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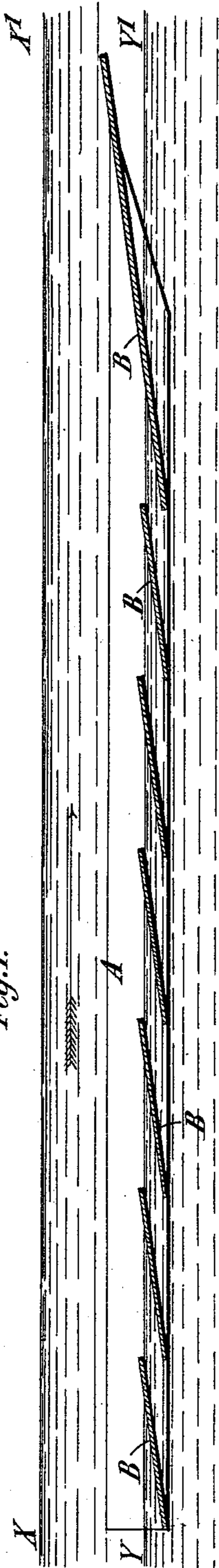
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C. A. DE LAMBERT.
BOAT OR VESSEL.

No. 538,527.

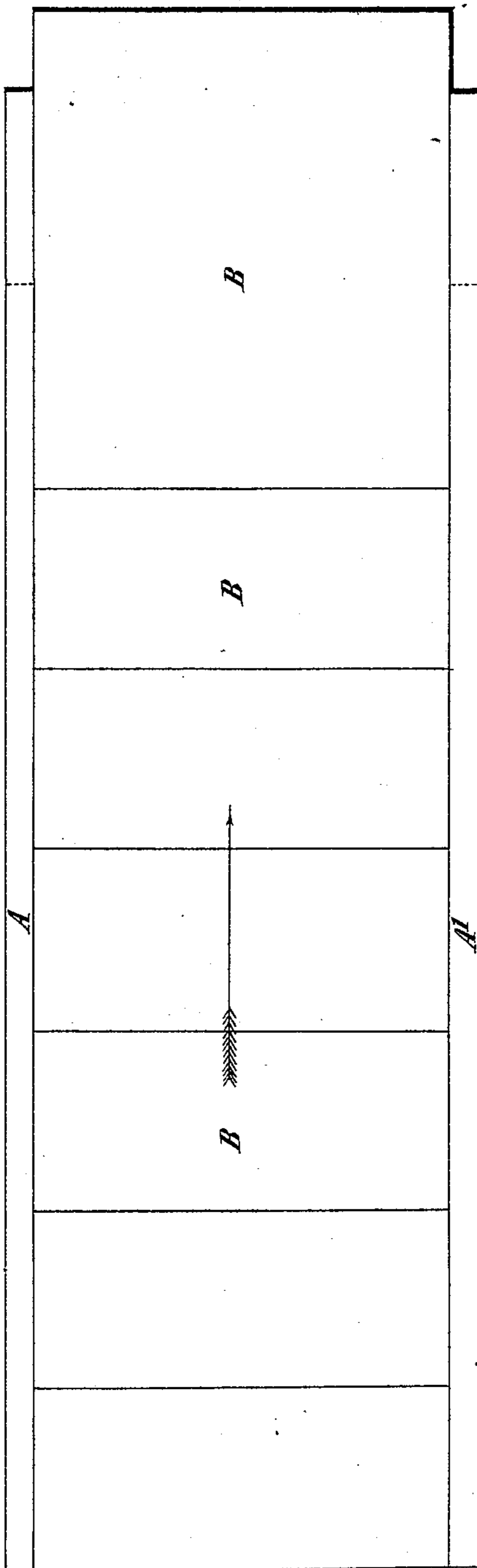
Patented Apr. 30, 1895.

Fig. 1.



Witnesses:
S. W. Rea.
J. A. Paul.

Fig. 2.



Inventor:
Charles A. de Lambert,
By James L. Norris.
att'y.

(No Model.)

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Fig. 3.

