June 6, 1939. F. C. DALTON 2,161,409

GASOLINE SAVER AND VAPOR LOCK REMOVER

Filed Jan. 24, 1938 2 Sheets-Sheet 1

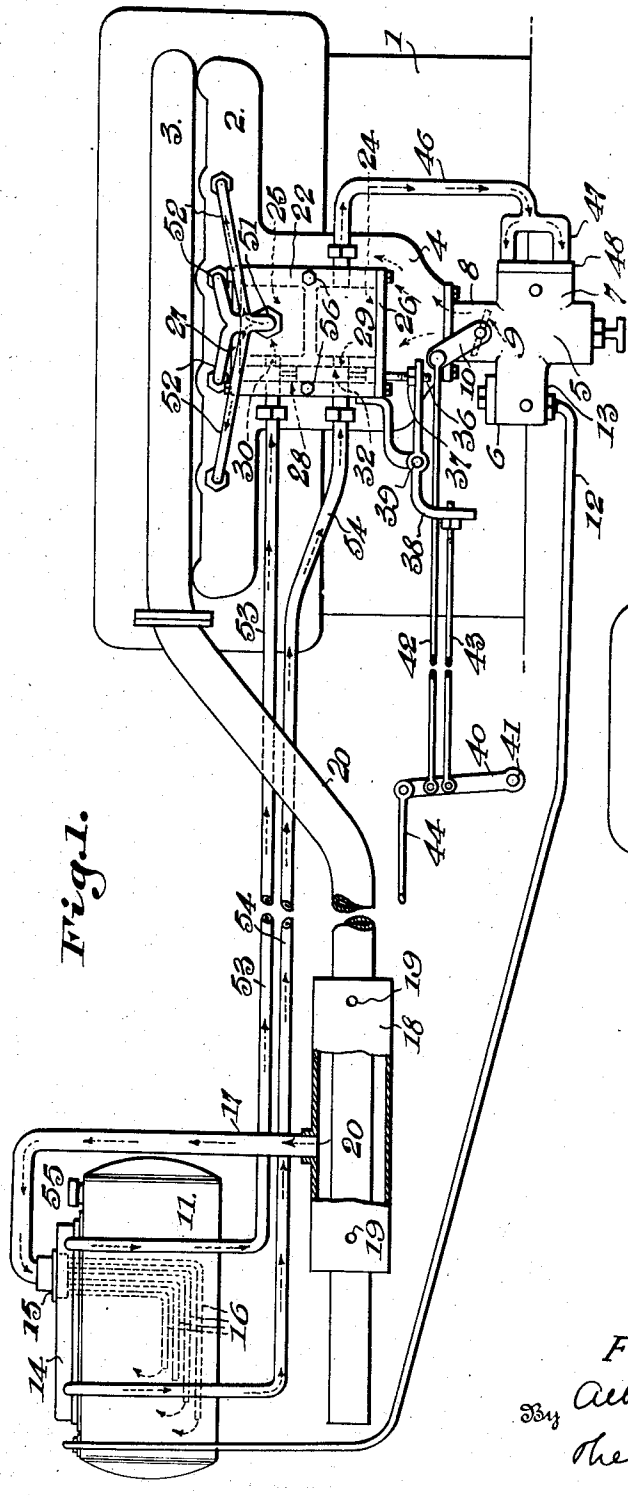


Fig. 1.

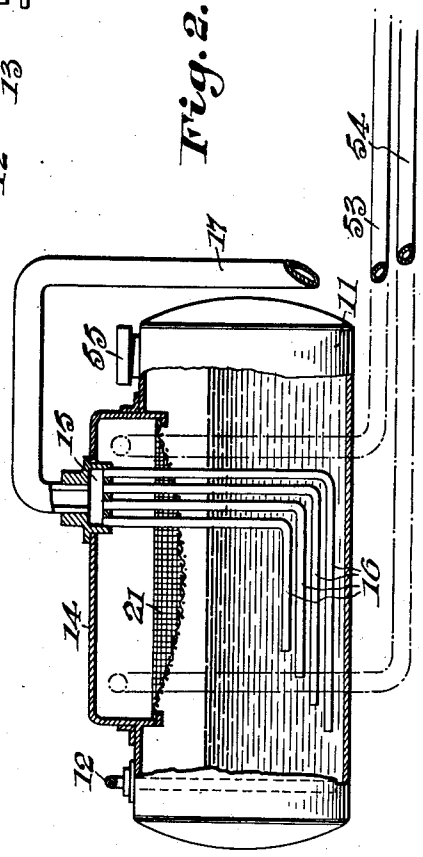


Fig. 2.

