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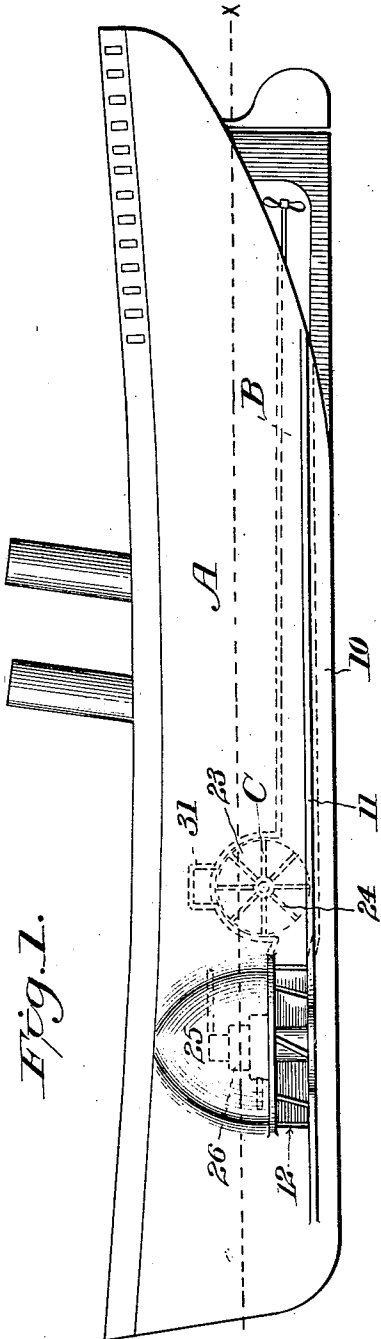
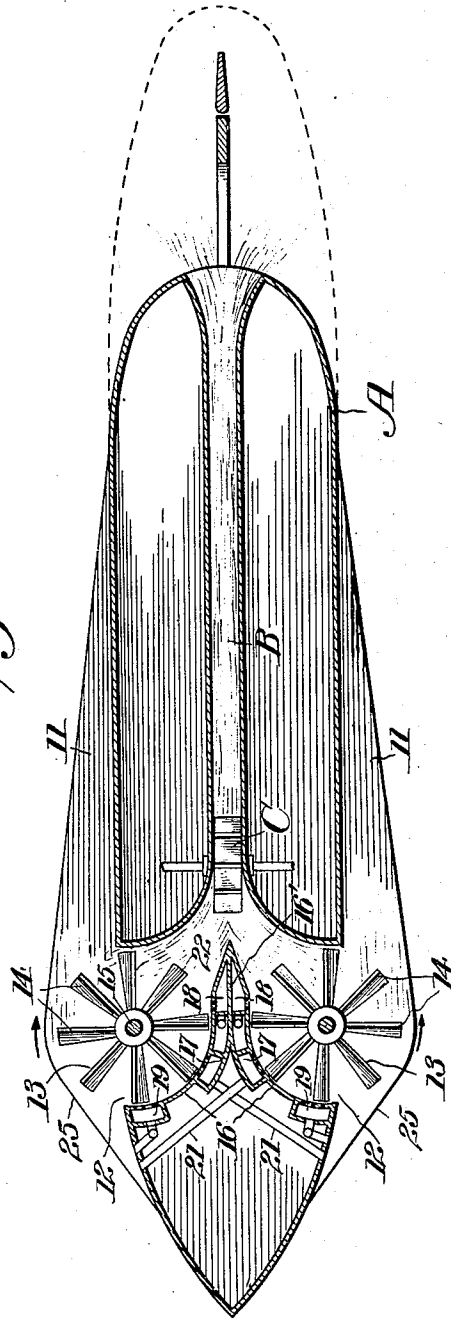


Fig. 1.

