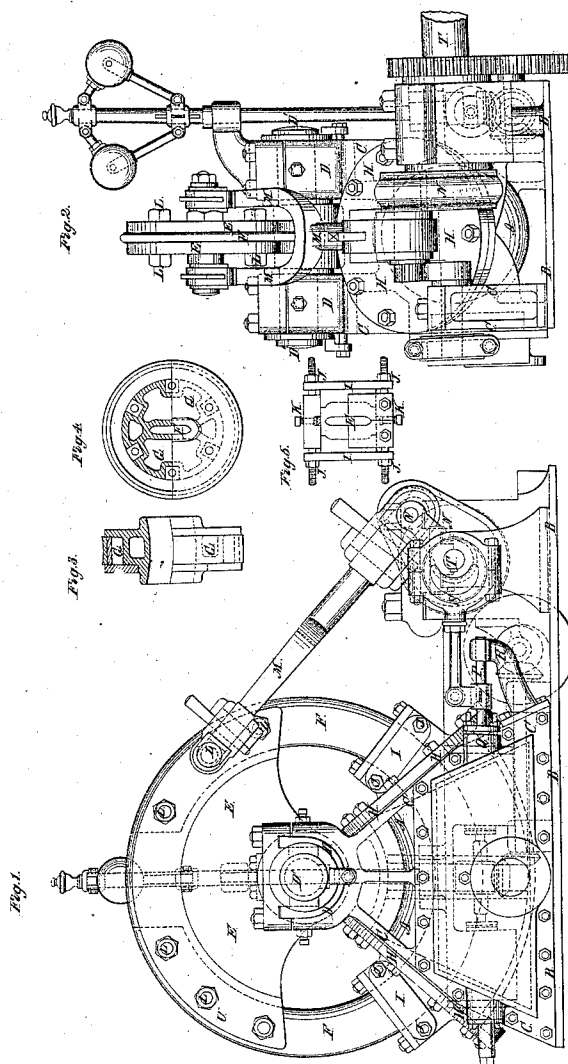


W. Wright.

Oscillating Steam Engine.

N^o 4,3362.

Patented June 28, 1864.



Witnesses.

Witness
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UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **43,362**, dated June 28, 1864.

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of New York, in the county and State of New York, have invented certain new and useful Improvements in Steam-Engines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figures 1 and 2 are respectively a side and end elevation, and Figs. 3, 4, and 5 constructive details of the same.

This invention relates to certain peculiar construction and arrangement of steam-engines, applicable to stationary or marine engines, whereby greater effect is obtained with a given amount of steam, while compactness, solidity, and particularly fewness and simplicity of parts are obtained with good balance and well-directed action.

The distinguishing feature of the steam-engine subject of this patent consists in the peculiar disposition of the steam cylinder or chamber, whereby the piston is caused to travel concentrically with the center of motion of an engine whose general character is that of an oscillating-beam engine—that is, an engine the movement of whose piston is transmitted to a beam oscillating upon its point of suspension.

Other improvements and features of novelty are involved in and subordinate to the general distinguishing characteristic before referred to, as will be more fully set forth in the following description.

The engine represented in the accompanying drawings embodies the principle of my invention, and may be considered the type engine, having the characteristic before set forth, and which I denominate the “segmental engine.” The steam-chamber, or, as it may be called by the conventional term, “steam-cylinder” A is stationary and curved, its axis forming a segment of a circle whose center is the center of motion of the parts of the engine which transmit their movements to the machinery to be driven. The segmental cylinder is supported on a solid sole-plate, B, to which are cast or bolted, or otherwise secured, triangular side standards, C, between which is incased the steam-cylinder with the convex side upon or toward the sole-plate. The side standards may be cast

in one piece with the said cylinder, and thus constitute two plane-surfaced exterior sides of the cylinder. One or both side plates may also be fitted with openings for the admission to and expulsion from the cylinder of steam, and may thus serve the purpose of a steam-chest. The apex of each triangular side standard is crowned with a central pedestal bearing, D, which, carrying a walking-beam or rocker, E, transmitting the main reciprocating movement of the piston of the engine to a main shaft to be driven, constitutes the center of motion. It is with this center of motion that the steam cylinder is concentric in all its parts, so that the course of travel of the piston it incloses will necessarily be like that of a pendulum of which the said center is the point of suspension. Longitudinally through the cylinder along its axis passes the piston-rod F, curved in conformity with the shape of the cylinder, traversing it at both ends. The piston-rod is formed into an opening ring, the opening being at a point diametrically opposite to the piston, so that both the piston and the piston-rod may be removed from the cylinder by shifting the rod until its opening comes within the cylinder, when it may be lifted up and out of the cylinder. The piston-rod I prefer to make of a sectional area (shown in Figs. 4 and 5) that is flat, presenting the greatest width or depth in the direction of the radii, and terminating on the interior and exterior circumference in an ogee-shaped angle.

