

(No Model.)

N. H. BORGFELDT.

SCREW PROPELLER.

No. 285,002.

Patented Sept. 18, 1883.

Fig. 1.

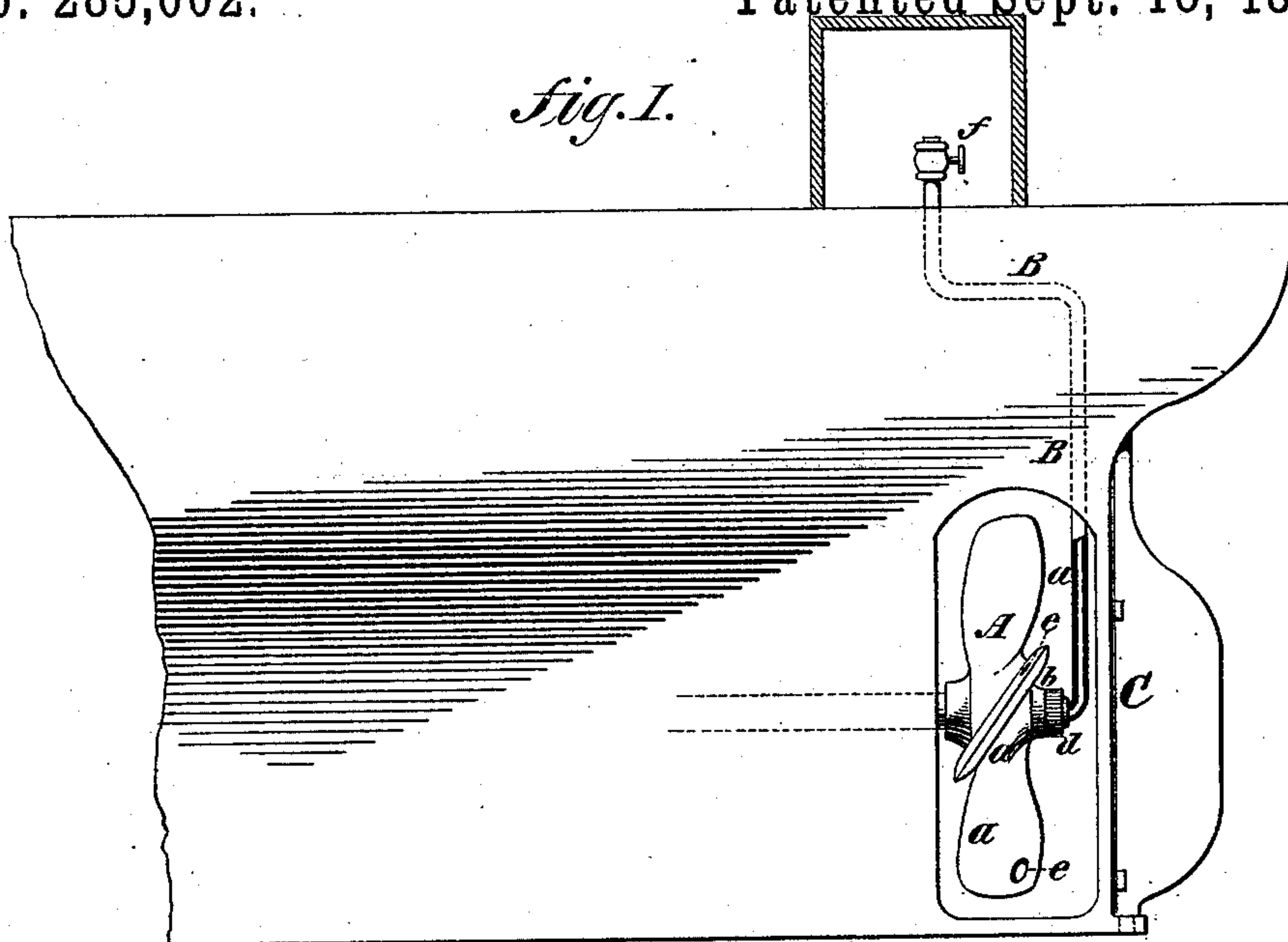


Fig. 2.

