

(Model.)

D. FREED.
SCREW PROPELLER.

No. 411,802.

Patented Oct. 1, 1889.

Fig 1.

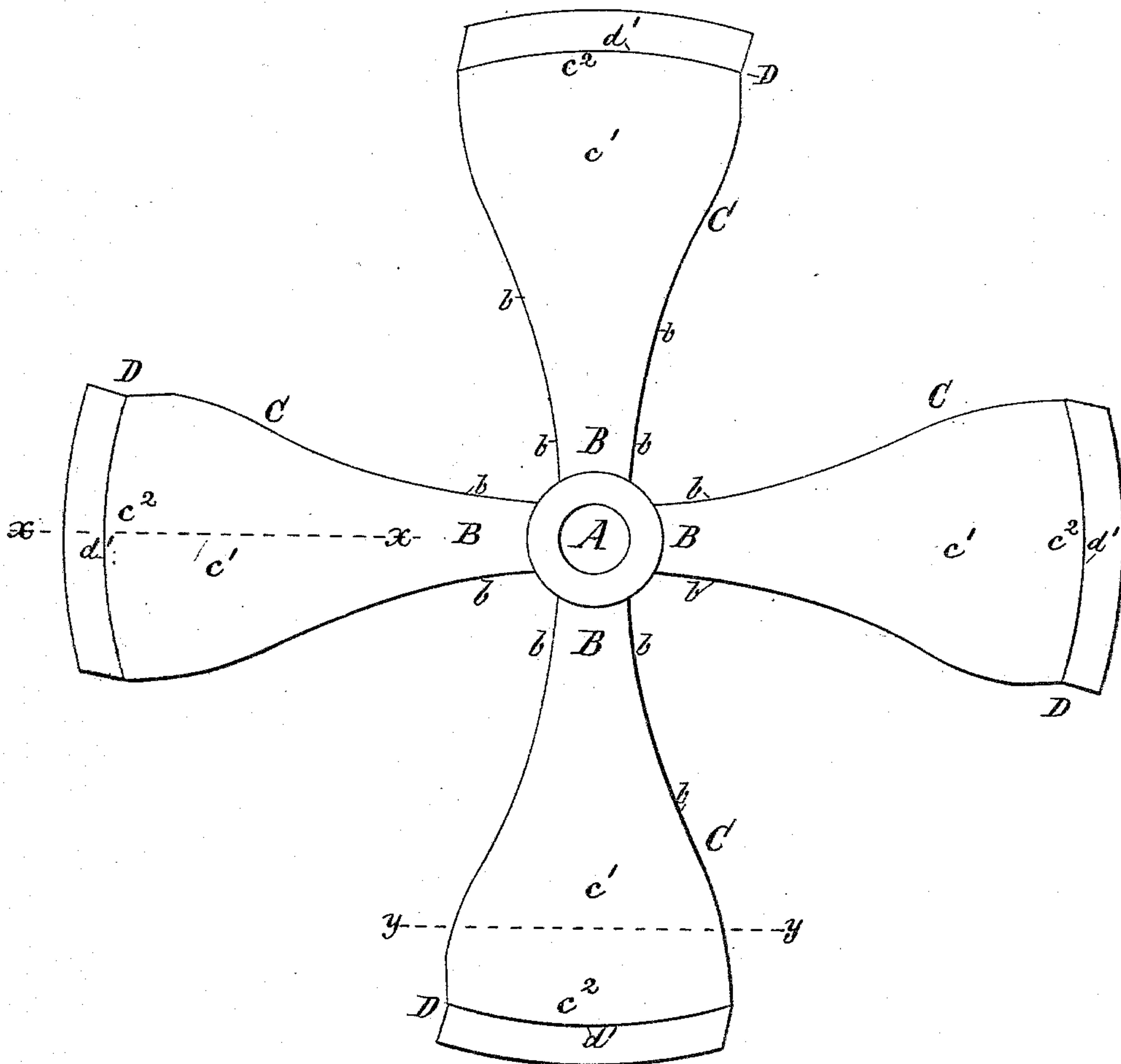


Fig 2.

