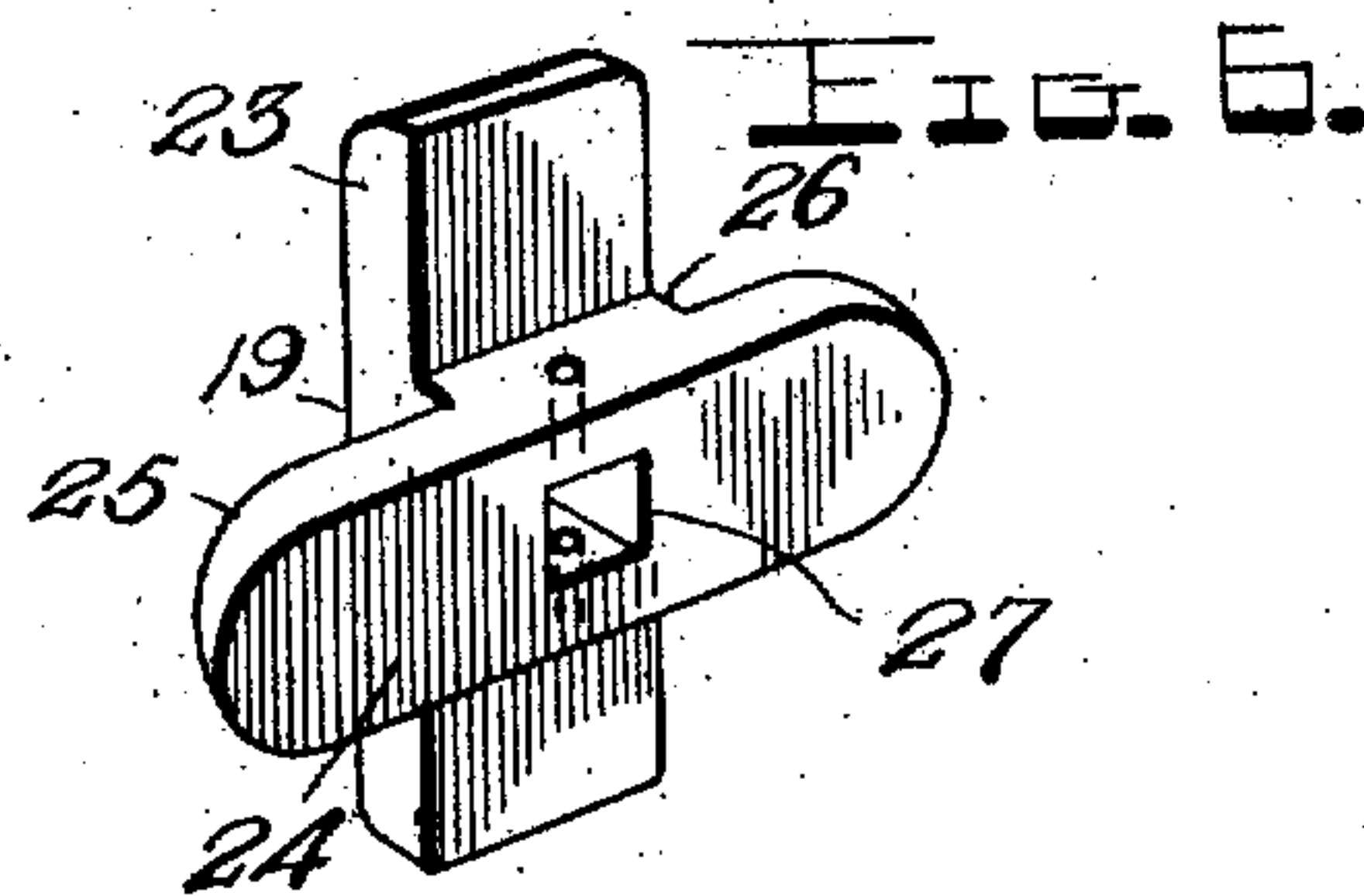
