

(No Model.)

J. WILLIAMSON.  
FEATHERING PADDLE WHEEL.

No. 409,440.

Patented Aug. 20, 1889.

Fig. 2.

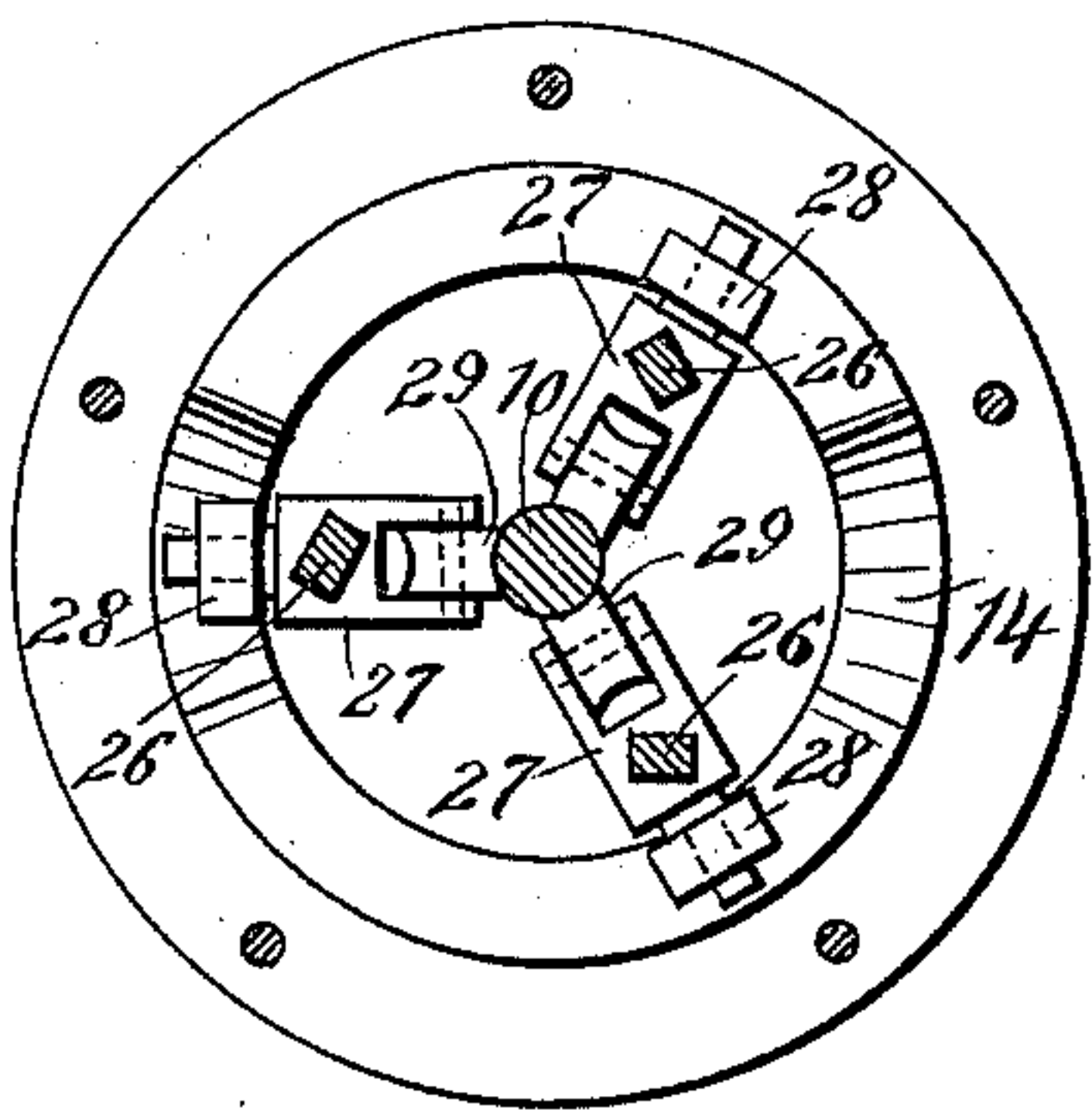


Fig. 1.

