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V. J. EMERY.

VAPORIZER FOR HYDROCARBON ENGINES.

APPLICATION FILED DEC. 1, 1902.

NO MODEL.

FIG. 1.

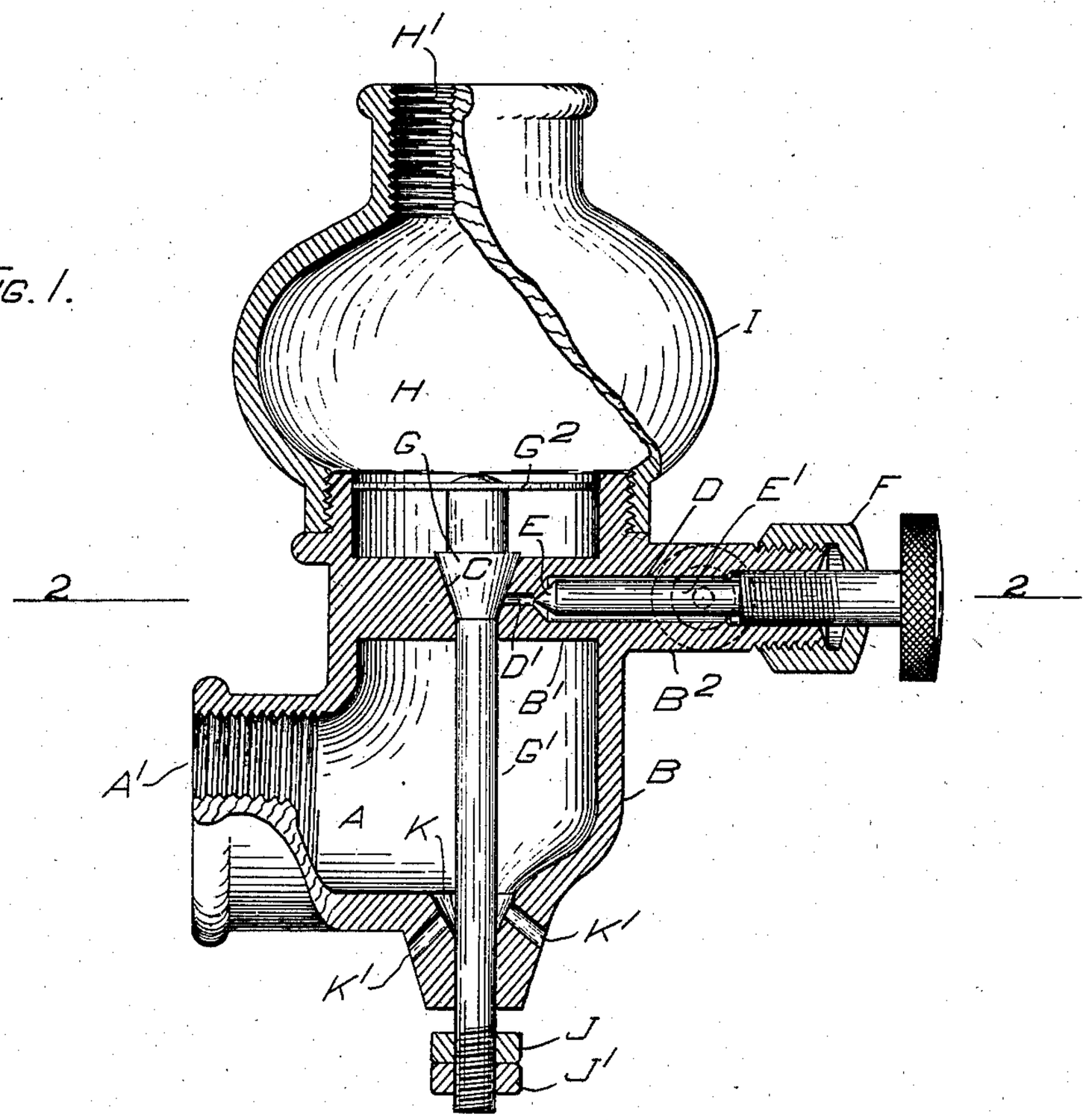
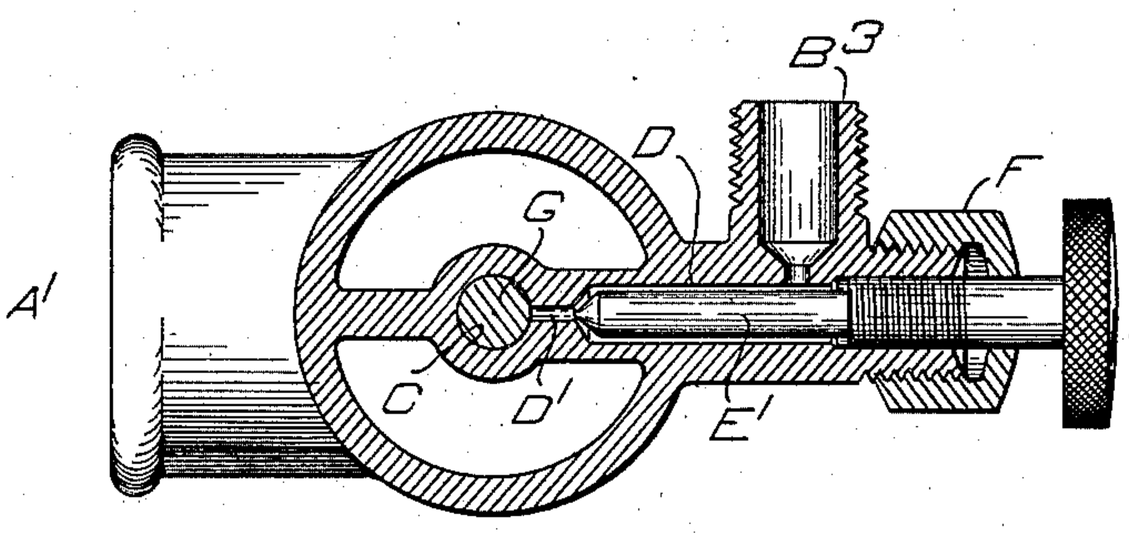


