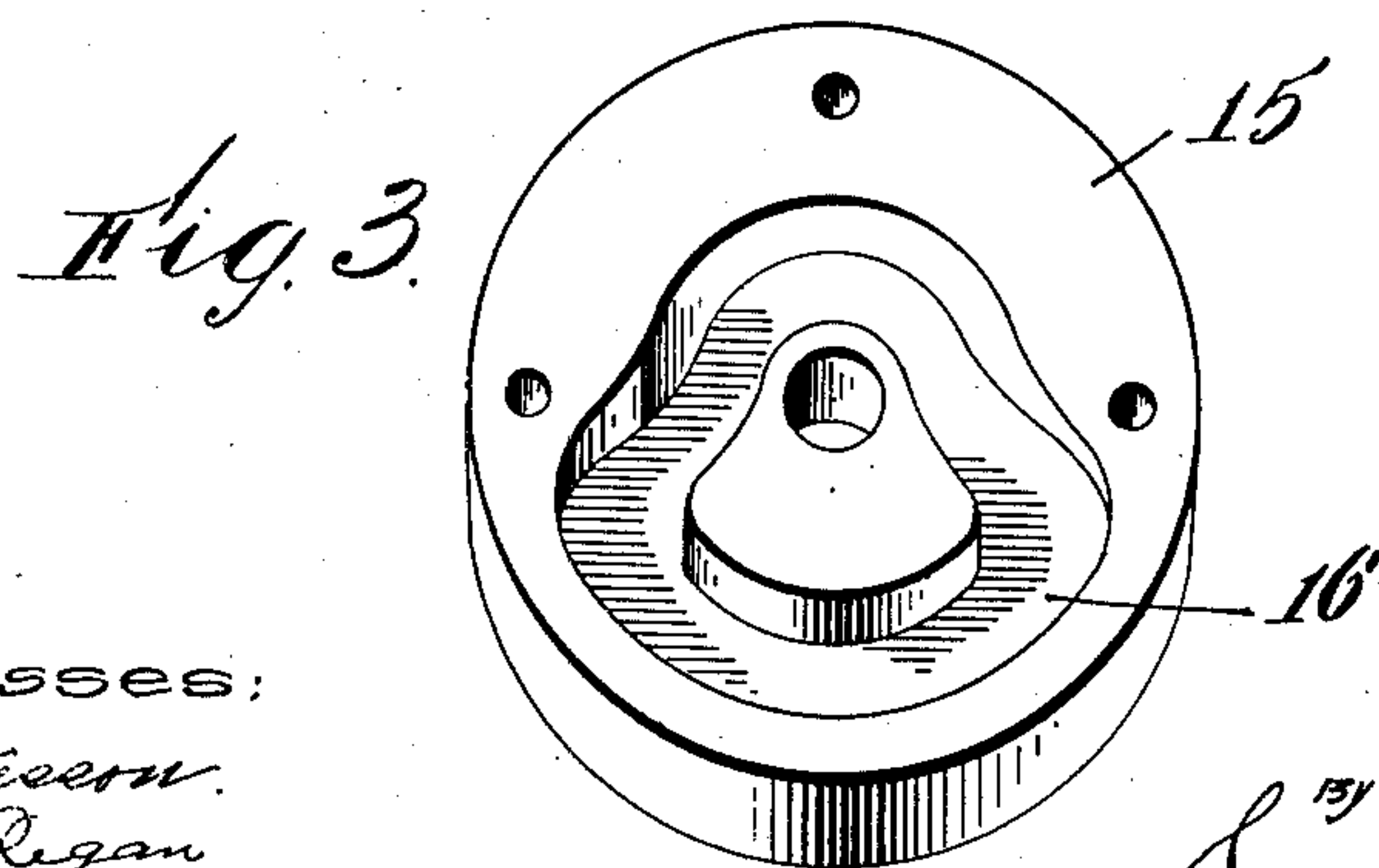
