No. 745,732. PATENTED DEC. 1, 1903.

# H. H. LITTLE.

## PROPULSION MECHANISM FOR VESSELS.

APPLICATION FILED JULY 2, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

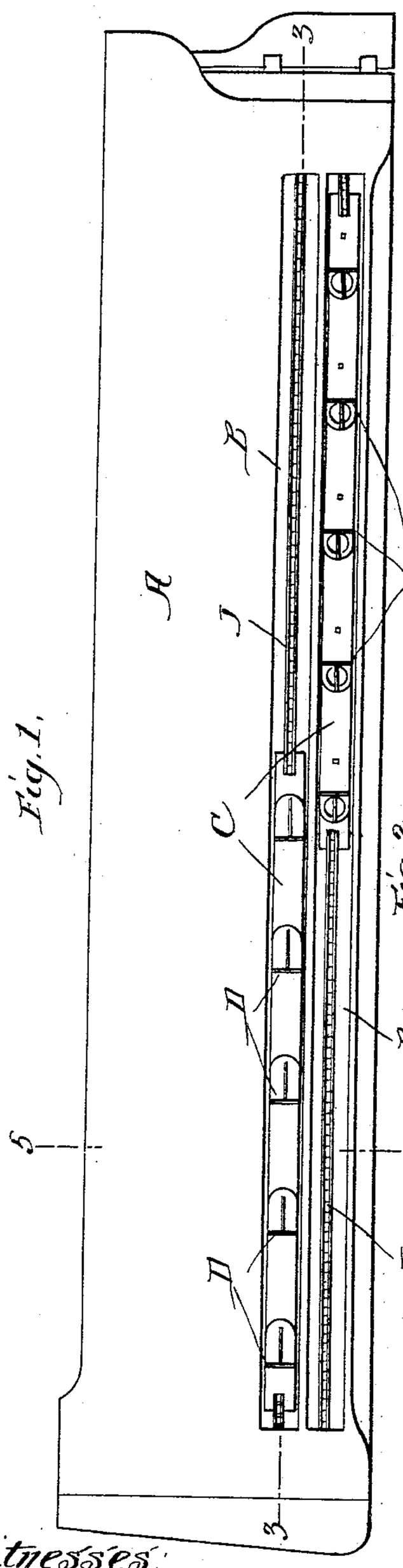


Fig. 1.

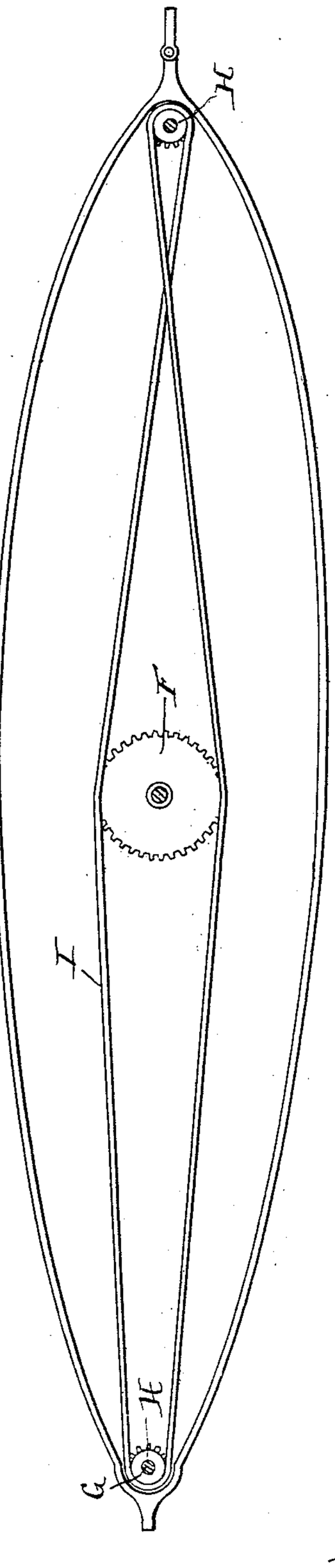


Fig. 2.

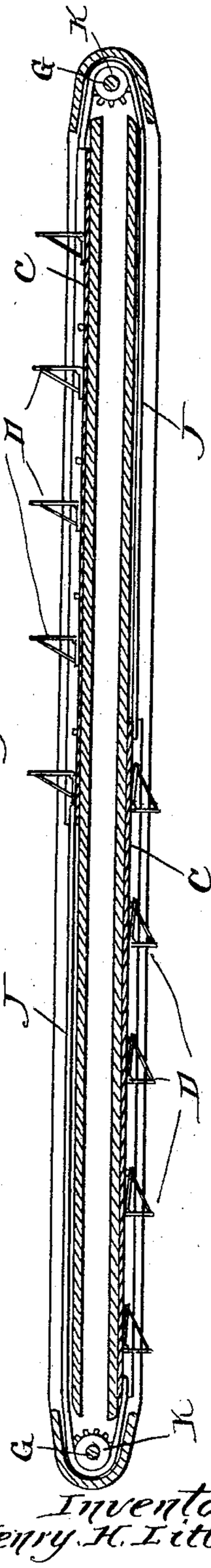


Fig. 3.

