

(Model.)

E. D. BANGS.
PROPELLER WHEEL.

No. 436,769.

Patented Sept. 23, 1890.

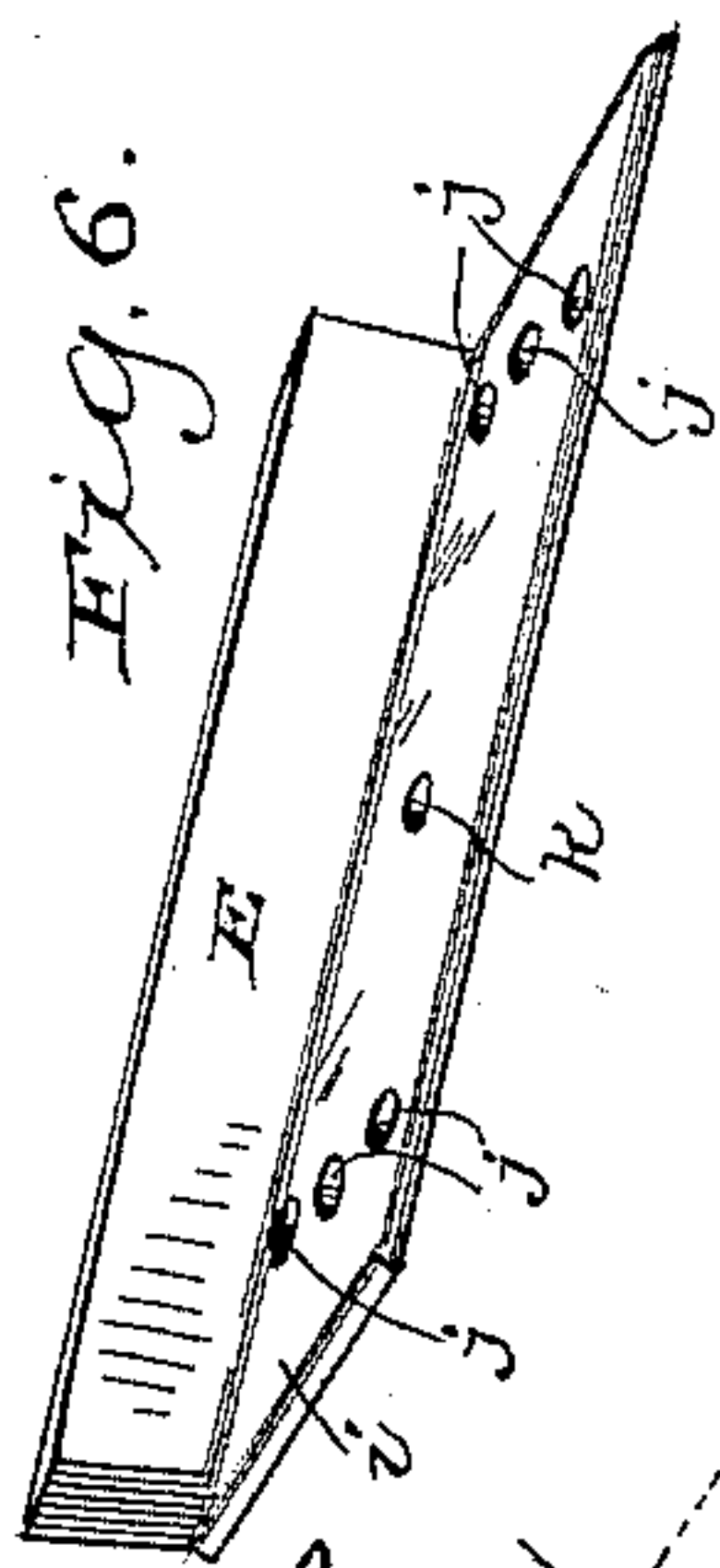


Fig. 3.

