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PATENTED FEB. 13, 1906.

J. B. I. A. JULHE.
CONSTRUCTION OF SHIPS' HULLS.

APPLICATION FILED FEB. 7, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

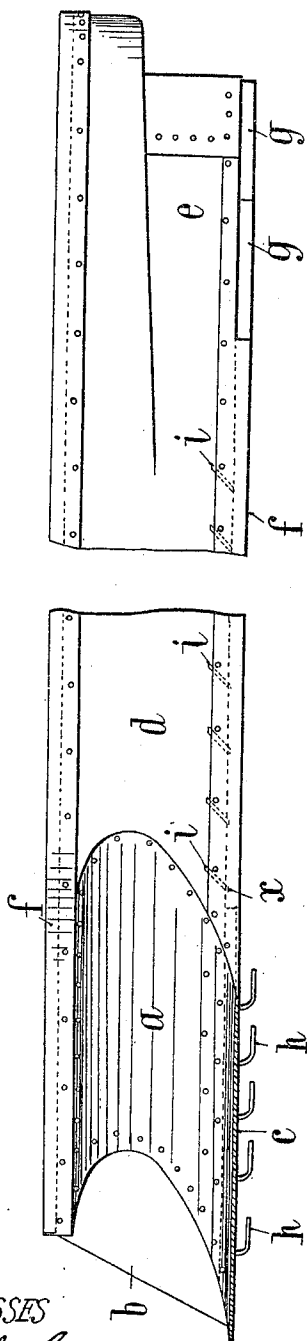
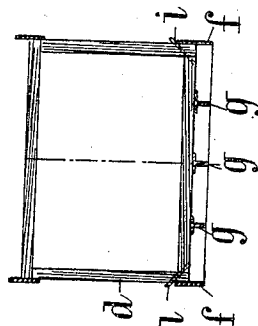


FIG. 2.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 3

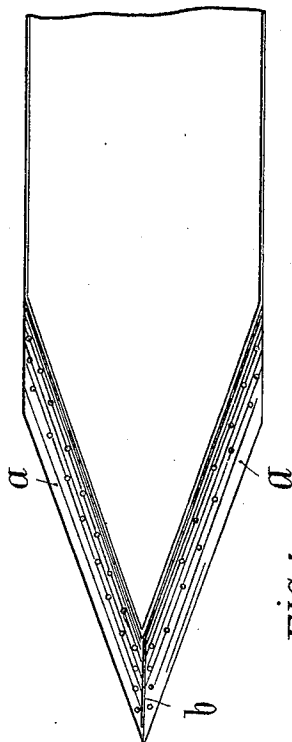
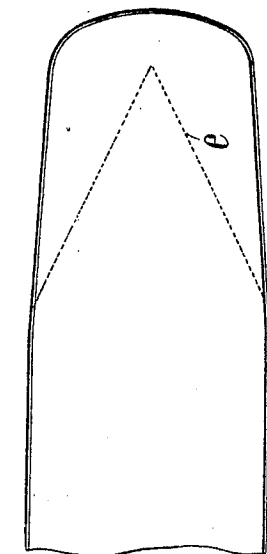


FIG. 4

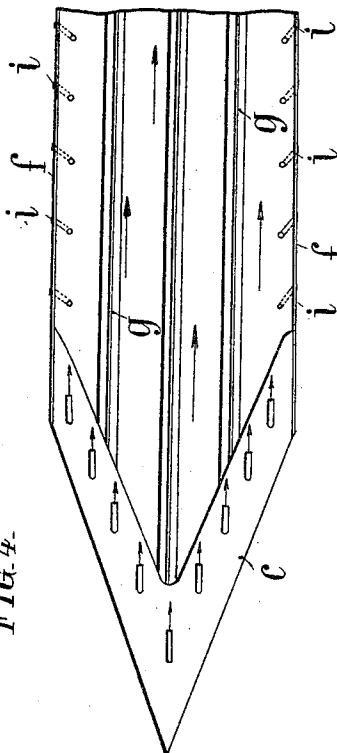
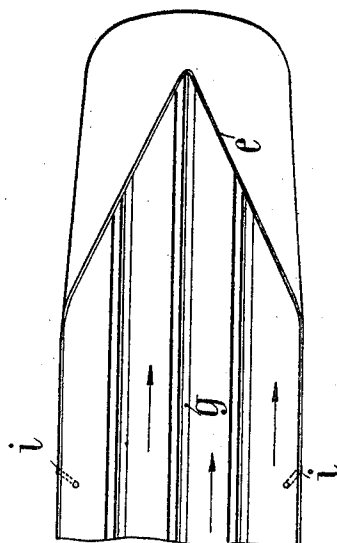


FIG. 5

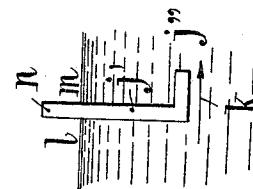
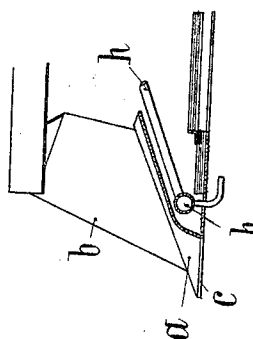


FIG. 6



WITNESSES

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UNITED STATES PATENT OFFICE.

JEAN BAPTISTE ISIDORE ARMAND JULHE, OF ST. MANDÉ, FRANCE.

CONSTRUCTION OF SHIPS' HULLS.

No. 812,656.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed February 7, 1905. Serial No. 244,607.

