W. A. ROOT.

AIR CONTROLLED DEVICE FOR GAS ENGINES.

APPLICATION FILED APR. 4, 1914.

1,143,230. Patented June 15, 1915.

Fig. 1.

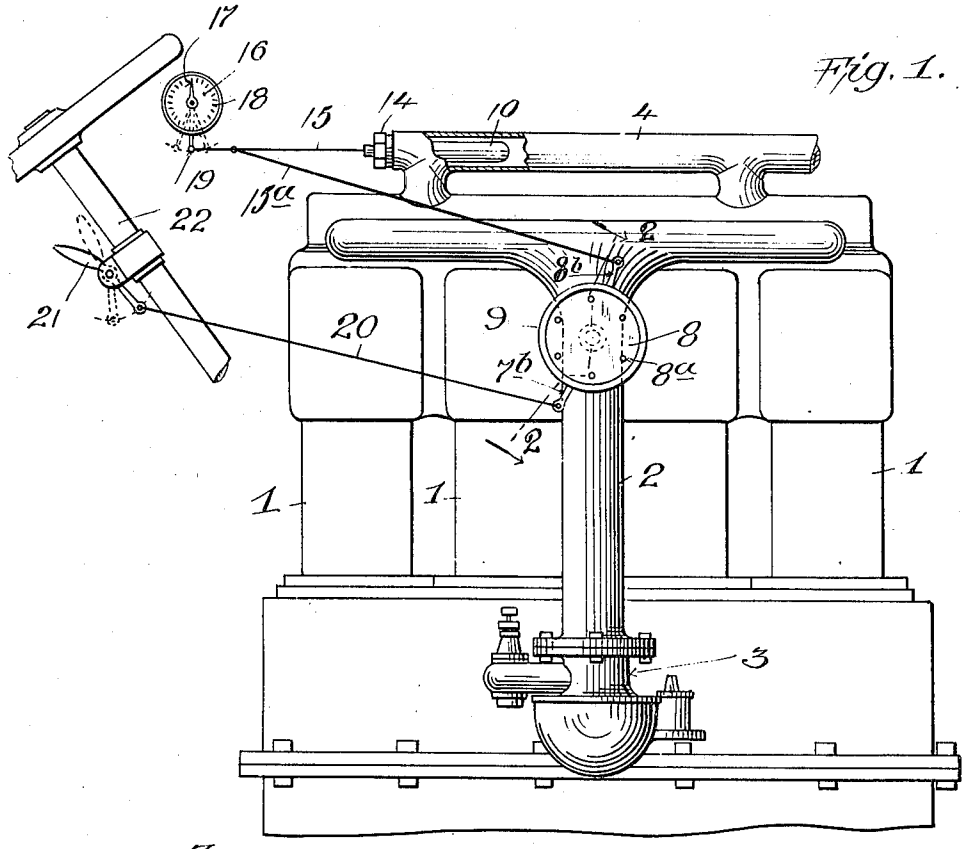
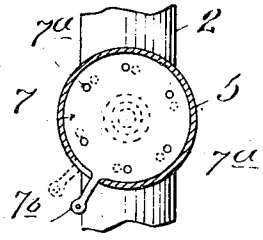


Fig. 3.



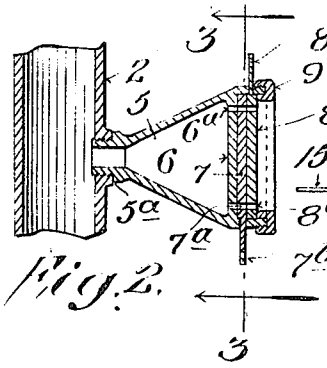
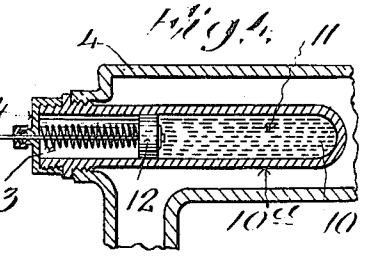


Fig. 2.

Fig. 4.



Witnesses:
C. M. Benjamin
Marie F. Wainwright

Inventor
W. A. Root.
By his Attorney
T. F. Bourne

UNITED STATES PATENT OFFICE.

WILLIAM A. ROOT, OF BENNINGTON, VERMONT.

AIR-CONTROLLED DEVICE FOR GAS-ENGINES.

1,143,230. Specification of Letters Patent. Patented June 15, 1915.

Application filed April 4, 1914. Serial No. 829,575.

