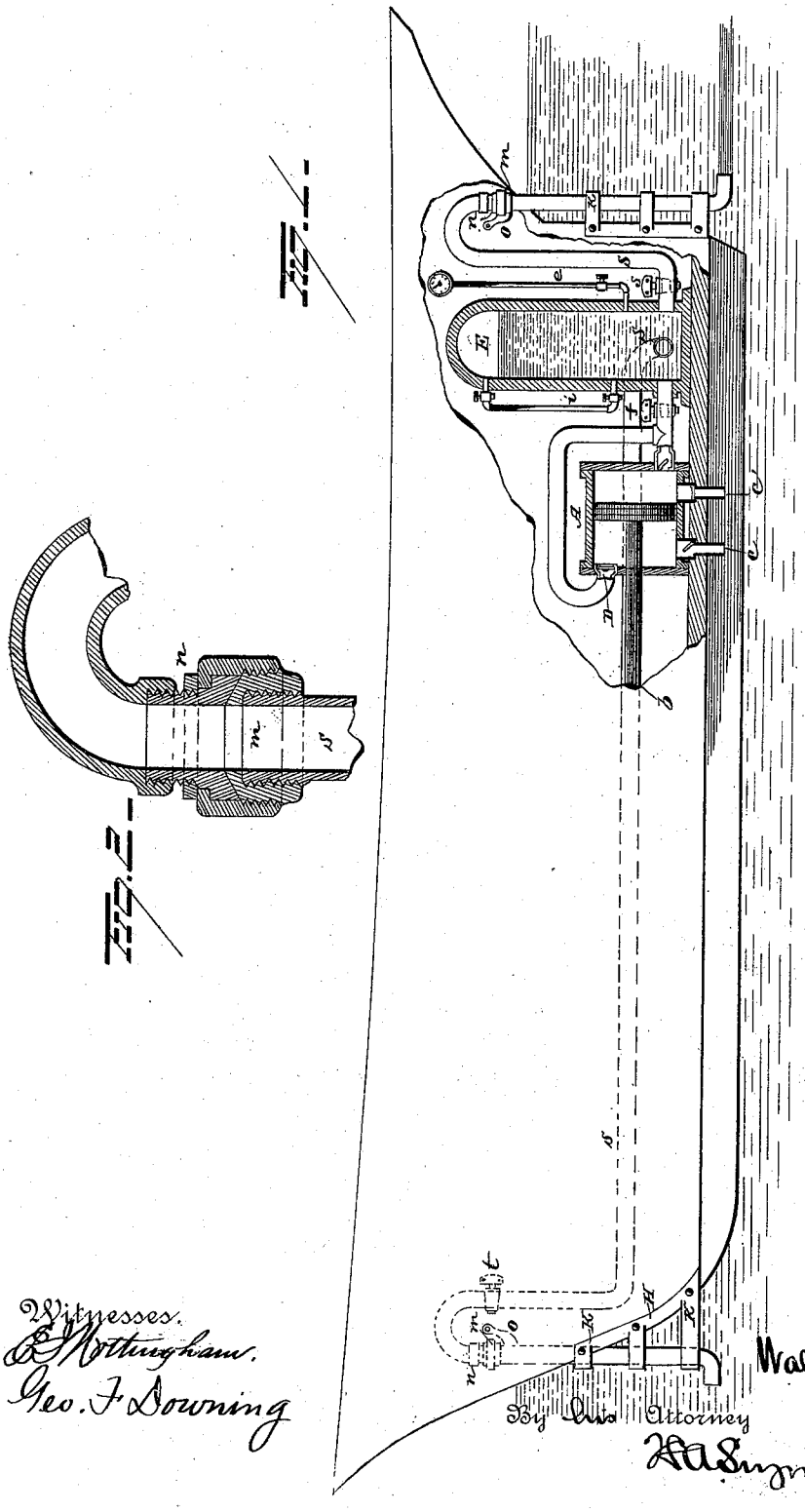
(No Model.)

W. M. JACKSON.

MARINE PROPULSION.

No. 385,183. Patented June 26, 1888.



Witnesses.
E. Nottingham.
Geo. F. Downing

Inventor.
Walter M. Jackson,
By his Attorney
H. A. Seymour.

UNITED STATES PATENT OFFICE.

WALTER M. JACKSON, OF NEW YORK, N. Y.

MARINE PROPULSION.

SPECIFICATION forming part of Letters Patent No. 385,183, dated June 26, 1888.

Application filed December 16, 1886. Renewed December 15, 1887. Serial No. 258,015. (No model.)

