P. B. HUNT.

FUEL MIXER.

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1,361,260.

Patented Dec. 7, 1920.

Fig. 1.

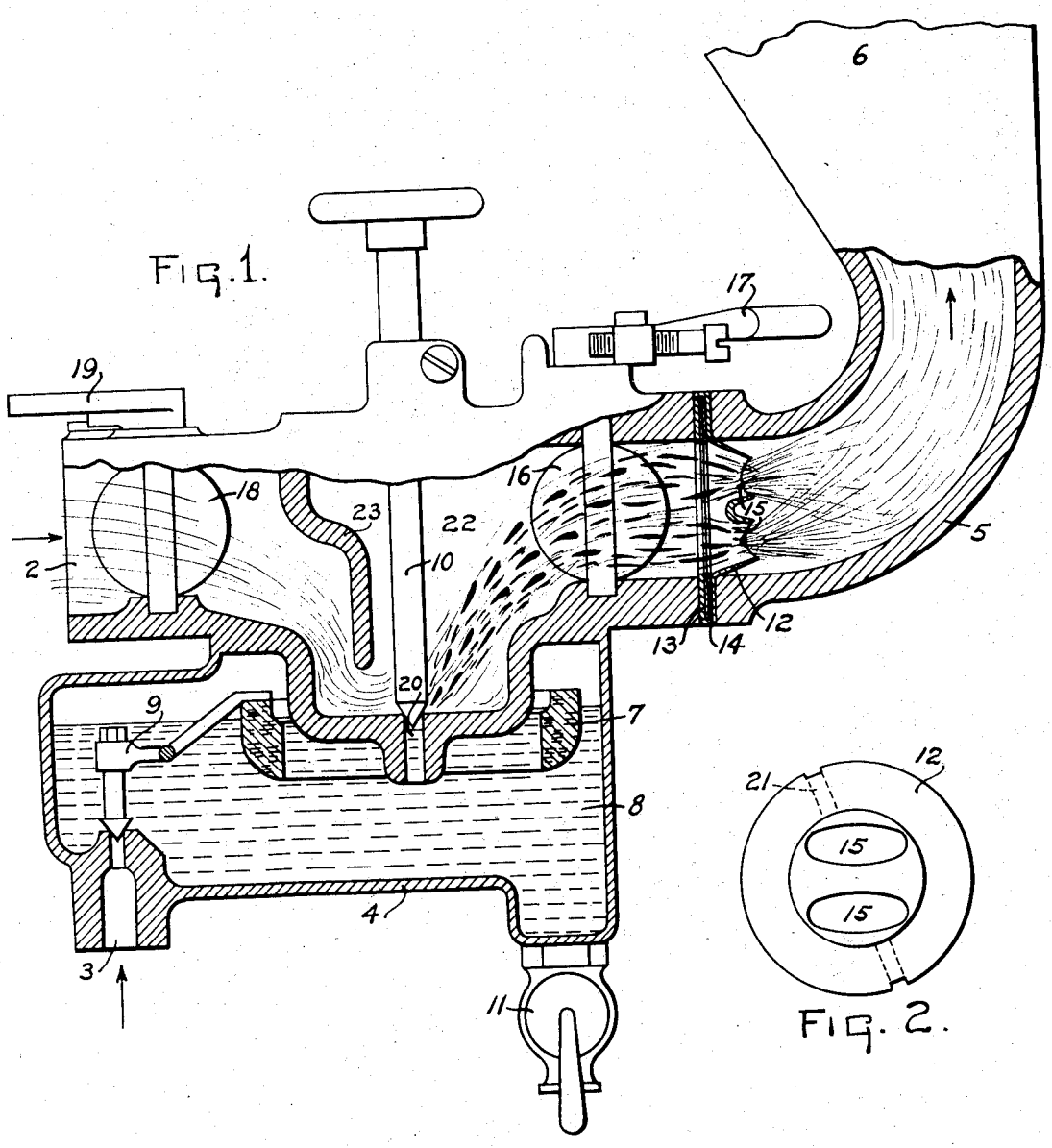


Fig. 2.

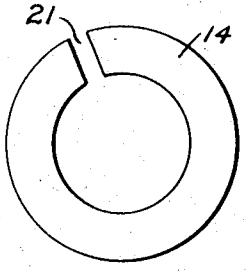


Fig. 3.

INVENTOR-

Paul B Hunt.

UNITED STATES PATENT OFFICE.

PAUL BENSON HUNT, OF WEST ALLIS, WISCONSIN, ASSIGNOR TO HENRY C. CASE, OF MILWAUKEE, WISCONSIN.

FUEL-MIXER.

1,361,260. Specification of Letters Patent. Patented Dec. 7, 1920.

Application filed May 12, 1917. Serial No. 168,107.

To all whom it may concern:

Be it known that I, PAUL BENSON HUNT, a citizen of the United States, residing at West Allis, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Fuel-Mixers, of which the following is a specification.

This invention relates to improvements in the construction of fuel mixers and atomizers for internal combustion engines.

An object of the invention is to provide a fuel mixer and atomizer which is simple in construction and efficient in operation. Another object is to provide a fuel mixer and atomizer especially applicable to automobile engines, which may be readily applied to any of the various standard types of internal combustion traction engines. A further object is to provide a fuel mixer and atomizer which may be sold at a moderate price and which will raise to a maximum the efficiency of an engine when operating with so called "low test" fuels. Still another object is to provide a fuel mixer and atomizer which is automatic in its operation and in which there are no movable or complicated parts which are apt to become inoperative and thus interrupt the operation of the device. A further object is to provide a fuel mixer and atomizer which may be readily manufactured from sheet metal with the use of dies.

