3 Sheets—Sheet 1.

A. DEMO.

Marine-Engine.

No. 203,006. Patented April 30, 1878.

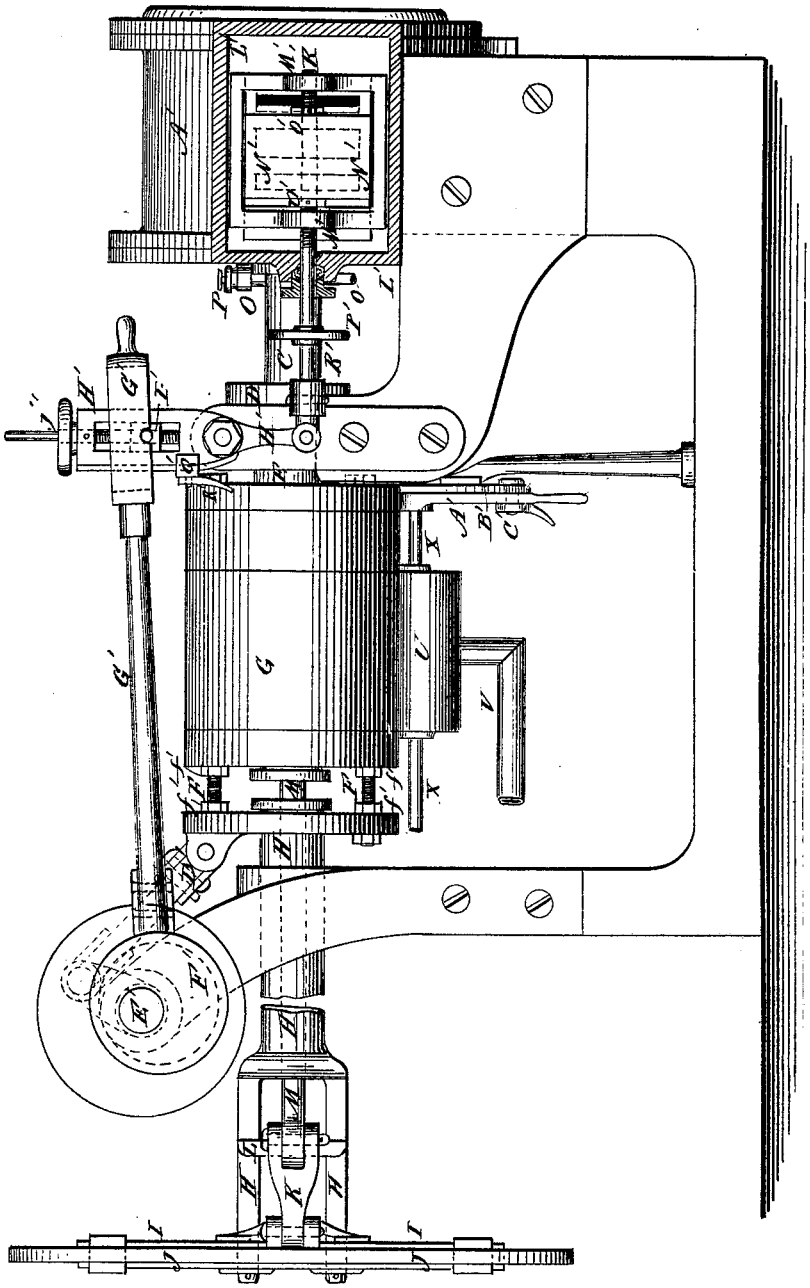

Fig. 1

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C. Sedgwick

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BY Munn & Co

ATTORNEYS.

