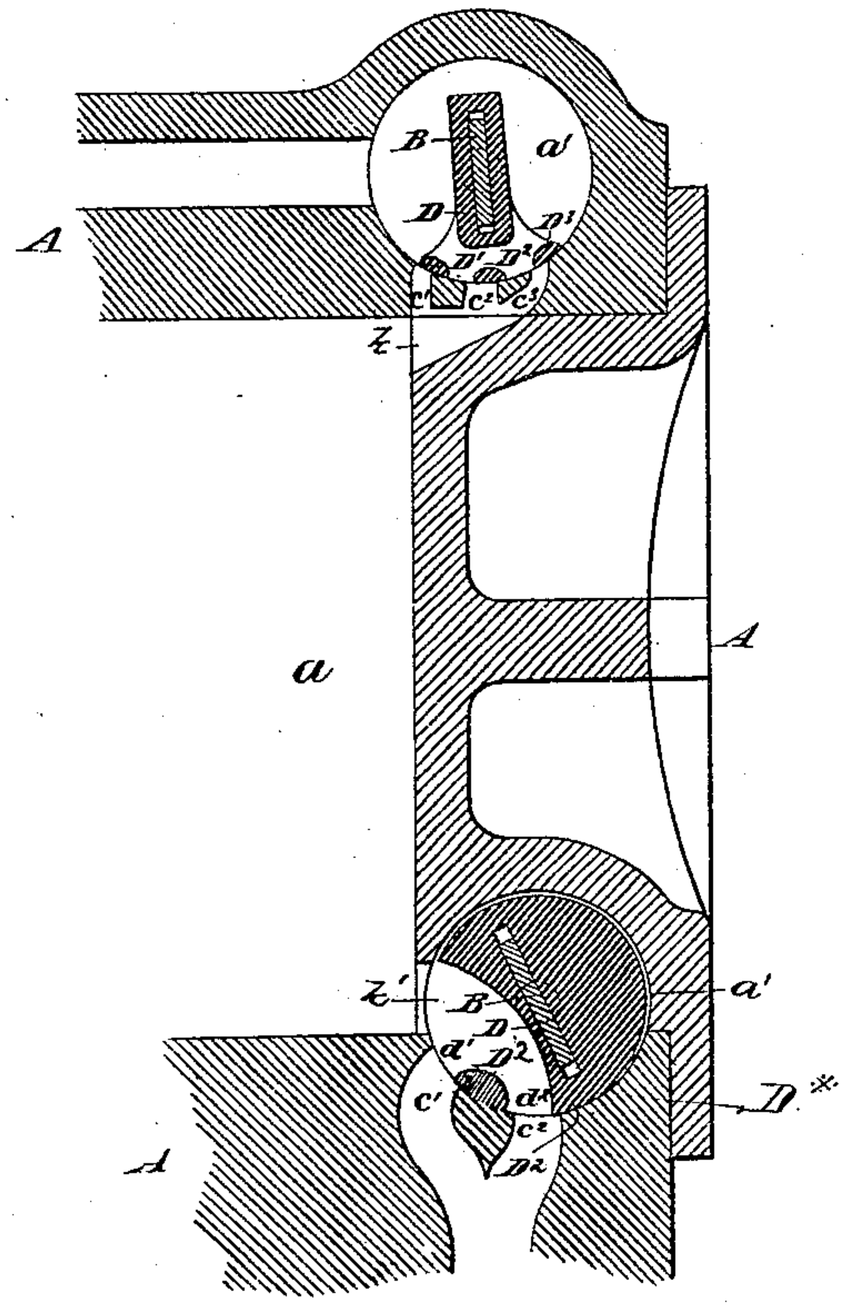
(No Model.)

M. R. MOORE.

OSCILLATING VALVE.

No. 271,729. Patented Feb. 6, 1883.



WITNESSES—

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UNITED STATES PATENT OFFICE.

MATTHEW R. MOORE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO HIMSELF AND THE ATLAS ENGINE WORKS, OF SAME PLACE.

OSCILLATING VALVE.

SPECIFICATION forming part of Letters Patent No. 271,729, dated February 6, 1883.

Application filed June 2, 1880. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW R. MOORE, of Indianapolis, in the county of Marion, in the State of Indiana, have invented certain new and useful Improvements Relating to Oscillating Valves or Rolling Valves for Steam-Engines and Analogous Purposes; and I do hereby declare the following to be a full and exact description of the valve.

The invention relates to oscillating valves; and the novelty consists in the construction and arrangement of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

The invention is illustrated in the accompanying drawing, which forms a part of this specification, and in which the figure represents a section through the center of the valves, cylinder, and head, showing the relation of the valves to said cylinder and head and to each other. It also shows the forms and relations of the parts adjacent to the valves, the seat of the steam-valve being entirely within the cylinder, and no part thereof being recessed into the head, and the seat of the exhaust-valve being in the cylinder so far as the bearing-surface is concerned, but a large part of the cavity being recessed in the head of the cylinder. The valves are inserted and removed by an endwise movement.

A, &c., are parts of the stationary work, which may be cast-iron. The cavity *a* is a portion of the hollow interior of the main cylinder, in which plies a piston. (Not represented.) The smaller cylindrical cavities, which receive the valves, stand at right angles and very near thereto. These cavities are marked *a'*.

