No. 696,666. Patented Apr. 1, 1902.

V. BERG.

HORIZONTAL PADDLE WHEEL FOR PROPELLING SHIPS.

(Application filed Nov. 20, 1901.)

(No Model.)

FIG. 1.

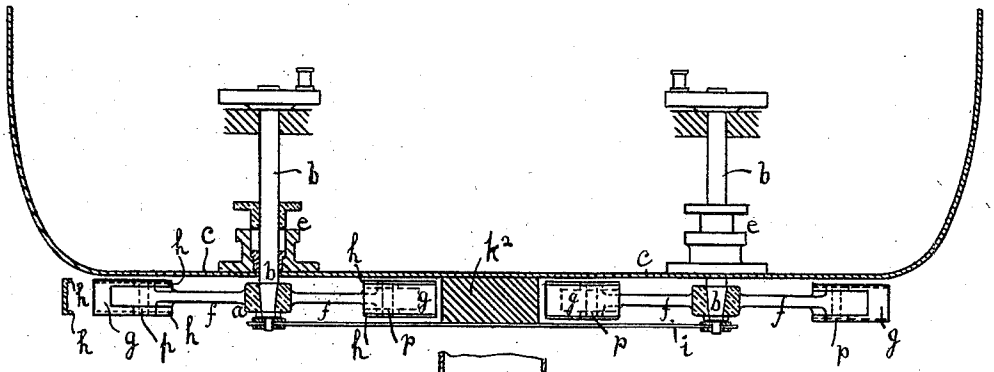


FIG. 2.

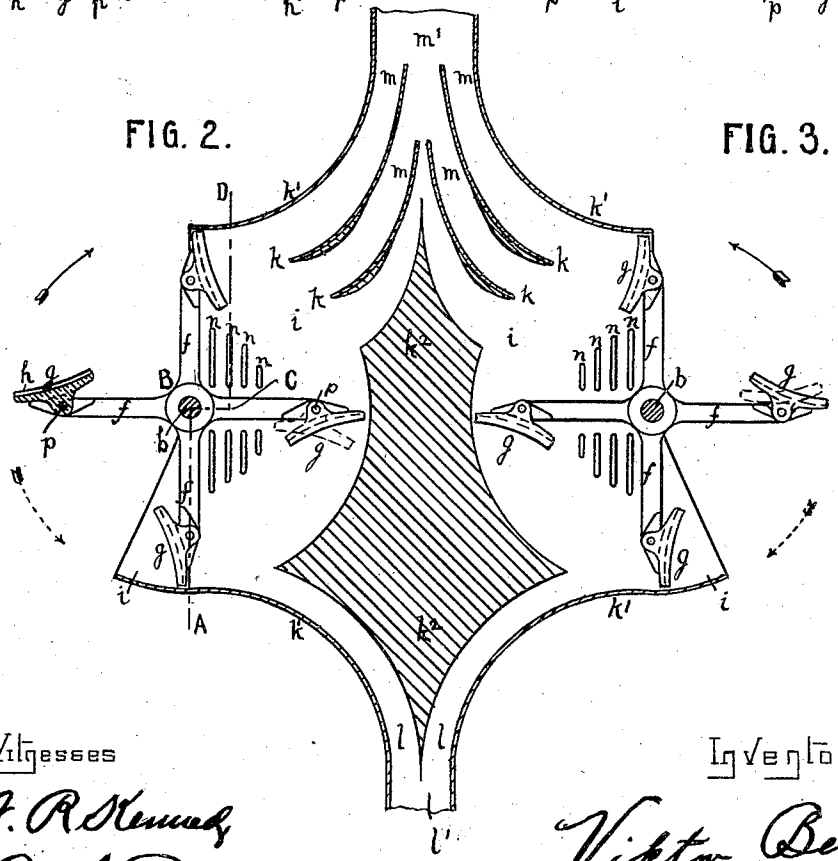
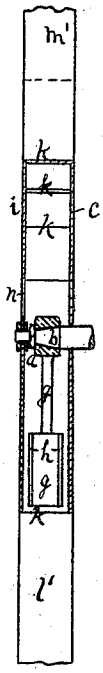


FIG. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

VIKTOR BERG, OF ABO, RUSSIA.

HORIZONTAL PADDLE-WHEEL FOR PROPELLING SHIPS.

SPECIFICATION forming part of Letters Patent No. 696,666, dated April 1, 1902.

Application filed November 20, 1901. Serial No. 83,061. (No model.)

To all whom it may concern:

Be it known that I, VIKTOR BERG, engineer, a subject of the Emperor of Russia, residing in Abo, Finland, Russia, (whose full postal address is Abo,) have invented certain new and useful Improvements in Horizontal Paddle-Wheels for Propelling Ships, (for which application has been made in Finland, dated April 30, 1901, and in England, No. 9,821, dated May 11, 1901,) of which the following is a specification.

The object of this invention is, with the assistance of steam-engines, explosion-engines, electrical or other motors, to propel ships by means of one or more horizontal, or nearly horizontal, paddle-wheels placed underneath the bottom of the ship, in combination with rigid guides or partitions and channels for regulating the current of water in the direction from bow to stern, or vice versa.