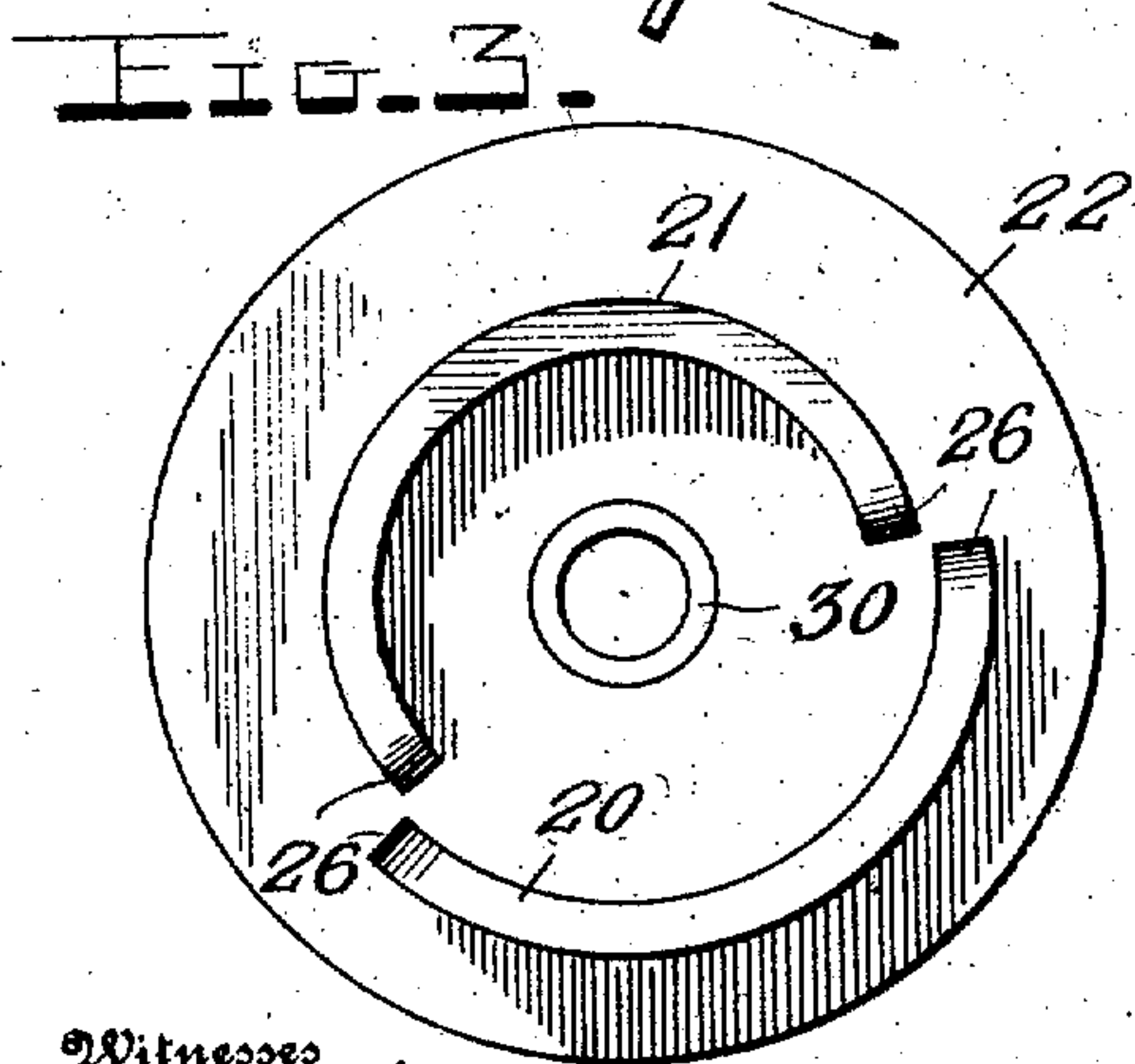
