

H. J. BERRUET.
HEATING APPARATUS FOR INTERNAL COMBUSTION MOTORS.
APPLICATION FILED JUNE 5, 1914. RENEWED OCT. 15, 1920.

1,373,290.

Patented Mar. 29, 1921.

Fig. 1.

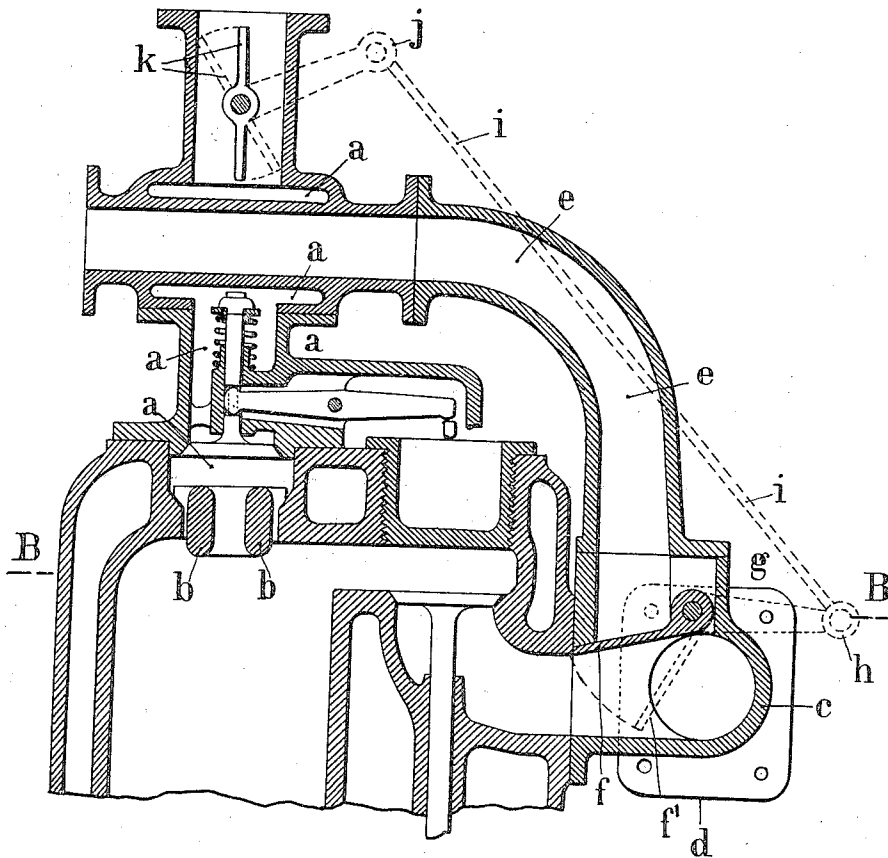
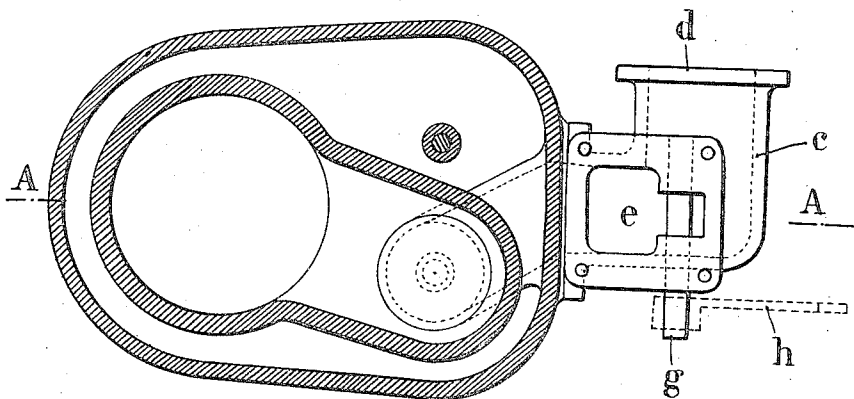


Fig. 2.



WITNESSES

William C. Bate Jr.
P. D. Kollhaus

INVENTOR

HENRI JEAN BERRUET

BY

Mum Co
ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRI JEAN BERRUET, OF LEVALLOIS-PERRET, FRANCE, ASSIGNOR TO SOCIÉTÉ INDUSTRIELLE POUR L'EMPLOI DES PÉTROLES LAMPANTS DANS TOUS MOTEURS À EXPLOSION, OF PARIS, FRANCE.

HEATING APPARATUS FOR INTERNAL-COMBUSTION MOTORS.

1,373,290.

Specification of Letters Patent.

Patented Mar. 29, 1921.

Application filed June 5, 1914, Serial No. 843,220. Renewed October 15, 1920. Serial No. 417,266.

To all whom it may concern:

Be it known that I, HENRI JEAN BERRUET, of 22^{bis} Rue Vallier, Levallois-Perret, Seine, Republic of France, have invented Improvements in Heating Apparatus for Internal-Combustion Motors, of which the following is a full, clear, and exact description.

In internal combustion motors using as carbureting liquids, heavy oils which are not volatile at ordinary temperatures, it is necessary to employ a suitable apparatus for the purpose of effecting a complete vaporization of such liquids before admitting them to the cylinder.

