

G. TITCOMB.

Improvement in Means for Propelling Vessels.

No. 130,455.

Patented Aug. 13, 1872.

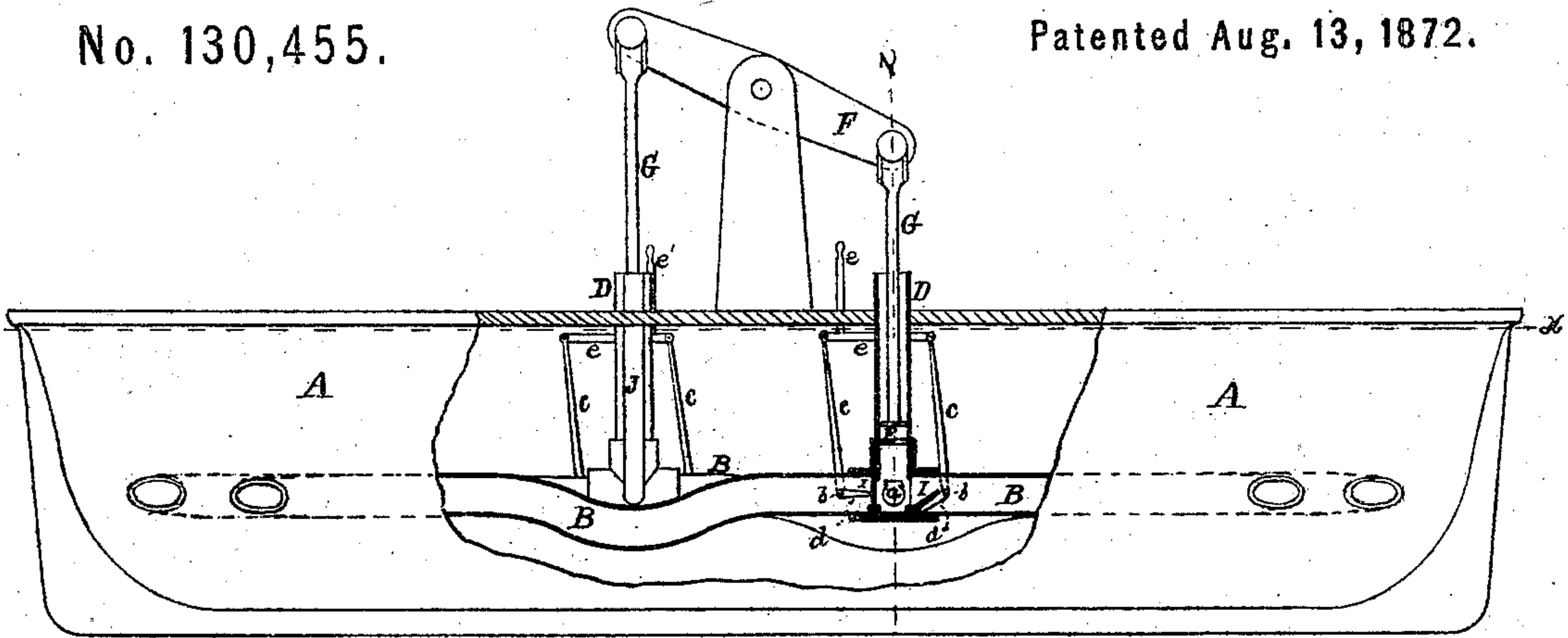


Fig. 1.

