(No Model.)

# E. BEARE.

## STEAM ENGINE.

No. 396,850. Patented Jan. 29, 1889.

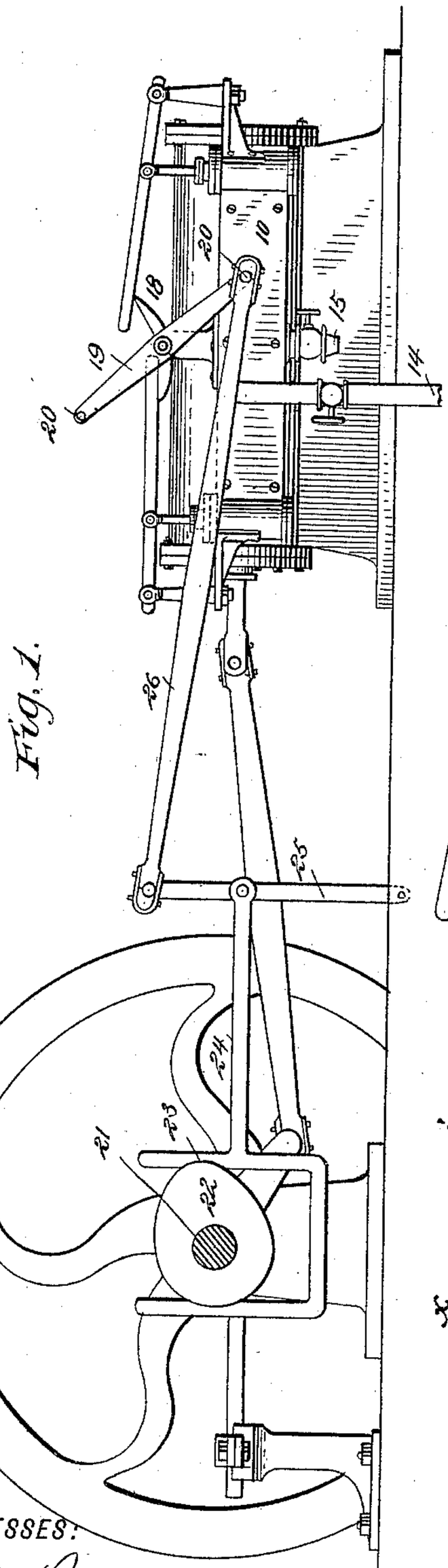

Fig. 1.

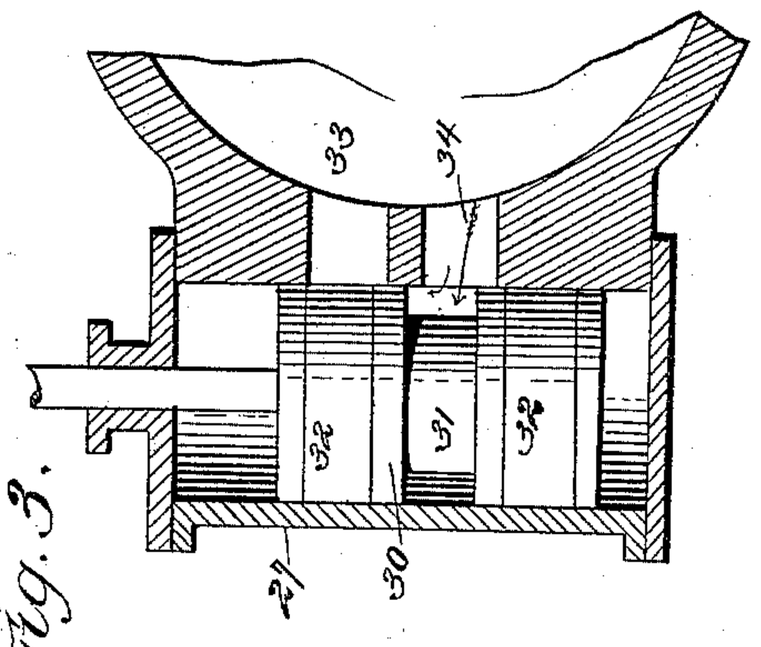

Fig. 3.

