

(No Model.)

B. BERNSTEIN.
PROPELLING APPARATUS.

No. 528,138

Patented Oct. 30, 1894.

Fig. 1.

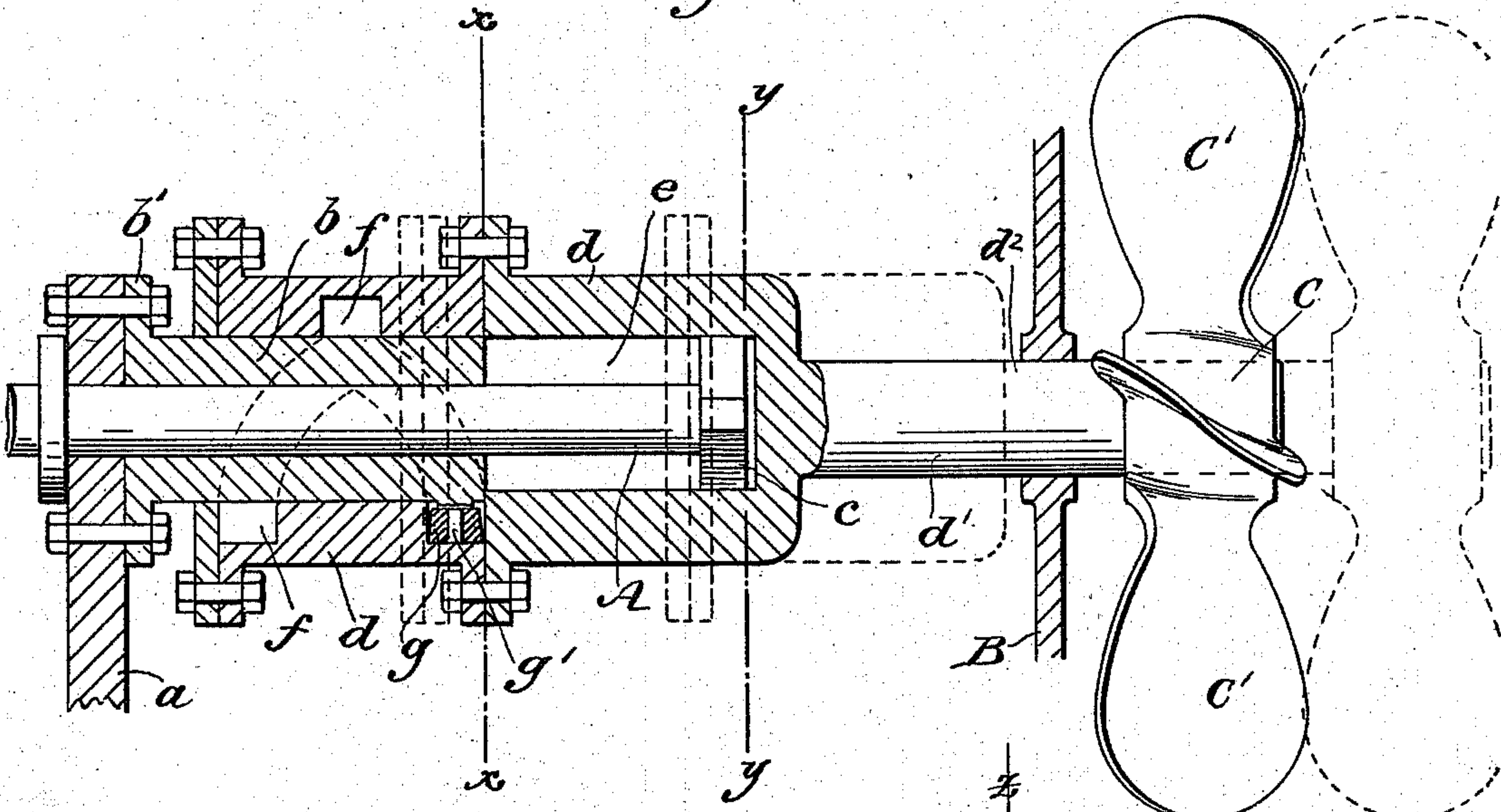


Fig. 2.