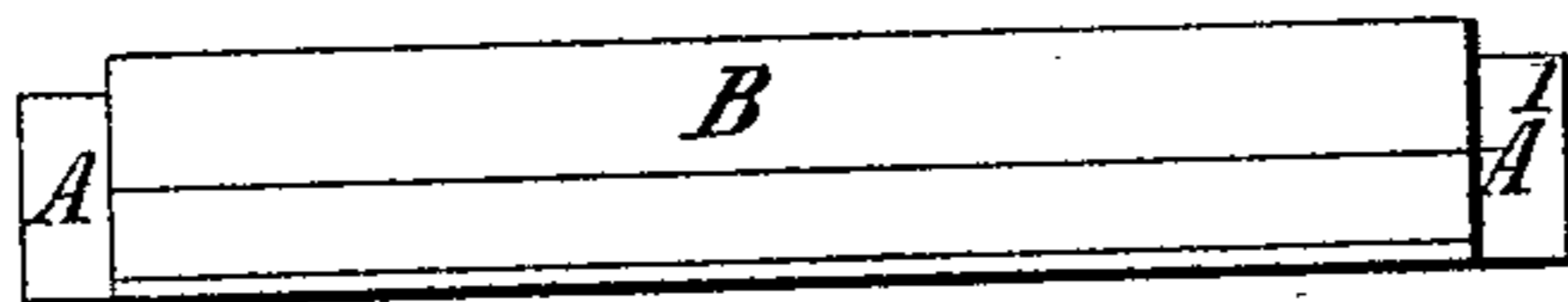
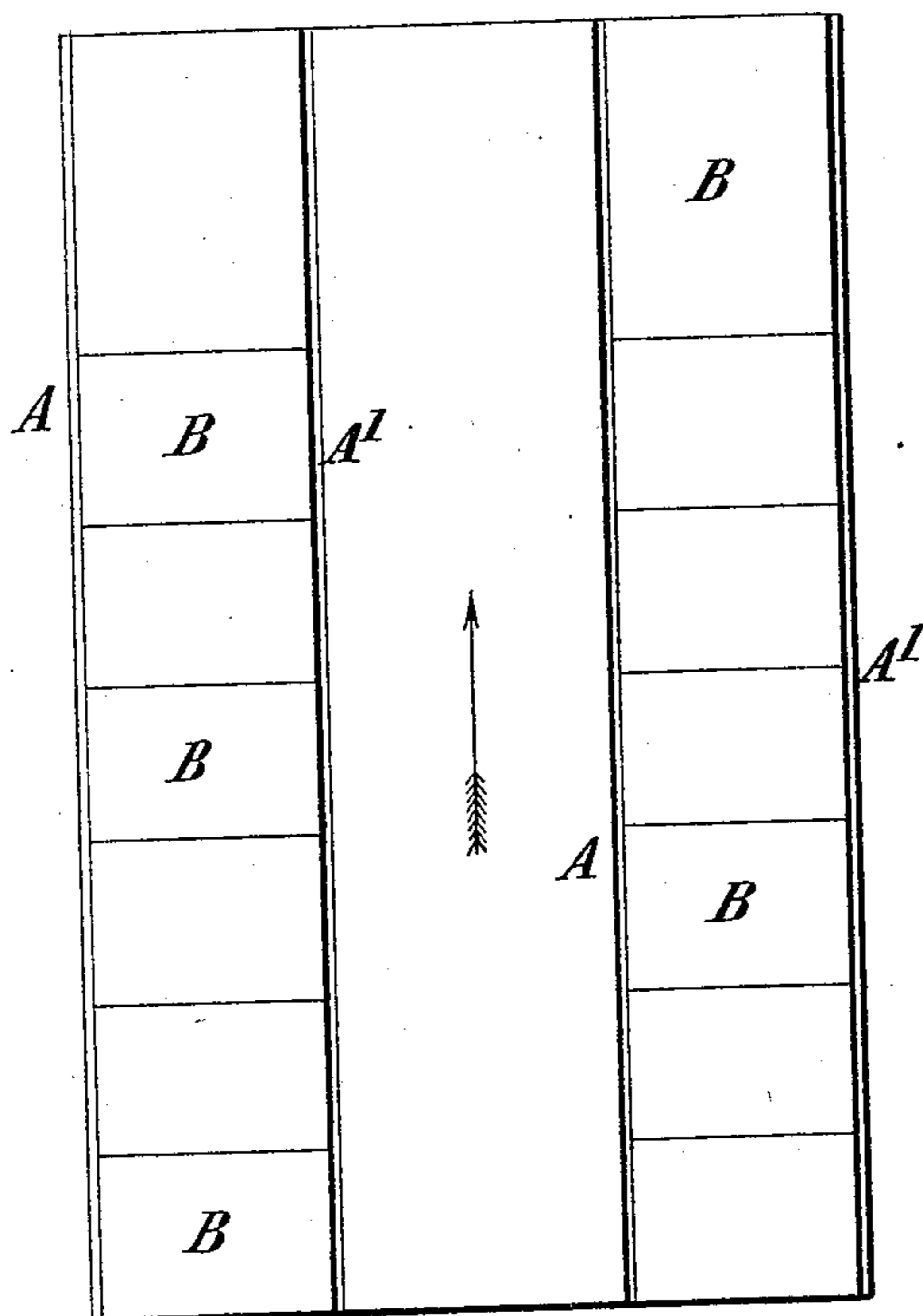


Fig. 4.



Witnesses:

G. W. Rea,

J. A. Saul

Inventor:

Charles A. de Lambert,

By

James L. Norris,

Atty.

