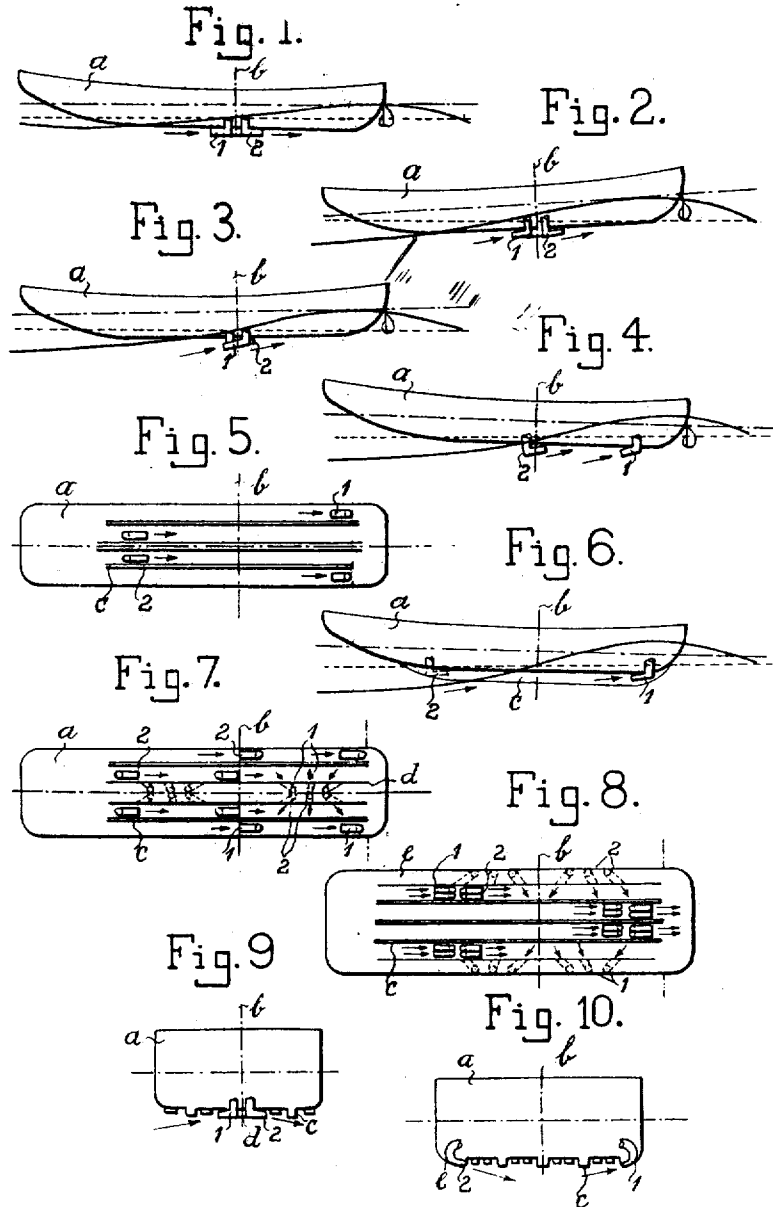


F. JENSEN.
WATER CURRENT PROPULSION FOR VESSELS.
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Witnesses:
H. J. Hamburger
C. J. Duffin

Inventor,
Frantz Jensen,

By *D. Singer*
Attorney.

UNITED STATES PATENT OFFICE.

FRANTZ JENSEN, OF COPENHAGEN, DENMARK.

WATER-CURRENT PROPULSION FOR VESSELS.

1.023,205.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANTZ JENSEN, engineer, a subject of the King of Denmark, and a resident of Sect. Paulsgade 5, Copenhagen, in the Kingdom of Denmark, have invented certain new and useful Water-Current Propulsion for Vessels, of which the following is a specification.

My invention relates to the propulsion of boats by means of water currents derived by suction of the water by tubes disposed below the water-line and forcing the same from tubes, also below the water-line, whereby the effect of the suction and impact of the water forced from the tube against the undisturbed volume of water causes the boat to move in an opposite direction to that in which the water current issues from the tube.

