

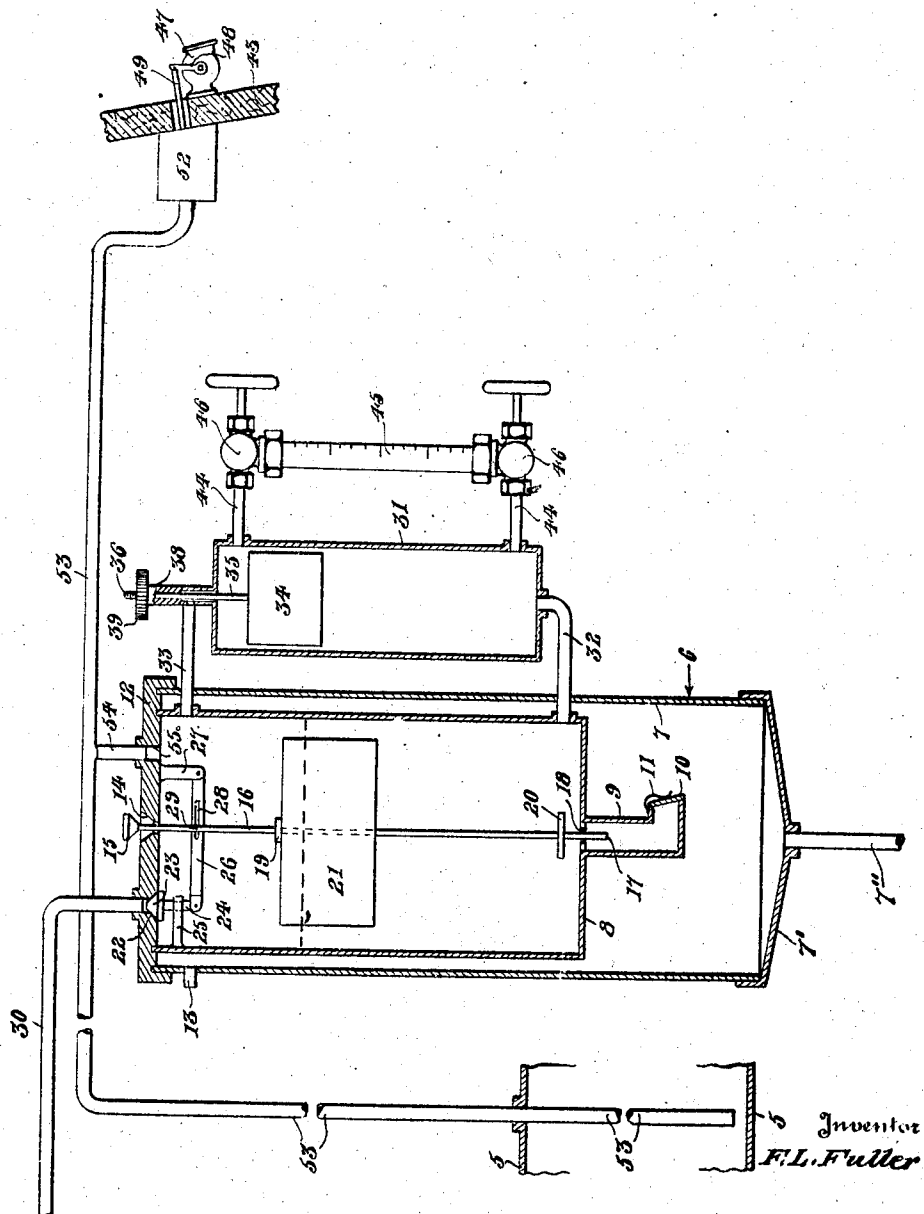
Dec. 14, 1926.

F. L. FULLER

1,611,017

AUTOMOBILE GASOLINE METER

Filed Nov. 15, 1923



இய

Patented Dec. 14, 1926.

1,611,017

UNITED STATES PATENT OFFICE.

FRED L. FULLER, OF SACRAMENTO, CALIFORNIA.

AUTOMOBILE GASOLINE METER.

Application filed November 15, 1923. Serial No. 674,930.

This invention relates to certain new and useful improvements in automobile gasoline meters.

An important object of the invention is to provide a device which may be employed in conjunction with any speedometer for computing the mileage per gallon of fuel consumption.

A further object of the invention is to provide means for adjusting the device to adapt the same for use with different gasoline feeding systems and to compensate for any slight changes that might occur in a system so equipped.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, the figure is a partly sectional and partly elevational view of a portion of a gasoline vacuum feeding system for an automobile equipped with the gasoline meter embodying this invention.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of this invention, the numeral 5 designates a fragmentary portion of a gasoline supply tank which is associated with the vacuum feed tank 6 for the purpose of causing the gasoline stored in the tank 5 to be fed or conveyed to a carbureter suitably associated with an internal combustion engine, not shown.

