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No. 821,398. PATENTED MAY 22, 1906.

J. BERGESEN.

OSCILLATING PISTON ENGINE.

APPLICATION FILED MAY 17, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

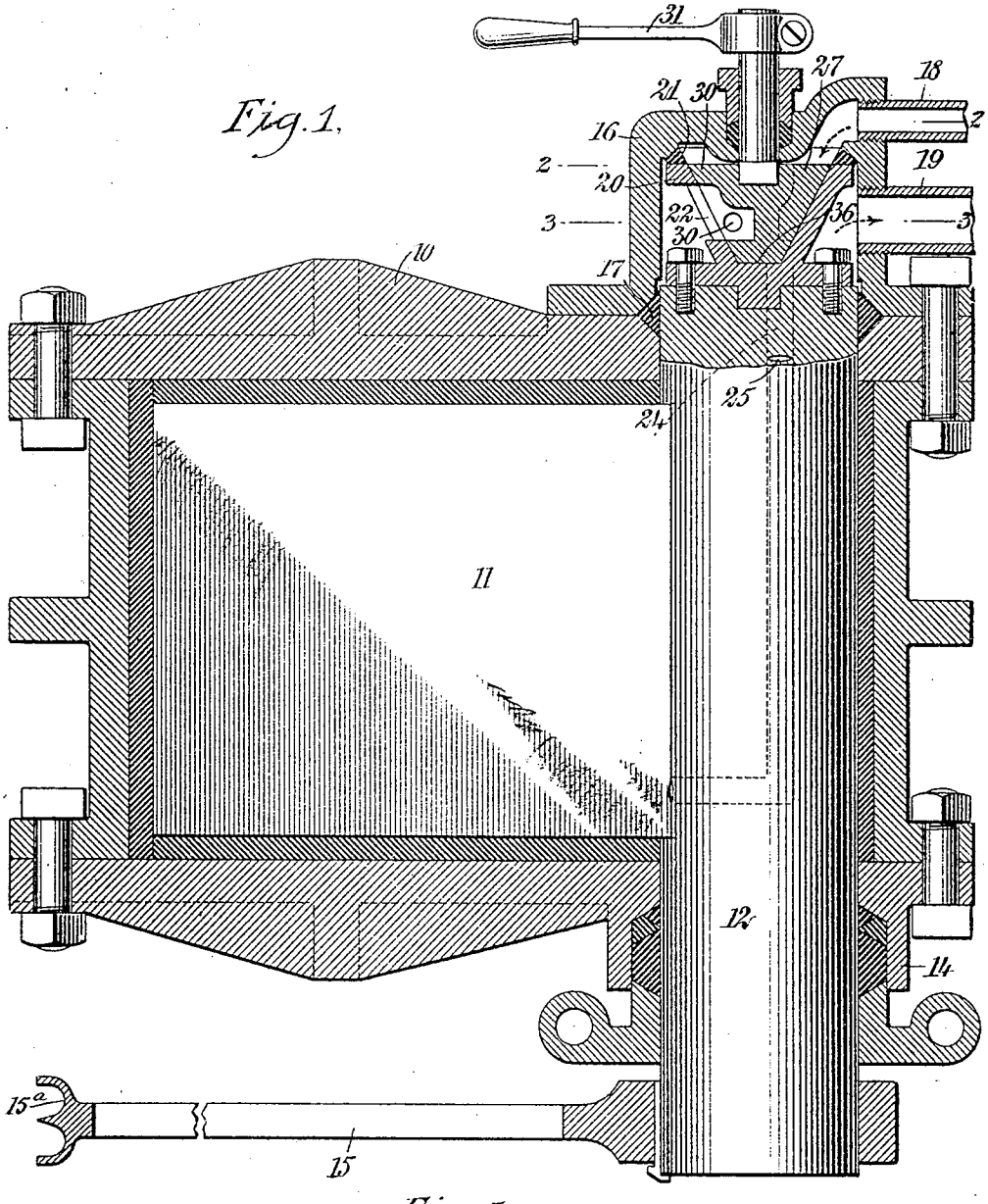
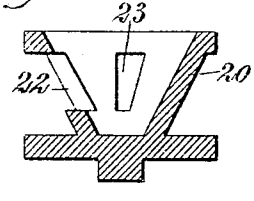


Fig. 5.



