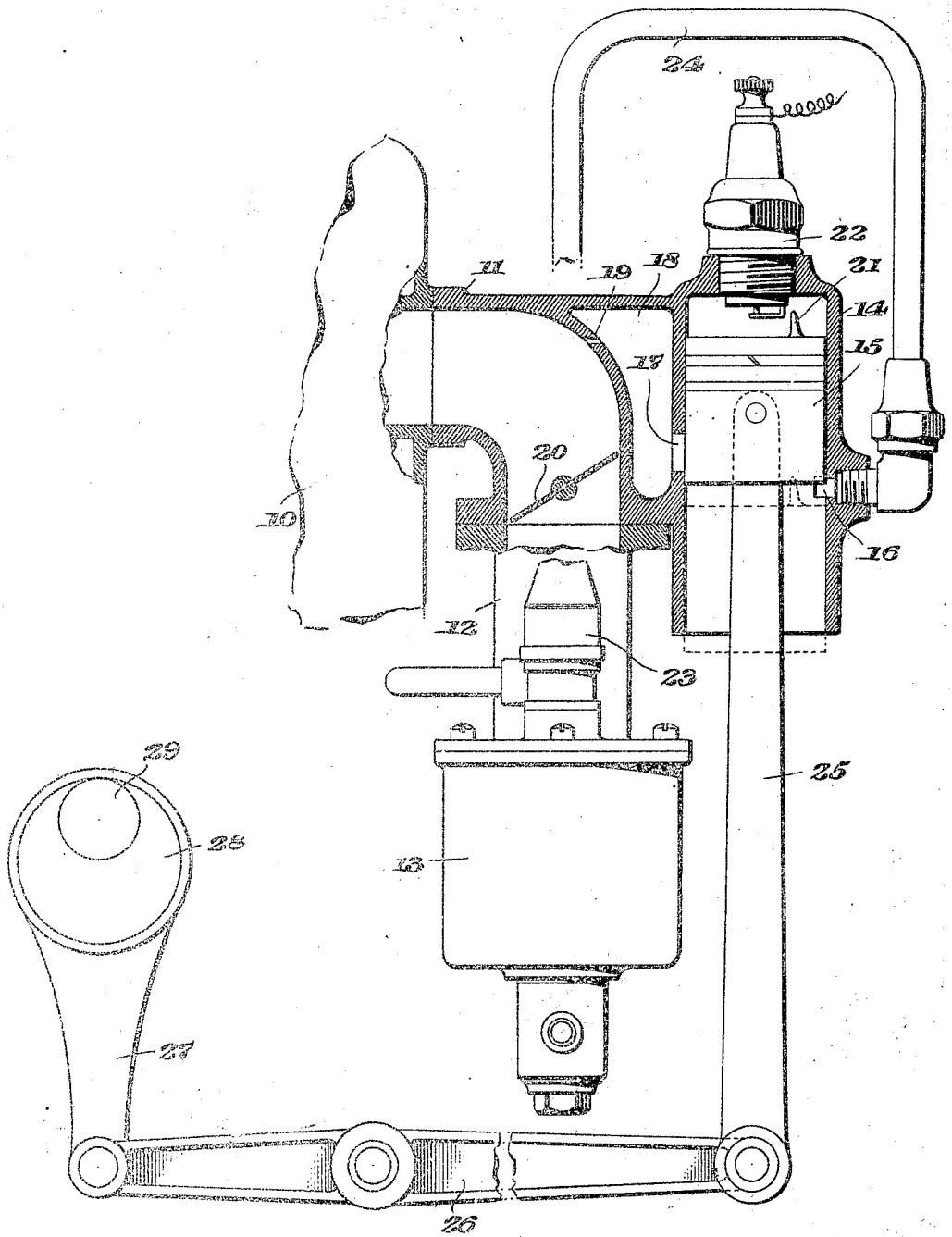
April 8, 1924. 1,489,411

L. M. WOOLSON

HYDROCARBON MOTOR

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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 January 31, 1920. Serial No. 355,200.

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 to the motor.

One of the objects of the invention is to provide means for heating the mixture of a hydrocarbon motor before it enters the cylinders and before a charge is fired in any of the cylinders.

Another object of the invention is to provide means for compressing and firing a small amount of combustible mixture in a closed space and then delivering the burnt gas to the motor intake conduit for heating the mixture as it passes therethrough.

Other objects and advantages will appear from the following description taken in connection with the drawing which forms a part of this specification, and in which the figure shows a portion of a hydrocarbon motor and parts thereof embodying this invention.

Referring to the drawing, 10 indicates a fragmentary portion of one of the cylinder blocks of a hydrocarbon motor, and 11 is the motor intake conduit or passage through which the mixture passes to the motor cylinders. The conduit 11 is shown as of elbow form and to its down turned end is connected a carburetor 12, which may be of any desired form or type. The carburetor supplies mixture to the conduit 11 through which it is conveyed to the motor. The carburetor also has as a part of it, a float chamber 13 of the usual type.

