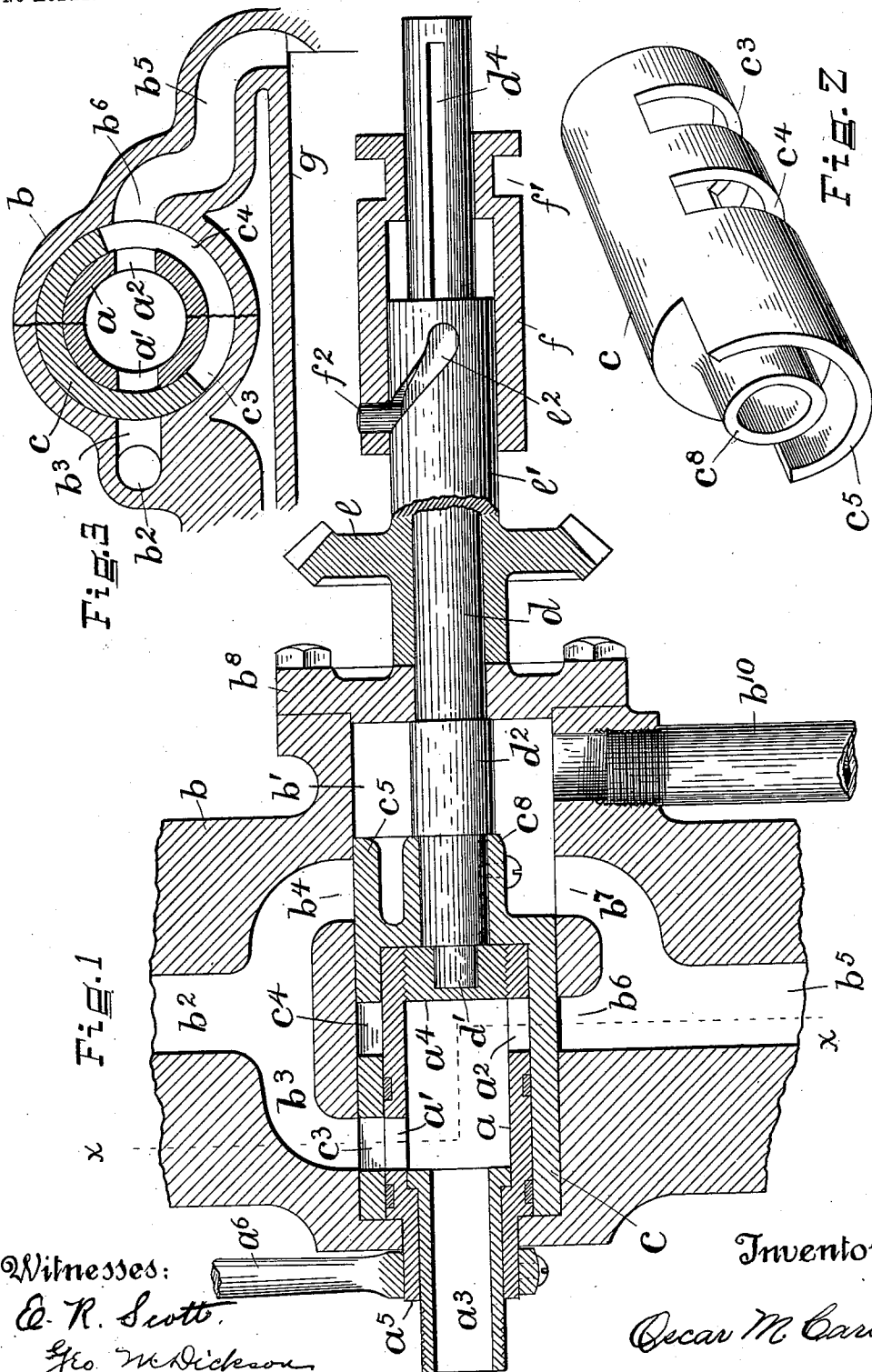


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O. M. CARLETON.
VALVE FOR ENGINES.
APPLICATION FILED APR. 16, 1903.