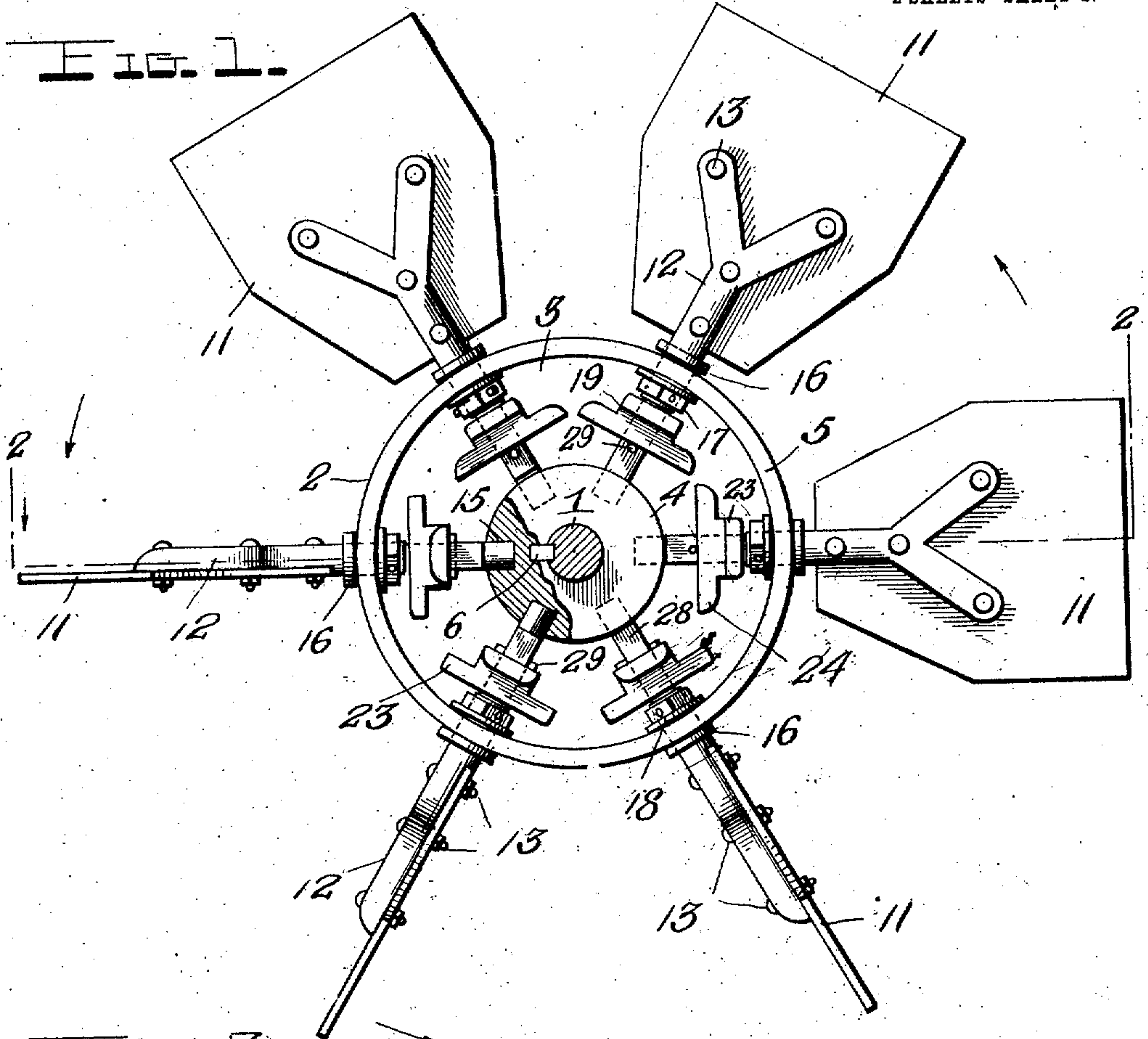