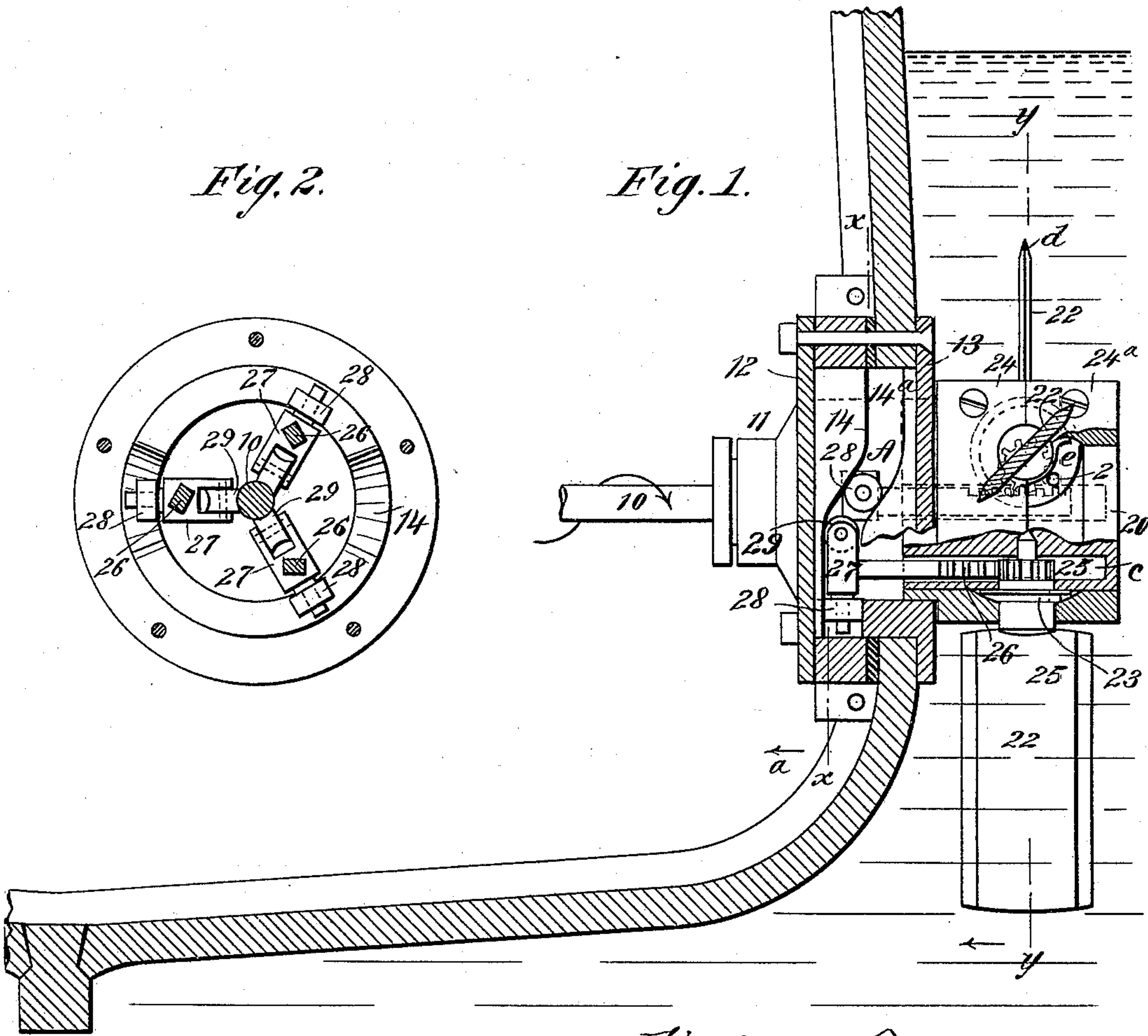