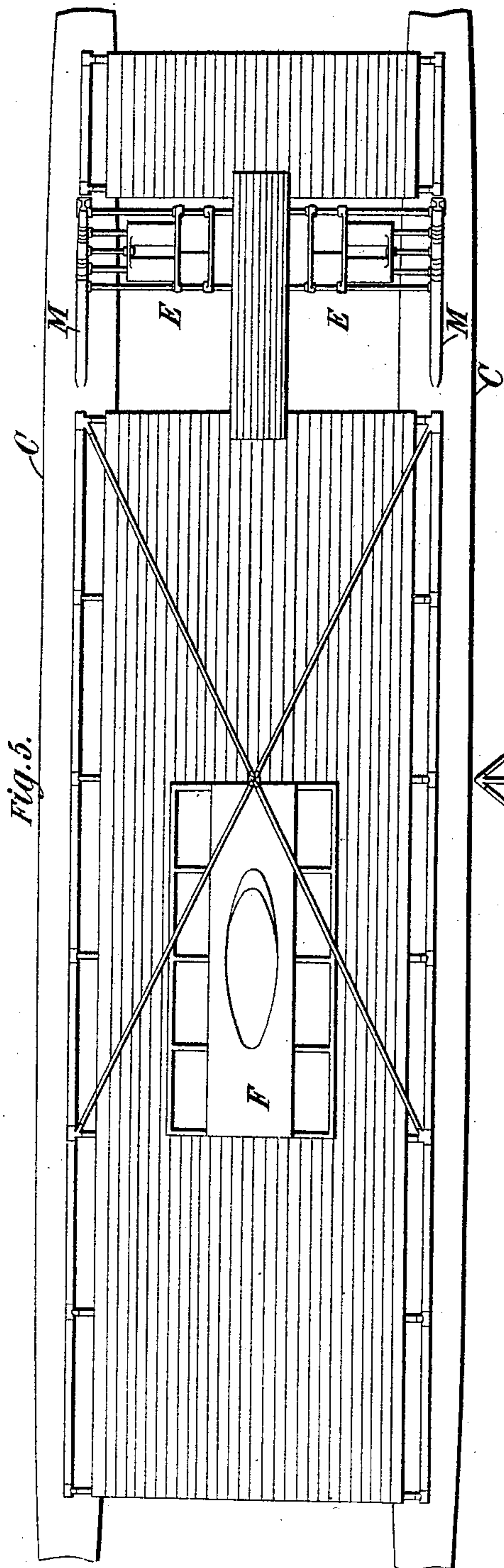
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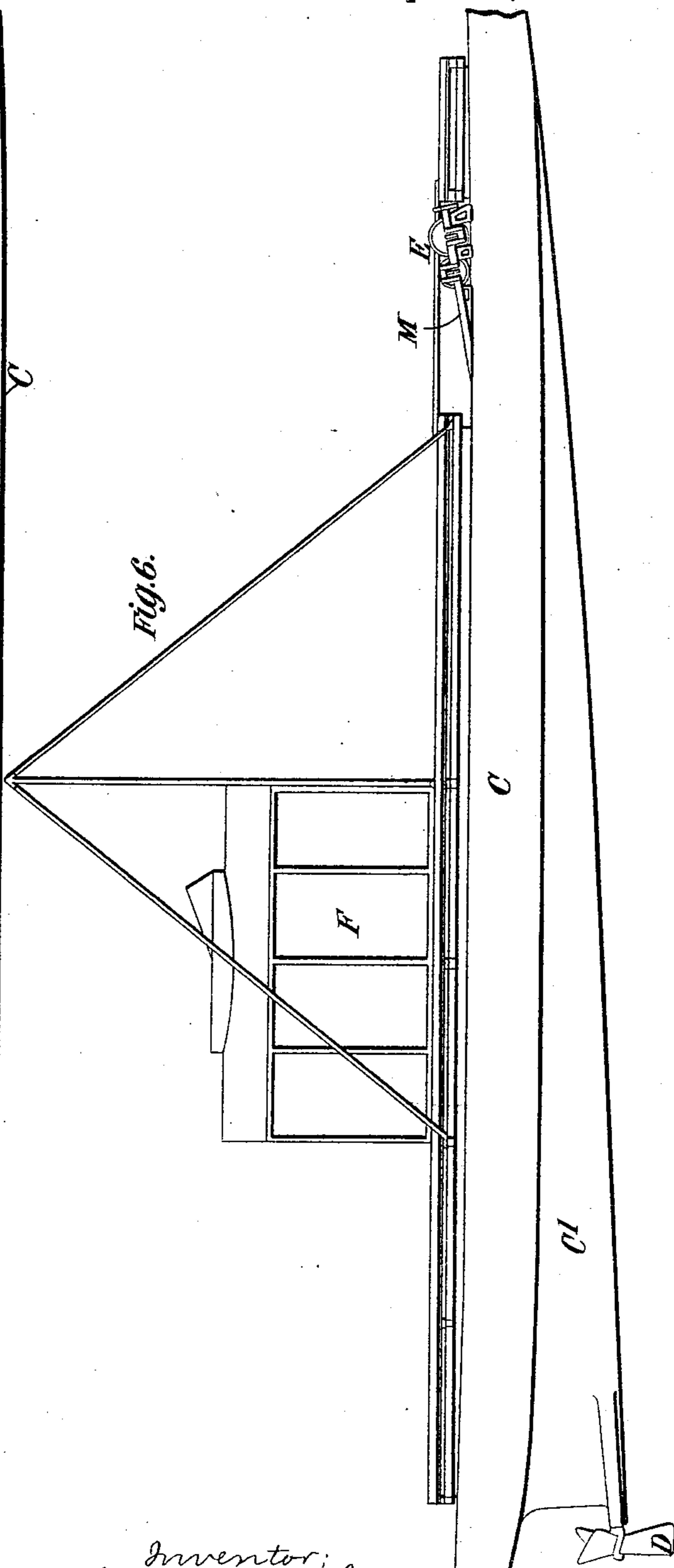
No. 538,527.