C. W. VAN WINKLE.  
FEATHERING BLADE PROPELLER.  
APPLICATION FILED MAR. 27, 1909.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.

955,023.



Witnesses

Chas. L. Griebauer.  
& M. Ricketts

Inventor

Charles W. Van Winkle

By

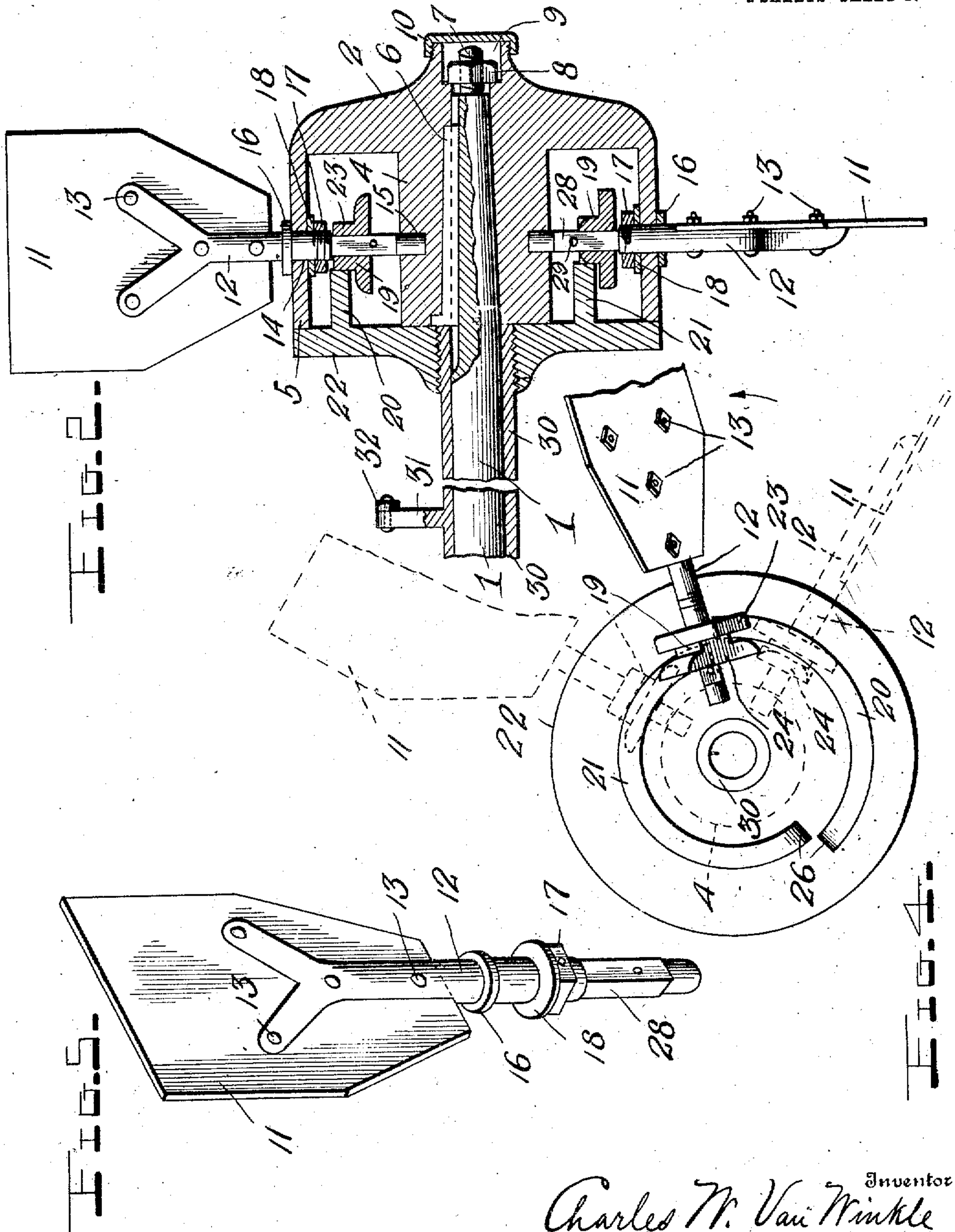
Watson E. Coleman  
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Attorney



# UNITED STATES PATENT OFFICE.

CHARLES W. VAN WINKLE, OF WHITE PLAINS, NEW YORK.

## FEATHERING-BLADE PROPELLER.

955,023.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed March 27, 1909. Serial No. 486,257.

*To all whom it may concern:*

Be it known that I, CHARLES W. VAN WINKLE, a citizen of the United States, residing at White Plains, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Feathering-Blade Propellers, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in feathering blade propellers especially adapted for use in propelling, lifting, steering and stopping air-ships, but which may be used for other purposes.

The object of the invention is to provide a simple and practical propeller of this character with improved means for feathering its blades and for enabling the blades to be feathered at different points in their circle of rotation, thereby permitting the propeller to be effectively used for propelling and controlling an air-ship.

