June 8, 1926.

J. LITCHFIELD

1,587,535

APPARATUS FOR IMPROVING THE FUEL MIXTURE IN INTERNAL COMBUSTION ENGINES

Filed Jan. 31, 1923

2 Sheets-Sheet 1

Fig. 1.

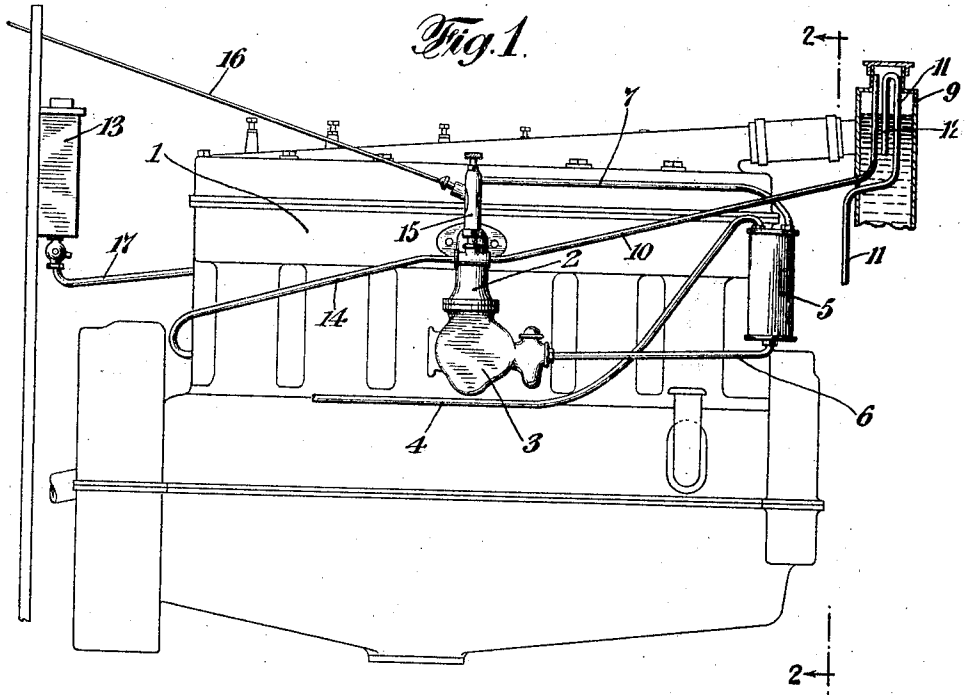
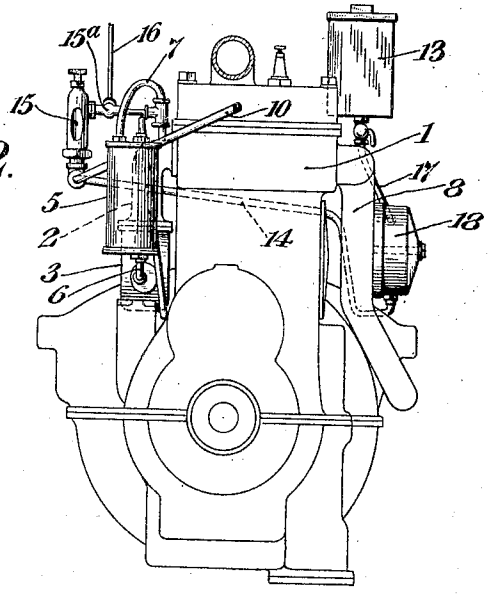


Fig. 2.



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Fig. 3.

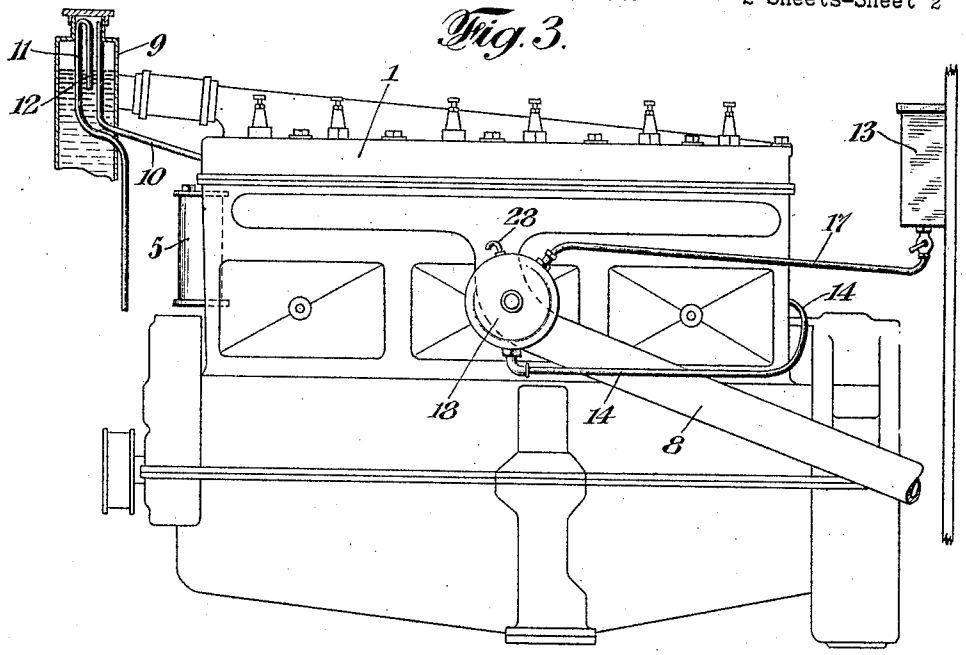


Fig. 4.