Inventor

F. C. Dalton

By Albert G. Dieterich and Theodore H. Rutley Attorneys

June 6, 1939. F. C. DALTON 2,161,409

GASOLINE SAVER AND VAPOR LOCK REMOVER

Filed Jan. 24, 1938 2 Sheets-Sheet 2

Fig. 3.

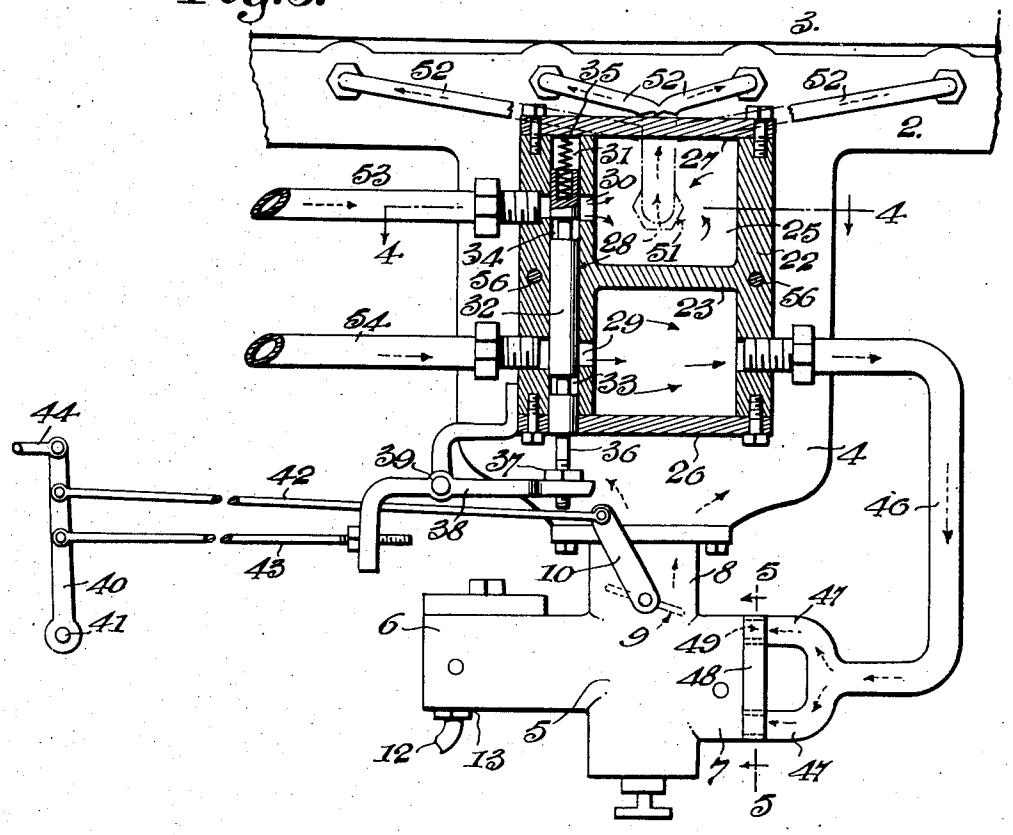


Fig. 4.

