June 4, 1929. L. MARTIN 1,716,074

AIR AND LIQUID FUEL VAPORIZING, MIXING, AND FEEDING DEVICE

Filed Feb. 17, 1927

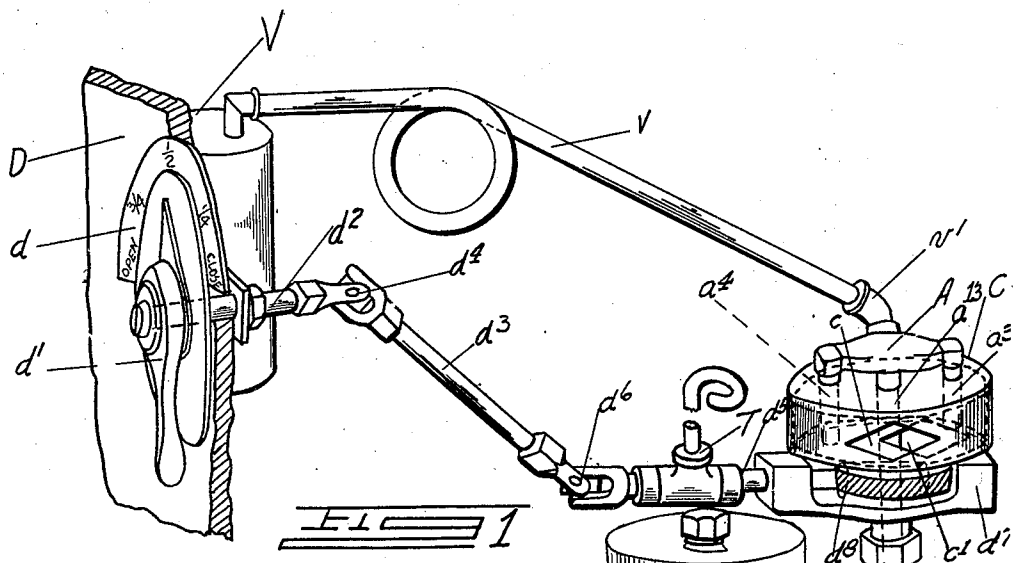


FIG 1

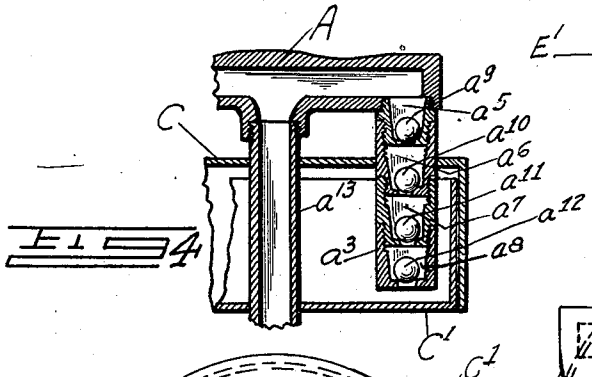


FIG 4

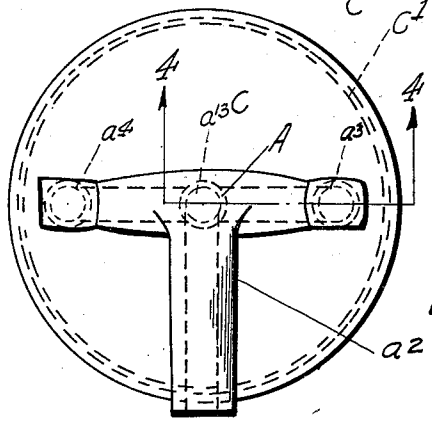


FIG 2

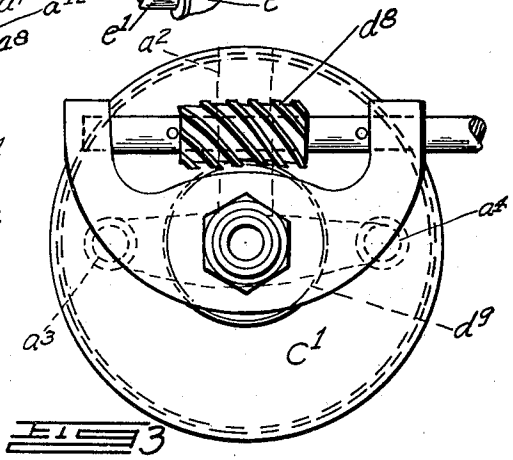


FIG 3

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UNITED STATES PATENT OFFICE.