To all whom it may concern:

Be it known that I, WILLIAM A. ROOT, a citizen of the United States, and resident of Bennington, in the county of Bennington and State of Vermont, have invented certain new and useful Improvements in Air-Controlling Devices for Gas-Engines, of which the following is a specification.

The object of my invention is to provide simple and efficient means for automatically, and at will, controlling the admission of air to the manifold or passage between the carbureter and the mixture intake port or ports of an internal combustion engine, independent of the carbureter, and in connection therewith to provide means whereby the temperature of the cooling water for the engine may be indicated.

In carrying out my invention I provide a suitable casing adapted to be connected with the manifold or mixture passage of a gas engine, independent of the carbureter, and provided with a plurality of apertured movable members to control the flow of air therethrough, with a thermostatic controlling device or regulator in thermal relation to the cooling water of the engine and connected with one of said members, means being provided to at will operate the other of said members, whereby additional free air may be admitted automatically to the mixture after it passes from the carbureter, in more or less accordance with the temperature of the cooling water, and whereby such admission of air may be manually controlled irrespective of the action of said thermostatic device.

My invention further comprises novel details of improvement and combinations of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming part hereof, wherein,

Figure 1 is an elevation of a portion of a gas engine equipped with my improvements; Fig. 2 is an enlarged sectional detail on the line 2, 2, in Fig. 1; Fig. 3 is a section on the line 3, 3, in Fig. 2, and Fig. 4 is an enlarged sectional view of the thermostatic device in the cooling-water manifold.

At 1 is indicated an internal combustion engine of any well known or desired type or construction, having the mixture manifold 2 connected with the mixture intake port or ports of the engine, and at 3 is indicated a carbureter connected with such manifold. At 4 is a manifold for the cooling water for the engine. A suitable casing 5 is shown provided with a threaded portion 5^a adapted to be connected with manifold 2 between the carbureter and the engine ports, said casing being shown provided with a plurality of apertured members operative independently of each other and capable of registering their openings one with another. One of said members is controlled by a thermostatic device in thermal relation to the engine cooling water and the other by the driver at will. A simple construction is herein shown as follows: Said casing is shown provided with a plate or disk 6 having any desired number of apertures 6^a. Within casing 5 an apertured member is rotatively supported, being shown as a disk or plate 7, having any desired number of apertures 7^a adapted to register with the apertures 6^a, and at 8 is a substantially similar apertured member, shown as a disk or plate rotatively supported within casing 5, and having any desired number of apertures 8^a to register with the apertures 7^a. Said disks may be mounted for rotation in any suitable manner. For this purpose I have shown a collar 9 provided with threads fitted upon threads on the outer end of casing 5, whereby said disks are rotatively retained, and are shown guided at their edges in casing 5.

One of the disks, such as 8, is adapted to be operated through the differences of temperature of the cooling water for the engine, as the water in manifold 4, and to this end said disk is shown provided with a projection or arm 8^b passing through a suitable slot in casing 5, and operated by a thermostatic device or thermal regulator 10, in thermal relation to the cooling water. Said thermostatic device may be of any suitable construction. I have shown the same as comprising a suitable casing or bulb 10^a containing mercury 11 and a piston 12, to be operated by the mercury, a spring 13 opposing the mercury and bearing against piston 12 and a cap 14 on the bulb 10^a. A suitable wire, rod or the like 15 is connected with piston 12, passing through cap 14, and is connected with arm 8^b in any suitable manner. A Bowden-wire may be used for this purpose. The thermostatic device or bulb may be screwed into a suitable aperture in manifold 4, so that the cooling water will thermally affect such device. To

indicate to the driver the temperature of the cooling water, I have shown an indicator 16, which may be of any suitable construction, and provided with a pointer 17 to sweep over dial 18, and an arm 19 operatively connected with wire 15. A wire 15^a is shown connecting wire 15 and arm 8^b, whereby both arms 8^b and 19 will be operated together. Where the indicator is not used the connection between piston 12 and arm 18 may be arranged in any desired manner. The disk 7 is shown provided with an arm 7^b passing through a slot in casing 5, and extending in position to be operated by the driver. As a convenient means for this purpose I have shown a wire 20 (which may be in the form of a Bowden wire) connecting arm 7^b with a handle or arm 21 secured upon the steering post 22, of a vehicle, air-ship, or the like.

The arrangement and relation of the parts may be such that when the engine is cold the disk 7 may be set with its apertures in register with the apertures 6^a, and the apertures of the disk 8 out of register with the first named apertures, when the thermostatic device is contracted to its normal temperature condition.

