April 5, 1932. E. H. TARTRAIS 1,852,986

TWO-CYCLE MOTOR

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Fig.1

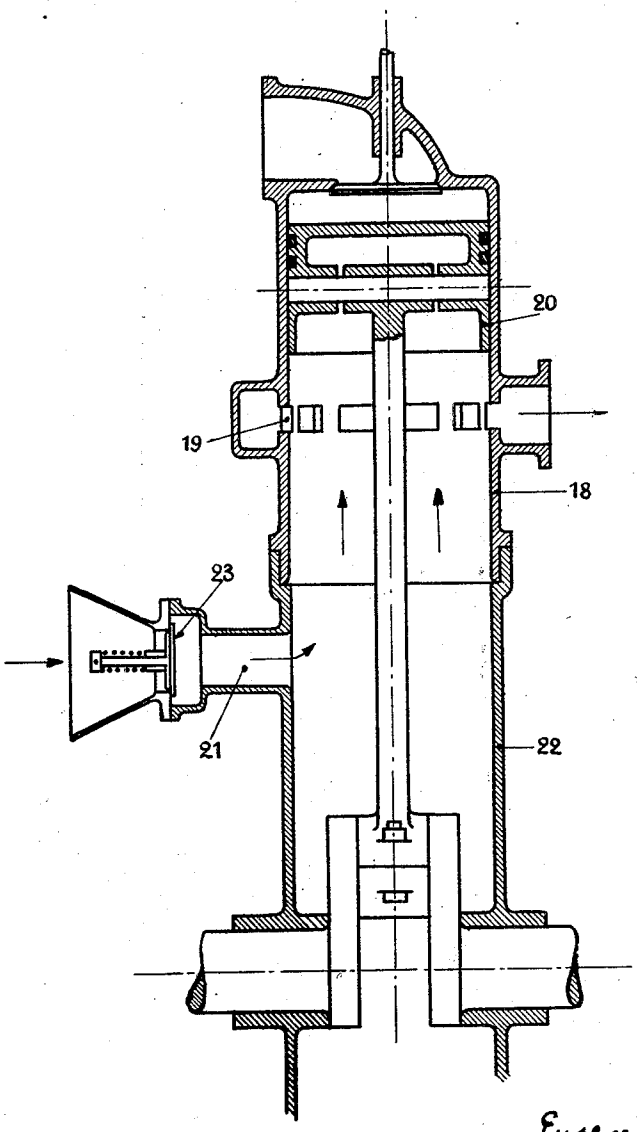

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Fig. 2

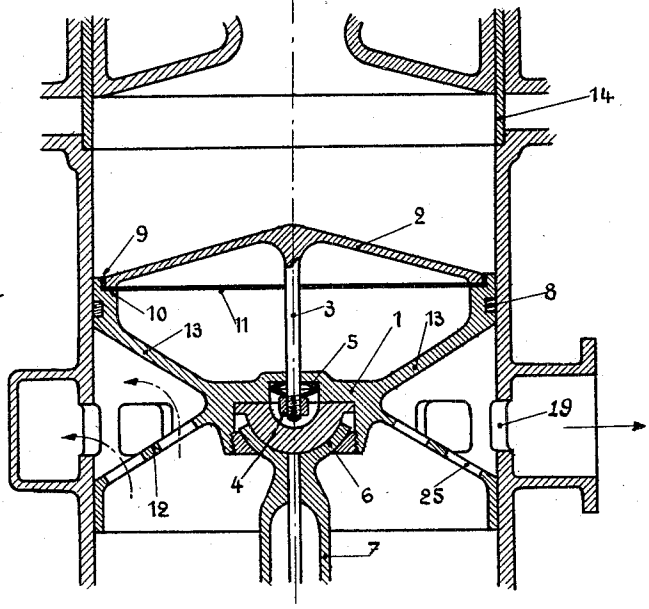


Fig. 3

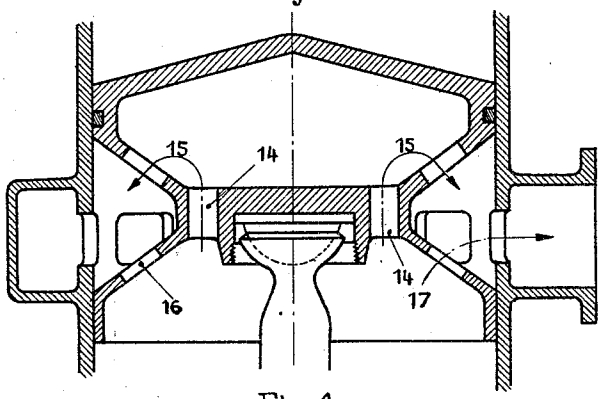
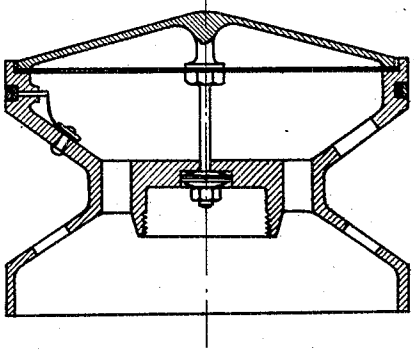


Fig. 4



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UNITED STATES PATENT OFFICE

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TWO-CYCLE MOTOR

Application filed November 26, 1929, Serial No. 409,888, and in France November 26, 1928.

The present invention relates to two stroke engines of the type in which the burnt gases escape through ports uncovered by the piston at the end of its outstroke, and the explosive mixture enters the cylinder through an inlet valve located in the opposite portion of said cylinder.

My invention consists in causing cold air to enter the crankcase and to circulate therefrom directly into said exhaust ports which are, for this purpose, uncovered by the piston during the intervals of time between the exhausts, in order to cool not only the crankcase and the parts connected thereto, but also the lower part of the cylinders and the pistons.

My invention also comprises special forms of pistons adapted to improve the operation of the engine.

In the drawings—

Fig. 1 illustrates a preferred embodiment of my invention given by way of example;

Fig. 2 shows a modified form of piston;

Fig. 3 is another embodiment of a piston according to my invention; and

Fig. 4 shows still another embodiment.

Adverting to Fig. 1, 18 is the cylinder provided with exhaust ports 19. The piston 20 is shown at its upper dead point. Said piston is short enough to uncover the exhaust ports during a sufficient interval of time. An aperture 21 is provided in crankcase 22 so that cold air may enter through said opening and circulate as shown by the arrows. Said air is introduced in any suitable manner, for instance by means of a fan or merely under the effect of the wind when the engine is fitted on a body moving at a high speed such as an aircraft for instance. Or still better I utilize, on the contrary, the suction produced by the exhaust, either through mechanical means or by the mere effect of the inertia of the gases projected into the exhaust pipe. I may also utilize a combination of these means.

