April 21, 1931. J. MUHR 1,801,446

CHARGE SUPPLY MEANS FOR INTERNAL COMBUSTION ENGINES

Filed July 21, 1926

Fig. 1.

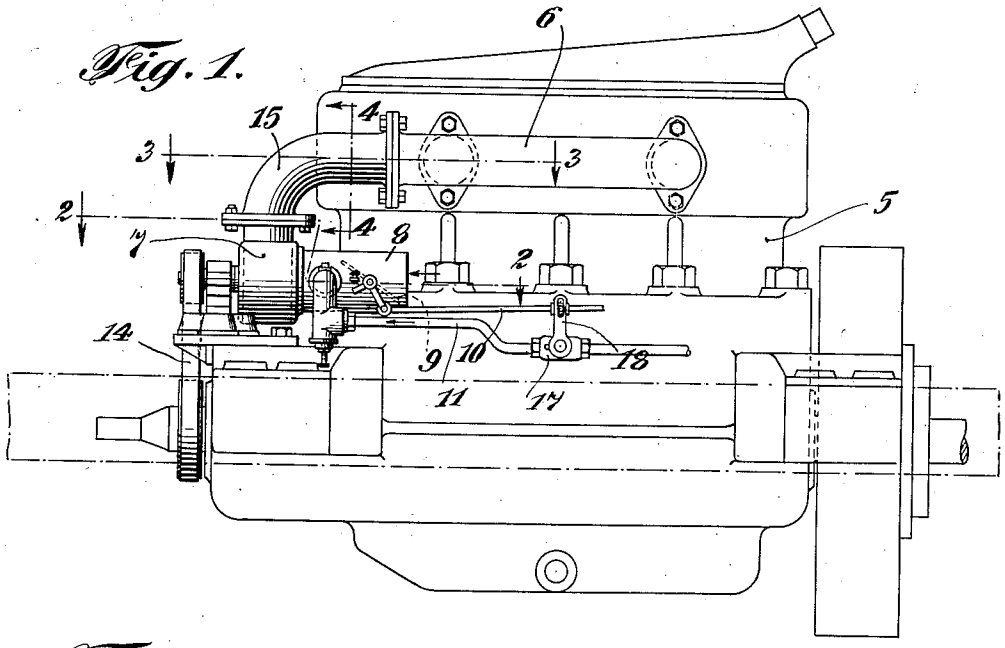


Fig. 2.

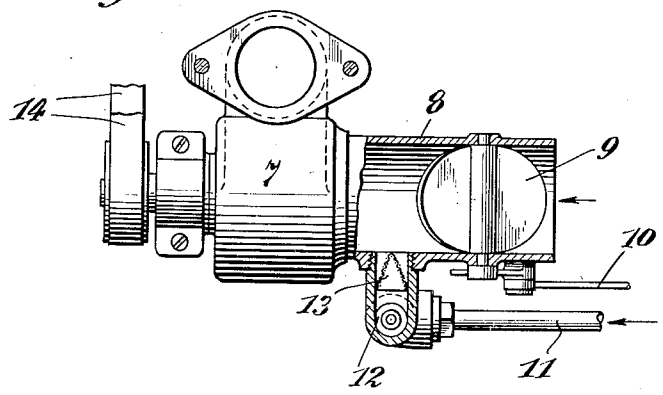


Fig. 4.

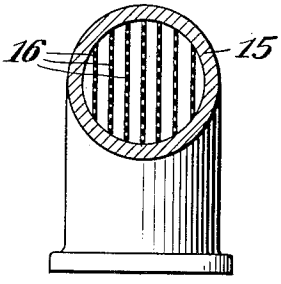
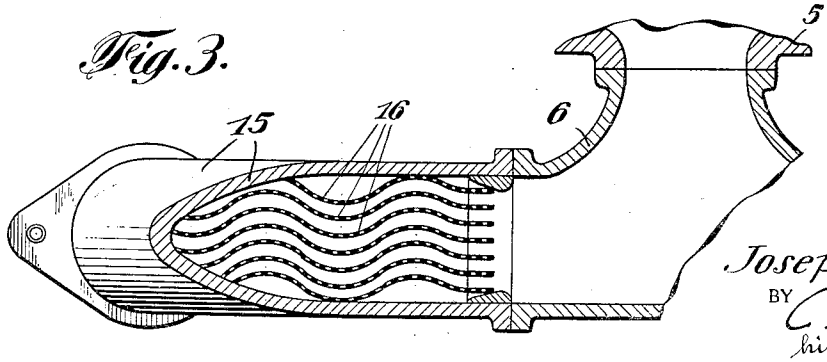


Fig. 3.



