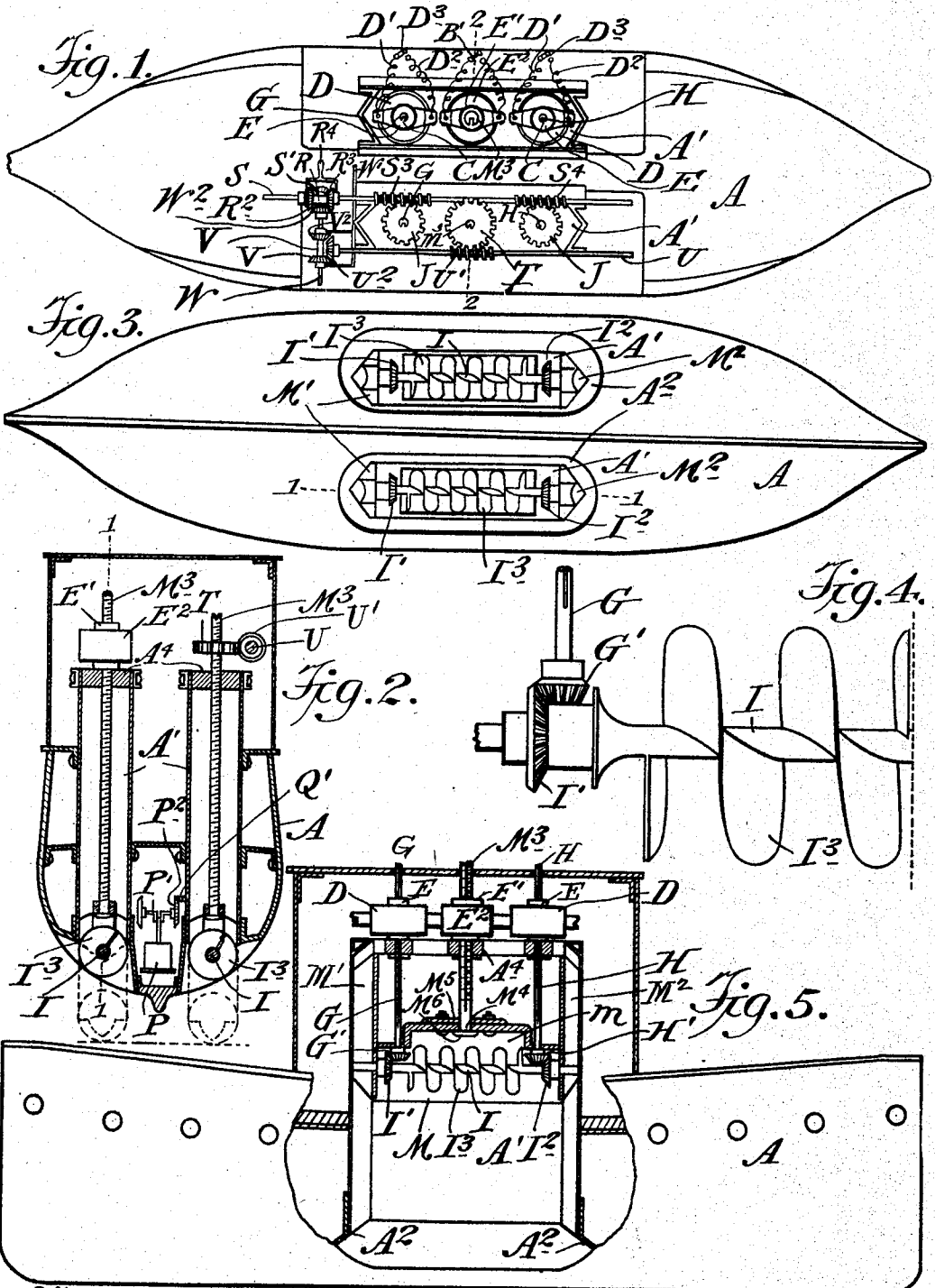


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PROPELLING VESSELS.
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PROPELLING VESSELS.

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To all whom it may concern:

Be it known that I, ROCCO STOLA, a citizen of the United States, residing in the borough of the Bronx, city and State of New York, have invented a certain new and useful Improvement in Propelling Vessels, of which the following is a specification.

The invention is adapted for use in all situations, but is more especially intended for service over shoals and ledges and among logs and other obstructions, as telegraph-cables. I provide for drawing the screws entirely within the hull and moving them out again at will and for doing this easily and rapidly.

I provide two screw-propellers at or near the mid-length of the vessel, with means for thrusting each downward into a position where it can act efficiently on the water when it is to be used. Each propeller is mounted in a casing, which I will term a "well," extending from an opening in the bottom up to any height desired. It may be quite out through the upper deck. The lower end of each well is flared at the front and rear, so that the water finds ready access at the front and also ready discharge at the rear even when the propeller is drawn up so as to be entirely protected within the general lines of the bottom.

I provide efficient and convenient means for raising and lowering the propellers as rapidly and frequently as shall ever be required without necessarily stopping or even slowing the revolutions.