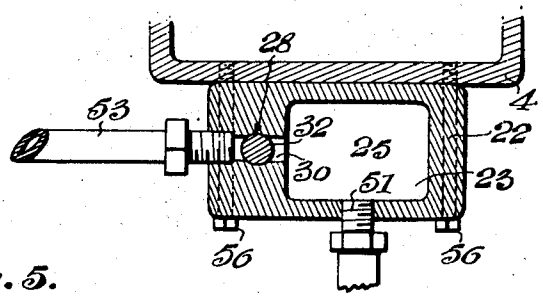
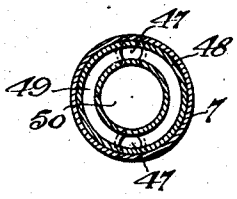


Fig. 5.



Inventor

F. C. Dalton

Albert E. Dieterich

and

Theodore H. Rutley

By

Attorneys

Patented June 6, 1939

2,161,409

UNITED STATES PATENT OFFICE

2,161,409

GASOLINE SAVER AND VAPOR LOCK REMOVER

Frederick C. Dalton, Portland, Oreg., assignor of one-fourth to W. H. Darby, Salem, Oreg., and one-fourth to E. R. Dalton, Portland, Oreg.

Application January 24, 1938, Serial No. 186,712

9 Claims. (Cl. 123—119)

My invention relates to the art of internal combustion engines and particularly to the charge-forming and controlling mechanism thereof. In modern engine practice, where the gasoline to and from the carburetor is often heated to high temperatures, vaporization occurs in the feed line and causes what is known as vapor lock, which often causes stalling of the engine. It also happens that carburetors are not always adjusted to or capable of giving the most efficient mixture, which results in waste of fuel with a consequent low mileage per gallon of gasoline factor for the vehicle. Again, owing to the vent to atmosphere in the gasoline storage tank, considerable gasoline vapor is lost.

It is to overcome the above deficiencies that my apparatus has been devised.

Other objects will in part be obvious and in part will be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention still further resides in those novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, and then will be pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1 is an elevation (the arrangement of the parts being schematic) of a portion of an engine, and the gasoline tank and the exhaust pipe, equipped with my invention.

Figure 2 is an enlarged detail elevation and part section of the gasoline tank, equipped with my invention.

Figure 3 is an enlarged detail vertical section showing the vapor and gasoline heating device and the valve mechanism for controlling passage of gasoline and vapor through the same.

Figure 4 is a detail horizontal section on the line 4—4 of Figure 3.

Figure 5 is a detail cross section on the line 5—5 of Figure 3.

In the drawings, in which like numbers of reference designate like parts in all the figures, 1 represents the engine (which may be of any of the usual types), 2 the intake manifold, 3 the exhaust manifold, 4 the "hot-spot" portion of the intake manifold, and 5 the carburetor (which latter may be of any of the usual approved types).

The carburetor 5 has the usual float-valve controlled gasoline receiving chamber 6, the air intake 7, the outlet neck 8 and throttle valve 9 whose shaft carries a lever 10 to which the accelerator pedal (not shown) is connected, as will more fully appear later.

The gasoline storage tank 11 is provided with a vapor tank 14 on top, which tank 14 communicates with the tank 11 through a suitable screen 21. The filler cap 55, when my invention is used, is unperforated or ventless.

Gasoline is conveyed from tank 11 to the float-valve chamber 13 by the usual pipe line 12 (see Figure 1).

The vapor tank 14 carries an air vent manifold 15 from which a series of small tubes 16 project into the tank 11 and have their outlet ends arranged to discharge the air at different levels and different places beneath the surface of the gasoline in tank 11 (see Figure 2). The manifold 15 receives heated air from an air heater 18 by means of a pipe 17. The heater 18 receives heat from the exhaust pipe 20 on which it is mounted, suitable air inlets 19 being provided in the heater 18.

Referring now particularly to Figures 3 and 4, it will be seen that a heater 22 is secured to the "hot-spot" portion 4 of the manifold 2 by cap screws 56, or by any other suitable means.

The casing of the heater 22 is chambered and the chambered portion is divided into two separate chambers 24 and 25 by a partition 23, these chambers being provided with removable caps 26 and 27 respectively. The casing is also bored to provide a valve chamber 28 for the control valve 32.

29 and 30 indicate the valve controlled inlet ports to the chambers 24 and 25 respectively, while 45 and 51 designate the respective outlet ports of these chambers.

