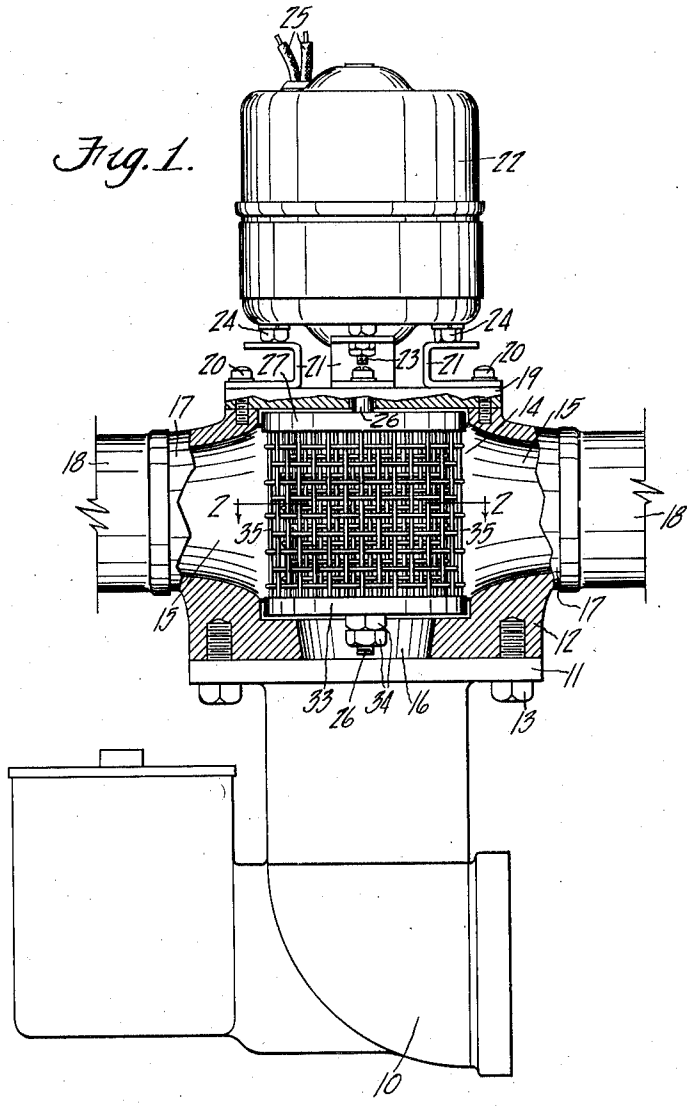
July 24, 1934. L. J. SEVISON 1,967,330

FUEL MIXER

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Fig. 1.



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FUEL MIXER

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Fig. 2.

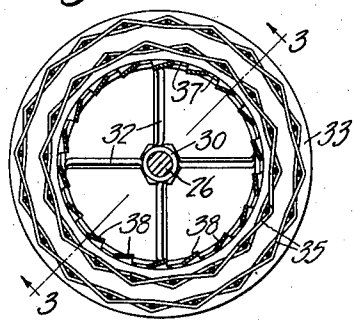


Fig. 3.

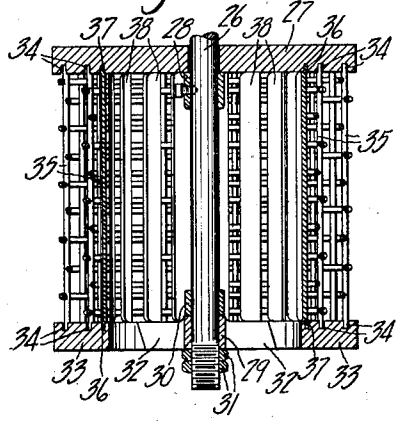


Fig. 4.

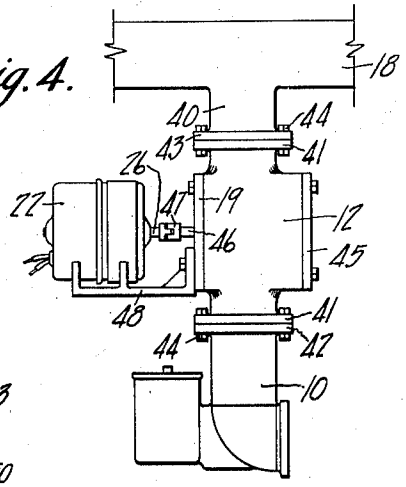
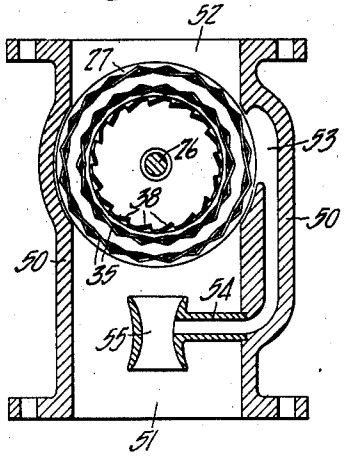


Fig. 5.



