Z. DRUON.

Means for Propelling Vessels.

No. 147,750. Patented Feb. 24, 1874.

Fig. 1.

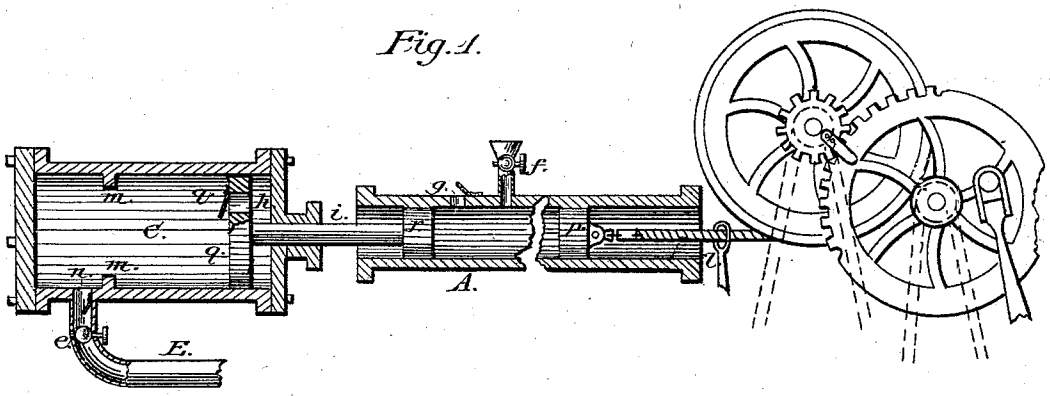
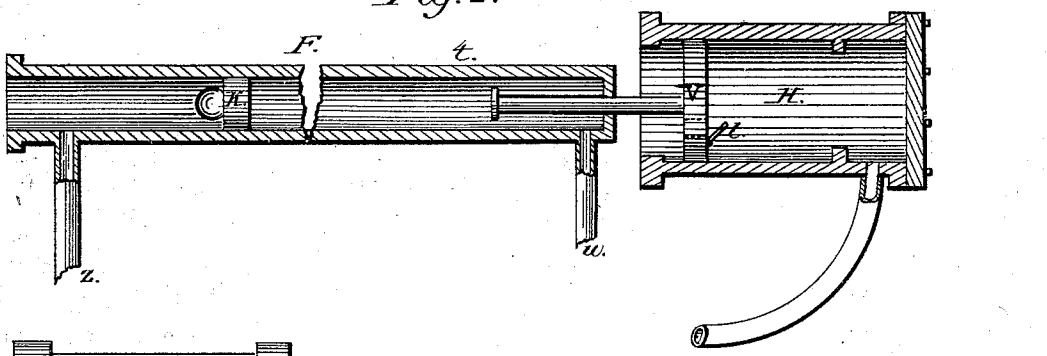


Fig. 2.



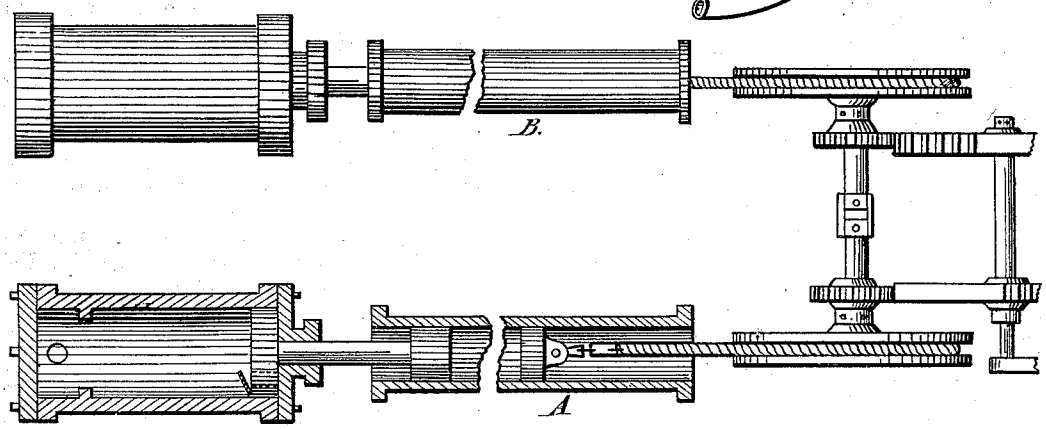
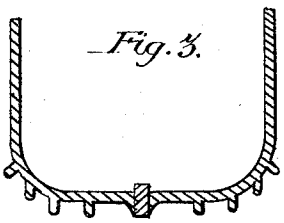


Fig. 3.



Witnesses:
Edw. W. Donn
M. Gardner

Inventor:
Zephyrin Druon

UNITED STATES PATENT OFFICE.

