

Mar. 13, 1923.

1,448,651

L. M. WOOLSON

HYDROCARBON MOTOR

Filed Oct. 16, 1919

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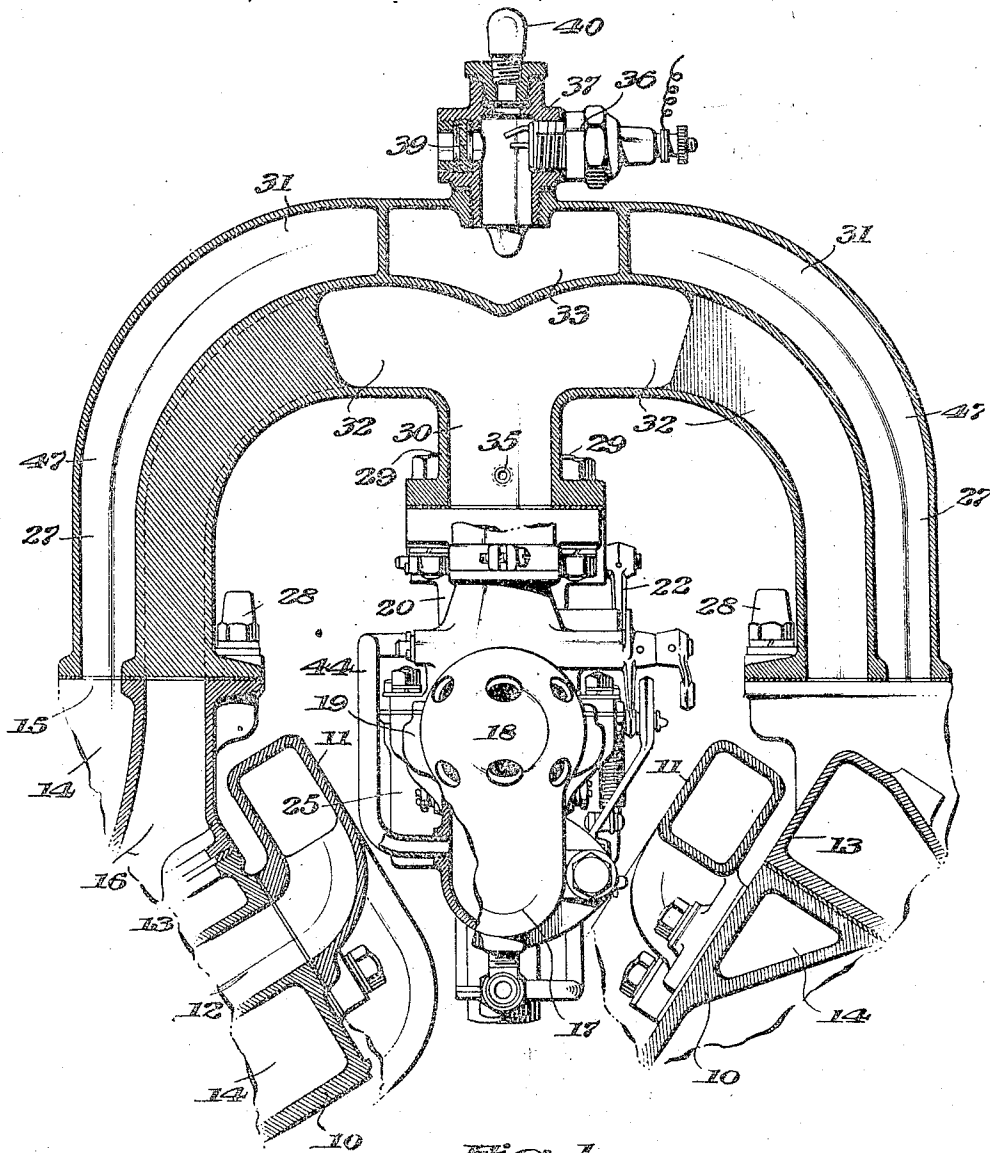


Fig. 1.