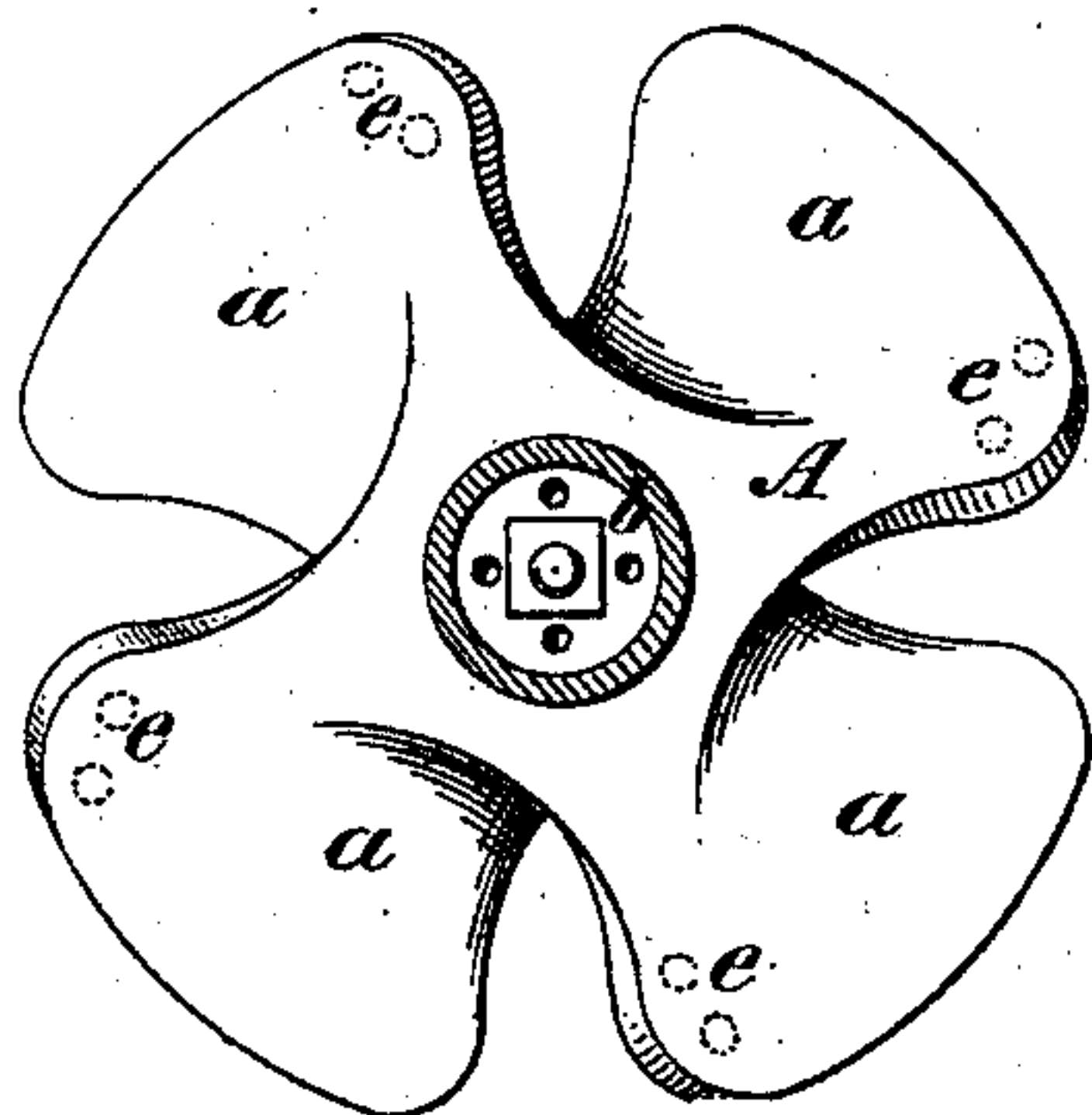


Fig. 3.