ZEPHYRIN DRUON, OF ST. ALBANS, VERMONT.

IMPROVEMENT IN MEANS FOR PROPELLING VESSELS.

Specification forming part of Letters Patent No. **147,750**, dated February 24, 1874; application filed February 9, 1874.

To all whom it may concern:

Be it known that I, Very Revd. ZEPHYRIN DRUON, of St. Albans, in the county of Franklin and State of Vermont, have invented a new Mode of Propelling Steamers, without paddles or screw, by the use of common air and of compressed air; and I do hereby declare that the following is a full and exact description, to wit:

The nature of my invention consists in using common air and compressed air to propel navigable vessels.

I will now describe my mode of propelling vessels.

Referring to Figure 1, I take a tube, A, twenty-five feet long, for instance, one foot in diameter, and perfectly smooth inside. I place it in a horizontal position, near the prow of the vessel, taking care that the open extremity should be turned toward the stern. Near the other extremity I place a cylinder, C, of a larger diameter, but shorter. The two tubes A and C are connected with one another by a rod, *i*, to which are attached two pistons, air-tight, one, *r*, moving in the tube A, and the other, *q*, moving in the cylinder C, which is full of air. By means of a strong wire rope, *x*, I draw the piston *p* the whole length of the tube very rapidly, thereby producing a vacuum. When the piston *p* has reached the extremity of the tube, I let it loose by disconnecting the wire rope *x* from the motive power, or rather by letting it loose. Under the influence of the atmospheric pressure the said piston will come back with great velocity and force, will impinge on the piston *r*, and force the piston *q* to compress the air contained in the cylinder C. The air thus compressed will be driven toward the stern, through the pipe E, which is slightly inclined. It will go under the vessel, near the prow, and, being kept constantly underneath by means of grooves, as in Fig. 3, will lubricate the whole bottom of the ship, and tend to propel the same before it escapes at the stern. When the piston *p* is drawn again by the wire rope, the two pistons *r* and *q*, under the influence of the atmospheric pressure caused by the vacuum, and also under the influence of the compressed air contained in the cylinder C, will return to their place. In the meantime the valve *n* will shut itself, and prevent the compressed air beneath or the water from entering into the cylinder. The valve *h* in the piston *q* is intended to let the surrounding air enter into the cylinder C to replace that which has been expelled under the vessel. The stops *m m* and the head of the cylinder C prevent the two pistons from moving too far either way. Two or more tubes, similar to A, may be used, as desired, instead of one, to be drawn successively one after another by the turning of a crank, to which steam-power is applied. At the end of the wire rope there is a swivel, and near the end of the tube A there could be an eye, to prevent the rope from twisting and sliding off. In the middle of the tube A, and on the top, there is a small cup, F, with a small aperture, intended to contain the lubricating-oil. A stop-cock cuts off all communication with the tube, when desired. The two small pistons in the same tube should be made air-tight. The surfaces of the two pistons, that impinge one upon another, may be covered with india-rubber, or any suitable material, so as to produce the least amount of heat. The valve *g* is to provide an escape for the air that might introduce itself in the tube A when the vacuum is made. The atmospheric pressure keeps the valve shut. The size of the cylinder C cannot be ascertained except by experiment, as it must vary with the hydrostatic pressure that the compressed air has to overcome, in order to flow freely under the vessel.

Instead of only one pipe, E, to conduct the air, there might be many of them, equally distant from each other, so as to equalize the distribution of air.

Referring to Fig. 2, I take a tube, F, similar to the tube A, and I fasten it horizontally, with its open extremity turned toward the prow, and I put in it an air-tight piston, K. At the extremity of the tube I place a cylinder, H, similar to the cylinder C in Fig. 1. To the piston V there is attached a strong rod, which enters into the tube F, and is kept air-tight where it penetrates into the tube. If, by the steam-pipe *u* connected with the boiler, I introduce high-pressure steam—of four atmospheres, for instance—the piston K will be pushed forward with great velocity and force. When the piston reaches

the point *t*, (the fourth part of the tube,) I cut off the steam. The steam will then expand, and continue to move the piston till it will be expanded nearly four times its volume, when the pressure will become equal to that of the atmosphere; then, by opening the condenser *z*, a vacuum is produced, which allows the piston to come back, and act by impact upon the piston V, compressing the air in the cylinder H. The compressed air in resuming its former volume will push back the piston V to its original position. By introducing steam in the tube F, I produce the same work as before.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of cylinders and pistons, adapted for operation as described, whereby a vacuum is first produced, and then the atmospheric pressure is utilized to cause one piston to act by impact upon another piston, to compress air and force it through suitable channels to the bottom of a vessel, and thereby propel said vessel, as set forth.

Witnesses: Z. DRUON.

GEO. N. CAISSY,

C. G. LAWRENCE.