In case of accident from any cause my propellers may be drawn up to an extra height for examination and repairs. Under favorable conditions they may be lowered completely below the bottom, so as to act with the fullest efficiency.

I prefer to make the screws single thread and will represent the invention as thus carried out. The driving means communicate the power at both ends of each shaft and attain this in all stages of elevation, greatly increasing the chances of success after a failure of a portion of the mechanism. This is especially important in war practice.

The propeller on either side can be worked slower or faster, so as to aid in steering or to effect the steering alone.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a plan view. The upper half

shows the preferred form and will be first described. The lower half shows a modification and will be referred to later. Fig. 2 is a corresponding cross-section on the line 2 2 in Fig. 1. Fig. 3 is a plan view seen from below. Fig. 4 is a diagram showing a portion of the propeller and a driving-shaft on a larger scale. Fig. 5 is a side view, partly in longitudinal section, on the line 1 1 in Figs. 2 and 3. Similar letters of reference indicate corresponding parts in all the figures where they appear.

A indicates the general hull of the vessel. Both ends are alike, each adapted to serve as the bow and each made with a strongly-shod forefoot adapted to serve on hard or rocky bottom.

A' A' designate the water-tight wells, of which there are two, one on each side near the mid-length. The two are counterparts each of the other. I will describe one alone.

A² A² indicate the flares at the front and rear, respectively, at the lower end of the well. These flares allow the water to enter and be discharged easily and to be acted on to propel the vessel, even when the propeller is in its partly-raised position, completely inclosed in the lower portion of the well.

M is a carriage inclosed in the well and vertically movable therein. Its interior, as indicated by *m*, is adapted to give a clear and easy sweep for the revolutions of the inclosed propelling-screw. The ends M' M² of the carriage are wedge-shaped in horizontal section. So are also the ends of the well. I prefer the proportions about as shown in Fig. 3.

D represents electric motors of the class adapted to be reversed by reversing the current, and D' and D² are efficient insulated conductors connecting through switches D³ with dynamos driven by steam-engines or other sources of electric energy. (Not shown.)

The motors D have each a rigidly-connected wheel E, revolved thereby, and the wheels E are engaged by feathers C C, respectively, with upright shafts G and H, which are allowed to move endwise up and down through the respective motors, but are compelled to turn therewith. The lower ends of shafts G H carry beveled gear-wheels G' H', which latter engage, respectively, with beveled gear-wheels I' I², keyed on the ends, respectively, of a horizontal shaft I, which latter is the shaft of the propeller and is mounted in suitable bearings in the carriage.

I³ is a broad thin screw-blade fixed on the

shaft I and revolved thereby. It is tapered at the ends and effects the propelling of the vessel without liability of injury or being itself injured by hawsers, chains, electric cables, or the like, which my vessel may be required to work among.

M³ is a sufficiently stout upright screw having a smooth bearing M⁴ with collars M⁵ M⁶ at its lower end. This screw is connected with liberty to revolve in the upper portion of the center of each carriage M. The long threaded portion is received in a correspondingly-threaded cross-girder or bridge-tree A⁴ in the top of the corresponding well and controls the height, each carriage being raised and lowered independently as its screw is turned. A motor E², entirely independent of the motor D, is arranged to turn this elevating-screw M³ by a feathered wheel E'. The current from the dynamo to the motor is controlled by a switch B' of any appropriate description.

The screw M³ and its connections compel the elevation or descent, no matter how much gravity tends to depress or the strong action of the propeller on the smooth water or the upward force of the sea in heavy weather may tend to hold it stationary or even to lift it.

By properly adjusting the switch B' the motor E² will be turned in the direction to raise the carriage M and its propeller I³, while the motors D may be acting to strongly and continuously revolve its pair of upright driving-shafts G and H. By reversing its switch the force of the motor is applied to turn the screw M³ in the opposite direction and compel the propeller to sink. By holding the switch in the middle position the screw M³ will remain motionless and there will be no elevation or depression of the propeller. This latter is the condition which obtains all the time, except in exigencies.

The above shows the mechanism for raising and lowering on one side of the vessel. There is a corresponding set of apparatus to operate and to lower and raise the propeller and its adjuncts on the opposite side of the vessel. Each can be worked independently.

It will be obvious that my mechanism can aid in the steering or even can effect the steering alone when moving at any speed or when it is desired to turn without going ahead at all. Ordinary steering can be effected or aided by slightly reducing the force of propulsion on one side. When very rapid turning or keeping a straight course in whirling currents is required, the motors on one side may continue turning in the direction to go ahead, and the motors on the other side may be completely stopped or even may be reversed.