NO MODEL.



Witnesses:

E. R. Scott.

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UNITED STATES PATENT OFFICE.

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VALVE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 731,161, dated June 16, 1903

Application filed April 16, 1903. Serial No. 152,834. (No model.)

To all whom it may concern:

Be it known that I, OSCAR M. CARLETON, a citizen of the United States, and a resident of Somerville, in the county of Middlesex, State of Massachusetts, have invented certain new and useful Improvements in Valves for Engines, of which the following is a full, clear, and exact description.

The object of this invention is the construction of an improved rotary valve for steam and other reciprocating engines.

Referring to the drawings forming part of this specification, and in which like letters of reference refer to like parts, Figure 1 is a central longitudinal section of my valve complete. Fig. 2 is a perspective view of the cylindrical sleeve composing the moving part of my valve, and Fig. 3 is a transverse view of the valve on the broken line X X in Fig. 1.

In said drawings the casting b , which forms a part of the engine-cylinder g , is formed with the cylindrical chamber b' , connected by the passages $b^2 b^5$ with the engine-cylinder. One end of the said chamber is partially inclosed by the casting itself, while the other end is closed by the removable head b^8 . Concentrically arranged within said chamber is located the cylindrical steam-chest a , receiving live steam at one end through a pipe a^3 and being closed at its opposite end by the head a^4 . Exterior to this steam-chest and fitted between the same and the casting b loose enough to be readily revolved, but tight enough to be steam-tight, is the sleeve c , forming the only moving part of my valve and rotated in unison with the drive-shaft of the engine by means of the shaft d , fixed at one end in the boss c^3 of said sleeve. This shaft passes out through the head b^8 and is provided with a means of communication with the engine drive-shaft, such means consisting, preferably, of bevel-gears, one of which is illustrated and lettered e . The inner extremity of this shaft is reduced to constitute a pintle d' , turning in a suitable seat in the head a^4 for the purpose of better centering the sleeve c .

The passages $b^2 b^5$ in the casting b are each separated into two branches or ports, all in the same horizontal plane, but the ports b^4 and b^7 being the only ones in the same vertical plane.

The steam-chest a is formed with two ports

$a' a^2$, both in the same horizontal plane cutting the axis of said chest, as shown in Fig. 3, but at opposite ends of the chest, as shown in Fig. 1. It is these ports with which the branches or ports $b^3 b^6$ are put into alinement, b^3 with a' and b^6 with a^2 .

In the sleeve c are formed the two slots or elongated openings $c^3 c^4$, each extending for nearly half the periphery of the sleeve, but one, c^3 , located in the plane of the ports $b^3 a'$ and the other, c^4 , in the plane of the ports $b^6 a^2$. Hence when said sleeve is revolved live steam is admitted from the steam-chest a to the ports b^3 and b^6 alternately and in each case for nearly the stroke of the engine.

At the end of the chamber b' next to the head b^8 is the exhaust-pipe b^{10} . To prevent the steam from blowing out through this exhaust-pipe at the wrong time, I form the sleeve c with an extension or hood c^5 , reaching peripherally for somewhat more than one-half the sleeve's circumference, but otherwise in a similar position to that of the slots or elongated openings $c^3 c^4$, as shown in Fig. 2. By this arrangement when the opening c^3 is presented to admit steam to the port b^3 the hood c^5 is closing the port b^4 , and at the same time the port b^6 is closed, while the port b^7 is open to permit the exhaust-steam to escape from the engine-cylinder to the exhaust-pipe b^{10} . So, also, when the port b^6 is opened to admit live steam thereto then the port b^7 is closed and the port b^4 opened.

The hood c^5 is made to embrace a larger arc than the openings $c^3 c^4$ in order to close the exhaust-ports b^4 or b^7 just before the engine-piston reaches the end of its stroke, and so properly cushion its stroke.