The valve-stems are marked B. It will be understood that these stems are thin and flat where they pass through the valve, and are cylindrical at the ends. One end is made long and extends out through a stuffing-box, and is the means through which the valve is rocked, as in ordinary engines of this class, of which the favorite Corliss is a type. The flat portions of the stems, by fitting in corresponding flat sockets in the valve, impart the rocking motion of the shaft to the valve, and by the socket being considerably deeper than the width of the valve-stem the valve is allowed to go and come in fitting steam-tight to the interior of the cavities *a'* as the valve wears away. Springs (not shown) aid in holding the valves with sufficient tightness on their seats.

So far as yet described the work is of a well-known and long approved character. My improvements lie in provisions for duplicating or triplicating the passages for the steam. I have succeeded in realizing with this form of valve the principle of duplication due to what is called the "gridiron-valve."

The steam, admitted through a sufficient passage, (not shown,) fills the chamber *a'*, and would flow freely to the cylinder through the three ports $C' C^2 C^3$, except for the bars $D' D^2 D^3$ of the valve D. These bars are sufficiently wide, and when the valve is in a closed position tightly cover their respective ports; but when the valve D is turned sufficiently they uncover the ports and allow steam to move rapidly through each. The edges are nicely finished, and the parts are so proportioned that as the valve is turned the three bars $D' D^2 D^3$ commence at the same moment to uncover their respective ports $C' C^2 C^3$. It follows that a given movement of the valve opens three ports for the flow of steam to the cylinder. This quality is particularly important in the return movement, which, when the engine is working expansively, takes place while the piston is in rapid motion, and it is important that the steam be cut off as instantaneously as possible. The three orifices for this purpose, being closed simultaneously, allow a given amount of movement of the valve in a given fraction of a second to contract the area of the opening about three times as rapidly as with the usual construction. I have marked the passages in the valve *d d' d²*. These letters indicate the points through which the steam flows when the valve is in the open position.

The large passage leading to the condenser is branched, the two branches being indicated by $C' C^2$.

The exhaust-valve, mounted in the same manner as in the Corliss, with freedom to shift on its flattened stem B to compensate for wear, is formed, not only with the ordinary cavity

or throat, but with a bar, D^2, in the throat, arranged to cover the passage or port C′. The ordinary surface of the valve which closes the port C^2 is marked D*. When the valve is in the closed position the surfaces D* and D^2 fit tightly upon the mouths of the respective ports C′ C^2, and hold the way tightly closed. When the time for the exhaust approaches, and the valve rolls in the right direction, the surfaces D* D^2 are moved off and uncover the ports C′ C^2. Thus conditioned, the steam from the cylinder *a* flows rapidly into the two ports C′ C^2, and thence through the main port or passage C to the condenser. (Not shown.) A given amount of angular motion, by uncovering the two passages, provides about twice the usual area for the rapid escape of the steam. It follows that the steam is completely exhausted earlier in the stroke than usual.

The passages in the valve, through which the steam flows, are marked d' d^2.

I attach much importance to the fact that the steam is always allowed a free admission into the central portion of the valve, and that the gridiron portion is only on one side—the exit side.

I am aware that somewhat analogous valves have been before known, having gridiron-passages on both the receiving and the discharging side of the valve. This is objectionable, for the reason that the space in the interior of the valve is left imperfectly filled, and at each opening to admit the steam for a fresh stroke has to be filled to full pressure before the full effect can be felt on the piston, which my invention avoids.

Modifications may be made in the details. I can use a triple passage for the exhaust and only a double passage for the live steam; or both may have triple passages or duplicate passages. It is always practicable, and may be expedient in some cases, to use four or a still higher number of passages; but I esteem three ordinarily sufficient.

My invention allows any of the ordinary means for operating the valve. It allows all the present facility for placing the valve-chambers a' very near the main chamber *a*. Any ordinary or suitable proportions of the valve-stem or valve may be employed. Any ordinary varieties of springs, stuffing-boxes, and connections may be employed.

It is expedient in some cases to make the valve-chambers a' and the corresponding valves a little larger than when the ordinary valve is employed, with a single passage for the steam.

It will be observed that the aperture which admits the steam into the cylinder-cavity *a* is formed in the head of the cylinder, as seen at *k*, and the exhaust-aperture is also formed in the head, as seen at k'. By this construction both apertures are directly in the line of travel of the piston-head, and the cylinder is left entire.

I claim as my invention—

1. In a steam or gas engine, the oscillating steam-valve D, working in a circular cavity, and having its seat formed entirely within the cylinder, and always open for the access of steam, and having also gridiron bars and passages, as shown, combined with corresponding gridiron bars and passages in the cylinder, and the steam-inlet passage formed in the cylinder-head, as set forth.

2. The exhaust-valve described, having its seat formed in the cylinder and its recess or cavity formed largely in the cylinder-head, the said valve being always open to the cylinder for the exit of water of condensation and exhaust, but having gridiron bars and passages to correspond with the ports in the cylinder, as set forth.

3. In a steam-engine, and in combination with a cylinder in which the inlet *k* and exhaust-passages k' are formed entirely in the cylinder head and in line with the travel of the piston, the inlet-valve having its recess and seat formed entirely within the cylinder always open for the access of steam, and having bars and passages to correspond with similar bars and passages in the cylinder, and the exhaust-valve always open to the cylinder, but having bars and passages, as shown, the said valve having its seat in the cylinder and its recess largely in the cylinder-head, as and for the purposes set forth.

In testimony whereof I have hereunto set my hand, at Indianapolis, Indiana, this 29th day of May, 1880, in the presence of two subscribing witnesses.

MATTHEW R. MOORE.

Witnesses:

A. M. MORSE,

R. M. COFFIN.