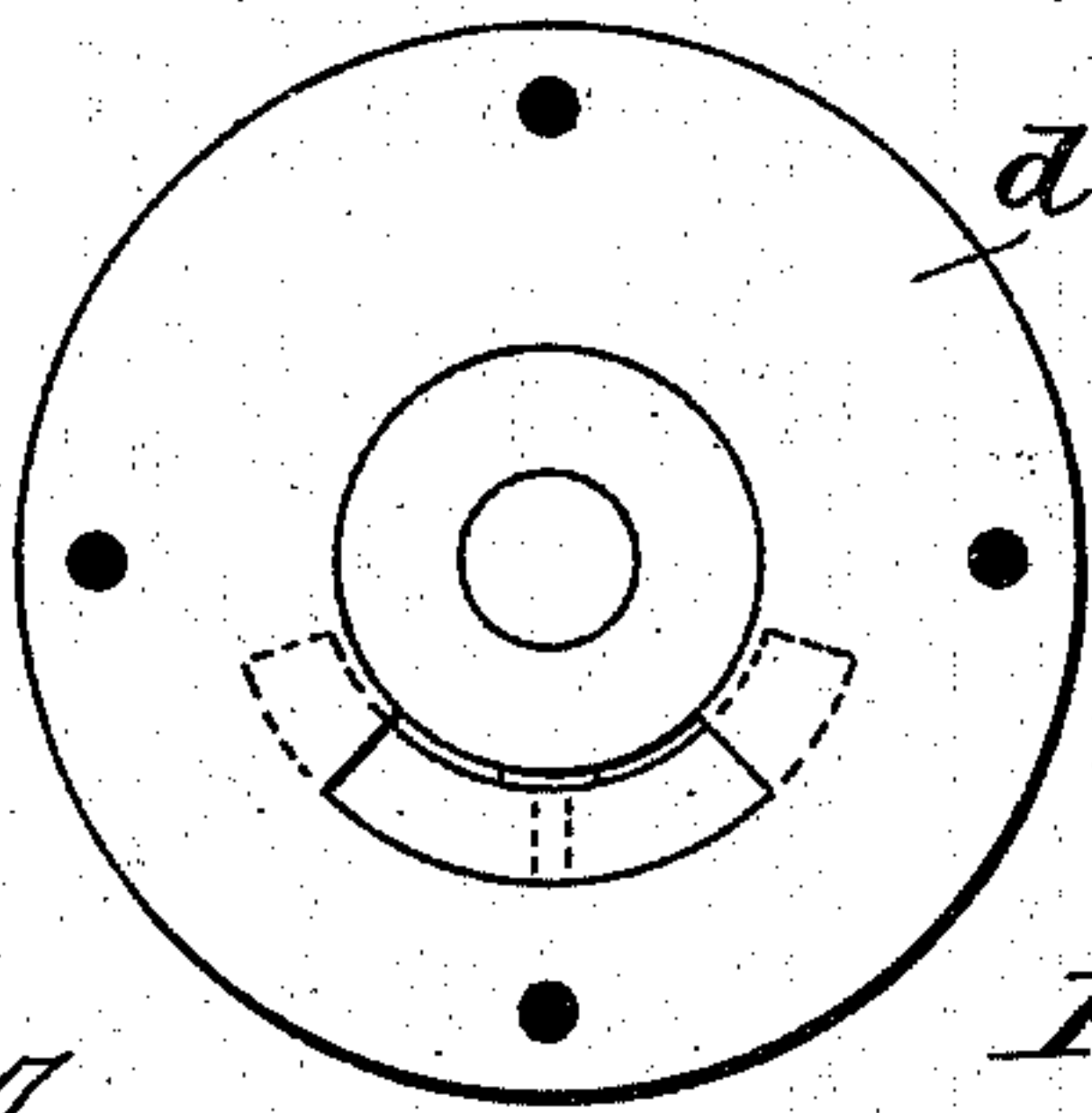


Fig. 3.

