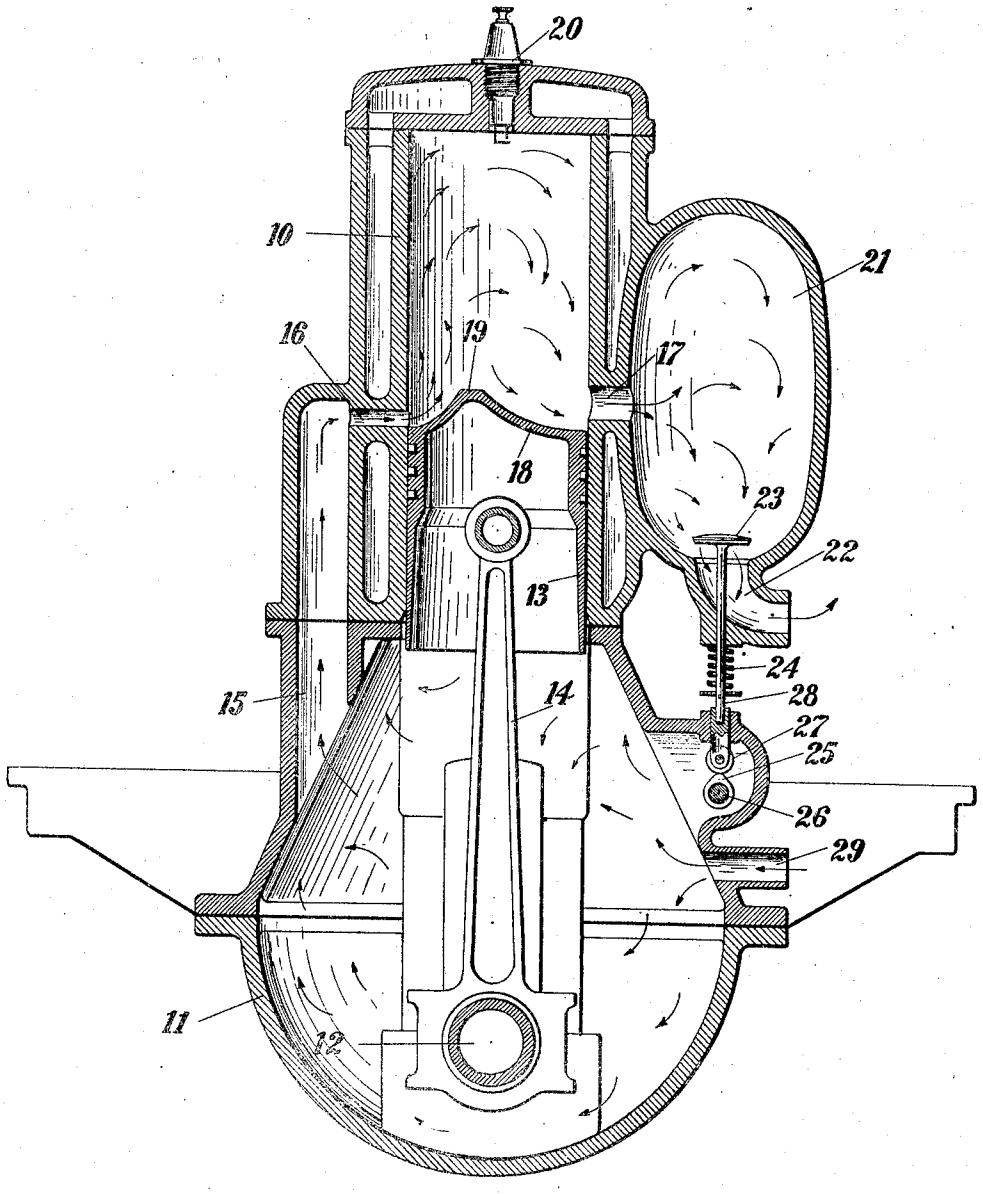
Feb. 9, 1926.

1,572,709

E. H. FAHRNEY

ENGINE

Filed Dec. 10, 1923



Inventor
Emery H. Fahrney
By

Patented Feb. 9, 1926. 1,572,709

UNITED STATES PATENT OFFICE.

EMERY H. FAHRNEY, OF CHICAGO, ILLINOIS.

ENGINE.

Application filed December 10, 1923. Serial No. 679,590.

To all whom it may concern:

Be it known that I, EMERY H. FAHRNEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Engines, of which the following is a specification.

This invention relates to improvements in engines of the explosion type, and one of the objects of the invention is to provide improved means for producing an engine which will be noiseless in operation.

It is well known that the sudden reduction of pressure of the gases upon being expelled from the engine always results in a loud report. Therefore if the end pressure of the gases is gradually decreased to the atmospheric pressure, the noise generally present when the discharge of the gases from the engine cylinder to the atmosphere takes place, will be completely obviated.

It is one of the objects of the present invention to overcome these difficulties and objections and to provide means for avoiding a sudden drop of end pressure of the gases discharged from the cylinder to the atmosphere, thereby insuring an engine which will be noiseless and steady in operation.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing illustrating this invention, and in which—

The figure is a vertical, longitudinal sectional view of an engine constructed in accordance with the principles of this invention.

Referring more particularly to the drawing the numeral 10 designates generally the engine cylinder having a crank case 11, in which a crank shaft 12 operates. Reciprocable in the cylinder 10 is a piston 13 and a piston rod 14 connects the piston with the crank 12.

Leading from the crank case 11 is a passage 15 which has communication with a fuel inlet port 16 leading into the cylinder 10.

