R. M. ROBERTS.

CARBURETER.

APPLICATION FILED AUG. 29, 1910.

1,013,955. Patented Jan. 9, 1912.

Fig. 1.

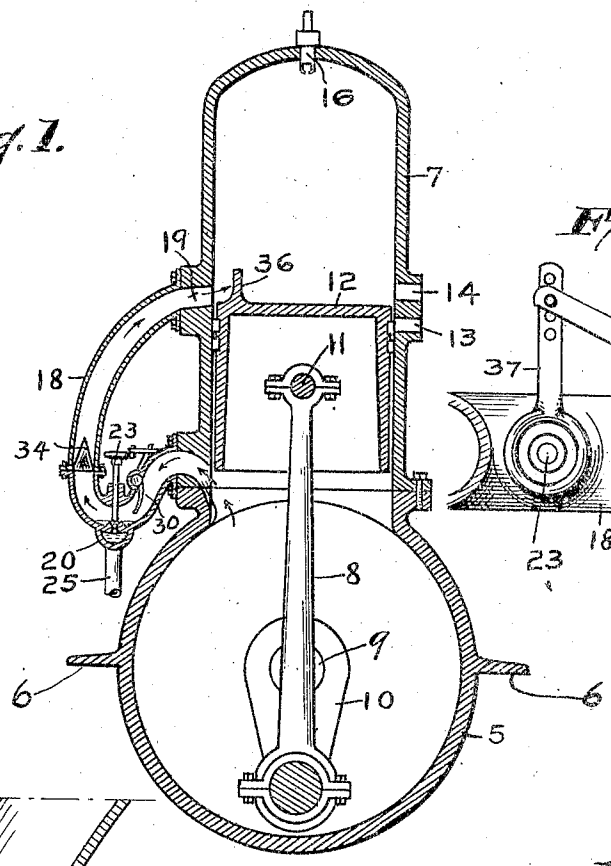


Fig. 4.

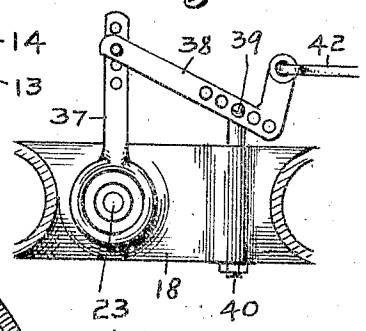


Fig. 2.

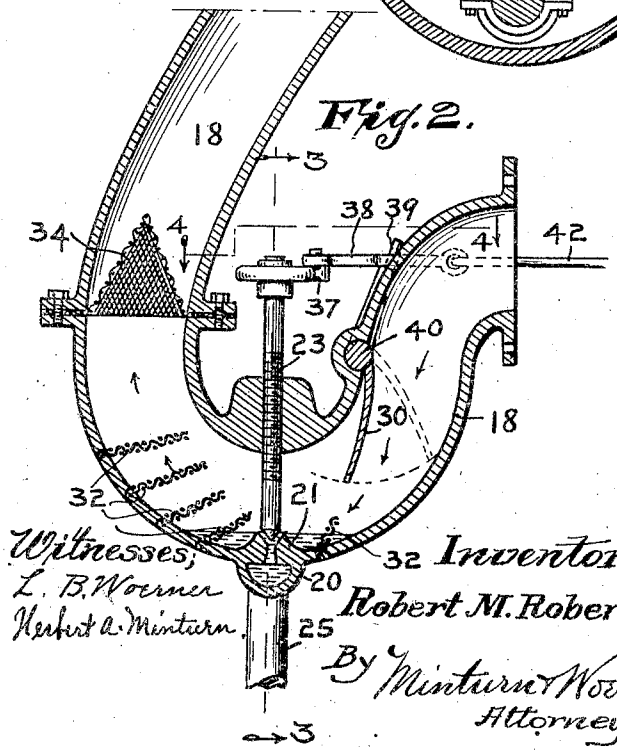
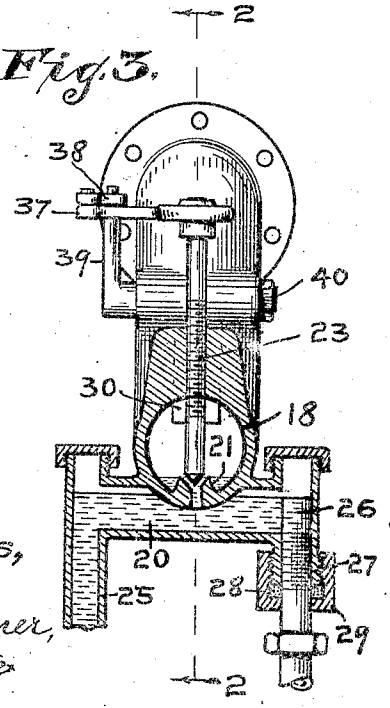


