

1,286,776.

J. REMMEN.
GAS ENGINE.
APPLICATION FILED NOV. 9, 1916.

Patented Dec. 3, 1918.
3 SHEETS—SHEET 1.

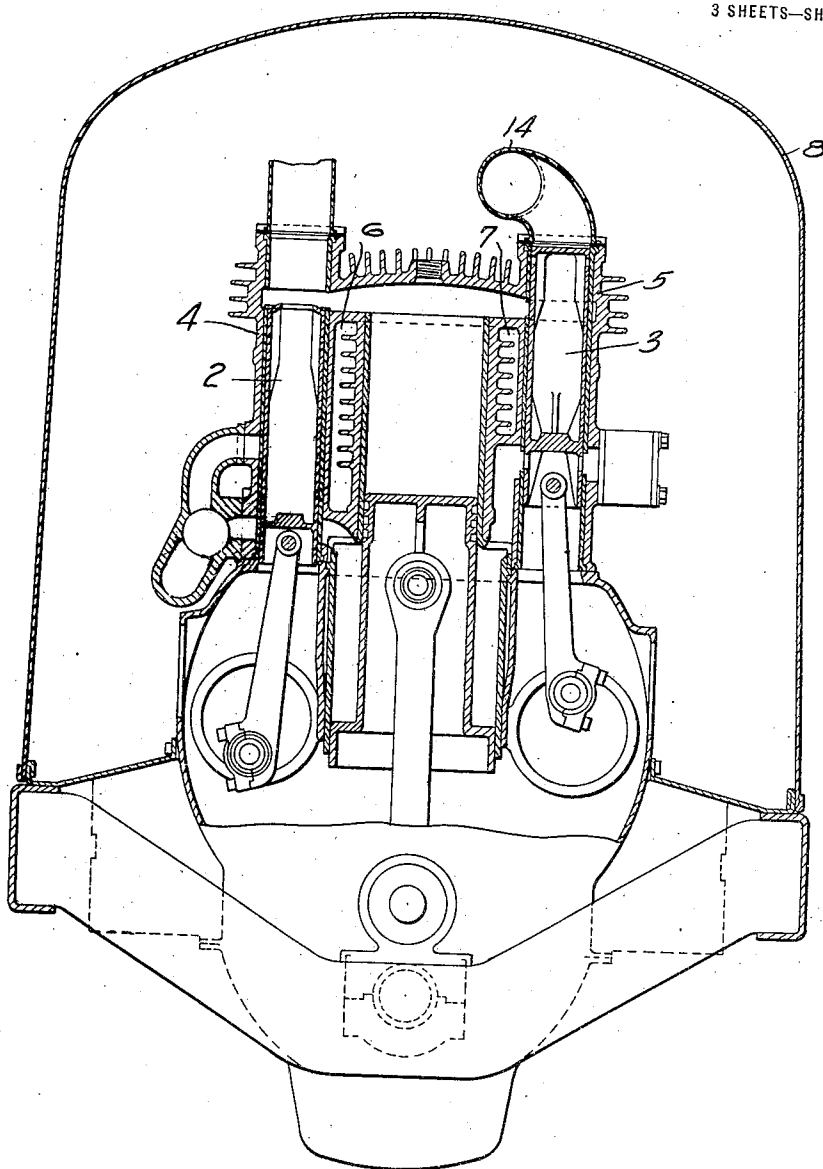


FIG. 1

WITNESSES

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3 SHEETS—SHEET 2.

FIG. 2.