The vacuum feed tank 6 consists of an outer chamber 7 that is suitably closed at its lower end by the cap 7' which is provided with a pipe 7'' communicating therethrough and intended to be connected at its opposite end to a carbureter, not shown. Positioned within this outer chamber 7 is an inner chamber 8 which is provided with a depending substantially L-shaped tubular member 9 having a flap valve 10 pivotally connected to the outer open end, the said flap valve 10 being normally retained in its closed position by the spring element 11. The upper open ends of the receptacles 7 and 8 are closed by the cap member 12, as shown. Formed in the side wall of the chamber 7 is a permanently open vent 13 which is adapted for allowing the admission of air into this chamber. The portion of the cap 12 that is provided for closing the upper end of the inner receptacle 8 is provided

with a conically-shaped valve seat 14 having associated therewith a valve member 15 that is adapted for being moved into and out of engagement with the said seat 14 for the purpose of intermittently allowing the entrance of air into the inner chamber 8 and preventing such entrance of air. This valve member 15 is rigidly mounted upon a valve rod 16 that extends downwardly through the chamber 8 and is guided at its lower end by a supporting web 18 that is located at the point of connection between the tubular extension 9 and said chamber. This valve rod 16 is provided with a movement limiting collar 19 suitably spaced from its upper end and a second movement limiting member 20 that is properly positioned from the lower end 17. Slidably mounted upon the valve rod 16 between the movement limiting collar and member 19 and 20 is a float 21 that is adapted for engaging said collar or member for the purpose of raising or lowering the valve member 15 in respect to the valve seat 14. The cap 12 is further provided with a conically-shaped valve seat 22 which is adapted for being selectively engaged and disengaged by the valve element 23 which is provided with a stem 24 slidably engaging the guide 25 and connected at its lower end to a link 26 that is pivotally connected to the supporting bracket 27 carried by the said cap 12. This link 26 is further provided with a longitudinally extending slot 28 that is adapted for being engaged by a pin 29 carried by the valve rod 16. The opening in the cap 12 which is formed into the valve seat 22 is further connected to a pipe 30 that is intended to be connected at its opposite end to the fuel intake manifold of an internal combustion engine, not shown.

Suitably supported in proximity to the vacuum feed tank 6 is a chamber 31 that is connected at its lower end to the lower end of the inner chamber 8 by means of the pipe 32 while the upper end of the said chamber 31 is connected to the upper end of the inner chamber 8 by a pipe 33. It will be seen by this construction that suitable communication is provided between the chambers 8 and 31 for allowing fluid fed into the chamber 8 to pass into the chamber 31 for suitably increasing the capacity of the chamber 8 for accomplishing the purpose desired. This purpose is to provide a total capacity that will measure one-tenth of a gallon of gasoline when the same has suitably filled the

chamber 8 for causing the float 21 to be raised to engage the stop collar 19 for opening the air vent valve 15 and closing the vacuum controlling valve 23. For the purpose of regulating the capacity of the chamber 31, a displacement element 34 is positioned therewithin and is secured to a stem 35 which extends through the top of this chamber and is provided with a threaded upper end 36 which is operatively engaged by a knurled nut 39 for raising or lowering the element 34 by engaging the upper end of the bracket 38.

The chamber 31 is connected by the pipes 44 with a sight tube 45 which is provided with the upper and lower shut off valves 46 as shown. It will be seen by this construction that the level of any liquid positioned within the chamber 31 may be determined by the sight tube 45.

Mounted upon the dash board 43 is a counter 47 that is adapted for indicating in tenths. Connected to the operating lever 48 of this counter is a rod 49 that is connected at its opposite end to a piston, not shown, which is positioned within the sealed chamber 52. This chamber 52 is connected to a pipe 53 which leads to the gasoline supply tank 5, terminating therewithin at a point properly spaced from the bottom of the same, and is further provided with a branch pipe 54 that is connected with an opening 55 formed in the cap 12 in the portion of the same that closes the upper end of the inner chamber 8.

The operation of the apparatus is as follows:—

The vacuum feed tank 6 is employed in the usual manner for transferring the gasoline from the supply tank 5 into the inner chamber 8 when a vacuum is created therewithin, the said vacuum being produced by connecting the said chamber with the intake manifold of the engine. In this instance it will first be considered that the tank 8 is empty and that the float 21 has moved downwardly upon the valve stem 16 until it engages the movement limiting member 20 for the purpose of moving the same to close the communication between the chamber 8 and the depending L-shaped extension 9. This downward movement of the valve stem 16 will cause the conically-shaped valve 15 to seat upon the valve seat 14 for preventing the admission of air into the chamber 8. Due to the pin 29 engaging the slot 28 formed in the link 26, the downward movement of the valve stem 16 will cause the valve 23 to disengage the valve seat 22, thereby connecting the inner chamber with the fuel intake manifold of the engine. The connecting of the inner chamber 8 with the intake manifold will cause the vacuum to be created within this chamber 8. This vacuum will cause gasoline to be drawn from the supply tank 5