To all whom it may concern:

Be it known that I, JEAN BAPTISTE ISIDORE ARMAND JULHE, a citizen of the Republic of France, residing at St. Mandé, in said Republic, have invented certain new and useful Improvements in Ships' Hulls, of which the following is a specification.

This invention relates to ships' hulls, and has among its objects to provide an improved form of hull by which the resistance of the water at the bow and along the sides and bottom is greatly decreased, so that a corresponding increase of speed is effected without enlarging the engines, and therefore necessarily increasing the capacity of the coal-bunkers.

The novel features of the invention will be described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a ship's hull constructed in accordance with the invention. Fig. 2 is a transverse section through the same. Fig. 3 is a plan view of the improved hull. Fig. 4 is a bottom view of the same. Fig. 5 is a detail elevation, partly in section, of the bow, showing the manner of mounting the air-supply pipes; and Fig. 6 is a diagrammatic view of an experimental apparatus for showing the effect of the air-jets delivered by said supply-pipes.

Similar parts are designated by corresponding reference characters throughout the several views.

One of the objects of the invention is to reduce to a minimum the resistance of the water upon the bow of the vessel. To this end the improved hull is provided with a bow of the form to be now described.

In the drawings, *d* denotes the body or hull of the ship, which hull is preferably of rectangular cross-section, as shown in Fig. 2. The front portion of the hull is made tapering, and in order to deflect the water to either side the bow is made in the form of a double moldboard *a*, such as used in plows, said moldboard being of the same width as the hull. At the point of connection of the two moldboards and projecting forwardly from the vessel is a vertical plate *b*, which is preferably made of steel and is adapted to act as a cutting edge. Said plate also imparts the necessary rigidity to the point formed by the two moldboards and causes the water to be passed to both of the latter which deflect it upwardly and to one side.

The second part of the invention relates to improved means for decreasing the resistance of the water upon the sides and bottom of the hull. In order to explain fully the means by which this object is carried out, reference is to be had to the experimental apparatus. (Shown diagrammatically in Fig. 6.) In said figure, *j* denotes a tube bent at right angles at a point below the level of the water, in which said tube is almost completely immersed. When said tube is dipped into a current of water moving in the direction indicated by the arrow *k*, it will be seen that the water entering the tube at its lower end does not reach the level *lm* and that the quicker the flow the lower will be the level of the water in the tube until when the speed of flow at the point *j''* becomes greater than about twice the difference of level between the points *j''* and *lm* water no longer enters the tube, and if the current be further increased air-bubbles will appear at *j''*. It is obvious that at this moment the layer of liquid situated at *j''* is subjected to the action of two forces, one tending to raise it into the interior of the tube up to the level *lm* and the other produced by the current acts in the opposite direction to the former and is equal or superior thereto, according to the speed of the current. If the principle just demonstrated be applied to a vessel and a similar tube be suspended from the bow of the latter in such a manner that the horizontal branch of said tube is under the keel pointing in a direction opposite to that of the movement of the ship, the water will rise in that tube to different levels, according to the speed of the ship, and the resistance opposed to air forced into said tube will be the smaller the lower the column of water—that is to say, the greater the speed of the ship.

A number of air-tubes *h* of the character described are applied to the improved ship's hull, preferably depending from a platform *c*, which extends across the bottom of the bow and is of the form shown in Fig. 4. The platform *c* extends downwardly from the bottom of the hull, as shown in Figs. 1 and 5, and the air-tubes mounted upon the same are disposed rearwardly, so as to be in line with a number of longitudinally-extending channels or compartments formed by longitudinally-extending ribs or keels *g*, attached to the bottom of the hull at the rear of said platform and extending approximately throughout the length of the hull. The edges of the

bottom are provided with flanges *f*, which correspond in depth to the ribs *g*, and inclose the bottom of the hull at its sides. The stern *e* terminates in a wedge, the portion below the water-line being recessed at either side to provide space for suitable propellers. In order to decrease the resistance of the water upon the sides of the ship, the latter are provided with air-supply pipes *i*.

When the improved hull is being propelled through the water, the plate *b* serves to cut the same and to uniformly deflect the water to the moldboards *a*, which in turn serve to deflect it in upward direction and to either side of the ship. Air is supplied in any suitable manner to the pipes *h* and *i*, so that the resistance of the water upon the bottom and sides of the vessel is noticeably decreased. At the rear of the platform *c* a layer or mattress of air is formed which is prevented from rapid displacement by the same. The air in issuing from the pipes *h* is conducted rearwardly and the bubbles formed rise and burst in the compartments between the several keels or ribs, which, together with the flanges *f*, serve to confine said layer or mattress of air, which materially reduces the friction. The pipes *i* are preferably inclined upwardly, as shown,

it having been found that this disposition gives the best results in decreasing the frictional resistance upon the sides of the vessel.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A ship's hull having a bow in the form of a double moldboard of a width corresponding to that of the hull.

2. A ship's hull having a flat bottom provided with a plurality of keels, a platform extending across the front of said keels, and air injectors carried by said platform.

3. A ship's hull having a flat bottom provided with a plurality of keels, a platform extending across the front ends of said keels, and rearwardly-disposed air-injecting tubes extending downwardly from said platform below said keels and directed rearwardly in line with the spaces or compartments between the latter.

In testimony whereof I have signed this specification, this 12th day of April, 1904, in the presence of two subscribing witnesses.

JEAN BAPTISTE ISIDORE ARMAND JULHE.

Witnesses:

EMILE LEDRET,
JOHN BAKER.