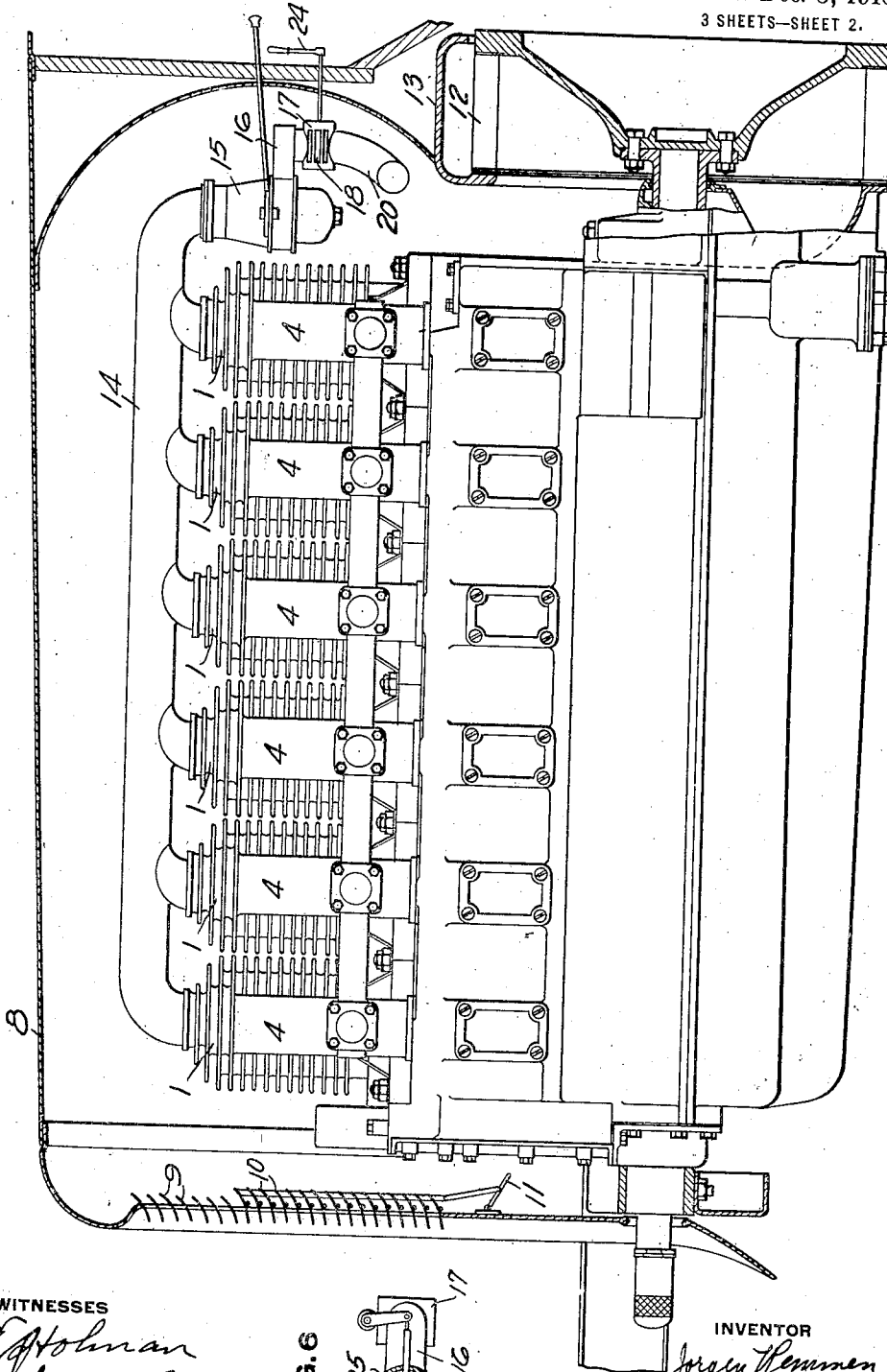
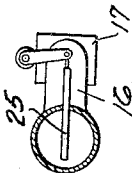


FIG. 6



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3 SHEETS—SHEET 3.

