R. H. TUCKER.

Pneumatic Propulsion of Vessels.

No. 215,842. Patented May 27, 1879.

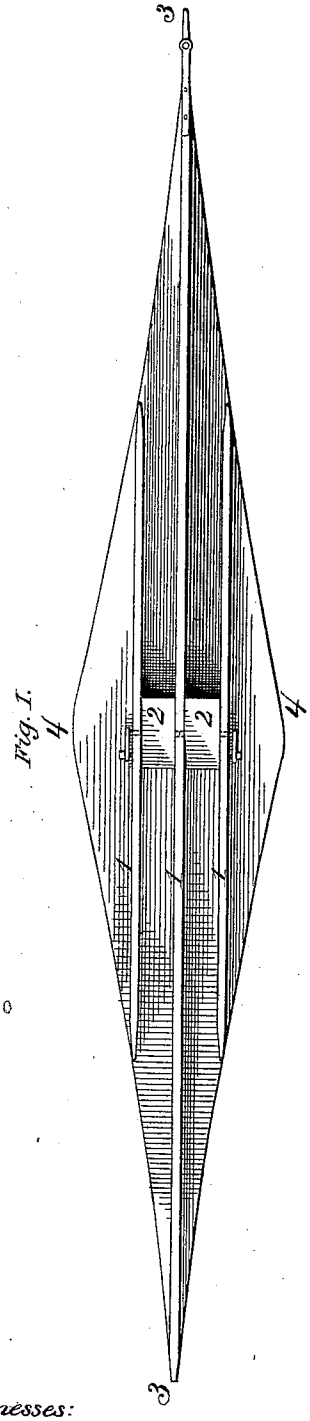


Fig. 1.

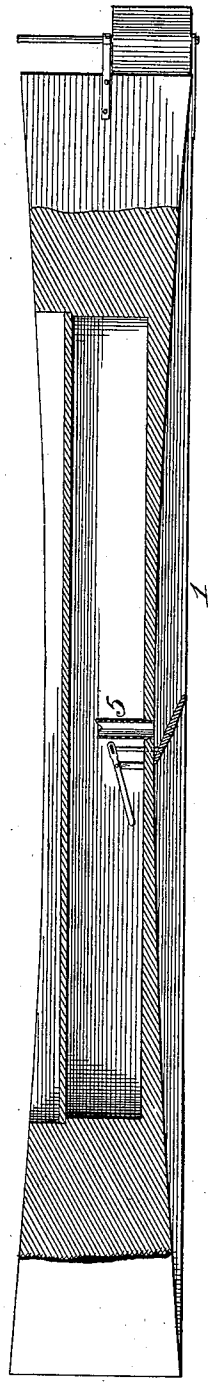


Fig. 2.

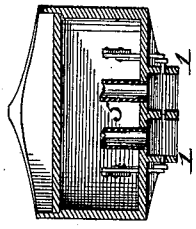


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

RICHARD H. TUCKER, OF WISCASSET, MAINE.

IMPROVEMENT IN PNEUMATIC PROPULSION OF VESSELS.

Specification forming part of Letters Patent No. **215,842**, dated May 27, 1879; application filed November 1, 1878.

To all whom it may concern:

Be it known that I, RICHARD H. TUCKER, of Wiscasset, Lincoln county, Maine, have invented an Improvement in the Construction of Ships, of which the following is a specification.

My invention has for its object the more direct and efficient application of blasts of air to the propulsion of ships, and in the adaptation of the form of the ship to this particular mode of propulsion.

It consists, first, in the provision of two or more keels extending the entire length of the ship, having a valve or valves located in the space or spaces between the keels, and having also a pipe or pipes arranged to conduct the blast of air in such direction as to cause it to strike against the said valve and be directed thereby against the water.

It consists, further, in giving to the bottom of the hull an upward curve in the center, and in a peculiar shape of the sides, the details of which improvements are more fully set forth and particularly claimed hereinafter.

Figure 1 is a plan view of the bottom. Fig. 2 shows a longitudinal section, and Fig. 3 a transverse section, of my improved ship.

