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L. M. WOOLSON

HYDROCARBON MOTOR

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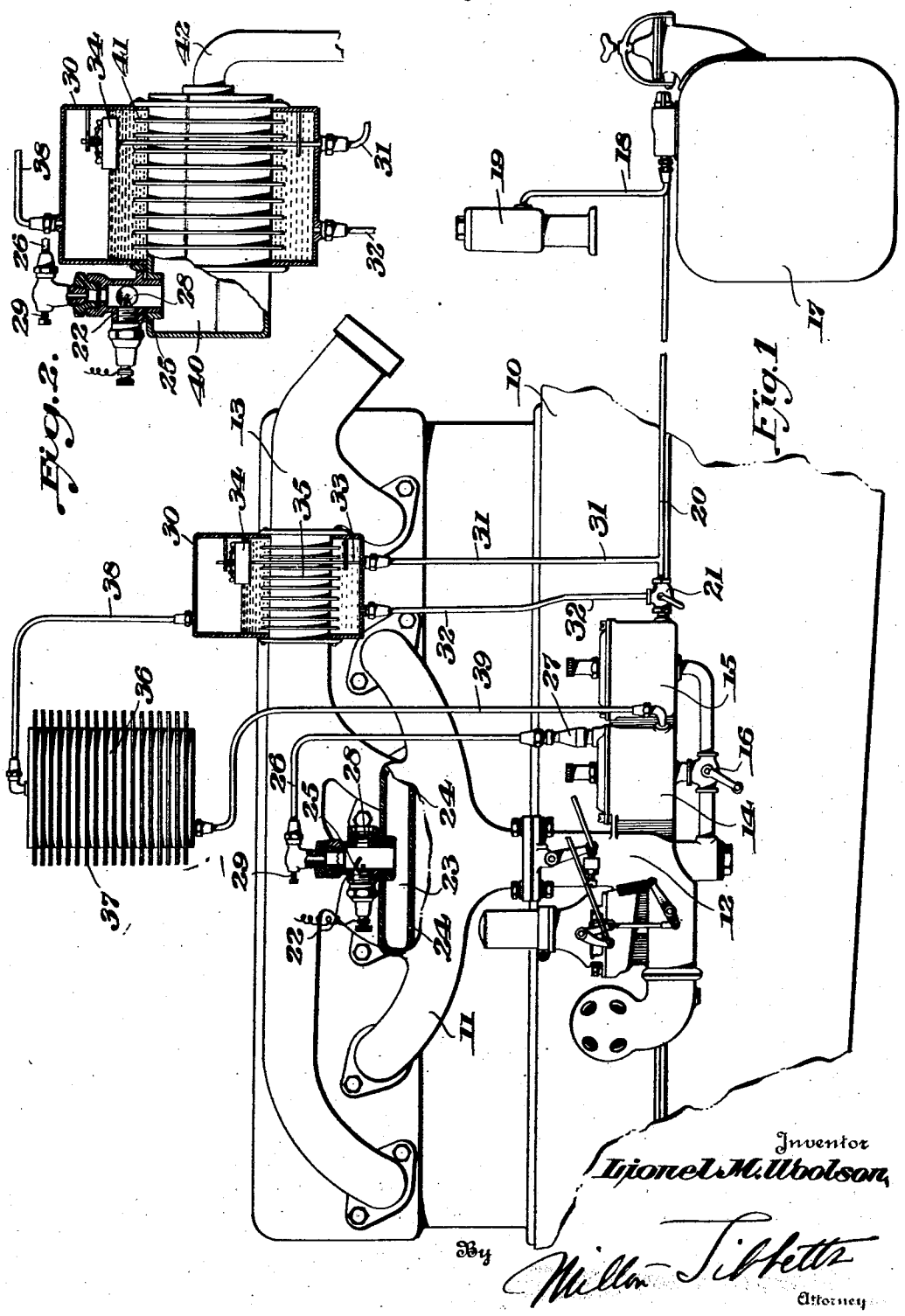

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UNITED STATES PATENT OFFICE.

