July 18, 1950 E. A. TALVIO 2,516,031

TWO-CYCLE INTERNAL-COMBUSTION ENGINE

Filed June 9, 1948 2 Sheets-Sheet 1

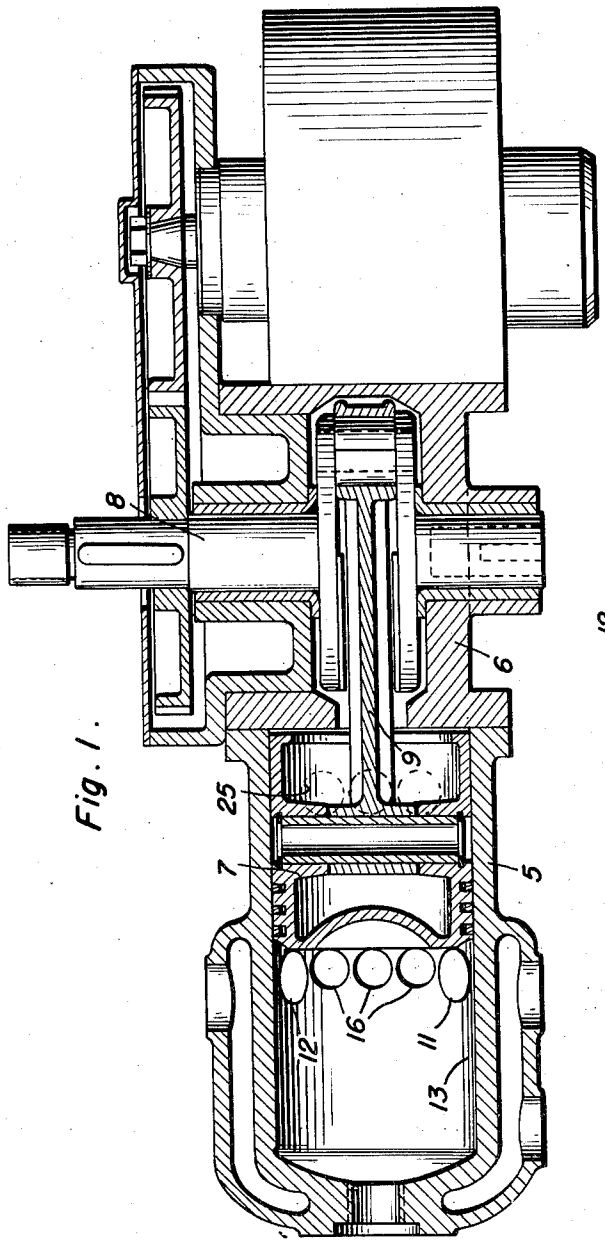


Fig. 1.

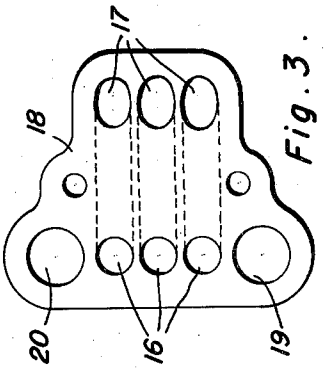


Fig. 3.

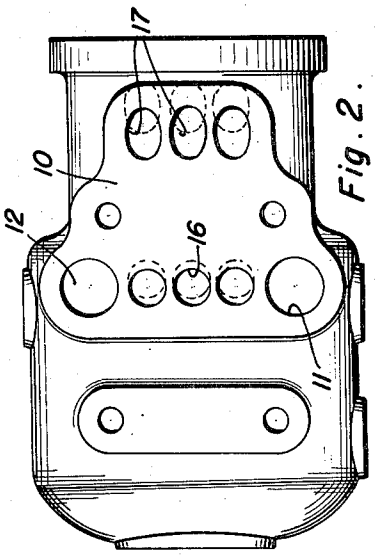


Fig. 2.

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July 18, 1950 E. A. TALVIO 2,516,031

TWO-CYCLE INTERNAL-COMBUSTION ENGINE

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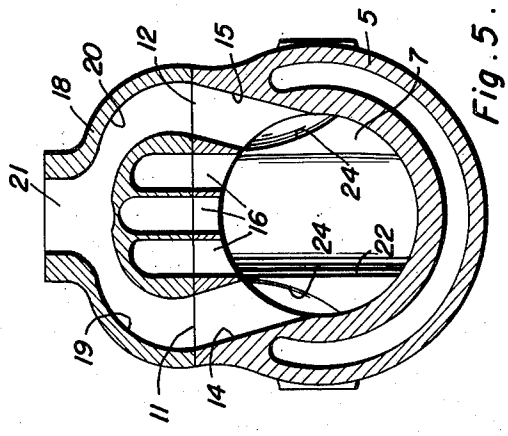


Fig. 5.