through the pipe 53 and into the chamber 8 through the branch pipe 54. The liquid will also enter the capacity increasing chamber 31 and will rise in both the chambers 8 and 31 equally. It will also be seen that the rising of the liquid level may be determined by the sight tube 45. The rising of the liquid within the chamber 8 will cause the float 21 to be moved upwardly upon the valve stem 16 until it engages the movement limiting collar 19 whereupon the valve stem 16 will be moved with the float 21 for raising the valve 15 from the seat 14 and for moving the valve 23 into engagement with the seat 22. When the valve 23 has been seated the chamber 8 has been disconnected from the fuel intake manifold and the vacuum creating effect of this connection is stopped. It is intended that the capacity of the chamber 8, the chamber 31, the lower pipe 44, the sight tube 45 and the branch pipe 32 connecting the chambers 8 and 31 shall be precisely one-tenth of a gallon of gasoline when the level of the latter has risen in the tank 8 for causing the valve 23 to seat. It will be seen that this capacity may be varied by raising or lowering the displacement element 34 within the chamber 31 causing a greater or lesser amount of the same to be positioned below the valve operating level of the gasoline within the chamber 8. The sight tube 45 will greatly aid the operator in adjusting this displacement object 34 for causing the total capacity to equal exactly one-tenth of a gallon. It will be seen that when the chamber 8 is connected with the intake manifold through the pipe 30 that the vacuum or suction is also effecting the pipe 53 for the purpose of drawing the gasoline from the supply tank 5. This suction will also be extended to the sealed chamber 52 for causing the piston, not shown, to be moved within the chamber 52 for operating the counter lever 48 for indicating one-tenth of a gallon of gasoline. When the vacuum has been broken by the closing of the valve 23, and air is allowed to enter the chamber 8 through the valve opening 14, air will be allowed to enter the chamber 52 for permitting the piston 51 to return to its normal position. Returning again to the chamber 8 of the vacuum feed tank 6, it will be seen that when the valve stem 16 is elevated by the float 21, communication will be established between this chamber 8 and the depending extension 9 for allowing the gasoline to feed into the latter. The weight of this gasoline will cause the flap valve 10 to be unseated and will allow the gasoline to drain from the chamber 8, chamber 31, sight feed 45, and pipes 32 and 44 into the outer chamber 7. The gasoline will then be fed from this outer chamber through the pipe 7" to the carbureter. The vent opening 13 in this

outer chamber 7 is provided for allowing the admission of air within this chamber when the gasoline is drawn from the same.

It has been stated, heretofore, that the float 21 will engage the movement limiting collar and member 19 and 20 respectively for operating the valve stem 16 whereby the various valves will be seated and unseated, but no mention has been made of the means employed to retain the valves in their various positions during the travel of the float between these collars. For this reason, it might be stated that when the valves are in the positions illustrated, that is with the valve 23 seated and the valve 15 unseated, movement of the float away from the collar 19 will apparently remove all support from the stem 16, the valves 15 and 23, the link 26, and the stem 24 and it would appear that these elements will then fall. This is not true, however, for there is a great difference in air pressure between the unfilled, upper portion of the vacuum chamber 8 and the pipe 30 connected to the intake manifold of an engine. The unfilled portion of the vacuum chamber 8 is at atmospheric pressure, while the pipe 30 is below atmospheric pressure. It, therefore, will be seen that this difference in pressure will operate on both sides of the valve 23 and will retain it on its seat until the weight of the float 21 is added to the remaining elements. The valve 23 will then be unseated. The space between the conical faces of the valve 23 and its seat 22, when the valve is resting upon the guide 25, will permit some air to pass into the pipe 30 to satisfy the suction therein and the valve 23, therefore, will not be sucked onto its seat. The float, when it is moved into engagement with the collar 19, will provide the power necessary to again seat the valve 23.

It will readily be apparent to those skilled in the art that if the gasoline consumed by the engine is recorded or measured in one-tenths of a gallon of gasoline and registered upon the counter 47, by computing this consumption of gasoline with the automobile

speedometer the mileage obtained by the car can be readily ascertained.

It is to be understood that the form of this invention herewith shown and described is to be taken as the preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:—

1. In an automobile fuel meter of the class described, a vacuum feed apparatus having a vacuum chamber, an auxiliary chamber connected to the vacuum chamber, means for varying the containing capacity of the auxiliary chamber below a predetermined level for the purpose of providing a total capacity in the vacuum and auxiliary chambers below said level equal to a predetermined fractional part of a gallon and means operated by the vacuum produced in the vacuum chamber for totalizing said fraction for ascertaining the consumption of fuel.

2. In an automobile fuel meter of the class described, a vacuum fuel feeding apparatus having a vacuum chamber provided with means for connecting the same with the intake manifold of the engine for causing fuel to be drawn from a supply tank and for causing the discharge of the fuel from the chamber when it has reached a predetermined level, an auxiliary chamber connected to the vacuum chamber, means for varying the containing capacity of the auxiliary chamber below a predetermined level for the purpose of providing a total capacity in the vacuum and auxiliary chambers below said level equal to a fractional part of a gallon at the time of discharging the fuel from the vacuum chamber, a counter for totalizing said fraction and means connected with the vacuum chamber for operating said counter.

In testimony whereof I affix my signature.

FRED L. FULLER.