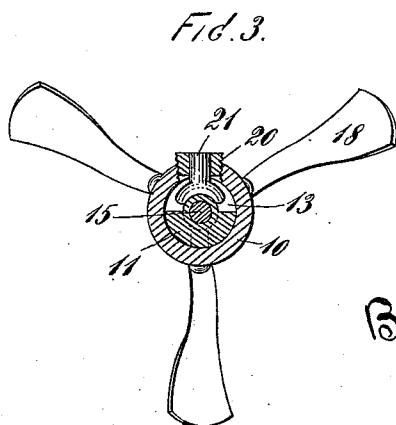
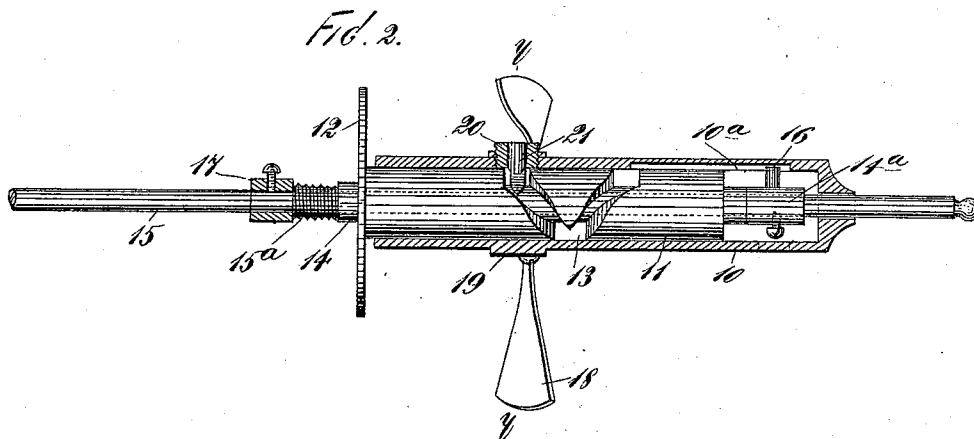
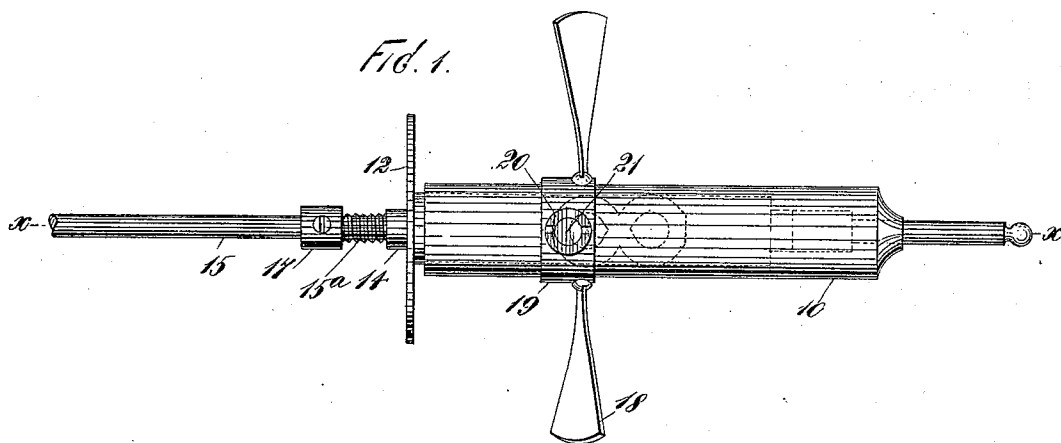


(Model.)

B. BERNSTEIN.
PROPELLING DEVICE.

No. 511,989.

Patented Jan. 2, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

BENNY BERNSTEIN, OF NEW YORK, N. Y.

PROPELLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 511,989, dated January 2, 1894.

Application filed December 2, 1892. Serial No. 453,808. (Model.)

To all whom it may concern:

Be it known that I, BENNY BERNSTEIN, a citizen of the United States, and a resident of the city of New York, county and State of New York, have invented certain new and useful Improvements in Propelling Devices, of which the following is a specification.

My invention relates to devices for actuating screw propellers, ventilating fans, boring tools, &c., and its object is to provide a simple and easily operated means whereby such propellers, fans and tools may be caused to travel alternately backward and forward as they are rotated without necessitating a change in the direction of rotation of the driving shaft, to the end that the articles named may have a screw-like course, and their blades or cutters exert their thrust or push continuously upon and against the medium or matter in which they are operated.

The accompanying drawings forming a part of this specification, illustrate my invention, similar numerals of reference designating corresponding parts in the several views.

Figure 1 is a plan view of the propelling device as utilized to actuate a screw-propeller. Fig. 2 is a vertical longitudinal section of the same on the line X—X in Fig. 1; and Fig. 3 is a vertical transverse section of the same, on the line Y—Y in Fig. 2.

In carrying out my invention, I provide a casing 10, constructed of any suitable metal and of any requisite length, the casing being circular in cross section, open at its inner end and of somewhat conical shape at its outer end, the latter being centrally apertured for a purpose which will presently appear.

Within the casing 10 is fitted a cylinder 11, corresponding in cross section to the body of the casing, and on which the latter is free to rotate and reciprocate, the cylinder being formed with a flange 12 which may be circular as shown, or of any other desired shape and by means of which the cylinder may be attached by screws or bolts to the stern of a vessel or any other suitable support, dependent upon the use to which the propelling device is to be put. About midway between the extremities of the cylinder is formed a double ellipsoidal groove 13, that is, a continuous groove in the shape of a figure "8," the

groove extending entirely through from face to face of the cylinder. Centrally within a bore in the cylinder is fitted a bearing sleeve 14, which receives the driving shaft 15, connected with mechanism for imparting a rotary motion to the shaft. I have not shown such mechanism, as any of the ordinary and well known means may be employed for the purpose and the selection is dependent upon the situation of the propelling device and the object to be attained by its use, as will be readily understood.

