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GAS AND VAPOR SEPARATOR

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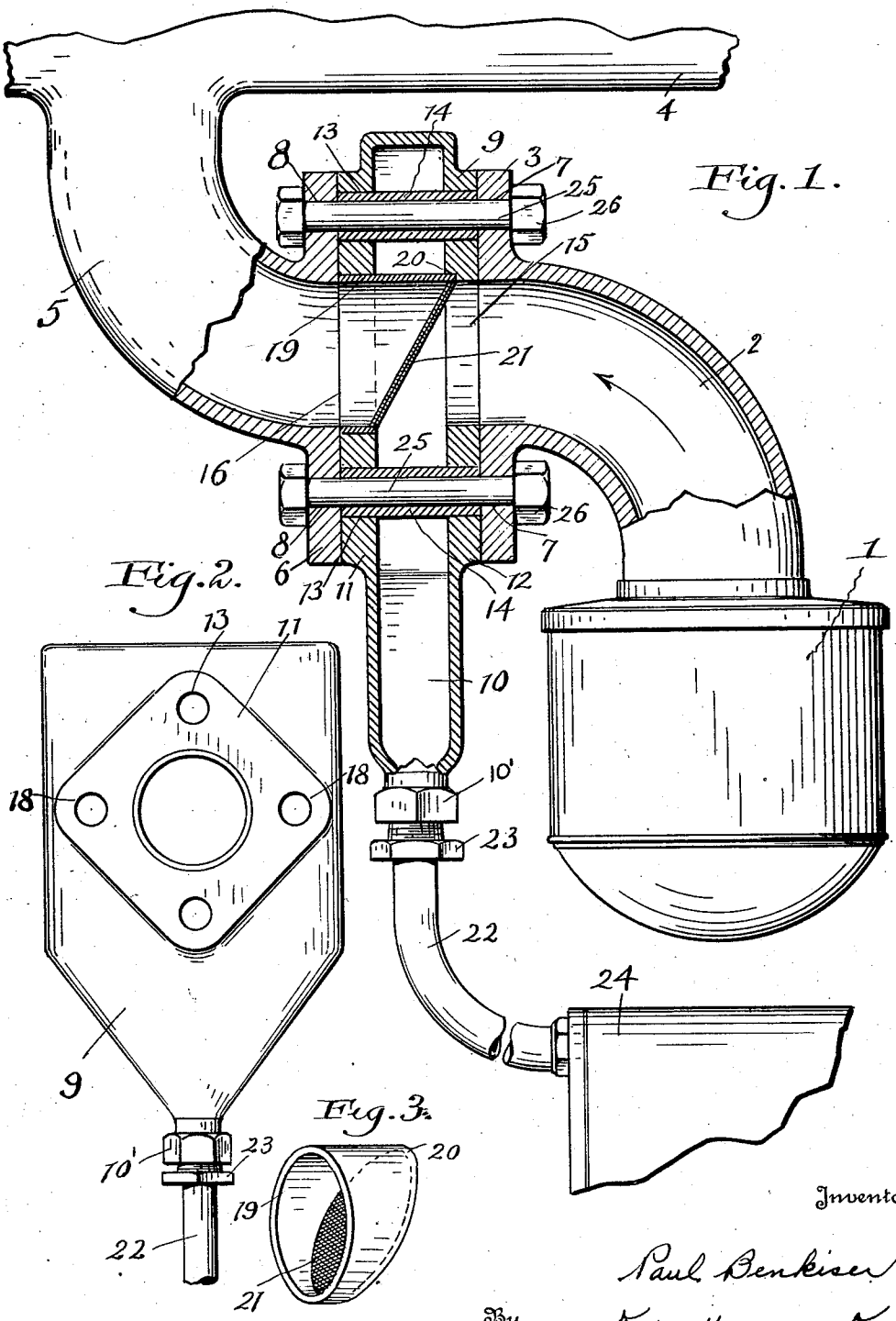


Fig. 1.

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE

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GAS AND VAPOR SEPARATOR

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My invention relates to a fuel separator for use in connection with internal combustion engines and the like, and is especially designed for separating the liquid fuel from the vapor as it is drawn from the carburetor into the cylinders of the engine.

An object of my invention is to provide a device which is very simple in construction, efficient in operation, and a device which can be easily attached between the carburetor and the intake manifold of the combustion engine.