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,013,955. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed August 29, 1910. Serial No. 579,525.

To all whom it may concern:

Be it known that I, ROBERT M. ROBERTS, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to two-cycle explosive engines for automobiles, motor boats and any other purpose for which this type of engine is commonly employed.

The object of the invention is to atomize gasolene or other liquid fuel, to thoroughly mix it with air, and to discharge the mixture into the cylinder of the engine in a dry condition for the sake of economy in fuel and particularly to avoid overheating the engine, as I have found by experience that the more thoroughly the gasolene is vaporized and mixed with air, and the drier this mixture is the less the tendency to overheat the engine will be and greater efficiency in horse power obtained will be the result.

I accomplish the objects of my invention by the mechanism illustrated in the accompanying drawing, in which—

Figure 1 is a view in vertical central section of the two-cycle gas engine embodying my improvements. Fig. 2 is a detail in like section of the carbureting mechanism shown in Fig. 1, but on a larger scale, the view being on the line 2—2 of Fig. 3. Fig. 3 is a vertical section on the line 3—3 of Fig. 2, and Fig. 4 is a detail in plan view and horizontal section on the line 4—4 of Fig. 2.

Like characters of reference indicate like parts throughout the several views of the drawings.

Referring to Fig. 1, 5 is a closed crank case having the outside brackets 6 to rest upon any suitable support or frame and from which the engine and its mechanism are supported. Above the crank case is the vertical cylinder 7 of a two-cycle explosive engine, the lower end of which communicates with the interior of the crank case through an opening which is sufficient for the passage and unobstructed operation of the pitman 8 in the usual manner.

9 is the engine crank shaft and 10 the crank, within the crank case 5, to which the lower end of the pitman 8 is connected, and the upper end of the pitman is connected with a pin 11 carried by a piston 12 which operates within the cylinder 7. The cylinder 7 is provided with an air inlet port 13 positioned so as to admit air to the cylinder below the piston 12 when the latter is at the upper end of its stroke in said cylinder. The air thus admitted is forced down and compressed within the crank case 5 by the downward movement of the piston 12. Above the air inlet port 13, through the wall of cylinder 7 is an exhaust port 14 which is closed by the piston 12 except when the latter is at the lower end of its travel, and when that condition of the movement of the piston obtains the exhaust port 14 is open for the free escape of the products of combustion accumulated by an explosion of the hydro-carbon mixture in the upper end of the cylinder. At the top of the cylinder is the usual sparking plug 16.

The air compressed in the crank case 5 by the downward travel of the piston 12 discharges through a pipe 18 leading from the top of the crank-case and entering the cylinder through the port 19, located just above the top of the piston when the latter is at the lowest point of its travel. The pipe 18, after it leaves the crank case, extends downwardly in a curve as shown, and then upwardly in a curve thereby forming a trap-like receptacle at the bottom of said downward bend, and discharging into the pipe 18 at the bottom of this downward bend is the hydro-carbon fuel supply which it is desired to vaporize and mix with the air being forced through pipe 18 by the compression in crank case 5. Located under the downward bend of the pipe 18, and here shown as formed integrally therewith, is a transverse cylindrical reservoir 20 which has communication with the interior of pipe 18 through a suitable perforation, as shown, and this perforation is surrounded, on the interior of pipe 18, by a dam or flange 21 which, by projecting up within the bend of pipe 18 as it does, forms a reservoir within said pipe 18 which will retain the liquid hydro-carbon, preferably gasolene, in the cavity surrounding the flange 21, of a depth equal to the height of said flange. The supply opening through flange 21 will be formed conically at its upper end into a seat for a needle valve 23. The needle valve 23 enters the pipe 18 through the suitably constructed top wall of the latter, as clearly shown in the drawing, and the size of the

discharge opening from the cylindrical reservoir 20 into the pipe 18 will be regulated by the adjustment of the valve 23.

