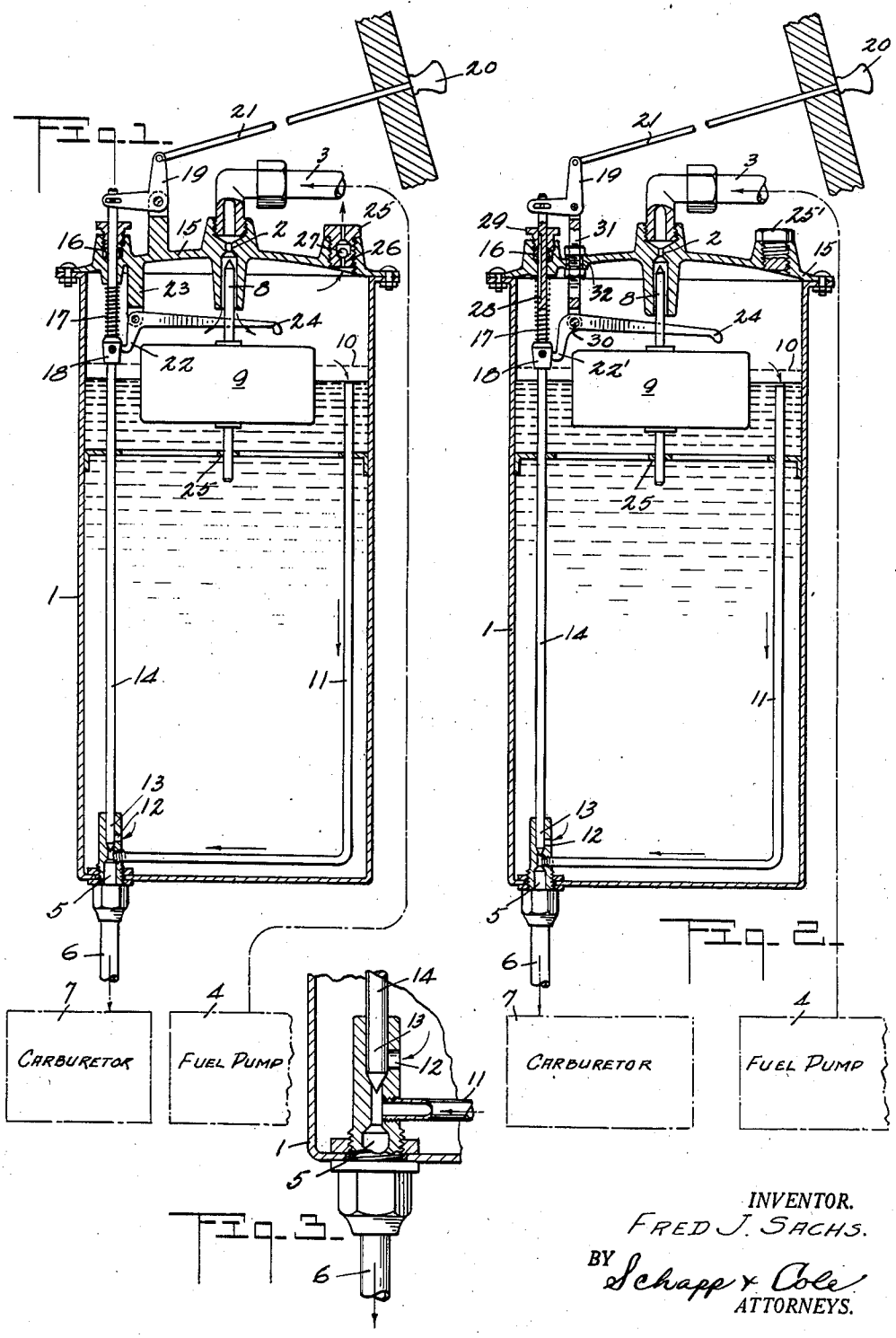
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FEED REGULATOR FOR CARBURETORS

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FEED REGULATOR FOR CARBURETORS

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The present invention relates to improvements in feed regulators for carburetors or charge forming devices for internal combustion engines and its principal object is to provide a feed regulator that will make the carburetor more efficient and at the same time place at the disposal of the operator a reserve fuel supply on which he may draw when the general fuel supply has become exhausted or fails for some other reason.

My invention is intended to be used principally in connection with motor vehicles which use a pump for feeding gasoline to the carburetor and consists in its main features of means interposed between the pump and the carburetor for obtaining the objects desired.

One of the objects of my invention is to provide a reservoir between the fuel pump and the carburetor and control means causing feed from the reservoir to the carburetor to stop when the level in the reservoir sinks below a predetermined point. Further feeding requires an act on the part of the driver so that his attention will be called to the fact that his supply of gasoline is running low and he may stop at the nearest service station for securing a new supply.

Another object of the invention is to provide an air chamber between the carburetor and the pump which permits vapors formed in the fuel line, usually through excessive heat to escape thereinto and to be vented therefrom.

Another object of the invention is to regulate the pressure at which the fuel is delivered to the carburetor so as to have the pressure remain relatively constant and stable instead of varying with the speed of the pump.