The valve 32 has a recess 31 to receive the valve closing spring 35 and it also has passes 33 and 34 for registering with ports 29 and 30 respectively when the valve is in the open position. The valve 32 has a stem 36 with an adjusting nut 37 (for timing adjustments) and is moved to its open position by a bell-crank lever 38 pivoted at 39 and connected to the rocking lever 40 by a rod 43.

Another rod 42 connects lever 40 to lever 10 so that both valves 9 and 32 are operated together. Lever 40 is suitably pivoted at 41 and is connected with the accelerator pedal (not shown) by the rod 44.

A pipe 52 connects port 51 to the intake manifold 2 and a pipe 46 connects port 45 to the air inlet end 7 of the carburetor 5, the latter connection being made by means of an annular plug 48 having an annular groove 49 to which the

branches 47 of pipe 46 lead. The center of the plug being open serves as an air inlet 50 for the usual air supply to the carburetor.

A pipe 53 conducts vapors from tank 14 to chamber 25 via port 30, while a similar pipe 54 conducts vapors from tank 14 to chamber 24 via port 29.

Operation

When rod 44 is pushed forward to rock lever 40 clockwise in Figure 3 both valves 9 and 32 are actuated through rods 42 and 43 and levers 10 and 38 respectively. The suction of the motor will then draw vapors from tank 14 via pipes 53—54 to heater 22, to manifold 2 via pipes 52, at intake ports and to carburetor 5 via pipe 46. As the vapor passes through the heater 22 it is heated to gaseous form before passing to the motor via manifold and carburetor, which effects a considerable saving of gasoline and increases the gasoline-mileage factor accordingly. Of course, as gasoline and vapors are withdrawn from tanks 11 and 14, warm air enters via 18, 17, 15, 16 to prevent formation of a partial vacuum.

When valve 32 is opened the draw on the needle valve in the carburetor is considerably less than usual and this, together with the use of the vapor that would ordinarily be lost, enables engines which are equipped with my invention to operate at the highest efficiency.

While I have illustrated the preferred embodiment of the invention, I desire it understood that changes and modifications can be made without departing from the spirit of the invention or the scope of the appended claims.

From the foregoing it is thought that the construction, operation and advantages of the invention will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In apparatus of the class described, in combination with an engine having an intake manifold, a carburetor having a throttle valve, a fuel inlet, an air intake and means delivering air and fuel mixture to said manifold via said throttle valve, a gasoline tank and a pipe line for conveying gasoline from said tank to said fuel inlet, of means for drawing vapors from the gasoline tank and delivering a part of the same directly to said intake manifold by the suction of the engine and another part directly to the air intake of said carburetor, and means controlling the flow of said vapors in harmony with the action of said throttle valve.

2. In apparatus of the class described, in combination with an engine having an intake manifold, a carburetor having a throttle valve, a fuel inlet, an air intake and means delivering air and fuel mixture to said manifold via said throttle valve, a gasoline tank and a pipe line for conveying gasoline from said tank to said fuel inlet, of means for drawing vapors from the gasoline tank and delivering a part of the same directly to said intake manifold by the suction of the engine and another part directly to the air intake of said carburetor, means controlling the flow of said vapors in harmony with the action of said throttle valve, and a vapor heater mounted on said intake manifold and through which said vapors are drawn before delivery to said intake manifold and said carburetor.

3. In apparatus of the class described, in combination with an engine having an intake manifold, a carburetor having a throttle valve, a fuel inlet, an air intake and means delivering air and fuel mixture to said manifold via said throttle valve, a gasoline tank and a pipe line for conveying gasoline from said tank to said fuel inlet, of means for drawing vapors from the gasoline tank and delivering a part of the same directly to said intake manifold by the suction of the engine and another part directly to the air intake of said carburetor, means controlling the flow of said vapors in harmony with the action of said throttle valve, and means for drawing heated air into said tank to displace the vapors and gasoline withdrawn from the tank.