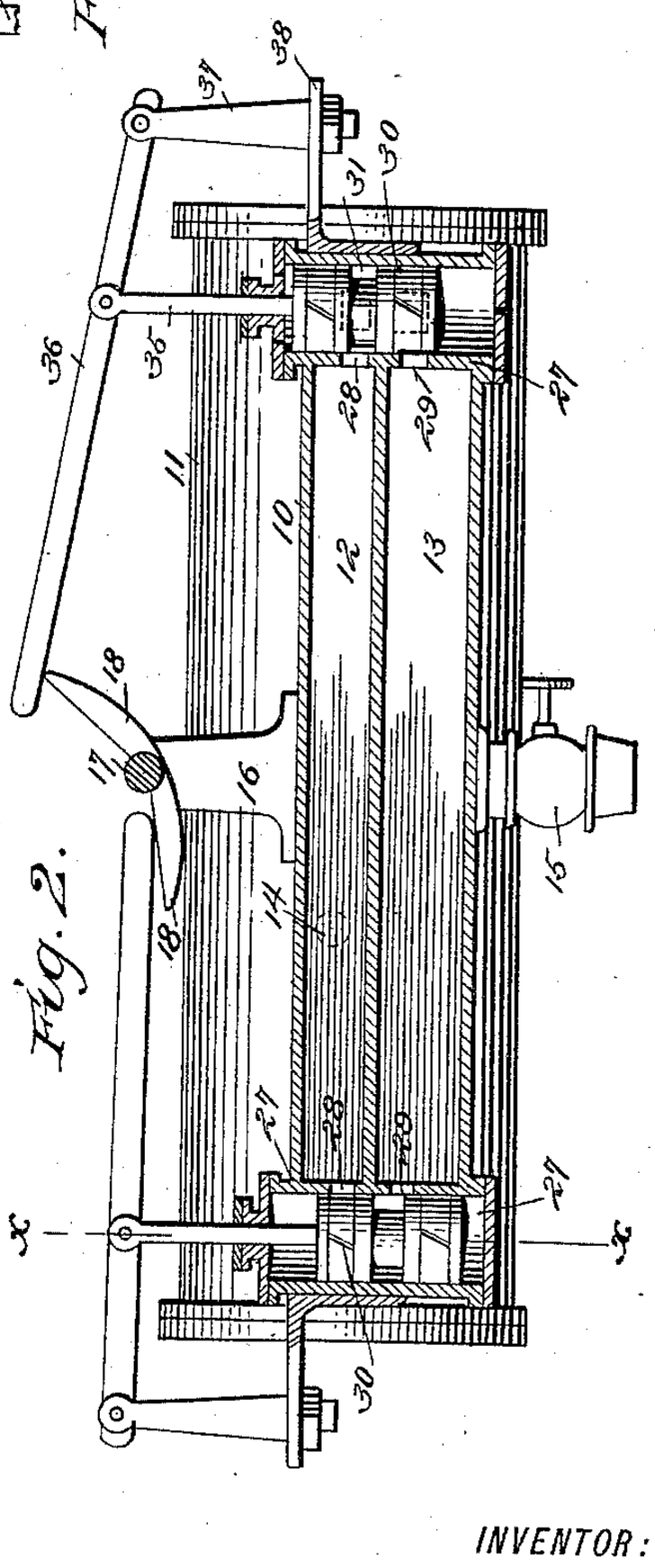

Fig. 2.

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# UNITED STATES PATENT OFFICE.

ERNEST BEARE, OF CHESTER, ILLINOIS.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 396,850, dated January 29, 1889.

Application filed July 28, 1888. Serial No. 281,264. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST BEARE, of Chester, in the county of Randolph and State of Illinois, have invented a new and Improved Steam-Engine, of which the following is a full, clear, and exact description.

My invention relates to an improvement in valve-gears for steam-engines, and has for its object to provide a gear especially adapted for stationary and marine engines of simple and effective construction; and the further object of the invention is to provide a means whereby the grinding of the valve-seats will be dispensed with and wherein there will be no down pressure on the valves, and wherein, further, the wear of the valves will be effectively taken up by the packing-rings.

The invention consists in the construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a stationary engine having my improved valve-gear applied. Fig. 2 is a central longitudinal and vertical section, and Fig. 3 is a transverse section on line *x x* of Fig. 2.