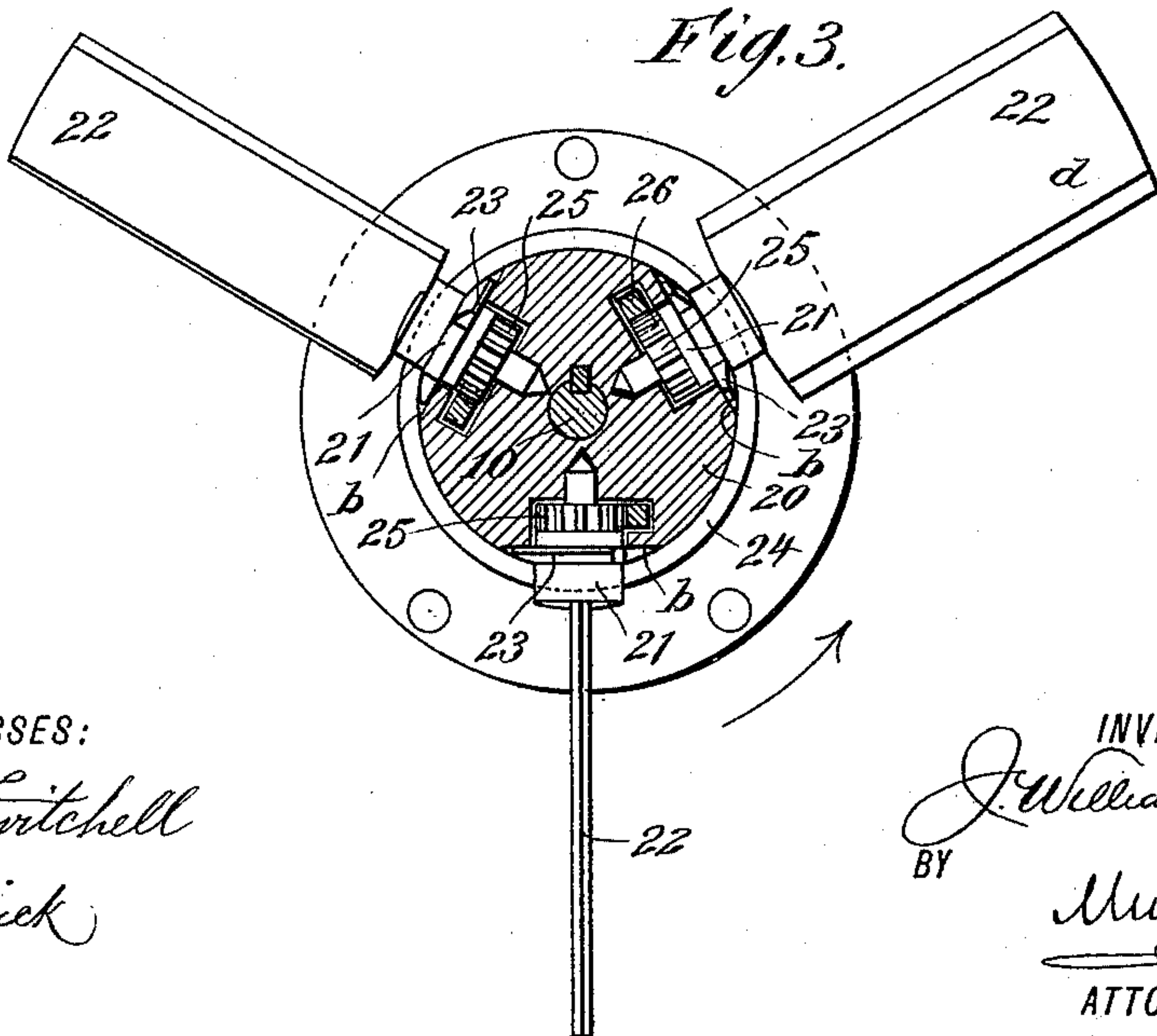