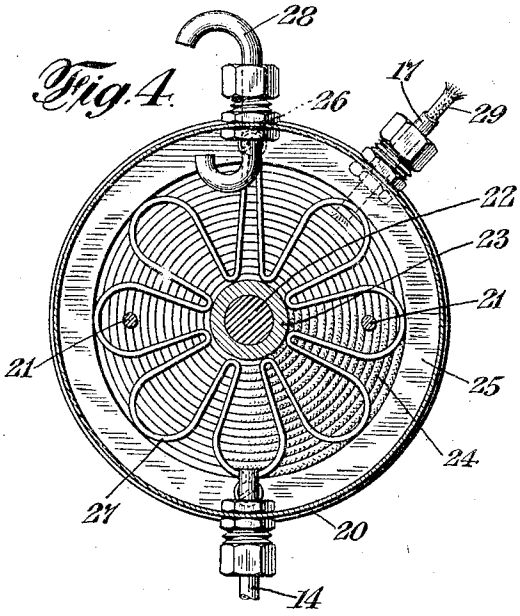
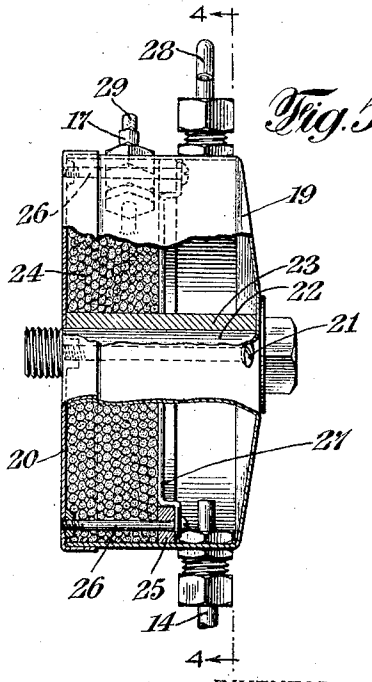


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR IMPROVING THE FUEL MIXTURE IN INTERNAL-COMBUSTION ENGINES.

Application filed January 31, 1923. Serial No. 616,012.

The invention relates to internal combustion engines supplied with a fuel-feeding apparatus of any usual type, and has for an object to blend in with the mixture passing through the inlet manifold from a carburetor or the like, certain ingredients which will improve the performance of the engine, particularly to effect the removal of carbon from the engine cylinders and secure efficient ignition of the mixture.

The invention further contemplates an apparatus of the above nature which shall be simple in construction and capable of being installed upon engines of the usual types, without requiring expensive alteration of the engine structure or additional expensive or cumbersome parts.

Further objects and advantages of the invention will be in part obvious and in part specifically mentioned in the description hereinafter contained, which, taken in connection with the accompanying drawings, discloses a preferred embodiment of the invention; such embodiment, however, is to be considered merely as illustrative of its principle. In the drawings:

Fig. 1 is a side view showing the general structure of an automobile engine having associated therewith an apparatus constructed in accordance with the invention.

Fig. 2 is a section on line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a side view similar to Fig. 1, but taken from the opposite side of the engine.

Figs. 4 and 5 are sectional views showing in more detail the structure of a preheating device adapted to be used in connection with the invention.

The present embodiment of the invention is illustrated as applied to an automobile engine 1, having an intake passageway 2, to which is connected a suitable carbureter 3 for supplying the fuel mixture; in the present instance the fuel is supplied by a vacuum feed including a gasoline supply pipe 4 and a vacuum tank 5 connected at its bottom to the carbureter 3 by means of a pipe 6, and at its top to the intake passageway 2, by means of a pipe 7. The engine will be understood as including other usual elements such as an exhaust pipe 8 and a radiator 9, and since the specific structure of the engine as a whole is not essential to the present invention, it will not be described in greater detail.

In accordance with the present invention I add to the fuel mixture as it passes into the engine cylinders, one or more ingredients which are designed to improve the performance of the engine preferably both from the standpoint of increasing the power and cleaning out from the engine cylinders accumulations of carbon and the like.

The preferred form of my invention includes devices for injecting moisture-laden air into the fuel mixture, as well as devices for utilizing a liquid cleaning or carbon-removing agent and injecting the same, preferably preheated or vaporized, into the fuel mixture. It will be understood, however, that either of the above devices may be separately used, if desired.