FIG. 3

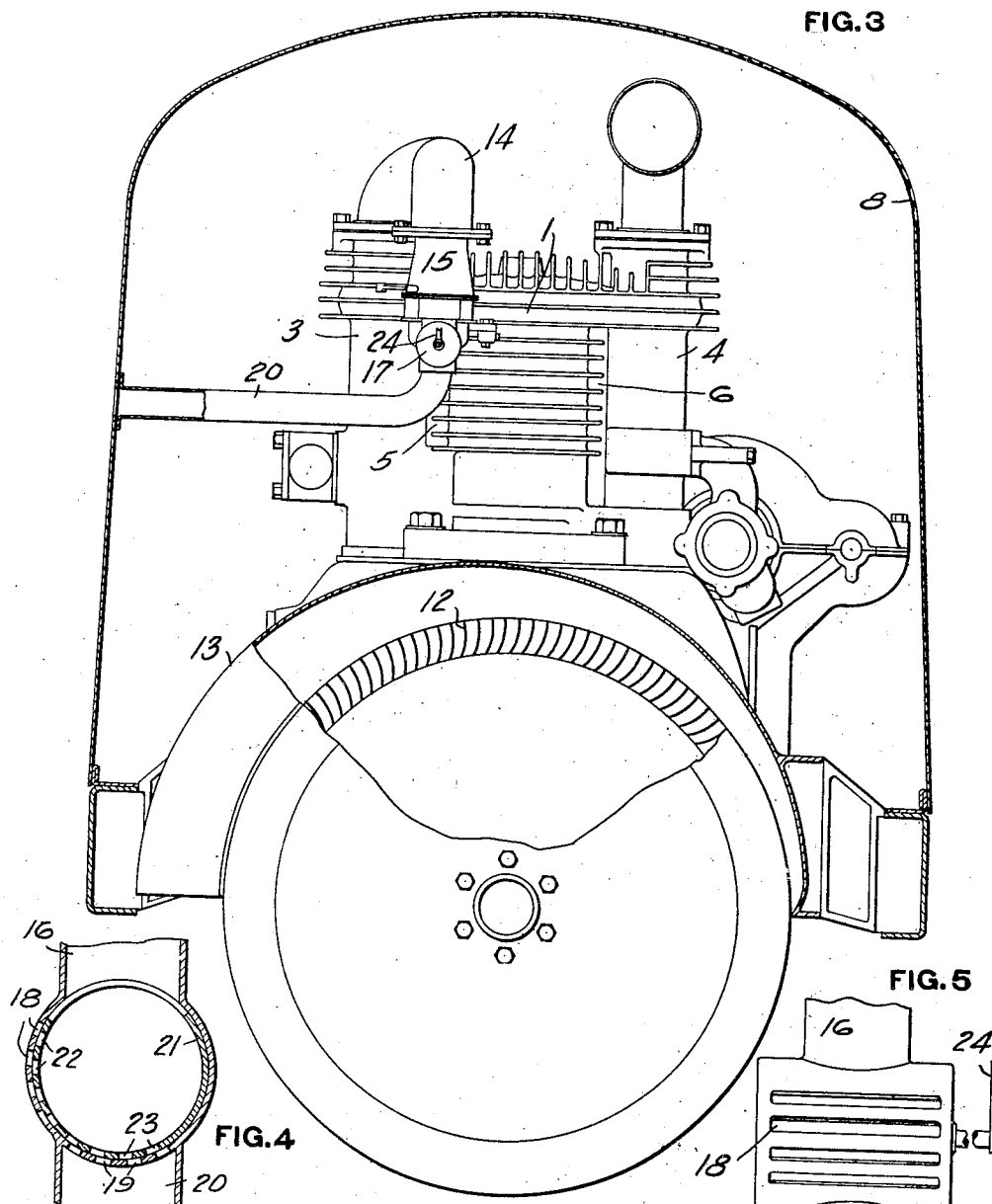
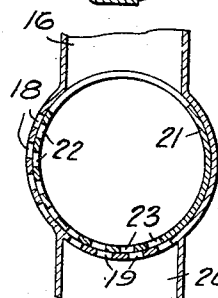


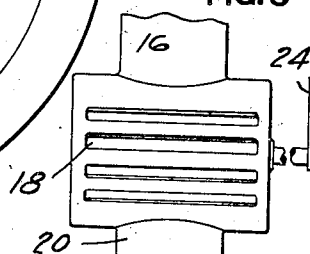
FIG. 4



WITNESSES

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FIG. 5



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UNITED STATES PATENT OFFICE.

