June 2, 1931. L. O. FRENCH 1,807,838

TWO-CYCLE ENGINE

Filed April 27, 1929

Fig. 1

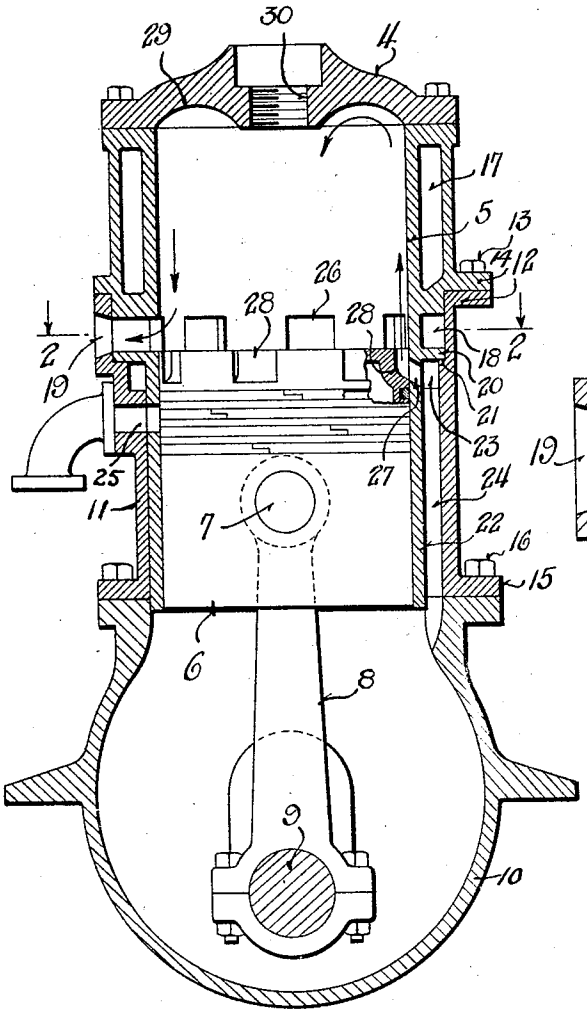
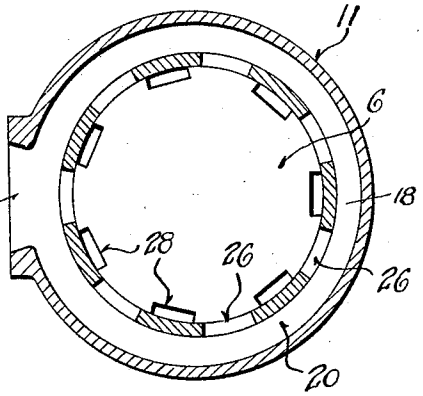


Fig. 2



Inventor

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Patented June 2, 1931

1,807,838

UNITED STATES PATENT OFFICE

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TWO CYCLE ENGINE

Application filed April 27, 1929. Serial No. 358,587.

The invention relates to internal combustion engines and more particularly to two cycle engines of the port-scavenging type.

One of the objects of the invention is to provide an exhaust and scavenging port arrangement giving better distribution and more effective purging of the cylinder of the burnt gases over the oppositely disposed port type by alternating the inlet ports with the exhaust ports and preferably where the piston controlling these ports has a substantially flat top and the incoming scavenging medium is deflected upwardly by grooves formed in the piston.

A further important object of the invention is to form the cylinder adjacent the ports in the form of a barrel so that the ports may be accurately formed in the cylinder by milling or other suitable finishing operation, the barrel fitting into a supporting cylinder which cooperates therewith to form the exhaust and intake passageways leading to the ports. Furthermore, the deflector grooves may be accurately machined or finished on the piston and the top finished off to the proper height to obtain accurate port registry and overcome the disadvantages usually encountered in this connection, where accuracy of casting the ports or deflectors is relied upon.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings Fig. 1 is a vertical sectional view through an internal combustion engine embodying the invention, parts being broken away;

Fig. 2 is a detail sectional view taken on the line 2—2 of Fig. 1.

Referring to the drawings the numeral 4 designates the cylinder head, 5 the cylinder, 6 the piston working therein, operatively connected by wristpin 7 and connecting-rod 8 to the crank shaft 9 suitably journalled in the crank case 10.