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UNITED STATES PATENT OFFICE

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CHARGE-SUPPLY MEANS FOR INTERNAL-COMBUSTION ENGINES

Application filed July 21, 1926. Serial No. 123,913.

This invention relates to charge supply means for internal combustion engines, and has for its primary object to provide a relatively simple means for producing a combustible charge from low grade fuels and supplying the same under pressure to the engine cylinders.

It is a more particular object of the invention to provide a combustible charge supply means wherein the usual carburetor is dispensed with and in lieu thereof means are employed for mechanically atomizing the relatively heavy fuel and securing a proper admixture of the atomized fuel with the requisite volume of air and discharging said mixture under pressure into the engine cylinder.

More particularly, in one practical embodiment of the invention, I provide a rotary suction blower having an air intake throttle valve and a fuel supply connection between the blower intake and the fuel tank or reservoir, said connection being provided with a fuel atomizing screen. Suitable means is also employed for variably regulating the ratio of air and fuel entering the blower, and in an outlet connection between the blower and the intake manifold of the engine, a plurality of sinuous foraminous screens or plates are arranged through and between which the mixture is driven under pressure and the solid fuel particles further atomized before entering the engine cylinders. I have found in actual practice that a good combustible mixture of properly proportioned quantities of kerosene or other low grade fuel and air may thus be obtained.

It is a further general object of the invention to provide a charge supply means for internal combustion engines as above characterized which may be produced at relatively low manufacturing cost and is adaptable to various types of motor vehicle engines now in common use, the several parts of the mechanism being of substantial construction so that they are not liable to get out of order and require more or less frequent repair.

With the above and other objects in view, the invention consists in the improved charge supply means and in the form, construction and relative arrangement of its several parts as will be hereinafter more fully described, illustrated in the accompanying drawing, and subsequently incorporated in the subjoined claims.

Referring in detail to the drawing, wherein I have illustrated one simple and practical embodiment of the invention, and in which similar reference characters designate corresponding parts throughout the several views,—

Figure 1 is a side elevation of a conventional type of motor vehicle engine having my improved charge supply means applied thereto;

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged horizontal sectional view taken on the line 3—3 of Fig. 1, and

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 1.

Referring in detail to the drawing, the engine generally indicated at 5 is provided with the usual intake manifold 6 attached to the cylinder head.

Upon one side of the engine and preferably adjacent the rear end thereof a rotary suction blower of any suitable form shown at 7 is mounted. The intake 8 of this blower has an air throttle valve 9 mounted therein, preferably of the butterfly type and actuated by the rod 10.

Between the blower fan and the valve 9, the fuel supply pipe 11 extending from the fuel tank or reservoir is connected with the intake by a suitably formed coupling 12. In this coupling a fuel atomizing screen 13 is arranged. This screen is preferably of conical form and made of fine wire gauze, the apex of said conical screen extending toward the blower intake 8.

Any suitable driving means may be provided for the blower fan such for instance, as the belt 14 between the fan shaft and the rear end of the motor shaft. The outlet side of the blower casing is connected by the elbow 15 with the rear end of the intake manifold 6. In this elbow connection 15, and preferably extending the en-

tire length thereof, a plurality of spaced parallel foraminous plates or screens 16 are arranged, said plates being of sinuous form or provided with serpentine curves therein.

A suitable control valve 17 is arranged in the fuel supply pipe 11, and any suitable operating connections indicated at 18 may be provided between this valve and the rod 10 for adjusting the air throttle valve 9, so that as the latter valve is adjusted to vary the volume of air entering the intake of the blower 7, the proportionate volume of fuel entering the blower intake is also varied in inverse ratio to the air.