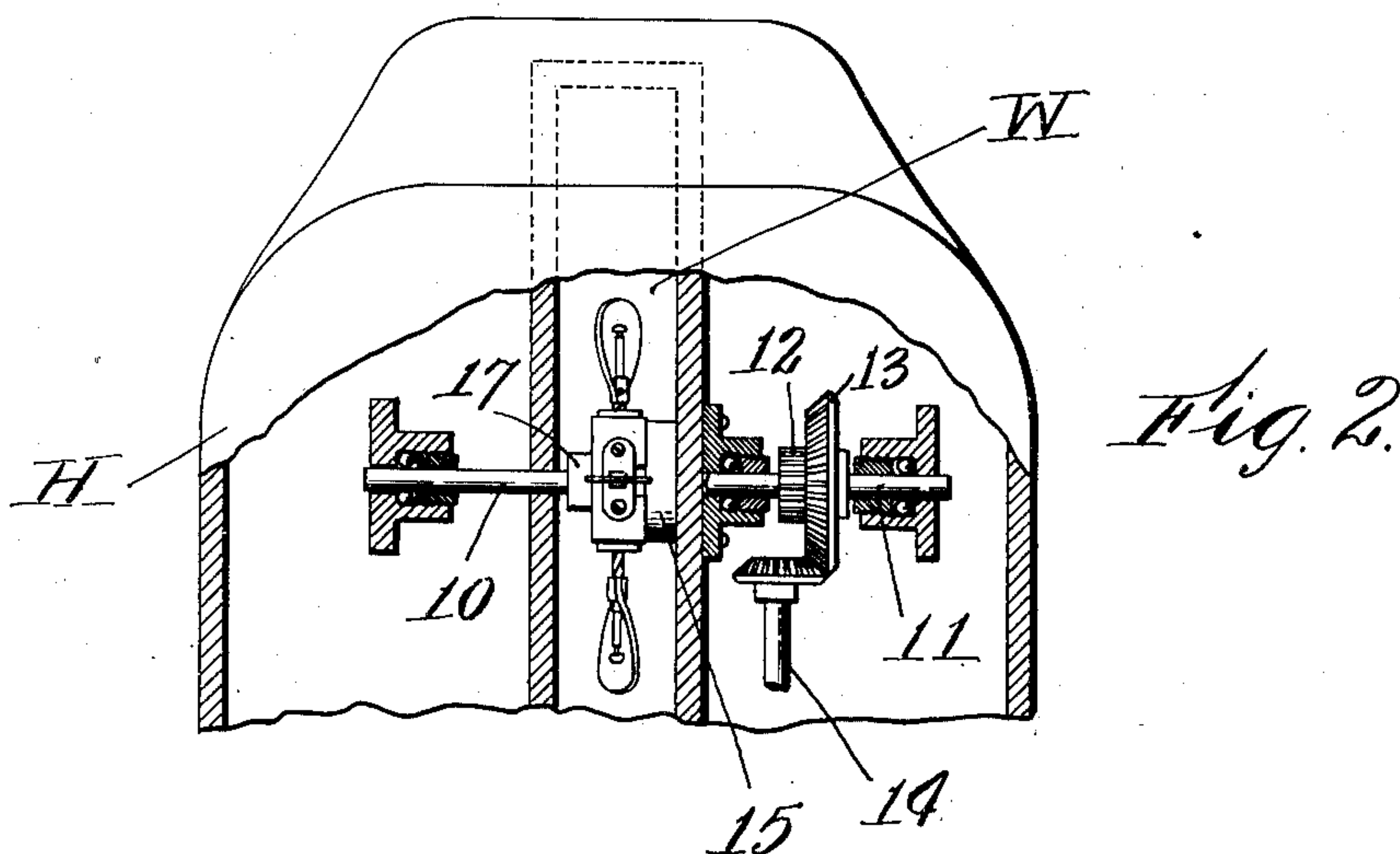