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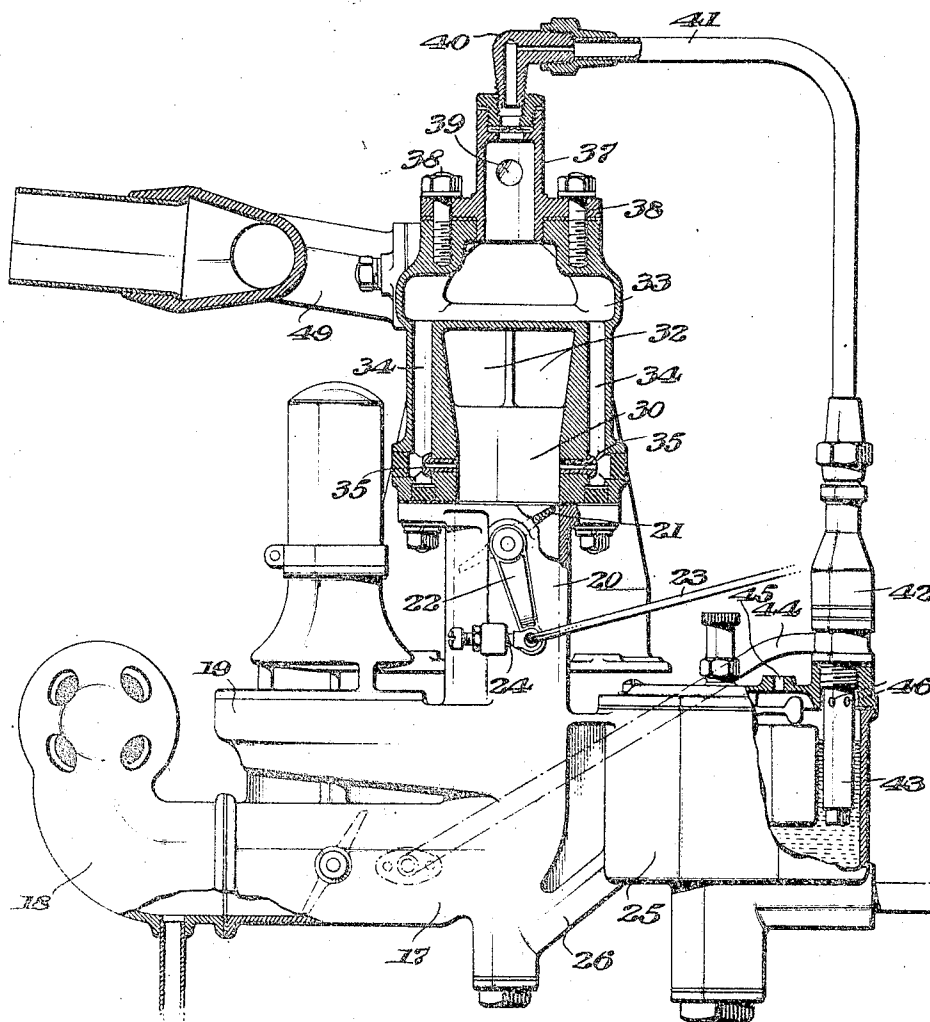
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Fig. 2.



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Fig. 3.