In the accompanying drawings, Figure 1 shows a transverse section of a ship fitted with the above-mentioned arrangement, the section being taken through the center of the wheels. Fig. 2 shows a plan of the paddle-wheels with the ship's bottom removed; and Fig. 3 shows a section in the direction of the keel, taken at the broken line designated by the letters A B C D in the plan view.

Like letters signify corresponding parts throughout the drawings.

The arrangement as here shown is with two paddle-wheels *a a*, mounted underneath the bottom of the ship upon the shafts *b b*, which for this purpose penetrate the bottom *c*. The places where the shafts penetrate the bottom are kept water-tight by means of stuffing-boxes *e e* or by other suitable appliances. On the ends of the shafts *b b*, situated above the bottom of the ship, the motors act either direct by means of cranks or the like or else indirectly by means of gearing. The paddle-wheels *a a* each have two or more arms *f f*, on the ends of which are placed straight or bent paddles *g*, which may be provided with projecting ribs or sides *h* in order to give them a better grip on the water. The paddles *g* are slightly movable on pins *p*, placed vertically to the plane of rotation of the wheel in order to give the paddles a more advantageous position when running backward—that is to say, in the directions shown by the dotted arrows.

The paddle-wheels *a* are incased for about half their circumference by a casing consisting of the horizontal plate *i* underneath the wheels, the side plates *k'*, and the water-divider k^2. The casing formed by the plates *i* and *k'* k^2 is transformed fore and aft into channels *l'* and *m'*, which may be continued as far as the bow and the stern of the ship or may terminate earlier. In the after end of the casing formed by the plates *i* and *k'* are placed guides *k k*, the object of which, as also is the case of the water-divider k^2, is to lead the current of the water in the most advantageous manner and to prevent the formation of whirlpools or counter-currents in the casing.

In the plate *i* may be arranged perforations *n n*, the object of which is to give free passage for the water to and from the casing.

When the ship is to be started forward, the paddle-wheels *a* are set into rotation in the directions signified by the arrows marked in full lines in the drawings. The paddles which move outside the casing act in a direct manner, propelling the ship. At the same time the paddles which move inside the casing cause a suction of water toward the paddle-wheels from the forward channel *l'*, which is divided by the water-divider k^2 into the two channels *l l*. Again, the centrifugal force caused by the rotating paddle-wheels throws the water into the channels *m m* sternward, and thence out through the channel *m'*. The reaction of the currents of water thus created in the channels *l'* and *m'* therefore assists in propelling the ship. When running backward, the current of water will of course run in the opposite direction to forward, inasmuch as the water will enter through the channel *m'* and will be ejected through the channel *l'*.

The arrangement shown in the drawings may of course be varied in many ways. Thus, for instance, guides *k k*, similar to those arranged in the after part of the casing, may be arranged in the forward part of the casing also, and the channels *l'* and *m'* may be each divided into two separate channels. Finally, one single paddle-wheel may be arranged under the ship or several twin pairs of wheels may be arranged either transversely or longitudinally underneath the bottom of the ship.

I declare that what I claim is—

1. A horizontal paddle-wheel propelling de-

vice for ships and boats, comprising a horizontal paddle-wheel having a plurality of paddle-arms each provided with a paddle-blade, a casing approximately inclosing one-half of said paddle-wheel, and passages at the forward and rearward ends of said casing adapted to direct the flow of the water sucked in at the forward end and expelled at the rearward end of said casing by said paddle-wheel, whereby the rotation of the portion of the paddle-wheel within said casing is utilized in the propulsion of the ship, substantially as set forth.

2. In a horizontal paddle-wheel propelling device for ships and boats, the combination of horizontal paddle-wheels arranged in pairs beneath the bottom of the ship, a shaft projecting through the bottom of the ship from the center of each paddle-wheel and adapted to be driven around by suitable means, a casing beneath the bottom of the ship approximately inclosing the half nearest the center line of the ship of each of said paddle-wheels, an opening into said casing near the forward end of the ship, passages from said opening communicating with the forward end of the casing surrounding each paddle-wheel in such manner that the rotation of the paddle-wheels within said casings may draw in water, through said passages from the forward end of the ship, and passages near the rear end of each paddle-wheel casing adapted to direct the water driven by said paddle-wheels within said casings toward the stern of the ship, whereby the rotation of the portions of the paddle-wheels within said casings is utilized in the propulsion of the ship, substantially as set forth.

3. A horizontal paddle-wheel propelling device for ships and boats, comprising horizontal paddle-wheels arranged in pairs at each side of the center line of the ship, shafts projecting from the center of said paddle-wheels through the bottom of the ship and adapted to be driven around by suitable means, a casing approximately inclosing the half nearest the center line of the ship of each of said paddle-wheels, and passages in said casing whereby the rotation of the paddle-wheels within their casings is utilized to suck in water from the forward end of said casing and to expel water at the rear end of said casing, substantially as set forth.

In witness whereof I have hereunto signed my name, this 16th day of October, 1901, in the presence of two subscribing witnesses.

VIKTOR BERG.

Witnesses:
ARTUR WILÉN,
EDVIN MOUER.