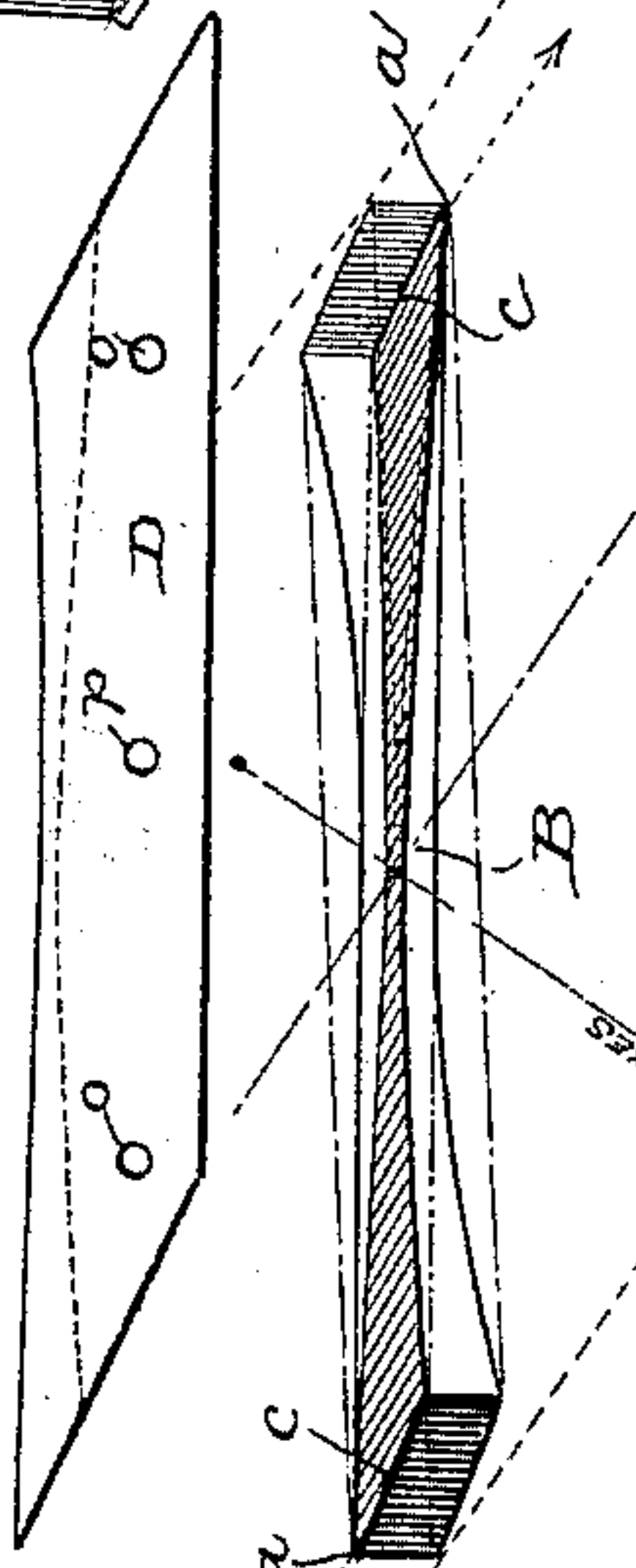
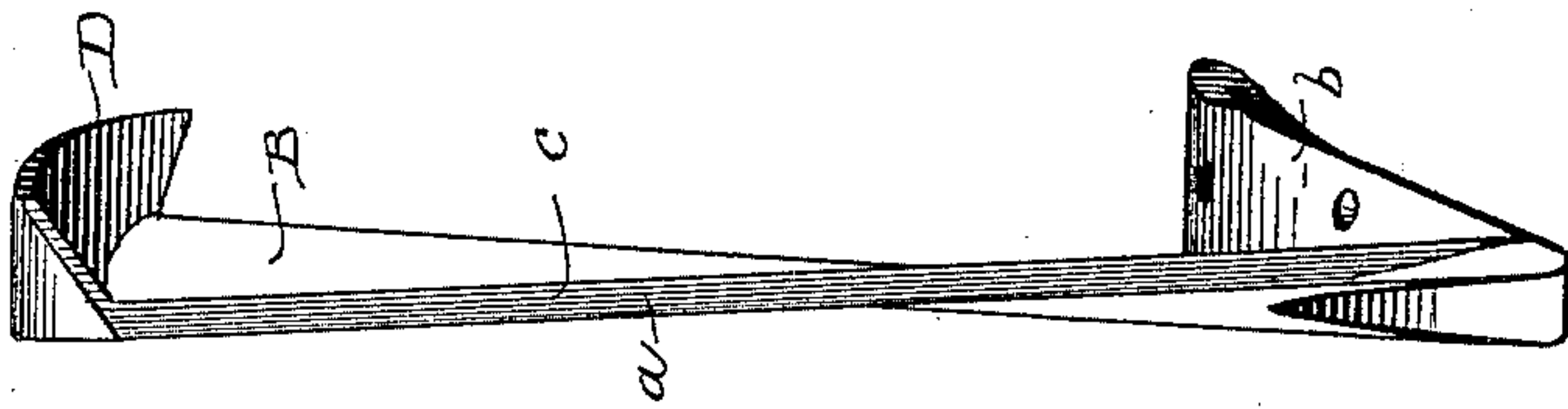


