E. D. y Sala.

Vibrating Propeller.

No. 51,025. Patented Nov. 21, 1865.

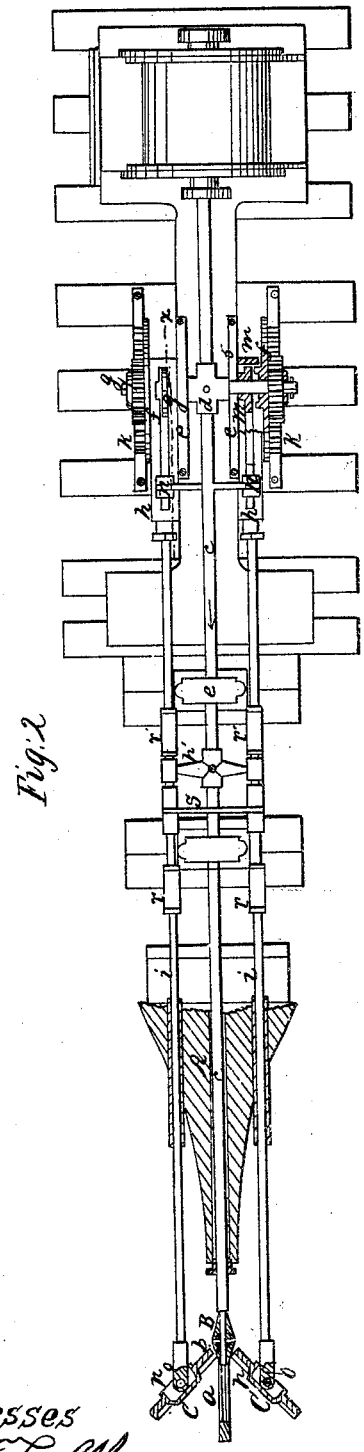

Fig. 2

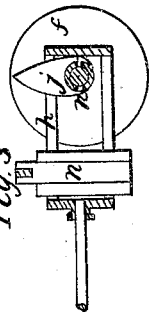

Fig. 3

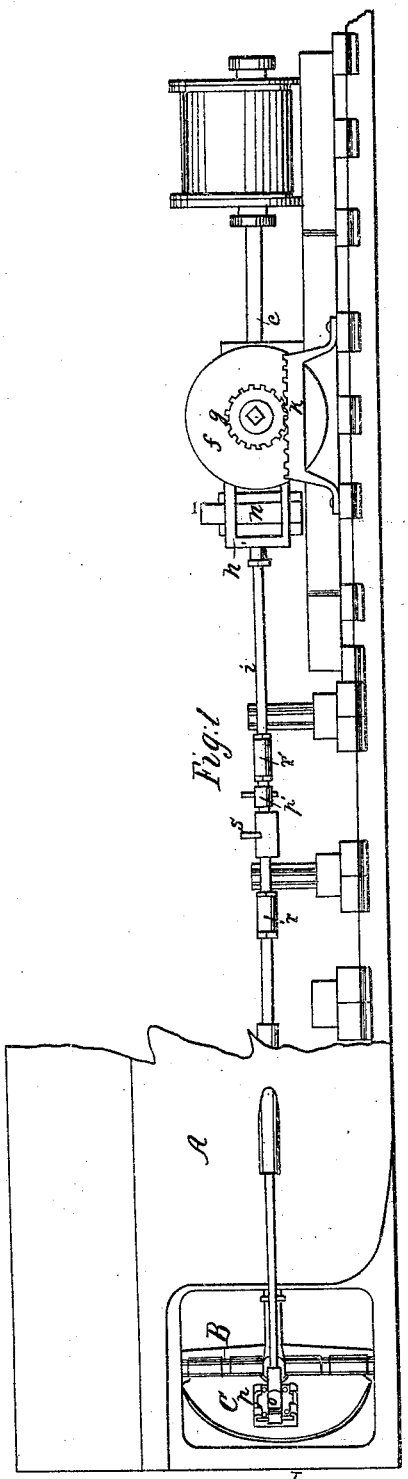

Fig. 1

Witnesses
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UNITED STATES PATENT OFFICE.

ESTEBAN DALMAU Y SALA, OF NEW YORK, N. Y.

IMPROVED PROPELLER.

Specification forming part of Letters Patent No. **51,025**, dated November 21, 1865.

To all whom it may concern:

Be it known that I, ESTEBAN DALMAU Y SALA, of the city, county, and State of New York, have invented a new and useful Improvement in Propellers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of this invention, the vessel in which the propeller is put up being shown in section. Fig. 2 is a sectional plan or top view of the same. Fig. 3 is a longitudinal vertical section of a portion of the reversing-gear, the line *x x*, Fig. 2, indicating the plane of section.

Similar letters of reference indicate like parts.

This invention relates to a propeller of that class commonly known as "duck's-foot" propellers, and generally constructed with two wings, which open as the propeller advances against the water, and which close when the propeller recedes.

The propeller which forms the subject-matter of this present invention is placed under the stern of the vessel, between the rudder-post and the stern-post, at the same place which is usually occupied by the screw-propeller, and it is composed of a frame to which a reciprocating motion is imparted in suitable guide-grooves, and which forms the bearings for the pin or pins which support the two wings. The sliding frame connects by a suitable rod with the cross-head of a steam-engine, which also imparts motion to the mechanism required for opening and closing the wings of the propeller at the proper intervals. This mechanism is so arranged that by a simple change of a few parts the propeller can be reversed without stopping or interrupting the motion of the engine.

