Dec. 4, 1934. W. STEIGER 1,983,198

TWO-STROKE SELF IGNITING INTERNAL COMBUSTION ENGINE

Filed Feb. 8, 1932

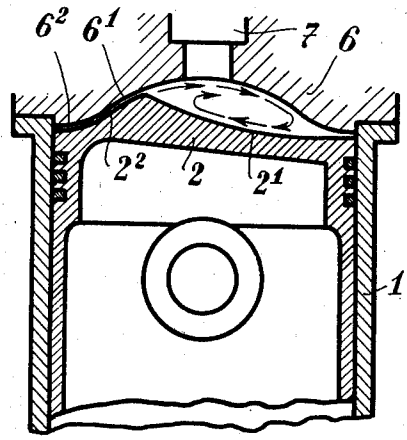


Fig. 1.

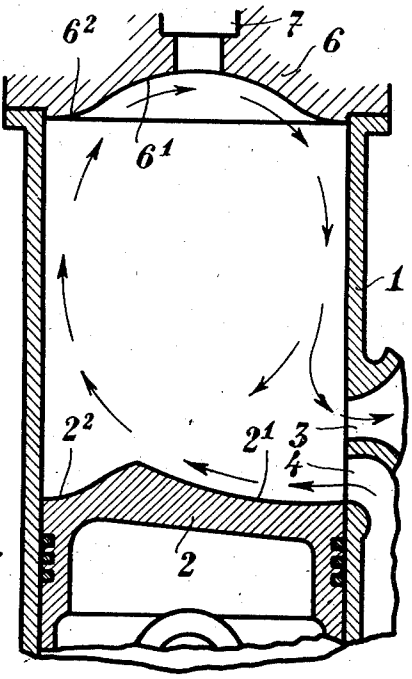


Fig. 2.

Fig. 3.

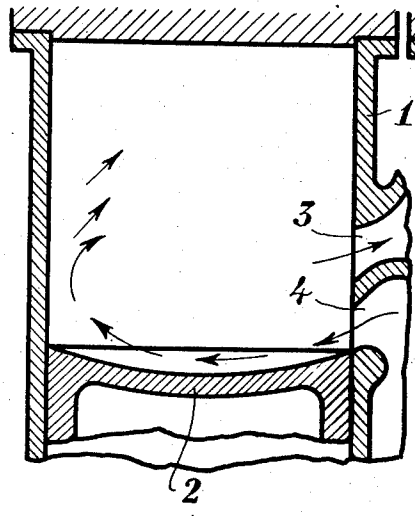
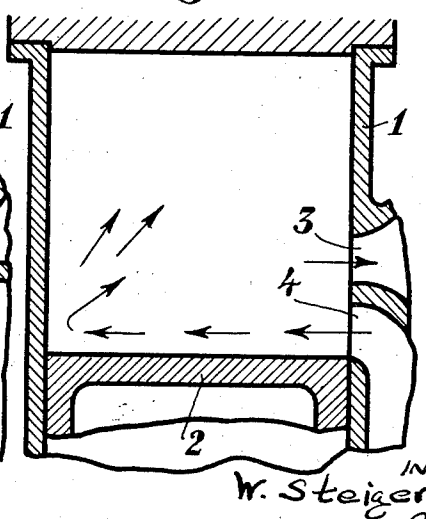


Fig. 4.



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TWO STROKE SELF-IGNITING INTERNAL COMBUSTION ENGINE

Walther Steiger, Bern, Switzerland

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In Germany February 9, 1931

1 Claim. (Cl. 123—191)

The present invention relates to a two stroke self-igniting internal combustion engine with return scavenging and with the exhaust ports arranged in the usual way.

The invention consists in that in order to create a return eddy current in the scavenging air the face of the piston is curved up beyond its center and that the bottom of the cylinder has a calot-shaped excavation the remaining portion of the piston face being so well conformed to said calot-shaped bottom that by the meeting of the two surfaces the gas mixture will be turned into an eddy current similar to the first.

In the accompanying drawing the part of the motor taken into consideration is shown in the Figures 1 and 2 while the Figures 3 and 4 represent some already known arrangements.

Fig. 1 shows the piston at the end of its stroke and

Fig. 2 at the beginning.

Experiments have shown that with flat faced pistons the air current will be directed as indicated by the arrows in Fig. 4. As may be seen from this figure the energy of the scavenging air is greatly broken by striking directly against the opposed wall of the cylinder so that the current of this scavenging air will never be able to turn into a revolving movement.

Such an arrangement will not only impair the admission but will increase also the remainder of exhaust gases. It has been already proposed to give the face of the piston a concave shape as shown in Fig. 3. This arrangement however necessitates a corresponding shaping of the scavenging passage ways. These ways must be directed obliquely downwards, which brings the disadvantage that the exhaust parts must be displaced very much upwards so that with a scavenging arrangement from the crank chamber very crooked passage ways would result, such tortuous ways create some difficulties in casting and increase the resistance in the conduits. Besides the direction of the gas current is not an exact one and an accelerated movement of the air is not possible. By displacing the exhaust ports sideways however the scavenging will become irregular.

By the present invention not only the said disadvantages have been avoided but also an improvement in mixing the gases will be obtained.

In the example shown in Figs. 1 and 2 the face side 2 of the piston has on the side of the ports 3 and 4, arranged on one side only, a bent up portion extended beyond the center at 2^1 the remaining portion of said face side of the piston being conformed at 2^2 to the corresponding portion 6^2 of the bottom 6 of the cylinder head. This bottom is at its middle portion at 6^1 calot-shaped and is joined with a convex border 6^2 to the cylindric walls.

In the position at the lower dead point of the piston shown in Fig. 2 the path of the scavenging air is marked with arrows. By the shape of the face of the piston the scavenging air is directed accordingly. It will assume a turning movement which lasts until the end of the compression stroke. According to Fig. 4 such a form of air current would be impossible, because the energy of the air current is directly broken against the cylindrical wall. A good scavenging is impossible here as has been proved by experiments. By the upwards movement of the piston the air will be compressed at a self-igniting temperature and shortly before the dead point according to the Fig. 1 an increased movement of the air will be created additional to the previous movement and in the same direction owing to the fact that the piston surface is closely adjacent to the calot-shaped surface so as to displace thereby the air.

According to the required number of revolutions of the machine the injecting of the fuel is effected 10 to 40° before the upper dead point and the jet of fuel will be seized by the air current which is still lively continuing in the same direction and will be intensively mixed and ignited.

What I claim as new is:

In a two-stroke self-igniting internal combustion engine having the scavenging ports arranged underneath the exhaust ports to produce a rotating eddying movement, the combination, a cylinder head formed with a calot-shaped central excavation and a convex border surface joining the cylindrical wall of the cylinder and a piston face formed with a curved-up portion extended from the port side beyond the center of the piston, the remaining portion of the piston face being shaped to fit the opposite portion of the cylinder head.

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