The cylinder is provided with an exhaust outlet opening 17 which is preferably of a size somewhat larger than the inlet port 16. The inlet port 16 and the outlet port 17 are controlled by the piston 13 during the reciprocating movement thereof and the outlet port 17 is out of alinement with the inlet port 16, so that the outlet port will be opened slightly in advance of the opening of the inlet port when the piston is moving in one direction and the inlet port will be closed in advance of the outlet port when the piston is moving in the opposite direction.

The head 18 of the piston is provided with a portion 19 extending therebeyond to form a baffle which is disposed between the inlet port 16 and the outlet port 17 when the piston 13 reaches the limit of its downward stroke. This baffle serves as a means for directing the incoming charge of fuel into the cylinder 10 in such a manner that it will force out or scavenge the cylinder of the burnt gases. A spark plug 20 is provided for igniting the charge.

Arranged adjacent the cylinder 10 is a muffler chamber 21 which may be of any desired size and configuration but is preferably of a size that the capacity or volume of the chamber is a multiple of the piston displacement. The interior of the cylinder 10 has communication with the chamber 21 through the outlet port 17 and the chamber 21 is itself provided with a discharge outlet passage 22 controlled by a suitable valve 23. A spring 24 is preferably provided, which tends normally to move the valve 23 in a direction to close the outlet 22, and the valve is adapted to be operated in timed relation with the piston 13 in any suitable manner, preferably through the medium of a cam 25 connected with a shaft 26 operated in any suitable manner. The cam engages an antifriction roller 27 connected with a valve stem 28.

Fuel is supplied to the engine at any suitable point and from any suitable source, preferably through the inlet opening 29 to deliver the fuel into the crank case. Obviously the volume of the muffler chamber 21 may be of any desired ratio with respect to the volume of the cylinder 10.

As the piston 13 moves towards the end of the cylinder from the position shown in Figure 1, the port 16 will first be closed, allowing any burnt gases which may be confined within the cylinder to escape through the exhaust opening 17 until the latter is closed by the piston 13. The charge will then be compressed in the cylinder 10 and after it is ignited and the piston driven

to the position shown in Figure 1, the burnt gases will pass out of the exhaust outlet 17 into the muffler chamber 21. At the same time and as the piston is descending the gases in the crank case 11 will be forced through the passage 15, through the supply inlet opening 16 and into the chamber 10, the incoming gases being deflected in the manner shown by the arrows and will operate to force out the burnt gases.

The valve 23 will remain closed until the piston 13 has partly uncovered or opened the exhaust port 17 and the valve 23 will remain open to give the gases a chance to expand from the muffler pressure to the barometric pressure of the atmosphere. The muffler valve 23 closes at any desired time after the piston 13 closes the exhaust port 17 on the return stroke.

With this improved construction it will be mainfest that as the gases pass from the cylinder 10 into the muffler chamber 21, the end pressure of the gases will be allowed to decrease gradually to a lower pressure in the muffler, after which the valve 23 will be opened to permit the gases in the muffler chamber 21 to be delivered to the atmosphere through the discharge outlet 22.

By allowing or causing a gradual decrease of the end pressure of the gases down to the atmospheric pressure, instead of discharging the gases from the cylinder 10 in a manner to cause a sudden reduction of the pressure, all noises resulting from the explosion will be overcome, with the result that the engine will be noiseless in operation.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. An explosion engine embodying a cylinder having a fuel supply inlet and an exhaust outlet, a piston reciprocable in the cylinder, a closed muffler chamber with which the said outlet has communication, there being a discharge outlet leading from the muffler chamber, and means operating automatically in timed relation with the piston for controlling the outlet leading from the said muffler chamber.

2. An explosion engine embodying a cylinder having a fuel supply inlet and a discharge outlet, a piston reciprocable in the cylinder, a chamber with which the cylinder has communication through said outlet, said outlet being controlled by the piston, said chamber having a discharge outlet, a valve for controlling the last said outlet, and means for actuating the valve, the said chamber co-operating with the interior of the cylinder on the explosion side of the piston when the first recited outlet is open, for reducing the end pressure of the gases before they are discharged into the atmosphere from the said chamber.

3. An explosion engine embodying a cylinder having a fuel supply inlet and a discharge outlet, a piston reciprocable in the cylinder, means operating to catch the exploded gases as they are discharged from the engine cylinder and for reducing the end pressure of such gases before they are discharged into the atmosphere, the said means embodying a chamber communicating with the said outlet and itself having a discharge outlet, a valve for controlling the last recited outlet, and means operating in timed relation with the piston for actuating the valve.

4. An explosion engine embodying a cylinder having a fuel supply inlet and a discharge outlet, a piston reciprocable in the cylinder, means operating to catch the exploded gases as they are discharged from the engine cylinder and for reducing the end pressure of such gases before they are discharged into the atmosphere, the said means embodying a chamber communicating with the said outlet and itself having a discharge outlet, a valve for controlling the last recited outlet, means tending normally to close the valve, and means operating in timed relation with the piston for opening the valve against the stress of the last said means.

5. An explosion engine embodying a cylinder having a fuel supply inlet and an exhaust outlet, a piston reciprocable in the cylinder, a muffler chamber, the said exhaust outlet discharging into the muffler chamber, said muffler chamber itself having a discharge outlet, a valve for controlling the outlet of the muffler chamber, and means operating in timed relation with the piston for actuating the valve, the said fuel inlet and the exhaust outlet of the engine cylinder being controlled by the piston and being out of alinement whereby the said exhaust outlet will be opened in advance of the said fuel inlet.

In testimony whereof, I have signed my name to this specification on this 7th day of December, 1923.

EMERY H. FAHRNEY.