The gasolene will be supplied to the cylindrical reservoir 20 through a supply pipe 25, by any suitable means as from an elevated tank, or by a pump, neither of which are shown as they are both well known. Located at the opposite end of the cylindrical reservoir 20 is a stand-pipe 26 through which the excess of gasolene in the cylindrical reservoir 20 is carried away from the reservoir and the gasolene maintained at a predetermined uniform height in the reservoir 20, which will be regulated by the height of stand-pipe 26 therein. The height of the stand-pipe 26 is readily varied by screwing it in or out of the sleeve-extension 27 and a tight joint is obtained by packing 28 and gland 29.

The upstroke of the piston 12 causes a suction through pipe 18 which draws the gasolene from reservoir 20 into the pipe 18, and the excess drains back into the said reservoir, but to make this operation effective and satisfactory in practice it is essential to maintain the gasolene level in the reservoir 20 at a proper height.

The force of the current of air discharged through pipe 18 from the crank case 5 is directed against the body of gasolene in the reservoir around flange 21, by means of a gate valve 30. The position of this valve 30 may be varied to regulate the size of the air passage through pipe 18, and also to vary the impact of the air current upon the gasolene. This air current blows the gasolene into waves and splashes which facilitates its vaporization. This vaporization is also greatly assisted and increased by the presence within the lower bend of the pipe 18 of a series of wire gauze barriers 32. These are introduced by slotting the walls of the pipe by saw-kerfs into which the wire fabric is then introduced and the kerfs closed with solder. Above the barriers 32 is a woven wire strainer 34 which will preferably be conical in shape to increase its area.

By the force of the air, directed by the gate valve 30, the gasolene in the bottom of the lower bend of the pipe 18 is broken into a spray which is beaten into still finer particles against the woven wire barriers 32 by which it becomes atomized and thoroughly mixed with air and therefore comparatively dry, and then it is blown through the strainer 34 which additionally removes any excess moisture, as well as any improper foreign substances, and thus carbureted the explosive mixture is delivered into the upper end of the cylinder 7, and at the time of its discharge to the cylinder it is thrown against a flange 36 formed on the top of piston 12 thereby still further atomizing and mixing the hydro-carbon vapor and air. The upper end of the needle valve 23 has a lateral arm 37 which is connected by a bar 38 with an arm 39 on the stem 40 of the gate valve 30. The bar 38 has a rod 42 which extends to any convenient point for the easy manipulation, and by a longitudinal movement of the rod 42 both valves 23 and 30 will be simultaneously opened or closed which provides a reciprocal control of both gasolene and air. The vertical edges of the valve 30 are shown as parallel, (see Fig. 3), and the width of the valve and its shape do not admit of its forming a complete closure in pipe 18.

Having thus fully described my invention, what I claim as new and wish to secure by Letters Patent, is—

1. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end to the crank-case and at the other to the cylinder, said conduit having a U-shaped bend at its lowest portion and an oil reservoir below said conduit having a discharge opening into the bottom of said U-shaped bend, a flange extending upwardly within the conduit around said opening to form a reservoir therein for gasolene which is drawn by suction caused by the outward stroke of the piston and which is blown into the cylinder through said conduit on the compression stroke of the piston.

2. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end to the crank-case and at the other to the cylinder, said conduit having a U-shaped bend at its lowest portion and an oil reservoir below said conduit having a discharge opening into the bottom of said U-shaped bend, a flange extending upwardly within the conduit around said opening to form a reservoir therein for gasolene which is drawn by suction caused by the outward stroke of the piston and which is blown into the cylinder through said conduit on the compression stroke of the piston, said flange also forming a seat for a needle-valve, and a needle-valve.

3. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end to the crank-case and at the other to the cylinder, said conduit having a U-shaped bend at its lowest portion and an oil reservoir below said conduit having a discharge opening into the bottom of said U-shaped bend, a flange extending upwardly within the con-

duit around said opening to form a reservoir therein for gasolene which is drawn by suction caused by the outward stroke of the piston and which is blown into the cylinder through said conduit on the compression stroke of the piston, said flange also having a seat for a needle-valve, a needle-valve, and a valve in the conduit between the needle-valve and crank-case to regulate the size of the opening in the conduit.

4. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end to the crank-case and at the other to the cylinder, said conduit having a U-shaped bend at its lowest portion and an oil reservoir below said conduit having a discharge opening into the bottom of said U-shaped bend, a flange extending upwardly within the conduit around said opening to form a reservoir therein for gasolene which is drawn by suction caused by the outward stroke of the piston and which is blown into the cylinder through said conduit on the compression stroke of the piston, said flange also having a seat for a needle-valve, a needle-valve, a valve in the conduit between the needle-valve and crank-case to regulate the size of the opening in the conduit, and perforated barriers in the lower bend of said conduit.

5. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end to the crank-case and at the other to the cylinder, said conduit having a U-shaped bend at its lowest portion and an oil reservoir below said conduit having a discharge opening into the bottom of said U-shaped bend, a flange extending upwardly within the conduit around said opening to form a reservoir therein for gasolene which is drawn by suction caused by the outward stroke of the piston and which is blown into the cylinder through said conduit on the compression stroke of the piston, said flange also having a seat for a needle-valve, a needle-valve, a valve in the conduit between the needle-valve and crank-case to regulate the size of the opening in the conduit, and a strainer in the conduit between said needle-valve and the discharge end of the conduit.

6. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end to the crank-case and at the other to the cylinder, said conduit having a U-shaped bend at its lowest portion and an oil reservoir below said conduit having a discharge opening into the bottom of said U-shaped bend, a flange extending upwardly within the conduit around said opening to form a reservoir therein for gasolene which is drawn by suction caused by the outward stroke of the piston and which is blown into the cylinder through said conduit on the compression stroke of the piston, said flange also having a seat for a needle-valve, a needle-valve, a valve in the conduit between the needle-valve and crank-case to regulate the size of the opening in the conduit, perforated barriers in the lower bend of said conduit, and a strainer in the conduit between said needle-valve and the discharge end of the conduit.

7. The combination of a crank, a crank-case, a cylinder opening into said case, means for supplying air to the case, a piston connected with said crank and mounted in said cylinder, a conduit connected at one end of the crank-case and at the other to the cylinder, a gasolene reservoir below said conduit the contents of which are exposed to suction in the conduit which is caused by the outward stroke of the piston whereby gasolene is supplied to said conduit and is then exposed to air forced through the conduit on the compression stroke of said piston which air takes up the gasolene and discharges it into the cylinder, and means for maintaining the gasolene at a predetermined level in said reservoir.

8. The combination, with an explosive engine, of the two-cycle type comprising a cylinder, piston and a crank case to which air is admitted by the travel of the piston, of a conduit conveying air from the crank case and discharging it into the explosive chamber of the engine, said conduit having a U-shaped bend, a gasolene supply opening at the bottom of said bend, an upward flange within the conduit around said supply opening forming a reservoir and a seat for a needle valve, a needle valve, a gasolene reservoir under said bend below the conduit supplying gasolene to the conduit by suction in the latter caused by the outward travel of the piston, means for maintaining the gasolene at a predetermined level in said last reservoir, a gate-valve between the needle valve and crank case within said conduit, and means for opening and closing said needle and gate valves.

9. The combination, with an explosive engine, of the two-cycle type comprising a cylinder, piston and a crank case to which air is admitted by the travel of the piston, of a conduit conveying air from the crank case and discharging it into the explosive chamber of the engine, said conduit having a U-shaped bend, a gasolene supply opening at the bottom of said bend, an upward flange within the conduit around said supply opening forming a reservoir and a seat for

a needle valve, a needle valve, a gasolene reservoir under said bend below the conduit supplying gasolene to the conduit by suction in the latter caused by the outward travel of the piston, means for maintaining the gasolene at a predetermined level in said last reservoir, a gate-valve between the needle valve and crank case within said conduit, means for simultaneously opening and closing said needle and gate valves, and perforated barriers in the lower bend of said conduit.

In witness whereof, I have hereunto set my hand and seal at Anderson, Indiana, this 20th day of August, A. D. one thousand nine hundred and ten.

ROBERT M. ROBERTS. [L. S.]

Witnesses:

WM. ROWLAND,

MASON M. ROBERTS.