FIG. 2.



WITNESSES

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No. 741,959. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

VICTOR J. EMERY, OF QUINCY, MASSACHUSETTS.

VAPORIZER FOR HYDROCARBON-ENGINES.

SPECIFICATION forming part of Letters Patent No. 741,959, dated October 20, 1903.

Application filed December 1, 1902. Serial No. 133,409. (No model.)

To all whom it may concern:

Be it known that I, VICTOR J. EMERY, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Vaporizers, of which the following is a specification.

My invention relates to vaporizers such as are used in connection with hydrocarbon-engines for vaporizing the oil and mixing it with air to form the explosive mixture introduced into the cylinder.

The object of the invention is to produce a vaporizer which shall be simple and compact in construction, which may be cheaply made, which will not readily get out of order, and which does not require delicate adjustments for its proper and efficient operation. These objects are accomplished by the construction and arrangement of parts hereinafter described, the essential features of which will be specified in the claims.

In the drawings, Figure 1 is a vertical section through the center of my vaporizer; and Fig. 2 is a section on line 2 2, Fig. 1.

As shown in the drawings, the walls of the air-chamber A are formed by a casting B, and this chamber is connected with the air-supply through an inlet A′, extending laterally from the bottom of the air-chamber. The inlet is internally screw-threaded to receive the end of the air-supply pipe. Near the top of the casting B a bar B′ extends radially inward from the wall of the air-chamber, and in this bar is formed a valve-seat C. A lug B^2 projects radially outward from the casting B in line with the bar B′, and in this lug and bar is formed a passage D for the oil. This passage D communicates with the valve-seat C through a smaller passage D′, which is controlled by a conical valve E, formed on the end of a valve-rod E′, which extends through the passage D and is screw-threaded in the end of the lug B^2. A stuffing-box F is screwed onto the end of the lug, and the valve-rod E′ extends through the box F and has a knurled head by which it may be turned to adjust the size of the opening between the passages D and D′. The lug B^2 is provided with a lateral boss B^3, screw-threaded for connection with the oil-supply pipe and provided with an inlet-passage for the oil leading to passage D.