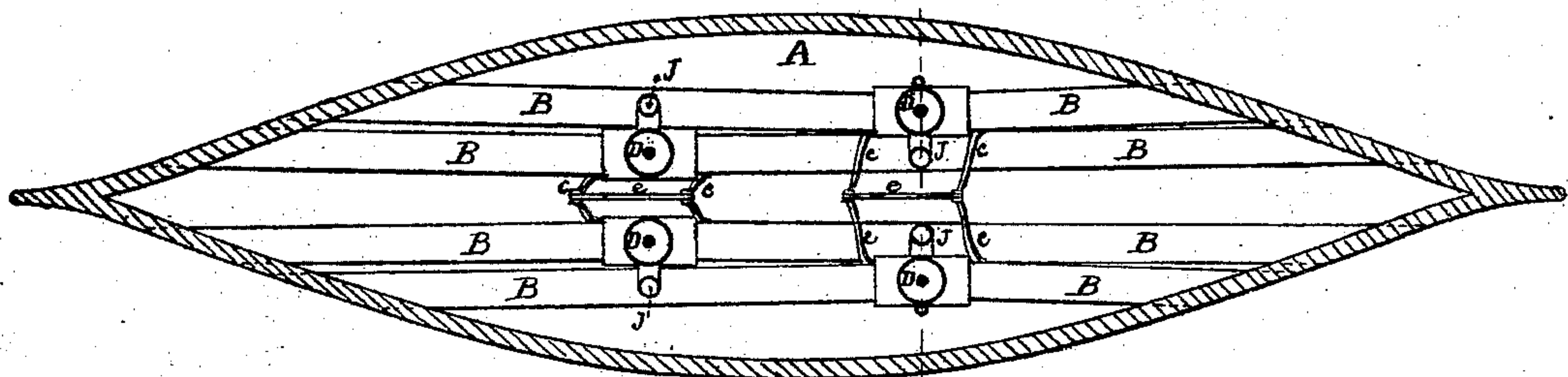


Fig. 2.