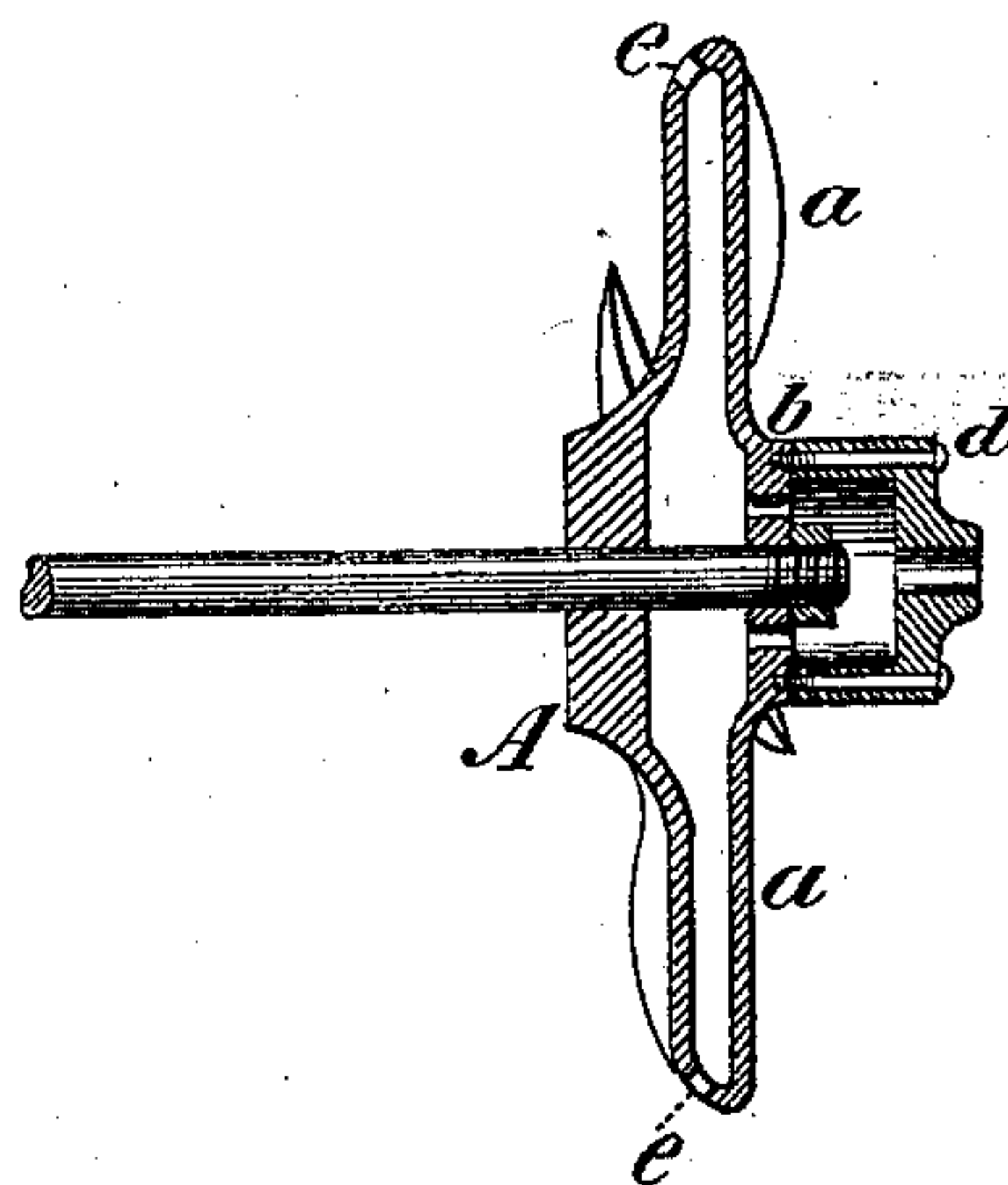


Fig. 4.