WITNESSES:

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2 SHEETS—SHEET 2.

Fig. 2,

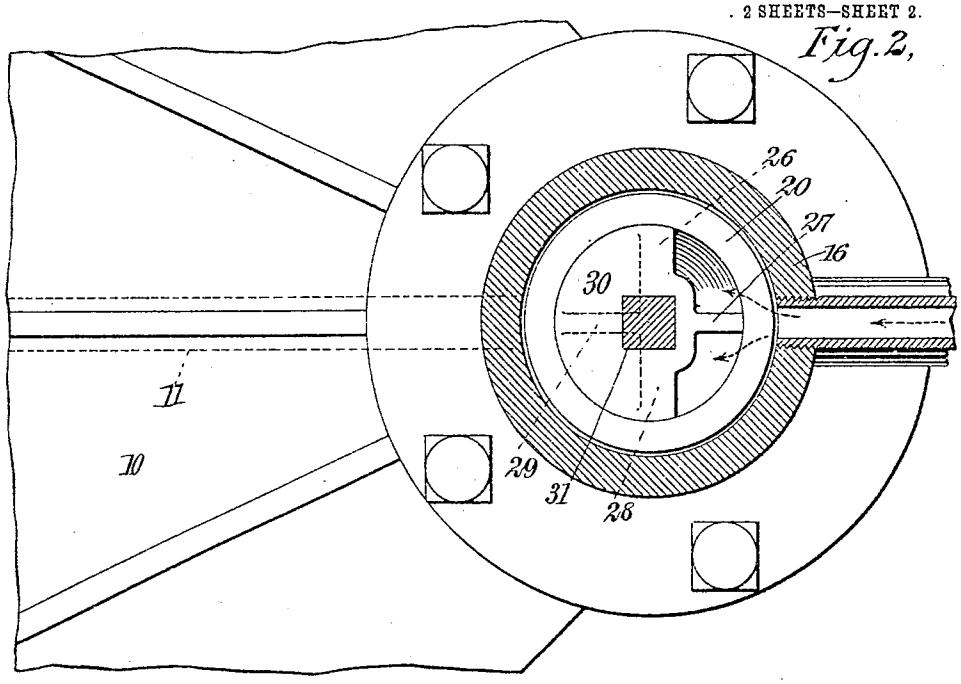


Fig. 3,

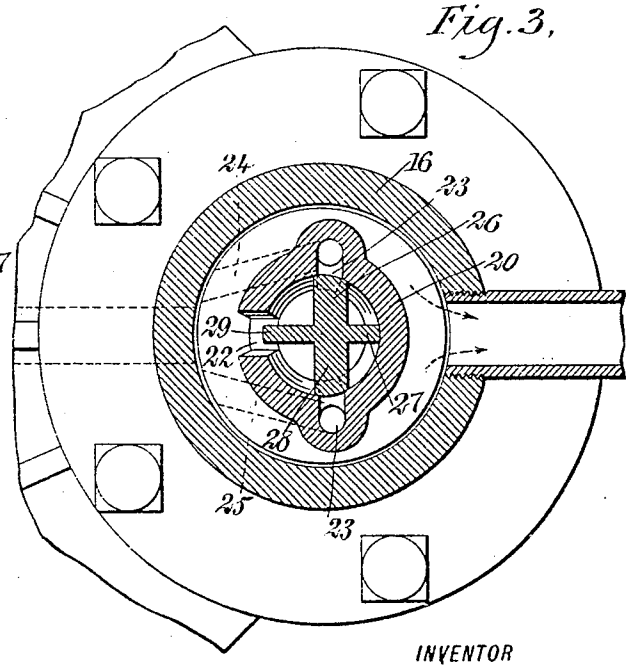
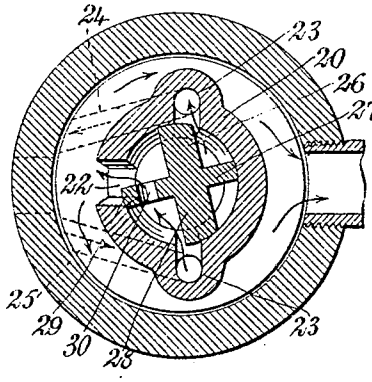


Fig. 4,



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UNITED STATES PATENT OFFICE.

