

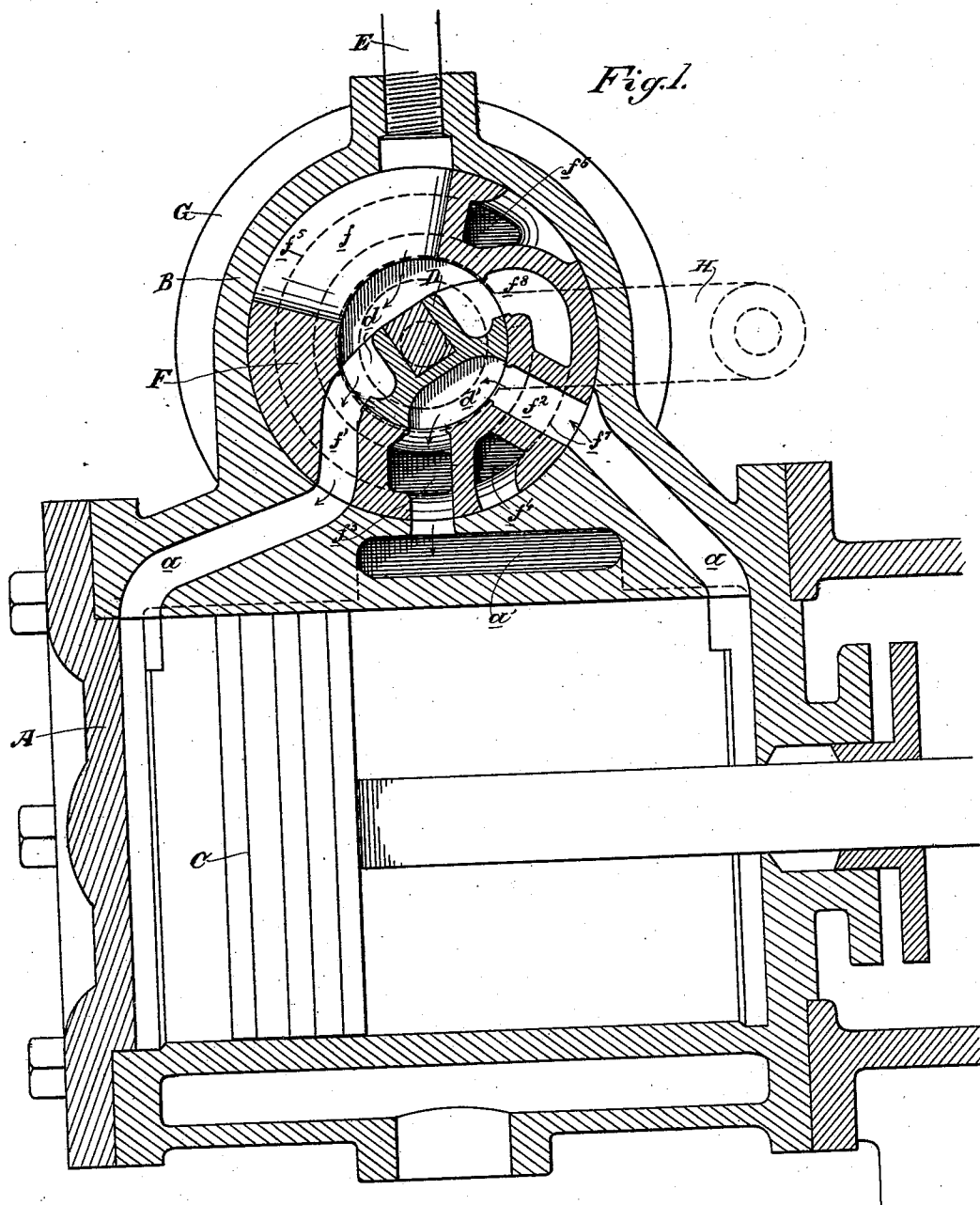
(No Model.)

2 Sheets—Sheet 1.

J. F. M. WOODS.
REVERSING GEAR.

No. 475,026.

Patented May 17, 1892.