3 Sheets—Sheet 2.

A. DEMO.

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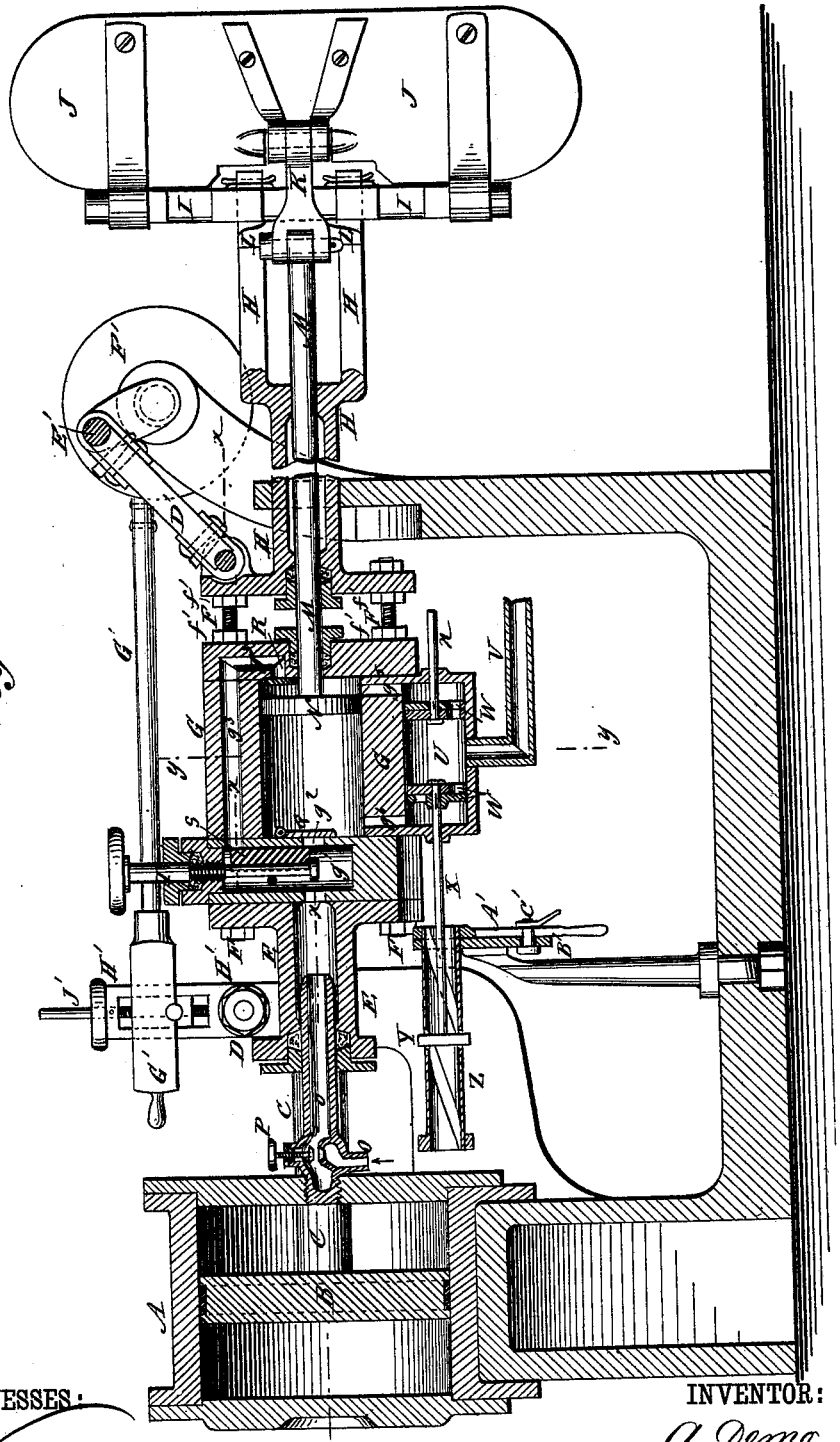

Fig. 2.

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3 Sheets—Sheet 3.

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No. 203,006. Patented April 30, 1878.

