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A. W. WALL

CYLINDER OF INTERNAL COMBUSTION ENGINE

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Fig. 1.

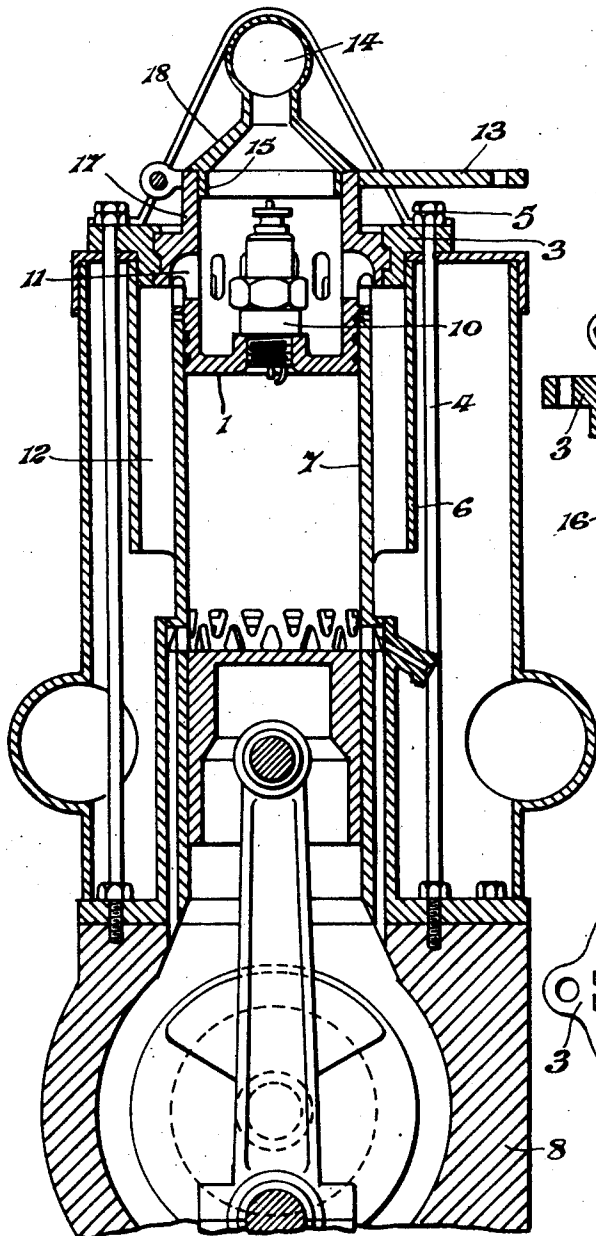


Fig. 2.

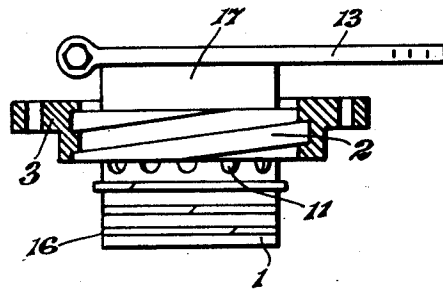
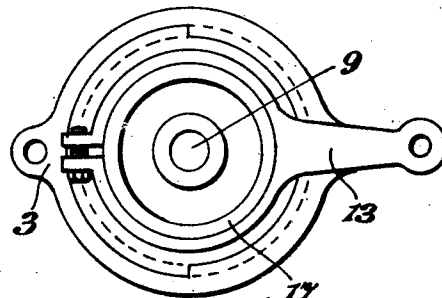


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CYLINDER OF INTERNAL-COMBUSTION ENGINES.

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My invention relates to cylinders of internal-combustion engines, and has for its object the provision of a device whereby the cylinder capacity of an internal-combustion engine may be varied at will.

The present invention in fact consists of an internal-combustion engine comprising, in combination, means whereby the compression space may be varied and a constant stream of gaseous fluid adapted to be directed over the cylinder so as to maintain it at a comparatively low temperature.

The invention is embodied in a two-stroke internal-combustion engine, of the type wherein the inlet and outlet ports are situated in the neighbourhood of the piston when the same is at its lower dead centre.

It will be appreciated that when an internal combustion engine is in operation, it would be possible to considerably decrease the compression space in the cylinder without in any way rendering the operation of the engine difficult, but although it would be possible to run an engine with such a high compression, it is recognized that it would be extremely difficult, if not impossible, to start an engine in which such a high compression exists.

In order to ensure that the compression of a cylinder may be increased by moving the closed end of the cylinder in the direction of the longitudinal axis of the cylinder, it is necessary to make provision that the movable closed end of the cylinder is kept at a comparatively low temperature, so as to avoid seizure between the movable parts. In order to disclose one satisfactory method of carrying the invention into effect, the device will be described in conjunction with an internal-combustion engine of the character described in British Patent No. 211,520 wherein the closed end of the cylinder is maintained at a comparatively low temperature by means of an air current which passes down over the head of the cylinder, completely enveloping the same, thereby maintaining the various sections of the cylinder at a comparatively low temperature.