A represents the stern of a vessel to which my propeller is applied. This propeller consists of a frame, B, made of metal or any other suitable material, and arranged so that it slides in suitable guide-grooves, *a*, (see Fig. 2,) and of two wings, C, which swing on a pin or pins, *b*, secured in the frame B, and which are made of metal or any other suitable material. The frame B connects, by means of a rod, *c*, with the cross-head *d*, to which a reciprocating motion is imparted by a piston and steam-cylinder of any suitable construction. The rod *c* extends through the dead-wood under the stern of the vessel, and suitable stuffing-boxes of metal or any desirable material prevent the entrance of water into the vessel. Said rod is guided by suitable boxes, *e*, in the interior of the vessel, and, if desired, it may be made solid with the piston-rod. The cross-head *d* is guided in stationary frames *e*, one on each side, and its ends extend through said frames and through carriages *h*, and form the bearings for disks *f* and cog-wheels *g*.

The carriages *h* connect by rods *i* with the two wings of the propeller, and each of said carriages receives a motion independent of that of the cross-head by a cam, *j*. These cams are mounted loosely on the ends of the cross-head, and they are situated in suitable slots in the carriages, as clearly shown in Figs. 2 and 3 of the drawings. They receive an oscillating motion by the action of stationary racks *k*, which are so situated that they gear in the cog-wheels *g* and cause the same to oscillate whenever a reciprocating motion is imparted to the cross-head. The cog-wheels *g* rotate freely on the ends of the cross-head, and they are provided with hubs *l*, provided with slots or notches that catch over suitable projections or dogs, *m*, secured to the sides of the cams *j*. By this arrangement the motion of the cog-wheels is communicated to the cams *j*, and by the action of these cams on the ends of the carriages *h* on one and on slides *n*, inserted into said carriages on the opposite sides, a motion is imparted to said carriages in advance of the cross-head, and the wings of the propeller are opened and closed.

By changing the position of the slides *n* from one end of the carriages to the other the motion of the propeller is reversed.

It must be remarked that the motion of the cams *j* may be produced in a variety of ways, and instead of the cog-wheels and racks suitable rods might be made to extend from eccentric wrist-pins in the disks *f* to stationary links, so that by imparting to the cross-head with the disks a reciprocating motion an oscillating motion will be imparted to the disks, and by changing the points of connection between

the rods and stationary links the motion of the disks might be reversed; or, instead of this, other devices might be used; and I do not wish to confine myself in this respect to the precise mechanism shown in the drawings, but reserve the right to change the same as occasion may render desirable.

The rods *i*, which connect the carriages *h* with the wings C, extend through the dead-wood under the keel, parallel to the rod *c*, and the connection between them and the wings is effected by cross-heads *o*, the ends of which slide back and forth in guides *p*, secured to the inner surface of the wings.

To reduce the friction small friction rollers may be applied to the ends of the cross-heads *o*.

The rods *i*, in passing through the dead-wood of the vessel, are guided by suitable tubes and stuffing-boxes.

In order to relieve the carriages *h* and cams *j* from the pressure of the water on the wings when the same move against the water, an additional cross-head, *p'*, is secured on the rod *c*, and this cross-head is provided with two eyes, which form guides for the rods *i*. These rods are made in three sections, each of which is joined by couplings *r r'*, placed at a suitable distance on either side of the cross-head *p'*.

Between the couplings *r* or *r'* and the cross-head *p'*, a yoke, *s*, is placed, which straddles the rods *i'*—that is to say, if the propeller is arranged to move the vessel forward, the yoke is placed between the cross-head *p'* or between the same and the couplings *r*, as shown in the drawings; and if the propeller is arranged for backing, the yoke is placed on the opposite side of the cross-head. When the rod *c* is moved in the direction of the arrow marked thereon in Fig. 2 the cross-head *p'* pushes the yoke *s* up against the shoulders formed by the couplings *r* before the wings open, and the carriages *h* are relieved from the pressure of the water against the propeller.

In vessels of large dimensions, such as frigates, monitors, and iron-clads, the wings of the propeller can be made of wood, with brass hoops and borders as a re-enforcement, covered with sheet-copper on their outer and with glass on their inner surface, fastened by screws or other suitable means, and underlaid with a thin sheet of india-rubber or gutta-percha. The object of the glass face is to reduce the friction in the water and to prevent incrustations.

If desired, the rod *c* may be made to extend through the rudder-post and through the stern-post, or it may be arranged as shown in Fig. 1 of the drawings.

I do not claim as my invention the use of what is known as the "duck's-foot" propeller for the propulsion of vessels; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The carriages *h* and cams *j*, in combination with the frame B and wings C of the propeller, and with the cross-head *d*, constructed and operating substantially as and for the purpose set forth.

2. The cog-wheels *g* and racks *k*, in combination with the cams *j*, cross-head *d*, and with the propeller B C, constructed and operating substantially as and for the purpose described.

3. The yoke *s*, shoulders *r r'*, and cross-head *p'*, in combination with the rods *c i*, carriages *h*, and propeller B C, constructed and operating substantially as and for the purpose set forth.

4. The movable slides *n*, in combination with the carriages *h* and with the propeller B C, constructed and operating substantially as and for the purpose described.

The above specification of my invention signed by me this 1st day of September, 1865.

ESTEBAN DALMAU Y SALA.

Witnesses:

M. HEVANT,

M. M. LIVINGSTON.