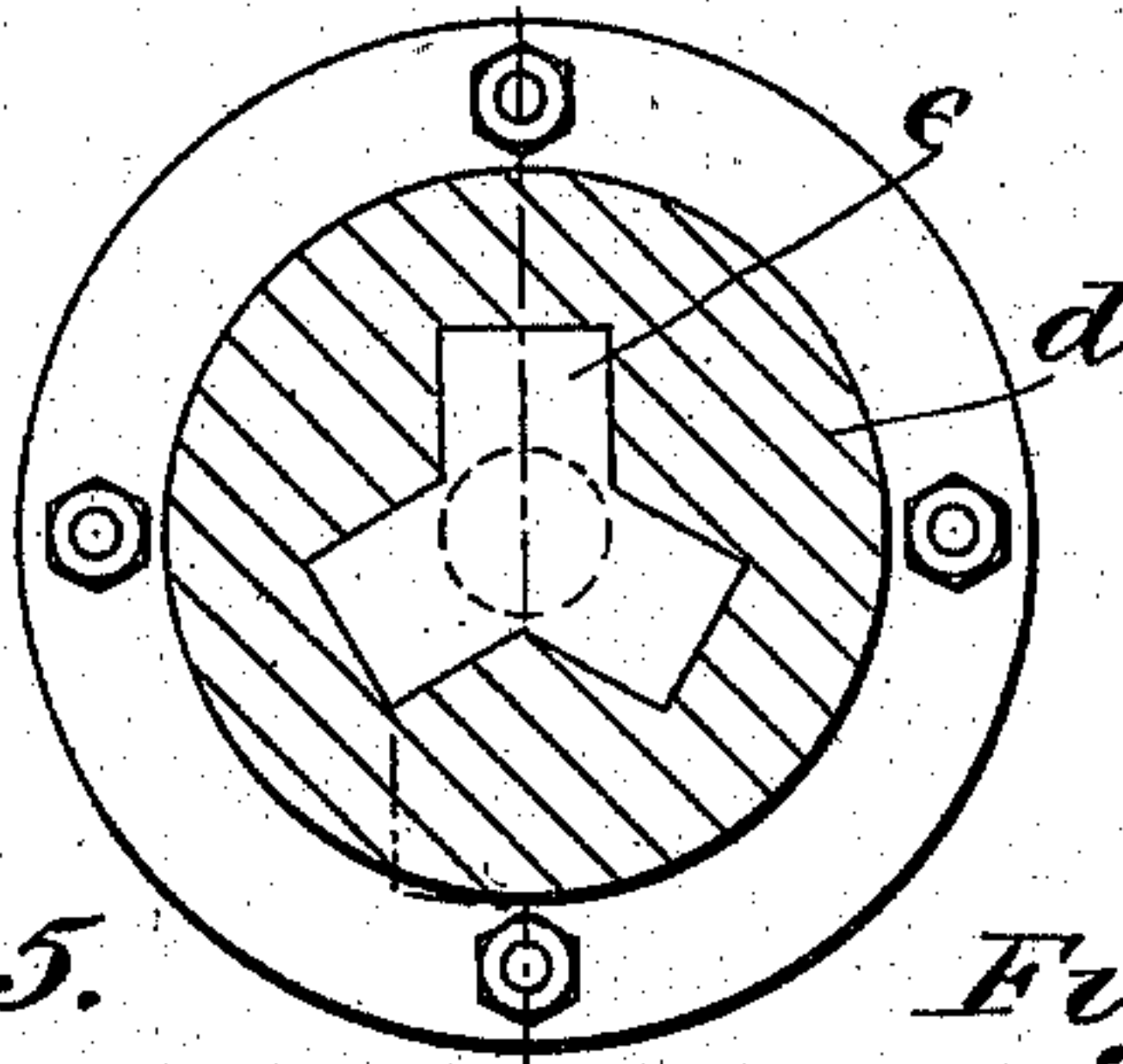


Fig. 4.