Witnesses,
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J. F. Aschbeck

Inventor,
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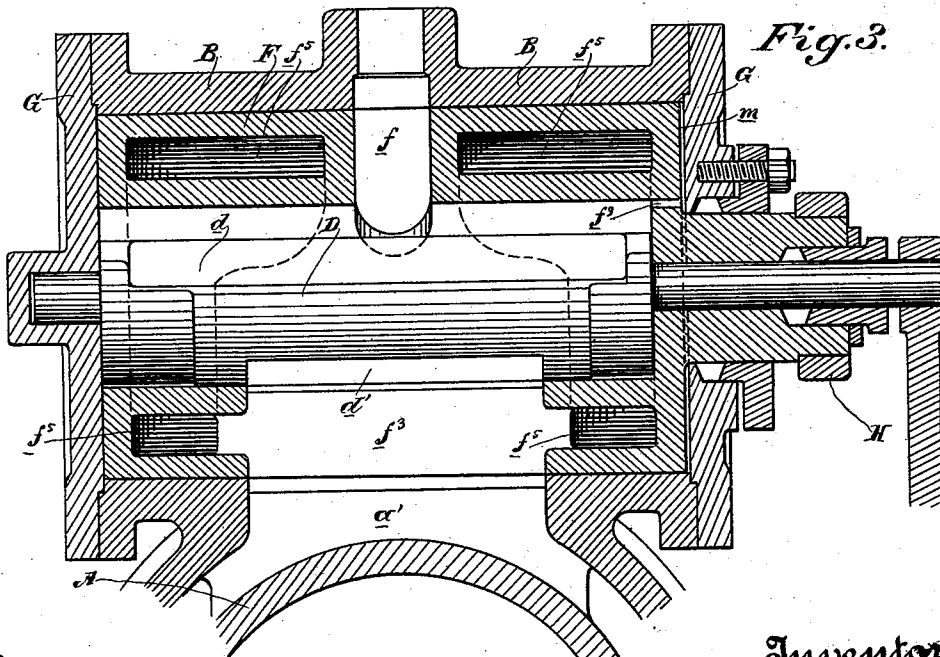
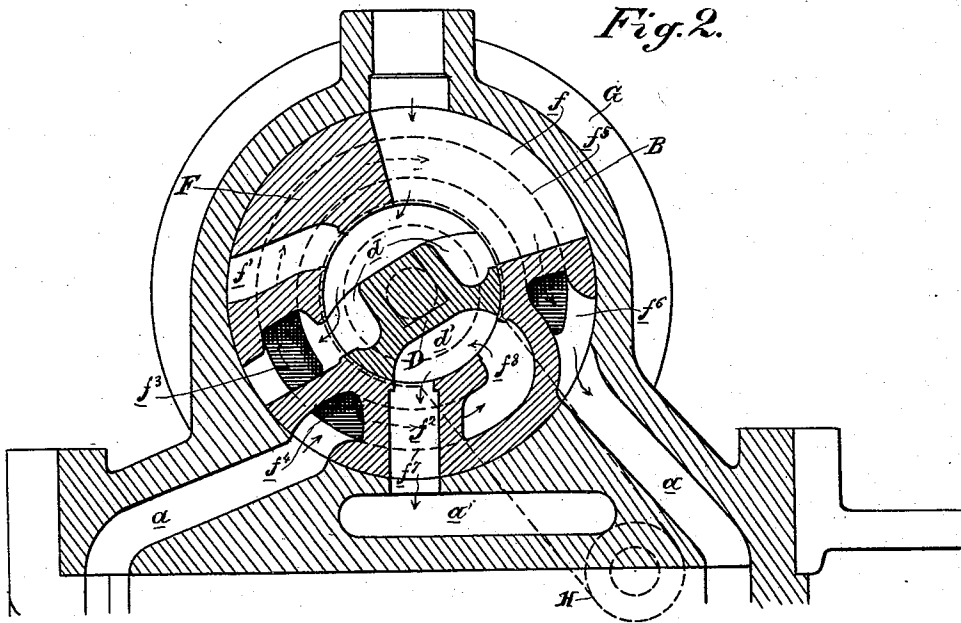
(No Model.)

2 Sheets—Sheet 2.

J. F. M. WOODS.
REVERSING GEAR.

No. 475,026.

Patented May 17, 1892.



Witnesses,
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UNITED STATES PATENT OFFICE.

JOHN F. M. WOODS, OF OAKLAND, CALIFORNIA.

REVERSING-GEAR.

SPECIFICATION forming part of Letters Patent No. 475,026, dated May 17, 1892.

Application filed November 16, 1891. Serial No. 412,083. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. M. WOODS, a citizen of the United States, residing at Oakland, Alameda county, State of California, have invented an Improvement in Reversing-Gears; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of steam-engines, and especially to the class of reversing devices therefor.

My invention consists, essentially, in a cylindrical valve-seat adapted to be oscillated and provided with suitable ports so arranged that by its oscillations they shall be brought into changed relations with the ports of the valve and cylinder to effect the reversal of the engine.

My invention also consists in the valve-seat, with its novel ports, hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to simplify the reversing mechanism of an engine by dispensing with all link motion and also dispensing with one of the eccentrics usually employed to effect the reversal by reversing the valve itself.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical cross-section showing the valve-seat arranged to take steam on the left. Fig. 2 is a similar section showing the valve seat arranged to take steam on the right. Fig. 3 is a longitudinal vertical section through the valve-chest, showing the left-hand half of the valve-seat.

A is the cylinder of an engine, having the valve-chest B and the steam and exhaust ports aa' . Within the cylinder is the piston C. In the valve-chest is an oscillating or rotary valve D of any usual or common pattern; the valve here shown having the steam-passage d and the exhaust-port d' .

E is the steam-inlet pipe to the valve. Between the valve and the valve-chest is located my valve-seat, (designated generally by the letter F.) This seat consists of a hollow shell or cylinder, its outer surface fitting within the valve-chest and confined therein by suitable end heads G and adapted to be oscillated

by a suitable mechanism, as by means of the reversing-lever H, connected with one end of it, as shown.