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Fig. 4.

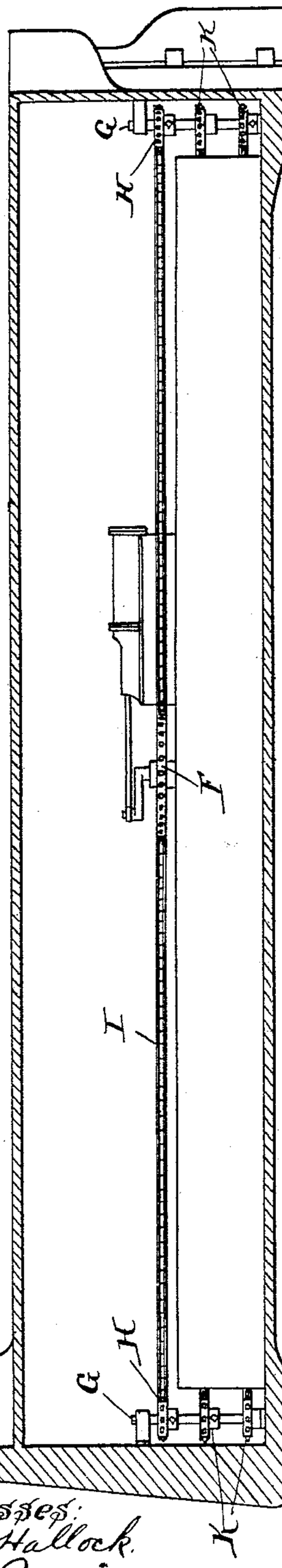



Fig. 6.

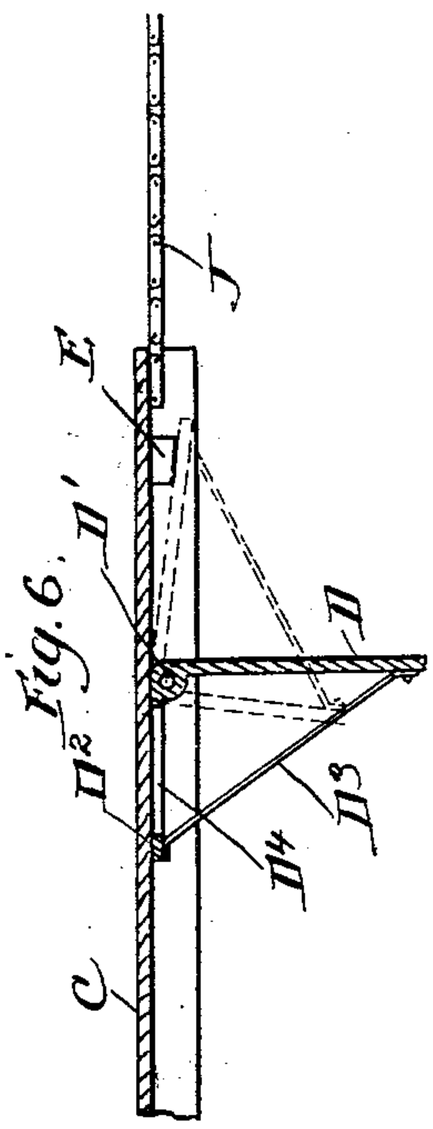



Fig. 7.

