March 27, 1934. K. MOHR 1,952,275

INTERNAL COMBUSTION ENGINE

Filed Aug. 1, 1930

Fig. 1.

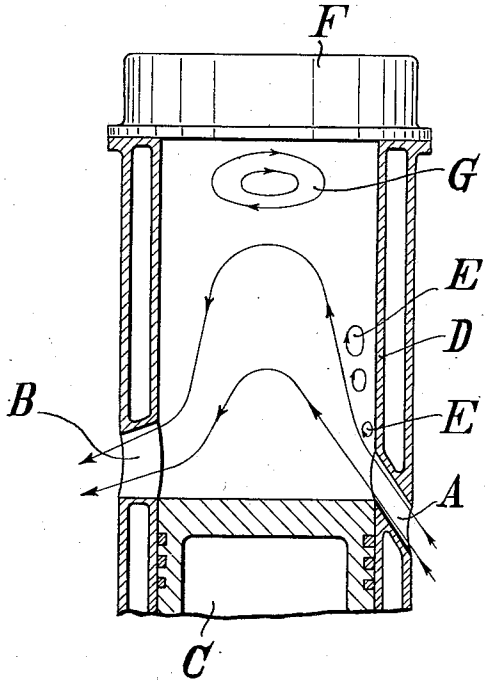
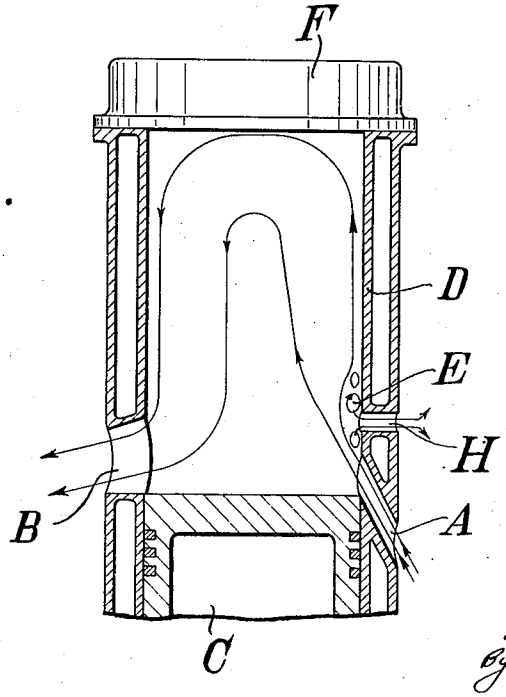


Fig. 2.



Inventor
Karl Mohr
By Knight Bros
Attorneys

Patented Mar. 27, 1934

1,952,275

UNITED STATES PATENT OFFICE

1,952,275

INTERNAL-COMBUSTION ENGINE

Karl Mohr, Kiel, Germany, assignor to Fried. Krupp Germaniawerft Aktiengesellschaft, Kiel-Garden, Germany

Application August 1, 1930, Serial No. 472,437
In Germany December 2, 1929

3 Claims. (Cl. 123—65)

The invention relates to two stroke internal combustion engines equipped with means for transverse scavenging.

In the transverse scavenging arrangements in which the inlet and exhaust ports are situated opposite one another on the periphery of the cylinder it is very difficult to raise the scavenging current up to the cylinder cover on the entrance side. Even if one succeeds in raising the entering scavenging current initially for a certain distance by mechanical means such as diverting surfaces on the piston or very steeply upwardly directed inlet ports, the current nevertheless very soon deviates short-circuitedly toward the exhaust ports, because whirls are formed between the cylinder wall and the rising current which whirls urge the current away from the cylinder wall. As a consequence thereof a whirl of waste gases is produced in the upper portion of the cylinder which whirl persists during the scavenging period and prevents scavenging of this cylinder portion.

Now it has been tried for instance, to give the current an upward direction by upwardly inclined supporting currents directed toward the inlet side; such a collision of currents, however, results in the formation of violent whirls, as experience has shown, which prevent correct guiding of the scavenging current. This proposal therefore does not solve the problem satisfactorily.

