S. S. SCOTT.

COOLING ATTACHMENT FOR EXPLOSIVE ENGINES.

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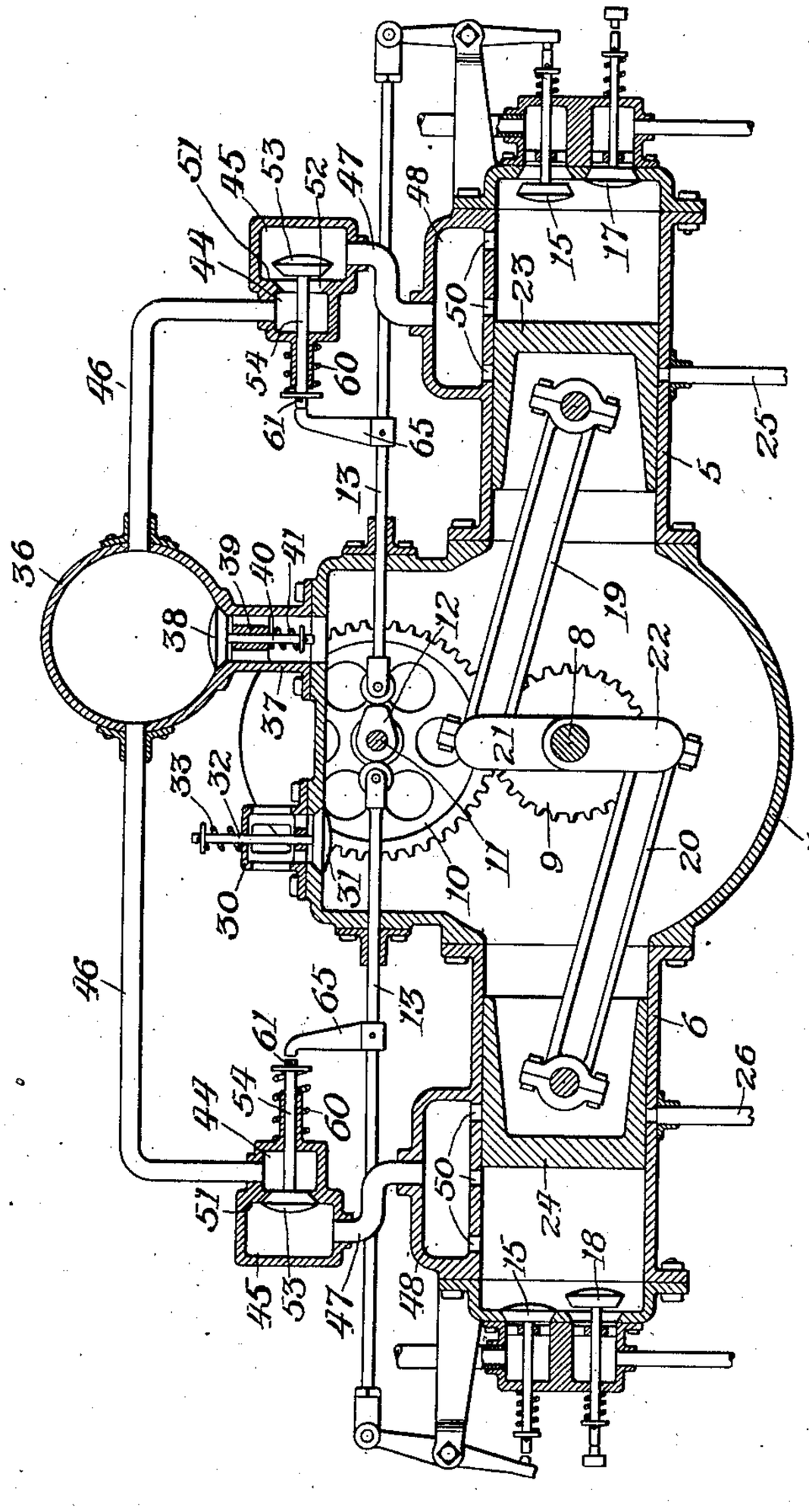
973,820. Patented Oct. 25, 1910.



Witnesses:
J. N. Daggett.
P. N. Hyde

Inventor:
Semple S. Scott.
by Poole & Brown
Attys.

UNITED STATES PATENT OFFICE.