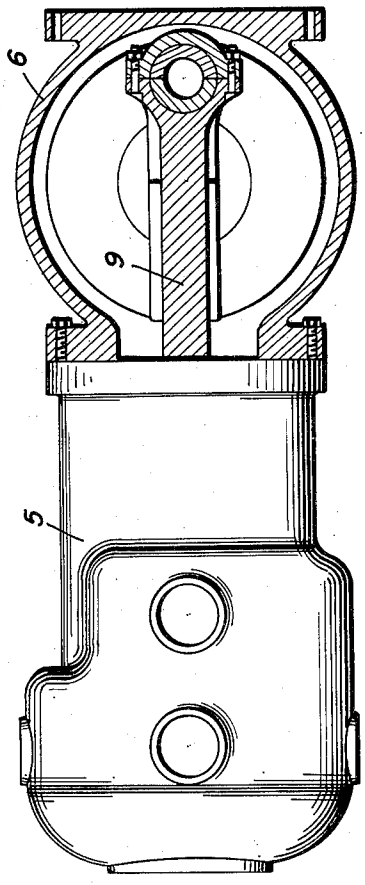


Fig. 6.

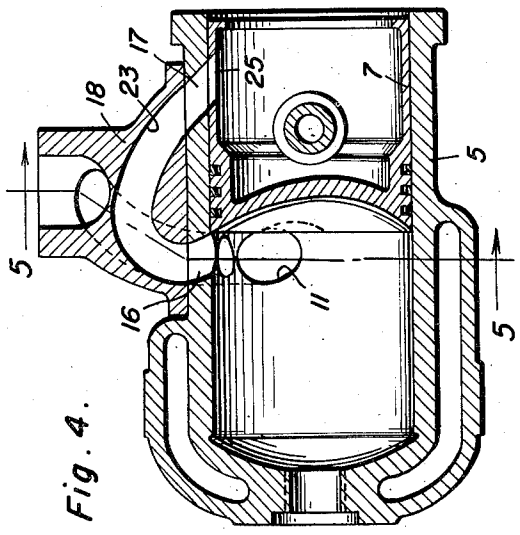


Fig. 4.

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UNITED STATES PATENT OFFICE

2,516,031

TWO-CYCLE INTERNAL-COMBUSTION ENGINE

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Application June 9, 1948, Serial No. 31,895

5 Claims. (Cl. 123—73)

1

The present invention relates generally to internal combustion engines and more particularly to a two-cycle internal combustion engine characterized by having the inlet as well as the outlet port in the wall of the cylinder adjacent each other whereby the efficiency of the engine is increased.

An important object of the invention is to provide inlet ports for the cylinder of the engine directed downwardly at an angle against the concave upper surface of the piston and arranging the outlet ports at each side of the inlet ports, and by reason of which it is found that the engine starts more easily, fuel consumption is materially reduced and the deposit of carbon in the combustion chamber is very small.

A further object of the invention is to provide a single manifold for the inlet as well as the exhaust ports of the engine whereby the construction of the engine is simplified, the weight of the engine is reduced, and the engine more compactly built.

A still further object is to provide a device of this character which is efficient and reliable in operation, relatively inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a vertical sectional view of the engine.

Figure 2 is a side elevational view of the engine cylinder with the combined inlet and exhaust manifold removed therefrom.

Figure 3 is a plan view of the inner side of the manifold.

Figure 4 is a longitudinal sectional view of the engine cylinder.

Figure 5 is a transverse sectional view taken substantially on a line 5—5 of Figure 4.

Figure 6 is a side elevational view of the engine.

Referring now to the drawings in detail wherein, for the purpose of illustration, I have disclosed a preferred embodiment of the invention, the numeral 5 designates a cylinder of an internal combustion engine suitably secured to a crankcase 6, the engine being of the two-cycle type. The engine piston is shown at 7 connected to a crank shaft 8 in the usual manner by a piston rod 9.

One side of the cylinder 5 is formed with a flat surface 10 provided with a pair of exhaust ports 11 and 12 connected to the combustion chamber 13 of the cylinder by passages 14 and 15.

2

Positioned between the exhaust ports 11 and 12 and on a horizontal plane therewith is a group of inlet ports 16. A second group of lower inlet ports 17 is also formed in the flat surface 10 of the cylinder below or longitudinally inwardly of the group of inlet ports 16.

