port. The lower level reserve is thus effective and when the tank is refilled the float will rise with the gasoline and again uncover the upper port so that the upper reserve level will be again effective.

In the aforesaid drawings 1 represents the main gasoline tank at the rear of the machine, 2 the attaching nipple for the main feed line to the vacuum tank, 3 the base plate of the nipple, 4 the hub of the adjusting handle 14. This hub is fast to the up-

per end of the tube or sleeve valve 10 so that when the handle is adjusted to the different positions indicated on the plate 3 at 13 and 15, the sleeve will be moved to bring the proper ports 18 or 25 formed therein to register with similar ports 30 and 32 formed in the main feed pipe 16 at the desired reserve levels. The hub 4 snaps into its different adjusted positions because of two recesses 5 formed in its upper surface to receive the lower end of a stud 6 fast in the plate 3, the latter being drawn downward under spring tension as hereinafter described. This results in an accurate positioning of the sleeve without nice adjustment from the operator.

The hub 4 is drawn downward under spring tension upon a fibre packing washer 7 which rests upon the top of a nut 8. This nut is screwed into a base plate 9 secured about an aperture in the top of the tank 1 by brazing or otherwise. The nut 8 is of sufficient size to permit all of the attachments on the lower end of the sleeve valve to be drawn upward out of the tank when the nut is removed. The hub 4 is held down by a coil spring 11 surrounding the tube 10 and engaging the under side of the nut 8 and a collar 12 fast to the tube. This results in a gasoline tight joint between the tube and the nut to prevent splash from the tank from leaking out at this point.

The two gasoline reserve levels are established by the spaced ports 30 and 32 formed near the lower end of the gasoline feed tube 16. The port 30 establishes the four gallon level while the port 31 establishes the two gallon level or any other desired quantities according to the car and the shape of the main tank.

The sleeve valve 10 is provided at the four gallon level with an air port 18 and when this port is brought into alignment with the port 30 the gasoline will cease to feed through the pipe 16 when the level in the tank allows air to enter through these ports.

At this time the handle 14 is in the position shown in Figures 1, 2, 3 and 6. When the car stops from lack of fuel the driver moves the handle from the four gallon position to the two gallon position, thereby closing the port by moving the port 18 away from it, and opening the port 32 by moving the port 25 to register with it. The gasoline is now used until the level passes below the ports 25 and 32, when the air entering these ports will again destroy the feed of the fuel.

Should the operator however, after closing the ports 18 and 30 run the machine for a while and then have the main tank refilled and leave the lever 14 in the two gallon position, the reserve supply of gasoline will still be maintained but it will be only a two gallon reserve and he will be so informed by glancing at the position of the handle when he adjusts it after the main supply is exhausted. When the gasoline has thus reached the lower reserve level as shown in Figure 1, the handle 14 is moved from the two gallon position to the four gallon position and lower ports 32 and 25 moved out of register. This movement opens the upper ports 18 and 30 but these ports at this time are otherwise closed by a loose sliding sleeve 19 mounted on a thin plate 20 which is attached to a sliding cork float 22 by screws 21. The aperture through the cork has a thin metal lining 23 and is arrested in the lower position shown in Figure 1 by contacting with a collar 24 fast to the sleeve 10.

The operator after closing the lower ports uses a certain part of the reserve and then refills the tank. While using this reserve below the port 32 the sleeve 19 has closed the upper ports 18 and 30 being drawn closely to them by the suction and because of the peculiarity of this device before described elevating the gasoline in the feed pipe past the openings 18 and 30 when it is caught by the full suction. The sleeve 19 does not have to fit tight as it will work very well with a very loose fit.

When the driver now refills the tank the cork 22 rises with the gasoline and uncovers the open ports 18 and 30.

As the gasoline level now descends the cork 22 moves downward until the level of the gasoline permits air to again enter the ports 18 and 30. This action will take place before the float 22 has moved far enough downward to bring the sleeve 19 over the ports 18 and 30. The sleeve 19 is limited in its upward movement by a collar 17 fast to the sleeve 10.

