H. Ronalds.

Pneumatic Propeller.

No. 1,899. Patented Dec. 14, 1840.

Fig. 1.

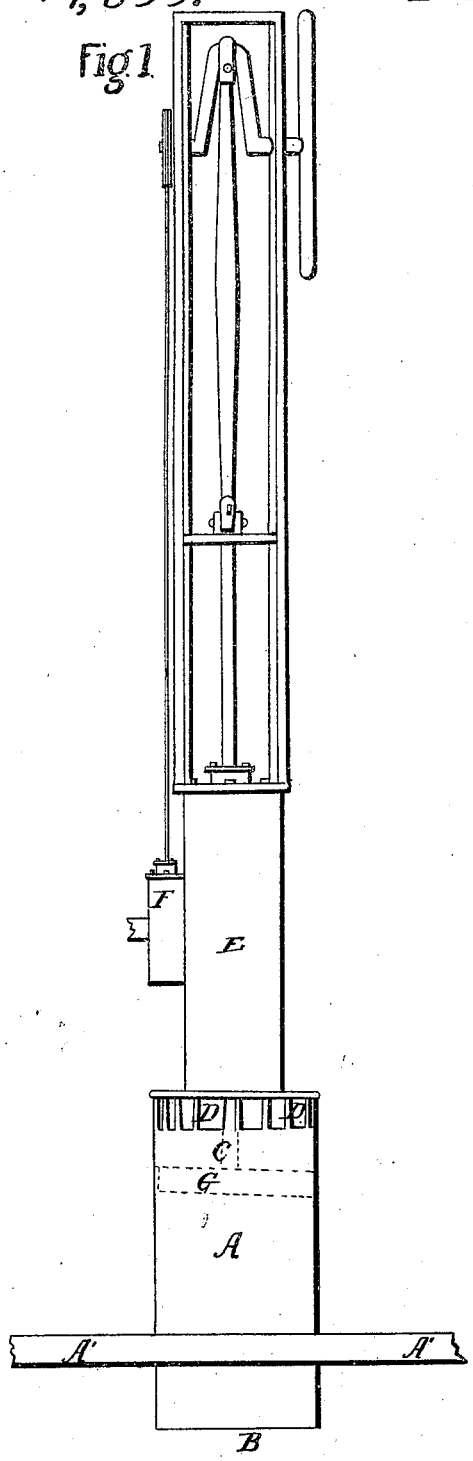


Fig. 2.

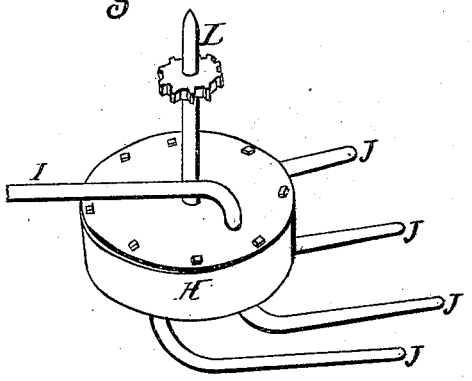


Fig. 4.

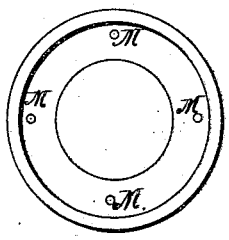


Fig. 3.

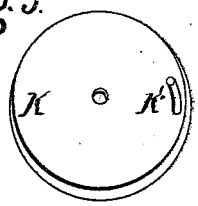
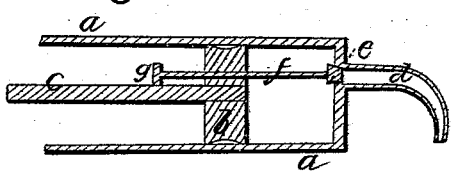


Fig. 5.



UNITED STATES PATENT OFFICE.

HUGH RONALDS, OF ALBION, ILLINOIS.

APPARATUS FOR PROPELLING BOATS, &c., BY MEANS OF JETS OF WATER DRAWN IN AND FORCED OUT BY PUMPS.

Specification of Letters Patent No. 1,899, dated December 14, 1840.

To all whom it may concern:

Be it known that I, HUGH RONALDS, of Albion, in Edwards county, in the State of Illinois, have invented an improvement in the manner of propelling vessels by the reaction of water, which is acted upon by pistons moving water-tight in cylinders which lie horizontally in the lower part of the vessel and which open in the direction of the stern; and I do hereby declare that the following is a full and exact description thereof.

Numerous attempts have been made to propel vessels by the reaction of water forced out through cylinders in the direction of their sterns; but in all those plans, so far as I am informed, the water so forced out has been drawn in at the bows, or supplied by means of pumps obtaining the water to be forced out from below, or from other parts of the vessel.

The distinguishing feature of my improvement is, that air is freely admitted on the inner side of the piston; while the water, against which the piston acts, is admitted into the cylinder at the same opening through which it is forced out; the propelling piston not being forced back with greater velocity, than that which is due to the head of water above it; so that no power shall be applied to draw the water back into the cylinder, but, while any required speed is given to the piston upon its outward stroke, the return stroke shall be under a velocity not greater than that by which the water will follow it by its own hydrostatic force.