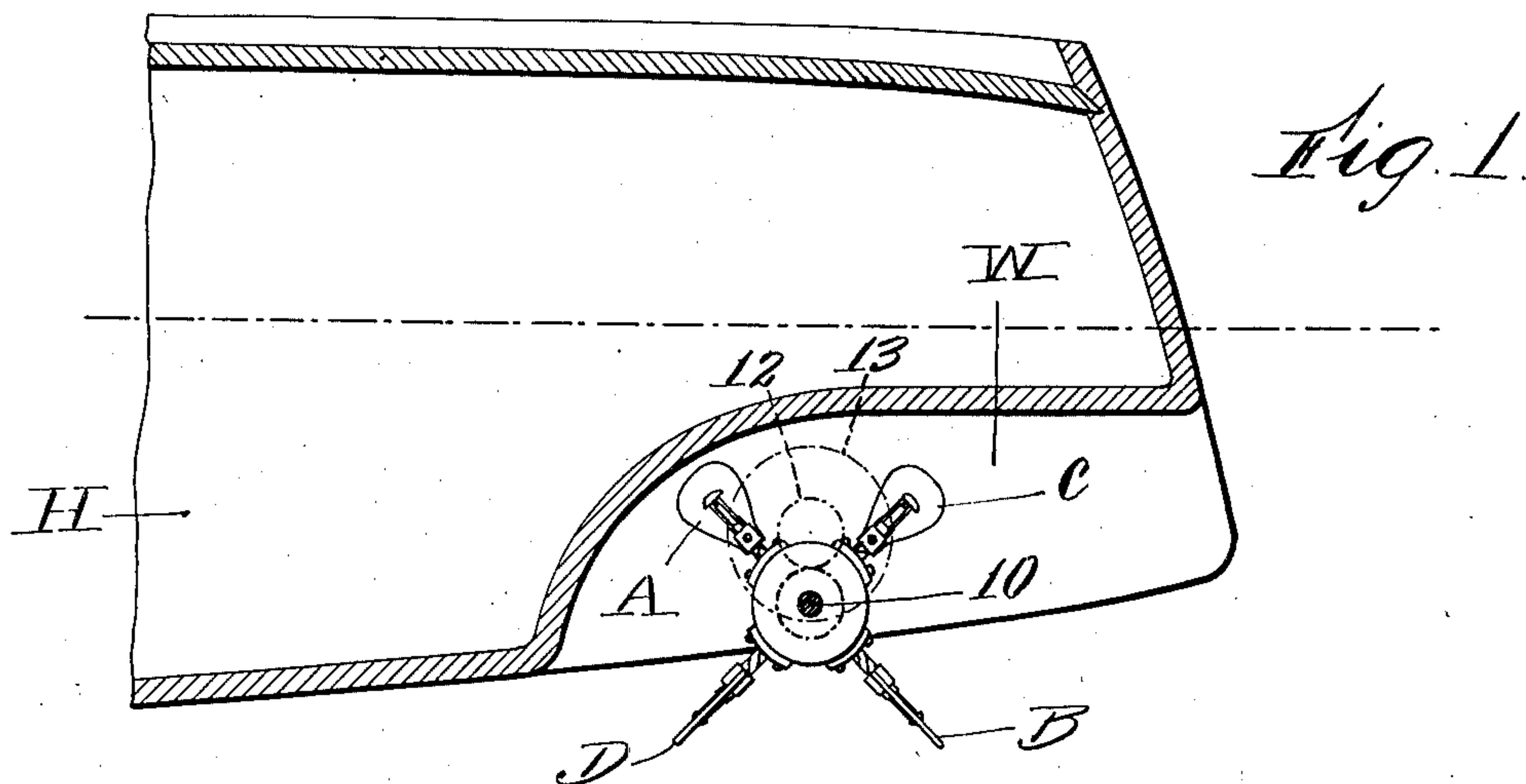