The sleeve 14 is fitted to receive a thread 15^a on the shaft 15, which has bearing at its outer portion in the aperture in the outer end of the casing 11, and on the cylinder 11 is located a collar 14^a held to the shaft 15 by a set screw. The collar 14^a carries a pin 16 which enters a recess 10^a in the casing 10 for a purpose hereinafter explained.

The shaft 15 is reduced in diameter near the thread 15^a, and a collar 17 is held thereon by a set screw, said collar and the collar 14^a, determining the outward travel of the shaft.

The propeller blades 18 are attached in the ordinary or any proper manner to a collar or enlargement 19 formed in one with the casing 11, the blades being of conventional form and of any desired number. In the collar or enlargement 19 a threaded aperture is formed to receive an externally threaded nut 20, which is adapted to turn or swivel in said aperture, and in said nut is fitted or is formed integral therewith a guide 21, having a straight body member from which extends a semi-circular member overlapping the sleeve 14 and having a reduced or tapered lower edge, the semi-circular member entering the groove 13 in the cylinder 11, as shown best in Fig. 2.

When used for actuating a screw propeller the device is entirely submerged in the water, and as the shaft 15 is revolved, the pin 16 on the collar 14^a held on the shaft engaging the wall of the recess in the casing 10, causes said casing to rotate on the cylinder 11 in the same direction as that of the shaft and carry with it and correspondingly rotate the blades 18. At the same time the semi-circular member of the guide 21 carried by the enlargement 19 on the casing, travels in the groove 13 in the cylinder, passing without intermission or break, that is, to say in a continuous manner from

one loop of the groove to the other, alternately crossing the point of junction of said loops, so that the casing as it rotates passes alternately outward and inward on the cylinder 11. The pitch of the blades 18 is such and their arrangement relative to each other and to the casing, is such that as the shaft is rotated continuously in one direction, the blades, which also rotate simultaneously and continuously in the same direction on the outward movement of the casing exert their thrust and push in an outward and downward direction upon or against the water, and on the inward movement of the casing the blades continue to exert the same thrust or push upon or against the water and in the same direction, that is, outward and downward as upon the outward movement of the casing. As a consequence the vessel is driven steadily forward. On reversing the direction of rotation of the shaft, the direction of rotation of the casing and blades is correspondingly reversed, the thrust or push of the blades 18 being exerted in a direction opposite to that formerly taken, and the vessel is carried backward. That is, so long as the shaft 15 is revolved in one direction the vessel is driven forward, and on reversing the direction of rotation of said shaft the vessel is carried backward, the casing and blades in each instance rotating continuously and simultaneously in the same direction as that of the shaft. It is the direction of rotation of the blades in connection with the inward and outward movement of the casing, that determines the direction in which the blades exert their push or thrust to propel or back the vessel. The cylinder 11 being stationary and the semi-circular member of the guide 21 lying in the groove 13 and being directed thereby, and such member overlapping the sleeve 14, the rotation and reciprocation of the casing 10 on the cylinder 11 are steady and uniform; and further as the two portions of the groove 13 gradually merge at their junction, and the guide is free to turn slightly or to swivel in the casing, the reciprocation is rendered smooth, even, continuous, and without jar, so that jerky or intermittent action of the blades 18 is entirely prevented.

While the invention is herein shown and described as applied to a screw propeller, such is only an instance of its utility as it may be equally well applied to ventilating fans and to tools for boring; the operation being the same in the instance of ventilating fans, while in the instance of boring tools, resistance to the tool being exerted only in one direction, the forward or inward movement only of the casing is made available, the rearward or outward movement of the casing clearing the

bore and rendering the tool ready for use at once on the material being bored, adjacent to the bore just finished.

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

1. A propelling device, consisting of a cylinder adapted to be fitted on a driving shaft, a casing rotatable and reciprocable on the cylinder, and means for rotating and reciprocating said casing by the rotation of the driving shaft, substantially as shown and described.

2. A propelling device, consisting of a horizontal cylinder, mounted on a rotatable driving shaft, a casing rotatable and reciprocable on said cylinder, and carrying blades or fans, and means for rotating and reciprocating said casing substantially as shown and described.

3. A propelling device, consisting of a fixed support, a cylindrical bearing attached to said support, a casing rotatable and reciprocable on said bearing and carrying blades or fans, a driving shaft journaled in the fixed support, the bearing and the casing, and means for rotating and reciprocating the casing by the rotation of the driving shaft.

4. A propelling device, consisting of a horizontal cylinder having a central bore, and a double ellipsoidal through groove in its body, a bearing sleeve fitting the bore of the cylinder, a casing rotatable and reciprocable on said cylinder and carrying blades or fans, a driving shaft extending through the sleeve and casing, a pin carried by the shaft and entering a recess in the casing, and a guide carried by the casing and entering the groove in the cylinder, substantially as shown and described.

5. In a propelling device, the combination with a driving shaft, a bearing sleeve mounted on said shaft and carrying a pin at one end, and a cylinder fitted on said sleeve and provided with a double ellipsoidal through groove in its body, of a casing fitted to rotate and reciprocate on said cylinder and formed with a recess to receive the pin on the bearing sleeve, blades or fans on an enlargement of said casing, and a nut fitted in the enlargement of the casing and carrying a guide entering the groove in the cylinder and overlapping the bearing sleeve substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses.

BENNY BERNSTEIN.

Witnesses:

M. V. CRONIN,
A. B. CHOBOT.