The communication between the oil-passage D′ and the air-chamber is opened and closed by a valve G, formed on a valve-rod G′, which extends down through the air-chamber and through the bottom of the casting B. The casting B extends a short distance above the bar B′, and within this part of the air-chamber is fitted a disk valve G^2, which forms the air-valve for opening and closing the communication between the air and mixing chambers. This valve is secured to the upper end of the rod G′ above the oil-valve G. These valves are so located with respect to each other that the disk valve will enter the cylindric upper end of the air-chamber and move downward therein slightly before the oil-admission valve G has reached its seat. It is obvious that when the valve G^2 is moved upward by the suction of the engine the oil-valve G will be opened first, thereby permitting the oil to flow up over the cross-bar an instant before the air-valve is open. This permits the oil to flow into the path of the air before the same is drawn upward. The walls of the mixing-chamber H are formed by a globular casting I, which is screwed onto the top of casting B and is provided with an outlet H′ at the top internally screw-threaded to receive the end of the pipe leading to the explosion-chamber of the engine-cylinder. When the piston advances on the suction-stroke of the engine, the valve g^2 is raised until it passes out of the upper end of the air-chamber, thereby opening communication between the chamber A and mixing-chamber H. This movement also opens the valve G, so that oil enters below the valve G^2 and is carried up with the air. The oil as it strikes against and passes over the edge of the valve-disk G^2 is broken up and vaporized and becomes mixed with the air as the air and vapor pass through the mixing-chamber H. Means are provided at the lower end of the valve-rod G′ for varying the extent to which the valve G^2 is opened. This means consists of a nut J, screwed onto the end of the valve-rod, which strikes against a boss B^4 on the lower end of the casting B and limits the upward movement of the valve-rod. By adjusting this nut the opening of the valve G^2 may be regulated to vary the amount of air supplied, and consequently the character of the charge, to suit the requirements for different

loads or speeds. The nut J is held in adjusted position by a check-nut J'.

A recess K is formed in the bottom of the chamber A, in which any excess of oil which may pass or leak by the valve G will collect and from which it will pass away through drip-openings K', thereby preventing any undue collection of oil in the air-chamber.

There is a great advantage in forming the horizontal cross-bar B' above the air-inlet A' and just below the outlet from the air-chamber and forming the valve-seat C in the upper side of said bar at the middle thereof, so that the said valve-seat will be at the axial center of the air-chamber A. The result of this is that oil entering the air-chamber through the passage D' will pass upward over the bar B' and will be uniformly distributed in the air-chamber. This bar will to a certain extent break up the air-currents flowing upward through the air-chamber, causing said upward-flowing air to be uniformly distributed. The upward and outward flaring valve G will also aid in breaking up the air-currents and causing a uniform distribution of the oil or gasolene vapor through the air. The valve or disk G^2 at the upper end of the air-chamber will still further break up the air-currents. This disk in conjunction with the transverse horizontal bar will cause such a swirl of air that the vapor will be thoroughly distributed therethrough and will pass into the commingling-chamber H in a thoroughly-mixed condition. It will also be noted that as the valve-disk G is raised the size of the passage around said disk into the commingling-chamber increases by reason of the fact that the walls of the commingling-chamber incline outwardly and upwardly from the top of the air-chamber A. This insures a free movement of the air from the air-chamber A, the volume of air passing out from said chamber increasing as the valve G^2 is elevated. This is of advantage, inasmuch as the charge taken into the cylinder at each suction-stroke may be nicely regulated by adjusting the nuts J and J' on the valve rod or stem G' to limit the upward movement of the valve G^2. By carrying the valve and stem downward and mounting the adjusting and locking nuts on the lower outer end thereof the commingling-chamber is entirely free of obstructions. This is a great advantage, as it permits of a free commingling of the air and vapor therein and enables its full capacity to be availed of.