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AIR AND LIQUID-FUEL VAPORIZING, MIXING AND FEEDING DEVICE.

Application filed February 17, 1927. Serial No. 169,081.

My invention relates to a device for supplying a mixture of gas vapor and air to the carburetor outlet of an internal combustion engine; is adapted to be connected on its intake side to the top of a vacuum tank and on its outlet side to the carburetor outlet and fuel supply pipe to the motor.

The principal object of the invention is to supply more air to the carburetor which is made possible by first mixing it with vapor of the fuel gas, and to supply it in such a manner as will never allow a breaking of the vacuum in the vacuum tank. Devices now in use for this purpose supply too much air and permit the vacuum to be broken, resulting in emptying the vacuum tank of its contents. The passages which admit air in my device are provided with a plurality of valves adapted to seat by gravity preventing the air from passing continuously thru these passages and causing it to pass intermittently in pulsations by the operation of the valves in the passage. Present devices having a single valve will when sufficient air is admitted, cause the valve to remain unseated for a substantial period of time, thus opening the passage to a continuous flow of air breaking the vacuum in the vacuum tank and causing a discontinuance of the supply of gasoline to the vacuum tank.

Another object of my invention is to preheat the air so mixed with gasoline vapor and passed to the engine by first passing it thru a warming chamber and to provide means for readily adjusting the quantity of air admitted to this chamber so as to maintain the efficiency of the device at all outside temperatures. Former devices were practically useless in cold weather.

The particular embodiment of my invention selected for illustration is an air and gas vapor feeding device adapted for use on a motor vehicle driven by a gasolene engine.

Fig. 1 is a perspective of such mechanism installed in a motor vehicle, the means for adjusting the openings in the heating chamber, the vacuum tank and its connections to the device which is the subject of this invention and the carburetor being shown, all other parts of the vehicle being broken away. The air inlet in the side of the warming chamber is shown partly open.

Fig. 2 is a top plan view of the device only.

Fig. 3 is an under plan view of the device showing the adjusting worm and screw, and

Fig. 4, a detail, is a vertical axial section on the line 4—4 of Fig. 2.

Referring now to the drawings and particularly Fig. 1, D represents the dash board of an automobile upon the face of which is secured in any convenient manner the graduated dial face plate d. Extending thru the dial d is the rod d^2 to the outer end of which is rigidly secured the combined indicating finger and operating handle d^1, provided to regulate the supply of air to be admitted to the air warming chamber hereinafter more fully described.

A connecting rod d^3 is attached at one end to the rod d^2 by universal joint d^4 and at its other end to rod d^5 by universal joint d^6. The rod d^5 extends thru and is supported by a yoke d^7 supported under the air warming chamber formed by the telescoping cups C, C^1. Fixed to the rod d^5 and between the forks of the yoke d^7 is a worm d^8 constantly in mesh with the worm gear d^9 fixed to the underside of the cup-shaped member C^1 so as to rotate it and close the opening formed by the co-acting apertures c, of the outside member and c^1 of the inside member.

V is the usual vacuum tank extending from top of which is the vapor supply line pipe v. The pipe v is connected thru the elbow v^1 to the manifold A above the casing member C.