In carrying out the invention the steam-chest 10 is located at one side of the cylinder 11, extending, essentially, from end to end of the latter. The said steam-chest 10 is divided longitudinally into two compartments, 12 and 13, the compartment 12 being adapted to receive live steam, which is supplied thereto through the medium of a pipe, 14, extending vertically upward outside of the said steam-chest, and the lower compartment, 13, is purposed to receive the exhaust-steam, which is discharged through a suitable valve, 15, located in the bottom of the chest.

Upon the upper portion of the chest, and preferably at the center of the same, a standard, 16, is secured, in which standard a rock-shaft, 17, is fulcrumed, carrying oppositely-extending and preferably upwardly-curved fingers 18. To the outer end of the said rock-shaft 17 a lever, 19, is centrally secured, provided with wrist-pins 20, one at each extremity. Upon the drive-shaft 21 of the engine an essentially heart-shaped cam, 22, is keyed, which cam is adapted to reciprocate the yoke 23 of the horizontal cam-rod 24, the said horizontal cam-rod 24 being pivoted at or near the center to a vertical link, 25, the lower end of which is pivotally connected with the engine bed or foundation.

The upper end of the link 25 is pivotally connected to one of the members of the lever 19 through the medium of a pitman, 26. The object of providing the lever with a wrist-pin at each extremity is that one wrist-pin may be utilized to go ahead and the other to back upon when connected with the pitman 26.

At each end of the steam-chest 10 a vertical cylindrical casing, 27, is formed, having a port, 28, leading into the upper or live-steam chamber, 12, and a similar port, 29, leading into the lower or exhaust chamber, 13. In the said cylindrical casing 27 a plunger-like valve, 30, is held to reciprocate, which valve is provided with a central circumferential groove, 31, the surface above and below the said groove 31 being provided with a metallic packing-ring, 32, adapted to take up the wear of the valve.

In the rear of each cylindrical casing two ports, 33 and 34, are produced, one below the other, and similar ports are also produced in the steam-cylinder 11, the ports 33 and 34 being in horizontal alignment with the ports 28 and 29.

The ports 33 and 34 in the valve-casing are made just large enough to admit steam into the cylinder 11 and take the exhaust-steam therefrom, and are preferably widened out longitudinally of the cylinder. The rings 32 of the valve are the same width as or a little larger than the ports, thereby preventing the valves from catching when in operation.

The cylindrical valve-casings 27 are provided with an inclosed top and a suitable stuffing-box, through which a valve-rod, 35, is vertically projected, connected with the plungers of the valves, and the said piston-rods 35 at their upper ends are pivotally united to a lever, 36, at one side of the center of the same, the outer end of which lever is pivoted upon a standard, 37, preferably secured to a bracket, 38, extending outward

from the valve-casing, as best illustrated in Figs. 1 and 2, and the inner ends of the said levers 36 are made to rest, respectively, upon the fingers 18.

In operation, when the plunger of one valve is down in the casing the plunger of the opposite valve is elevated. Thus at the right in Fig. 2 the live steam entering the chamber 12 passes through the port 28 into the groove 31 of the valve, and from thence through the port 33 into the steam-cylinder 11, and the said steam entering the said cylinder at the rear of the piston forces the said piston forward. The live-steam port at the left is now closed by the upper portion of the valve-plunger, and the exhaust-ports 29 and 34 are open, whereby the exhaust-steam from the cylinder, passing through the cylinder-port 34 and around the surface of the piston, finds its way into the exhaust-chamber 13 through the port 29, and from thence out into the atmosphere through the valve 30.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the cylinder of an engine, of the steam-chest 10, divided longitudinally into the compartments 12 and 13, the vertical cylindrical casings 27 at the ends of the steam-chest and communicating with the compartments 12 and 13 of the steam-chest and with the steam-cylinder, the valves 30 in the cylindrical casings 27, and means for operating the said valves, substantially as herein shown and described.

2. The combination, with the steam-cylinder 11 and the drive-shaft 21, provided with the cam 22, of the steam-chest 10, provided with the compartments 12 and 13, the cylindrical casings 27 at the ends of the steam-chest and communicating therewith and with the steam-cylinder 11, the valves 30 in the cylindrical casings 27 and provided with the rods 35, the pivoted levers 36, to which the valve-rods 35 are pivoted, the rock-shaft 17, provided with the curved fingers 18 and the lever 19, the pitman 26, the link 25, the cam-rod 24, and the yoke 23, substantially as herein shown and described.

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Witnesses:
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