In the case of the mere effect of inertia being utilized for producing the air circulation, I may advantageously fit inlet port 21 with a check or automatic valve 23 in order to prevent exceptional backfire in the crankcase in the event of an over-high pressure developing in the exhaust, which over-high pressure may be accidental or determined and momentary or permanent.

In order to improve the cooling of the piston and at the same time of the whole engine, it is advantageous to use the special shapes hereinafter described.

In the form shown in Fig. 2 it will be seen that the piston is composed of a body 1 having the shape of a sheave, which may be made of a light conducting alloy and a head 2 preferably made of a heat resisting and slightly conducting alloy. In the example shown, said head is maintained in suitable position by a central rod 3 provided with a nut 4 and a washer 5. 6 is the articulation of the connecting rod little end with the piston. Said articulation consists of a ball and socket joint in order to allow of the piston turning about its center. Therefrom results a more equal distribution of the cooling action and accessorily but very advantageously of lubrication and wear. 8 is a piston ring. Head 2 is centered in the mortise 9 of the body, and a certain play is provided between 2 and 9 so as to permit said head 2 to expand freely. Consequently very little heat will be transmitted from head 2 to body 1 through the small surface of contact 10, and in order to do away with heat radiation, a screen such as 11 consisting of a thin sheet of aluminium for example is disposed under the head, as the present embodiment concerns an engine in which self ignition is not to be feared. In order to ensure the cooling of body 1 I have provided holes 25 of the largest possible section in the conical surface 12. Furthermore it is pointed out that scavenging takes place, as previously stated, through exhaust ports 19 located in the lower part of the cylinder and that the air inlet for this purpose is effected through openings located in the cylinder head and controlled by a slide valve 14 or in any other suitable manner.