Patented Apr. 30, 1895.



Witnesses:
By *J. A. Saul*
J. A. Saul

Fig. 6.



Inventor:
Charles A. de Lambert
By *James L. Norris*
attor.

(No Model.)

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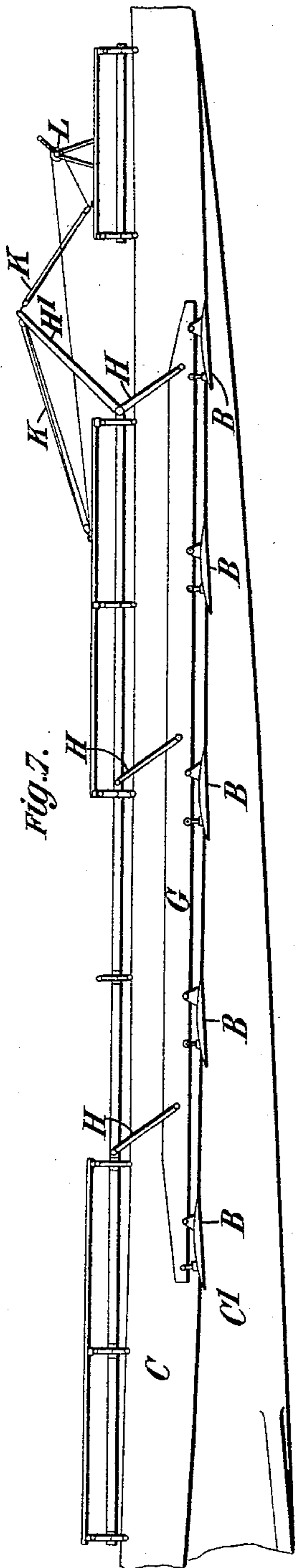
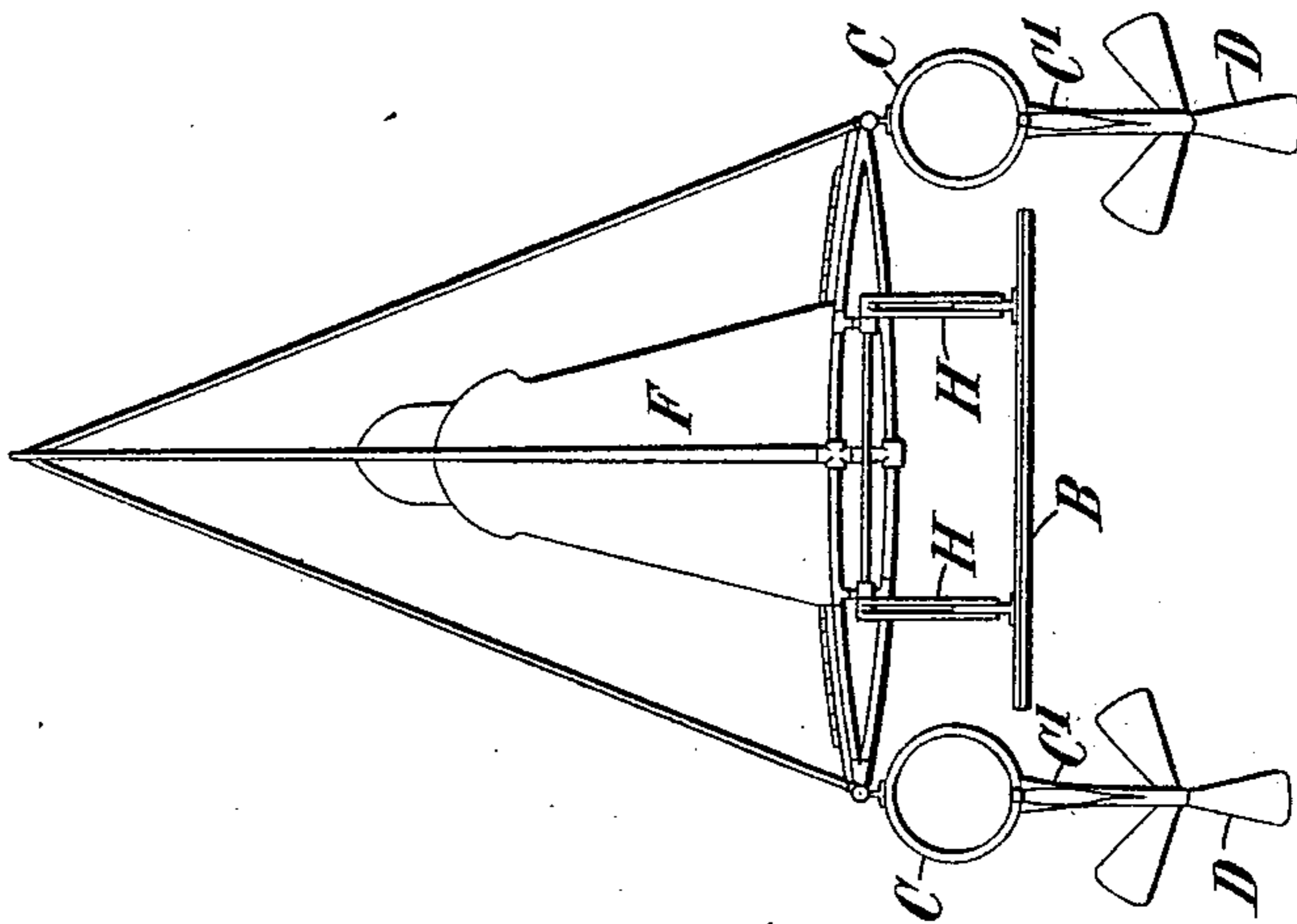


