

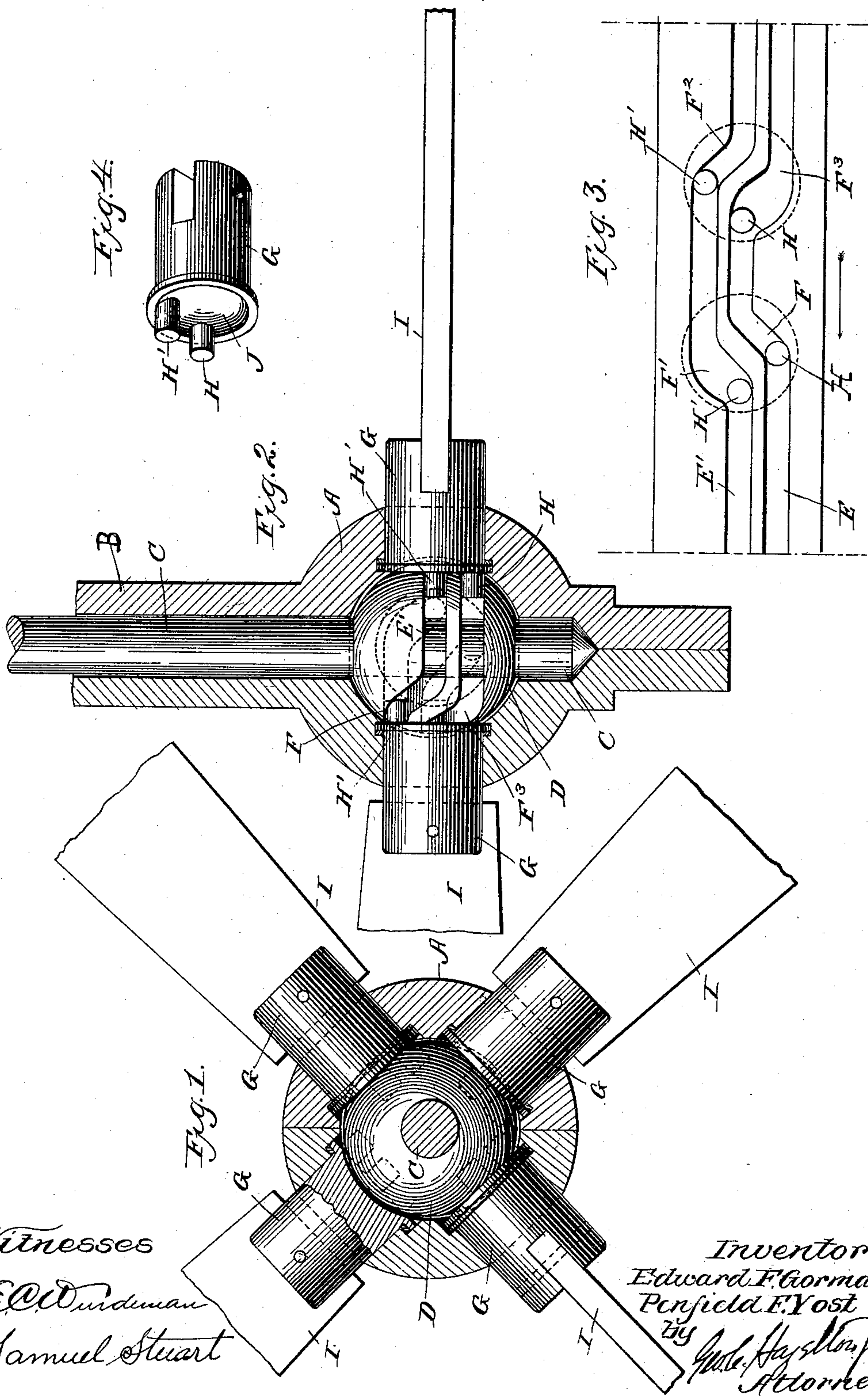
No. 630,499.

Patented Aug. 8, 1899.

E. F. GORMAN & P. F. YOST.  
SUBMERGED FEATHERING PROPELLER.

(Application filed Oct. 19, 1898.)

(No Model.)



Witnesses

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# UNITED STATES PATENT OFFICE.

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## SUBMERGED FEATHERING-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 630,499, dated August 8, 1899.

Application filed October 19, 1898. Serial No. 694,020. (No model.)

*To all whom it may concern:*

Be it known that we, EDWARD F. GORMAN and PENFIELD F. YOST, citizens of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a certain new and useful Improvement in Submerged Feathering-Propellers for Marine Purposes, of which the following is a specification.