The air supply pipes a^3, a^4 are secured to the underside of the manifold A at each end thereof and terminate at their lower ends within the chamber formed by the cup-shaped casing members C, C^1. Within each pipe a^3, a^4 are four ball valves a^9 a^{10}, a^{11} and a^{12}, each having a suitable seat and operating within their chambers a^5, a^6, a^7, a^8 respectively. Connected with the lower side of the manifold A at its center is the pipe a^{13} which passes thru the chamber formed by C, C^1 and extends into the gas supply pipe E, which is the main connection between the carburetor E^1 and the motor, not shown. The pipe e^1 and its connection e shown here connected with the bottom of the carburetor E^1 is the gasoline supply pipe. T shown here fitted on to the rod d^5 is a support for the device which is fastened on to the top of the motor head, not shown, in any convenient manner.

The operation of the device is as follows:—

Casing member C^1 is rotated causing the coacting apertures c, c^1 to register in whole or in part to admit the desired quantity of air into the chamber formed by C, C^1. If

the engine is cold and the weather cold, the opening should be very slight; if warmer, more air should be admitted, and this is readily adjusted by the driver from his seat by means of d^1. The air enters the said chamber and is considerably warmed by the heat from the engine; then passing upwardly thru the pipes a^3 and a^4 lifting the valves a^{12}, a^{11}, a^{10}, a^9 from their seats, one after the other, allowing the air to pass thru the chambers a^8, a^7, a^6, a^5 respectively. The air then comes into contact with the gas vapor from the pipe v, and being mixed together pass downwardly thru the pipe a^{13} into the pipe E.

It can be readily seen that due to the pulsation caused by one valve unseating at a time that only a limited amount of air can be passed into the gas vapor conduit and that at no time will such amount of air be permitted to enter as to cause the vacuum in the vacuum tank to be broken, and thus cut off the supply of fuel. As stated in the preamble, with the devices using only one valve, the valve becomes unseated permanently with the entering of a quantity of air and consequently breaks the vacuum and discontinues the fuel supply, causing the engine to become temporarily inoperable.

Having described my invention I do not wish to limit myself to the precise form of device shown but claim as within the scope of my invention all devices readable on the annexed claims.

I claim as my invention and desire to secure by Letters Patent of the United States:—

1. A device for supplying aerated vaporized fuel to an internal combustion engine; comprising in combination, a manifold having a chamber in which the fuel vapor and air mix, means for admitting fuel vapor to said manifold, means for admitting air to said manifold, a plurality of suction operated valves arranged in series in said air admitting means thru each of which valves the air admitted to said manifold must pass and an outlet from said manifold thru which said mixture of vapor and air flows.

2. A device for supplying aerated vaporized fuel to an internal combustion engine; having in combination a manifold having a chamber in which the fuel vapor and air mix, an opening in said manifold to admit fuel vapor, a tube connected at one of its ends to said manifold and open at its other end to admit air, a plurality of suction operated valves in said tube thru each of which the air admitted to said manifold must pass and an outlet opening in said manifold thru which the aerated vaporized fuel passes out.

3. A device for supplying aerated vaporized fuel to an internal combustion engine; having in combination a manifold having a chamber in which the fuel vapor and air mix, an opening in said manifold to admit fuel vapor, said manifold having a depending tubular portion open at its lower end, a plurality of valves in said tubular portion adapted to seat by gravity and so arranged that the air admitted to said manifold must pass each of said valves in order, a seat and a chamber for each of said valves, and an outlet opening from said manifold thru which the aerated vaporized fuel passes.

4. A device for supplying aerated vaporized fuel to an internal combustion engine; having in combination, a manifold having a chamber in which the fuel vapor and air mix, an open orifice in said manifold to admit fuel vapor, said manifold having a plurality of depending tubular portions open at their lower ends, a plurality of valves in said tubular portions adapted to seat by gravity and so arranged that the air admitted passes each of said valves in order in said tubular portions, a chamber for each of said valves, a seat for each of said valves, and a constantly open orifice in said manifold thru which the aerated vaporized fuel passes.

In testimony whereof I have hereunto set my hand.

LOUIS MARTIN.