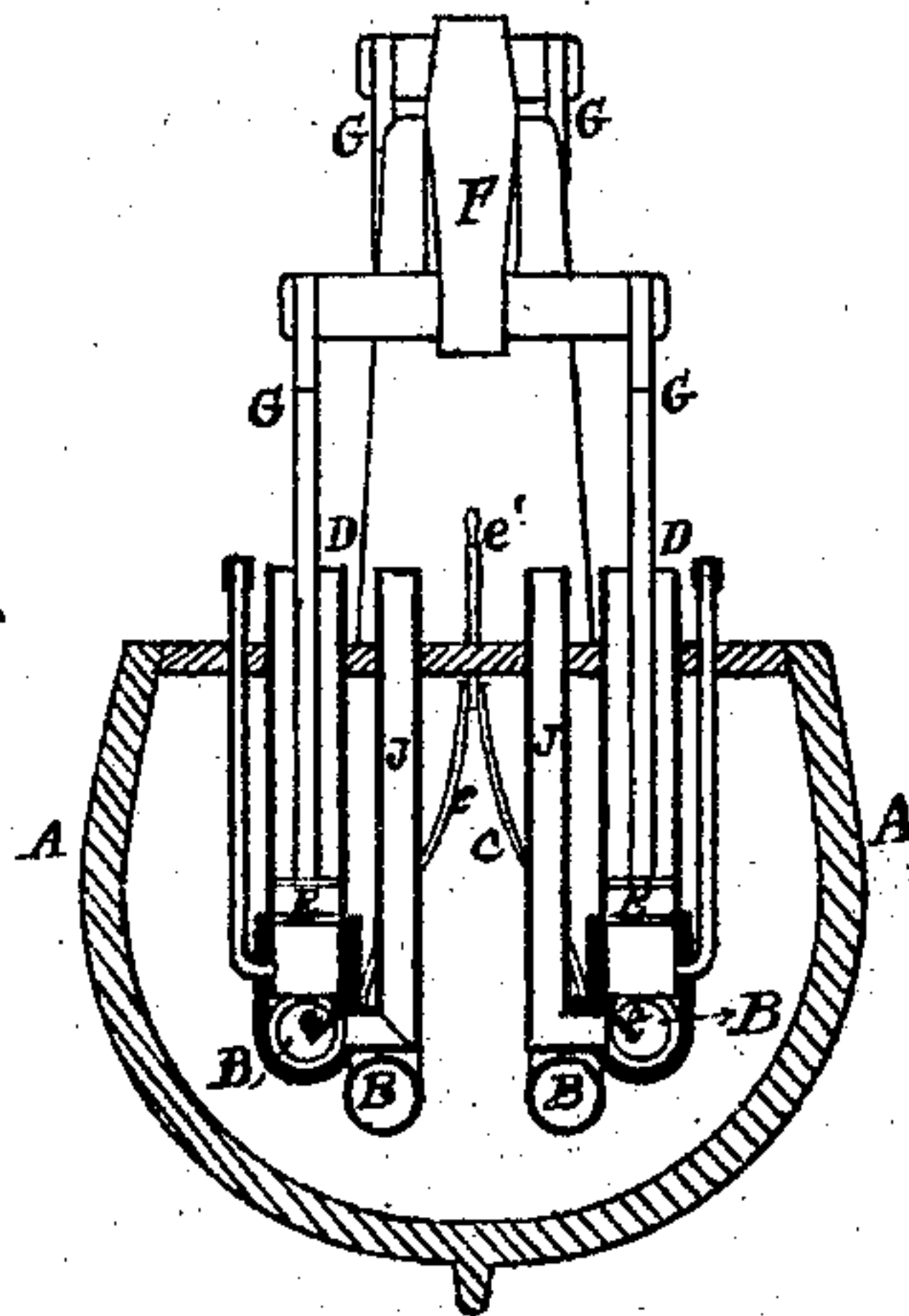


Fig. 3.

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IMPROVEMENT IN MEANS FOR PROPELLING VESSELS.

Specification forming part of Letters Patent No. 130,455, dated August 13, 1872.

To all persons to whom these presents may come:

Be it known that I, GEORGE TITCOMB, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Apparatus for the Propulsion of Navigable Vessels or Boats; and do hereby declare the following, taken in connection with the accompanying drawing, to be a specification of the said invention.

My invention relates to that class of propelling apparatus by which a vessel or boat is made to move in the water by the discharge of water below the water-line, and at either the bow or stern. My invention consists in the combination, in an apparatus for propelling vessels, of two pumps, two educts, and two eduction-valves, with two valve-locking mechanisms, the last so arranged as to enable them to be simultaneously operated, so that they shall alternately lock and unlock their respective valves according to the direction of the motion it is desired to impart to the vessel, all as hereinafter set forth.

With my propelling apparatus the boat is advanced or moved by the direct pressure of air against the water in an educt. I employ, in connection with the said single air-forcing pump and its educt to lead out of the stern, an auxiliary eduction-valve, and another educt or pipe to lead from the pump to and through the bow of the vessel or hull, and, with the two educts and the two eduction-valves, I employ to each valve a mechanism for locking or fastening it against its seat, so as to prevent it from being moved off such. I also so combine the two locking mechanisms as to enable them to be simultaneously operated, so as to move one into action with and the other out of action with respect to its valve.

From the within it will be seen that, with each pair of the eduction-pipes leading either out of the stern or bow, air will be driven out one pipe of the pair while water is flowing back into the other, the air being forced into them alternately. There is not a constant stream of air through each pipe but an intermittent one, so as to enable the water under hydrostatic pressure to flow into the pipe and against its closed eduction-valve during each intermission or period while air is not being forced by the pump into the pipe.

In carrying out my invention the air-pump to each eduction-pipe is to be of such a character as to force air into the pipe intermittently, as set forth, so as to allow back flowage of the water into such pipe, and against its eduction-valve during each intermission. To accomplish this I generally use a single air-forcing pump to each eduction-pipe leading out of the stern or out of the bow of the vessel and below the plane of flotation, but a double-acting forcing-pump may be so made and combined with two eduction-pipes leading from it either stern-wise or bow-wise, or with two leading from it bow-wise and two leading from it stern-wise, as, while in operation, to cause the air to be driven alternately into the pipes of each pair. When such a double-acting air-forcing pump—a pair of pipes leading stern-wise and another pair leading bow-wise—is used there should be a locking apparatus to each eduction-valve of such pump, in order that the eduction-valve of one pair of the pipes may be kept closed while the other pair of pipes may be used for propelling. Furthermore, I have an arrangement of two or more air-pumps, in which the pistons thereof are so connected with the driving mechanism that the piston in one cylinder shall make its upward stroke while the piston in another cylinder is making its downward stroke, the said pumps being arranged in pairs and provided with induction-pipes communicating with their lower ends and supplied with induction-valves. Furthermore, in the hold of the vessel, on each side of the keelson, and extending fore and aft through the hull, I arrange pipes having their outer ends communicating with the water outside of the vessel, each of said pipes being connected with one of said pump-cylinders provided with two eduction-valves opening outward from it into the pipe, and also being furnished with a locking mechanism to each eduction-valve.

Of the drawing, Figure 1 is a side elevation of a vessel embodying my improvements, with a portion of the hull broken away to show the arrangement of the pipes, cylinders, pistons, valves, &c. Fig. 2 is a horizontal longitudinal section on line *xx* on Fig. 1; and Fig. 3 is a vertical transverse section on line *zz* on Fig. 1.