WITNESSES

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Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

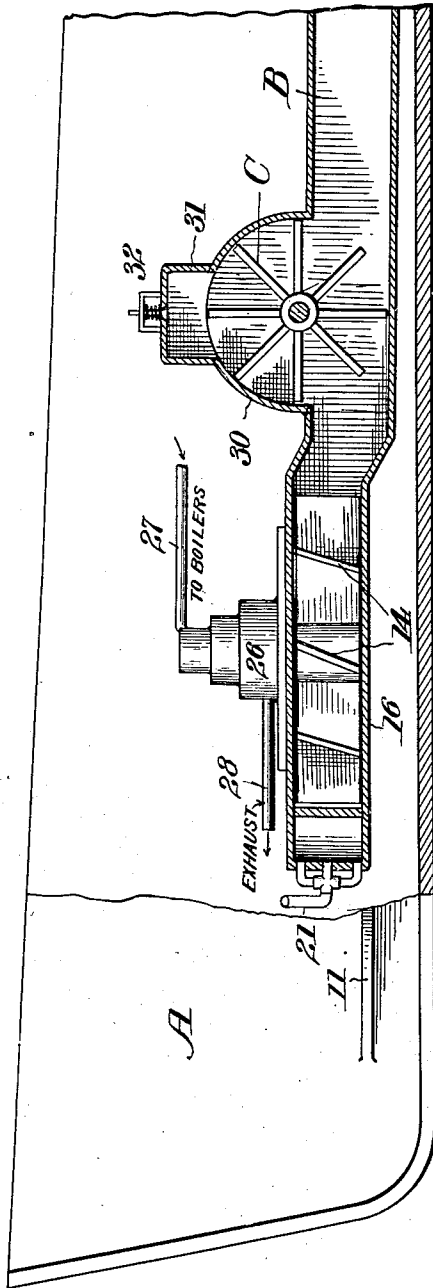


Fig. 5.

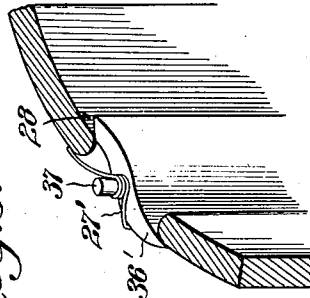
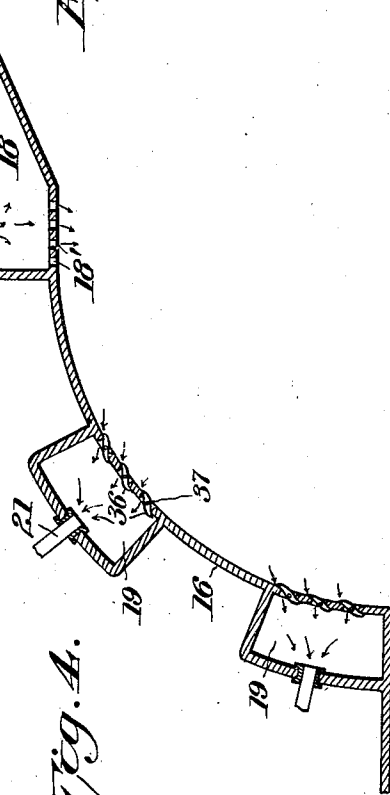


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES F. HILDEN, OF OAKLAND, CALIFORNIA.

BOAT-PROPELLING MEANS.

1,050,458.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed July 20, 1912. Serial No. 710,596.

To all whom it may concern:

Be it known that I, CHARLES F. HILDEN, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Boat-Propelling Means, of which the following is a specification.

My invention relates essentially to certain new and useful improvements in means for propelling ships and increasing the speed thereof and for controlling the ship by increasing the propelling and directing force, combined with means for facilitating the discharge through the stern of the ship of the water displaced by suitable side propellers.

With the above and other objects in view my invention consists of the parts, and the constructions, arrangements and combinations of parts which I will hereinafter describe and claim.

In the accompanying drawings forming part of this specification and in which similar reference characters indicate like parts in the several views, Figure 1 is a side view of a ship embodying the salient features of my invention. Fig. 2 is a horizontal sectional view on the line X—X of Fig. 1. Fig. 3 is an enlarged part section and part elevation of the forward end of the ship showing one of the side propellers and the propeller in rear thereof for accelerating the discharge of water through the ship to the stern thereof. Fig. 4 is an enlarged detail in horizontal section of a part of the compartment casing in which a side propeller operates. Fig. 5 is a detail showing a valve for exhausting air from the chamber in which the side propeller operates.

