July 30, 1929. H. M. COGAN 1,722,367

AIR AND FUEL MIXING DEVICE

Filed Feb. 12, 1927

Fig. 1.

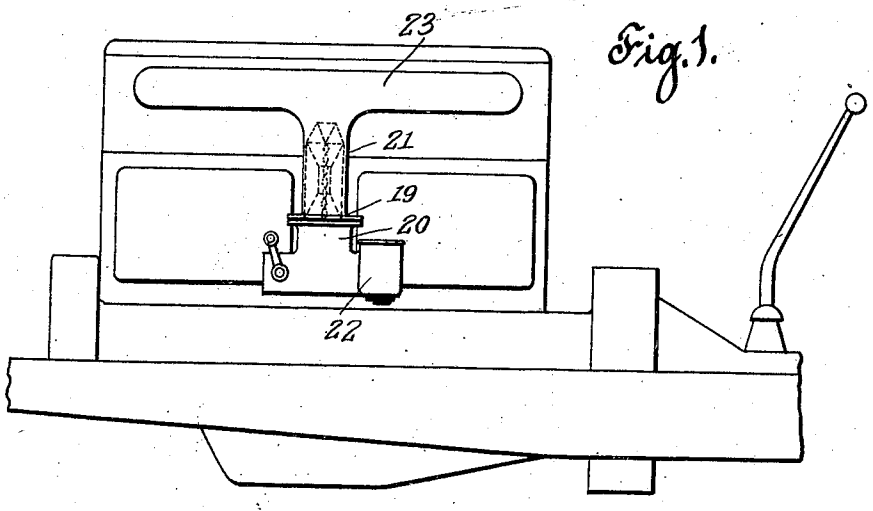


Fig. 2.

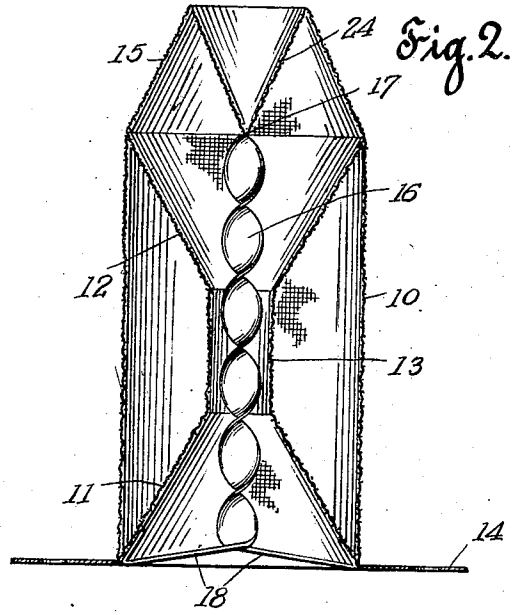
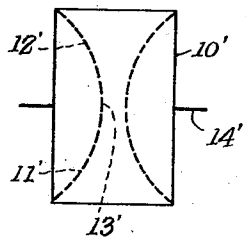


Fig. 3.



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AIR AND FUEL MIXING DEVICE.

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The main object of my invention is to effect as complete a gasification as possible of the liquid fuel used in internal combustion engines. Among the other objects of my invention are to eliminate the danger of back firing into the carbureter, to prevent the entry of any dust or grit into the engine cylinder with the fuel and to lessen the rate of dilution of the engine lubricating oil by preventing liquid fuel from entering the engine cylinders and working its way into the crank case.

In the accomplishment of the foregoing objects I employ a device having a number of screens preferably of fine wire mesh and a central helical member adapted to give to the inrushing air, gas and entrained liquid fuel, a whirling motion, which in combination with the screens rapidly evaporates or breaks up the liquid fuel into a form in which it may be most efficiently consumed.

Fig. 1 is a diagrammatic drawing of a side elevation of an engine showing in dotted lines my invention applied in the intake pipe between the carbureter and the intake manifold.

Fig. 2 is a central vertical sectional view showing one form of my invention.

Fig. 3 is a section of a modification of the device.

In the preferred form the two truncated cones of foraminous material 11 and 12 may be secured along their bases to opposite ends of the foraminous cylinder 10 and may be joined at their least diameters by the foraminous tube 13. The cylinder 10 is secured at one end to a flange member 14 and at its upper end to the cone 15. The upper half of this cone is preferably introverted or reversed upon itself substantially as shown. The reinforcing piece 16 is preferably constructed of a flat metallic strip twisted so that its edges form intertwined helices of steep pitch, and is secured at 17 to the apex of the reversed cone 15 and by means of extensions 18, 18 to the truncated cone 11 may be secured at any point and the flange member 14 is adapted to be held between the flanges of any two adjoining pipe sections such as 19, 20 and it serves to hold my device in the manifold intake pipe 21 between the carbureter 22 and the intake manifold 23.