JORGEN REMMEN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO GEORGE T. LADD, TRUSTEE, OF PITTSBURGH, PENNSYLVANIA.

GAS-ENGINE.

1,286,776.

Specification of Letters Patent.

Patented Dec. 3, 1918.

Application filed November 9, 1916. Serial No. 130,491.

To all whom it may concern:

Be it known that I, JORGEN REMMEN, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Engines, of which the following is a specification.

The invention relates to improvements in internal combustion engines, particularly to internal combustion engines for motor vehicles and the like.

One of the objects of the invention is to provide an internal combustion engine having improved means for regulating the temperature of the explosive charge furnished to the engine.

Another object is to provide an internal combustion engine having improved means for regulating the temperature of the air supply to the carbureter.

Another object is to provide an improved construction by means of which the engine may be air cooled.

A further object is to provide an improved air-cooled engine in which the cooling may be regulated and in which the parts are so located that the heat radiated from the engine is employed to heat the explosive charge furnished to the engine.

Other objects and advantages will appear from the following specification.

An embodiment of the invention is shown in the accompanying drawings. The views of the drawings are as follows:—

Figure 1 is a cross section of the engine.

Fig. 2 is a side elevation and partial cross section of the engine.

Fig. 3 is a rear end elevation of the engine.

Fig. 4 is a cross section of the valve mechanism for regulating the air supply to the carbureter.

Fig. 5 is a side elevation of the valvular mechanism.

Fig. 6 is a modification showing automatic means for regulating the valve mechanism in response to the temperature of the charge in the intake manifold.

The engine is of the air-cooled type, being provided with cylinders 1 and piston valves 2 and 3. The valves are located in suitable

casings 4 and 5 at the sides of the cylinders. The engine shown is provided with six cylinders and twelve valves and valve casings.

It is important in engines of this type that the temperature of the cylinders and valve casings be kept within certain limits. When the valve casings are integral with and closely adjacent to the cylinders, they prevent the air currents from contacting the cylinder directly and thus prevent the attainment of a maximum cooling effect upon the cylinders. At the same time the valves and valve casings themselves are heated to a high temperature which interferes with their proper operation.

In the present engine the valve casings 4 and 5 are separated from the cylinders 1, leaving air spaces 6 and 7 between the cylinders and casings into which spaces project the ribs of the cylinder. These spaces provide a passage from the front to the rear of the engine through which a current of air may pass. This current of air comes in direct contact with the cylinder walls and thus exerts a maximum cooling effect thereon and at the same time insulates the valve casings from the cylinders, thereby preventing the valves and valve casings from being heated to an excessive temperature by the heat from the cylinders. It is to be understood that the valve casings as well as the cylinders may be provided with cooling ribs if desired, but ordinarily this is unnecessary since, with the construction shown, the valve casings are insulated by air from the cylinders and the current of air passing over and through the engine will cool the valve casing sufficiently without the provision of cooling ribs.

When an engine of this type having air passages between the cylinders and the valve casings from the front to the rear of the engine is used with a motor vehicle, openings are provided in the front of the hood to permit the passage of a current of air to the engine, and at the rear of the engine an exhaust opening is provided through which the heated air may pass downwardly or outwardly and away from the engine. The motion of the motor vehicle tends to cause the current of air to flow over and through

the engine, the speed of such current increasing with the speed of the motor vehicle and consequently exerting a greater cooling effect when the engine is running fast than when it is running slowly, and thus automatically cooling the engine in response to the speed thereof.