A combined inlet and outlet manifold plate 18 is suitably secured to the flat surface 10 of the cylinder and is formed with exhaust passages 19 and 20 connected respectively to exhaust ports 11 and 12 and merging as at 21 for attaching a single exhaust pipe (not shown) thereto.

The upper inlet ports 16 are inclined downwardly toward a trough-shaped concaved upper surface 22 of piston 7 and the manifold plate 18 is formed with a plurality of curved vertical passages 23 having their upper ends connected to the upper inlet ports 16 and their lower ends connected to the lower inlet ports 17. The trough-shaped concavity 22 on top of piston 7 extends transversely thereof and at each side of the concavity is a recess 24 in the top of the piston and extending into the wall thereof for registry with the respective exhaust passages 14 and 15.

The skirt of piston 7 is formed with openings 25 which register with the lower group of inlet ports 17 when the piston reaches its extreme lower position, as shown in Figures 1 and 4.

In the operation of the device, fuel is supplied to the crankcase in any suitable manner and is admitted to the combustion chamber by way of openings 25 in the piston, lower group of inlet ports 17, passages 23, and upper group of inlet ports 16, when the piston is in its extreme lower position.

The burnt gases are exhausted by way of exhaust ports 11 and 12 and passages 19 and 20, the recesses 24 in the top side edges of the piston registering with the exhaust ports enabling efficient scavenging of the combustion chamber.

The downwardly inclined inlet ports 16 direct the fuel downwardly into the trough-shaped concavity on top of the piston to keep the piston free of the accumulation of carbon.

In view of the foregoing description taken in conjunction with the accompanying drawings, it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention, the same

is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. In a two-cycle internal combustion engine, a cylinder having upper and lower groups of inlet ports in one side positioned respectively above and below a piston working in the cylinder during movements of the piston into its opposite positions, a pair of exhaust ports in the cylinder at the sides of said upper group of inlet ports, and a combined inlet and exhaust manifold plate attached to the cylinder and having inlet and exhaust passages therein connected respectively to the inlet and exhaust ports, said inlet passages connecting the upper and lower groups of inlet ports to each other.

2. In a two-cycle internal combustion engine, a cylinder having upper and lower groups of inlet ports in one side positioned respectively above and below a piston working in the cylinder during movements of the piston into its opposite positions, a pair of exhaust ports in the cylinder at the sides of said upper group of inlet ports, and a combined inlet and exhaust manifold plate attached to the cylinder and having inlet and exhaust passages therein connected respectively to the inlet and exhaust ports, said upper group of inlet ports being inclined downwardly into the cylinder and said inlet passages connecting the upper and lower groups of inlet ports to each other.

3. In a two-cycle internal combustion engine, a cylinder having a piston working therein and provided with a central concaved top and recesses in its upper edge at opposite sides of the concaved portion, said cylinder also having upper and lower groups of inlet ports in one side positioned respectively above and below the piston during its movement in opposite directions, and a pair of exhaust ports at opposite sides of the upper group of inlet ports, said upper group of inlet ports being inclined downwardly toward the concaved top of the piston and said exhaust ports registering with the recesses when the piston is moved downwardly, and a combined inlet and exhaust manifold plate attached to the cylinder and having inlet and exhaust passages therein connected respectively to the inlet and exhaust ports, said inlet passages connecting the upper and lower groups of inlet ports to each other.

4. In a two-cycle internal combustion engine, a cylinder having a piston working therein, said piston having a trough-shaped top extending substantially across the top and a recess in the upper edge of the piston at each side of the trough and adjacent one end of the trough, said cylinder also having upper and lower groups of inlet ports in one side positioned respectively above and below the piston during its movement in opposite directions, and a pair of exhaust ports at opposite sides of the upper group of inlet ports, said upper group of inlet ports being inclined downwardly toward the trough of the piston and said exhaust ports registering with the recesses when the piston is moved downwardly, and a combined inlet and exhaust manifold plate attached to the cylinder and having inlet and exhaust passages therein connected respectively to the inlet and exhaust ports, said inlet passages connecting the upper and lower groups of inlet ports to each other.

5. In a two-cycle internal combustion engine, a cylinder having a piston working therein and provided with openings in its skirt, said cylinder having a pair of exhaust ports in one side, an upper group of inlet ports between the exhaust ports, and a lower group of inlet ports, said lower group of inlet ports registering with the openings in the piston upon reaching its extreme lower position, and a combined inlet and exhaust manifold plate secured to the cylinder and having exhaust passages leading from the exhaust ports, and inlet passages connecting the upper and lower groups of inlet ports.

ERIK ALBERT TALVIO.

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