JOHN BERGESEN, OF NEW YORK, N. Y.

OSCILLATING-PISTON ENGINE.

No. 821,398. Specification of Letters Patent. Patented May 22, 1906.

Application filed May 17, 1905. Serial No. 260,866.

To all whom it may concern:

Be it known that I, JOHN BERGESEN, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Oscillating-Piston Engine, of which the following is a full, clear, and exact description.

The invention relates to a peculiar form of oscillating-piston engine useful in connection with fluid under pressure. It is especially designed as a steam steering-gear for marine vessels.

The invention belongs to that class in which a quadrant-shaped cylinder is provided and a wing or piston arranged to swing in the same. The journal on which the wing is carried is provided with steam-ports and a valve coacting with the ports being engaged with or mounted on the said journal or stem. An example of a device of this general character may be seen in the prior patent to Barger, No. 683,427, dated October 1, 1901.

The object of the invention is to improve the construction and arrangement of the valve, so as to render the action of the engine more certain and rapid than heretofore, and to avoid loss of steam and difficult operation.

The invention resides in certain special features of construction and combination of parts, which will be fully set forth hereinafter and pointed out in the claims.

Reference is to be had to the accompanying drawings, which illustrate as an example the preferred embodiment of my invention, in which drawings like characters of reference indicate like parts in the several views, and in which—

Figure 1 is a vertical section of the motor. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a section on the line 3 3 of Fig. 1. Fig. 4 is an enlarged section on the line 3 3 of Fig. 1, but showing the valve in open position; and Fig. 5 is a detail section of the valve-seat.

10 indicates a quadrant-shaped cylinder in which is located the piston-wing 11. Said piston is carried by an oscillating shaft 12, which is located coincident to the center around which the piston 11 swings. The shaft 12 passes out from one end of the casing or cylinder 10, a stuffing-box 14 being provided to prevent leakage at this point, and as here shown the shaft is provided with a sector 15, having a grooved periphery 15ª, with which the tiller-ropes are joined.

The upper end of the shaft 12 projects into a housing or valve-box 16, secured to the upper part of the cylinder or casing 10. 17 indicates a suitable packing surrounding the upper end of the shaft to prevent leakage past the same. 18 indicates a steam-supply pipe leading to the upper part of the casing 16, and 19 indicates the exhaust-pipe.

Suitably fastened to the upper end of the shaft 12 and located within the box or chest 16 is a frusto-conical valve-seat 20. The seat tapers from its upper to its lower end, and a packing 21 is interposed between the upper end of the seat and the inner walls of the housing 16. Said seat has a port 22 therein opening into the lower part of the housing 16 to permit the exhaust-steam to pass through the lower part of the housing out by way of the pipe 19. The valve-seat 20 is also provided on each side of the port 22 with a port 23. Said ports 23, as shown with respect to one of said ports in Fig. 5, have one of their sides inclined for the purpose which will hereinafter appear. The ports 23 communicate directly with passages 24 and 25 formed in the shaft 14. These passages 24 and 25 lead down through the shaft 12 and communicate with the casing 14 on opposite sides of the piston 11. Operating within the valve-seat 20 is a frusto-conical valve. This valve has ribs or vanes 26, 27, 28, and 29, and it is provided at its upper portion with a cover or top wall 30, which prevents steam from passing from the exhaust-chamber in the lower part of the housing 16 up through the upper part of the housing, or vice versa. The valve is adapted to rock in the seat, so as alternately to connect the ports 23 to the steam supply or exhaust passage 24 or 25, as the case may be. During this movement the rib 29 rocks from one side to the other of the port 22. Said rib 29 is provided with an opening or openings 30, which facilitates steam movement through the rib, as indicated by the arrows in Fig. 4. 31 indicates a handle or any other desired means for operating the valve.