Fig. 3.



WITNESSES:

Norm Fitchell  
C. Sedgwick

INVENTOR:

J. Williamson  
BY  
Munn & Co.  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

JOHN WILLIAMSON, OF BROOKLYN, NEW YORK.

## FEATHERING PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 409,440, dated August 20, 1889.

Application filed May 16, 1889, Serial No. 310,977. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN WILLIAMSON, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Propeller, of which the following is a full, clear, and exact description.

This invention relates to propellers, the object of the invention being to provide a submerged propeller, wherein the parts shall be so constructed that as the propeller is revolved the broad flat surfaces of the blades will be at right angles to the line along which the vessel is traveling at times when the blades are in position to act to force the vessel ahead; but when the blades would otherwise act to retard the onward progress of the vessel they are turned so that their side faces will be parallel with the line along which the vessel is passing.

To the ends above named the invention consists, essentially, of a hub, blades mounted to turn therein and provided with gears, racks arranged to engage said gears, and a means for reciprocating the racks, all as will be hereinafter fully explained, and specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a cross-sectional view of a portion of a vessel, representing the same as it appears when provided with my improved propeller, parts of said propeller being broken away to disclose the interior construction, and the view being taken looking toward the stern of the vessel. Fig. 2 is a cross-sectional view on line *x x* of Fig. 1 in the direction of the arrow *a*, shown in connection with said line; and Fig. 3 is a cross-sectional view on line *y y* of Fig. 1.

In the drawings, 10 represents a driving-shaft, which extends outward through the side of the vessel, passing through a packing or stuffing box 11, which extends inward from a plate 12, said plate 12 being bolted to an external plate 13, the parts being properly packed, as illustrated. The plate 12 is formed with a cam-faced flange 14, while the plate 13 is formed with a complementary cam-faced flange 14<sup>a</sup>, the arrangement being such that

when the two plates are in position, as represented in the drawings, there will be a cam-groove A between the approaching edges of the cam-plates 14 and 14<sup>a</sup>.

To the extending end of the shaft 10 there is keyed a hub 20, formed with radial apertures adapted to receive the inner ends of hubs 21, which carry broad blades 22, and are formed with flanges 23, which overlap flattened sections *b*, formed on the hub 20, the flanges in turn being overlapped by retaining-rings 24 and 24<sup>a</sup>, which said retaining-rings are held to the hub by set-screws or bolts, as represented in the drawings.

To the hubs 21 there are connected gears 25, and these gears 25 are engaged by racks 26, that are housed within recesses *c*, formed in the hub 20, said recesses being parallel with the axis of the shaft 10. The inner ends of the racks 26 carry brackets 27, which serve as supports for anti-friction rolls 28, said rolls riding in the cam-groove A, and for other anti-friction rolls 29, that ride upon the peripheral face of the shaft 10, the rolls 29 being employed to properly support and guide the inner ends of the racks, as will be readily understood.

Such being the general construction, the operation is as follows: We will suppose that the vessel is to be moved ahead, in which case the shaft 10 would be revolved in the direction of the arrow shown in connection therewith, and as the shaft is so revolved the hub 20, and with the hub the blades 22, will be carried forward in the direction of the arrow shown in Fig. 3. Then as the roll 28 of any one of the brackets 27 enters the inclined section of the cam-groove A, which section is shown in Fig. 1, the rack in connection with which the bracket is arranged will be drawn inward, and the blade 22 controlled by said rack will be moved, so that its flat face will be presented to act upon the water—that is, the face of the blade will extend substantially parallel with the axis of the shaft 10, the blade being maintained in this position until its roller 28 enters the inclined section of the cam A—that is, to the rear of the shaft—and as the roller passes through such inclined section of the cam-groove the blade will be moved to the position in which it is shown at *d* in Figs. 1 and 3.



To limit the motion of the blades, and to partially support the blades when they are in their operative position, I provide a stop or limit pin 2 in connection with each blade, such  
5 stop or limit pin extending upward from the hub 20 into a recess formed by cutting away a portion of the hub-flange 23, such cut-away portion being shown at *e* in Fig. 1.

Now, although I have illustrated and de-  
10 scribed my propeller as being submerged, still I desire it to be understood that in certain cases the driving-shaft might be arranged above the water-line.

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

1. The combination, with a driving-shaft, of a hub connected thereto, radially-extending blades held by the hub, gears connected to the blades, racks arranged to engage the  
20 gears, and a means for reciprocating the racks, substantially as described.

2. The combination, with a driving-shaft, of a hub connected thereto, radially-extend-

ing blades held by the hub, gears connected to the blades, racks arranged to engage the  
25 gears, brackets connected to the racks, anti-friction rolls or wheels carried by the brackets, and flanges forming a cam-groove within which the anti-friction rolls ride, substan-  
30 tially as described.

3. The combination, with a driving-shaft, of a hub connected thereto, radially-extending blades held by the hub, gears connected to the blades, racks arranged to engage the  
35 gears, brackets connected to the racks, anti-friction rolls carried by the brackets and arranged to bear upon the driving-shaft, other anti-friction rolls carried by the brackets, and flanges forming a cam-groove, within which  
40 groove the last-referred-to anti-friction rolls ride, substantially as described.

JOHN WILLIAMSON.

Witnesses:

J. T. MATTHEWS,

J. H. WHITTAKER, Jr.