The operation of the device above described will be readily understood. Thus, in the rotation of the blower fan, a partial vacuum is induced in the fuel supply pipe 11 and the fuel is drawn by suction through said pipe and the atomizing screen 13. At the same time, the induced suction effect causes air to be drawn past the throttle valve 9 where it mixes with the liquid fuel as it enters the blower casing. Within said casing, the fan blades thoroughly mix the liquid fuel and air and thoroughly break up the solid particles of fuel. The mixture is then driven under pressure from the outlet of the blower casing through the connection 15 to the intake manifold 6 and in the passage of the mixture through said connection, the air and fuel is caused to violently impinge against the series of sinuous perforated plates or screens 16 and pass between and through the same so that the fuel particles are further atomized and reduced to a more or less molecular condition. This fuel and air mixture is driven under pressure by the blower fan into the respective engine cylinders and independently of the suction effect induced by the operation of the pistons in said cylinders. Thus, the mixture is violently impinged against the heated cylinder walls and the mist-like particles of fuel are instantly converted into vapor. Thus, a highly combustible mixture may be produced with the use of a relatively low grade fuel since the volatility of the fuel is not relied upon to secure the proper admixture of the fuel and air but this result is obtained primarily by the mechanical atomization of the liquid fuel. Thus, I am enabled to dispense with the use of the usual carburetor containing many delicate parts requiring frequent adjustment and repair. Tests which I have made of my invention proved highly satisfactory, and I have succeeded in using kerosene and other low grade fuels as a substitute for gasoline in the operation of such motor vehicle engines.

The point I would emphasize is this: The value of this device lies in the fact that it forces the fuel to mix with the air; heavy fuel can be used, because vaporization does not depend on the volatility of the fuel, as in carburetors in use on gas engines now. My idea behind this device was this, that any inflammable substance can be made to explode, provided the proper amount of air is mixed with it, for instance dust explosions in mills or smut explosions in threshing machines. That is the reason for the screens in the intake and discharge pipes of the device, to force the globules of the fuel to thoroughly mix with the air and form an explosive mixture.

The main value of the device is to enable the engine to be run on heavy fuel, to start on heavy fuel and to start in cold weather without any heating device.

I do not lay so much stress on the plenum of air in the cylinders as on the forceful mixing of the two elements—fuel and air.

In the foregoing description and the accompanying drawing, I have disclosed an embodiment of the invention which I believe to be entirely practical. Nevertheless, it is to be understood that the several detail parts thereof as herein shown might be variously modified and otherwise arranged, and I accordingly reserve the privilege of resorting to all such legitimate changes therein as may be fairly embodied within the spirit and scope of the invention as claimed.

I claim:

1. In charge supply means for supplying low grade fuel to an internal combustion engine, consisting of a blower casing containing a fan, an air supply connection joined to the casing, a fuel supply connection joining the air supply connection adjacent said casing and provided with means for dividing low grade fuel as it issues into the air supply, to provide under operation of the fan for breaking up the divided particles and for thorough intermixture with the air, a feed conduit united to the casing and having connection with the manifold intake of the engine to receive the air and fuel intermixture under pressure of the fan, said conduit being subdivided into a series of shallow serpentine flow paths through which the air and fuel intermixture is forcibly fed under fan pressure, whereby to effect further division of the fuel particles and thorough reintermixture with the air before delivery to the manifold intake.

2. In charge supply means for supplying low grade fuel to an internal combustion engine, consisting of a blower casing containing a fan, an air supply connection joined to the casing, a fuel supply connection joining the air supply connection adjacent said casing and provided with means for dividing low grade fuel as it issues into the air supply, to provide under operation of the fan for breaking up the divided particles and for thorough intermixture with

the air, a feed conduit united to the casing and having connection with the manifold intake of the engine, and a series of baffle elements disposed within the conduit lengthwise thereof, said elements being spaced apart and parallel and continuously curved first in one direction laterally and then in the opposite direction laterally so that the intermixture will be forcibly and continuously impinged thereon during passage through the conduit to further atomize the fuel and reintermix it with the air before delivery to the manifold intake.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

JOSEPH MUHR.