Another object of the invention is to provide means whereby the pressure while remaining constant for different pump speeds, may be varied or regulated to suit different operating conditions.

Further objects and advantages of my invention will appear as the specification proceeds.

The preferred forms of my invention are illustrated in the accompanying drawing in which

Figure 1 shows a vertical section through one form of my invention,

Figure 2 a vertical section through a modified form of my invention, and

Figure 3 an enlarged detail view of the lower left-hand portion shown in Figures 1 and 2.

While I have shown only the preferred forms of my invention I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

In the form shown in Figures 1 and 2 my feed regulator consists of a tank 1 having an intake opening 2 connecting through a pipe 3 with the fuel pump 4 and having a discharge opening 5 connecting through a tube 6 with the carburetor 7. As applied to a motor vehicle, the pump will draw on a larger gasoline tank usually placed in the rear of the vehicle while the carburetor is connected to the intake manifold of the engine. The tank 1, especially in the form shown in Figure 1, should be mounted higher than the carburetor so as to feed by gravity, while the position of the pump is optional as long as it delivers gasoline from the main fuel supply to the tank 1.

The intake opening 2 is controlled by a valve 8 which is carried by a float 9. The latter closes the intake valve when the level of the gasoline reaches a predetermined maximum level as indicated by the dotted line 10. The discharge of gasoline normally takes place through the overflow pipe 11, the upper end of which extends to within close proximity of the maximum level while its lower end connects with the outlet 5. Thus, in normal operation, the float maintains the fuel in the tank at a constant level and fuel is delivered to the carburetor at constant pressure through the overflow pipe 11, the pressure depending upon the relative height of the fuel level above the carburetor.

If, for some reason, the fuel supply furnished by the pump stops, as for lack of fuel in the main tank of the automobile or for failure of the pump to properly function, the fuel level in the tank 1 recedes until it is flush with the upper end of the overflow pipe 11 and thereupon further feed to the carburetor stops and the motor vehicle comes to a stand still as soon as the small supply in the carburetor is exhausted.

But the reserve supply in the tank 1 is still available and the operator may now rely on this supply to take him to the nearest service station.

To render the reserve supply available I provide a second discharge opening 12 near the bottom of the tank which connects with the opening 5 and the tube 6 but which is normally closed by the valve 13 having a rod 14 extending vertically through the top 15 of the tank. Suitable packing 16 is provided to prevent leakage about the rod and the valve is normally closed by the spring 17 bearing down on a collar 18 secured to the rod.

The upper end of the rod 14 is connected to a crank lever 19 and the latter may be operated

from the driver's seat through a handle 20 on the dashboard and a cable 21 connecting the handle with the lever. When the rod is raised for opening the valve a catch 22 pivoted in the lug 23 depending from the top of the tank is moved underneath the collar 18 under the influence of the weight of a long lever arm 24 and automatically holds the valve in open position.

The opening of the valve opens up a new supply for the carburetor. As the level of the reserve supply sinks the float sinks until it reaches a stop 25 which is in the nature of a spider secured in the tank underneath the float and which may also be used as a support for the overflow pipe and for the rod 14. The entire supply of the tank is now available and will probably be sufficient to carry the vehicle to a supply station.

After the main tank has been filled again and the pump is set in operation, the tank 1 begins to fill and as it rises to a position near the maximum height it lifts the float and as the float rises it strikes the lever arm 24 and releases the catch 22 so that the spring 17 returns the valve 13 to its normal and closed position, while the tank feeds the carburetor through the overflow pipe 10.

The lever arm 24 is of considerable length and its outer end descends considerably when the catch engages underneath the collar 18 so that it will be struck by the float before the maximum level has been reached by the rising fuel. The collar 18 is shown as being tapered and when it rides downward along the catch it has a tendency to throw the latter outward and to thereby raise the arm 24 well away from the float.

A filler cap 25 is provided in the top of the tank 1 and is formed with a vent 26 and a check valve 27 which allows air to escape but which would close against rising liquid so as to prevent leaking in case the float control should fail and the tank should fill beyond the maximum level.

The form thus far described depends on gravity feed and the pressure at which the fuel is delivered at the carburetor depends upon the level of the gasoline in the tank. Since the level is constant under normal operating conditions, the pressure at which the gasoline is delivered to the carburetor is constant.

It frequently happens that, under the influence of excessive heat, as when traveling in the desert or when the engine becomes too hot, the gasoline in the feed pipe begins to vaporize and interferes with the proper feeding of gasoline to the carburetor. This is known as vapor lock and becomes quite troublesome, especially when traveling under unusual conditions where assistance is not easily obtained. My invention does away with vapor locks since any vapor formed in the fuel line will naturally rise into the air chamber above the gasoline in the tank 1 and will disappear through the vent 26.

In the form shown in Figure 2 a special feature is added to that of Figure 1, namely means for providing pressure in the air chamber, so that the delivery at the carburetor may be under pressure in addition to that of the head of liquid, and means permitting the pressure to be regulated. In most points this construction is the same as in Figure 1 and the changes consist in the elimination of the vent from the filler cap 25' and the substitution of a movable and adjustable vent in connection with the rod 14.