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FUEL MIXER

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Application March 7, 1932, Serial No. 597,288

7 Claims. (Cl. 48—180)

The invention relates to fuel mixers, and particularly to mixers to be used as auxiliaries to conventional carburetors for internal combustion engines.

Difficulty and failure to completely utilize fuel is commonly experienced in the operation of internal combustion engines by reason of the fact that conventional carburetors do not supply the engine with properly carbureted fuel under all conditions. This may result from "choking" or "flooding" the engine to start it in cold weather, from supplying fuel to an engine too quickly in accelerating the engine, or from other causes inherent in conventional engines in which the operation of the engine produces the suction by which fuel is drawn from the carburetor to the engine cylinder. Poor carbureting of the fuel supplied to an engine causes the formation of carbon deposits in the cylinders and on pistons and valves, and thinning of oil in the engine crank case by leakage of unvaporized fuel to the crank case, and consequently produces engine knocks, poor engine lubrication, undue wear on and short life of the engine, and minimizes the operating efficiency of the engine. Hot manifolds, which are commonly used to assist in vaporizing fuel supplied to an engine, are other factors which waste fuel.

It is the object of my invention to overcome these difficulties and inefficiencies by incorporating my improved carburetor in the engine fuel feeding system to perfectly carburet or mix the fuel with air before it is supplied to the engine.

Another object is to provide a device of this character, driven independently of the engine, by which fuel is properly vaporized for use in the engine under all conditions before being supplied to the engine.

Another object is to provide a device of this character for vaporizing and mixing fuel and air and having means for directing unvaporized fuel to be again acted upon by the device.

Another object is to provide a device of this character by which properly conditioned fuel is supplied to the engine under pressure.

Other objects will be apparent from the appended description, claims and drawings forming a part hereof and illustrating the preferred embodiment of the invention, it being understood that changes may be made in the precise embodiment of the invention within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:

Figure 1 is a view of the device in side elevation and partly in section illustrating the manner in which it is installed in the engine fuel feeding system.

Figure 2 is a transverse horizontal sectional view taken on line 2—2 of Figure 1.

Figure 3 is a vertical sectional view taken on line 3—3 of Figure 2.

Figure 4 is a view in side elevation illustrating a modified installation of the device in the fuel feeding system.

Figure 5 is a vertical sectional view of a modified construction of the device.

Referring to the drawings, and particularly to Figures 1 to 3 thereof which illustrate the preferred construction and installation of the device, the numeral 10 designates a conventional engine carburetor provided with a flange 11 at its upper end which is secured to the bottom of my improved mixer 12 by means of bolts 13. My improved mixer 12 is preferably integrally formed, as by casting, and is provided with a cylindrical opening 14 therein extending from the top thereof to a point spaced above the bottom thereof. Horizontal passages 15 extend from opening 14 to opposite sides of the mixer 12 and a passage 16 extends from the bottom of the mixer 12 into communication with opening 14. The sides of mixer 12 are preferably provided with tubular projections 17 forming part of passages 15. The mixer 12 is interposed in the intake manifold 18 of the engine by securing the projections 17 thereof to the intake manifold with the passages 15 in communication with said manifold.

A plate 19 is secured to the top of mixer 12 by bolts 20, which also serve to secure brackets 21 to plate 19. Brackets 21 are preferably U-shaped, and the bolts 20 each preferably secure one arm of the brackets to plate 19. A motor 22 is carried by brackets 21, screws 23 preferably securing the motor to one pair of opposite brackets, and suitable positioning bolts 24 carried by the motor bearing upon the other pair of opposite brackets to provide a four point support for the motor. Lead wires 25 of the motor are connected to a battery or other source of electrical energy. The motor drive shaft 26 extends vertically downwardly through a suitable bearing or opening in top plate 19 and centrally of opening 14 in the mixer 12.

A circular plate 27 is mounted on the motor shaft 26 adjacent the top plate 19 and is positioned by a collar 28. A collar 29 is mounted on the shaft 26 in spaced relation to plate 27 and adjacent the lower end of opening 14, said

collar being positioned on shaft 26 by a collar 30 at its upper side and by nuts 31 at its lower side. Radially projecting arms 32, whose faces are positioned angularly whereby they form fan blades, are carried by the collar 29 and mount an annular member 33. A pair of spaced concentric grooves 34 is formed in both the annular member 33 and plate 27 adjacent the outer edges thereof, and said grooves mount the opposite sides of cylindrically shaped screen members 35. A third concentric groove 36 is formed in both the annular member 33 and plate 27 in spaced relation to and inwardly of the grooves 34, said grooves 36 each mounting a ring 37, which rings carry the opposite ends of fan blades 38.