SEMPLE S. SCOTT, OF CHICAGO, ILLINOIS.

COOLING ATTACHMENT FOR EXPLOSIVE-ENGINES.

973,820. Specification of Letters Patent. Patented Oct. 25, 1910.

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To all whom it may concern:

Be it known that I, SEMPLE S. SCOTT, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cooling Attachments for Explosive-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in explosion motors and more particularly to means attached to such a motor for delivering air to its cylinder to cool and thoroughly clean the same during the operation of the engine.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

The drawing is a view in vertical cross-section of an engine embodying my invention.

In the said drawing, the parts relating to this invention are shown as applied to an engine of the horizontal, oppositely disposed cylinder, four cycle type. Briefly described, said engine comprises two horizontally arranged opposed cylinders 5 and 6 attached to and opening into a crank casing 7. Said crank casing contains the crank-shaft 8 and valve operating gears 9 and 10. The gear 9 is attached to the crank-shaft 8 and the gear 10 is secured to a rotating shaft 11 in the upper part of the crank casing. Mounted upon said shaft 11 is a cam 12 which, in the rotation of said shaft, alternately engages the inner ends of operating rods 13, 13 which are operatively connected at their outer ends with exhaust valves 15, 15 located in the outer ends of the cylinders 5 and 6. Intake valves 17 and 18, also located at the outer ends of said cylinders, are opened by a similar arrangement of cams and rods not herein shown.

19 and 20 indicate connecting rods pivotally attached at their inner ends to crank-arms 21 and 22 and at their outer ends to pistons 23 and 24 in the usual manner. Fire exhaust ports 25 and 26 are located midway between the ends of the cylinders 5 and 6 and open through the walls thereof.

Referring now to the means for cooling and cleaning the engine cylinder, the same embraces features of construction as follows: As shown in the drawing, there is mounted upon the upper wall of the crank casing 7, a valve comprising a casing 30, a valve 31 and a valve stem 32. The valve casing which is preferably cylindrical in shape is provided through its side wall with ports or openings through which air enters said casing. The valve 31, which is of the ordinary mushroom type, bears against a seat formed upon the inner face of the upper wall of the crank casing and forming a port opening into the valve casing 30. The valve stem 32, which is attached to the valve disk 31 projects outwardly through a guide passage formed in the upper end of the valve casing 30 and is provided at its outer end with an actuating coil spring 33 which is adapted to close the valve. The valve thus arranged is opened by the suction or vacuum created during the compression and scavenger strokes of the piston and is closed by the action of the spring thereon during the impetus and intake strokes of the piston. The air thus taken into the crank casing during the opening of the intake valve is compressed in the crank casing during the impetus and intake strokes of the piston and is forced into a storage tank 36 which is mounted upon said crank casing. Said casing is carried upon the upper end of a tubular neck 37 which opens into said crank casing and communication between the two is controlled by means of an upwardly opening check-valve, the disk 38 of which is adapted to bear upon a seat formed in the upper end of said neck 37 at its junction with the storage tank 36. Below said valve seat is provided a downwardly extending guide stem 39 through which the stem 40 of the valve extends; said stem being surrounded by an actuating coil spring 41 which is adapted to close said valve in the usual manner. As will be seen from this construction, the check-valve controlling the opening into the storage tank 36 will be open during the strokes of the piston in which the air intake valve is closed, and as a consequence, the air which is drawn into the crank casing during the compression and scavenger strokes of the pistons will be forced into the storage tank during the