It will be noted that the latter is formed with a groove or slot 28 in the upper portion thereof. This groove or slot is dimensioned so that when the rod 14 is in valve closing position, as shown in the figure, the upper end of the groove is underneath the top of the packing gland 29 and is closed thereby so that no venting takes place. When the valve is raised, however, the upper end of the groove rises above the gland while the lower end is still in communication with the inside of the tank so that now the groove is operative as a vent.

This construction has the following effect: When the valve 13 is opened for drawing on the reserve supply, air is free to enter through the vent to fill the vacuum caused by the receding liquid. When the tank is filled again, with the valve 13 still open, the rising liquid pushes the air through the vent until the float 9 trips the catch and thereby closes the valve 13. This brings the slot or groove 28 below the gland so that the tank is now hermetically sealed and the air remaining in the tank will be compressed by the further rise of the liquid until the latter reaches its maximum level. Thus the body of liquid is under pressure during normal operation.

The degree of pressure depends, of course, upon the amount of air compressed and the latter depends upon the timing of the vent valve. The sooner the vent valve closes the more air will be trapped and the later it closes, the less air.

To permit the amount of air to be regulated I mount the pivot 30 for the catch 22, on a movable rod 31 which is threaded into a sleeve 32 rotatably mounted in the top of the tank and held against endwise motion so that the rod may be lowered and raised by turning the sleeve. The pivot for the lever 19 may be mounted on the same rod without affecting the operation of the lever.

The lowering of the rod causes an earlier closing of the vent and a larger amount of trapped air with a corresponding increase in pressure, while the rising of the rod causes a delayed closing of the vent and less air trapped with a correspondingly smaller degree of pressure.

I claim:

1. In combination, a carburetor, a fuel pump, a tank having an intake directly connected to the pump and an outlet directly connected to the carburetor for normally feeding the same, control means for the outlet adapted to build up a reserve fuel supply in the tank, means for automatically shutting off the feed from the tank to the carburetor when the reserve fuel supply sinks below a predetermined level, manually controlled means for releasing the reserve fuel supply for feeding the carburetor, automatically operating means for holding the latter means in fuel releasing position and automatically operating means for returning said means to non-releasing position when the level of the fuel in the tank again rises above the predetermined fuel level.

2. In combination, a tank for holding fuel, an outlet for the same, a valve for the outlet having means urging the valve into closed position, means for opening the valve, a catch for holding the valve in open position and a float riding on the fuel having means for releasing the catch when the fuel rises to a predetermined height.

3. In combination, a tank for holding fuel, an outlet for the same, a valve for the outlet having a rod extending through the top of the tank, a collar on the rod, spring means bearing on the collar and urging the valve into closed position, means for longitudinally moving the rod for opening the valve, a catch engageable with the collar for

holding the valve in open position, an arm projecting from the catch and a float riding on the fuel adapted to raise the arm for releasing the catch when the fuel rises to a predetermined height.

4. In combination, a tank for holding fuel, an outlet for the same, a valve for the outlet having a rod extending through the top of the tank, a collar on the rod, spring means bearing on the collar and urging the valve in closed position, means for longitudinally moving the rod for opening the valve, a catch engageable with the collar for holding the valve in open position, an arm projecting from the catch and a float riding on the fuel adapted to raise the arm for releasing the catch when the fuel rises to a predetermined height, the collar being tapered to swing the catch outward for lifting the arm away from the float.

5. In a reserve fuel supply, a tank having a feed inlet and means for feeding fuel therethrough, a valve for the inlet having a float for closing the same when the fuel reaches a predetermined level, a vent for the tank and means operated by the float prior to the closing of the fuel inlet valve for closing the vent whereby a pressure is built up in the tank.

6. In a reserve fuel supply, a tank having a fuel inlet and means for feeding fuel therethrough, a valve for the inlet having a float for closing the same when the fuel reaches a predetermined level, a vent for the tank and means operated by the float prior to the closing of the fuel inlet valve for closing the vent whereby a pressure is built up in the tank, the latter means being adjustable for predetermining the level at which the float closes the vent and for thereby regulating the pressure obtained.

7. In combination, a tank for holding fuel and having a fuel outlet, a valve for the outlet, means for seating the valve to close the outlet, a catch engageable with the valve for holding the valve in open position, an arm projecting from the catch, and a float riding on the fuel and positioned to raise the arm for releasing the catch when the fuel in the tank rises to a predetermined height and means for guiding the float with freedom of limited vertical movement.

8. In combination, a tank for holding a fuel supply and having an inlet and an outlet, means for supplying fuel to the tank through the inlet, a valve for closing the inlet and having a float for operating the valve, a valve for the outlet having means to close the same, means for opening the outlet valve, a catch engageable with the outlet valve to hold the latter in opened position, and means operated by the float to release the catch when the fuel in the tank rises to a predetermined height.

9. In combination, a tank for holding a fuel supply having a fuel intake, a fuel outlet and a vent, valves for the intake, outlet and vent and a float in the tank having means for controlling all three of the valves.

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