A clear conception of an embodiment of the invention may be had by referring to the drawing accompanying and forming part of this specification in which like reference characters designate the same or similar parts in the various views.

Figure 1 is a fragmentary part sectional view of a carbureter, internal combustion engine, and conduit means connecting the carbureter and engine, showing a fuel mixer constructed in accordance with this invention located in the connecting means.

Fig. 2 is an elevation, looking in a direction toward the carbureter, of a fuel mixing and atomizing device.

Fig. 3 is an elevation of one of the elements forming part of the fuel mixing and atomizing device.

Referring specifically to Fig. 1, the ordinary fuel supply system for internal combustion gasolene engines, therein disclosed, comprises a carbureter 4, an engine manifold 6 and a fuel conduit or pipe 5 forming a conduit connecting the carbureter 4 with the engine manifold 6.

The carbureter 4 comprises a casing forming a gasolene chamber 8 and a mixing chamber 22. The chambers 8, 22 communicate through a passage 20, the opening in which is controllable by means of a manually adjustable needle valve 10. The oil is admitted to the chamber 8 through an inlet 3 controlled by a valve 9 operable by means of a cork float 7. The oil may be removed from the chamber 8 by means of a drain cock 11. The air is admitted to the mixing chamber 22 through an air inlet 2 controlled by means of an air throttle valve 18 operable by means of a throttle lever 19. The air passing through the inlet 2 has its velocity gradually increased and is directed toward the passage 20, by means of a downwardly extending baffle wall 23. The mixture of air and oil produced in the mixing chamber 22 passes into the conduit or pipe 5 and to the engine manifold 6, through a mixture throttle valve 16 which is operable by means of a throttle lever 17.

Within the conduit or pipe 5 at a point between the throttle valve 16 and engine manifold 6, is located a fuel mixer and atomizer. This mixer comprises a diaphragm 12 intercepting the conduit 5 and having two constricted openings 15 therethrough surrounded by walls which converge in the direction of flow of the mixture in the conduit 5. The openings 15 are preferably located on opposite sides of the center line of the conduit 5. A washer 13 the periphery of which snugly fits a circumferential rim of the diaphragm 12, is spaced from the flange of the diaphragm 12 by means of two discontinuous spacing washers 14. The washers 14 see Fig. 3 are provided with radial saw cuts 21 which with the mixer assembled, form diametrically opposite radial passages for air extending from the exterior to the interior of the conduit 5. The rim of the diaphragm 12 is cut away at the outer extremities of these air passages. The mixer is preferably formed of sheet metal by the use of dies and is held in position by means of the bolts ordinarily provided to connect the carbureter 4 and conduit or pipe 5.

During the normal operation of the device, air is admitted to the mixing chamber 22 through the inlet 2 past the baffle wall 23, and comingles with oil sprayed into the

chamber 22 past the needle valve 10. The mixture of oil and air passes upwardly within the mixing chamber 22, as indicated in Fig. 1. After passing the throttle valve 16, the mixture of oil and air enters the converging passages in the diaphragm 12. The velocity of the mixture is gradually increased as it passes the converging walls and the stream of mixture is divided into two parts which upon leaving the openings 15 form two overlapping elliptical spray jets. The impingent of these spray jets against each other, together with the sudden decrease in velocity thereof, produces thorough mixing and complete atomization of the particles forming the mixture. The mixture of the jets is enhanced by the bend in the pipe 5. The final mixture is then drawn into the engine manifold 6 in the usual manner.

It will thus be noted that the thorough mixing and atomization of the fuel is effected entirely automatically. If the mixing is incompletely performed in the mixing chamber 22 of the carbureter 4, this generally being the case when "low test" oils are used, complete mixing and atomization will be effected by the mixer, thereby raising to a maximum the efficiency of an engine when operating with "low test" fuels. The mixer may be readily manufactured from sheet metal with the use of dies, and may therefore be sold at a moderate price. The device is also readily applicable to any of the various standard types of internal combustion automobile engines and requires no other fastening means than are ordinarily furnished between the carbureter 4 and pipe 5.

It should be understood that it is not desired to be limited to the exact details of construction herein shown and described for various modifications within the scope of the appended claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. As an article of manufacture, a fuel mixer comprising a circular sheet metal diaphragm having a pair of elliptical through openings located on opposite sides of the center line of said diaphragm.

2. As an article of manufacture, a fuel mixer comprising a sheet metal diaphragm having a pair of elliptical through openings located on opposite sides of the center line of said diaphragm, each of said openings being surrounded by a converging wall.

3. As an article of manufacture, a fuel mixer comprising a diaphragm having a plurality of through openings each completely surrounded by a converging wall.

4. As an article of manufacture, a fuel mixer comprising a circular diaphragm having a pair of through openings on opposite sides of the centerline, each of said openings being surrounded by a converging wall.

5. As an article of manufacture, a fuel mixer comprising a diaphragm having a plurality of segregated through passages surrounded by converging walls and adapted to deliver impinging spray jets.

6. As an article of manufacture, a fuel mixer comprising a diaphragm having a plurality of segregated converging through passages adapted to deliver impinging spray jets, and means forming a passage transverse to said openings for admitting air to the fuel passing said mixer.

In testimony whereof I affix my signature.

PAUL BENSON HUNT.