Fig. 5.

Fig. 2.

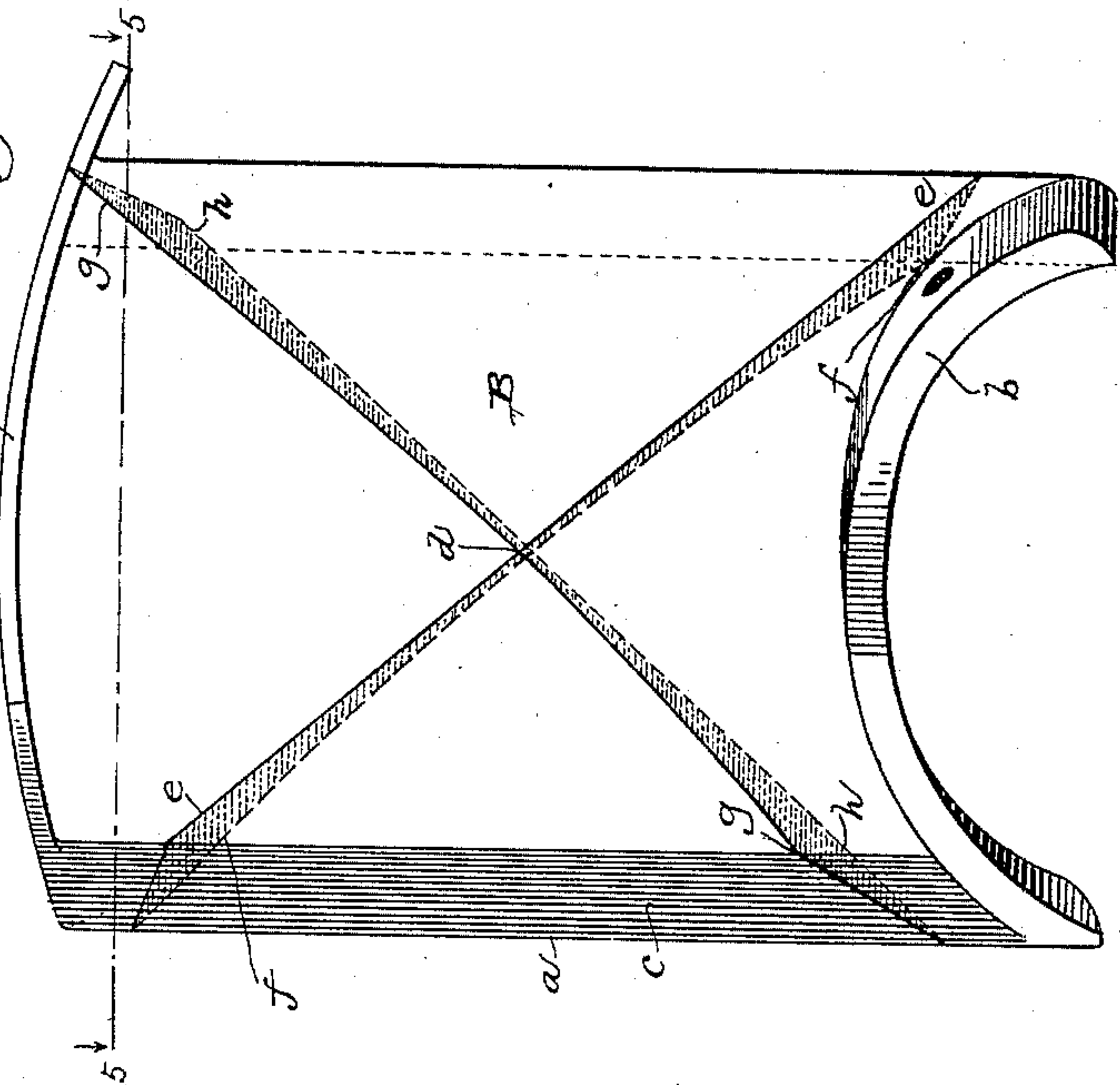