In such drawing, A denotes the hull of a

vessel of ordinary construction, in the hold of which are arranged two, four, or more horizontal pipes, B B, extending fore and aft on either side of the keelson, the open ends of which protrude or open through the hull and communicate with the water outside of the vessel, both forward and aft. At their open ends the pipes may be enlarged, or be bell-shaped, or be provided with flaring mouths to facilitate the egress and ingress of water; and, where the pipes join to the cylinders of the air-pumps, such pipes may be enlarged or bell-mouthed. D D are single-acting air-forcing pump-cylinders, two, four, or more of which may be used. Each, arranged as shown, communicates with two of the horizontal educts or pipes B B, extended in opposite directions from it, and is fitted with a piston, E, connected by suitable means with a "walking-beam," F, or by a connecting-rod, G, applied to the two in a proper manner. These air-pumps, as shown in the drawing, are arranged in pairs, one half the number used being worked from each end of the "walking-beam," which may be operated by a steam-engine or other proper motor. The pipes B B to each air-pump are provided with two valves, I I, which I call "eduction-valves," to distinguish them from the other or induction-valves, such eduction-valves being located at opposite sides of the pump-cylinder, and opening outward therefrom, and being so arranged that they will be closed by the pressure of the water in the pipes, so as to prevent the water from entering the cylinder. One only of said eduction-valves of each pump-cylinder is in operation at the same time, the other being closed and locked by its locking mechanism. J J are air-induction pipes, one to each pump-cylinder, with which their lower ends communicate, their upper ends being open to the atmosphere outside of the vessel. Each of these air-pipes is provided with an induction-valve, *a*, which opens into the chamber or pump space between the two eduction-valves and under the piston of the air-pump. In the pipes B B, just outside of the valves I I, are placed short rocker-shafts *b* in a horizontal position transversely across said pipes, each of such shafts being extended through a stuffing-box at the side of the pipe, and being secured to a lever, *c*. Inside of the pipe B, and secured to such rocker-shaft *b*, is a toe or arm, *d*, so arranged that when it is brought into a horizontal position, it will close the valve and securely lock it in its vertical position. The levers *c* of the eduction-valves of each pump are connected together at their upper ends by a link or bar, *e*, to which is connected the shipper-handle *e'*. The drawing also shows two pairs of such levers connected by a single bar, *e*, provided with a handle, *e'*. The operation of my improved apparatus is

as follows: The shipper-handles *e* being so moved as to cause all the water-valves toward one end of the vessel to be unlocked, and all those toward the other end to be locked, if the "walking-beam" F be put in motion so as to raise the pistons connected with one end of said beam, the water-valves I of the cylinders of such pistons will be closed by the pressure of the water in their pipes B B. At the same time the air or pneumatic valves *a* will be opened by the pressure of the air in the air-pipes J J, and the air will rush into the pump-cylinders. During descent of the pistons the pneumatic valve *a* of each of their barrels will be closed, and the water-valve I of such barrel will be opened by the pressure of the air in the cylinder and the column of air will rush through the opening of the seat of the valve I and against the column of water in the pipe B, the same expelling the water from the pipe, and as a consequence causing the hull or vessel to be propelled through the water. On the elevation of each piston the eduction-valve will be closed, and the water under hydrostatic pressure will be driven back into the eduction-pipe, and with great force against the eduction-valve.

Precisely the same results are produced in the pumps and pipes connected with the opposite end of the "walking-beam" during the rise and fall of such end; but the motions alternate with the motions just described in such a manner that water is being discharged under the stern or the bow of the boat below the water-line all the time, thereby propelling the boat at a uniform speed.

When it may be desired to reverse the motion of the vessel or back her, the shipper-handles *e'* are to be moved to the opposite limit of motion. This closes and locks the water-valves previously opened, and unlocks those that were closed. The pneumatic action of the pumps will next cause the water to be discharged at the bow of the boat, and the boat will be made to go backward.

Having thus fully set forth the construction and operation of my improved propelling apparatus, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In an apparatus for propelling vessels, the combination and arrangement in the manner described, of the force-pumps D D, educts B B, eduction-valves I I and their valve-locking mechanisms, all constructed and operating as and for the purpose set forth.

2. The valve-locking mechanism, constructed and operating as specified.

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Witnesses:

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