To reverse the engine it is only necessary to reverse the position of the sleeve c with respect to the drive-shaft. This is done in the simplest manner by forming the gear e with the elongated hub e' having the spiral groove e^2 therein. Over this hub slips the sleeve f , carrying the pin f^2 , which projects into said groove, said sleeve being slidable on said hub and shaft d , but made to turn with said shaft by a spline and spline-seat d^4 in the usual manner. The groove f' receives the shifting-lever, by which the said sleeve is moved back and forth upon the shaft d .

In Fig. 1 only about half of the groove e^2

is shown, as it must of course extend one-half the circumference of the hub e' in order to reverse the engine.

For adjusting the cut-off of the engine I provide means for varying the angular position of the ports $a' a^2$. This is preferably done by forming the steam-chest a with a tubular stem a^5 , projecting through to the exterior of the chamber b' , and fixing on said stem a lever a^6 or other suitable means for turning the same. The chest a being thus slightly turned to bring its ports out of the same horizontal plane as the ports $b^3 b^6$, it will vary the point at which the valve will admit and cut off steam, and so adjust the cut-off as may be desired.

The live-steam pipe is suitably coupled to the pipe-section a^3 , the latter being loose within the stem a^5 to permit the angular adjustment referred to. This pipe-section is formed with a shoulder at its inner end to bear against the interior of the steam-chest, and thus prevent both the escape of steam and itself being forced out by the steam-pressure.

What I claim as my invention, and for which I desire Letters Patent, is as follows, to wit:

1. In a valve, the combination with the cylindrical chamber having the ports, of the cylindrical steam-chest fixed within the said chamber and having two openings or ports in the same plane but at opposite ends and sides thereof, and the sleeve fitted between said chest and the inner walls of said chamber and formed with the elongated openings or slots and having means for its rotation, substantially as described.

2. In a valve, the combination with the cylindrical chamber having the ports, of the cylindrical steam-chest fixed within the said chamber and having the two ports, and the rotary sleeve fitted within said chamber and exterior to said chest, said sleeve having the two elongated openings and the hood suitably coacting with said ports, substantially as described.

3. In a valve, the combination with the cylindrical chamber having the ports, of the cylindrical steam-chest fixed within the said chamber and having the two ports, the ro-

tary sleeve fitted to said chest and chamber, the shaft turning said sleeve and extended to the exterior of said chamber, and means for angularly adjusting said shaft with respect to the source from which it receives its motion, substantially as described.

4. In a valve, the combination with the cylindrical chamber having the ports, of the cylindrical steam-chest fixed within the said chamber and having the two ports, the rotary sleeve fitted to said chest and chamber, the shaft turning said sleeve and extended to the exterior of said chamber, the gear loose on said shaft and having a spirally-grooved hub, the sleeve turning with said shaft but slidable thereon and carrying the pin entering said groove, and means for longitudinally shifting the last-named sleeve, substantially as described.

5. In a valve, the combination with the cylindrical chamber having the ports, of the cylindrical steam-chest fixed within the said chamber but angularly adjustable therein and having the two ports, the rotary sleeve fitted to said chamber and chest and having the elongated openings and the hood and boss, the shaft fixed in said boss and reaching through to the exterior of said chamber and having means for its rotation; the inner extremity of said shaft having a bearing in the head of said steam-chest, substantially as described.

6. In a valve, the combination with the cylindrical chamber having the ports, of the cylindrical steam-chest located within said chamber and having the two ports and the outwardly-extended tubular stem, means of angular adjustment connected with said tubular stem, the steam-pipe loosely connected with the end of said steam-chest, and the slotted sleeve fitted to said chest and chamber and having means for its rotation, substantially as described.

In testimony that I claim the foregoing invention I have hereunto set my hand this 14th day of April, 1903.

OSCAR M. CARLETON.

Witnesses:

GEO. M. DICKSON,
E. R. SCOTT.