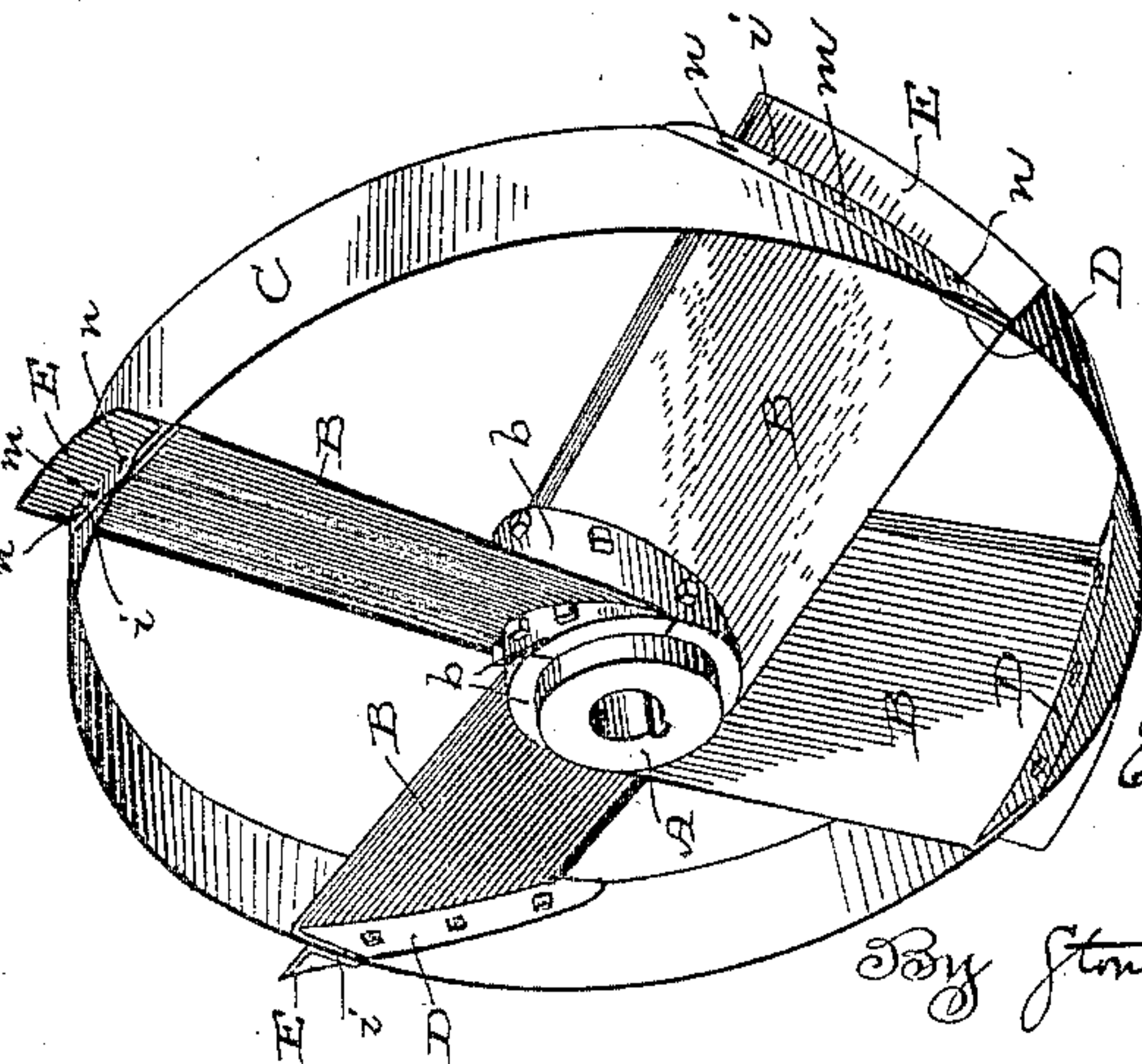