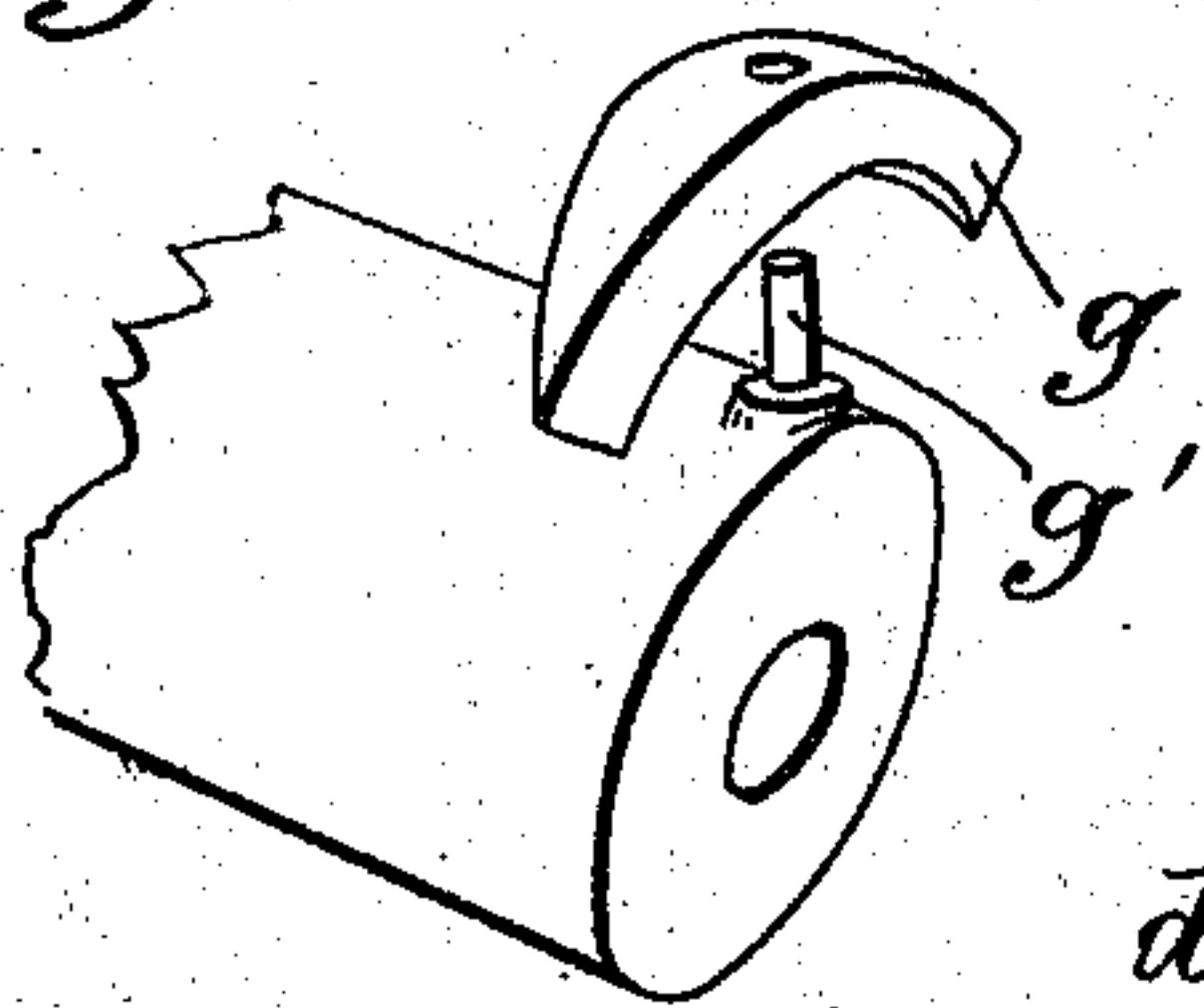


Fig. 5.