Fig. 7.

Fig. 8.



Witnesses;
G. W. Rea.
J. A. Saul.

Inventor;
Charles A. de Lambert,
By James L. Norris.
Atty.

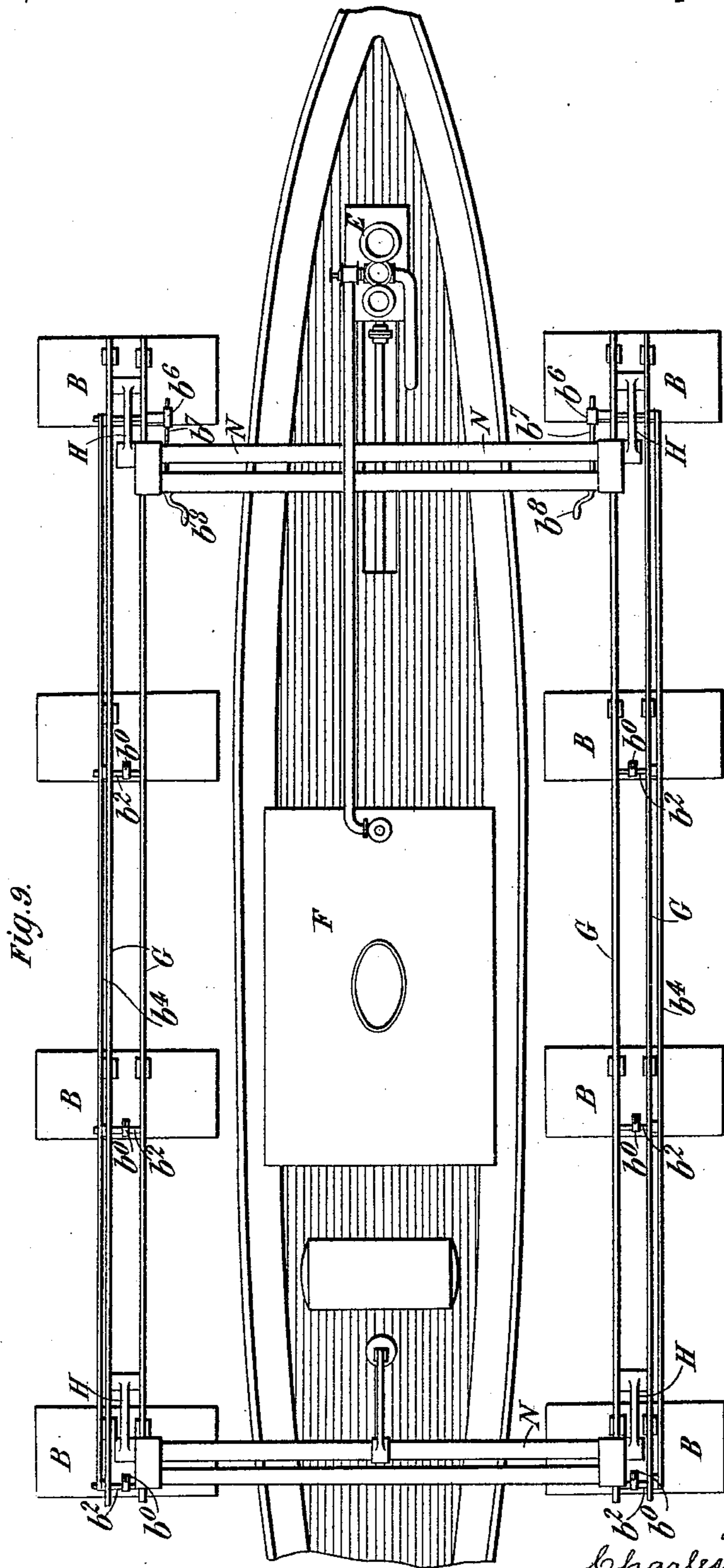
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Witnesses:
G. W. Rea.
J. A. Saul.

Inventor,
Charles A. de Lambert,
By James L. Norris.
Atty.