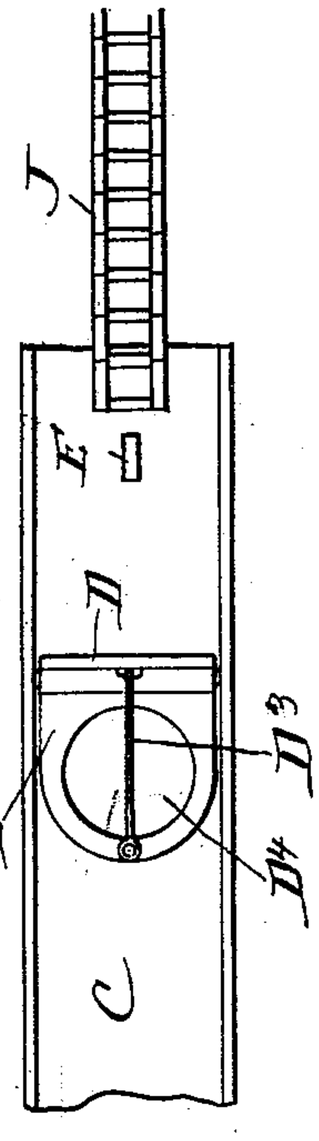
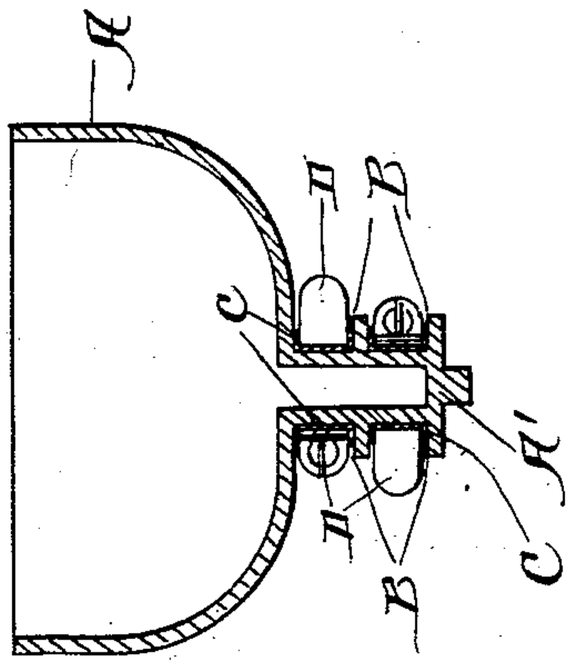



Fig. 5

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No. 745,732. Patented December 1, 1903.

# UNITED STATES PATENT OFFICE.

HENRY H. LITTLE, OF PHILADELPHIA, PENNSYLVANIA.

## PROPULSION MECHANISM FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 745,732, dated December 1, 1903.

Application filed July 2, 1903. Serial No. 163,989. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY H. LITTLE, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a certain new and useful Improvement in Propulsion Mechanism for Vessels, of which the following is a specification.

My invention relates to a new and useful improvement in propulsion mechanism for vessels, and has for its object to provide propellers operating upon each side of the keel of the vessel whereby the propeller-blades operate in a direct line backward and forward, and said blades are made movable, so as to feather or offer no resistance when traveling toward the bow of the vessel.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side elevation of the hull of a vessel having my improved propelling mechanism applied thereto; Fig. 2, a sectional plan view showing the means of operating the propellers in each end of the vessel; Fig. 3, a sectional plan view taken on the line 3 3 of Fig. 1; Fig. 4, a vertical section through the hull of a vessel having my improved propelling mechanism applied thereto; Fig. 5, a cross-section through a vessel provided with my improved propelling mechanism; Fig. 6, a detail sectional plan view showing one of the propeller-blades; Fig. 7, a side elevation of Fig. 6.

My invention consists, essentially, in providing upon each side of the keel of the vessel two guideways, one above the other, in which guideways are adapted to reciprocate alternately longitudinally of the vessel bars, which carry a series of propeller-blades, which blades are pivoted to the bar, so as to offer resistance against the water as the bars travel rearward and turn upon their pivot, so as to feather or offer practically no resistance as the bars travel forward.

A represents the hull of a vessel, of which A′ is the keel thereof. Located upon each side of the keel are two guideways B, and fitted to slide within these guideways are the bars or elongated plates C.

D represents the propeller-blades which are arranged at intervals along the bars C and are pivoted to the bars at the points D′. These blades D are solid and are adapted to stand at right angles to the bars when the bars are traveling rearward, as shown in Fig. 6. For the purpose of holding the blades at a right angle to the bars and causing them to offer resistance to the water I provide the blades with a right-angle extension $D^2$, which extension is adapted to lie flat against the bars, as shown in Fig. 6. When the blades are in their operative position, a brace $D^3$ may extend from the outer end of the blade D to the outer end of the extension $D^2$ to further support the blade. When the bars C travel rearward, the impact of the water against the back of the blades D will turn them upon their pivots to the position shown in dotted lines in Fig. 6. Then the extension $D^2$ will extend outward from the bar, and to prevent such extension from offering any vertical resistance to the water a hole $D^4$ is formed through the extension, as shown in Fig. 7. Of course this extension $D^2$ may be made in skeleton form, so as to support the blade and yet offer practically no resistance to the water when the blade is traveling forward. When the bars commence to travel rearward, the impact of the water against the blade D will throw it outward to its operative position, as shown in full lines in Fig. 6, and to facilitate the throwing outward of the blades I provide upon the bars lugs E, with which the blades D come in contact when in their inoperative position, and these lugs E thereby hold the blades at a slight distance from the bars, so as to allow the water to enter between the blades and the bars and force the blades into their operative position.