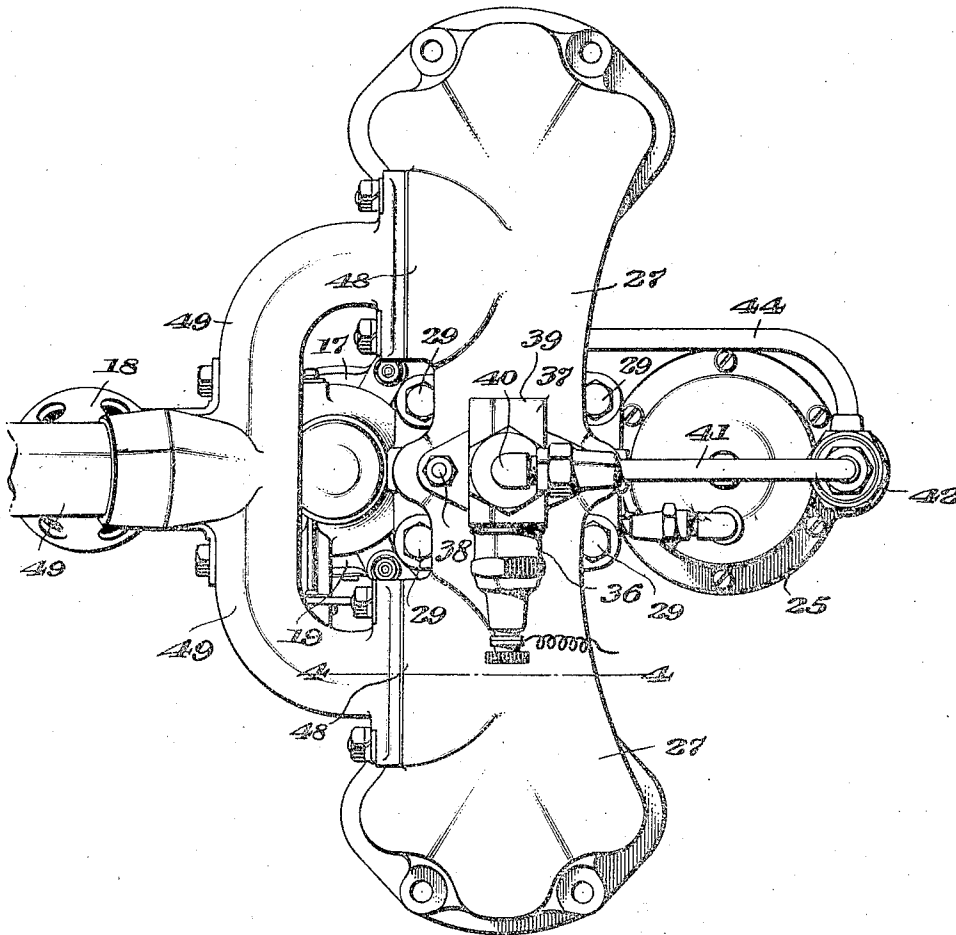
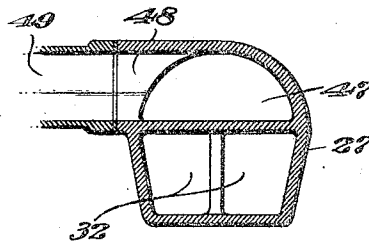


Fig. 4.

Inventor,
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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.

Application filed October 16, 1919. Serial No. 331,043.

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 means for heating the mixture passing from the carburetor to the motor cylinders.

Various means have been provided heretofore for heating the mixture of a hydrocarbon motor and in my earlier application, Serial No. 323,627, filed September 13, 1919, I provided a combustion heater for the motor intake pipe. One of the objects of the present invention is to improve upon the construction and arrangement of the heater and intake pipe of a hydrocarbon motor.

Another object of the invention is to provide improved means for applying heat to the motor intake pipe both by means of a combustion heater and by the use of the hot water from the motor cylinder water jackets.

Another object of the invention is to form a motor intake pipe with a plurality of independent heating jackets, one of which is adapted to apply intense heat to the mixture, as by a combustion heater of the type above referred to, and the other of which applies less heat as by the use of the water from the cylinder jackets.

Another object of the invention is to provide a branched intake pipe with a plurality of heating means at different points in the pipe.

Another object of the invention is to provide a novel and useful arrangement of carburetor and heated intake pipe in a V-type hydrocarbon motor.

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

Figure 1 is a transverse section through a hydrocarbon motor embodying one form of my invention, certain parts being shown in elevation;

Figure 2 is a section at right angles to Figure 1 taken through the motor intake pipe or header, showing the carburetor largely in elevation;

Figure 3 is a plan view of the intake pipe

and carburetor shown in the other figures; and

Figure 4 is a detail sectional view on the line 4—4 of Figures 1 and 3.