Fig. 4

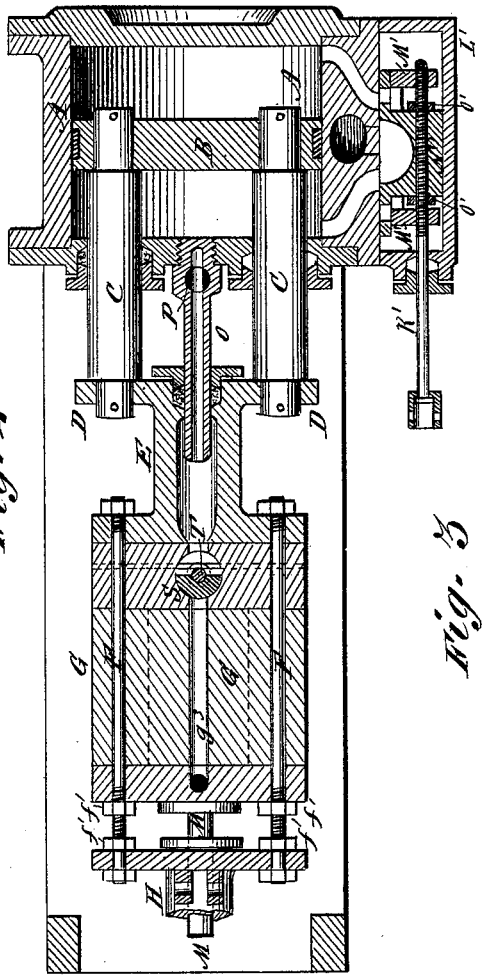


Fig. 5

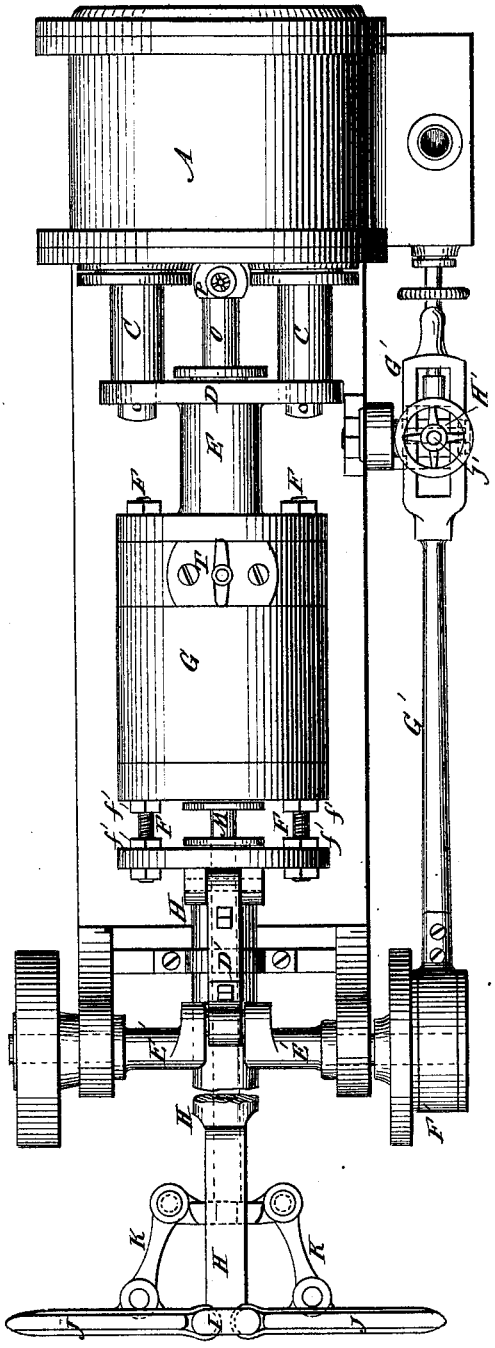
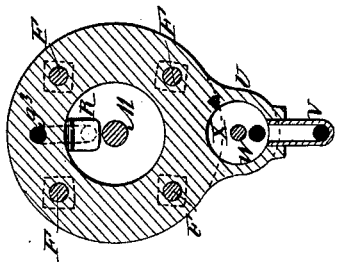


Fig. 5



WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

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UNITED STATES PATENT OFFICE.

ALBERT DEMO, OF CAMDEN, NEW JERSEY.

IMPROVEMENT IN MARINE ENGINES.

Specification forming part of Letters Patent No. **203,006**, dated April 30, 1878; application filed March 28, 1878.