In carrying out my invention I wish it understood that the essential features thereof and which I will hereinafter describe, are applicable to any design and size of vessel; for the purpose of illustration I have shown in Fig. 1 a representation of a liner, supplied with the improved means for increasing the speed of and controlling the propelling and directing force of the ship.

The ship, A, may be of any design and of any modern construction and will be supplied with such accessories as a modern ship requires, said ship being constructed with the central keel, 10, and having its outer sides slightly above the keel, formed with outwardly extending horizontal flanges, 11,

which form side-keels for steadying the vessel and reducing the rocking motion thereof, to a minimum, said side-keels also forming guards or protectors for the side propellers which latter preferably do not project beyond said side-keels.

Near the bow end of the vessel, the sides thereof are provided with suitable openings, 12, through each of which operates a suitable horizontally rotatable propeller, 13; these propellers may be of any suitable and approved construction and of such diameter as the size and desired speed of the vessel may require, and each propeller will be supplied with suitable downwardly pitched blades or vanes, 14, and a hub adapted to receive a vertical shaft, 15, which is designed to be positively rotated by an engine or suitable motor appropriately placed within the vessel, and which engine or motor is not shown as it forms no essential part of the present invention, it being understood that the vertical shafts may be coupled in any desired manner to any suitable driving mechanism and that the propellers, 13, of which there shall be one or more at each side of the bow end of the vessel, are to be independently coupled to the engine so that either or both of the propellers may be operated in opposite directions, as when the ship is to be propelled in a straight course, in one direction, or that one of the propellers may be operated in a direction opposite to that of the other, as when it is desired to quickly change the course of the vessel. In other words these propellers may also serve to assist in the maneuvering and mooring of the vessel by changing the direction of rotation of the propellers, and the means which may be employed for this purpose may be of any usual construction.

The propellers, 13, are placed at diametrically opposite sides of the vessel and they are designed to operate within suitable housings or casings, 16, whose inner walls are concentric with the circle described by the outer ends of the propeller blades, the said casings or housings being of any well known and appropriate construction and being, preferably, divided into compartments, 18—19, by means of transverse partitions, 17.

Certain of the compartments of the housings or casings are designed as air chambers and to this end, an air pipe, 20, from some suitable source, under pressure or not, is shown in Fig. 4, as entering the chamber,

18, and delivering air thereto, the inner wall of this chamber being perforated or provided with openings, 18' through which the air escapes into the inner portion of the chamber in which the propeller rotates, the air thus admitted being primarily for the purpose of preventing the formation of a vacuum, or seal in the chamber in that part thereof in which the inner half of the propeller operates and from which chamber it is desired to exclude, as much as possible, the water taken out by the outer half of the propeller and thrown inwardly during the operation of the propellers.

The compartments, 19, before mentioned have their inner surfaces connecting by suitable openings with the interior of the chambers in which the propellers operate, and the air admitted to these chambers from the chambers, 18, is exhausted through the openings in the chambers, 19, as the propeller blades successively pass the latter chambers, the air finally escaping to the atmosphere through suitable pipes or outlets, 21, leading through the side of the vessel near the bow-end, or to such other point as may be desired and found most convenient in the actual construction of the vessel.

The compartment casings or housings, 16, in which the inner portions of the propellers operate are extended rearwardly for a short distance and are tapered to form a dividing wall, 16', at the rear end, the casings at each side of the vessel being of similar construction and the propellers being of similar arrangement and being designed to pick up the water and force the same inwardly from each side of the vessel and deliver the water into a rearwardly converging chamber, 22, which in turn communicates with the front end of a tunnel or passage, B, leading straightway through the vessel to the stern end thereof, and through which tunnel or passage the water drawn in by the propellers during their operation is delivered under such velocity as may be desired to facilitate the discharge of the water through the tunnel or passage and to promote the speed of the vessel. To accelerate the flow of the water through this passage, B, whereby the water may be delivered at the stern end of the vessel under some considerable head or velocity to thereby assist the propellers in their propelling function, I mount within the forward end of the tunnel or passage just back of the chamber, 22, into which the side propellers deliver the water, a vertically rotatable propeller, C, the lower portion of which extends across the tunnel or passageway and whose blades or vanes, 24, operate upon this moving column of water to accelerate the flow thereof through the tunnel or passage, B, and the discharge of the same at the stern-end thereof, said vertically rotatable propeller being adapted

to be positively driven in any suitable manner, either independent of or in conjunction with the propellers, 13.