Our invention relates to a new and useful improvement in submerged feathering-propellers for marine purposes, and has for its object to provide a simple and effective propeller of this description the blades of which will exert the maximum force against the water in the proper direction and then be turned edgewise through one portion of their movement which would retard the vessel.

A further object of our invention is to overcome the side thrust incident to the screw-propeller and avoid the possibility of "churning" or "racing," thereby permitting the application of a greater amount of power to a propeller of given size.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a section of the hub, showing the blade-spindles and the spherical cam for operating the same; Fig. 2, a longitudinal section of the power-shaft and hub, also showing the spherical cam and the grooves therein for operating the blade-spindles; Fig. 3, a diagrammatical view of the cam-grooves, and Fig. 4 a detail perspective of one of the blade-spindles.

In carrying out our invention as here embodied, A represents a hub formed or secured upon the hollow shaft B, and this hub and shaft are made in two sections secured together in any convenient manner. A spindle C is fitted within the hub and shaft so as to remain stationary while the shaft and hub revolve and has secured thereon a spherical cam

D. This cam D has two grooves E and E' formed therein, and these grooves are deflected, as indicated at F and F', as clearly shown in Fig. 3.

Spindles G, here shown as four in number, are fitted within the hub so as to oscillate therein, each having two pins H and H' projecting therefrom into the grooves E and E', respectively. The result of this is that when the hub is revolved, carrying the blade-spindles G, the pins of said spindles, traveling in the straight portions of the grooves E and E', will hold the spindles, and consequently the blades, in the position which corresponds to the particular portion of the grooves in which the pins are then traveling; but when the pins are brought into engagement with the deflected portions F and F' of the grooves the spindles G will then be caused to oscillate through ninety degrees, carrying with them their blades, for the purpose hereinafter set forth.

The formation of the deflections in the grooves E and E' is such that the deflection F, coming in contact with the pin H, will act to turn its spindle, while the pin H' will revolve without being acted upon by the deflection F', which is enlarged, so as to not act upon this last-named pin; but when in the travel of the pins they reach the second set of deflections F<sup>2</sup> and F<sup>3</sup> the deflection F<sup>2</sup> acts upon the pin H' to again turn the spindle to the first position, during which movement the pin H will move in the deflection F<sup>3</sup> without effect.

From this description it will be seen that the revolving of the hollow propeller-shaft B will cause the propeller-blades I, carried by the spindles G, not only to revolve with the hub, but also to alternately turn to bring their surfaces against the water and to again turn edgewise thereto, and this turning movement should be so timed by the proper location of the spherical cam D as to first cause the propeller-blades to fully act upon the water to force the vessel forward and then edgewise to feather during the remainder of their movement until reaching the proper point, when they will again be turned and take a full hold upon the water, as will be readily understood. The reversing of the movement of the propeller-shaft will produce a reverse of the pro-



propeller-blades, thereby driving the vessel backward.

It is to be noted that the blade-spindles G are concaved upon their inner ends, as indicated at J, so as to be adapted to the contour of this spherical cam, and thereby always remain in close proximity thereto.

We do not wish to be limited to any particular manner of journaling the propeller-shaft or the securement of the cam-spindle passing therethrough, as these may be accomplished in any suitable manner.

A propeller constructed in accordance with our improvement when submerged will have little or no side thrust and will at all times tend to force the vessel in the proper direction with the least consumption of power for the speed obtained.

Having thus fully described our invention, what we claim as new and useful is—

1. A propeller consisting of a suitable hub, spindles journaled therein, blades carried by said spindles, a cam fitted within the hub, means for holding said cam stationary during the revolving of the hub, and pins arranged on one side of and projecting from the blade-spindles into the grooves of said cam, as specified.

2. In combination, a suitable hub, a spherical cam fitted therein, means for holding said cam stationary while the hub revolves, spindles G fitted to oscillate within the hub, two pins arranged side by side, near the outer edge of and projecting from each of the last-named spindles into the grooves of the cam, and blades carried by the said spindles, as shown and described.

3. In combination, a rotary hollow hub, a spherical cam fitted therein, means for holding said cam stationary during the revolving of the hub, said cam having two grooves formed therein with deflections, oscillating spindles fitted within the hub having their inner ends concaved, two pins arranged side by side, near the edge and projecting from each of these spindles into the grooves of the cam, and blades carried by these spindles, as specified.

In testimony whereof we have hereunto affixed our signatures in the presence of two subscribing witnesses.

EDWARD F. GORMAN.  
PENFIELD F. YOST.

Witnesses:

MARY E. HAMER,  
SAMUEL STUART.