Referring to the drawings, the moisture-laden air above-mentioned may be obtained in a simple manner from the radiator 9 of the engine. As shown, a pipe 10 runs from the upper portion of the radiator to draw air into the intake passageway 2, and the usual overflow pipe 11 of the radiator has an extension 12 projecting downwardly into the water in the radiator, and thus the air which is drawn into intake passageway 2 through the auxiliary air intake pipe 10, is compelled to pass from the overflow pipe 11 into the water in the radiator before reaching pipe 2. In passing through the water the air absorbs a substantial amount of moisture, particularly when the engine is warm, with the result that the moisture-laden air entering the cylinders improves the operation of the engine both as regards complete combustion and the removal of carbonaceous accumulations in the cylinders.

In order to make use of liquid carbon-removing, cleaning or lubricating agents in the fuel mixture, I provide a reservoir 13 which may be conveniently mounted upon the dashboard when the invention is applied to automobile engines. The reservoir 13 may contain kerosene, for example, to assist in removing carbon from the engine cylinders, or aniline oil as a lubricant, dirt remover and cleaner for the engine cylinders, or a mixture of liquids having properties such as are above-mentioned. The reagents supplied from reservoir 13 pass through a conduit 14 into the intake pas-

sageway 2 where they are blended with the fuel mixture, and the moisture-laden air is supplied through pipe 10 when the latter pipe is used in conjunction with pipe 14. Preferably a needle valve 15 is interposed between the pipes 10 and 14 and intake passageway 2 to enable the proportions of the above reagents to the fuel mixture to be adjusted as desired, and similar regulating valves, (not illustrated), may also be provided in pipes 10 and 14 to adjust the relative proportions of the reagents supplied through these pipes when they are in use. A further needle valve 15[a] if desired may be provided in series with a valve also, and regulated from the driver's seat by a control rod or the like 16 (Fig. 1) extending to the dashboard.

Where a liquid such as kerosene is supplied from reservoir 13, I prefer to pass the liquid through a heating device, in such manner that the kerosene will enter the intake passageway 2 in a vaporized form. In the present instance a pipe 17 leads from reservoir 13 to a vaporizer 18 clamped to the exhaust pipe 8 of the engine, and from thence through pipe 17 as above described. As shown, this vaporizer consists of a container 19 (see Figs. 4 and 5) having a cap 20 on its inner side adapted to rest against the exhaust pipe 8, the members 19 and 20 being suitably held together as by means of screws 21, and being fastened to the exhaust pipe 8, as by a bolt 22; a bushing 23 may be placed around the bolt to relieve the container of strains.

The preheater or vaporizer preferably contains absorptive material such as the coils 24 and 25 of asbestos wicking, which will take up the liquids supplied through pipe 17 and carry them into good thermal contact with the exhaust pipe 8. In the present instance the asbestos wicking 24 is held in place by a ring 25 within the container 19 and fixed in position by screws 26, and a wire grid or the like 27 overlies the asbestos wicking to hold it in place on the wire. As shown, the wire 27 is fastened under the heads of screws 26.

An auxiliary intake pipe 28 permits the suction in intake passageway 2 to draw air into the vaporizer 18, where the air will absorb the preheated or vaporized liquids supplied through pipe 17. Preferably a cotton wick 29 or the like (Fig. 4) is inserted into pipe 17 to control the rate at which liquid is fed therethrough.

While a specific embodiment of the invention has been disclosed, it will be obvious that many changes may be made therein without departing from its spirit as defined in the appended claims.

I claim:

1. In combination, an internal combustion engine having an intake passageway leading to the engine cylinders, means for supplying a fuel mixture to said intake passageway, a reservoir containing a carbon removing liquid, a gasifying chamber in communication therewith and containing absorptive material, said chamber also having an air inlet opening and being held against the exhaust pipe but out of contact with the exhaust gases within said pipe to heat the air and gasify the liquid, and means for conducting gases from said chamber to the intake passageway.

2. In combination, an internal combustion engine having an intake passageway leading to the engine cylinders, means for supplying a fuel mixture to said intake passageway, means for drawing air through the water of the engine radiator to heat the same and add water vapors thereto, a reservoir containing a carbon removing liquid, a heating chamber for gasifying said liquid and a common inlet pipe for mixing and leading said gasified liquid and moisture laden air to said intake passageway.

3. In combination, an internal combustion engine having an intake passageway leading to the engine cylinders, means for supplying a fuel mixture to said intake passageway, a reservoir containing a carbon removing liquid, a heating chamber in communication with said reservoir for gasifying said liquid, means independent of said heating chamber for supplying moisture laden air, and a common inlet pipe for mixing and leading said gasified liquid and moisture laden air to said intake passageway.

In testimony that I claim the foregoing, I have hereunto set my hand this 19 day of Jan., 1923.

JAMES LITCHFIELD.