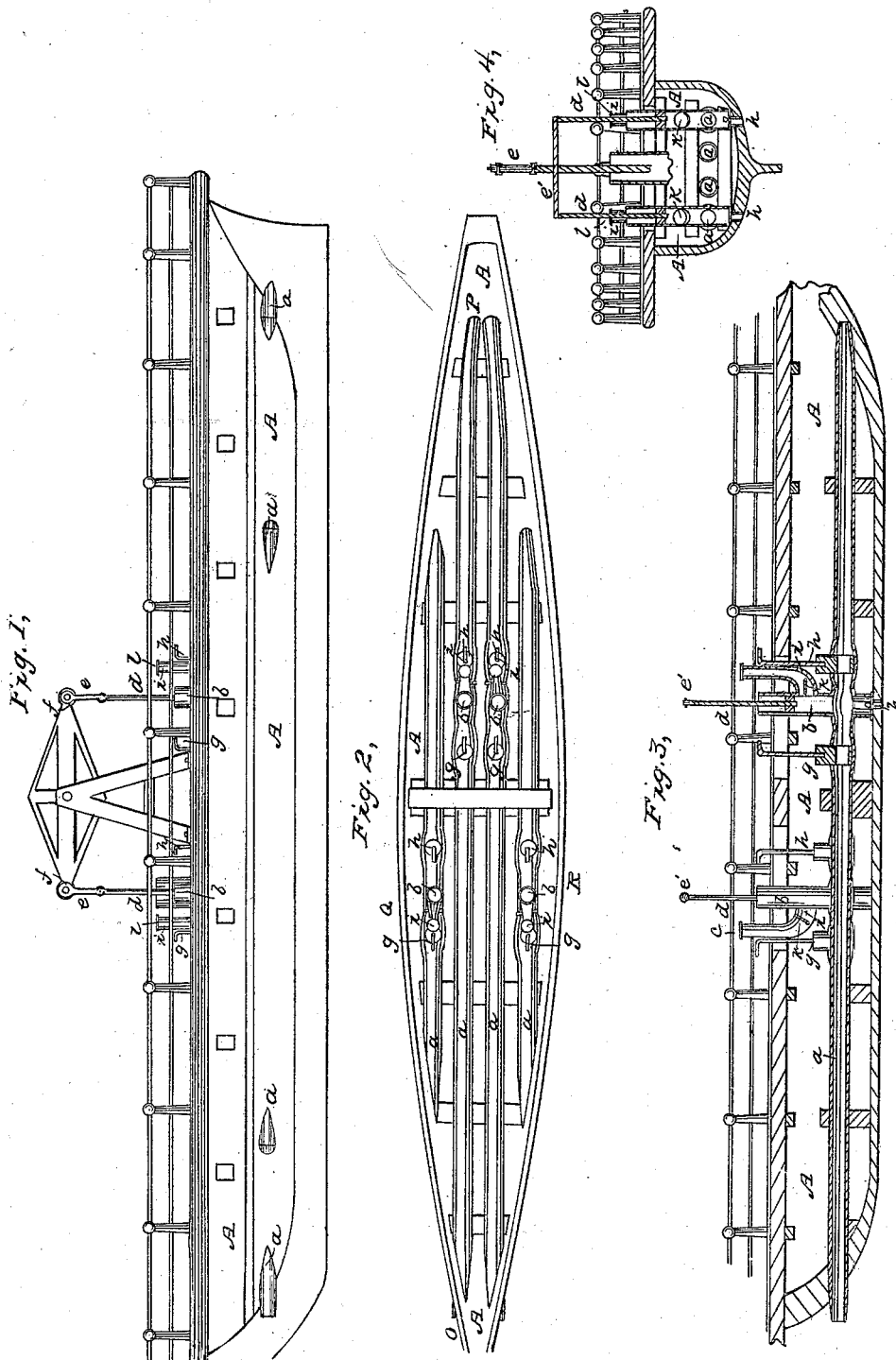


Pneumatic Propeller.

No. 2,477.

Patented March 4, 1842.



UNITED STATES PATENT OFFICE.

STEPHEN BATES AND GEO. TITCOMB, OF BOSTON, MASSACHUSETTS.

MACHINERY FOR PROPELLING BOATS AND EXTINGUISHING FIRE.

Specification of Letters Patent No. 2,477, dated March 4, 1842; Antedated September 4, 1841.

To all whom it may concern:

Be it known that we, STEPHEN BATES and GEORGE TITCOMB, both of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Machinery for Propelling Boats, Vessels, &c., and that the following is a full and exact description of the same, reference being had to the accompanying drawings, which will be hereinafter described and which, taken in connection herewith, form our specification, wherein we have set forth the principles of our said invention, by which it may be distinguished from others for a similar purpose, together with such parts, improvements, or combinations as we claim and for which we solicit an exclusive property for fourteen years, to be secured to us by Letters Patent.

Figure 1 of the accompanying plate of drawings is a side elevation of a boat, with our improved apparatus applied. Fig. 2, is a plan of the same with the top or decks removed. Fig. 3 is a longitudinal vertical section through the center on the line O P and Fig. 4, is a cross vertical section on the line Q R.