To connect the piston G with the rod, I form the piston-mold around the piston-rod, and cast the body of the piston upon it as a core. In this way a very secure attachment is effected, and the difficulty and trouble attending the boring of a longitudinally-curved hole to fit the piston-rod is obviated. The piston may be fitted with metallic or other suitable packing. The steam-cylinder is provided with two head-plates, H, with which are cast or connected stuffing-boxes in which the packing is adjusted by means of side compressing-plates, I, and screw-bolts J. Opposite the angles of the piston-rod I provide the stuffing-box with screws K, which actuate blocks or wedges to securely pack the joint between the side packing-plates, I. The walking-beam is composed of one or two disk-plates, which, conforming along its outer cir-

cumference with the annular piston-rod, constituted segments of circular disks whose bordering radii form an angle of one hundred and twenty-five degrees, more or less, according to the length of stroke. These plates are united together with the piston-rod by means of bolts L, passing through both the plates and the rod. If the walking-beam be composed of a single plate, then it is double-flanged along the circumference, and the two ends of the piston-rod are incased between the two flanges and secured together by means of bolts, as described. The beam is supported in its bearings by means of an axle or pin run through a hub or flange for that purpose made in the beam. To the beam is jointed the one end of the connecting-rod M, forked to embrace the beam at the point of attachment. The head of the connecting-rod is keyed by means of straps, braces, and wedge-pieces to a pin passing through both the beam and the rod, in lieu of one of the bolts. The other end of the connecting-rod is by similar means connected with the crank N of the main driving-shaft.

For double-screw propulsion—i. e., when two screws are used—a second connecting-rod is arranged symmetrically with the one last described, jointed at U and connected with a crank-shaft located on the other side of the cylinder in the same relation to the cylinder as the shaft T bears to it on the opposite side.

The steam-chest, as before stated, is located at the side of the steam-cylinder and contains the steam-admission valve, which is operated from without by means of an eccentric on the main shaft, or by some other moving part of the engine. The steam-exhaust valve is in this instance operated independently of the other valves by means of the rod P, guided in a stuffing-box, Q, and collar cast to a bracket, R. The exhaust-valve rod is combined with an eccentric, S, on the shaft T through the intermediary of a key or other adjustable contrivance whereby it may be set to suit the work to be performed.

The adaptation of an exhaust-valve adjustable at the will of the attendant without necessarily involving a corresponding adjustment of the steam admission and cut-off arrangement enables the engine to be worked with great economy, inasmuch as the discharge of steam may be regulated to prevent concussion and to insure equable movement of the parts.

The operation of an engine constructed according to my invention will be readily understood from the foregoing description. Steam being admitted into the cylinder, the piston, together with its rod and walking-beam, will be moved to and fro in arcs of a circle of which D' is the center. This oscillating motion is directly transmitted by means of the connecting-rod to the crank-shaft, to which a

rotary motion is imparted. The great simplicity of this arrangement of engines, combined with direct connection of the main working parts, all having one and the same center of motion, dispenses with sliding blocks, ways, and other undue friction, and admits of their being run at a great velocity without injurious vibration or liability to derangement.

Having thus described my invention, I claim—

1. The arrangement of a steam-engine for marine and other purposes, the steam chamber or cylinder of which is stationary and curved into a segment of a circle concentric with the center of motion, the said chamber or cylinder being of a circular sectional area, substantially as set forth.

2. In combination with a segmental steam cylinder or chamber, the piston-rod traversing both ends of the said cylinder or chamber and forming an open ring, the center of which is the center of motion, substantially as set forth.

3. The combination, with a stationary segmental steam-cylinder, piston, and annular piston-rod, of a walking-beam hung and oscillating in bearings at the center common to the cylinder and piston-rod, substantially as set forth.

4. In combination with a stationary segmental steam cylinder and piston and annular piston rod, an oscillating walking-beam rigidly connected and moving in unison with the piston-rod, substantially as set forth.

5. The combination of an annular piston-rod extending through both ends of a segmental steam-cylinder with a walking-beam rigidly connected at both of its ends with the piston-rod, substantially as set forth.

6. The attachment of a connecting-rod to both the beam and piston rod, when the movement of the latter is thus transmitted directly to a revolving shaft, substantially as set forth.

7. The arrangement of a segmental engine, substantially as described, whereby two connecting-rods may be used, operating two independent shafts on either side thereof, for the perfect balancing of and for obtaining the greatest useful effect from the engine, substantially as set forth.

8. In combination with a piston rod whose transverse section is more or less oval or elongated, the method herein described of packing the same by the employment, in connection with a suitable stuffing material, of side compression-plates, substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

WM. WRIGHT.

Witnesses:

H. MERRIAM,

R. E. STILWELL.