No. 839,897.

PATENTED JAN. 1, 1907.

O. P. SMITH.
MARINE PROPELLER.
APPLICATION FILED DEC. 19, 1904.

2 SHEETS—SHEET 1.



Witnesses:
C. F. Mason.
M. C. Regan

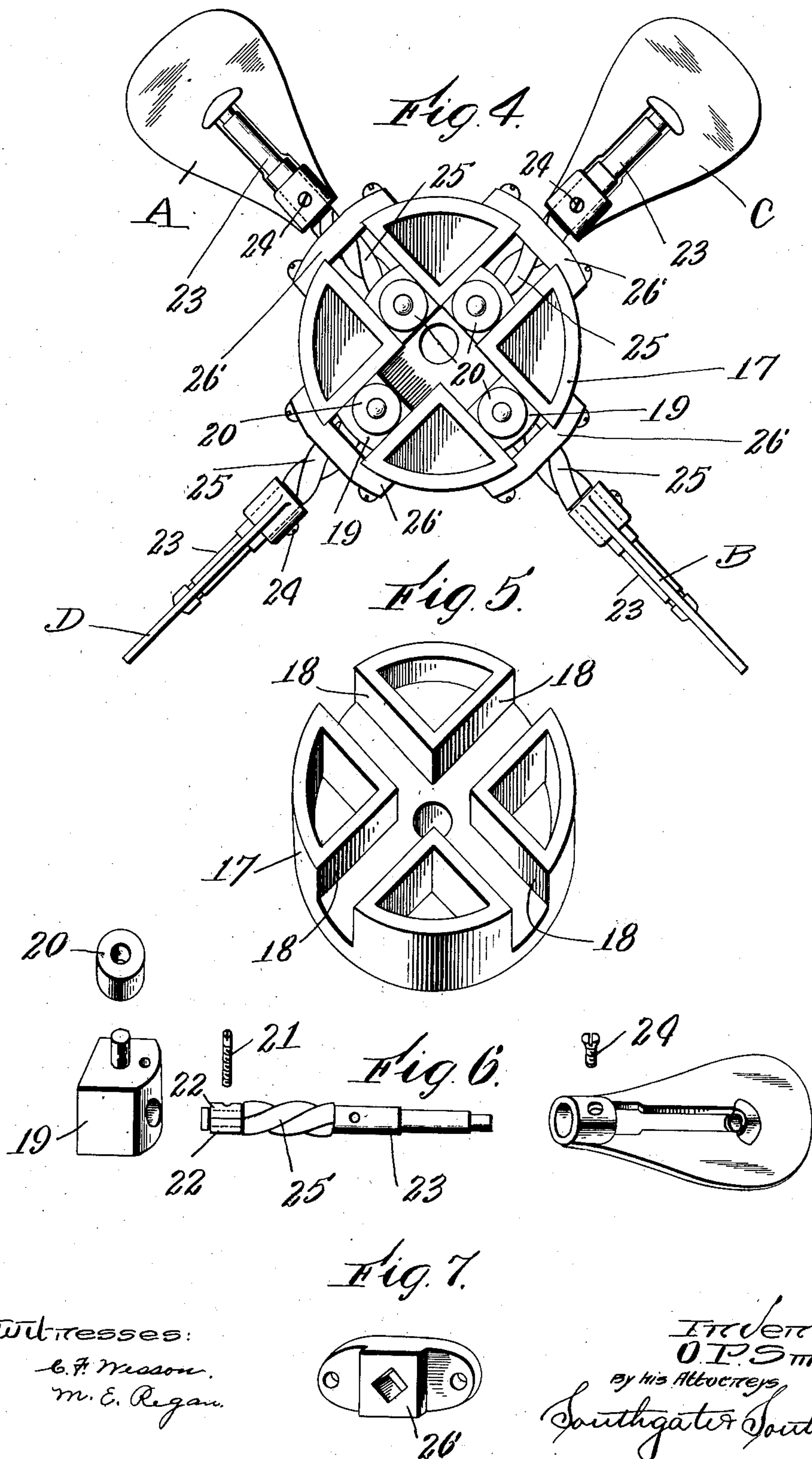
Inventor:
O. P. Smith
by his Attorneys
Southgate & Southgate

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UNITED STATES PATENT OFFICE.

OZRO P. SMITH, OF SOUTH FRAMINGHAM, MASSACHUSETTS, ASSIGNOR
TO HIMSELF AND JOHN L. YOUNG, OF SOUTH FRAMINGHAM, MASSA-
CHUSETTS.

MARINE PROPELLER.

No. 839,897.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed December 19, 1904. Serial No. 237,390.

To all whom it may concern:

Be it known that I, OZRO P. SMITH, a citizen of the United States, residing at South Framingham, in the county of Middlesex and State of Massachusetts, have invented a new and useful Marine Propeller, of which the following is a specification.

This invention relates to that class of propelling devices for vessels which employ feathering or turning blades.