LIONEL M. WOOLSON, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

HYDROCARBON MOTOR.

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To all whom it may concern:

Be it known that I. LIONEL M. WOOLSON, a citizen of the United States, and resident of Detroit, Wayne County, State of Michigan, have invented certain new and useful Improvements in Hydrocarbon Motors, of which the following is a specification.

This invention relates to hydrocarbon motors, and particularly to the fuel feeding mechanism thereof.

One of the objects of the present invention is to provide means for utilizing the heavier grades of fuel in a hydrocarbon motor, while at the same time facilitating the starting of such motors.

Another object of the invention is to provide means for supplying a hydrocarbon motor with both a light and a heavy fuel from a single source of supply.

Another object of the invention is to provide means for utilizing some of the heat of the motor to distil a fractional part of the heavier fuel for use in starting, as well as for operating a combustion heater in connection with the motor.

Other objects of the invention will appear from the following description taken in connection with the drawing which forms a part of this specification, and in which—

Figure 1 is a side elevation of a hydrocarbon motor embodying the invention, parts being broken away for better illustration, and

Figure 2 is a sectional view of a combustion heater and still combined, thus forming another form of a part of the invention shown in Figure 1.

With the heavy fuels, such as kerosene, that it is now desired to use in hydrocarbon motors, difficulties in starting are encountered and where a combustion heater is used on the motor it is difficult to make it operate satisfactorily on these heavier grades of fuel. To obviate the necessity of having two definite sources of fuel supply, one a heavy fuel for running the motor after it is warmed up, and the other a lighter fuel for starting and for feeding the combustion heater, if one is used, the present invention contemplates a single source of fuel supply and the use of a still in connection with the motor for separating some of the lighter fractions from the heavy fuel and feeding these lighter distilled fractions to the motor carburetor for starting, and, if desired, to the combustion heater continuously.

Referring to the drawings, which are illustrative of the invention, 10 represents a hydrocarbon motor having an intake conduit 11, a carburetor 12 connected thereto, and an exhaust pipe 13, of somewhat usual form. The carburetor 12 receives its liquid fuel from either of two float chambers 14 and 15, and a switch valve 16 may be operated to determine which of the float chambers shall supply the carburetor.

A source of fuel supply is shown in the form of a tank 17 which may be mounted high enough to permit the withdrawal of fuel therefrom by gravity, or it may be mounted in a lower position, as shown, and have connected to it, as by a pipe 18, a small pump 19 which is operated by the motor and adapted to supply pressure to the tank 17. The tank 17 may be connected to one of the float chambers, as 15, through a still which will be hereinafter described.

A combustion heater 22 is adapted to heat the mixture passing from the carburetor 12 to the motor through the intake conduit 11. This heater, of itself, is of well known form and comprises a combustion chamber 23, having one or more outlet ports 24 into the intake conduit, a spark plug 25 for igniting the mixture in the chamber, and a pipe 26 for supplying mixture to the chamber 23 as from a small carburetor 27 which is shown connected to the float chamber 14 of the carburetor 12. A small glass window 28 permits the operation of the combustion heater to be observed and the admission of additional air thereto may be controlled by a small valve 29 for the purpose of obtaining the best mixture.

It will be understood that the combustion heater operates by the suction of the motor since the openings 24 are above the throttle

valve. The motor suction draws a combustible mixture from the carburetor 27 through the pipe 26 and into the chamber 23 where it is fired by the spark plug 25. The hot burnt mixture passes through the openings 24 into the intake conduit and thereby heats the mixture passing to the motor. Heat from the chamber 23 is also passed through the wall between the chamber and the intake conduit, thus assisting in heating the mixture.

In the form of the invention shown in Figure 1, a still 30 is mounted on the exhaust pipe 13. The still is in the form of an enclosed chamber surrounding the exhaust pipe and is connected to the fuel supply 17 as by a pipe 31 and the pipe 20 hereinabove described. A pipe 32 connects the lower part of the still with the float chamber 15 and this pipe is also connected to the pipe 20 through a switch valve 21 which determines whether the float chamber is supplied with fuel from the still or directly from the tank 17.