Figure 1 is a cross-sectional elevation of the engine illustrated and described in British Patent No. 211,520, illustrating means whereby the compression space of the cylinder may be varied.

Figure 2 is a detail view of one device constructed according to the present inven-

tion for varying the compression space of an internal-combustion engine, and

Figure 3 is a plan view of Figure 2.

As herein shown the head of the cylinder is formed so as to constitute a piston 1 provided with piston rings 16, and constructed of such a size as to form a close fit with the interior of the cylinder 7. The piston 1 is provided, on a portion of its external surface, with a screw thread 2, adapted to engage with a ring 3, which is clamped by screw-threaded stems 4 and nuts 5 onto the outer jacket 6 which is fixed relative to the cylinder walls 7. The screw-threaded stems 4 extend upwardly from the crank-case 8 of the engine to engage with the ring 3 and hold it in position above the cylinder 7 in such a manner that it lies co-axial therewith. The piston 1 is provided with a central screw-threaded hole 9, Fig. 3 adapted to receive the sparking-plug 10. The screw-threaded portion 2 which engages with the ring 3 is provided with radial holes 11 at a point between the screw-threaded portion 2 and the lower end of the piston 1, so that a current of air can pass down over the head of the cylinder and sparking-plug to egress through said radial holes 11 into the air jacket 12 surrounding the cylinder. Fixed to the upper end of the piston 1 is a lever arm 13, extending radially therefrom and adapted to be operated by an external control to give a desired angular displacement to the piston 1.

The connection between the upper end of the piston 1 and the inlet conduit 14 for the cooling air constitutes a conical cap 18 having an annular flange 15 which yieldingly engages with the top of the piston so as to form a close fit therewith.

Thus it will be seen that by actuating an external control, the piston 1 which forms the closed end of the cylinder 7 may be given an angular movement, whereby the head of the piston is moved in the direction of the longitudinal axis of the cylinder so as to either increase or decrease the compression space in the cylinder.

The piston rings 16 ensure a close fit between the cylinder wall and the piston. Although the piston 1 has been shown to be movable in the longitudinal direction of the cylinder, by means of a screw actuated mechanism, it is to be appreciated that the piston may be moved in any desired manner,

for example by a cam, whereby the piston slides without rotation in the cylinder 7.

Further, it will be appreciated that instead of the inlet and outlet ports of the engine being controlled solely by the piston, the same may be controlled by a rotatable sleeve formed to open and close the ports at the desired points in the path of the piston in the cylinder.

10 The air flow over the top of the cylinder and the sparking-plug fitted therein ensures that the head of the cylinder and the sparking-plug are kept at a comparatively low temperature, thereby avoiding any possibility of the movable head of the cylinder becoming seized, and thus destroying the effective operation of the same.

What I claim as my invention and desire to secure by Letters Patent is:—

20 1. In a two-stroke internal combustion engine, the combination with the working piston and the cylinder having inlet and outlet ports immediately above the dead center position of said piston, of a screw-threaded piston forming the closed end of said cylinder and movable in the direction of its longitudinal axis, means for rotating said piston thereby causing its axial movement, and in connection with said piston means for causing a continual flow of a gaseous cooling medium over said cylinder.

2. The combination as set forth in claim 5, in which separate from said cylinder an internally threaded stationary annular member is provided for engaging the screw threads of the said screw-threaded piston.

3. In a two stroke internal combustion engine, a cylinder, a piston therein, means for varying the compression space of said

cylinder comprising a movable head, and means for causing a constant flow of cooling medium over said movable head and the cylinder walls.

4. In a two stroke internal combustion engine, a cylinder, a piston therein, inlet and outlet ports immediately above the lower dead center position of the piston, means for varying the compression space of said cylinder comprising a movable head, and means for causing a constant flow of cooling medium over said movable head and the cylinder walls.

5. In a two stroke internal combustion engine, a cylinder, a piston therein, a movable hollow head for said cylinder, a jacket about said cylinder, and means for causing a constant flow of cooling medium through said hollow head and said cylinder jacket.

6. In a two stroke internal combustion engine, a cylinder, a piston therein, inlet and outlet ports immediately above the lower dead center position of the piston, a movable hollow head for said cylinder, a jacket about said cylinder, and means for causing a constant flow of cooling medium through said hollow head and said cylinder jacket.

7. In a two stroke internal combustion engine, a cylinder, a piston therein, a movable hollow head for said cylinder, a jacket about said cylinder, ports communicating the interior of said head and jacket, and means for causing a constant flow of cooling medium through said hollow head, said ports, and said cylinder jacket.

In witness whereof I have hereunto set my hand.

ARTHUR WILLIAM WALL.