The air-inlet valve and oil-admission valve and the oil-regulating valve are all mounted in one casting. This is of advantage in that it enables the valves to be accurately fitted to their seats and avoids all danger of disarranging the valves when the parts are assembled on the engine.

The disk valve G^2 and the oil-admission valve G form gravity-closures, no spring being used to hold the valve G to its seat, the weight of these parts being sufficient to quickly and positively close the valves. It will be readily seen, therefore, that the nuts J and J' may be adjusted on the valve-stem to vary the upward movement of the valves without increasing the pressure of the oil-admission valve G on its seat. This is a great advantage, as the resistance of the valves is not increased even though the nuts be so adjusted as to permit only a slight opening of the valves.

What I claim, and desire to secure by Letters Patent, is—

1. A vaporizer comprising, a vertical air-chamber provided with a horizontal cross-bar near its upper end, said chamber being cylindrical above said cross-bar, an upward and outward expanding valve-seat formed in the top of the cross-bar midway its ends, an oil-passage being formed in the said bar its inner end opening to the valve-seat formed therein, a vertical valve-rod working through said cross-bar and through the lower end of the air-chamber, an oil-admission valve on said rod adapted to rest in the valve-seat of the cross-bar, a piston-valve secured to said valve-rod above the oil-admission valve and adapted to fit the cylindric part of the air-chamber, said valve being mounted on the valve-rod in such a position that the piston-valve will enter the air-chamber before the oil-valve is seated, an adjustable valve for controlling said oil-inlet, and adjusting and locking nuts on the lower end of the valve-rod outside of the casing.

2. A vaporizer comprising, a vertical air-chamber formed with an air-inlet at its lower end, a horizontal cross-bar near its upper end, said chamber above the cross-bar being cylindric, an upward enlarged valve-seat in the top of the cross-bar, an oil-inlet formed in said cross-bar and opening to the valve-seat, a central vertical valve-rod mounted in the cross-bar and extending through the bottom of the air-chamber, an oil-admission valve secured to said rod and adapted to rest in the valve-seat of the cross-bar, a piston-valve secured to said valve-rod above the oil-admission valve said valves being so located with respect to each other that the piston-valve will enter the cylinder and move downward therein before the oil-admission valve is seated and the oil-admission valve will be open before the piston-valve is raised out of the cylindric part of the air-chamber, a valve to control the flow of oil to the valve-seat, an adjustable stop-nut on the lower end of the valve-rod outside of the air-chamber, whereby the extent of the upward movement of the valve-rod may be regulated without varying the pressure of oil-admission valve on its seat.

3. A vaporizer formed of a single casting said casting constituting a vertical air-chamber having an air-inlet near its lower end, a horizontal cross-bar near its upper end, the interior of the said chamber being cylindric above said cross-bar, an upward enlarged valve-seat formed in the top of the said cross-bar, an oil-inlet opening through the cross-bar to

said valve-seat, a valve-seat in the cross-bar to receive the oil-controlling valve whereby all the valve-seats will be formed in the single casting, a vertical valve-rod centrally mounted in the air-chamber and extending through the cross-bar and through the lower end of said chamber, an oil-admission valve carried by said valve-rod and adapted to rest in the valve-seat of the cross-bar, a piston-valve secured to said valve-rod above the oil-admission valve, this latter valve being adapted to enter and move down in the cylindric part of the air-chamber before the oil-admission valve is seated, a valve to control the flow of oil, and a stop-nut secured to the lower end of the valve-rod outside of the air-chamber.

In testimony whereof I have affixed my signature in presence of two witnesses.

VICTOR J. EMERY.

Witnesses:

IRA L. FISH,

KATHARINE A. DUGAN.