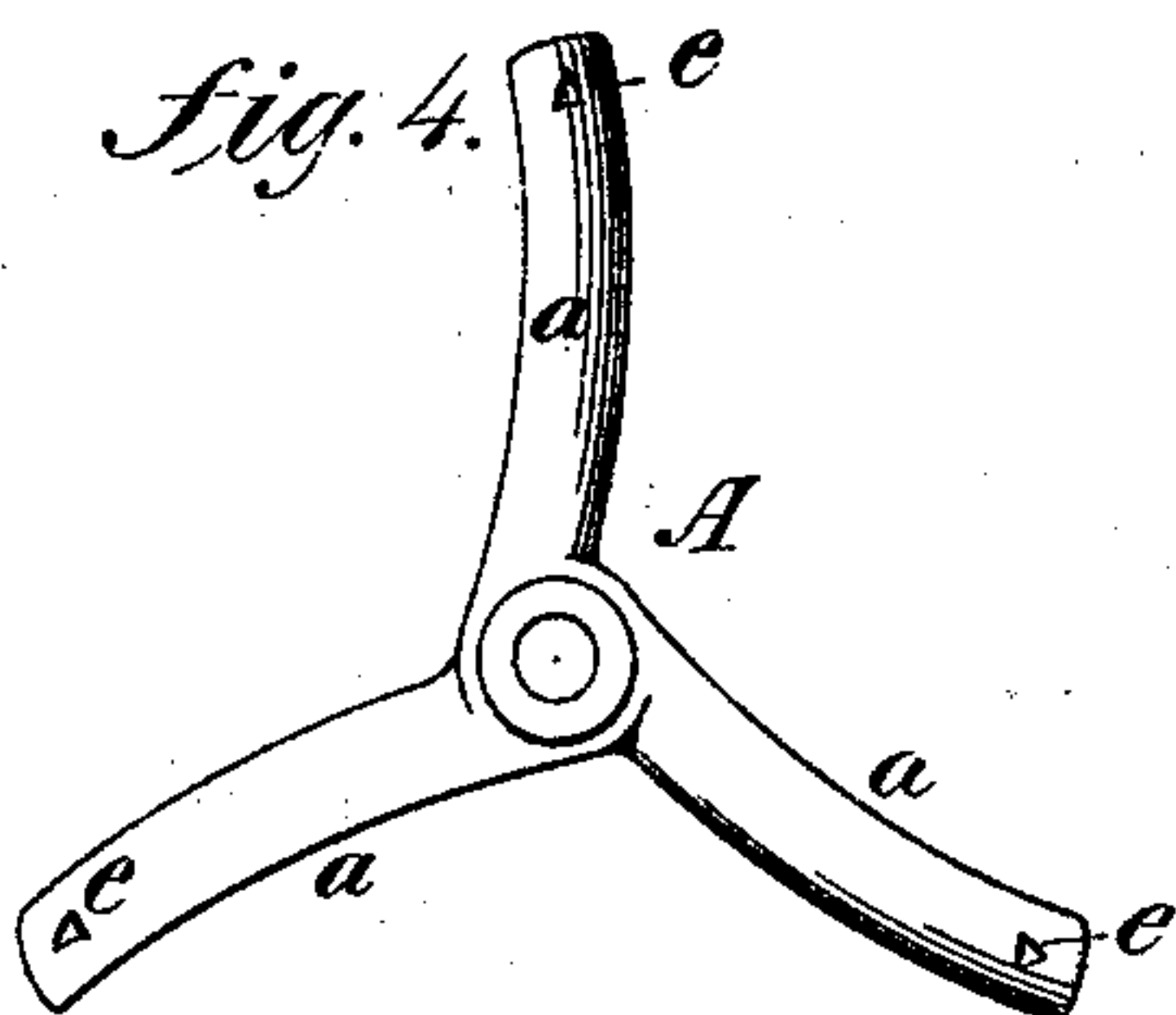