Fig. 1.



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EDWIN D. BANGS, OF MILWAUKEE, WISCONSIN.

PROPELLER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 436,769, dated September 23, 1890.

Application filed June 17, 1889. Serial No. 314,584. (Model.)

To all whom it may concern:

Be it known that I, EDWIN D. BANGS, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Propeller-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to propeller-wheels; and it consists in certain peculiarities of construction, as will be fully set forth hereinafter, and subsequently claimed.

In the drawings, Figure 1 is a perspective view of a wheel embodying my present invention. Fig. 2 is a face view of one of the blades. Fig. 3 is an edge view of the same. Fig. 4 is an outer end view of the same. Fig. 5 is a horizontal section of the blade on the line 5 5 of Fig. 2, and Fig. 6 is a detail view of one of the blade-extensions.

A is the hub of the propeller, to which are secured the inner flanges *b* of the blades B, which latter have straight side edges *a a*, so that the width of the blade is the same throughout its length, the said edges being beveled their entire length on opposite sides, as shown at *c c*. My improved wheel is reversible, and therefore the opposite sides of each blade are exactly alike in all respects, the thinnest part of each blade being at the center *d*, increasing therefrom in thickness in every direction, particularly toward the sides, and especially the corners. This is a feature of the greatest importance, as thereby the greatest possible resistance is presented to the water, extending over the entire surface of the blade, and hence the moment my wheel begins to turn power is instantly developed, and the actual propulsion of the vessel to which my wheel is attached begins with the very first revolution of said wheel, which result is consequent, chiefly, upon the said construction. Each surface of the blade embodies a double curve, as best shown in the edge view, Fig. 3, and transverse section, Fig. 5, and a line drawn from the upper left-hand corner (beginning with the inner edge of the bevel of the left side) to the extreme edge of the lower right-hand corner on the side facing the observer will meet a straight or plane surface of the blade, as shown by the full line *e e*, Fig. 2, while the opposite side of the blade between

these points will show a concave surface, as indicated by the dotted curved line *f f*, and the opposite is true with a line drawn from the upper right-hand corner to the lower left-hand corner, as indicated by the full curved line *g g*, showing the concave surface on the side facing the observer, and the dotted straight line *h h*, showing the straight or plane surface between these points on the opposite side of the blade, in Fig. 2.

In Fig. 1 I show a propeller-wheel provided with a band C, and have consequently shown my blades B provided with outer end flanges D, for the purpose of receiving said band, and affording a means of securing the band to the blades; but it will be understood that in many instances—as, for instance, in cases where the navigation will be obstructed by weeds, grass, and the like—I make my propeller-wheels without bands, and hence the blades would then be made without the flanges D; but where they and the band C are employed I usually attach blade-extensions E (formed on exactly the same principle as the blades B and having attaching-flanges *i*) to the outside of the band, normally directly in line with the blades and forming merely continuations thereof, as shown in Fig. 1.