Within the hollow of the valve-seat the valve D is located and is oscillated by suitable connections from a single eccentric. (Not necessary herein to show.)

The valve-seat is to be provided with any arrangement of ports which control the communication of the ports of the valve with the ports of the cylinder and which, by the oscillation of said seat, will change this communication when desired to reverse the engine. This is the principle of my invention, and by it I am enabled to effect the reversal of the engine while still continuing the oscillation of the valve in exactly the same way. I thus dispense with one of the eccentrics usually employed to effect the reversal by changing the movement of direction of the valve itself, and I am also enabled to dispense with all link motion.

The particular arrangement of ports in my valve-seat is as follows: It has a main port f . This passes through the valve-seat from the outside to the inside, and it is long enough to be always in communication with the steam-inlet E, no matter to what position the seat may be turned to effect the reversal. f' is an inlet-port made through the valve-seat, and f^2 is an exhaust-port, also made completely through the seat. Lying between these two ports is a port f^3 and a port f^4 . The former port opens through the valve-seat and also opens sidewise into a passage f^5 , which is a branched one, passing around each end of the seat and joining in a port f^6 , which opens to the outside of the valve-seat. The port f^4 opens to the outside of the valve-seat and also opens into branch passages f^7 around each end of the valve, which said passages join in a port f^8 , opening to the inside of the valve-seat.

The operation of these parts is as follows: If we suppose the cylinder to be taking steam at the left-hand end and exhausting from the other end, the positions of the valve-seat and valve are shown in Fig. 1, in which it will be seen that the main port f communicates with inlet E and the port f' is in communication with the left-hand inlet-port a of the cylinder

and also in communication with the inlet-passage d of the valve. The port f^2 of the seat is in communication with the right-hand end port a of the cylinder and is also in communication with the exhaust-port d' of the valve, said exhaust-port being in communication with the port f^3 of the valve-seat, which is itself in communication with the exhaust-port a' of the cylinder. The passages f^5 of the port f^3 do not interfere with the exhaust, because their end port f^6 is at this time closed by the wall of the valve-chest. Now, if it be desired to reverse the engine the valve may be supposed to be in the same position, as its oscillation is always the same; but the valve-seat F is moved to the position shown in Fig. 2. In this position it will be seen that the main port f of the valve-seat is still in communication with the inlet E . The inlet-passage d of the valve is in communication with the port f^3 of the valve-seat, the outer end of said port being closed, consequently the steam has to pass from said port f^3 around through the passages f^5 to the port f^6 , which is now in communication with the steam-port a at the right-hand end of the cylinder. The steam-port a at the left-hand end of the cylinder is in communication with the port f^4 of the valve, and the steam exhausts from said port through the passages f^7 into the port f^8 , the inner end of which communicates with the exhaust-port d' of the valve. The steam passes from said port d' through the port f^2 of the seat and out through the exhaust-port a' of the cylinder. Thus the cylinder takes steam and exhausts from ends opposite those from which it took steam and exhausted in the first instance.

The valve-seat F is made slightly tapering, and at its smaller end fits up snugly to the end head. At its larger end it is separated from the head by a slight space, as shown at m . Through this larger end of the seat is made a small hole f^9 , leading from the inside to the space m . Now, when the steam is turned on it passes through hole f^9 into space m and drives the seat tightly to its place. Then when the steam is shut off the pressure on the seat is relieved and it can be readily turned to effect the reversal.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. In an engine, and in combination with its cylinder having its end inlet-ports and exhaust-port and an oscillatory valve, an oscillatory cylindrical valve-seat in which the valve is mounted, having the main port, the through ports, and the outwardly and inwardly opening ports and connecting-passages, said ports adapted by the movement of said seat to be brought alternately into such relation with the valve-ports and the cylinder-ports as to reverse the engine, substantially as herein described.

2. In an engine, the oscillatory valve-seat for reversing the engine, consisting of the hollow shell or cylinder having the main port f , the through ports f' , f^2 , and f^3 , the outwardly-opening ports f^4 and f^6 , the inwardly-opening port f^8 , the passages f^5 , connecting the port f^3 with the port f^6 , and the passages f^7 , connecting the ports f^4 and f^8 , substantially as herein described.

3. In a steam-engine, and in combination with its cylinder having a valve-chest and inlet and exhaust ports and an oscillatory valve, an oscillatory valve-seat fitted in the valve-chest and carrying the valve, said seat consisting of a hollow shell or cylinder provided with the main port f , the through ports f' , f^2 , and f^3 , the outwardly-opening ports f^4 and f^6 , the inwardly-opening ports f^8 , the passages f^5 , connecting the port f^3 with the port f^6 , and the passages f^7 , connecting the ports f^4 and f^8 , substantially as herein described.

4. In a steam-engine, and in combination with the valve-chest and oscillatory valve therein, the oscillatory cylindrical valve-seat in said chest having suitable ports adapted by its movement to effect the reversal of the engine, as described, and a hole f^9 in one end to obtain a pressure in said seat to hold it in place and to relieve it of said pressure, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN F. M. WOODS.

Witnesses:

S. H. NOURSE,

J. A. BAYLESS.