Referring to the drawings, 10 indicates the cylinder blocks of a hydrocarbon motor of V-type and 11 the exhaust pipes connected to the cylinder blocks. In the left-hand cylinder block the exhaust passage 12 is shown as communicating with its exhaust pipe 11.

Each of the cylinder blocks 10 has a cylinder head 13 and both the blocks and heads are provided with water jackets 14. It will be understood that in the usual circulation of water through the motor water jackets the water will pass upwardly through an outlet passage 15 provided for the purpose. This passage is shown in the head of the left-hand cylinder block and there is a similar passage at the right-hand side.

Each of the cylinder heads is also formed with an intake passage 16 for the mixture, these passages leading to the respective cylinders through suitable inlet valves, not shown.

Arranged between the cylinder blocks is a carburetor 17, which may be of any suitable construction, the well known Packard carburetor being illustrated in the drawing. This carburetor consists mainly of a primary air intake passage 18, an auxiliary air intake passage 19, and a mixture tube or outlet passage 20 in which a butterfly throttle valve 21 is arranged. This valve is controlled by an arm 22 and a rod 23, an adjustable stop 24 being provided to determine the idling position of the throttle.

The carburetor is supplied with a liquid fuel, such as gasoline, by a float chamber 25 which connects through a tube 26 with the carburetor fuel nozzle arranged below the passage 20, but not shown in the drawing.

An intake passage is provided between the carburetor outlet 20 and the intake passages 16 of the motor cylinder blocks. This passage is formed, in the illustrated device, in an intake pipe 27 which is connected to the heads 13 of the cylinder blocks as by the bolts 28 and to the carburetor as by the bolts 29. Thus the intake pipe or header 27 bridges across from one cylinder block to the other and supports the carburetor 17 between the cylinder blocks.

The intake has a main passage 30 which forms a continuation of the outlet passage 20 of the carburetor and is arranged vertically above it. This passage 30 bends at its upper end and forms branches 31 extending in opposite directions towards the cylinder blocks. The branches 31 are themselves bifurcated forming pairs of branches 32 which, as shown, bend downwardly to their outlets. These branch passages 32 communicate with the intake passages 16 above referred to and in a 12-cylinder V-type motor, such as the one herein shown, each branch passage 32 is adapted to feed three of the cylinders.

Means are provided for heating the mixture passing through the passages of the intake pipe. In this invention there are a plurality of such means, each operating independently of the other. One of the means comprises a combustion heater device which is shown as connected to the intake pipe at the bend where the branches 31 begin, and the other means, which is of less intensity than the first means, uses the hot water from the cylinder jackets for heating the walls of the branches 32.

The upper part of the middle of the intake pipe, above the carburetor, is formed with a chamber or jacket 33 which is in direct heating relation with the passage 30 and the branches 31, and outlets from this chamber 33 extend downwardly therefrom, as shown at 34, on opposite sides of the passage 30. (See Figure 2). These outlets 34 lead directly into the interior of the intake pipe, that is into the passage 30, through perforated plugs 35, as shown in Figure 2.

The outlets 34 run from the lowest points of the chamber 33, and in consequence thereof any fuel that may condense in the chamber 33 by reason of misfiring of the spark plug or otherwise, will immediately drain through the outlets 34 and plugs 35 and not collect in the chamber to cause trouble upon sudden closing of the throttle.

An igniter 36 for the combustion heater, which igniter is shown in the form of a spark plug, is arranged in a casting 37 bolted to the upper part of the chamber 33 as by the bolts 38. This casting is also provided with an observation window 39 opposite the spark plug 36 and it is adapted to receive the elbow 40 or other fitting for a pipe 41 which leads a combustible mixture to the fitting 37 and chamber 33 from a small auxiliary carburetor 42, which carburetor is shown as connected to the float chamber 25 hereinabove described. Said auxiliary carburetor 42 is similar to that shown in my said pending application Serial No. 323,627, and for the purposes of this application it is sufficient to say that the said auxiliary carburetor receives gasoline from the float chamber as by a tube 43 and air from the main air

intake passage 18 of the main carburetor through a pipe 44. Some air is also supplied to the carburetor 42 from the air chamber in the upper part of the float chamber 25, which is open to the atmosphere as at 45. This air reaches the carburetor 42 through ports 46.