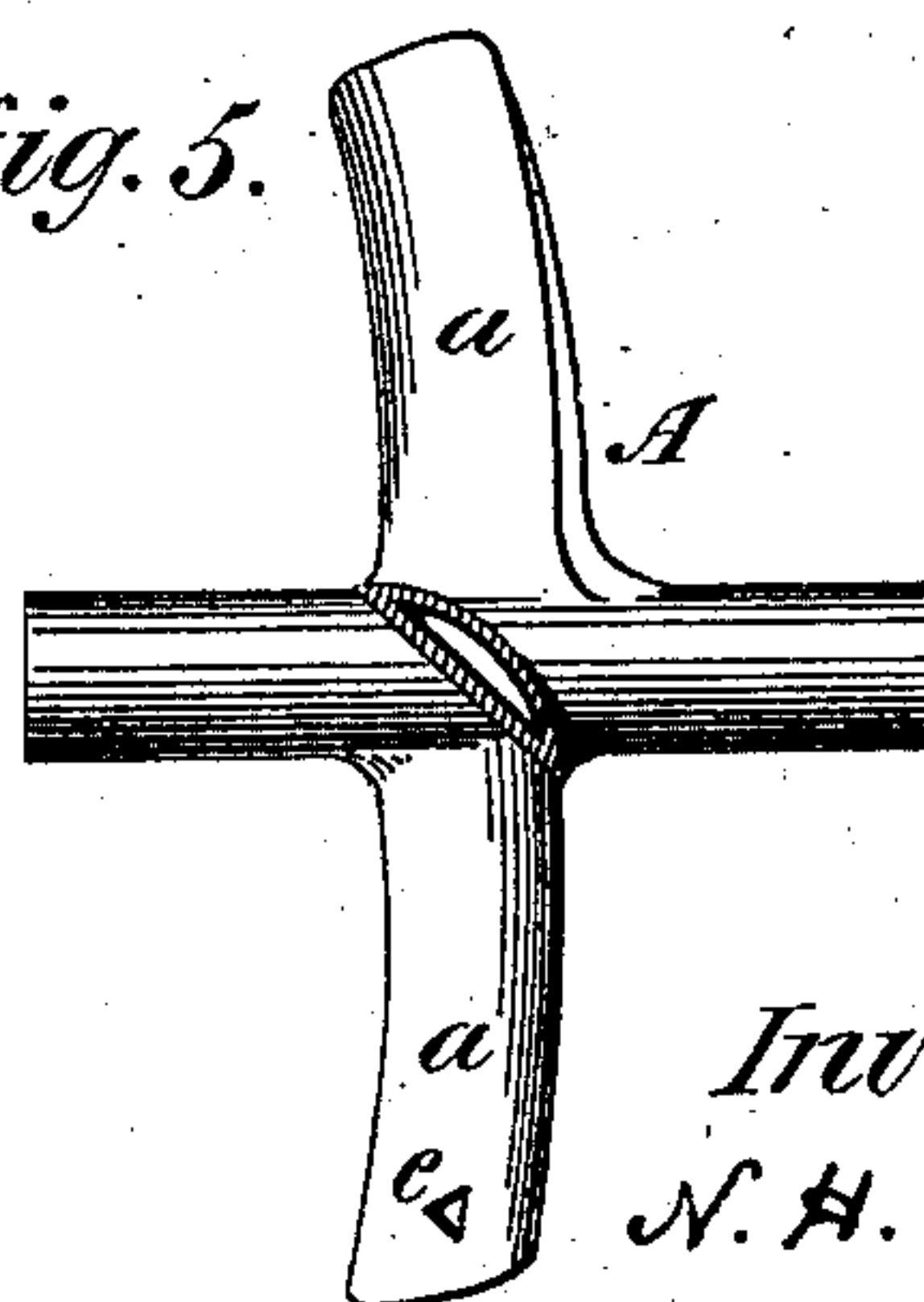