The objects of my invention are to provide for the propulsion of boats by means of in-drawn and discharged water currents, below the water line, in such a manner that the inlet tubes are directed to reduce resistance to the forward movement of the boat and the suction which occurs at the stern of the boat during movement thereof.

A further object of my invention is to divide the in-drawn and discharged currents and confine them between keel-like structures in order to increase their propelling effect.

Other objects of my invention will be more fully described in connection with the accompanying drawing, in which,—

Figures 1 to 4 inclusive, illustrate boats embodying my invention and diagrammatic representations of the action of the in-drawn and discharged water currents of the tubes upon the proximate water volume. Fig. 5 is a bottom plan view of a boat embodying my invention and showing keels adapted to separate the in-drawn and discharged water currents. Fig. 6 is a side elevation of the same and showing, diagrammatically, the effect of the currents upon the proximate water volume. Figs. 7 and 8 are bottom plan views of boats embodying my invention and showing means for steering the boat by current tubes. Figs. 9 and 10 are cross sectional views of the boats illustrated in Figs. 7 and 8 respectively.

Similar reference characters refer to similar parts throughout the several views.

With reference to Figs. 1 and 2, *a* represents a boat having a substantially flat bot-

tom. The broken lines indicated at *b* represent a vertical line drawn through approximately the center of gravity of the boat. At each side of this line *b* is disposed an inlet tube 1, hereafter termed a suction tube and an exhaust tube 2, both suitably connected to a pump, or similar means for producing a current of water under pressure, carried within the boat not shown in the drawings.

The suction tube 1, as shown, is slightly inclined downwardly and projects in the direction of the bow of the boat, while the exhaust tube is inclined upwardly, the discharged current striking the underside of the boat and flowing in the direction of the stern. According to the degree of inclination of the tubes with the horizontal line of the boat, the riding surface of the body of water upon which the boat is traveling will be effective as indicated diagrammatically in the views. The greater the angle between the horizontal and the axes of the discharge portion of the outlet tubes, the higher the bow will rise out of the water. This action is due to the suction in the forward direction of the boat, and the exhaust toward the rear and the disposition of the tubes with respect to the vertical axis of symmetry indicated at *b*.

In Fig. 3 the suction tube and exhaust tube are shown transposed with regard to the entrance of the tubes into the boat and the vertical line *b*, but in which the effect of the water current as a means of propulsion is substantially the same as that described in connection with Figs. 1 and 2.

In Fig. 4 the suction tube is shown near the stern of the boat but also opening to draw the water current from the forward direction of the boat, the effect here being to raise the bow high out of the water to reduce the resistance at that end.

With reference to Figs. 5 and 6, the inlet and outlet currents are separated by providing a plurality of keel-like structures *c* which separate the suction and exhaust currents and by which the power of the currents is increased by being confined between the structures *c* and the bottom of the boat. By this constructure also, no rudder is necessary, the steering of the boat being accomplished by either reducing the current on the side to which the boat is to turn, or by increasing the current on the opposite side thereof.

In order to provide for rapid lateral

movement of the boat, desirable especially in connection with battle-ships, I may provide, as shown in Figs. 7 and 9, a central keel-like structure *d* provided with suction and exhaust tubes projecting at angles laterally thereof and preferably arranged symmetrically with respect to the approximate vertical axis of symmetry *b* of the boat. The current is drawn in from one side of the boat and exhausted at the other side as indicated by arrows with the result, that a rapid turning or sidewise movement may be accomplished by the tubes projecting from the structures *d*.

In the form shown in Figs. 8 and 10, the tubes for lateral movement are carried by outer keel-like structures *c*, while the propelling tubes are separated by a keel-like structure *c*, as before described. With particular reference to Fig. 10, it will be seen that the current is directed by the exhaust and suction tubes to flow below the structures *c* in order to increase the turning power thereof.