The intake pipe 27 is also formed with jackets 47 which connect with outlet passages 15 formed in the heads 13 of the cylinder blocks so that the water from the cylinder block jackets will pass into these intake pipe jackets 47. At the upper parts of the jackets 47 are outlets 48 and a branched pipe 49 connects with these outlets as shown particularly in Figures 2, 3 and 4. The pipe 49 may lead to a radiator or other cooling device for the water and the water will then be pumped to the cylinder jackets for continuous circulation in the usual way.

In the operation of the device as illustrated, the motor will be turned over by an electric starting motor, or otherwise, which will cause a depression in the intake passage 30, thus bringing mixture into the passage from the main carburetor 17. This depression will also be communicated to the combustion chamber 33 and a mixture will be drawn into that chamber from the auxiliary carburetor 42. This mixture will be ignited by the spark plug 36 and thus heat the motor intake pipe. The burnt gases from the chamber 33 will pass through the passages 34 and plugs 35 into the passage 30 and mix with and heat the mixture from the main carburetor 17. Thus there will be a preliminary heating of the mixture for the motor which will tend to volatilize any particles of liquid in the mixture and make it more easily ignited in the motor cylinder. The hot water jackets 47, after the motor has been operated long enough to heat the water in its jackets, will supply heat to the walls of the branches 32 and thereby prevent condensation of the mixture on the inner walls of those branches.

Other forms than the one herein shown may be made without departing from the spirit or scope of this invention.

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

1. In a hydrocarbon motor, the combination with an intake pipe having branches, of a combustion heater device connected to the main part of the intake pipe, and separate jacket heating means for the branches.
2. In a hydrocarbon motor, the combination with an intake pipe having a main passage and a plurality of branch passages, of a combustion heater device connected to the intake pipe at the main passage part, and hot water heating means connected to the branches of said intake pipe.
3. A hydrocarbon motor intake pipe com-

prising a main passage, and pairs of branches leading from opposite sides thereof, of a combustion heater for the main portion of the pipe, and water heating means for the branches.

4. In a hydrocarbon motor, the combination with an intake pipe and a throttle valve therein, of a combustion heater device connected to the upper part of said pipe and having an outlet passage leading downwardly and into the pipe below said upper part and above said throttle valve.

5. In a hydrocarbon motor, the combination with an intake pipe having a vertical passage with a bend at the top thereof, of a heater device connected to said pipe at the bend and having passages on opposite sides of said intake pipe leading downwardly from the connection of the device to the intake pipe and communicating with the interior of the intake pipe below said bend.

6. In a V-type hydrocarbon motor, the combination with the two water jacketed cylinder blocks, of a carburetor arranged between the blocks, an intake pipe connected to the carburetor and having branches leading to the cylinder blocks, said intake pipe having water jackets adapted to receive circulating water from the jackets of the cylinder blocks, and a combustion heater device arranged at the middle part of said intake pipe.

7. In a V-type hydrocarbon motor, the combination with the two water jacketed cylinder blocks, of a carburetor arranged between the blocks, an intake pipe connected to the carburetor and having branches leading to the cylinder blocks, said intake pipe having water jackets adapted to receive circulating water from the jackets of the cylinder blocks, and a combustion heater device connected to said intake pipe immediately above the carburetor connection thereto.

8. In a hydrocarbon motor, the combination with an intake pipe, having a throttle valve therein, of a combustion heater device connected to said pipe and comprising a combustion chamber, said device having an outlet from the lowest part of said chamber and communicating with the interior of the intake pipe beyond said throttle valve.

9. In a hydrocarbon motor, the combination with an intake pipe having a vertical passage with a bend at the top thereof, and a throttle valve in the vertical passage, of a combustion heater device connected to said pipe at the bend and comprising a combustion chamber, said device having a passage leading from the lowest point of said chamber downwardly and into the interior of the intake pipe below the bend and above said throttle valve.

In testimony whereof I affix my signature.
LIONEL M. WOOLSON.