It has been proposed to effect the volatilization of the carbureting liquids by storing the heat generated by the combustion in the motor, in a mass of metal or other material arranged in the end of the cylinder and upon which the carbureting liquid is caused to impinge. This method gives good results, but it has the drawback that it does not adjust itself readily to the necessary regulation required for different speeds of rotation of the motor. Namely if the apparatus has been designed so that the supply of heat shall be sufficient for volatilizing the liquids when the motor is running at its maximum speed, this supply of heat will in general be insufficient when the motor is running slowly, because the amounts of heat supplied to the mass of metal at the different speeds of rotation of the motor are not in proportion to the amounts of heat which are required at these different speeds for volatilizing the amount of liquid necessary for maintaining a normal speed.

The present invention has now for its object to remedy this drawback and it consists essentially in combining with the arrangement for heating by a mass of metal, a supplementary arrangement for heating by means of a branch off the exhaust.

The invention also consists in automatically regulating the amount of the exhaust gas employed for effecting the supplementary heating, by regulating means connected to the mechanism for controlling the admission of the gases into the cylinder. Under these circumstances, when the throttle or other controlling device is operated to slacken the speed of the motor, the branch off the exhaust is opened at the same time to a proportionate extent, so as to supply to the

carbureting liquid the amount of heat which it requires. This arrangement thus allows of effecting an efficient vaporization of the carbureting liquid at all speeds of the motor.

One form of the improved heating apparatus which constitutes the subject matter of this invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a sectional elevation taken on the line A—A of Fig. 2 of the upper part of a motor cylinder so as to show the general arrangement of the improved apparatus.

Fig. 2 is a horizontal section on the line B—B of Fig. 1 of a motor provided with the improved vaporizing apparatus.

As shown, the motor is provided at the place where the admission pipe *a* enters the cylinder, with a mass of metal *b* which is intended for effecting the volatilization of the carbureting liquid.

The exhaust pipe *c* comprises two branches:—one branch *d* which leads directly into the exhaust port, and the other branch *e* which is curved back so as to pass through the suction pipe *a* on its way to join the exhaust port (not shown).

A flap valve *f* which is fixed on a spindle *g* provided with a lever *h*, is arranged at the entrance of the exhaust pipe *e*. This flap valve is adapted to assume all positions intermediate between the extreme positions *f* and *f'*, and thus close more or less the exhaust pipe *e*.

The lever *h* for actuating this flap valve, is connected by a connecting rod *i* to the lever *j* that actuates the throttle *k* situated in the suction pipe for the purpose of regulating the passage therethrough. The positions and extents of movement of these valves or throttles are adjusted in such a manner that the valve *f* shall be closed when the throttle *k* is opened full and the motor is consequently running at its maximum speed.

The operation of the improved apparatus is as follows: When the motor is running at full speed, the throttle *k* is opened full, and this full opening has the result of causing a complete closure of the flap valve *f*; this position is shown at *f*. Under these conditions the heating is effected solely by the mass of metal *b* which is itself heated by the heat generated by the explosions in the cylinder.

When the throttle *h* is being gradually closed for the purpose of reducing the speed of the motor, the flap valve *f* will open more and more, and a portion of the exhaust gases will supply the necessary heat through the branch *e* to the carbureting gases which enter the admission pipe *a* and pass around the walls of the branch *e*. The arrangement must be made such that the heat supplied by the exhaust gases shall make up at all times the amount of heat which is required of, but is not supplied by the mass of metal which is now insufficiently heated for that purpose.

This improved apparatus thus allows of assuring a complete vaporization of the carbureting liquids in such a manner as to produce for each speed of the motor those conditions which are best for the working of the motor.

The apparatus as described and shown is given solely by way of example and it is to be understood that the construction and arrangement of the same may be varied to suit the requirements of the various kinds of motors.

The essential features of the improved apparatus will remain the same whether the motor has one or more cylinders; whether the valves are automatic or positively operated; and whether the valves are situated at the top or at the sides of the cylinders.

Claims:

1. In internal combustion motors using heavy oils, which include a cylinder and an admission pipe in the head thereof, an annular metal mass within the cylinder in the path of the admission pipe and coaxial therewith, supplementary volatilizing means heated by the exhaust gases of the motor, and means for automatically regulating the exhaust in direct ratio to the opening of the throttle of the motor.

2. In internal combustion motors using heavy oils and including a cylinder and an

admission pipe in the head thereof, an annular metal mass, supported within the cylinder in the path of the admission pipe and coaxial therewith, supplementary volatilizing means heated by the exhaust gases of the motor, and means operably connecting the throttle and exhaust of the motor whereby the quantity of exhaust gas is automatically controlled by the throttle of the motor.

3. In internal combustion motors using heavy oils and comprising an explosion cylinder, and an inlet port through the head of the same, a metal mass suspended within the head of the cylinder and coaxial therewith, a supplementary volatilizing means consisting of a passage from the exhaust through the intake of the motor, a throttle valve in said intake, a valve controlling the exhaust passage and connections between said valves whereby movement of the throttle will automatically regulate the amount of exhaust passing through the passage of the supplementary volatilizing means.

4. In internal combustion motors using heavy oils and comprising an explosion cylinder having an inlet port through the head thereof, the combination with an annular metal mass for volatilization of the oil and suspended within said port, an intake pipe leading to said port and metal mass, said metal mass being coaxial with the said port, a pipe leading from the exhaust of the motor and passing through the intake pipe in advance of its discharge to the aforesaid metal mass, whereby complete volatilization of the heavy oil is secured, at its entrance to the explosion cylinder.

The foregoing specification of my improvements in heating apparatus for internal combustion motors signed by me this 26th day of May, 1914.

HENRI JEAN BERRUET.

Witnesses:

CHAS. P. PRESSLY,
RENÉ THIRIOT.