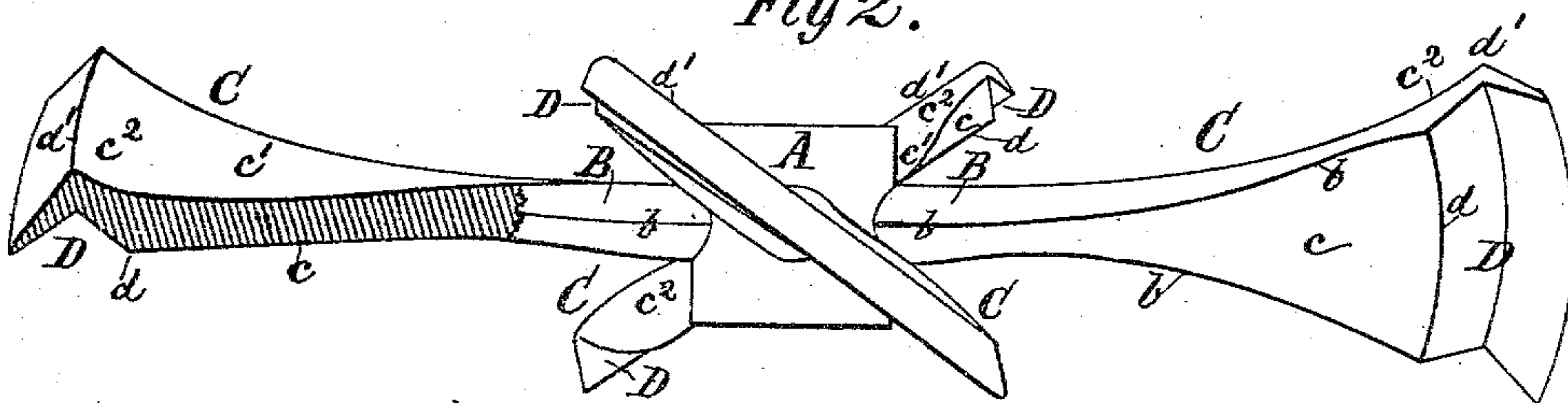


Fig 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

DAVID FREED, OF PHILADELPHIA, PENNSYLVANIA.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 411,802, dated October 1, 1889.

Application filed April 19, 1889. Serial No. 307,643. (Model.)

To all whom it may concern:

Be it known that I, DAVID FREED, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Propellers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement on an earlier invention for which I obtained a patent dated August 19, 1873, No. 141,871; and it consists in an improved construction of the propelling-blades, as will be hereinafter fully described and specifically claimed.

In the accompanying drawings, Figure 1 is a rear view of my screw-propeller. Fig. 2 is a side elevation of the same, one of the blades being shown partly in section along the line $x x$ in Fig. 1; and Fig. 3 is a section in the line $y y$ of Fig. 1.

The letter A in the drawings represents the hub of the screw-propeller, and B arms which gradually widen and form working-blades C. The hub A is of ordinary construction. The thus united arms B and blades C are preferably of triangular shape on their faces, and are so reduced in width toward the hub as to afford a comparatively free passage to the water while in operation.

The reduced blade portions designated as arms perform no essential part in the propelling function of the blades proper C. For this reason they are termed "arms;" and the length of these arms is made in proportion to the speed with which the propeller is calculated to be operated—say one-third or one-half the whole length of the blades, respectively. The object of this special construction is to prevent, as usual, the formation of a vacuum behind the propeller caused by the quick revolutions of broad blades.

The arms B in cross-section are double-convex, or have a duplex segmental area standing inclined to the axis of the propeller, and said area is gradually broadened and flattened outwardly until it finally unites with the blade portion proper. Two diagonal ridges b are thus formed on the arms B,

which are continued as cutting-edges upon the blades C. Each blade C has a spiral, furrowed, or grooved peripheral end formation D, which in cross-section is preferably V-shaped. This furrowed end formation joins the forward propelling-surface c of the blade C, so as to form therewith a spiraled edge d . The backward propelling-surface c' of blade C joins the central back portion of the furrowed end formation D by means of an outwardly-curved spiral surface c^2 , forming therewith a spiral ridge d' .

The forward propelling-blade surface c of the blade C is a radially-straight screw-surface, which, as it impinges upon the water, causes the same to move toward the furrowed end formation D by reason of centrifugal force, and in flowing over the edge d meets with and abuts against a body of water moving in a direction transverse to that of the water leaving the surface c . This meeting of the two transverse currents retards the speed of the current from the surface c , and thus creates a more solid resistance to the propeller-blades, reducing the slip of the same and increasing the speed of the vessel. The backward propelling-blade surface c' , being terminated by the re-curved portion c^2 , permits the water to move along the blade with a gradual reduction of speed, thereby increasing the resistance of the water to the blade without violently counteracting the centrifugal force, as is the case with my aforesaid patented device and other constructions having the angular termination. I have found after repeated experiments that in backing in a boisterous sea with a propeller of this improved construction the motion of the vessel is remarkably uniform and quiet, and this is owing to the recurved surface c^2 , whereby the water impinged upon by said surface is gradually deflected from its radial course, and upon leaving the blade C meets the surrounding water in a more nearly tangential direction, thereby creating a uniform confluence between the two and avoiding concussions with the rising and falling waves.

In the forward motion the body of the vessel breaks the greater portion of the dash-ing force of the waves, and thus protected

the furrowed blade can operate to the best advantage.

I do not claim the construction shown in Letters Patent granted to me August 19, 1873,
5 No. 141,871, but as an improvement thereon.

What I claim as my invention is—

A propeller having a forward propelling
radial feathered or spiral surface *c*, termi-
nated by a spiral furrowed end formation *D*,
10 and a backward propelling radial spiral sur-

face *c'*, terminated with a spiral recurved surface *c''*, substantially as and for the purpose described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

DAVID FREED.

Witnesses:

STANISLAUS REMACK,
WM. ANDERSON.