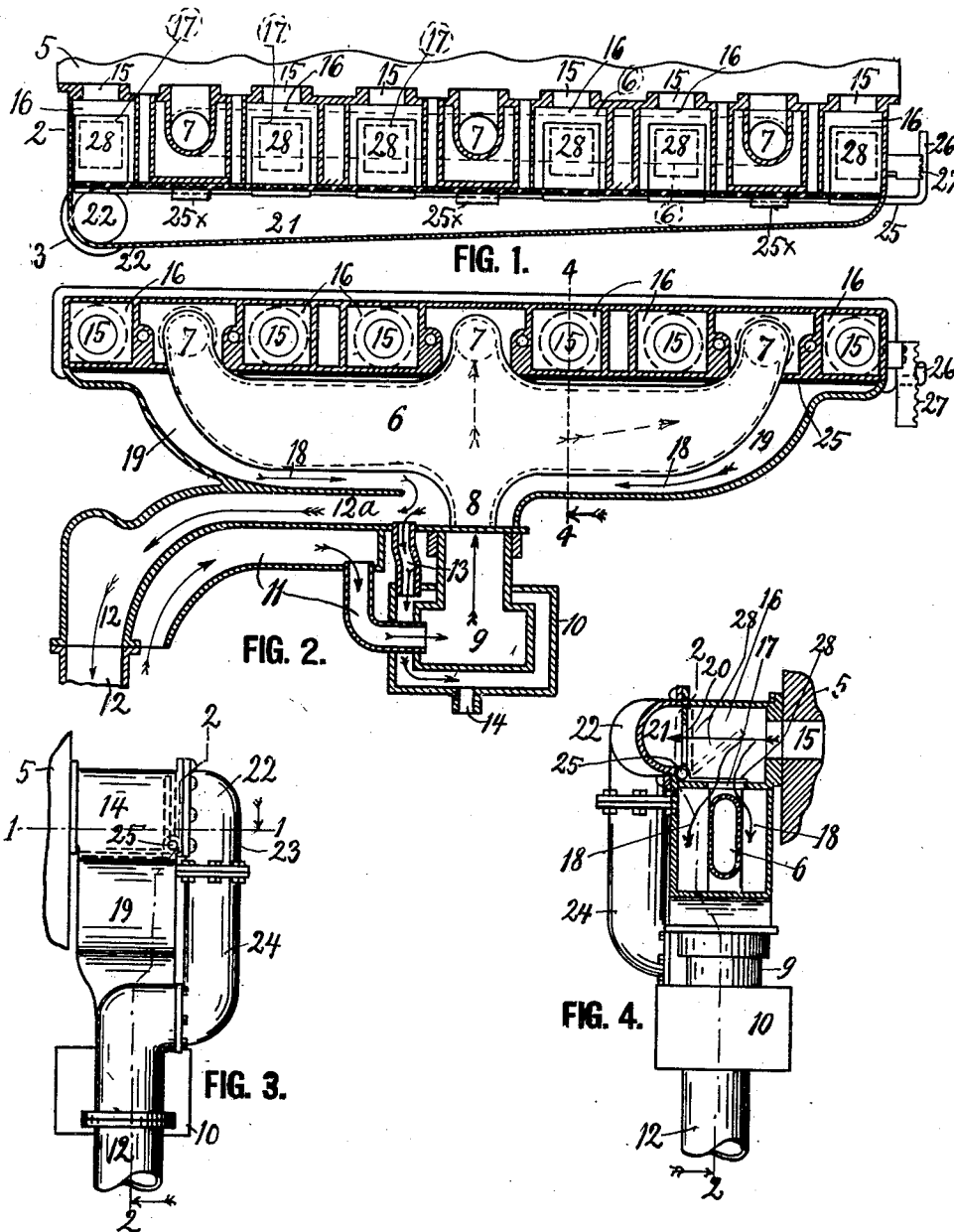


1,290,953.

Patented Jan. 14, 1919.



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UNITED STATES PATENT OFFICE.

EDMUND W. FIRNER AND THEODORE FIRNER, OF RIVER FALLS, WISCONSIN.

MANIFOLD HEAT-REGULATOR.

1,290,953.

Specification of Letters Patent.

Patented Jan. 14, 1919.

Application filed January 8, 1918. Serial No. 210,818.