Figure 1, in the accompanying drawing represents one of my propelling cylinders, in connection with a steam cylinder, by means of which the piston of the propelling cylinder is to operate; this steam cylinder, with its appurtenances, is similar in all respects to such as are in common use. A, is the propelling cylinder which lies horizontally in the lower part of the vessel, and has its end B opening out through the stern, or in the direction of the stern of the vessel; its inner end C, being within the vessel, the timber of which A′ A′, incloses its outer surface perfectly. D D are openings through the end C of the cylinder for the admission of air; or this end may be entirely open and disconnected with the steam cylinder, it only being necessary that their axes should coincide. E, is a steam cylinder, of which F is the valve box; a piston rod is continued from the center of the piston of the steam cylinder to the piston G (shown in dotted lines) of the propelling piston; so that they operate simultaneously. The two pistons may in fact be said to be upon the same piston rod. As represented in the drawing the steam engine is supposed to be operating upon the high pressure principle, but by enlarging the steam cylinder E, the engine may be used with low pressure, and it may be single acting. In this case I intend to leave the outer end of the cylinder (or that toward the propelling cylinder) open, like the top of the old atmospheric engine. Under this construction, when the piston has been forced outward by the steam, and the communication with the condenser opened, the vacuum formed will enable the pressure of the atmosphere and the head of water, to force the pistons back. I intend, should I find it most eligible so to do, to reverse this order of action in the steam cylinder; that is to say, to turn the open end of the steam cylinder inward, having its closed head and the stuffing box for the piston toward the propelling cylinder; in this case, the pressure of the steam will be used to cause the propelling piston to return, and upon opening the communication with the condenser, the whole pressure of the atmosphere upon the area of the piston head, will be exerted to force the steam piston forward and the propelling piston against the water. The advantage offered by this mode of construction is, that it affords an opportunity of admitting the steam into the steam cylinder in any quantity that may be desired, by which means the velocity of the return stroke may be regulated. It is not necessary to exhibit a condenser, or to show the ordinary appendages of a steam engine, as I construct and use these in modes that are well known.

In Fig. 2 I have represented the manner in which I construct a revolving valve, and its appendages, for supplying the steam to several steam cylinders in regular succession. H is a cylindrical steam chamber into which steam is to be admitted from the boiler through the pipe I, and J J J are pipes, of which I have shown four, for conveying the steam to as many steam cylinders by which the propelling pistons are to be

worked in the manner already made known. Within this steam chamber there is a disk, shown separately at K, in Fig. 3, which is made to revolve, by motion communicated to its shaft L; this disk, has a hole through it as at K′, and at the bottom of the steam chamber Fig. 4, there are holes M M M communicating with the steam tubes as pipes J J. The lower side of the disk, or revolving valve Fig. 3, is ground so as to fit the bottom of the steam chamber closely; and when the steam is admitted into the steam chamber on its upper side, the valve, in its revolution, will supply it to each of the pipes J J in succession. The length of the opening K′ will serve to determine the quantity of steam to be admitted. The friction of this disk, or valve, may be confined to a ledge, of width sufficient to receive the holes M M; or the disk may be a metallic packing, throwing the friction upon the sides of the steam chamber.

In Fig. 5, I have represented the arrangement for opening and closing the valve on the head of the condenser, or eduction pipe; this figure is a sectional view along the axis of the steam cylinder, the open end of it being supposed to be toward the propelling cylinder; but it may be situated in either of the ways above described. *a a* is the steam cylinder; *b*, the piston; and *c*, the piston rod; *d*, the exhaust tube leading to the condenser; *e*, is the valve closing this tube, which valve is attached to a steam or rod *f*, which passes through the piston *b*, where it is surrounded by packing; this rod has a button *g*, at its end, against which the piston *b* strikes, at the end of its stroke, and opens the valve *e*. On the return stroke of the piston, the friction of the rod *f*, within the piston, will close the valve; which will be held close by the pressure of the steam at its readmission. A spring may be made to bear against the button *g*, but it is supposed that this will not be found necessary.

By the foregoing arrangement and devices I produce the required action in each of the steam cylinders, without that array of eccentrics, connecting rods, valves and other appurtenances, ordinarily employed; but I do not intend to limit or confine myself to the particular modes of constructing the respective parts, as herein made known. It is manifest that the pistons of the respective propelling cylinders might be acted upon by the requisite number of cranks upon the same crank shaft; but in this case the motion of the pistons in either direction would be performed in equal times, and this, where the propelling cylinders are at a considerable depth below the surface, (or in other words where the vessel draws several feet of water) would, I believe, be a good plan; but where their distance from the surface is small, this equality of motion might be objectionable.

Where the rotary valve, above described, is employed, a separate engine may be constructed to give motion to the disk, and to the air pump, and supply pump; its power being such as to effect these objects, and its supply of steam being from one boiler common to the whole apparatus.

For the purpose of backing the vessel, a cylinder or cylinders may be placed in the direction of the bows, similar to the propelling cylinders; the usual devices for throwing the stern pistons out of gear, and for putting those toward the bows into action, may in this case be adopted.

As it will be necessary sometimes to renew the packing of the pistons of the propelling cylinders, provision must be made for this operation, and this may be readily done by shutters, as stoppers adapted to them, by which they may be closed at pleasure.

Having thus fully set forth the manner in which I construct my propelling apparatus; and having shown various modes in which I arrange the respective parts thereof, which, in many instances, consist of devices before known and used, and which I do not therefore intend to claim, as constituting any part of my invention; it is to be understood that what I do claim, is—

The employment of propelling cylinders and pistons so constructed and arranged, as that the water, by which the propelling is to be effected, shall be admitted at the mouth or outer ends of said cylinders; while air has free ingress and egress within said cylinders, at that end which is toward or within the vessel; the water, as it flows into said cylinders, doing so by hydrostatic pressure merely.

HUGH RONALDS.

Witnesses:
THOS. P. JONES,
GEORGE WEST.