To all whom it may concern:

Be it known that I, ALBERT DEMO, of Camden, in the county of Camden and State of New Jersey, have invented a new and useful Improvement in Marine Engines, of which the following is a specification:

In the accompanying drawings, forming part hereof, Figure 1, Sheet 1, is a view of my improved engine, the valve-chest being shown in section. Fig. 2, Sheet 2, is a longitudinal vertical section of the same. Fig. 3, Sheet 3, is a top view of the same. Fig. 4, Sheet 3, is a detail section taken through the broken line *x x x x*, Fig. 2. Fig. 5, Sheet 3, is a detail cross-section taken through the line *y y*, Fig. 2.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved marine engine which shall be so constructed that the paddle may be driven against the water to propel the boat with great force, and which will exert a lesser force when drawing the paddle back, and which shall be so constructed as to prevent the paddles closing too closely together when drawn forward, and to prevent them from opening more than at right angles with the line of stroke when forced back, and which at the same time will prevent any jar or hammering when the paddles reach the end of their movement in opening and closing.

The invention consists in the combination of the two piston-rods, the cross-head, the hollow rods, the secondary steam-cylinder, the vertical cross-head, the pivot-bars, and the wings with the steam-cylinder and its piston; in the combination of the steam-pipe, provided with a valve, with the steam-cylinder, the hollow rod, and the secondary steam-cylinder; in the combination of the chamber, the valves, the rods, provided with cross-heads upon their outer ends, and the spirally slotted or grooved tube.

A is a steam-cylinder, and B is its piston, which are constructed in the ordinary way. To the piston B, upon the opposite sides of and equally distant from its center, are attached two piston-rods, C, which pass out through stuffing-boxes in the head of the said cylinder, and their outer ends are attached to a cross-head, D. The cross-head D is attached to or formed upon the end of a hollow rod, E, upon the other end of which is formed a flange to receive the bolts F, which secure it to the secondary steam-cylinder G and the flanged end of the hollow rod H.

The bolts F are made longer than the length of the cylinder G, and are provided with jam-nuts f', so that the relative positions of the said cylinder G and the flanged ends of the hollow rods E H may be adjusted as required. The hollow rod H slides in bearings in some suitable support, and its rear end is slotted, and to it is attached the upright cross-head I, to which are hinged the wings or paddles J, that act upon the water.

To the forward sides of the wings J are pivoted the ends of the connecting-bars K, the other ends of which are pivoted to a cross-head, L, which works in the slot of the rod H, and is attached to the outer end of a rod, M. The rod M passes through the cavity of the hollow rod H, and to its forward end is attached the piston N of the secondary cylinder G.

In the center of the head of the main cylinder A is secured a steam-pipe, O, which is provided with a valve, P, to regulate the passage of the steam, and the outer end of which passes through a stuffing-box in the end of the hollow rod E. The cavity of the rod E communicates with the steam-chest g^1, formed in the end of the cylinder G, and from which ports g^2 and g^3 lead into the opposite ends of the said cylinder G, the ports g^3 passing through the shell of the said cylinder, as shown in Fig. 2. The ports g^2 g^3 are closed by two inwardly-opening valves, Q R.

S is a valve, placed in the valve-chest g^1 in such a position that it may be adjusted to close the inlet-openings of the ports g^2 g^3 more or less, as may be required, the said valve closing one of said ports as it opens the other.

To the valve S is swiveled a hand-screw, T, which passes in through a screw-hole in the top of the steam-chest d', so that the valve S may be conveniently adjusted to regulate the size of the inlet-ports g^2 g^3, as required.

By this construction steam may be admitted into the opposite ends of the cylinder G in such quantities as to cushion the piston N and

stop it at any desired point of its stroke, so that by regulating the admission of the steam the wings J may be allowed to nearly close as they move forward through the water, and may be prevented from opening farther than at right angles with the line of their stroke when moving back to propel the boat.

In case the vessel is to be backed, the valve S is adjusted so as to admit the larger quantity of steam through the port g^3 and the smaller quantity through the port g^2, so that the wings J can open at right angles when making the stroke, and may fold up when moving in the other direction through the water.

As the steam condenses in the cylinder G, the water of condensation passes through the ports g^4 g^5 into the chamber U, whence it passes out through the pipe V into the tank. In the chamber U, between the ports g^4 g^5 and the opening of the pipe V, are placed valves W, which are made double, one part sliding within the chamber without turning, and the other part being attached to the valve-stems X, so as to be turned by and with the said stems.