As the means for connecting the various propellers to any particular operating mechanism form no part of the present invention, there has been no attempt to show any particular connection for the purpose, it being understood that any modern driving mechanism and any desired type of motor or engine may be used and suitably connected to the shafts of the horizontally and vertically rotatable propellers for giving motion to these parts in any desired direction, and for rotating these propellers at the same or at different speeds. As a matter of fact the vertically rotatable propeller, 23, I prefer to rotate at a speed in excess of that of the propellers, 13, so that the column of water in the tunnel or passageway may have its flow greatly accelerated to insure of the proper handling and discharge of the water thrown into the center of the vessel by the positively rotating side propellers, 13.

As shown in Figs. 1 and 2, the side propellers, 13, lie adjacent to and are protected by the horizontal side-keels, 11, said propellers being, also, interposed between the said side keels and the lower sides of segmental housings, 25, secured on the outer sides of the vessel, in which housing may be located, if desired, any well known form of steam turbine shown generally at 26 having a steam pipe, 27, leading to the boilers of the vessel, the turbine having an exhaust pipe, 28, for carrying off the exhaust, in any suitable manner. The inner walls of the exhaust chambers, 19, of the compartment casings or housings, 16, may have their inlet openings controlled by one or more valves, 36, which may be operated in any suitable manner. For instance, in Fig. 4, I show a series of valves or vanes pivotally mounted at their centers upon pintles, 37, these valves or blades being arranged substantially similar to the pivoted slats of a window shutter or the like, so that the valves may swing upon their pintles to open more or less of the area of the inlet openings which they control. The valves have their opposite ends adapted to seat against the casing at each side of the opening controlled by the valve, and the valves may be provided with springs, 27', so arranged that as a valve is opened by the pressure of air in the chamber in which the propeller operates, the spring will yield to allow the valve to open, and when the pressure of air in this chamber is reduced below that of the pressure of the spring, the said spring will react to close the valve and thus shut off communication between the propeller chamber and the exhaust chamber. Each exhaust chamber may be provided with a plurality of valves, as shown in Fig. 4, or there may be

a single valve, 36', for each chamber, as shown in Fig. 5, and the valves, if a plurality are used, may be connected in any suitable manner so as to operate either independently or in series.

The inner ends of the valves or blades project slightly beyond the inner circumference of the chamber in which the propeller operates whereby a pocket is formed at the intersection of the wall of said chamber and the inner end of the valve or blade, as shown at 28 in Fig. 5, whereby the air admitted to the propeller chamber and carried forward therein by the propeller blade will be forced into the pocket, 28, and will re-act against the outer end of the valve or blade and cause said valve or blade to swing about its pintle and thereby uncover the opening leading to the exhaust chamber, 19, to permit the air to be exhausted into this latter chamber and finally escape through the exhaust pipe, 21. The casing, 30, in which the vertically rotatable propeller, 23, operates, has an extension at its upper end forming an air chamber, 31, and in order to supply air to this chamber to prevent the formation of a vacuum therein, due to the rotation of the propeller blades, in their rapid movement through the casing, I mount within this air chamber a suitable valve, 32, which will open automatically when the suction within the chamber overbalances the pressure of the spring with which the valve is supplied whereby air passes the valve and enters the chamber and prevents the formation of a vacuum in that part of the chamber in which the upper portion of the propeller, 23, operates. This construction also prevents the water being carried around through the chamber by the propeller blades, and consequently reduces to a minimum the force or resistance of the reactionary dead water which would otherwise be carried around the chamber by the propeller blades.