intake and impetus strokes of said pistons. The air thus delivered to the storage tank 36 is delivered into the engine cylinders at the time of the exhaust stroke of the engine through valves which are mechanically or automatically opened simultaneously with the opening of the exhaust valve. As shown in the drawing, each of these valves for delivering the air into the engine cylinders comprises two chambers 44 and 45, the chamber 44 being connected with the storage tank 36 by a pipe 46 and the chamber 45 with the engine cylinder by means of a pipe 47. Said pipe 47 is connected at its upper end with said chamber 45 and at its lower end with a chamber 48 which is formed integrally with the engine cylinder and which opens into the interior thereof through a series of ports 50, 50, said ports being arranged in a row, along the head end of the cylinder equal to the length of the piston stroke. The chambers 44 and 45 are separated by a wall 51 provided with a port opening 52 adapted to be closed by a valve disk 53. A valve stem 54, attached to said disk, projects outwardly from the chamber 44 through a guide passage formed in a lug located upon the outer side wall of the chamber 44. Said lug extends toward the crank casing and is surrounded by a spring 60, the inner end of which bears against the outer wall of the chamber 44 and the outer end of which bears against a pin 61 extending transversely through the outer end of the valve stem 54. The valve disk 53 is moved inwardly to permit the air from the storage tank 36 to enter the engine cylinder by means of an arm 65 which is secured to and extends upwardly from the exhaust valve operating rod 13. Said arm is provided on its upper end with an inturned portion which is adapted to engage the outer end of the valve stem 54 to open the air control valve simultaneously with the opening of the exhaust valve. While the valve for controlling the delivery of air from the storage tank into the engine cylinder is herein shown and described as mechanically operated, same may be operated as a check valve by the suction created by the piston in the scavenger stroke. As will be seen from this construction, the air which is contained in the storage tank will, upon the scavenger stroke of the engine, be forced into the engine cylinder just ahead of the piston on its outward stroke. This fresh cool air will drive the burned gases out through the exhaust port of the cylinder and will thoroughly clean the cylinder and at the same time will cool the cylinder, piston and valves.

The arrangement herein shown and described for cooling and cleaning the engine cylinder may be applied to any style or type of explosive motor and, when used, water cooling accessories may be dispensed with, inasmuch as the air thus introduced into the cylinder maintains its parts at a sufficiently low temperature to insure an efficient operation of the engine.

I claim as my invention:—

1. In an explosion motor, in combination with the crank casing, the power cylinder, the exhaust valve, and the rod for opening said exhaust valve, a check valve through which air is taken into the crank casing, a storage tank adapted to receive air from the crank casing, a pipe connection between said storage tank and the power cylinder, a valve casing in said pipe connection provided with two chambers opening into each other, a valve adapted to close the opening between said chambers, said valve having a stem projecting through the wall of said valve casing, and an arm attached to the exhaust valve operating rod adapted to engage said valve stem to open the valve in the pipe connection.

2. In an explosion motor, the combination with a crank casing, a power cylinder which is provided near one end with a longitudinally arranged row of ports, an exhaust valve for said cylinder and operating mechanism for said valve, of a check-valve through which air is taken into the crank casing, a storage tank adapted to receive the air from the crank casing, an air chamber formed integrally with the power cylinder and covering the longitudinally arranged row of ports therein, a pipe connection adapted to deliver air from the storage tank into the air chamber upon the cylinder wall, and a valve located in said pipe connection and adapted to be opened simultaneously with the opening of the exhaust valve of the engine.

3. In an explosion motor, in combination with the power cylinder, the exhaust valve and operating mechanism for said exhaust valve, said power cylinder being provided with a longitudinally arranged row of ports on one side thereof, a storage tank containing compressed air, and means controlled by the operating mechanism of the exhaust valve for delivering air from said storage chamber to said ports in the side of the cylinder upon the scavenger stroke of the engine.

4. In an explosion motor, in combination with the crank casing, the power cylinder, the engine piston, the exhaust valve and the valve controlling mechanism, an intake valve in the crank casing which is opened by the vacuum created in the crank casing at the outer stroke of the piston, an air storage tank opening into said crank casing, a valve controlling the inlet opening of said tank, said valve being opened by the pressure of air in the crank casing, a fire exhaust port located near the inner end of the cylinder, and means controlled by the exhaust valve operating mechanism for delivering air from the tank

into the power cylinder in advance of the piston as it travels toward the outer end of the cylinder on its scavenger stroke.

5. In an explosion motor, in combination with the crank casing, the power cylinder, the exhaust valve for said power cylinder and the operating rod for opening said exhaust valve, a fire exhaust port located near the inner end of said cylinder, a check-valve through which air is drawn into the crank casing, a storage tank which receives the air from said crank casing, a pipe connecting said tank with said power cylinder at a point or points intermediate of the ends of said cylinder, a control valve in said pipe embracing a valve and stem therefor, and an arm secured to the exhaust valve operating rod adapted to engage the end of said valve stem to open said control valve.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 21st day of July A. D. 1909.

SEMPLE S. SCOTT.

Witnesses:

CLARENCE E. MEHLHOPE,

GUY M. CAMPBELL.