It will therefore appear that when the piston is in the middle part of its stroke, as shown in Fig. 2, if there is a difference of pressure between the crankcase and the exhaust pipe, air will circulate as shown by

the arrows, and cool webs 12 and 13 of the body through convection, and the remainder of the pieces through conduction.

In the embodiment of Fig. 3 it is proposed to cool the head of the piston as completely as possible. To that end I provide holes such as 14, establishing communication between the opposite cones of the piston. Air therefore follows the path shown by arrows 15 and directly cools the piston head, which in this case is shown as being integral with the body. I could obviously at the same time provide other holes such as 16 (Fig. 3) disposed in the same way as the holes 25 in Fig. 2, if it is deemed advantageous to obtain a complementary circulation according to arrows 17 of Fig. 3, which circulation is identical to that described with reference to Fig. 2.

Finally I may, when utilizing the piston head shown in Fig. 2, cool the inner wall of the upper cone and nut 11. In this case I make use of the arrangement shown in Fig. 4, which is a combination of the above described arrangements and needs no further explaining.

What I claim is:

1. A two stroke engine comprising a cylinder, provided with an exhaust port, a crankcase provided with an air inlet, and means for circulating cold air from said air inlet into said exhaust port during the intervals of time between exhausts.

2. A two stroke engine comprising a cylinder provided with an exhaust port, a crankcase provided with an air inlet, and means for circulating cold air from said air inlet into said exhaust port during the interval between the end of the instroke and the beginning of the outstroke.

3. A two stroke engine comprising a cylinder provided with an exhaust port, a crankcase provided with an air inlet, a piston in said cylinder adapted to uncover said exhaust port and place it in direct communication with the crankcase air inlet during the intervals of time between exhausts, whereby cold air can be circulated from said air inlet into said exhaust port during said intervals.

4. A two stroke engine comprising a cylinder provided with an exhaust port, a crankcase provided with an air inlet, a piston in said cylinder adapted to uncover said exhaust port and place it in direct communication with the crankcase air inlet during the interval between the end of the instroke and the beginning of the outstroke, whereby cold air can be circulated from said air inlet into said exhaust port during said interval.

5. In a two stroke engine as claimed in claim 3, a piston comprising a central part, means for connecting said central part to the connecting rod, two separate cylindrical elements having each a relatively small height with respect to the distance between them and being adapted to fit against the walls of the cylinder, a conical web for connecting the upper cylindrical element to the central part and a conical web provided with apertures for connecting the lower cylindrical element to the central part.

6. In a two stroke engine as claimed in claim 3, a piston comprising a central part, a ball and socket joint for connecting said central part to the connecting rod, two separate cylindrical elements having each a relatively small height with respect to the distance between them and being adapted to fit against the walls of the cylinder, a conical web for connecting the upper cylindrical element to the central part and a conical web provided with apertures for connecting the lower cylindrical element to the central part.

7. In a two stroke engine as claimed in claim 3, a piston comprising a central part provided with longitudinal conduits, a ball and socket joint for connecting said central part to the connecting rod, two separate cylindrical elements having each a relatively small height with respect to the distance between them and being adapted to fit against the walls of the cylinder, a conical web provided with apertures for connecting the lower cylindrical element to the central part, whereby air can circulate through said conduits and apertures so as to cool the piston.

In testimony whereof I have signed this specification.

EUGÈNE HENRI TARTRAIS.