4. In apparatus of the class described, in combination with an engine having an intake manifold, a carburetor, having a throttle valve, a fuel inlet, an air intake and means delivering air and fuel mixture to said manifold via said throttle valve, a gasoline tank and a pipe line for conveying gasoline from said tank to said fuel inlet, of means for drawing vapors from the gasoline tank and delivering a part of the same directly to said intake manifold by the suction of the engine and another part directly to the air intake of said carburetor, means controlling the flow of said vapors in harmony with the action of said throttle valve, a vapor heater mounted on said intake manifold and through which said vapors are drawn before delivery to said intake manifold and said carburetor, and means for drawing heated air into said tank to displace the vapors and gasoline withdrawn from the tank.

5. In a motor vehicle having a gasoline tank, an internal combustion engine that has intake and exhaust manifolds, an exhaust pipe, a liquid fuel carburetor, and a connection for conveying gasoline from said tank to said carburetor; a fuel-saving and vapor-lock preventing apparatus comprising a vapor-collecting space carried by the gasoline tank, a pipe line connecting said space to the intake manifold of the engine, another pipe line connecting said vapor-collecting space with the air inlet of the carburetor, a common heater connected in said pipe lines for heating the vapors passing through said lines, a valve device controlling the flow of vapors through said heater, a throttle valve controlling said carburetor, and means simultaneously actuating both of said valves.

6. In a motor vehicle having a gasoline tank, an internal combustion engine that has intake and exhaust manifolds, an exhaust pipe, a liquid fuel carburetor, and a connection for conveying gasoline from said tank to said carburetor; a fuel-saving and vapor-lock preventing apparatus comprising a vapor-collecting space carried by the gasoline tank, a pipe line connecting said space to the intake manifold of the engine, another pipe line connecting said vapor-collecting space with the air inlet of the carburetor, a common heater connected in said pipe lines for heating the vapors passing through said lines, a valve device controlling the flow of vapors through said heater, a throttle valve controlling said carburetor, means simultaneously actuating both of said valves, an air heater, and means operable by the suction in the gasoline tank, as gasoline and vapors are withdrawn therefrom, for conveying air from said air heater and delivering it into said gasoline tank.

7. In a motor vehicle having a gasoline tank, an internal combustion engine that has intake and exhaust manifolds, an exhaust pipe, a liquid fuel carburetor, and a connection for conveying gasoline from said tank to said carburetor; a fuel-saving and vapor-lock preventing appa-

ratus comprising a vapor-collecting space carried by the gasoline tank, a pipe line connecting said space to the intake manifold of the engine, another pipe line connecting said vapor-collecting space with the air inlet of the carburetor, a common heater connected in said pipe lines for heating the vapors passing through said lines, a valve device controlling the flow of vapors through said heater, a throttle valve controlling said carburetor, means simultaneously actuating both of said valves, an air heater, and means affected by the suction in the gasoline tank, as gasoline and vapors are withdrawn therefrom, for conveying air from said air heater and delivering it into said gasoline tank below the liquid level and at a number of different points.

8. In apparatus for the purposes described, a vapor heater designed for mounting on the "hot-spot" portion of the intake manifold of an engine, said heater comprising a body having two separate vapor heating chambers, inlet and outlet ports for the respective chambers and a valve-receiving bore intersecting the inlet ports, a single valve in said bore to control the inlet ports of both chambers, and spring means normally holding said valve closed, in combination with a duct from one of said chambers to the intake manifold of an internal combustion engine and a duct from the other of said chambers to the air inlet of the carburetor of the engine, and means to conduct gasoline vapors to said inlet ports.

9. In an apparatus for supplying fuel vapor to an engine having an intake manifold and a carburetor, a body having two separate vapor-receiving chambers, inlet and outlet ports for the respective chambers, and a valve-receiving bore intersecting the inlet ports, a single valve in said bore for controlling the inlet ports of both chambers, and spring means normally holding said valve closed, means for conveying vapor from one of said chambers to the intake manifold of an internal combustion engine, means for conveying vapor from the other of said chambers to the air-inlet of the carburetor of that engine, and means to conduct gasoline vapors separately to said inlet ports.

FREDERICK C. DALTON.