When the air passes through the carbureter it vaporizes only a part of the liquid fuel, the balance is carried along as an entrained fluid and is ordinarily induced in an unvaporized and non-explosive condition into the combustion chambers of the engine. This causes much of the fuel to be wasted, carbon to form rapidly in the cylinders and crank case dilution.

The ventural form achieved by the use of the truncated cones 11 and 12 and the tube 13 causes a high gas velocity in this tube and on account of the helical form of the reinforcing piece 16, a whirling motion is given to the mixture which tends to throw any liquid particles entrained in the gas against the foraminous walls of the structure. The particles of liquid gas thus thrown will spread over the mesh walls of the structure and readily vaporize. The inverted cone 15 is so shaped as to have a large area so as not to effect too great a reduction of gas velocity and functions both as a final means for removing ungasified particles of fuel and as a screen to prevent the flame from a back fire from reaching the carbureter.

I do not limit myself to the exact device shown in Fig. 2 as my invention readily lends itself to many modifications. For instance, the truncated cones 11′ and 12′, as in Fig. 3, may meet at their smaller ends to form a Venturi throat 13′. In using my device on some internal combustion engines, I have found it more convenient to have the flange member 14′ attached around the tube 10′ near its center, rather than at its lower end because of the short length of their manifold intake pipes.

The use of my device causes an internal combustion engine to operate more smoothly and efficiently. It reduces the formation of carbon deposits in the combustion chambers to a minimum and prevents ignition in the carbureter from a back fire. It also enables the engine to be started more easily in cold weather on account of the more complete gasification of the liquid fuel obtained.

I claim:

1. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, helical means for imparting rotary motion to the fuel stream flowing through said tube, and means for supporting said device in a pipe.

2. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the car-

buretor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, helical means for imparting rotary motion to the fuel stream flowing through said tube, a foraminous cylinder surrounding said tube and connected therewith, and means for supporting said device in a pipe.

3. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination, a plurality of connected spaced screens in the form of truncated cones, helical means for rotating the fuel stream passing through said screens, and means for supporting said device in a pipe.

4. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, a foraminous cylinder around said tube and connected with its ends, the space between said tube and cylinder being free and unobstructed to permit the passage of a gas stream therethrough, and means connected with said foraminous cylinder for supporting said device within a pipe.

5. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, a foraminous cylinder around said tube and connected with its ends, the space between said tube and cylinder being free and unobstructed to permit the passage of a gas stream therethrough, a screen tapered toward the axis of said cylinder from its walls connected with said cylinder for screening the fuel stream after the same has passed through said tube and cylinder, and means for supporting said device within a pipe.

6. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a foraminous cylinder, spaced truncated foraminous cones inverted with respect to one another and having their large ends connected adjacent the ends of said foraminous cylinder, a second foraminous cylinder of smaller diameter than the first and adjoining the small ends of each said truncated cones, the space within the smaller cylinder and also the space between the first and second mentioned foraminous cylinders being free to permit the unobstructed passage of gas, a screen tapered toward the Venturi tube axis from its walls connected with the first mentioned foraminous cylinder for screening the fuel stream after it has passed through said cylinders and truncated cones, and means for supporting said device within a pipe.

7. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold comprising in combination a longitudinally disposed foraminous cylinder, helical means inside said cylinder for imparting rotary motion to the fuel stream to centrifugally separate liquid particles from the gas stream onto said cylinder, a screen tapered toward the axis of said cylinder from its walls and located beyond said means for imparting rotary motion, connected with the cylinder and adapted for screening the fuel stream after passing through said cylinder, and means for supporting said device in an intake pipe.

8. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, helical means for imparting rotary motion to the fuel stream flowing through said tube, a screen tapered toward the axis of said Venturi tube from its walls, connected with said tube for screening the fuel stream after passing through said tube, and means for supporting said device within a pipe.

9. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, a screen inclined away from the wall of the foraminous Venturi tube in the direction of travel of the fuel stream, connected with said tube for screening the fuel stream after passing through the tube, and means for supporting said device in a pipe.

10. A gaseous fuel mixing device adapted for insertion in the fuel intake passage of an internal combustion engine between the carburetor and intake manifold, comprising in combination a longitudinally disposed foraminous Venturi tube, helical means for imparting rotary motion to the fuel stream flowing through said tube, a foraminous cylinder surrounding said tube, a screen inclined away from the wall of the foraminous cylinder in the direction of travel of the fuel stream, connected with said tube for screening the fuel stream after passing through the tube, and means for supporting said device within a pipe.

HENRY M. COGAN.