To all whom it may concern:

Be it known that we, EDMUND W. FIRNER and THEODORE FIRNER, citizens of the United States, residing at River Falls, in the county of Pierce and State of Wisconsin, have invented a new and useful Manifold Heat-Regulator, of which the following is a specification.

Our invention relates to means for preheating the fuel used in explosive engines, and the main object is to provide a highly efficient and regulable device of said kind, and thereby economize on the gasoline or other fuel from which the fuel is produced.

In the accompanying drawing, Figure 1 is a sectional view on the line 1—1 in Fig. 3 of the manifold of an explosive engine, said manifold embodying our invention. Fig. 2 is a longitudinal vertical section on the line 2—2 in Figs. 3 and 4. Fig. 3 is a left hand end elevation of what is shown in Fig. 1 with the top of the device intact and a fragment of the engine added. Fig. 4 is a section as on the line 4—4 in Fig. 2, of the complete device and a fragment of the engine added.

Referring to the drawing by reference numerals, 5 designates the part of a gasoline engine to which the intake manifold 6, through its upper ports 7, delivers fuel to the cylinders of the engine, said fuel being drawn through a lower port 8 from the carbureter 9. The latter is surrounded by a jacket 10.

The fresh air is drawn into the carbureter through a passage 11 (see Fig. 2) and is thus partly heated by the adjacent gas exhaust tube 12, 12^a. And from said passage 12^a some of the hot exhaust gas passes down through a duct 13 into the jacket 10 so as to heat the carbureter and then escape from the jacket through an outlet 14 in same. 15 are the ports through which the exhaust gas from the cylinders escapes into a series of valve chambers 16 (see Fig. 4). Each of said chambers is provided with a port 17 through which the gas may pass downward like the arrows 18 in Fig. 4 and reach the exhaust 12 by passing through an exhaust manifold 19 which forms a jacket about the intake manifold 6, which latter is thus heated by the exhaust gas. Each chamber 16 is also provided with a lateral port 20, which opens into a horizontal diverting tube or duct 21, whose larger end 22 has a down-

ward extension 23—24 communicating with the final exhaust tube 12.

Journaled in bearings 25* along the base of the tube 22 is a rock shaft 25 having at one end a rocker arm 26 adapted to spring into either one of several notches in a notched segment 27, which is fixed on any adjacent stationary part.

On said rock shaft is fixed a series of wings or valves 28, each of which, in the present drawing, is shown as extending from the shaft into the valve chamber through the port 20 and arranged to close alternately the port 17 or the port 20 of the valve chambers 16, or the valve may occupy an inclined position in the chamber, so as to let half or more of the gas pass to either port as may be required to obtain the most fuel economizing degree of heat to the intake manifold during any variation of the atmospheric temperature.

From the foregoing description it will be seen that by placing the rocker arm 26 in the desired notch in the member 27 all the valves will be set to regulate the amount of heat the intake manifold is to receive; and that when the hot gas is thus more or less diverted from the jacket 19 to the tube 21 it is thereby also diverted from the tubes 12^a and 13 so as to reduce the heat in tube 11 and in the carbureter and its jacket 10. And that this regulation of heat of said parts saves all the fuel that is wasted when the intake manifold and carbureter are allowed to deliver either too cold or too hot gas into the explosion chambers.

This invention is especially applicable to engines of automobiles and auto trucks, but is also applicable to explosive engines in general.

What we claim is:—

In a device of the class described, an intake manifold arranged to deliver fuel into the combustion chambers of an explosive engine, an exhaust manifold spaced as a jacket about the intake manifold and having a series of valve chambers forming passages arranged to receive the exhaust gas from the engine and a final exhaust outlet for said gas, a diverting tube extending along all the valve chambers and having one end directed into the final exhaust outlet, each valve chamber having three ports, one port arranged to receive the hot exhaust gas from the engine, the second port to admit said gas

into the outlet manifold and the third port
to admit more or less of said gas into the di-
verting tube, a series of valves so arranged
one in each valve chamber that it may close
5 more or less either the second or third port
of the chamber, and means for setting all
of said valves simultaneously in any desired

position, and a carbureter furnishing gas
to the intake manifold.

In testimony whereof we affix our signa- 10
tures.

EDMUND W. FIRNER.
THEODORE FIRNER.