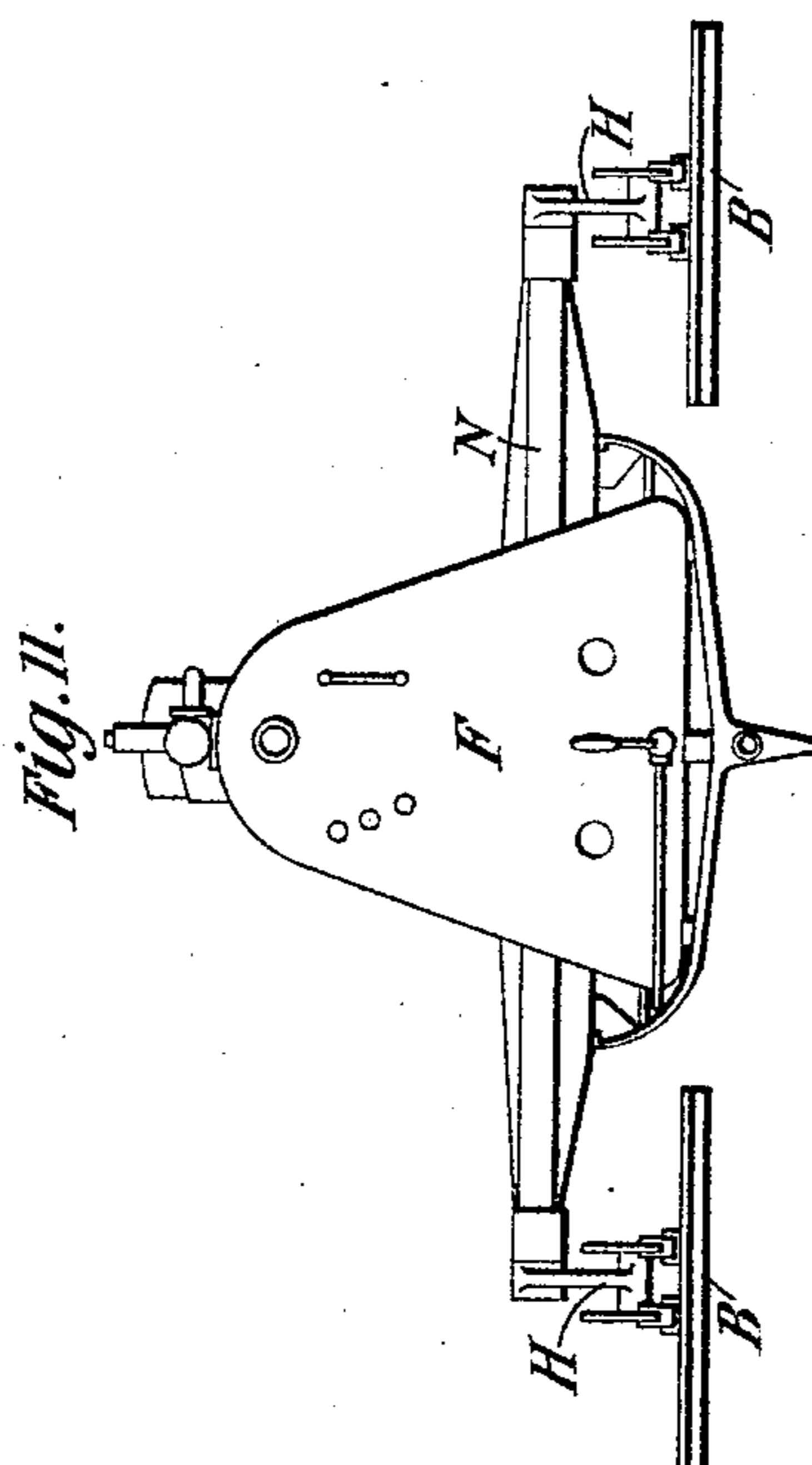
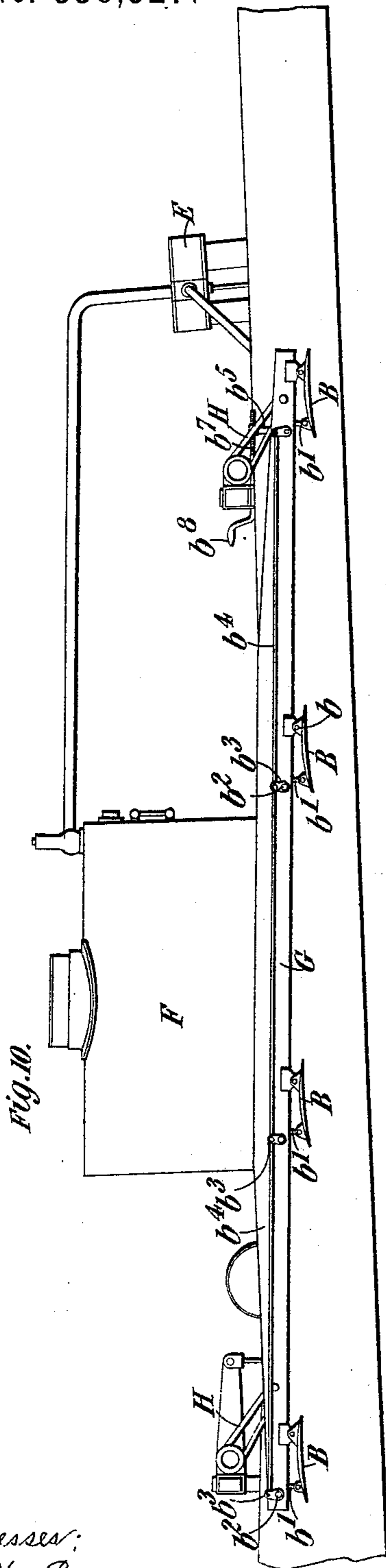
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No. 538,527.