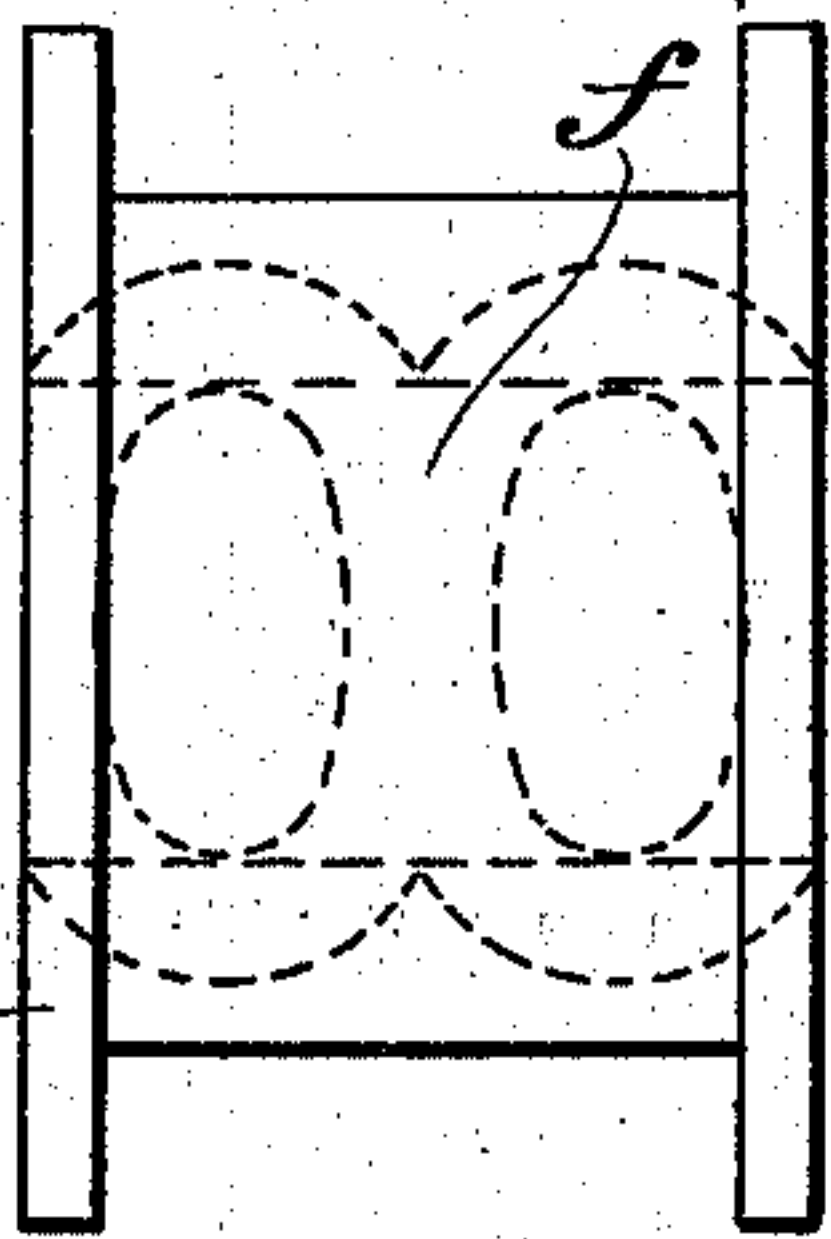
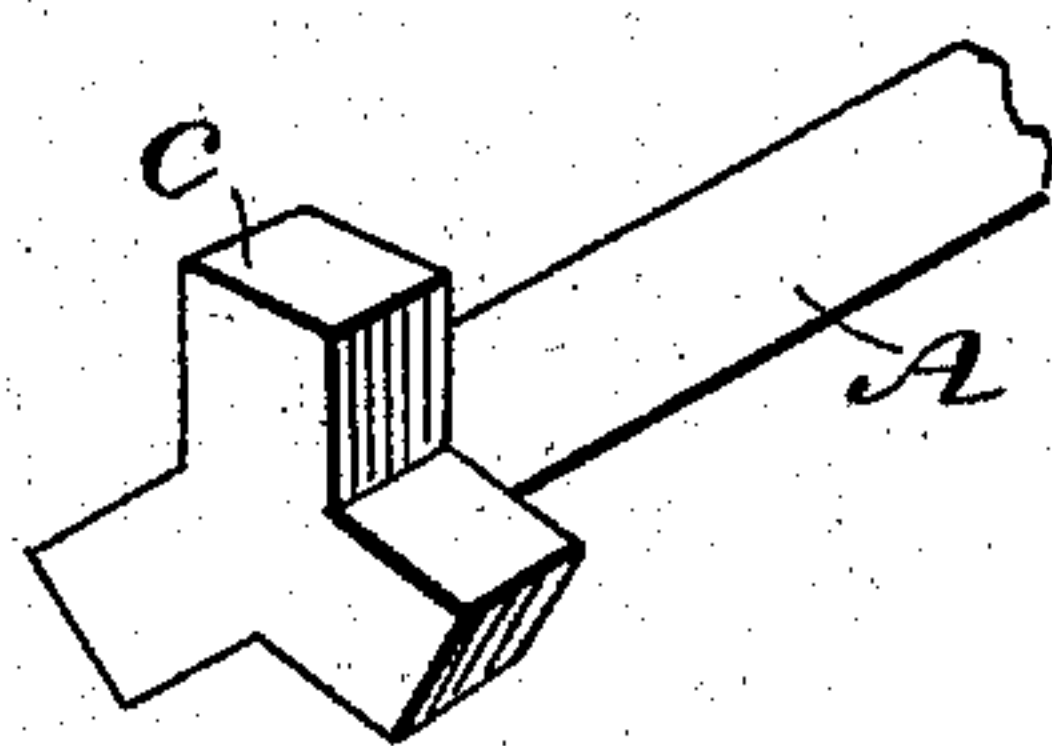