I have shown four blades B with my wheel; but their number is immaterial, and when I dispense with the band C, I usually employ five blades, their flanges *b* forming a continuous collar around the periphery of the hub A.

In the operation of my wheel, by reason of the described construction with the straight edges *a*, the blades take the water evenly along their entire length, (instead of carrying it in a diagonal channel across the blade and discharging it at one point,) and distribute it evenly in the same way, so that the power is equally distributed throughout the blade, and there is therefore just as much power developed from a point adjacent to the hub (in proportion to the speed or motion of the entire wheel) as at the outer ends of the blades, all parts thereof performing proportionally equal and full duty.

In order to increase or lessen the speed of the wheel, I prefer to make my blade-extensions E adjustable, as best shown in the detail view, Fig. 6, wherein the flange *i* is shown with a central hole *k* for the pivotal bolt *m*,

which secures the flange *i* to the band C, and with other holes *j j* arranged near the ends of said flange, so that the blade-extensions may be turned on the pivotal bolt *m* and adjusted at any desired angle to the ends of the adjacent blades B, and then secured by the other bolts *n n*, passed through the required holes *j j* and through the holes in the band C and the registering-holes *o o* in the blade-flanges D, the pivotal bolt *m* passing through a like hole in the band and the central registering-hole *p* in said flange D, there being of course just the same number of holes in the band C and flange D always in register with each other, but a greater number of holes *j j* (or a slot in place thereof, if preferred) than holes *o* beneath to permit the desired adjustment. This is a valuable feature, as in towing, for instance, power rather than speed is desired, and according to the adjustment of the blade-extensions more power with less speed, or the reverse, may be quickly and easily obtained at any time.

By reason of the two sides of my blades being made exactly alike my wheel may at any time be reversed without the slightest change in either power or speed, and thereby a fruitful source of accident and collision is averted, for with my wheels the instant the engine is reversed my blades catch the water equally as well and promptly as when running in the original contrary direction.

Another valuable feature of my wheel lies in the fact that in case one of the blades becomes broken a new blade can be quickly and readily supplied without removing the wheel from the boat.

By reason of the beveled shape of the edges of my blades they run through the water without creating a vacuum behind them, and hence the forward motion of the boat is not retarded.

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

1. In a propeller-wheel, the combination, with the hub, of a series of blades thinnest at their centers, spirally arranged around said hub, and having straight side edges equidistant apart throughout the entire length of the blade.

2. In a propeller-wheel, the combination, with the hub, of a series of blades thinnest at their centers, spirally arranged around said

hub, and having straight side edges equidistant apart throughout the entire length of the blade, said side edges being beveled their entire length, and the bevel of one side edge being on the opposite side of the blade from the bevel of the other side edge.

3. In a propeller-wheel, the combination, with the hub, of a series of straight-edged blades of equal width throughout their length, spirally arranged around said hub, said blades having double-curved outer surfaces and being thinnest at the center and increasing in thickness therefrom in every direction and especially toward the sides and corners.

4. In a propeller-wheel, the combination, with the hub, of a series of straight-edged blades of equal width throughout their length, spirally arranged around said hub, said blades having their two faces of precisely the same construction and being thinnest at the center and thickest at the sides and corners and presenting a plane surface on a diagonal line extending from the upper left-hand corner to the lower right-hand corner, and a concave surface on a diagonal line extending from the upper right-hand corner to the lower left-hand corner of each face.

5. In a propeller-wheel, the combination, with the hub, of a series of straight-edged blades thinnest at their centers, of equal width throughout their length, spirally arranged around said hub, and having laterally-projecting outer-end flanges, and a band surrounding said blades and secured to their said end flanges.

6. In a propeller-wheel, the combination, with the hub, of a series of straight-edged blades thinnest at their centers, of equal width throughout their length, spirally arranged around said hub, and having laterally-projecting outer-end flanges, a band surrounding said blades and secured to their said end flanges, and a series of flanged blade-extensions adjustably secured to said band adjacent to the ends of said blades.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

EDWIN D. BANGS.

Witnesses:

H. G. UNDERWOOD,
WM. KLUG.