With the above and other objects in view, the invention consists in the combinations and arrangements of parts and in the novel features of construction hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view of the inner side of the rotary blade carrying member, parts being broken away and in section; Fig. 2 is a horizontal section taken on the plane indicated by the line 2—2 in Fig. 1; Fig. 3 is a view of the inner side of the shiftable cam carrying member; Fig. 4 is a view similar to Fig. 3 showing one of the blades arranged in a position thereon to illustrate the feathering operation; Fig. 5 is a detail perspective view of one of the blades and its pivot; and Fig. 6 is a detail perspective view of one of the blade holding members which co-act with the cams.

In the drawings 1 denotes a rotary shaft which has suitably fixed to it for rotation therewith a blade carrying member 2. As illustrated, the member 2 is in the form of a cylindrical body and has in one of its sides an annular cavity or chamber 3 which provides a hub 4 and a concentric rim 5. The hub 4 has an opening to receive the shaft 1 and to lock the member or body 2 to the shaft for rotation therewith, a longitudinal key 6 is preferably provided, as shown more clearly in Figs. 1 and 2 of the drawings. When the propeller is secured

on one end of the shaft, said end may, if desired, be tapered longitudinally and it may be provided with a reduced threaded stem 7 to receive a retaining nut 8, the latter being arranged in a cavity 9 formed in the outer side of the member 2 and closed by a screw cap 10, as clearly shown in Fig. 2.

11 denotes the blades or wings which may be of any suitable form and construction and which are provided with stems or pivots 12. The latter radiate from the member 2 and are rotatable therein so that the blades can feather. As illustrated, the pivots 12 have the blades 11 bolted, as shown at 13, or otherwise secured to their forked or recessed outer ends. The inner ends of the pivots project through bearing openings 14 formed in the rim 5 and in the bearing sockets 15 formed in the hub 4. To retain said pivots in the member 2, collars 16, 17 are fixed to them on opposite sides of the rim 5 and washers 18 are preferably interposed between the inner collars 17 and the rim, as clearly shown in Figs. 1 and 2 of the drawings. While this is the preferred manner of constructing and mounting the blades and their pivots, it will be understood that they may be otherwise constructed and mounted.

For the purpose of causing the blades to feather and maintaining them in either their operative position or their inoperative feathered position, holding members 19 are arranged upon the pivots 12 and adapted to co-act with cams 20, 21 arranged upon a carrying member 22 in the form of a plate or head which closes the open side of the cavity 3 in the member or body 2 of the propeller. The cams 20, 21 are in the form of ribs projecting from the inner face of the head 22 and arranged concentrically with respect to each other, the cam rib 21, however, being of less diameter than the cam rib 20 and of slightly greater length than the same, as clearly shown in Fig. 3. The holding members 19 are preferably in the form of X-shaped or cross-shaped blocks suitably fixed to the pivots 12 of the blades and having their cross arms 23, 24 extending at right angles to each other to provide flat bearing faces upon their edges for engagement with the edges of the cam ribs 20, 21. Each of the holding members 19 is so fixed to the pivot 12 that the outermost cross arm 23 which engages and co-acts with the cam rib 20, extends in a plane at right angles to the plane of the blade carried by said pivot 12,



in order that such blade will be held squarely to the wind or in an operative position when the cross arm 23 is engaged with the cam rib 20; and since the other cross arm 24 is disposed in a plane at right angles to the cross arm 23, it will be in a plane parallel with the blade 11 carried by the pivot 12 so that when the cross arm 24 engages the cam rib 21, the blade will be held in a feathered position, that is, with its edge to the wind. The ends of the cross arms 24 are rounded, as shown at 25, and the ends of the cam ribs 20, 21 are rounded and slightly spaced apart, as shown at 26, so that the holding members 19 will readily pass from one of said cam ribs onto the other and in so doing will make a quarter turn and thereby turn the blade either into the wind or out of the wind. The holding members 19 are preferably fixed to the pivots 12 by providing them with centrally arranged, square or flat faced openings 27 to receive similar-shaped portions 28 on the pivots 12, on which portions said members 19 are secured by transverse pins 29 or similar fastenings. It will be seen that when the holding members 19 pass over the cam rib 20 the blades will be held to the wind or in an operative position, and that when they pass over the cam rib 21 they will be held with their edges to the wind or in a feathered position.