Parts of the invention can be used without the whole. Other means than electric motors may be employed to effect the continued and strong revolutions of the propeller-shafts and also to effect the occasional or frequent rais-

ing and lowering of them so long as the peculiarities of the other features are preserved. The lower side of Fig. 1 and the right side of Fig. 2 show provisions for attaining this, while the power for the whole is derived from one motor shown as an oscillating steam-engine. In this modification the two propellers I³, with their shafts I and their carriages M and also their upright driving-shafts G and H, are arranged as before described. The screws M³ and cross-girders or bridge-trees A⁴ may be as before; but instead of electric motors D for the propelling and electric motors E² for raising there are worm-wheels J, feathered on the shafts G and H, ready to receive the propelling power through worms and worm-wheels T, feathered on the screws M³, ready to receive power to raise and lower the propeller-carriages M. P is a steam-engine continuously revolving a horizontal shaft P', having a bevel gear-wheel P². The latter by engaging a bevel gear-wheel Q' revolves an upright shaft which is provided with a bevel-gear S' and operates to revolve the longitudinal shaft S through said gear S' and one or other of the gears R² R³. These gears R² R³ are feathered on the shaft S and interconnected by the sleeve R. The shaft S carries two worms S³ and S⁴, which engage, respectively, with the worm-wheels J and drive the propeller.

Motion is transmitted to shaft I of propeller I³ through the gears S' R² and shaft S for working in one direction. For working in the other direction the gears R² R³ and sleeve R must be shifted. This is done by moving the lever R⁴. The shifting disengages the bevel-gear R² from the bevel-gear S' and engages the bevel-gear R³ therewith.

The raising and lowering of the carriages is effected by turning the wheels T, which correspond to the motor-wheels E' of the form first described, except that instead of employing electric motors each is a worm-wheel. Each wheel T is engaged by a worm U' on a longitudinal shaft U, which receives motion through its bevel-gear U² from one or other of the bevel-gears V' V², which are interconnected by the sleeve V, feathered on a transverse shaft W and controlled in position by a handle W', which is within convenient reach of the engineer. The shaft W has a bevel-gear W², through which it always receives rotary motion from the gear-wheel S' in the same direction. The motion is transmitted to the shaft U in one direction or the other or is not transmitted in either direction, according to the position of the sleeve V and the gears V' V², which are interconnected thereby. When the gear V' engages the gear U², the shaft U is revolved in one direction. When the gear V² engages the said gear U², the shaft U is revolved in the opposite direction. When the sleeve V is by its handle W' set in its middle position, neither of its gear-

wheels V' or V^2 is engaged, the longitudinal shaft U is not revolved, and the propeller is not raised or lowered. This is the condition for ordinary working; but when difficulties are encountered the handle W' is worked and the screws are turned to raise and lower, as required.

Other modifications may be made without departing from the principle or sacrificing the advantages of the invention. Instead of locating the wells at the mid-length of the vessel they may be further toward the bow or nearer the stern. One well and one set of propelling means alone may be of service in some cases.

With two wells, each open-topped, as shown, no changes are required to adapt the invention for submarine vessels.

I claim as my invention—

1. As a means for propelling and steering, a hull constructed with a well in combination with a carriage having wedge-shaped ends adapted to be raised or lowered therein, means for raising and lowering such carriage, a propeller mounted in such carriage and means for revolving the latter all arranged to serve substantially as herein specified.

2. As a means for propelling and steering, a hull constructed with a well in combination with a carriage having wedge-shaped ends adapted to be raised and lowered therein, means for raising and lowering such carriage, a propeller mounted in such carriage and means for revolving it arranged on one side of the center line of the hull and with another corresponding set of mechanism and propelling means on the opposite side of the center line all adapted to serve substantially as herein specified.

3. As a means for propelling and steering, a hull constructed with a well having the lower end flared as indicated by A^2 adapted to allow the water to obliquely and strongly rise into and sink out of the well in combination with a carriage having wedge-shaped ends adapted to be raised and lowered therein, means for raising and lowering such car-

riage, a propeller mounted in such carriage and means for revolving it all arranged to serve substantially as herein specified.

4. As a means for propelling and steering, a hull constructed with a well in combination with a carriage having wedge-shaped ends adapted to be raised and lowered therein, means for raising and lowering such carriage, a propeller mounted in such carriage and means for revolving it arranged on one side of the center line, the power being communicated to the propeller through upright shafts with bevel-gears feathered connections adapted to serve substantially as herein specified.

5. As a means for propelling and steering, a hull constructed with a well in combination with a carriage having wedge-shaped ends adapted to be raised or lowered therein, means for raising and lowering such carriage, a propeller mounted in such carriage and means for revolving it, the power being communicated to the propeller through upright shafts with bevel-gears and feathered connections and with an independent motor for each shaft and controlling means therefor all adapted to serve substantially as herein specified.

6. As a means for propelling and steering, a hull constructed with a well in combination with a carriage having wedge-shaped ends adapted to be raised or lowered therein, a propeller mounted in such carriage and means for revolving it, the power being communicated to the propeller through upright shafts with bevel-gears and feathered connections and with elevating-screws and independent motors for each, for rapidly raising and depressing the carriages, all substantially as herein specified.

Signed at New York, in the county of New York and State of New York, this 14th day of January, A. D. 1905.

ROCCO STOLA.

Witnesses:

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