In the operation of the device, the motor controlling circuit is closed at the same time that the engine ignition is closed. This causes the motor to rotate the plate 27, ring 33, and their connected parts, which may be called the mixer rotor, independently of the operation of the internal combustion engine with which the mixer is employed and during the starting and operation of said engine. The operation of the mixer rotor with the attendant rotation of fan blades 32 and 38 thereof, produces an upwardly directed suction which, combined with the suction of the engine cylinders, draws the fuel and air from the conventional carburetor 10 to the rotor. When the fuel enters the rotor it is acted upon by currents of air therein produced by the vertical fan blades 38 which throw the fuel outwardly of the rotor against and between the blades and against and through the two screens 35, which rotating fan blades and screens break up the fuel into the form of a vapor which mixes with the air to properly condition it for use in the engine. The vaporized fuel is then discharged through the passages 15 into the intake manifold 18 under pressure induced by the fan blades. It will thus be seen that under all conditions, the rotor being driven independently of the engine, the fuel will at all times be completely carbureted and vaporized before it is supplied to the engine regardless of choking of the engine in starting, quick changes in the amount of fuel supplied to the engine, as upon quick acceleration, faulty operation of the conventional carburetor, or other causes which commonly result in unvaporized fuel being supplied to the engine. The device thus prevents flooding of the cylinders with unvaporized fuel with attendant difficulties due to the formation of carbon and mixing of the fuel with the lubricating oil in the crank case of the engine by leakage past the pistons. The device also enables the greatest amount of power obtainable from the quantity of fuel used to be generated by the engine, and provides a forced feeding of the fuel to the engine.

In Figure 4 of the drawings is illustrated a modified installation of the device in the fuel feeding system of an internal combustion engine. The installation here illustrated is intended particularly for engines not designed to include an auxiliary device of this type. This installation employs my rotary mixer 12 interposed between the conventional carburetor 10 and the intake manifold 18. The rotary mixer is positioned at right angles to its position in the installation illustrated in Figure 1, whereby one of the passages 15 thereof communicates with the conventional carburetor 10 and the other passage communicates with the intake manifold 18 by means of a conduit 40. Suitable flanges 41 are formed on the opposite ends of the rotary mixer 12 and abut flanges 42 and 43 of the carburetor 10 and conduit 40, respectively, to which they are secured by bolts and nuts 44. A plate 45 is secured to and closes the side of the mixer which forms the bottom in the position illustrated in Figure 1. Plate 19 is secured to the rotary mixer at the side opposite plate 45 and has a suitable opening or bearing therein for a rotor shaft 46 which is connected by a coupling 47 with the shaft 26 of the electric motor 22. The motor 22 is supported by a bracket 48 secured to the plate 19 of the rotary mixer. The operation of this device as thus installed is the same as that previously described.

In Figure 5 is illustrated a rotary mixer of slightly modified construction. The rotor, comprising shaft 26, end plate or plates 27, screens 35 and fan blades 38, is of substantially the same construction as illustrated in Figures 1 to 3, and is mounted in a cylindrical opening in a casing 50 which has an intake passage 51 adapted to communicate with a conventional carburetor and an outlet passage 52 adapted to communicate with an intake manifold, said passages 51 and 52 being in open communication with the opening in which the rotor is mounted. A duct 53 is formed in casing 50 at one side thereof, one end thereof being in communication with the rotor opening of the casing at a point adjacent the outlet passage 52 and the other end opening to the intake passage 51 of the casing. A conduit 54 is mounted in the intake passage 51 in communication with the duct 53 and mounts a Venturi tube 55 disposed centrally of and in axial alignment with the intake passage 51, the end of conduit 54 opening to the interior of the Venturi tube adjacent the central reduced width portion thereof.

In the operation of this modified construction of the device the fuel is taken in through intake passage 51 and acted upon by the rotor, in the manner previously described, to break up and vaporize the fuel. In the event some of the fuel is not broken up by the rotor, the centrifugal force created by the rotation of the rotor throws that unvaporized fuel outwardly thereof and into the duct 53, through which it passes to the conduit 54 and the Venturi tube 55. The force of the suction in the Venturi tube draws the unvaporized fuel from the conduit 54 and into the intake passage 51 to be again delivered to the rotor. In this way complete vaporization of the fuel is assured by the separation of the unvaporized fuel from the vaporized fuel prior to its entry into the outlet passage 52, and the unvaporized fuel is redirected to and through the rotor.