Patented Apr. 30, 1895.



Witnesses:
G. W. Rea,
J. A. Saul.

Inventor:
Charles A. de Lambert,
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

CHARLES ALEXANDRE DE LAMBERT, OF VERSAILLES, FRANCE.

BOAT OR VESSEL.

SPECIFICATION forming part of Letters Patent No. 538,527, dated April 30, 1895.

Application filed October 1, 1894. Serial No. 524,628. (No model.) Patented in France August 13, 1891, No. 215,498.

To all whom it may concern:

Be it known that I, CHARLES ALEXANDRE DE LAMBERT, (Comte de Lambert,) a subject of the Emperor of Russia, residing at 64 Avenue de Paris, Versailles, in the Republic of France, have invented certain new and useful Improvements in Boats or Vessels, (for which I have obtained a patent in France, No. 215,498, dated August 13, 1891,) of which the following is a specification, reference being had to the accompanying drawings.

This invention has for its chief object to provide means for increasing the buoyancy and speed of boats or vessels so that when in motion they will skim over the surface of the water, or in other words will displace considerably less water when in motion than when at rest. Such boats or vessels will experience less resistance to their movement through the water by reason of their elevated position as compared with ordinary boats or vessels of the same size, and hence they will travel at a greater speed than ordinary vessels when propelled by the same power.

Many experiments have been heretofore made having for their object to construct a boat that will skim over the water in the manner above indicated, but it has been found that as the bow of such a boat advances it strikes the water with great violence and forces it downward. The water continues to descend for some little time and thus partially removes the support from the boat, and as a consequence that part of the boat above the depression in the water has a tendency to descend and of course to drag the remainder of the boat with it. Now when the effect of the impact is exhausted, the water commences its return movement and like a pendulum rises higher than its normal position, the whole movement, viz: the descent and the rise taking place very rapidly. By my invention I take advantage of this circumstance in such a manner that the boat, is maintained well on the surface of the water. I do this as follows: that is to say, I provide the boat or vessel with a number of blades or planes of a width or size suited to the boat, and placed at a suitable distance apart in a line extending from the stem toward the stern. When the for-

ward blade strikes the water, it produces the depression above referred to, but when the water rises again it does so at the moment when the second blade is passing the point of impact and exercises a lifting effect on that blade which prevents the boat sinking in the water. The second blade also produces an impact followed by a reaction in the manner above described on the third blade and so on through the whole series of blades. The upward impulse given to the blades succeeding the first blade will be proportional to the downward impulse given by the first blade. It will be observed that the distance between the blades must be such that the rise of the water coincides with the advance of each plane to the position previously occupied by the preceding plane when giving the impact, and hence it is necessary that the distance between the blades be proportioned to the speed of the boat. This constitutes a very important feature of my invention.

Another important feature is that the blades are made either flat or very slightly concave on their lower faces. I may make the blades fixed, but I prefer to so arrange that they can be raised and lowered to vary the height of the boat as desired when in motion. I also provide for varying the angle of the blades.

My invention also comprises various improvements in the boat as hereinafter described.

In the accompanying drawings I have shown how my invention may be conveniently and advantageously carried into practice.

Figures 1 to 4 are diagrammatic views intended to illustrate the principle underlying my invention, while Figs. 5 to 11 indicate practical applications of my invention.

Fig. 1 is a vertical longitudinal section of the lifting apparatus of the boat. Fig. 2 is a plan, and Fig. 3 is a vertical transverse section, of the same. Fig. 4 is a plan of a double set of lifting-blades placed one on each side of the boat. Fig. 5 is a plan, Fig. 6 is a side elevation, Fig. 7 is a longitudinal section, and Fig. 8 is a transverse section, of a boat with central lifting-blades constructed in accordance with my invention. Fig. 9 is a plan, Fig. 10

10 is a side elevation, and Fig. 11 is a transverse section, of a boat with lifting-blades on each side.

Like letters of reference denote corresponding parts in all the figures.

Referring to Figs. 1 to 4 which illustrate diagrammatically the devices that serve to lift the vessel to the surface of the water, A, A' are two longitudinal supports between which are placed a series of blades B, B. Said blades are pivoted to the supports A, A', so that their angle of inclination may be adjusted as required. In some instances it may be required to place them quite horizontally. I sometimes make the front blade as shown in Figs. 1 and 2 much longer from front to rear than the other blades to facilitate its passage over wreckage, waves and other obstacles. The blades may be arranged to follow closely upon each other or they may be set so that an interval exists between the rear edge of each and the forward edge of the next blade behind it. This space will be proportioned to suit the speed to be attained.