When the engine is in use and its cooling water becomes heated, as to a substantially predetermined or desired degree, the piston 12, or the expansion of one or more metals comprising the thermostatic device, will cause the operation, more or less, of arm 8^b through the intermediate connections, whereby the disk 8 will be rotated to bring its apertures to register, more or less, with the apertures 7^a to admit air to manifold 2. The arrangement may be such that the said apertures will register more or less in accordance with the increasing temperature of the cooling water, whereby if the engine becomes overheated the apertures 8^a will register fully with the apertures 7^a, and as the cooling water cools the disk 8 will be rotated reversely to cut off more or less of the supply of air through apertures 8^a. The indicator 16 will indicate to the driver the approximate temperature of the cooling water by reason of the connection of such indicator with the thermostatic device. During all conditions of use of the engine, the air admitted to manifold 2 may be controlled at will by operating handle 21 to rotate disk 7 more or less, to permit more or less air to flow through casing 5, notwithstanding any automatic adjustment that may be made to disk 8 by the thermostatic device. For instance, while the thermostatic device may operate disk 8 to admit a full complement of air through its apertures 8^a, conditions may arise where it is not desired to have so much additional air enter manifold 2, and thereupon the driver may operate disk 7 to reduce the amount of air that would be admitted through apertures 8^a, by moving the apertures 7^a more or less out of register with the apertures 8^a. The diameters of the apertures of the several disks may be the same or different as desired.

Changes may be made in the arrangement and details of construction set forth, within the scope of the appended claims, without departing from the spirit of the invention.

While I have shown the thermostatic device as within the cooking water manifold, it will be understood that said device may be located on the exterior of said manifold or in any other desired thermal relation to the engine or its cylinders.

Having now described my invention what I claim is:

1. The combination of an engine having a cooling water passage, a carbureter, and a passage for mixture therefrom to the engine, with means to admit air to said passage independent of the carbureter, and means in thermal relation to the cooling water to automatically operate the first named means in accordance with the temperature of said water.

2. The combination of an engine having a cooling water passage, a carbureter, and a passage for mixture therefrom to the engine, with means to admit air to said passage independent of the carbureter, a thermostatic device in thermal relation to said water, and means operatively connecting said device with the first named means for automatically operating the latter in accordance with the temperature of said water.

3. The combination of an engine having a cooling water passage, a carbureter, and a passage for mixture therefrom to the engine, with a casing connected with said passage, an apertured disk or plate carried by said casing, a second apertured disk or plate movably carried by the casing, whereby said apertures may register more or less, a thermostatic device in thermal relation to said cooling water, and means connecting said device with one of said disks or plates for operating the latter in accordance with the temperature of the water.

4. The combination of an engine having a cooling water passage, a carbureter, and a passage for mixture therefrom to the engine, with a casing connected with said passage, an apertured disk or plate carried by said casing, a second apertured disk or plate movably carried by the casing, whereby said apertures may register more or less, a thermostatic device in thermal relation to said cooling water, means connecting said device with one of said disks or plates for operating the latter in accordance with the temperature of the water, a third apertured disk or plate, and means to at will control

the latter to at will vary the flow of air through the first named disks or plates as controlled by the thermostatic device.

5. The combination of an engine having a cooling water passage, a carbureter, and a passage for mixture therefrom to the engine, with means to admit air to said passage independent of the carbureter, and means in thermal relation to the cooling water to automatically operate the first named means in accordance with the temperature of said water, and an indicator connected with said thermostatic device to indicate the temperature of said cooling water.

6. The combination of a casing adapted for connection with a gas engine intake manifold, with a plurality of independently movable apertured members, means for separately rotatively supporting said members, thermally acting means for operating one of said members, and means for separately manually operating the other member.

7. The combination of a casing adapted for connection with a gas engine intake manifold, with a plurality of apertured disks or plates, means for rotatively supporting one of said disks or plates, a thermostatic device, means to maintain said device in thermal relation to the engine water cooling system, and means connecting said device with said rotative disk or plate for automatically operating the same.

8. The combination of a casing adapted for connection with a gas engine intake manifold, with a plurality of apertured members, means for rotatively supporting said members, a thermostatic device, means connecting said device with one of said members for automatically operating the same, a handle, and means operatively connecting said handle with the other of said members for at will controlling the flow of air through said casing.

Signed at New York city, in the county of New York and State of New York, this 3rd day of April, A. D. 1914.

WILLIAM A. ROOT.

Witnesses:
RALPH H. RAPHAEL,
T. F. BOURNE.