It is of course understood that any, or all of the tubes may be provided with means for either swinging the same in a horizontal or a vertical plane, or both, whereby steering of the boat will be facilitated or the effect of the tubes upon the gliding surface of the water changed in the manner shown in Figs. 1, 2, 3, 4 and 6 by the heavy curved lines.

I claim:

1. In the propulsion of boats, the combination with means for producing a current of water under pressure, of an inlet tube therefor extending from the boat and having the axis of its intake portion directed downwardly and toward the bow of the boat and below the water line thereof, and an exhaust tube for said means having the axis of its discharge portion directed upwardly toward the bottom of the boat and in the direction of the stern thereof.

2. In the propulsion of boats, the combination with means for producing a current of water under pressure, of a plurality of inlet tubes therefor extending from the boat and having the axes of their intake portions directed downwardly and toward the bow of the boat and below the water line thereof, and a plurality of exhaust tubes for said means having the axes of their discharge portions directed upwardly toward the bottom of the boat and in the direction of the stern thereof.

3. In the propulsion of boats, the combination with means for producing a current of water under pressure, of an inlet tube therefor extending from the boat and having the axis of its intake portion directed downwardly toward the bow of the boat, an exhaust tube for said means having the axis of its discharge portion directed upwardly toward the bottom of the boat and in the

direction of the stern thereof, and a keel-like structure separating said inlet and exhaust tubes whereby the concurring currents are separated one from another.

4. In the propulsion of boats, the combination with means for producing a current of water under pressure, of a plurality of inlet tubes therefor extending from the boat and having the axes of their intake portions directed downwardly and toward the bow of the boat, a plurality of exhaust tubes for said means having the axes of their discharge portions directed upwardly toward the bottom of the boat and in the direction of the stern thereof, and a plurality of keel-like structures separating said inlet and exhaust tubes whereby the concurring currents are separated one from another.

5. In the propulsion of boats, the combination with means for producing a current of water under pressure, of an inlet means therefor having its intake portion directed toward the bow of the boat, an exhaust means for said current producing means having its discharge portion directed toward the stern of the boat, and a keel-like structure separating said inlet and exhaust means whereby the concurring currents are separated one from another.

6. In the propulsion of boats, the combination with means for producing a current of water under pressure, of a plurality of inlet members therefor having their intake portions directed toward the bow of the boat, a plurality of exhaust members for said current producing means having their discharge portions directed toward the stern of the boat, and a plurality of keel-like structures separating said inlet and exhaust means whereby the concurring currents are separated one from another.

7. In the propulsion of boats, the combination with means for producing a current of water under pressure, of an inlet tube therefor extending from the boat and directed toward the bow of the boat and below the water line thereof, and an exhaust tube for said means having the axis of its discharge portion directed upwardly toward the bottom of the boat and in the direction of the stern thereof.

8. In the propulsion of boats, the combination with means for producing a current of water under pressure, of a plurality of inlet tubes therefor extending from the boat and directed toward the bow thereof and below the water line, and a plurality of exhaust tubes for said means having the axes of their discharge portion directed upwardly toward the bottom of the boat and in the direction of the stern thereof.

9. In the propulsion of boats, the combination with means for producing a current of water under pressure, of an inlet tube therefor extending from the boat and di-

rected toward the bow thereof, an exhaust tube having the axis of its discharge portion directed upwardly toward the bottom of the boat and in the direction of the stern thereof, and a keel-like structure separating said inlet and exhaust tubes whereby the concurring currents are separated one from another.

10. In the propulsion of boats, the combination with means for producing a current of water under pressure, of a plurality of inlet tubes therefor extending from the boat and directed toward the bow thereof, a plu-

ality of exhaust tubes for said means having the axes of their discharge portion directed upwardly toward the bottom of the boat and in the direction of the stern thereof, and a plurality of keel-like structures separating said inlet and exhaust tubes whereby the concurring currents are separated one from another.

In testimony whereof I affix my signature.

FRANTZ JENSEN.

In the presence of—

BERNH. LARSEN,
GEORG V. NOELSEN.