In Figs. 5 to 11 I have shown a practical mode of applying the lifting blades to the boat.

C, C Figs. 5 to 8 are two hollow cigar-shaped floats stayed and braced together at a suitable distance apart and each having a deep and narrow keel C', a propeller D, and a driving engine E.

F is the steam generator which is supported on the deck between and above the two tubular floats.

The blades B are placed between the tubular floats, and are supported by beams G which are suspended on swinging arms H. The latter can be adjusted to regulate the height of the blades. For this purpose I provide in some instances a tackle or tackles K, K controlled by a winch L, see Fig. 7, and connected with an arm H' secured on the spindle or shaft of one of the arms H. It will be obvious that by raising and lowering the arm H' the blades will be raised or lowered. I prefer to make the keels hollow and utilize the same as condensers. The propeller shaft M passes slantingly through the hollow float and keel from the engines which are placed preferably in the bow of the boat.

In the modification shown in Figs. 9, 10 and 11 I attach the lifting blades B to longitudinal beams or girders G suspended on each side to an ordinary shaped boat from arms H secured to transverse shafts N. I provide any suitable mechanism for turning said arms to raise and lower the blades to vary the height of the boat when traveling, or to raise the blades completely out of the water when desired. I also in some cases provide means for simultaneously varying the angle of all the blades, which in this case are pivoted to the supporting beams and are connected by suitable links to the adjusting mechanism. Such a device is shown in Figs. 9 and 10. The blades are in this case pivoted to the bars G near their forward ends at b and are sus-

pending at their rear ends by short links b' from a short crank b⁰, Fig. 9, fixed on a spindle b². The spindles are connected together by short cranks b³ Fig. 10 and a connecting rod b⁴. On one of the said spindles is fixed an arm b⁵ carrying a nut b⁶ in which works a screw threaded spindle b⁷. Said spindle is supported by a fixed part of the framing and is furnished with a handle b⁸ by which it can be rotated to raise and lower the rear ends of the blades and thereby simultaneously adjust the inclination of the blades.

With my improved boats two arrangements are possible, viz: First, the blades may be out of the water when the boat is put in motion. In this case, when sufficient speed has been attained, the blades are lowered and brought into contact with the water and are thus made to lift the floats or boat above the surface of the water. This disposition is illustrated in Figs. 5 to 11. Secondly, the blades may be submerged when the boat is put in motion. In this case by the effect of the inclined blades acting on the water the vessel is brought to the surface as in the preceding case.

In Fig. 1 X X' show the water line when the boat is at rest and Y Y' show approximately the position of the water line when the boat is in motion.

Any system of motor or propeller may be used and either paddles or screws may be employed.

The blades may as before stated be made with flat or with slightly concave faces, and be so arranged that their forward edges project above the surface of the water when the boat is in motion. In this position they will serve to gather or confine a quantity of air between their faces and the water. Such air will escape under the rear edges of the blades and in its passage across the faces of the blades will diminish skin friction and so increase the upward impulse and the speed. I prefer to so arrange the blades that their angles of inclination may be changed suddenly at any time for the purpose of checking or stopping the boat. The blades may in some cases be used where there are two sets of them for the purpose of steering by suitably increasing their angle of inclination on one side and so increasing the resistance on that side which will then drag. In this manner I can dispense with the need for a rudder.

I am aware that submarine vessels have been provided on their opposite sides with series of floats or fins carried on the ends of transversely arranged crank shafts extended through the vessel so that by a simultaneous adjustment of the various crank shafts the attached floats or fins can be turned to such inclinations as will cause the submarine boat or vessel to descend or to rise in the water or to move through the water in a horizontal direction. This I do not claim.

What I claim is—

1. The combination with a boat, of a series of adjustable blades or vanes supported one

behind another and having their forward edges projecting above the surface of the water when the boat is in motion, and mechanism, substantially as described for raising said
5 blades out of the water and for lowering the same into the water, substantially as set forth.

2. The combination with a boat, of the hollow floats C on opposite sides, and a series of adjustable blades or vanes B placed one be-
10 hind another and suspended from pivotal supports in such manner that their forward edges will project above the surface of the water when the boat is moving, substantially as described.

15 3. The combination with a boat, of the swinging arms H having a pivotal connection

with the boat and depending therefrom on each side, the beams G suspended from said arms and extended along opposite sides of the boat, a series of adjustable blades or vanes 20 pivoted to said beams and arranged one behind the other, means for adjusting the inclination of said blades, and mechanism for raising and lowering the swinging arms, substantially as shown and described.

In testimony whereof I have hereunto set
my hand this 11th day of September, 1894. 25

CHARLES ALEXANDRE DE LAMBERT.

Witnesses:

CLYDE SHROPSHIRE,

D. T. S. FULLER.