Another object of my invention is to provide a device which is capable of actually separating, substantially, all of the liquid fuel from the vapor as it is drawn from the carburetor so that only a vapor gas is supplied to the combustion chamber of the engine, thereby aiding in its efficiency, preventing the formation of carbon upon the pistons and cylinder head, and substantially eliminating the possibility of any liquid fuel working down into the oil between the pistons and the cylinder walls, thereby eliminating the necessity for changing the oil as often as is now required.

A still further object of my invention is to provide a means for receiving the liquid fuel as it is drawn off through the device. The fuel so drawn off may be emptied into the main gas tank and used further, thereby producing more miles per gallon than the cars at present produce with the present system of carburation.

A still further object of my invention is to provide a device which is capable of removing dust particles from the vapor and liquid fuel as it is drawn from the carburetor and thereby further assuring the cleanness of the oil in the motor.

With the objects above indicated and other objects hereinafter explained, in view, my invention consists in the construction and combination of elements hereinafter described and claimed.

Fig. 1 is a side elevational view of a carburetor and portion of an intake manifold showing in section the details of my invention.

Fig. 2 is an end view of my invention showing the means for attaching the same to the flanges of the intake manifold and the carburetor.

Fig. 3 is a perspective view of the filtering means.

In the drawings 1 indicates the usual carburetor of an internal combustion engine and is provided with an outlet pipe 2 which has a flange 3 formed at its outer end. The usual manifold 4 attached to the engine (not shown) is provided with an inlet pipe 5 which has a flange 6 formed at its lower end. The flanges 3 and 6 have provided in their outer ends holes 7 and 8 respectively. Ordinarily these two flanges are secured together by means of bolts and the fuel from the carburetor is drawn into the intake manifold and subsequently into the combustion chamber. This fuel is in the form of vapor and liquid fuel and the vapor ignites within the combustion chamber but the liquid fuel does not. Consequently the liquid gas, or a great portion of it, lodges upon the top of the pistons where it forms carbon deposits and some works down between the piston and the cylinder walls finally mixing with the oil. This is one of the reasons why it is necessary to drain off the oil every so often.

It is the purpose of my invention to provide a device which will practically eliminate this condition and at the same time increase the efficiency of the engine.

The device comprises a chamber 9 which is provided with an internal pocket 10 and terminates at its lower portion in a tapered end. The end of the chamber 9 has formed thereon a head 10′ the interior of which is screw-threaded.

On the outer faces of the chamber 9 there are formed bosses 11 and 12 which extend substantially to a distance corresponding in length to the length of the flanges 3 and 6. At the outer ends of the bosses holes 13 are provided whose centers are on the same radius as the holes 7 and 8 in the flanges 3 and 6. These holes 13 are, however, drilled to a larger diameter than the holes in the flanges and are adapted to receive therein a sleeve 14 which extends through the chamber 9 and are flush with the faces of the bosses 11 and 12. These sleeves 14 are provided for the

purpose of strengthening the chamber 9 and preventing it from becoming crushed upon being clamped in position.

The chamber 9 is provided with an inlet opening 15 which communicates with the outlet opening of the carburetor 1 and an outlet opening 16 which communicates with the inlet opening of the intake manifold 4.

The bosses 11 and 12 are further provided with holes 17 and 18 which extend in the same manner as the holes 7 and 8 but whose axis is 90° therefrom. These holes are provided for attaching the device to engines the carburetors of which are not located in the position indicated in Fig. 1.

A piece of tubing 19 is secured within the outlet opening 16, which is of a larger diameter than the inlet opening 15. The tubing is sheared off angularly from a point 20 within the upper inner face of the chamber 9 of the inlet opening 15 and extends downwardly to the inner lower face of the outlet opening 16.

A piece of fine mesh screen 21 is secured to the sheared edge of the tube 19 so that it is impossible for any fuel to pass through the discharge opening except through the screen 21. This screen may be made from a plurality of screens placed one upon the other and all joined at their outer edges, the number of screens depending upon the degree of separation required. It should be noted that the tube 19 and the screen 21 entirely enclose the discharge opening so that any fuel which is drawn from the carburetor 1 is compelled to pass through the screen 21 before it can enter the combustion chamber of the engine.