According to the invention the object aimed at of raising the entering scavenging current on the entrance side of the cylinder up to the cylinder cover is obtained in simple manner by the entering scavenging current being directed upwardly toward that cylinder end which is remote from the inlet and exhaust ports, and by reducing or entirely eliminating the corner remaining between the scavenging current and cylinder wall on the entrance side by providing auxiliary exhaust ports above the inlet ports, these auxiliary ports sucking the scavenging current up to the cylinder wall.

It may be noted that in a known transverse scavenging arrangement additional exhaust ports are provided above nearly horizontally directed inlet ports, in order to increase the useful exhaust area. This port arrangement, however, is not capable of sucking the scavenging current up to the cylinder wall as the current already from the beginning is carried away too far from the additional exhaust ports and cannot be deflected by nearly a right angle.

In order that the invention can be more readily understood, an embodiment of the same is illustrated by way of example in the accompanying drawing in which

Figure 1 shows the course of the scavenging current in the cylinder when fitted with the usual upwardly directed inlet ports, without application of the invention, and

Figure 2 shows the course of the scavenging current in a cylinder designed according to the invention.

In Figure 1 the upwardly inclined inlet scavenging ports are denoted by A, while B denotes the oppositely situated exhaust ports; C is the piston. The scavenging air streams here through the cylinder in the direction of the arrows and in so doing produces at the cylinder wall D the edge whirls E and at the cylinder cover F the known upper permanent waste gas whirl G. The cylinder is thus scavenged only in part.

Now according to the invention, in Figure 2, auxiliary exhaust or relief ports H are provided in the cylinder wall D above the upwardly directed inlet ports. During the backward stroke of the piston C a small quantity of waste gases escapes through these ports H, as indicated by the horizontal arrow, whereby pressure below atmospheric is produced at the entrance side of the cylinder wall which pressure causes the entering scavenging current to be sucked up to the cylinder wall. Edge whirls as occurring in the cylinder according to Figure 1 cannot thus be formed at all on this place, but the scavenging current under the action of the auxiliary exhaust ports is sucked up to the cylinder wall and even in long stroke engines rises up without hindrance to the cylinder cover. This results in a more thorough scavenging being obtained than it was hitherto possible by transverse scavenging arrangements.

The auxiliary exhaust ports H communicate with the exhaust duct of the engine. They can have only a small sectional area and extend beyond the main outlet ports B but little or not at all. A notable loss of scavenging air thus does not take place. Besides, as with the above-mentioned known additional ports, an increase of the time cross section for the pre-exhaust is obtained.

As to be seen from the foregoing, the satisfactory scavenging effect is based on the cooperation of the upwardly directed scavenging current with the sucking effect of the auxiliary exhaust ports situated above the inlet ports.

I claim:—

1. In a cylinder for two stroke cycle internal

combustion engines a scavenging arrangement comprising scavenging air inlet ports having an inclined upward direction, exhaust ports diametrally opposite said inlet ports, and relief ports situated closely above said inlet ports and open during the entire period that the scavenging air inlet ports are uncovered adapted to suck the scavenging currents adjacent to the wall of said cylinder.

2. In a cylinder for two stroke cycle internal combustion engines a scavenging arrangement comprising scavenging air inlet ports having an inclined upward direction, exhaust ports diametrally opposite said inlet ports, and auxiliary exhaust ports situated closely above said inlet ports and approximately within the same height as said exhaust ports, operating as such during the scavenging operation.

3. In a cylinder for two stroke cycle internal combustion engines, a scavenging arrangement comprising at least one scavenging air inlet port having an inclined direction toward the head end of said cylinder, at least one exhaust port diametrally opposite said inlet port, and at least one relief port situated closely beyond said inlet port and open during the entire period that the scavenging air inlet port is uncovered, adapted to suck the scavenging currents adjacent to the wall of said cylinder.

KARL MOHR.