A collar 26 fast to said sleeve 10 is engaged by one end of a coil spring 27 surrounding the sleeve, the opposite end of the spring engaging a pin 29 which passes through the tube 16. A lug 28 formed on the lower end of the sleeve 10 limits the movements of the sleeve in either direction by contacting with the pin 29 at either end. As the spring 27 forces the tube 16 downward and as the sleeve is in turn forced downward by the spring 11 the whole device is anchored securely to the tank and the snapping action is thus given to the operations or adjustments of the handle 14.

By the above means the operator cannot forget and leave the adjusting handle 14 in the wrong position and thus find his supply of gasoline exhausted without any reserve remaining.

He always has to move the handle to bring the reserve into use but after he has thus adjusted the handle he can refill the main tank and leave the handle just where he previously moved it and still have a reserve

supply of gasoline when the main supply is exhausted. This is particularly of great advantage in devices of this character. Previously in order to practically secure any such result, it has been necessary to place dividing partitions in the main tank to segregate different portions of the fuel supply. This has been done at great expense as it is very difficult practically to place gasoline tight dividing partitions in a tank which itself must be sealed gasoline tight. Applicant has accomplished the desired result by simply projecting his devices down into a single undivided tank and automatically controlling air ports to secure what may be termed a dominating atmospheric pressure in the lower portion of the feed pipe to raise the gasoline past the air port and thus subject it to the full vacuum lift. Applicant is aware that an endeavor has been made to trap a reserve supply of gasoline in a tank by a float controlled valve which is intended to obstruct the flow of gasoline through a submerged port. To fully obstruct gasoline requires a close fitting pressure operated valve and applicant's experience has been that a float controlled submerged gasoline valve is not practical to stop gasoline. For this reason applicant uses a loose fitting float operated air valve in proximity to the reserve level and secures a perfect control of the gasoline feed by destroying the suction.

In the modified form of the invention shown in Figure 7 I employ a pivotally mounted cork or float 41 carried by a small lever 40 which is pivoted or hinged to a pivot eye 47 at the upper end of a standard 39. The lever 40 is apertured at 49 to loosely receive and support the shank of a flat valve 42 which is counterbalanced at 43. This valve as shown in Figure 7 closes a port 50 formed in a casting 38 which is fast to the sleeve 10. The lever 40 is provided with an arm 48 which limits its upward movement when the gasoline tank is refilled. In this modified form of the invention the valve sleeve is operated just the same as that shown in Figure 1 except that it is given only a one-quarter turn while the devices shown in Figure 1 are given a one-third turn. The operation of the float and the valve controlled thereby is just the same as the operation described for the devices shown in Figure 1, the float being so located that the port 50 will not be closed by the valve 42 until the gasoline is approximately at the lower gasoline level or at least somewhere well below the port 50. The lower spring 35 in this modified form surrounds the inner tube 16 which is longer than the sleeve 10 and bears with one end against the bottom of the latter and the opposite end against a washer 37 free on the inner tube and held in position by a pin 36 which passes through the inner tube. The limiting stop 28 in this modified form is omitted as the snapping action of the devices 5 and 6 under the action of the spring 35 is sufficient to notify the operator that the adjustment of the handle is correct and to also assist in bringing it to the correct positions of adjustment.

It will further be seen that while the devices described provide a practically "fool proof" device that cannot be forgotten and left in the wrong adjusted position, they at the same time provide a choice of the amount of reserve to be held, whether it be two or four gallons. The operator may actuate the devices in the manner best suited to his requirements. He can always have four gallons reserve if he wishes, or he can always have two gallons reserve at his pleasure, but no matter how he uses the devices he always has a reserve no matter which position the handle is left in and he is informed by a glance at the index plate just how much reserve he has when he turns the handle to secure it. It will of course be understood that while I have not shown the devices for operating the parts from the dash of the machine, this can be very easily done in the manner before described and shown in my before mentioned applications.

The loose fit of the telescoping tubes or sleeves is a feature of the invention that makes for practicability as the corrosive action of the gasoline will not cause them to bind as they would if they were a tight fit.