Fig. 6.



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UNITED STATES PATENT OFFICE.

BENNY BERNSTEIN, OF NEW YORK, N. Y.

PROPELLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 528,138, dated October 30, 1894.

Application filed December 22, 1893. Serial No. 494,448. (No 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 Apparatus, of which the following is a specification.

This invention relates to actuating devices for screw-propellers, ventilating fans or wheels, blowers, boring tools, the platens of printing presses and other articles or machines requiring a similar motion. Its object is to provide a simple and readily operated device whereby the blades or cutters of such propellers or tools may be caused to reciprocate in either a horizontal or vertical plane and to rotate simultaneously in either a vertical or horizontal plane, dependent upon the character and requirements of the apparatus; and this without necessitating a change in the direction of rotation of the driving shaft, so that the blades or cutters may have a screw-like course and exert a thrust or push continuously upon or against the medium or matter in which they are rotated.

The invention is illustrated in the accompanying drawings, forming part of this specification, like letters of reference designating corresponding parts in all the views.

Figure 1 is a sectional side elevation of the apparatus applied to actuate a propeller for vessels, the sectional view of the recess in the hub being taken upon a line corresponding to $z-z$ in Fig. 3 in the interest of clearness. Fig. 2 is a vertical transverse section of the same on the line $x-x$. Fig. 3 is a similar section on the line $y-y$. Fig. 4 is a perspective view of a portion of the sleeve-bearing upon the shaft. Fig. 5 is a plan view of part of the hub surrounding the shaft and sleeve-bearing, and Fig. 6 is a perspective of the end of the said shaft.

The driving shaft A is journaled near the stern of the vessel in any suitable support, such as a , to which is affixed by screws or bolts the base flange b' of the circular sleeve bearing b . At the extreme end of the driving shaft A which revolves in these bearings is a key or spider c .

Upon the bearing b is imposed a circular hub d preferably made in two parts, the rearward one being formed integrally with the

shaft d' which is journaled at d^2 in the wall B of the vessel's stern. The rearward half of the hub is provided with a longitudinal slot or recess e registering with the spider c and within which the said spider fits.

The forward part of the hub d is formed on its inner side with a double cam groove f ; that is, a groove in the shape of a figure 8, as best shown in Fig. 5, this groove being adapted to receive a guide g seated upon a pin g' carried by the bearing b .

The two parts of the hub are securely bolted together. Upon that part of the shaft d' which is outside the wall of the vessel is affixed the screw-propeller C having a plurality of blades C' of any desired shape and style.

It will be understood that the driving shaft A is connected with a source of power whereby the said shaft is rotated. I have, however, not shown such mechanism as this forms no part of my invention and any of the ordinary and well known means to the desired end may be adopted, it being obvious that the selection is dependent upon the situation of the propelling apparatus and the direction in which it is to be utilized.