To permit the blades to be feathered at different portions of the propeller or their circle of movement, I may provide any suitable means for shifting the cam carrying member 22 and retaining it in the desired position. To accomplish this object, the member 2 is suitably fixed to a sleeve 30 which surrounds and rotates upon the shaft 1 and which may be provided with a radially projecting arm 31 having a suitable actuating and holding rod or other connection 32 pivoted to it, as shown in Fig. 2 of the drawings. It will be seen that by shifting the cam carrying member 22 around the shaft 1 the blades may be caused to feather at the top, bottom, front, rear or any intermediate portion of the propeller, thereby enabling the latter to be effectively used for lifting, steering, stopping or otherwise controlling the movement of an air-ship as well as for propelling the same in a forward direction.

In operation, it will be seen that when the cam carrying member 22 is held stationary and the shaft 1 is rotated, the blades 11 will rotate with the member 2 on said shaft and the holding members 19 upon the pivots of the blades will be moved successively over the two cam ribs 20, 21. When the cross arms 23 of said holding members have their flat side faces bearing against the edge of the cam rib 20, the blades 11 on such pivots 12 will be held to the wind until the cross arms reach the end of the cam rib 20, where-

upon the cross arms 22 engage the adjacent end of the cam rib 21 and are caused to make a quarter turn to feather the blade and then bear against such cam rib to retain the blade in feathered position until the cross arm 24 disengages the cam rib 20, as will be readily understood upon reference to Figs. 1, 2 and 4 of the drawings. When it is desired to cause the blades to feather at different points of the propeller or the circle of movement of the blades, the operating and holding element 32 is moved to rotate the sleeve 30 and hence the cam carrying member or plate 22 on the shaft 1, as above explained.

It will be noted that the blades will feather when the shaft 1 is reversed as well as when it is turned in its normal or forward direction.

While the invention is especially adapted for use as a propeller for an air-ship, it will be understood that it may be used upon other machines and for other purposes, and it will also be understood that while the preferred embodiment of the invention has been shown and described in detail, various changes in the form, proportion and arrangement of parts and in the details of construction may be resorted to without departing from the spirit and scope of the invention.

Having thus described the invention what is claimed is:

1. In a propeller of the character described, the combination of a rotary shaft, a blade carrying member fixed to said shaft for rotation therewith, blades having pivots arranged radially in said member for rotation, a cam carrying member upon said shaft, the curved cam ribs 20, 21 arranged on said cam carrying member concentric with the shaft and at different distances therefrom and the X-shaped holding members 19 fixed to said blade pivots and each having the oppositely projecting flat faced cross arms 23 to co-act with the cam rib 20 and the oppositely projecting cross arms 24 offset from the cross arms 23 and disposed in a plane at right angles thereto and adapted to co-act with the cam rib 21, substantially as and for the purpose set forth.

2. In a propeller of the character described, the combination of a rotary shaft, a hollow blade carrying member fixed to said shaft and having a hub, an annular rim and a connecting side or end portion, said rim and hub being formed with radially aligned bearings, blades having pivots rotatable in said bearings, said pivots having stop shoulders to engage the outer face of the rim, screw threaded portions arranged within the rim and flat faced portions between the rim and hub, nuts upon the threaded portions of said pivots to retain them in the rim, a sleeve upon said shaft,

a relatively stationary cam carrying plate  
fixed to said sleeve and adapted to close  
the opening in the side or end of said blade  
carrying member, the cam ribs 20 and 21  
5 projecting from said plate and into said  
member, said ribs being arranged concen-  
tric with the shaft and at different distances  
therefrom, the X-shaped holding members  
19 fixed to the flat faced portions of said  
10 pivots and each having the flat faced cross  
arms 23 to co-act with the cam rib 20 and

the cross arms 24 offset from the arms 23  
and disposed in a plane at right angles  
thereto and adapted to co-act with the cam  
rib 21 and means for rotating said sleeve. 15

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

CHARLES W. VAN WINKLE.

Witnesses:

JAMES T. BURT,  
LEO P. O. FARRELL.