In all the figures, 1 represents the keels. They must be at least two in number, but the construction shown in Figs. 1 and 3 is the most convenient. The central keel extends from stem to stern, and in no way differs from that in ships of ordinary construction. The two other keels are at such distance as to leave space or channels sufficient for the operation of the air upon the water between them. Located at any suitable point in these channels, preferably midway, are valves 2 2, which fit snugly between the keels and turn in bearings in them, so as to be capable of reversal or of movement to any desired angle in relation to the bottom of the ship. For the operation of these valves I have shown a crank and wrist-pin on the shaft of the valve prolonged beyond the bearing, which wrist-pin a pitman connects to a lever. This manifestly may be indefinitely modified, and a great variety of devices known to mechanics used to operate and control the valves. Directly over the central part of the valve a central vertical pipe, 5, is located for the purpose of conducting the current of air to the valves. This may be connected to any convenient form of blower located within the hold of the ship.

It will be observed in Fig. 2 of the drawings that the bottom of the ship is curved upwardly from the ends to the center. This curve I prefer to make on a scale of one to sixty, though it may be varied without material disadvantage. The purpose of this is to give depth of keel at the valves, and at the same time afford depth of the ship at stem and stern and greater hold upon the water in sailing.

The figures show that my apparatus is adapted to and allows the use of a flat bottom and vertical sides approximating as nearly as practicable to that shape which permits the craft to displace the water nearest the surface.

In the plan view of Fig. 1 it will be further observed that the shape of the ship is approximately that of a double wedge. The sides, however, from 3 to 4 curve inwardly in a slight degree at a ratio of one (1) to twenty (20). This, I have found, gives the best results in sailing.

Although I have shown the valves pivoted and movable, they may be fixed, if desired, in any kind of craft.

Obviously, for the purpose of backing or regulating the pitch of the valves, it is preferable to have them pivoted, and in any ordinary craft I intend to arrange them in this manner. I have found that it is not necessary that the valves should be so far turned that the elevated edge shall touch the bottom of the channel, as shown in the drawings, as good results have been obtained with the valves only slightly moved from the horizontal line.

The operation of the air upon the valve and upon the ship is easily understood from the construction and the general principles of the operation of fluid substances under pressure.

The pipe which conducts the air to the channels should be made as small as is consistent with the transmission of the air. The space between the keels becomes practically a chamber in which the bottom of the vessel forms the top, the keels the sides, and the water the bottom and ends.

The pressure of the air is in accordance with well-known laws, depending in amount upon

the relative size of the pipe and the space below. The side of least resistance for the escape of air will obviously be that opposite the inclined valve, or (when the valve is in its normal position for going ahead) toward the stern, the valve, which practically becomes the propelling-blade, receiving the constant pressure of the compressed air.

The action of this precise form of sailing-vessel and propelling apparatus I have found, by trial, to be excellent; but I do not confine myself strictly to the proportions shown, nor to the precise construction of the subordinate apparatus by which the valves are moved and controlled.

It is necessary, as has been stated, for the purpose of backing, that the valves should be movable and controlled. Such a regulation and control of the valves and the blasts of air is also exceedingly serviceable in turning, the air being made to act in opposite directions, to assist the action of the rudder.

This method of propulsion gives opportunity to use the form of rudder shown, which has the post nearly in the middle, thus rendering it more easy of management.

I am aware that the air-blast has been used in connection with various forms and arrangements of pipes for the propulsion of vessels, and do not broadly claim the general plan.

I am also aware that channels have been formed upon the inclined after portion of the ship, to afford ways for the air to act against the water, with air-passages inclined to direct the air into the channels.

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

1. The combination of the keels extending from stem to stern nearly, and serving the purpose of ordinary keels, the valves located in the space between the said keels, and the air-pipe, constructed to operate in the manner set forth.

2. The combination of the bottom, curved equally to the center from stem to stern, the keels extending substantially the entire length, the pivoted valve between the keels, and the pipe directed vertically downward to the center of the valve, as set forth.

3. The combination of the keels, the valve pivoted therein and operated in the manner shown, and the air-pipe, all as set forth.

4. A craft provided with keels or equivalent devices and air-pipes operating in connection therewith upon the water, for the purpose of propulsion, and also formed in the double-wedge shape, with the inwardly-curved sides, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RICHARD H. TUCKER.

Witnesses:

L. W. SEELY,

J. W. HAMILTON JOHNSON.