Upon throwing the lever to the position shown in Fig. 4 steam will be admitted into the passage 24 and will pass into the casing 10, moving the piston 11 in one direction. The piston carries with it the valve-seat 20, and this seat will move the ports around the

valve, so as to cut off the steam-supply, holding the piston 11 in its new position until the valve is again shifted, or if the apparatus is applied as a steam steering-gear until the condensation of steam will permit the force of the water acting on the rudder to start the piston from its new position, whereupon the piston in coming back will carry the valve-casing with it, and a fresh supply of steam will be admitted to the cylinder. This action goes on throughout the operation of the apparatus, the operator opening the steam-supply sufficiently to move the piston to the desired position, and this movement acting to cut off the steam, holding the piston in the position desired until the valve is again moved or until the condensation of steam in the casing permits the piston to move, whereupon the steam-supply will be again opened.

It will be observed, particularly by reference to Fig. 5, that the ports 23 have a diagonal side adjacent to the steam-supply connection 18, so that when the valve connects one of the ports 23 with the steam-supply the valve uncovers the tapering side of the port at the same time the valve uncovers the straight side of the opposite port, and the result of this is that with the same movement of the valve a larger area is given to the port which is exhausting than to the port which is receiving the steam. This is illustrated in Fig. 4, where it will be seen from the arrows that the steam entering the engine passes the diagonal side of one of the ports 23, while the steam exhausting from the engine passes the straight side of the opposite port. It also may be seen that the live-steam pressure on top of the valve holds the same firmly to its seat, while the flat end (indicated at 36 in Fig. 1) prevents the conical valve from binding in its seat. This holds the valve tight without undue friction.

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

1. In an oscillating-piston engine, the combination with the engine-cylinder, piston and shaft, of a housing inclosing one end of the shaft, a valve-seat in the housing, the seat dividing the housing into live and exhaust steam compartments and being connected to the shaft, and a valve coacting with the seat.

2. In an oscillating-piston engine, the combination with the engine-cylinder, piston and shaft, of a housing inclosing one end of the shaft, a valve-seat in the housing, the seat dividing the housing into live and exhaust steam compartments and being connected to the shaft, and a valve coacting with the seat, said valve bearing on the live-steam side of the seat and being held into position by the steam-pressure.

3. In an oscillating-piston engine, the combination with the engine-cylinder, piston and shaft, of a housing inclosing one end of the shaft, a valve-seat in the housing, the seat dividing the housing into live and exhaust steam compartments and being connected to the shaft, and a valve coacting with the seat, said seat having a tapering cavity facing the live-steam compartment of the housing, and the valve being supported and fitted in the seat whereby to be held in place by the steam-pressure.

4. In an oscillating-piston engine, the combination with the engine-cylinder, piston and shaft, of a housing inclosing one end of the shaft, a valve-seat in the housing, the seat dividing the housing into live and exhaust steam compartments and being connected to the shaft, and a valve coacting with the seat, said seat having a tapering cavity with a flat surface at its end, and the valve being correspondingly formed and fitted in the cavity, for the purpose specified.

5. In an engine, the combination of a cylinder, an oscillating piston operating therein, a shaft to which the piston is fastened, a housing inclosing one end of the shaft and having steam admission and exhaust connections, a valve-seat within the housing and connected to the said end of the shaft, the seat engaging the housing between the admission and exhaust connections thereof to separate said connections, the seat having a port communicating with the exhaust connection of the housing, and two additional ports communicating with the cylinder respectively at the sides of the piston, and a valve operating on the side of the seat adjacent to the admission connection of the housing, said valve commanding the steam-flow to and from the additional ports of the seat and having a portion separating the exhaust side from the live-steam division of the housing.

6. In an engine, the combination of a cylinder, an oscillating piston operating therein, a shaft to which the piston is fastened, a housing inclosing one end of the shaft and having steam admission and exhaust connections, a valve-seat within the housing and connected to the said end of the shaft, the seat engaging the housing between the admission and exhaust connections thereof to separate said connections, the seat having a port communicating with the exhaust connection of the housing, and two additional ports communicating with the cylinder respectively at the sides of the piston, and a valve operating on the side of the seat adjacent to the admission connection of the housing, said valve commanding the steam-flow to and from the additional ports of the seat and having a portion separating the exhaust side from the live-steam division of the housing, the said additional ports of the valve-seat having diagonal walls adjacent to the steam-supply, for the purpose specified.