In the lower part of the stationary part of the valve W is formed an opening, and in the upper part of the movable part of said valves are formed corresponding openings.

The outer ends of the rods X have small cross-heads Y attached to them, which enter spiral grooves or slots in the guide-tubes Z, into which the outer ends of the said stems X enter. By this construction, as the cylinder G and its attachments move forward and back, the rods X are turned, by their cross-heads Y and the grooved tubes Z, so as to open and close the openings through the valves W, and thus allow the water of condensation to escape.

To one end of the tube Z is attached a lever, A′, which moves along the side of a stationary plate, B′. In the plate B′ is formed a curved slot, through which passes the bolt C′, which also passes through the lever A′, so that the said lever may be clamped in any desired position. By this construction, by adjusting the lever A′, the tube Z may be adjusted to open the valves W at any desired point of the stroke.

To the flange of the hollow rod H is pivoted a connecting-rod, D′, the other end of which is pivoted to a crank of the shaft E′. The shaft E′ works in bearings in some suitable support, and to it is attached an eccentric-wheel, F′, to which is connected, by an eccentric-strap, the end of the connecting-rod G′. The other end of the connecting-rod G′ is slotted to receive the lever H′, which is pivoted to some suitable support, and the upper part of which is slotted to receive the block I′, which has gudgeons formed upon its sides to enter notches in the lower edges of the slotted end of the rod G′, so that the said lever may be oscillated by the movement of the said rod G′.

The block I′ has a screw-hole formed through it to receive the hand-screw J′, which passes in through the upper end of the lever H′, so that by adjusting the said hand-screw the stroke of the lever H′ may be regulated as required.

To the lower end of the lever H′ is pivoted a coupling, to which is swiveled the end of the valve-stem K′. The valve-stem K′ passes through a stuffing-box in the valve-chest L′, and has screw-threads cut upon it, to fit into the screw-threads of the nuts M, formed upon or attached to the end parts of the valve N′.

To the valve-stem K′, at the opposite sides of the valve N′, are attached collars O′, to keep the said valve in position upon the inner part of the said stem. To the outer part of the valve-stem K′ is attached a hand-wheel, P′, so that by turning the said valve-stem K′ the valve N′ may be adjusted to admit more steam to either end of the cylinder A than to the other, as may be desired. By this arrangement more steam may be admitted to the cylinder to drive the piston with more force when moving in the direction to operate the paddle to propel the boat than when moving the said paddle in the opposite direction, when it encounters less resistance from the water; and in case it is desired to back the boat, by adjusting the valve N′ more steam may be admitted to the other end of the cylinder, so as to drive the paddle in the proper direction with more force.

By this construction all the adjustments required in controlling and reversing the engine may be made without stopping it.

To the side of the valve-lever H′ is attached, by means of a clamping-bolt, R′, a block, Q′, so that by loosening the said bolt R′ the block Q′ may be raised to support the slotted rod G′ above the gudgeons of the adjustable block I′, so that the said rod G′ and lever H′ may move independently of each other, for convenience in admitting steam to the cylinder A′ in harbors and other places where it is desired that the paddles should make but one or more strokes to enable the position of the vessel to be adjusted as required. When not required for use, the stop-block Q′ is lowered so as to be out of the way of the said rod G′.

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

1. The combination of the two piston-rods C, the cross-head D, the hollow rods E H, the secondary steam-cylinder G, the vertical cross-head I, the pivot-bars K, and the wings J with the steam-cylinder A and its piston B, substantially as herein shown and described.

2. The combination of the steam-pipe O, provided with the valve P, with the steam-cylinder A, the hollow rod E, and the secondary steam-cylinder G, substantially as herein shown and described.

3. The combination of the chamber U, the

valves W, the rods or stems X, provided with the cross-heads Y upon their outer ends, and the spirally slotted or grooved tube Z, with the secondary steam-cylinder G, substantially as herein shown and described.

4. The combination of the adjustable stop Q′ and its clamping-bolt R′ with the valve-lever H′ and the slotted connecting-rod G′, substantially as herein shown and described.

ALBERT DEMO.

Witnesses:
JAMES T. GRAHAM,
C. SEDGWICK.