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G. GUNTHER ET AL

HUMIDIFIER FOR INTERNAL COMBUSTION ENGINES

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Fig. 1.

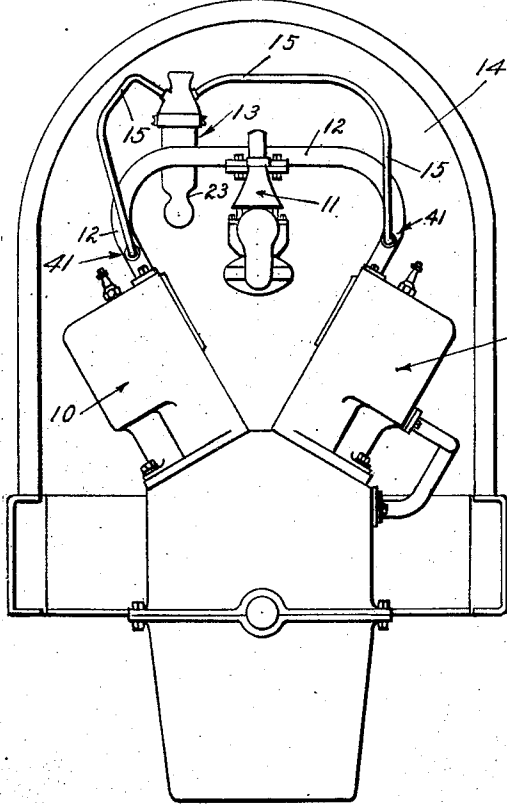


Fig. 2.

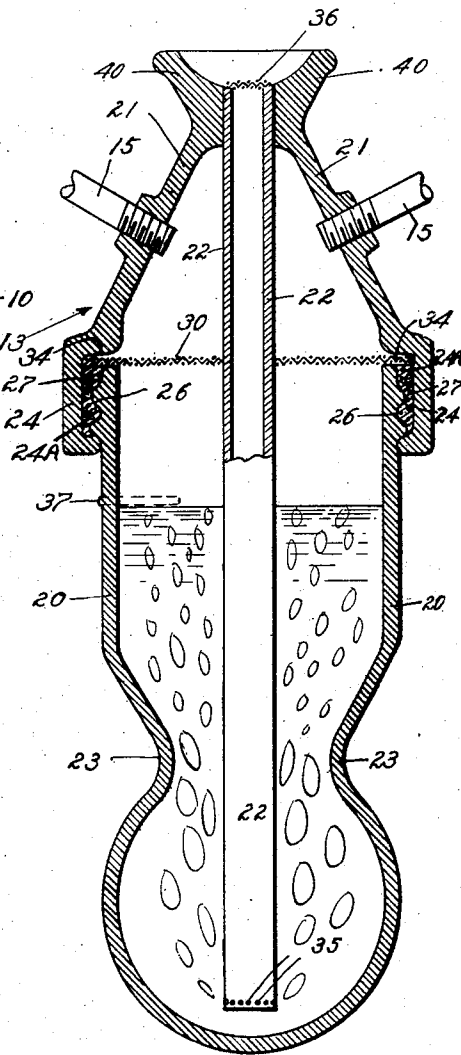
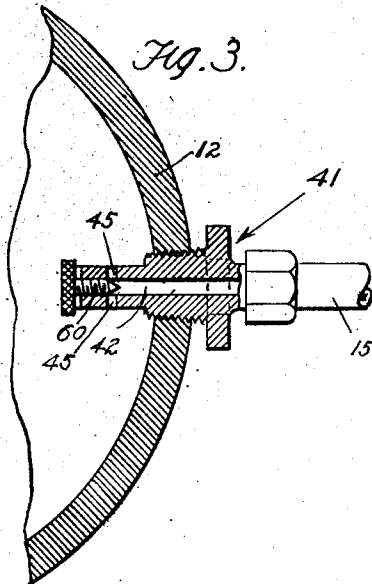


Fig. 3.



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HUMIDIFIER FOR INTERNAL-COMBUSTION ENGINES.

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This invention relates to humidifiers for internal combustion engines and particularly to humidifiers for internal combustion engines of the type commonly used in automobiles and the like. It is an object of the invention to provide a device of this character which is simple, inexpensive and effective.

Although devices, for supplying air carrying water vapor to the cylinders of internal combustion engines, have been provided, or proposed, many of such devices have not been entirely satisfactory as they have embodied various types of valves, adjustments, etc. which have required more or less attention thereby making the devices inconvenient and, if not properly adjusted, ineffective. The device provided by the present invention is extremely simple in construction and has no valves or the like which require attention. In the device provided by the present invention a mixer or humidifier is provided in which air is drawn through water or other suitable liquid in such a manner as to catch and carry with it vapor. From the humidifier the air, carrying vapor, is conducted to the manifold which leads to the engine cylinders from the carbureter. The air is injected or sprayed into the manifold of the engine in such a manner as to become thoroughly and completely mixed with the combustible mixture being fed to the engine from the carbureter. The construction of the nozzle which sprays the air, carrying vapor, into the manifold is such as to cause proper and complete distribution of the air in the manifold and eliminates condensation of the vapor.