Fig. 5.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

NICHOLAS H. BORGFELDT, OF NEW YORK, N. Y.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 285,002, dated September 18, 1883.

Application filed November 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS H. BORGFELDT, of New York, in the county and State of New York, have invented an Improved
5 Screw-Propeller, of which the following is a specification.

Figure 1 is a side view of my improved screw-propeller; Fig. 2, a face view of the same; Fig. 3, a central section thereof; Fig. 4, a face
10 view of a propeller of different form, having my invention; Fig. 5, a side view of the same.

The object of this invention is so to construct screw-propellers for ships as to prevent the formation of a suction-vacuum behind each
15 propeller-blade. I have ascertained that ordinary propellers are moved through the water with a degree of speed greater than the motion of the water resulting from its gravity or endeavor to find a level; and that, consequently,
20 a vacuum is formed behind each revolving propeller-blade, which vacuum tends to delay the rotary motion of the blade and retard the action of the propeller. This suction-vacuum exists on the backing side of the propeller-blade
25 when the propeller is in motion. If this suction-vacuum can be destroyed by the admission of air, its retarding influence upon the propeller will be overcome, and the action of the propeller made the more effective upon the ship
30 to which it is attached. The result of such a destruction of the suction-vacuum will be that a propeller of a given size, driven with the full power of an engine, and propelling a ship with a certain speed when the vacuum is in
35 existence, will, when the vacuum is destroyed, increase the velocity of the ship, and where such a result does not flow from the destruction of the vacuum it will be because the propeller working with the vacuum is too small for
40 the ship, so that a larger propeller can be used by the same engine on the same vessel with improved result, provided my invention is applied thereto.

My invention consists in carrying air, by
45 the action of the propeller alone, through or along the propeller-blade to the point which is threatened with the vacuum, so as to destroy the suction-vacuum, and at the same time providing the air-supply pipe leading to this propeller-blade with an adjustable valve or means
50 of regulating the amount of air admitted from the deck of the vessel.

In the accompanying drawings, the letter A represents a screw-propeller, having blades *a*, boss *b*, and metallic cap *d* fastened onto the boss. 55 This screw-propeller is mounted upon a shaft in the usual manner, and hung as screw-propellers have always been hung, or in any suitable manner. B is an air-pipe leading into the cap *d*, and carried upward by preference 60 along the rudder-post C. The propeller-blades *a* are channeled or hollowed, and have apertures *e* on the backing sides of their blades, only preferably near the edges. The hollows of the blades and the apertures *e* communicate 65 through the boss *b* and cap *d* with the pipe B. The upper end of the pipe B extends above deck and in the neighborhood of the wheel-house—in fact, I prefer to cause it to enter the wheel-house, so that it shall be under the control of the man at the wheel. At this upper 70 end the pipe has a suitable valve, *f*, or stopping device, by means of which the amount of air allowed to it can be regulated at will. The form of propeller to which my invention 75 is applied is immaterial. It may either be such form as indicated in Fig. 2, or such as shown in Fig. 4, or any other form. As this propeller is revolved, the air will be drawn by the propeller through the pipe B and apertures 80 *e*, so as to fill whatever space the water cannot fill with sufficient rapidity behind the rapidly-revolving propeller-blade. By this means the draw-back of suction usually suffered is entirely obviated, its effect on the ship done 85 away with, and the entire driving force of the propeller utilized. My experiments have satisfied me that in the neighborhood of twenty per centum of force will be gained by the destruction of the vacuum that is caused on the 90 backing side of the propeller-blade of ordinary construction.

When my invention is applied to a propeller, the same can be about twenty per centum larger in area than the propeller of ordinary construction that would be adaptable to a given 95 vessel under the standing rules, or should have a coarser pitch to the extent of about twenty per centum.

I do not regard the manner of fastening the 100 pipe B, or the direction of its course, as at all material to my invention. It may be caused to communicate with the central portion of the screw-propeller in suitable manner, and

may be supported or held in place in any suitable manner.

Instead of making the blades hollow, as shown, they may be suitably channeled or provided
5 with pipes or conduits that lead to the apertures *e*.

I do not claim drawing water through propeller-blades, which interferes with their motion by its centrifugal action; nor do I claim
10 forcing air through such blades by separate contrivances.

I claim—

A screw-propeller whose blades have air-channels and apertures *e* on the backing side, combined with the air-pipe *B*, leading upward 15 to the deck of the vessel, and with the regulating appliance *f* on the upper part of said pipe, all arranged for drawing air automatically to the backing side of the propeller by its rotation, as set forth.

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Witnesses:

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WILLIAM H. C. SMITH.