7. In an engine, the combination of a cylinder, an oscillating piston operating therein,

a shaft to which the piston is fastened, a housing inclosing one end of the shaft, and having steam admission and exhaust connections, a valve-seat attached to the said end of the shaft, the valve-seat being contained within the housing and engaging the same between the admission and exhaust connections to divide the housing into two compartments, said valve-seat having a cavity on the side adjacent to the live-steam compartment and having a port therein communicating with the exhaust-steam compartment of the housing, and two additional ports respectively at the sides of the first-named ports and adapted to communicate with the cylinder on opposite sides of the piston thereof, and a valve located in the cavity in the seat and coacting with the ports thereof.

8. In an engine, the combination of a cylinder, an oscillating piston operating therein, a shaft to which the piston is fastened, a housing inclosing one end of the shaft, and having steam admission and exhaust connections, a valve-seat attached to the said end of the shaft, the valve-seat being contained within the housing and engaging the same between the admission and exhaust connections to divide the housing into two compartments, said valve-seat having a cavity on the side adjacent to the live-steam compartment and having a port therein communicating with the exhaust-steam compartment of the housing, and two additional ports respectively at the sides of the first-named ports and adapted to communicate with the cylinder on opposite sides of the piston thereof, and a valve located in the cavity in the seat and coacting with the ports thereof, said valve comprising a section reaching across between the two additional ports of the seat and controlling the steam-flow to and from the same, and a cover or top wall extending from said section of the valve over to the seat to separate the first-named port thereof from the live-steam compartment of the housing.

9. In an engine, the combination of a cylinder, an oscillating piston operating therein, a shaft to which the piston is fastened, a housing inclosing one end of the shaft, and having steam admission and exhaust connections, a valve-seat attached to the said end of the shaft, the valve-seat being contained within the housing and engaging the same between the admission and exhaust connections to divide the housing into two compartments, said valve-seat having a cavity on the side adjacent to the live-steam compartment and having a port therein communicating with the exhaust-steam compartment of the housing, and two additional ports respectively at the sides of the first-named ports and adapted to communicate with the cylinder on opposite sides of the piston thereof, and a valve located in the cavity in the seat and coacting with the ports thereof, the said additional ports of the seat having diagonally-extending side walls, for the purpose specified.

10. In an engine, the combination of a cylinder, an oscillating piston operating therein, a shaft to which the piston is fastened, a housing inclosing one end of the shaft, and having steam admission and exhaust connections, a valve-seat attached to the said end of the shaft, the valve-seat being contained within the housing and engaging the same between the admission and exhaust connections to divide the housing into two compartments, said valve-seat having a cavity on the side adjacent to the live-steam compartment and having a port therein communicating with the exhaust-steam compartment of the housing, and two additional ports respectively at the sides of the first-named ports and adapted to communicate with the cylinder on opposite sides of the piston thereof, and a valve located in the cavity in the seat and coacting with the ports thereof, said valve comprising a section reaching across between the two additional ports of the seat and controlling the steam-flow to and from the same, and a cover or top wall extending from said section of the valve over to the seat to separate the first-named port thereof from the live-steam compartment of the housing, the said additional ports of the valve-seat having diagonal side walls, for the purpose specified.

11. In an engine, the combination of a cylinder, an oscillating piston operating therein, a shaft to which the piston is fastened, a housing inclosing one end of the shaft, and having steam admission and exhaust connections, a valve-seat attached to the said end of the shaft, the valve-seat being contained within the housing and engaging the same between the admission and exhaust connections to divide the housing into two compartments, said valve-seat having a cavity on the side adjacent to the live-steam compartment and having a port therein communicating with the exhaust-steam compartment of the housing, and two additional ports respectively at the sides of the first-named ports and adapted to communicate with the cylinder on opposite sides of the piston thereof, and a valve located in the cavity in the seat and coacting with the ports thereof, the cavity in the valve-seat tapering toward the shaft and terminating in a flat surface, and the valve engaging the walls of the cavity in the seat and being correspondingly formed.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BERGESEN.

Witnesses:

ISAAC B. OWENS,

JNO. M. RITTER.