The invention having been set forth, what is claimed as new and useful is:—

1. A fuel mixer adapted to be interposed in the intake manifold of an internal combustion engine comprising a casing having aligned outlet passages communicating with said manifold and a fuel inlet passage, a shaft rotatably mounted in said casing and extending perpendicularly of said outlet passages, an electric motor carried by said casing and driving said shaft, a circular plate fixedly carried by said shaft, a collar fixedly carried by said shaft in spaced relation to said plate, fan blades projecting outwardly from said collar, a ring carried by said fan blades concentric of said shaft, a pair of spaced cylindrical screen members extending between said ring and plate concentrically of said shaft, and a cylindrical member extending between said ring and plate and disposed within said screen members, said

last named cylindrical member being cut away to form spaced fan blades parallel said shaft, said motor rotating said shaft, fan blades and screens to completely vaporize the fuel passing from said fuel inlet to said outlets.

2. A fuel mixer interposable in the intake manifold of an internal combustion engine and comprising a casing having aligned outlets communicating with said manifold and a fuel inlet, a shaft rotatably mounted in said casing, means for rotating said shaft, a plurality of apertured cylindrical members fixedly carried by said shaft in spaced concentric relation, and a fan carried by said shaft, rotation of said fan and cylindrical members completely vaporizing said fuel as it passes through said casing and discharging said vaporized fuel through said outlets under pressure.

3. In a fuel mixer, a casing having an opening therein and fuel intake and outlet passages communicating with said opening, a shaft rotatable in said casing and extending perpendicularly of said outlet passage, a plate fixedly carried by said shaft adjacent one end of said opening, fan blades fixedly carried by said shaft adjacent the opposite end of said opening, a ring carried by said fan blades, said plate and ring having spaced concentric grooves formed therein, a cylindrical apertured member having its ends mounted in one pair of said grooves, a cylindrical member having portions thereof cut away to form fan blades parallel said shaft mounted in the other pair of grooves, and means for rotating said shaft, said fan blades creating air currents urging fuel through said mixer, and said apertured cylindrical member vaporizing the fuel as it passes from the intake passage to the outlet passage.

4. In a fuel mixer, a casing having an opening therein and intake and outlet passages communicating with said opening, a shaft rotatable in said casing and positioned perpendicularly of said outlet passage, a plate fixedly carried by said shaft adjacent one end of said opening, fan blades fixedly carried by said shaft adjacent the opposite end of said opening, a ring carried by said fan blades, a cylindrical apertured member extending between said plate and ring, a plurality of fan blades extending between said plate and ring, and means for rotating said shaft, said fan blades and apertured cylinder vaporizing fuel passing through said casing and centrifugally discharging said fuel into said outlet passage.

5. In a fuel mixer, a casing having a fuel inlet and an outlet passage therein, a shaft rotatable in said casing and extending perpendicularly of said outlet passage, a pair of supports fixed to said shaft in spaced relation adjacent opposite sides of said casing, an apertured cylinder mounted between said supports, a plurality of fan blades extending between said supports, and means for rotating said shaft, apertured cylinder and fan blades to vaporize fuel passing through said casing and to centrifugally discharge said fuel through said outlet passage.

6. A fuel mixer interposable in the intake manifold of an internal combustion engine and comprising a casing having aligned outlet passages communicating with said manifold and a fuel inlet passage, a shaft rotatably mounted in said casing transversely of said outlet passages, means for rotating said shaft, a plurality of cylindrical apertured members fixedly carried by said shaft in spaced concentric relation, a plurality of fan blades carried by and extending parallel to said shaft in spaced relation to said cylindrical members, and a fan carried by said shaft, the rotation of said fan, fan blades and cylindrical members completely vaporizing fuel as it passes through said casing and discharging said vaporized fuel through said outlet passages under pressure.

7. A fuel mixer adapted to be interposed in the intake manifold of an internal combustion engine comprising a casing having aligned outlets communicating with said manifold and a fuel inlet, a shaft rotatably mounted in said casing and extending perpendicularly of said outlets, an electric motor carried by said casing and driving said shaft, a circular plate fixedly carried by said shaft, a collar carried by said shaft in spaced relation to said plate, fan blades projecting outwardly from said collar, a ring carried by said fan blades concentric of said shaft, said ring and shaft each having a plurality of spaced concentric grooves formed therein, a pair of cylindrical screen members having their ends mounted in the outer grooves, and a cylindrical member having its ends mounted in the inner grooves and being cut away to form spaced fan blades parallel said shaft, said motor rotating said shaft, fan blades and screens to forcibly supply fuel from said inlet to said outlets and to completely vaporize the fuel as it passes through said casing.

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