A A A is the woodwork or hull of the boat, which may be of the shape represented in the drawings or of any other desirable model.

a, a, a, a, Figs. 1, 2, 3, 4 are four horizontal pipes or cylinders which may be formed of any suitable metal and arranged in the bottom or lower part of the vessel or boat, with their diminished mouths or orifices at one end, passing through the sides of the vessel near or under what is usually termed the counter, and communicating directly with the water in which the vessel is afloat, which flows in freely by hydrostatic pressure. The other ends of these pipes likewise communicate with the water, by passing through the curved part of the bows as shown in Figs. 1 and 3.

b, b, b, b, are four upright cylinders, entering into and communicating with the horizontal pipes *a, a, a, a* at any convenient parts of the same. Plungers or pistons *c, c, c, c* Figs. 3, 4, are arranged in these upright cylinders, (or pumps as we denominate them), the rods *d, d, d, d*, of which are connected, through the intervention of connecting arms *e, e*, and cross rods *e'* to the ends of a working beam *f f* of a steam engine, which may be worked in any of the various ways.

The main feature in the part of our invention above described is, diminishing the bore or diameter of the horizontal tubes at their orifices, or making them smaller in this dimension than the upright cylinders, as shown more particularly in the longitudinal section Fig. 3, which greatly enhances the speed of the boat. This may be explained as follows. When the pistons are made to ascend, by the action of the engine, the water entering by hydrostatic pressure the horizontal tubes, (and through tubes with valves on their tops which conduct through the bottom of the boat, and which will be more particularly described hereafter), follows the pistons in the upright cylinders *b, b, &c.*, and when they descend, the water is returned or forced out, and the vessel is propelled ahead, (theoretically), a distance equal to the length of the column of water which is ejected of the diameter of the orifices of the pipes *a, a, a, a*. This column is evidently longer than it would be were the horizontal pipes of the same diameter throughout and consequently, (the power of the engine being made adequate to perform the stroke of the piston in the same time as it would were these pipes of the same diameter throughout), the velocity of the boat would be greater with our improved arrangement, being subject to the same increase by the acquisition of momentum as in ordinary cases. It will be seen that the process of ejection is constant and consequently the propulsion of the boat is so likewise, inasmuch as there are four pistons, (two at each end of the beam *f f*), so that while one set is ascending the other is descending the ingress and egress of the water both serving to propel the vessel. There may be more pipes than are mentioned in the above described arrangement, so that several streams may be working at the same time to propel the vessel if the same should be deemed necessary.

Two sets of ordinary stop-cocks, viz, *g, g, g, g*,—*h, h, h, h* are inserted in the horizontal tubes, respectively in front and rear of the upright cylinders *b, b, b, b*, as shown in Figs. 2 3, 4, those denoted by *g, g, &c.*, serving to open or close the communication through the pipes with the water at the bows of the vessel or boat, and those represented at *h, h, h, &c.*, performing the same office with reference to the water at the stern. By the proper use of these stopcocks, the

vessel, (it will be seen without further explanation) can be propelled either forward or backward at pleasure.

An apparatus for extinguishing fire is 5 connected and may be used with our improved propelling machinery, and with much effect even while the latter is in operation, or the stopcocks above described may be all closed, so that the whole force of the engine may be used in throwing water for 10 extinguishing fire. The apparatus consists of curved pipes *i, i, i, i*, having suitable stopcocks *k, k, k*, &c., arranged in the sides of the pumps as shown in Fig. 3, to the top of 15 which pipes, engine hose may be screwed in the ordinary way which may conduct the water to any part of the vessel, caps *l, l, l*, &c., being screwed on the tops of the pipes *k, k, k*, when the hose is not attached. From 20 this it will be perceived, that when the stopcocks *k, k, k* in the fire-pipes are opened, a portion of the water which is drawn into the pumps by the ascent or upward motion of the pistons, will, on the descent of the same, 25 (while the vessel is being propelled ahead), be forced through the said fire tubes for the purpose above specified, as this portion has only the resistance or weight of the atmosphere to contend with. The smallness of the 30 fire pipes it should be observed, prevents the whole quantity from passing out this way when it has other outlets by which it can escape. But if we wish to use a large quantity of water for extinguishing fire and to take 35 the whole power of the engine for this purpose, all the stopcocks in the horizontal pipes should be closed, the water being drawn up through pipes *n, n, n*, &c., which pass through the bottom of the vessel to the water beneath, 40 and open into the horizontal pipes *a, a, a*, opposite to where the pump cylinders enter

the same. On the top or mouths or in any convenient part of these pipes *n, n*, &c., valves *o, o, o*, are arranged opening upward the operation of which will be readily un- 45 derstood. Thus it will be seen, that when the action of the propelling machinery is checked, by turning the stopcocks, the steam-engine may work the pumps so as to effectually arrest the progress of the flames and 50 check the most extensive conflagration.

It is scarcely necessary to observe, after the above description, that in our propelling apparatus, the power of the steam-engine is made to operate directly upon the resistance 55 or surrounding water, without the intervention of the crank and all the intricate machinery used in the common propelling apparatus, which it will be admitted is a great advantage. 60

Having thus described our improvements, we shall only claim as our invention in the above described machinery—

The propelling cylinders provided with valve-pipes, conducting through the bottom 65 of the vessel, and with horizontal pipes, having stopcocks, in combination with the fire-pipes, of smaller diameter arranged in the side of said propelling cylinders and having suitable stop cocks substantially as described—for propelling the vessel and ex- 70 tinguishing fire—and likewise exclusively for extinguishing fire, as described.

In testimony that the foregoing is a true description of our said invention we have 75 hereto set our signatures.

STEPHEN BATES.
GEORGE TITCOMB.

Witnesses:

R. N. EDDY,
HENRY PARK,
G. T. HIBBURN.