To all whom it may concern:

Be it known that I, WALTER M. JACKSON, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Marine Propulsion; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to marine propulsion, and has for its object to provide new devices by which a vessel may be driven through the water at a higher speed than has heretofore been attained, and this without shaft, wheel, or ordinary rudder.

My invention still further consists in means for guiding and manipulating a vessel, by which I secure the utmost freedom of control, and stop, start, revolve, or move in any direction at will.

The following specification and accompanying drawings will sufficiently illustrate my invention to enable those skilled in the art to construct, apply, and operate the same.

In the accompanying drawings, Figure 1 is a view in longitudinal vertical section of a vessel embodying my invention, and Fig. 2 is a view in section showing the manner of coupling the sections of a discharge-pipe.

As near the bottom of the vessel as possible I locate a steam-boiler and connect to the same a steam-pump of suitable character, preferably a Worthington double-acting piston.

At the base of the pump A may be seen the suction-pipes *c c*, leading through the bottom of the vessel and opening into the water on one or both sides of the vessel's keel, B. Said suction-pipes are provided with check-valves.

Opening from the pump-cylinder may be seen the outlets D D, also provided with check-valves. Both outlets communicate with the high-service receiver E. A stop-cock, *f*, is placed between the receiver and pump. This is not necessary, but might prove convenient. The high-service receiver E is constructed of great strength—of steel, iron, or other material—lined, if necessary, with copper or non-corrosive material, and has one or more outlets, (two being shown in the drawings,) S S. One outlet leads to the stern of the vessel, the other to the bow. Both outlets are provided with suitable valves, *s t*, said valves being operated from the pilot-house or other convenient place for the purpose of increasing or diminishing the speed of the vessel. Inserted upon the receiver E may be seen projections *i* and *e*, *i* being a glass tube provided with stop-cocks above and below, entering an air-chamber above and water-chamber below, the object of said tube being to determine the quantity of water in the receiver E and the degree of air-compression at a glance, while *e* is a pressure-indicator giving the number of pounds to the square inch.

The outlet-pipes S S are constructed practically alike, except the one leading to the bow may have an oblong opening conforming to the shape of the vessel's prow or cut-water, while that at the stern has preferably a circular outlet. These pipes pass through the vessel and are fastened to descend vertically into the water, their outlets being below the water-line. A clamp or flanged plate is secured to the ends of the vessel, (shown by dotted lines H H,) and to these clamps are secured rings K K K, through which the outlet-pipes pass.

At the point *m m* a joint is made like a common ground-seat union, except a lock-nut, *n n*, is employed over the union for the purpose of determining the friction of the joint. The object of this device is to provide a rotating water-tight joint. Below the joint and attached to it may be seen levers *o o*, the object of which is the attachment of suitable connections which may lead to the pilot-house or other suitable place for the purpose of rotating or changing the direction of the opening in the outlet-pipes. Having made a fire under the boiler and raised the steam-pressure to, say, eighty pounds to the square inch, I start the pump. Now, as the water is taken into the pump and driven out into the receiver E, the outlet from said receiver being of smaller capacity than the inlet, the water becomes accumulative. Now, if the steam-piston has an area five times greater than the pump-piston, then eighty pounds of steam is capable of pumping against a reflex pressure of five hundred pounds from the receiver. Now, as water is not compressible, there is no elasticity, and to store the water in the receiver in

such a manner that dynamic value will result I must put the water in a dynamic condition of compression. This I do by providing a closed receiver at the top, so that no air can escape, and as the water is packed in under the column of air the air is more and more compressed, reflecting its own elasticity upon the water, and thus I have the water in a dynamic state of compression.

My object in providing this dynamic compression of water is, first, to soften the movements of my machinery; second, to store power; third, to even the pulsations of the steam and pump pistons; fourth, to secure a steady uniform flow of water through my outlet-pipes; fifth, to make my receiver its own governor of the pump and steam pistons without danger of sudden stoppage of said pistons, and, sixth, to provide a high steady pressure, by means of which I accomplish a most important part of my invention.

By actual experiment I have determined that the secret of propelling vessels effectively and economically by throwing a jet of water against water consists in the intensity of contact, the impact or suddenness of the blow, and if the blow be continuous the reflex thrust is nearly the full power of the primary expenditure of force. Water alone is practically and chemically non-interstitial in composition. Its very slight compressibility is due to the mechanical admixture of air. Therefore, if I experiment with a wooden plank upon its surface by striking violently, the suddenness of the impact causes a simultaneous concentration of energy at the point of contact, and, the water being non-compressible, the plank does not penetrate but is broken by the reaction, while if a soft and graduated blow be given the water will calmly recede under its law of mobility, and the sum of the energy displayed will be radiated in all directions. The power being consumed by the time and ease of the resistance, there is no concentration of energy in this last experiment, no suddenness of impact, no marked and solidly-concentrated resistance.