By the pressure in the tank 17, supplied by the pump 19, above referred to, the heavy fuel is fed to the still 30, and a valve 33 therein, controlled by a float 34, determines the level to which the liquid is permitted to rise in the still. The heat for the still is supplied by the exhaust pipe 13 and fins 35 may be provided to assist radiation at this point.

A condenser for the still is shown in the form of a tank 36 which may be supplied with radiation fins 37, and this tank, in addition to performing the function of a condenser, is also in the nature of an auxiliary supply tank for the lighter fractions of fuel that are received by it from the still 30. A pipe 38 connects the upper part of the still 30 with the tank 36 so that the vapors produced by the still will pass to the condenser where they will be condensed and stored.

The condenser 36 is connected to the float chamber 14 of the carburetor 12 as by a pipe 39, and thus the condenser or supply tank 36 will supply the carburetor 12 with fuel when the switch valve 16 connects the float 14 to the carburetor, and regardless of the position of the switch valve 16, the condenser 36 will supply the carburetor 27 with fuel for the combustion heater 22. Thus it is possible to start the motor on the lighter fuel contained in the condenser 36 and so operate it until the motor is warm enough to run on kerosene or other heavier fuel. But even after the switch valve 16 has been so turned that the motor will run on the heavier fuel supplied from the float chamber 15, the combustion heater 22 will operate on the lighter fuel supplied to the float chamber 14 by the condenser 36. Of course the still 30 will continue to operate and will replenish the supply of fuel in the condenser 36 as fast as, or faster than it is withdrawn therefrom by the combustion heater, so that there will always be sufficient lighter fuel in the condenser 36 to start the motor after it has been stopped for a period of time.

Referring to the form of the invention shown in Figure 2, the combustion heater 22 has a large cylindrical chamber 40 upon which the still 30 is mounted, just as it is mounted on the exhaust pipe in Figure 1. The chamber 40 has radiating fins 41 thereon, and it also has an outlet pipe 42 which extends to a suitable point in the motor intake conduit. The other parts of the still are the same as in the form shown in Figure 1 and its outside connections are the same. The same is true of the other parts of the combustion heater.

In this form of the invention it is probable that a greater amount of mixture would be fed to the combustion heater due to the fact that considerable of its heat units would be absorbed by the still, but, within reasonable limits, any desired amount of mixture can be fed to the combustion heater so that there will be sufficient heat both for operating the still and for heating the mixture passing from the carburetor 12 to the motor.

It will be understood that the forms shown herein are illustrative only of the invention, and various modifications thereof may be made without departing from the spirit or scope of the invention as defined by the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a hydrocarbon motor, the combination with the motor intake conduit, the carburetor connected thereto, a combustion heater also connected to the intake conduit, and a fuel supply, of a still connected to said fuel supply, and a condenser connected to the still and adapted to supply fuel to the carburetor and to the combustion heater.

2. In a hydrocarbon motor, the combination with the motor intake conduit, the carburetor connected thereto and having two float chambers, either of which may be connected to the carburetor, and the fuel supply connected to one of said float chambers, of a still connected to be fed by said fuel supply, and a condenser for said still connected to the other of said float chambers.

3. In a hydrocarbon motor, the combination with the motor carburetor and the motor exhaust pipe, of a combustion heater adapted to heat the mixture from said carburetor, a still operated by the heat from said exhaust pipe, and a condenser for said still connected to supply said combustion heater.

4. In a hydrocarbon motor, the combination with the motor carburetor, a fuel sup-

ply connected thereto, and a combustion heater adapted to heat the mixture from the carburetor, of a still fed by said fuel supply, and a condenser for said still adapted to supply fuel for said combustion heater.

5. The method of operating a hydrocarbon motor having a single source of fuel supply which consists in distilling a portion of the fuel by heat from the exhaust of the motor, employing the distilled portion for starting the motor, and employing the residue and the original fuel for subsequent running of the motor.

In testimony whereof I affix my signature.

LIONEL M. WOOLSON.