Further objects and features of the invention will be best understood from the following detailed description of a preferred embodiment of the invention throughout which reference is had to the accompanying drawings, in which—

Fig. 1 is a view of a typical automobile engine showing the humidifier in connection with it; Fig. 2 is a sectional view of the humidifier; and Fig. 3 is a sectional view of the nozzle which extends into the manifold, showing the nozzle in place in the manifold.

Throughout the drawings numeral 10 designates a typical automobile engine provided with a carbureter 11 connected to the cylinders of the engine by manifolds 12. The mixer or humidifier 13 may be mounted on any suitable part of the machine, for in-

stance, on the dash 14 as shown in the drawings, and the air, carrying vapor supplied from the humidifier 13, may be conducted to the intake manifolds 12 by suitable tubing 15. It is preferred, however that the humidifier be mounted in a comparatively cool place if convenient.

The humidifier in which the air is charged with water vapor comprises a bowl 20 provided with a cap 21 from the center of which a tube 22 extends downward into the bowl 20. The bowl 20 is preferably glass and has a restricted portion or neck 23 formed near its lower end as clearly shown in Fig. 2.

The cap 21 is preferably cast metal and of the general shape shown in the drawings. The tubes 15, which conduct the air from the humidifier to the manifold, screw thread into the cap 21 from opposite sides, as shown in Fig. 2. It will be understood that the cap 21 may be arranged to have any desired number of tubes 15 connected into it, which number depends entirely upon the number of intake manifolds in the engine or engines, and that the invention is not in any way limited to the number or arrangement shown in the drawings. The cap 21 is preferably provided with a flange 24 which has a recess 24^a in its inner side and is adapted to fit around the top of the bowl 20. The bowl 20 is preferably provided at its upper end on its outer side with indentations 26 which make it possible to effectively and inexpensively attach the cap 21 to the bowl with cement 27. It will be readily understood how cement, when placed in the recess 24^a in the flange 24, engages and fills the indentations 26 and when set prevent removal of cap 21 from the bowl 20. A screen 30 is held between the upper edge of the bowl 20 and a flange 34 formed in the cap 21. The tube 22 preferably fits tightly in the cap 21 and extends to the bottom of the bowl 20. The lower end of the tube 22 is preferably closed and holes or perforations 35 are provided in the wall of the tube near its lower end. The upper end of the tube 22 is open to the atmosphere and is preferably provided with a screen 36. The screen 36 will not be drawn into the humidifier by the air or will not be filled into the humidifier with the water. Water is filled into the humidifier through the tube 22 to about the level shown in Fig. 2. The top of the cap 21 is preferably cup shaped to provide

a funnel which makes the humidifier very easily filled. The proper level of liquid to be maintained in the bowl 20 may be indicated on the bowl in any suitable manner, for instance, a boss 37 may be provided in the glass as shown in the drawings.

The nozzle 41, which extends into the manifold 12, is preferably a casting, screw threaded into the manifold, and having a central bore 42. The bore 42 has screw threaded into its inner end a regulating screw 60. The air carrying vapor is sprayed from the nozzle through holes 45 which extend radially from the bore 42 as clearly shown in Fig. 3. It will be readily understood how the screw 60 can be regulated so that the proper amount of moistened air is discharged from the nozzle. The screw 60 is provided so that the same sized nozzle can be used in all sizes and types of engines, and the screw does not require regulation or adjustment after it is once properly set. In the preferred form of construction we have found that best results are obtained by making the bore 42 about one-sixteenth of an inch in diameter and by making the holes 45 about three-sixty-fourths of an inch in diameter. It will be readily understood how the air issuing from the nozzle 41 through the holes 45 will be spread, or will be distributed, into the manifold so as to completely mix with the combustible charge passing through it.

The action of the device is practically the same as that of a carburetion system in that the difference between the pressure in the manifold and the pressure (atmosphere) in the tube 22 causes air to issue from the perforation 35, pass upward through the water contained in the bowl 20, and pass from the top of the bowl to the manifolds 12 through the tubes 15 and nozzles 41.

The air issuing from the perforations 35 form bubbles in the water, which rise and are broken or divided into fine bubbles by the neck 23. The fine bubbles raise from the neck 23 to the surface of the liquid where the air escapes from the liquid carrying with it considerable amount of vapor or moisture in suspension. Drops or slugs of water are prevented from getting into the manifold 12 by the screen 33.

With a mixer or humidifier, constructed in the manner hereinabove described, co-operating with a nozzle as above specified will cause the proper amount of moisture to be supplied into the manifolds of an engine and will cause or greatly assist in causing practically perfect combustion, cool cylinder walls, etc.

Having described a preferred embodiment of our invention we do not wish to limit ourselves to the particular details hereinabove set forth but wish to reserve to ourselves any changes or modifications that may appear to those skilled in the art or fall within the scope of the following claims.

Having described a preferred form of our invention, we claim:

In a device of the character described, the combination of a liquid container, means for introducing air into the container at a point adjacent its bottom, means for discharging air from adjacent the top of the container, the internal area of the container being restricted by a neck portion intermediate the air inlet and outlet and a liquid carried in said container with its level above said restriction and below the air outlet.

In witness that we claim the foregoing we have hereunto subscribed our names this 5th day of November, 1919.

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