A pipe 22 is provided with screw threads at one end and adapted to engage with the screw threads of the head 10. A lock nut 23 is provided upon the end of the pipe 22 and by tightening the nut, will firmly hold the pipe 22 in any desired position. The opposite end of the pipe is secured to an air-tight receptacle 24 which is provided for holding the separated liquid as it falls by gravity from the chamber 9.

In attaching the device to the engine the chamber 9 is introduced between the flange 3 of the carburetor 1 and the flange 6 of the intake manifold 4. The holes of the flanges and the holes of the chamber are aligned and a bolt 25 is inserted through both holes and the parts are drawn together by means of a nut 26. It should be understood that in attaching the device care should be taken to see that the discharge opening 16 registers with the opening in the flange 6 of the intake manifold 4.

With the device in proper place the fuel is drawn, by means of the intake manifold 4, from the carburetor 1 and is subjected to quite a blow as it hits the screen 21. This has a tendency to break up the fuel into vapor and liquid fuel and the vapor is permitted to pass through the screen 21 and into the intake manifold. This provides a good combustible mixture and free from the liquid fuel. The liquid fuel, at the point of separation, runs down the screen 21 as it cannot pass therethrough due to the fine mesh of the screen 21, and into the lower portion of the pocket 10 of the chamber 9. The unvaporized fuel which is not permitted to pass through the screen 21 passes to the lower portion 10 of the receptacle 9 due to gravity, from whence it passes from the pipe 22 into the receptacle 24.

The liquid fuel also carries with it, as it is drawn off, all dust particles or dirt and these accumulate in the bottom of the receptacle 24.

It will be noted that inasmuch as the receptacle 24 is air-tight a negative pressure will exist therein during operation of the engine, due to the negative pressure existing in the intake manifold, so that when the velocity of the liquid particles in the fuel mixture is arrested by their contact with the screen 21 they will fall by gravity into the pocket 10 and by way of the pipe 22 into the receptacle 24.

It should be noted that this liquid fuel is not permitted to enter the internal combustion engine except upon passing again through the carburetor 1 and through the screen 21 in the form of vapor.

It is to be understood that I am not to be limited to the specific construction described herein as it will be apparent and may be necessary to modify the device therefrom without departing from the spirit of the invention as set forth in the claims.

Having thus described my invention, I claim:

1. In a device of the type described, a chamber provided with an inlet opening and an outlet opening, adapted to be interposed between the carburetor and the intake manifold of an internal combustion engine, separating means adapted to fit within the outlet opening and extending angularly to within the inlet opening, the said means being adapted to permit the passage of vaporized fuel therethrough but to prevent the passage of unvaporized fuel, and means for drawing off the unvaporized fuel into a receptacle independent of the fuel supply.

2. In a device of the type described, a chamber provided with an inlet opening and an outlet opening, bosses on the outer faces thereof, apertures extending through said bosses, sleeves within said apertures, separating means adapted to fit within the outlet opening and extending angularly to within the inlet opening, and a further opening for drawing off the separated liquid.

3. In a device of the type described, a chamber provided with an inlet opening and an

outlet opening, bosses on the outer faces thereof, apertures extending through said bosses, sleeves within said apertures, separating means adapted to fit within the outlet opening and extending angularly to within the inlet opening, a further opening for drawing off the separated liquid and means for receiving the liquid so drawn off.

4. A device for separating unvaporized fuel from the vaporized fuel as it is drawn from a carburetor comprising a chamber having an inlet opening and an outlet opening, a separator disposed between said openings and adapted to permit the passage of vaporized fuel therethrough, but to prevent the passage of unvaporized fuel, and means for drawing off the unvaporized fuel which is not permitted to pass through said separator into a receptacle independent of the fuel supply.

5. A device for separating the unvaporized fuel from the vaporized fuel as it is drawn from a carburetor comprising a chamber having a separator angularly disposed therein and adapted to permit the passage of vaporized fuel therethrough but prevent the passage of unvaporized fuel and means for drawing off the unvaporized fuel into a receptacle independent of the fuel supply.

6. In a device of the type described, a housing provided with an inlet opening and an outlet opening, a screen angularly disposed across the outlet opening, and an opening at the base of the housing.

7. In a device of the type described, a housing provided with an inlet opening and an outlet opening, a plurality of screens angularly disposed across the outlet opening, and an opening at the base of the housing.

In testimony whereof, I hereunto affix my signature.

PAUL BENKISER.