The operation of the device will be readily apparent from the accompanying drawings, representing the propelling apparatus applied to a vessel. As the driving shaft b is rotated, the spider c upon the end thereof, engaging with the hub d , causes the said hub and the shaft d' carrying the propeller-blades to rotate in the same direction. As the hub rotates, the guide g on the bearing b travels in the cam groove in the hub, passing from one loop of the groove to the other, so that the hub as it rotates travels backward and forward, the spider c being alternately at the bottom and at the mouth of the recess e in the hub, the shaft d' and the propeller blades simultaneously and continuously rotating in the same direction as the driving shaft.

The propeller blades C' have such a pitch and are so arranged in relation to each other and to the shaft d' that as the driving shaft is continuously rotated in one direction the blades upon the rearward movement of the hub exert their push in a rotary and obliquely outward direction upon or against the water and on the forward movement of

the hub the blades continue to exert their thrust or push in a rotary and obliquely outward direction. As a result the vessel moves steadily forward. The direction of rotation of the driving shaft being reversed a corresponding reversal of the direction of rotation of the hub and blades follows, the thrust or push of the blades being consequently exerted in a direction exactly opposite to that previously taken, thus causing the vessel to be carried backward.

It is to be particularly understood that it is the direction of rotation and pitch of the blades in connection with the reciprocatory movement of the shaft upon which they are, that determines the direction in which the blades exert their push or thrust and thus so long as the driving shaft is rotated in the one direction the vessel is driven forward, and when rotated in the opposite direction the vessel is carried backward, the hub and blades in each instance rotating continuously and simultaneously in the same direction as the shaft. The bearing *b* being stationary the travel of the guide in the cam groove of the hub is uniform and the rotation and reciprocation of the hub is steady and regular. The junction of the two branches of the cam groove moreover, being a gradual one, the motion of the hub and blades is smooth and even, without jar or intermission.

While I have illustrated this propelling apparatus only as applied to vessels it will be manifest that I do not confine myself to its use in this connection alone, as the device may be equally well employed for any purpose where a rotary and reciprocatory motion is the desideratum.

I do not claim broadly the principle of producing the rotary and reciprocatory motion of the propeller through the agency of the swiveled guide and the figure 8-shaped groove in the hub, this being covered by Letters Patent No. 511,990, granted to me January 2, 1894, and my present invention has particular reference to certain new and useful improvements whereby it is possible to locate the entire apparatus, except the propeller within the vessel.

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

1. A propelling apparatus consisting of a bearing sleeve secured to a fixed support, a guide attached thereto, a hub rotatable and reciprocable upon the bearing sleeve and

formed with an internal figure 8-shaped cam-groove adapted to receive the guide carried by the bearing sleeve, a shaft extending rearwardly from the hub through the wall of the vessel and carrying the propeller blades, and means for connecting the said hub with a driving shaft, in such manner as to permit of reciprocatory motion thereof, the said bearing sleeve and the hub thereon being located within the body of the vessel substantially as shown and described.

2. A propelling apparatus consisting of a bearing sleeve secured to a fixed support, a guide attached thereto, a hub rotatable and reciprocable upon the bearing sleeve and formed with an internal figure 8-shaped cam-groove adapted to receive the guide carried by the bearing sleeve, a longitudinal recess in the said hub, a shaft extending rearwardly therefrom through the wall of the vessel, and carrying the propeller blades and a driving shaft journaled in the said bearing sleeve and provided at the end with a spider adapted to register with the recess in the hub, the said bearing sleeve and the hub thereon being located within the body of the vessel substantially as shown and described.

3. A propelling apparatus consisting of a bearing sleeve rigidly secured to a fixed support, a segmental guide swiveled to the said bearing sleeve, a hub rotatable and reciprocable upon the bearing sleeve, the said hub being formed in two portions bolted together, the forward being formed with an internal figure 8-shaped cam-groove, adapted to receive the guide carried by the bearing sleeve, the rearward part of the hub being provided with a longitudinal recess, a shaft extending from the said hub through the wall of the vessel and carrying the propeller blades, a driving shaft journaled in the fixed support and in the bearing sleeve, and provided at its end with a spider adapted to register with and work within, the longitudinal recess in the rearward part of the hub, the said bearing sleeve and the hub thereon being located within the body of the vessel 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, this 19th day of December, 1893.

BENNY BERNSTEIN.

Witnesses:

PERCY T. GRIFFITH,
C. GERST.