The mounting of the engine in a motor vehicle is illustrated in Fig. 2. The engine is covered by a hood 8 having an opening in the front thereof in which are located the series of stationary vanes 9 and a series of movable vanes 10. These vanes are inclined forwardly and downwardly so as to permit the passage of air through the front of the hood to the engine and prevent the passage of water, snow and the like when the vehicle is being operated in wet or wintry weather. The movable vanes 10 are adjustable by means of a lever 11 or other suitable mechanism, so that the size of the opening in the front of the hood may be varied to vary the volume of air passing through the front of the hood to the engine. The air passes through the front of the hood over the engine and through the air passages between the cylinders and valve casings and down and out at the rear of the engine.

Provision is also made for exhausting the air at the rear of the engine and thereby creating a pull tending to draw a current of air over and through the engine. The means for doing this comprises an exhaust fan 12 at the rear of the engine. The fan in this case is a centrifugal exhaust fan mounted on the fly-wheel. It draws a current of air in at its center and discharges it by centrifugal force, the hood 13 being provided for causing the fan to discharge downwardly so that the current of air passes out at the bottom of the motor vehicle. It is to be understood that any suitable type of exhaust fan might be used and that it might be mounted independently of the fly-wheel or be driven by means independent of the engine. A blower may also be used and arranged at the front of the engine instead of the exhaust at the rear of the engine.

The exhaust means at the rear of the engine is particularly useful when the engine is running but the motor vehicle is stationary. Under such conditions and in the absence of an exhaust means there would be little or no current of air over and through the engine to cool it. When the exhaust means is provided, however, the current of air is drawn over the engine even though the motor vehicle is stationary. The exhaust fan also assists in drawing a current of air over and through the engine when the vehicle is running.

In order to utilize to the best advantage the heat radiated from an air-cooled engine of this type the following construction has been devised for heating the explosive

charge supplied to the engine and for regulating the temperature of the air supplied to the carbureter:—

The intake manifold 14 is located above the cylinders so that it is heated by the heat radiated upwardly from the engine. The explosive charge in the manifold is thus heated before it passes to the cylinder, thereby preventing condensation when operating on the throttle and consequently increasing the efficiency.

The carbureter 15 is attached to the intake manifold 14 at the rear of the engine. It is preferably located adjacent the exit from one of the air passages between the cylinders and the valve casings so that the warm current of air coming from the passage tends to heat the carbureter to a good working temperature. By locating the carbureter at the rear of the engine it is surrounded by air which has been heated by passing over the engine and it is thus not only kept at a good working temperature but also draws its air from a heated air supply and consequently increasing the vaporization of the liquid fuel over what it would be if the fuel supplied to the carbureter were mixed with cold air. Such arrangement provides the carbureter with a warm air supply under all ordinary conditions. In case more warm air is required, it may be obtained by drawing air from a jacket arranged around the exhaust manifold of the engine in the usual manner.

The air intake passage 16 to the carbureter has connected therein a valvular mechanism 17 having ports 18 communicating with the atmosphere at the rear of the engine and other ports 19 shown in Fig. 4 communicating with a passage 20 leading to the exterior of the hood. Cold air from the exterior of the hood is supplied through the passage 20 to the valve mechanism and consequently in case the air surrounding the carbureter should be too warm for efficient operation, cold air may be supplied by properly adjusting the valvular mechanism.

The valve mechanism 17 has a rotary member 21 provided with ports 22 arranged to register with the ports 18 and ports 23 arranged to register with the ports 19. The rotary member 21 may be adjusted manually by a lever 24 conveniently located on the dashboard of the motor vehicle. When the rotary member 21 is rotated in a clockwise direction the ports 22 register with the ports 18 and the ports 23 are out of register with the ports 19 so that the cold air supply is shut off and the warm air admitted to the carbureter. When the rotary 21 is rotated in a counter-clockwise direction, the ports 19 and 23 register and the ports 18 are closed, thereby shutting off the warm air supply and admitting cold air. When the rotary is in any of its intermediate posi-

tions both the warm and cold air ports are partially opened, the extent to which each set of ports is opened depending upon the position of the rotary. By this means warm air or cold air only may be supplied to the carbureter, or any desired mixture of cold and warm air may be supplied by simply regulating the valvular mechanism by means of the hand-lever 24.