The cylinder 5 is connected to the crank case 10 by a supporting cylinder or casing 11 having a flange 12 connected by bolts 13 to a flange 14 on the cylinder and a flange 15 connected by bolts 16 to the crank case.

The cylinder 5 has a jacket space 17 and an annular groove 18 cooperating with the casing 11 to form an exhaust gas passageway having an outlet 19, the bottom wall 20 of said groove seating against a shoulder 21 formed on said casing. The cylinder 5 also has a barrel extension 22 fitting within the bore of the casing 11 and cooperating with recessed portions thereof to form an intake passageway 23 and a transfer passage 24 from the crank case to said passageway.

Either the air charge of a Diesel type engine or the combustible mixture charge of a carburetor type engine may be introduced into the crank case through a port 25 in the parts 10 and 22 uncovered by the piston at the end of its out stroke, or the usual suction inlet valve, controlling a passage to the crank case, may be used for this purpose.

The exhaust ports 26, establishing communication between the interior of the cylinder 5 and the passage 18, are radially disposed and uncovered by the piston 6 near the end of its power stroke, the top of the piston being flat or substantially plain surfaced to permit ready registry thereof with these ports and also permit of close clearances between the piston and head in the case of high compression engines.

The scavenge inlet ports 27 are formed in the cylinder barrel 22 below and in the spaces between the exhaust ports to establish communication between the supply passageway 23 and the cylinder. These ports may be straight but are preferably upwardly inclined, as shown, and are uncovered by the piston as it nears the end of its inward stroke after the exhaust ports have been uncovered, the incoming scavenging medium being directed upwardly along the cylinder walls by the walls of the grooves 28 formed in the piston and moving into registry therewith, as shown in the drawings.

Thus the scavenging medium is directed upwardly in a plurality of streams as the exhaust gases flow outwardly and finally strike the head 5 and are deflected inwardly, mingling with each other and thus filling the up-

per part of the cylinder and driving the exhaust gases ahead of them until the cylinder is well filled with fresh air or a new charge, the head 5 preferably having inwardly curved walls 29 to assist the deflection of the streams into the center of the cylinder.

The cylinder head has a threaded passage 30 for the reception of a spark-plug, if an explosive mixture engine, or a fuel injector if an oil engine. With an explosive mixture engine the charge is ignited as usual at the end of the compression stroke to produce constant volume combustion. With a fuel injector or liquid fuel type engine the fuel charge introduced near the end of the compression stroke is ignited by the heat of compression or auxiliary ignition devices where lower compressions are used.

Inasmuch as the ports 26 and 27 are formed in a separable cylinder they may be readily and accurately machined or hand-finished to accurately register with the top and grooves in the piston and the difficulties of misalignment of ports through shifting of cores in casting is eliminated.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except insofar as such limitations are specified in the claims.

What I claim as my invention is:

1. In a two cycle internal combustion engine, the combination of a cylinder head, a cylinder, a piston working in said cylinder, said cylinder having exhaust and scavenge ports formed therein successively uncovered by the piston at the end of its inner stroke, said exhaust ports radially arranged and alternating with said scavenge ports, said piston having shallow grooves formed therein registering with said scavenge ports to deflect the scavenging medium upwardly along the wall of the cylinder.

2. In a two cycle internal combustion engine, the combination of a cylinder head, a cylinder, a piston working in said cylinder, said cylinder having exhaust and scavenge ports formed therein successively uncovered by the piston at the end of its inner stroke, said exhaust ports being radially arranged and alternating with said scavenge ports, said piston having shallow grooves formed therein registering with said scavenge ports to deflect the scavenging medium upwardly along the wall of the cylinder, said cylinder head having inwardly curved walls to deflect the streams of said scavenging medium toward the center of the cylinder and downwardly.

3. In a two cycle internal combustion engine, the combination of a cylinder head, a cylinder, a piston working in said cylinder, said cylinder having exhaust and scavenge ports formed therein successively uncovered by the piston at the end of its inner stroke, said ports being radially arranged and alternating with each other, said piston having a plain surfaced top and provided with shallow grooves registering with said scavenge ports to deflect the scavenging medium upwardly along the wall of the cylinder.

In testimony whereof, I affix my signature.

LOUIS O. FRENCH.