From the foregoing it will be understood that my invention comprehends and includes a combination of side propellers operating in a housing, to which air may be admitted in any suitable manner to prevent the formation of a vacuum in that part of the housing in which the inner portion of the propellers operate and whereby the presence of this air in this part of the housing excludes the water by preventing the water being carried around through the housing by the propeller, and a third propeller located at the forward end of a tunnel or passageway formed through the vessel and opening at the stern thereof, the third propeller being adapted to operate upon the moving column of water delivered from the side propellers and to accelerate the flow of this column through the tunnel

or passageway and its delivery at the stern of the vessel, the combination producing an effective means for propelling a ship and increasing the speed and control of the ship at an economical expenditure of power and a minimum fuel consumption.

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

1. In a propelling means for a ship, the combination of propellers mounted in the sides of the ship near the bow end and horizontally rotatable, a chamber in the central portion of the ship into which the propellers discharge, a tunnel or passageway extending through the ship and opening through the stern thereof, and a propeller mounted in the inlet of said tunnel or passageway adapted to act upon the column of water discharged by the side propellers and deliver the same at an accelerated speed through the tunnel and through the stern outlet thereof.

2. In a propelling means for a ship, the combination of horizontally rotatable propellers mounted in the sides of the ship near the bow end thereof, said ship having openings through which a portion of the propellers project outside the ship, a tunnel or passageway extending longitudinally through the central portion of the ship having its inlet end positioned adjacent the propellers and adapted to receive the water delivered from the latter, and means in the tunnel or passageway operating upon the column of water therein for accelerating the travel of the water and delivery of the same through the stern of the ship.

3. In a propelling means for a ship, the combination of horizontally rotatable propellers mounted in the sides of the ship near the bow end thereof, said ship having openings through which a portion of the propeller projects outside the ship, a tunnel or passageway extending longitudinally through the central portion of the ship having its inlet end positioned adjacent the propellers and adapted to receive the water delivered from the latter, means in the tunnel or passageway operating upon the column of water therein for accelerating the travel of the water and delivery of the same through the stern of the ship, and segmental casings in which the inner portions of the propellers operate, said casings having compartments, one of said compartments having an air inlet for admitting air to the inner portions of the casings, one of said compartments forming an exhaust chamber and having means for conducting the air from said chamber.

4. In a propeller means for a ship, the combination of horizontally rotatable propellers mounted in the sides of the ship near the bow end thereof, said ship having open-

ings through which a portion of the propeller projects outside the ship, a tunnel or passageway extending longitudinally through the central portion of the ship having its inlet end positioned adjacent the propellers and adapted to receive the water delivered from the latter, and means in the tunnel or passageway operating upon the column of water therein for accelerating the travel of the water and delivery of the same through the stern of the ship, and segmental casings in which the inner portions of the propellers operate said casings having compartments, one of said compartments having an air inlet for admitting air to the inner portions of the casings, and one of said compartments forming an exhaust chamber and having means for conducting the air from said chamber, said exhaust chamber having an exhaust inlet, a pivoted valve controlling said inlet and adapted to be automatically opened by the pressure of air in the chamber, said valve having a spring which reacts to close the valve when the air pressure in the chamber is reduced.

5. In a propelling means for a ship, the combination of side propellers rotatable in a horizontal plane, a tunnel or passageway extending longitudinally through the ship having its inlet adjacent the propellers, whereby the water delivered from the propellers is directed into the tunnel, a vertically rotatable propeller operating in said

tunnel to accelerate the flow of water there-through, said tunnel delivering at the stern end of the ship, a casing in which the vertically rotatable propeller operates, and an air chamber formed in the casing having a valve which automatically operates to admit air to the casing to relieve a suction therein and to prevent water from being carried through the casing by the propellers.

6. The combination with a ship having horizontally projecting keels at the sides, said ship having openings in its sides above said keels, propellers mounted in said openings and horizontally rotatable therein, a chamber in the central portion of the ship into which the propellers discharge, a tunnel or passageway extending through the ship and opening through the stern thereof, means in said tunnel or passageway operating upon the column of water therein for accelerating the travel of the water through the tunnel and the delivery of the water through the rear end thereof, and segmental casings on the outside of the ship and projecting outwardly therefrom and overlying the exposed portions of the propellers, and serving as guards for said propellers.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. HILDEN.

Witnesses:

T. W. FOWLER,
C. W. FOWLER.