This is an important feature of the invention because it enables the operator to regulate the temperature of the air supplied to the carbureter. A careful operator, by observing the operation of his engine, may regulate the temperature of the air supply so as to secure the most efficient operation of the engine under varying atmospheric conditions. Moreover, by providing means for indicating the temperature of the charge, he may regulate the air supplied to the carbureter so as to keep the temperature of the explosive charge uniform, or he may regulate it to secure the most efficient operation of the engine.

In some cases it is desirable to automatically regulate the temperature of the explosive charge, and for this purpose a thermostat 25 is provided, as shown in Fig. 6, which may be located in the intake manifold or at any other convenient point where it is subjected to the temperature of the explosive charge, such thermostat being connected to the valvular mechanism so that when the temperature of the explosive charge varies the thermostat regulates the valvular mechanism to vary the temperature of the air supplied to the carbureter and thus maintain the temperature of the explosive charge uniform.

It is to be understood that the structure shown is for purposes of illustration only and that other structures may be devised which come within the spirit and scope of the appended claims.

What is claimed is:—

1. An air cooled internal combustion engine for motor vehicles having a plurality of cylinders and a plurality of valve casings parallel to said cylinders, said casings being spaced from the cylinders to provide air passages from the front to the rear of the engine between the cylinders and valve casings so that an air current may be drawn through the engine to cool the cylinders.

2. An air cooled internal combustion engine for motor vehicles having vertically located cylinders and piston valve casings parallel to said cylinders, said piston valves and cylinders being spaced from each other to form passages from the front to the rear of the engine so that when the vehicle is in motion an air current passes through said

openings to cool the cylinders and valve casings.

3. An air-cooled internal combustion engine for motor vehicles having openings between the cylinders thereof and the valve casings whereby an air passage is provided from the front to the rear of said engine between said cylinders and valve casings, and a carbureter located at the rear of said engine adjacent the exit from one of said passages so that it is subjected to the heated air flowing through said passage.

4. An air-cooled internal combustion engine for motor vehicles having openings between the cylinders and the valve casings thereof whereby air passages are formed from the front to the rear of the engine between the cylinders and the valve casings, a carbureter located at the rear of the engine adjacent the exit from one of said passages, a valvular mechanism in the air intake passage to said carbureter, said mechanism having ports communicating with the atmosphere at the rear of the engine and other ports communicating with a passage leading to a cold air supply, and means for regulating said valvular mechanism to vary the temperature of the air supplied to the carbureter.

5. An air-cooled internal combustion engine for motor vehicles having openings between the cylinders and the valve casings whereby air passages are formed from the front to the rear of said engine between said cylinders and valve casing, an intake manifold located above the cylinders, a carbureter at the rear of said engine adjacent the exit from one of said passages, a valvular mechanism in the air intake passage to said carbureter, said mechanism having ports communicating with the atmosphere at the rear of the engine and other ports communicating with a passage leading to a cold air supply, and a thermostat in the intake manifold for regulating the valvular mechanism to vary the temperature of the air supplied to the carbureter in response to the temperature of the charge in the intake manifold.

6. An air cooled internal combustion engine having a row of parallel upright cylinders, inlet and exhaust valves for each cylinder situated in supplemental cylinders separated from the explosive cylinders by air passages, and means to force air from the front to the rear of the engine, between the explosive cylinders and valve cylinders.

In testimony whereof, I have hereunto set my hand.

JORGEN REMMEN.

Witnesses:

GLENN H. LERESCHE,
A. E. JOHNSON.