It will of course be understood that when the construction shown in Figure 7 is used the nut 8 would have to be of a corresponding diameter to permit the passage of the float, lever and valve through the opening in the plate 9 when the devices were being applied to the tank or removed from it.

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

1. The combination with a fuel tank, of a fuel feeding pipe extending down into the tank and formed at different levels above the bottom of the pipe with submerged air vents which, when uncovered by the gasoline, allow air to enter and stop the feed, means for opening the vent at one level and closing that at the other, and a float and valve for opening and closing one of the vents according to the level of the gasoline.

2. The combination with a fuel tank, of a fuel feeding suction pipe extending down into the same and formed at different levels with submerged air vents to provide a reserve below each vent and to destroy the suction when the descending fuel uncovers an open vent, means for closing an open vent at will, and automatic means for closing and opening an open air vent according to the level of the gasoline in the tank.

3. The combination with a fuel tank, of

a fuel feeding suction pipe extending down into the same and formed at different levels with submerged air vents which when uncovered by the descending fuel stop the fuel feed, means for alternately opening and closing one of the vents according to the level of the fuel in the tank.

4. The combination with a fuel tank, of a fuel feeding suction pipe extending into the same and formed at different levels with submerged air vents to stop the feed when the fuel uncovers a vent, means for alternately opening and closing the vents, and automatic means for opening and closing the higher open air vent according to the level of the gasoline in the tank.

5. The combination with a fuel tank, of a fuel feeding suction pipe extending into the same and formed at different levels with submerged air vents, hand means for alternately opening and closing the vents so that the fuel feed will stop when an open vent in uncovered, and independent automatic means for opening and closing the upper vent according to the level of the gasoline in the tank.

6. The combination with a fuel tank, of a fuel feeding pipe extending down into the same and having submerged air admission apertures to provide two reserve supplies in the tank, means for opening and closing the apertures by hand to secure the desired reserve supply when the fuel uncovers an air aperture, and automatic devices for providing a reserve independently of the adjustment of the opening and closing means.

7. The combination with a fuel tank, of a fuel feeding pipe extending down into same and having submerged air admission apertures at different reserve levels, means for alternately opening and closing the apertures from the exterior of the tank, and independent automatic means within the tank for opening and closing one of the apertures.

8. The combination with a fuel tank, of a fuel feeding pipe extending down into the same and formed with the submerged air vents at different reserve levels, valves for opening and closing the air vents, hand means for opening the valves and a float carrying a sleeve valve for opening and closing the upper air vent.

9. The combination with a fuel tank, of a fuel feeding pipe extending down into the same and having submerged air vents at different distances from its lower open end to stop the feed when uncovered by the fuel, a handle operated sleeve surrounding the pipe for opening and closing the air vents, and a float and connections for automatically opening and closing one of the air vents.

10. The combination with a fuel tank, of a fuel feeding pipe extending down into the same and formed at different reserve levels with submerged air vents, valves for opening and closing the air vents at will, means for operating the valves from the exterior of the tank and an independent float carrying a valve for opening and closing the upper air vent.

11. The combination with a fuel tank, of a fuel feeding pipe extending down into the same, reserve devices co-acting with the pipe and adjustable to two different positions, one a feeding position and the other a non-feeding position, and automatic means for securing a feeding reserve with the reserve devices adjusted to the non feeding position.

12. The combination with a fuel tank, of a fuel feeding pipe extending down into the same and apertured to form an air vent a sleeve surrounding the pipe and also apertured at the same level as the pipe, a handle for turning the sleeve, and spring devices for causing the handle to snap into its adjusted position.

13. The combination with a fuel tank, of a fuel feeding pipe extending down into the same and formed with air vents at different reserve levels, a sleeve valve for opening and closing the air vents, an attaching nut surrounding the sleeve, a handle for operating the sleeve, a packing between the handle and nut, a spring for drawing the handle and nut together, and a spring for anchoring the feed pipe in position.

In witnesses whereof, I hereunto subscribe my name this 9th day of February, 1921.

WILLIAM H. MUZZY.