Means are provided for supplying heat to the mixture as it passes from the carburetor 12 through the intake conduit 11 of the motor, and in general this means comprises a cylinder 14 and a piston 15 operating therein. As shown, this cylinder 14 is formed as an integral part of the casting forming the conduit 11 and it has an inlet port 16 at one side and an outlet port 17 at the opposite side, the outlet port being slightly above the inlet port and exhausting the burnt gases into a jacket 18 formed around a part of the intake conduit 11. A port 19 connects the interior of the jacket 18 with the interior of the intake conduit 11 above a throttle valve 20 arranged in said conduit 11. Thus the suction of the motor above the throttle valve 20 is communicated to the jacket 18 and consequently to the interior of the cylinder 14 when the piston 15 is low enough to open the port 17. The piston 15 has a deflector or baffle 21 formed on its upper surface to deflect the incoming gases to the upper part of the cylinder so that they will not pass directly across the top of the piston to the opposite port 17. A spark plug 22 is provided in the upper part of the cylinder, and it is understood that it may be connected to the ignition system of the motor so that a spark is intermittently formed in the cylinder as the piston reaches the upper end of its stroke. If desired, the compression space in the cylinder may be made sufficiently small so that the charge will be automatically fired at the top of the stroke due to high compression, and, in this case, the spark plug may be omitted.

For delivering a mixture to the cylinder 14, the port 16 may be connected either with the carburetor 12 below the throttle valve 20 or it may be connected to a separate and independently acting carburetor 23, which is shown as mounted on top of the float chamber 13 above referred to. A pipe 24 carries the mixture from the auxiliary carburetor 23 to the port 16.

The piston 15 above referred to may be operated in various ways, and it is shown as connected by a rod 25, a rock shaft 26 and a link 27 with an eccentric 28 on a rotating shaft 29. The shaft 29 may be the cam shaft or other rotating part of the hydrocarbon motor, or it may be the armature shaft of an electric motor, which electric motor may also be the starting motor of the hydrocarbon motor. In the latter event, the timing mechanism for the spark plug 22 will be connected to the electric motor for operating the spark in time with the reciprocations of the piston 15.

From the above description it will be seen that as the hydrocarbon motor is turned over for starting, suction will be created in the intake pipe or conduit 11, and if the throttle valve 20 is only slightly opened, a small amount of mixture will be drawn from the carburetor 12 and pass through the conduit 11 to the motor cylinders. Depression will also be created in

the jacket 18 and the piston 15 will be reciprocated by the operation of either the hydrocarbon motor or the electric starting motor. As the piston 15 reaches the lowest part of its stroke, as shown in dotted lines, the depression in the jacket 18 will augment the depression in the cylinder 14 and this will cause suction through the pipe 24, thereby drawing a charge of combustible mixture from the auxiliary carburetor 23. This charge of mixture drawn into the cylinder 14 above the piston 15 will be compressed within the cylinder as the piston moves upwardly, and when the piston is at the top of its stroke, the charge will be fired by the spark plug 22. The piston 15 then moves downwardly and uncovers the port 17 and the hot gases from the cylinder pass into the jacket 18 and thereby heat the intake conduit 11. The hot gases also pass through the port 19 to the interior of the conduit 11 where they come in direct contact with the mixture passing through said conduit to the motor cylinders. The mixture thereby becomes relatively highly heated and much more easily ignites when it reaches the motor cylinders.

A specific embodiment of the invention has been described in detail and will be specifically claimed, but it will be understood that the invention is not limited to the exact details of construction shown, as it will be apparent that changes may be made without departing from the spirit or scope of the 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 the intake conduit thereof, of a heater device comprising a combustion chamber, means for drawing a charge of mixture into said chamber, compressing and firing it therein, and delivering the burnt gas to the interior of said conduit.

2. In a hydrocarbon motor, the combination with the intake conduit thereof, of a carburetor for supplying mixture thereto, and a heater device for said mixture comprising means for compressing and firing a charge of combustible mixture and delivering the burnt gas to said conduit.

3. In a hydrocarbon motor, the combination with the motor intake conduit, of a heater device comprising a cylinder, a piston operating in said cylinder, mixture supply means for said cylinder, and means for discharging the products of combustion of said cylinder into said conduit.

4. In a hydrocarbon motor, the combination with the motor intake conduit, of a carburetor for supplying mixture thereto, and a heater for said mixture comprising a piston and cylinder for compressing the quantity of mixture, and means for discharging the burnt gas from said cylinder into said conduit.

5. In a hydrocarbon motor, the combination with the motor intake conduit, of a heater device for the intake gases comprising a piston and cylinder mounted as an integral part of said conduit.

6. In a hydrocarbon motor, the combination with a moving part of the motor, of a heater for the motor mixture comprising a cylinder and a piston, and means connecting said piston with said movable part of the motor for operating the piston.

7. In a hydrocarbon motor, the combination with the mixture conduit, of a heater for said mixture comprising means for compressing and firing a charge of combustible mixture and delivering it to said mixture conduit, and power means for operating said heater.

8. In a hydrocarbon motor, the combination with the mixture conduit, of a heater for said mixture comprising means for compressing and firing a charge of combustible mixture and delivering it to said mixture conduit, and means for operating said heater.

9. In a hydrocarbon motor, the combination with a mixture intake conduit, of a cylinder, a piston operating in the cylinder and operated by a movable part of the motor, means for supplying said cylinder with a combustible mixture and firing it therein, and outlet means from said cylinder to said intake conduit.

In testimony whereof I affix my signature.

LIONEL M. WOOLSON.