By my experiments I determine that a vessel twenty-six inches long and eight inches wide, modeled after the yacht Mayflower, displacing six hundred and ninety-seven cubic inches of fresh water, will, with a discharge-orifice one sixty-fourth of an inch in diameter, under four hundred pounds pressure to the square inch, travel thirty-one feet per second, while the same vessel with a discharge-opening of one thirty-second of an inch under one hundred pounds pressure moves but twenty-two feet, and, again, with a discharge-opening of one-sixteenth of an inch under twenty-five pounds to the square inch will go only eight feet, while a discharge opening of one-eighth of an inch under six and a quarter pounds pressure will give a speed of less than one foot per second.

My invention embodies other features consequently valuable.

Inasmuch as I provide a means of rotating the discharge-pipes or changing the direction of the current of water-discharge, I can readily change the course of my vessel without materially lessening her speed. A rudder changes course or direction by offering resistance, thus unbalancing direction, while by my system I preserve the driving force, simply throwing the stern around, thus causing the vessel to sheer in any direction from a straight line. I can also, at a moment's notice, change the discharge of water from the stern to bow and thus cause almost immediate stops when under full headway. I can also move in a direct line sidewise or revolve as if upon a pivot.

I am aware that others have sought to compete with screws and wheels by means of water pumped out of the sterns of vessels, and have also made provision for steering and guiding vessels by such means; but none heretofore have ever made any effort to place the water after it is pumped in a state of high dynamic compression; nor have they discovered that such high pressure is particularly efficient by means of the suddenness of impact upon the resisting water.

I make no claim in this application to the method disclosed, as the same forms the subject of pending application Serial No. 259,953, filed January 6, 1888.

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

1. The combination of a suitable pump or water-forcing device having water-inlet pipe and outlet or outlets, the latter being of smaller capacity than the inlet, and water-storage tank or reservoir adapted to contain air or other elastic medium, the said tank being located between the pump or water-forcing device and the propelling or guiding outlet or outlets.

2. In a device for propelling or handling a floating vessel, the combination of a pump or water-forcing device having a water-inlet, an outlet-pipe the submerged discharge end of which is of smaller capacity than the inlet, a tank or receiver adapted to contain air or other elastic medium and located between the pump and discharge-pipe, and valves for cutting off the water to and from the tank, substantially as set forth.

3. In a device for propelling and handling a floating vessel, the combination, with a tank or reservoir provided with an air-cushion, a pump or other device for forcing water into said tank or reservoir, and an inlet-pipe leading to said tank, of a water-discharge pipe connected to said tank or reservoir at or near the bottom thereof, the submerged outlet of said discharge-pipe being of smaller capacity than the inlet, substantially as set forth.

4. In a device for guiding or steering floating vessels, the combination, with a pump having an inlet, of a storage-tank into which the water is forced under a column of air or other elastic medium, a pipe leading from said storage-tank, and a movable discharge-pipe

communicating with said tank and having a submerged discharge-orifice of less capacity than the water-inlet, substantially as set forth.

5. In a device for propelling and guiding a floating vessel, the combination, with a pump or water-forcing device and inlet-pipe leading thereto, of a storage-tank into which the water is forced under a column of air, a discharge-pipe a section of which is adapted to rotate and thus change the direction of the issuing jet of water, the submerged outlet of said rotating section being of smaller capacity than the water-inlet, and valves for cutting off the water to and from the tank, substantially as set forth.

6. The herein-described apparatus for propelling or maneuvering a vessel, consisting, first, in a suitable boiler; second, in any suitable water-forcing device; third, in the employment of any suitable means for taking the water in which the vessel is wholly or partially submerged through the vessel and into said water-forcing device, and fourth, in discharging said water by means of suitable conduits connecting with said water-forcing device, said conduits having their discharge-orifices opening into the water in which the vessel is wholly or partially submerged at a greater pressure to the square inch than that exerted to the square inch by the boiler, for the purpose of creating aqueous molecular confusion or the impact of water particles in the water in which the vessel is wholly or partially submerged, establishing intense reactionary resistance in said water and attaining a greater percentage of the energy of the boiler for propelling and maneuvering vessels than has heretofore been secured, substantially as specified.

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

WALTER M. JACKSON.

Witnesses:
W. C. DUVALL,
G. F. DOWNING.