There being two bars located upon each side of the keel, I provide mechanism inside of the vessel for reciprocating these bars alternately upon each side, so that one bar upon each

side is always traveling rearward while the other two are traveling forward. Thus the vessel is at all times receiving a forward impetus. Of course, if desired, there could be more than two bars located upon each side of the vessel, and there could be any number of blades attached to each bar. I do not wish to be limited to any means for reciprocating these bars, as any suitable method could be employed. The means which I have shown in the drawings consists of a main sprocket-wheel F, journaled upon a vertical pivot and adapted to be rocked backward and forward through a partial revolution by the motor of the vessel.

Journaled vertically in each end of the vessel are the shafts G, and secured to these shafts G near the upper end are the sprocket-wheels H.

I is an endless chain which passes upon each side of the wheel F and meshes with the sprockets of said wheel. This chain passes around the sprocket-wheel H in one end of the vessel direct and also passes around the sprocket-wheel H in the other end of the vessel; but the chain is crossed before passing around this last-named sprocket-wheel, so as to give the proper movement to both of the vertical shafts G, so it will be seen that as the wheel F is rocked backward and forward movement will be imparted to the shafts G, so as to turn them in the opposite direction.

J represents chains attached at one end to one of the bars C upon one side of the keel, and the other end of each chain is attached to the other bar upon the opposite side of the keel, and these chains pass around sprocket-wheels K upon the shaft G. One of the sprocket-wheels at one end of the vessel around which one chain J of one set of propellers passes is fast or secured to the shaft G, the other sprocket-wheel around which the chains secured to the other end of the same set of propellers is loose upon the opposite shaft G, and the other set of chains secured to the other set of propellers is arranged in the same manner, except that the wheel fast to the shaft G is located upon the same shaft as the loose wheel of the other set of propellers. Therefore it will be seen that as the wheel F is rocked backward and forward through a partial revolution motion will be so communicated to the chains J that the bar will be caused to reciprocate alternately upon each side of the vessel.

Of course I do not wish to be limited to the exact construction here shown, as slight modifications could be made without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful is—

1. In a vessel, longitudinal guideways formed in each side of the keel and arranged one above the other, bars or elongated plates fitted to reciprocate within said guideways longitudinally of the vessel, blades pivoted to and carried by the bars, means for reciprocating said bars laterally upon each side of the keel, said blades so arranged as to stand at right angles to the bars and offer resistance against the water as the bars are traveling rearward and to turn upon their pivots so as to offer practically no resistance to the water when the bars are traveling forward, as and for the purpose specified.

2. A vessel provided with guideways formed longitudinally upon each side of its keel, bars fitted to reciprocate within said guideways, means for reciprocating said bars alternately upon each side, blades pivoted to and carried by the bars, said blades extending at right angles to the bars when said bars are traveling rearward, skeleton extensions extending from the blades and adapted to lie flat against the bars to support the blades in their operative position, and braces extending from the outer end of the extensions to the outer end of the blades, as and for the purpose specified.

3. A vessel provided with longitudinal guideways formed upon each side of its keel, bars adapted to reciprocate within said guideways, means for reciprocating said bars alternately upon each side, a series of blades pivoted to and carried by each member, said blades extending at right angles to the bar as the bars are traveling rearward, skeleton extensions extending from the blade and lying flat against the bars so as to support the blades in their operative position, braces extending from the outer end of the extensions to the outer end of the blades, and lugs extending outward from the bars a short distance against which the blades contact when the bars are traveling forward so as to prevent the blades coming in close contact with the bars, as specified.

4. A vessel provided with longitudinal guideways upon each side of its keel, bars fitted to slide within said guideways, a series of blades pivoted to each bar, said blades extending at right angles to the bars when the bars are traveling rearward, and to turn upon their pivots and feather when the bars are traveling forward, means for supporting said blades against the resistance of the water, chains attached at each end of the bars upon one side, sprocket-wheels around which the chains pass at each end of the vessel, the other end of the chains being attached to the bars upon the opposite side of the keel, vertical shafts upon which said sprocket-wheels are arranged, there being two sprocket-wheels for each set of propellers, one sprocket-wheel at one end being fast to its shaft, the other sprocket-wheel being loose upon the shaft, a sprocket-wheel secured to each shaft near its upper end, a large sprocket-wheel journaled vertically adapted to be rocked through a partial revolution backward and forward by the motor of the vessel, a chain passing upon each side of the large sprocket-wheel and in mesh with the sprockets of said wheel, said chain pass-

ing around the top sprocket-wheel of one of the vertical shafts direct and passing around the top sprocket-wheel upon the other vertical shaft, but being crossed between said top sprocket-wheel and the large sprocket-wheel, as and for the purpose specified.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

HENRY H. LITTLE.

Witnesses:
RUSSELL H. FOSTER,
B. B. LUDLAM.