The especial object of this invention is to provide a strong, simple, and efficient propelling apparatus for a vessel which will secure the highest possible degree of efficiency from the amount of power absorbed thereby and which is self-clearing, so that the same will not become fouled by weeds, ropes, or other debris liable to be encountered.

To these ends this invention consists of the apparatus for propelling a vessel, of the combinations of parts therein, and of the manner of mounting the propeller in the hull of a vessel, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying two sheets of drawings, Figure 1 is a sectional view of sufficient parts of a vessel to illustrate the application of this invention thereto. Fig. 2 is a fragmentary plan view thereof partly in section. Fig. 3 is a perspective view of the cam for extending and retracting the blades. Fig. 4 is an enlarged side view of the propeller removed from the shaft. Fig. 5 is a perspective view of the hub of the propeller. Fig. 6 is a perspective view of one of the blades and of the operative parts therefor, and Fig. 7 is a perspective view of one of the guide-pieces or nuts.

One of the principal difficulties which is encountered in navigating waterways, particularly rivers and lakes, is due to the fouling of the propelling apparatus by weeds, ropes, or other floating debris. This is especially so in the use of the ordinary screw-propeller, because while a properly designed screw-propeller can be operated with a high degree of efficiency it creates a vortex or water-whirl, which tends to collect weeds, ropes, or other floating debris and tends to foul the shaft of the vessel.

An apparatus constructed according to this invention has been especially designed

with a view of providing a propelling apparatus which will be non-fouling, or which at least will tend to be self-clearing, so that it will not pick up weeds or other debris. This result is accomplished by using a number of propeller-blades which revolve about an axis transverse to the length of the vessel, which blades are alternately extended away from and drawn back toward the axis or shaft. The blades are moved out and remain extended during the operative part of their stroke and are drawn in toward the shaft during the return or idle part of their stroke, and in practice it has been found that this alternate moving out and drawing back of the blades will produce a self-clearing action which will prevent the picking up of weeds or other matter.

In the particular construction herein illustrated the propeller is located in a submerged well below the water-line of the vessel and comprises four blades which are alternately moved out away from and drawn back toward the shaft. These blades are given a feathering or turning motion as they are moved in and out, the blades during their idle or return travel standing in a plane at right angles to the shaft, and during the operative part of their stroke or travel standing in planes parallel with the shaft.

The moving in and out of the blades is preferably accomplished by a stationary grooved cam, and the feathering or turning of the blades is accomplished by the use of screw-threads or spiral guideways on the rods.

Referring to the accompanying drawings for a detail description of an apparatus constructed according to this invention, as shown in Fig. 1, H designates the hull of a launch or other vessel.

Formed in the rear part of the hull H is a submerged well W, and extending through the side walls of the submerged well W is a cross-shaft 10. The cross-shaft 10 is preferably journaled in suitable ball-bearings, and located above the cross-shaft 10 at one side of the well W is a counter-shaft 11. Secured on the counter-shaft 11 is a spur-gear 12, which meshes with and drives a corresponding gear upon the shaft 10. (Shown by dotted lines in Fig. 1.) Also secured upon the counter-shaft 11 is a bevel-gear 13, which

meshes with and is driven from a bevel-pinion carried by the power-shaft 14.

Secured in fixed position on the inside of the well W is a stationary cam 15, (shown in Fig. 3,) having a track or way 16, and also secured upon the shaft 10 is the hub 17, which carries the blades and connections for operating the same.

The construction of the blades and their operating connections is shown most clearly in the second sheet of drawings.

As shown in Fig. 5, the hub 17 is provided with four radial guideways. Fitted in each of the guideways 18 is a sliding block 19, and journaled on a pin extending from each of the sliding blocks 19 is a roller 20 for engaging the groove 16 of the cam 15. Clamped in each of the blocks 19 by a screw 21 are half-sleeves 22, and journaled in each pair of half-sleeves 22 is a rod or arm 23, and secured on each arm 23, by means of a screw 24, is one of the blades. At an intermediate point each of the arms 23 is provided with spiral guideways or grooves 25, each of which is threaded through a socket piece or nut 26, said nuts or guide-pieces 26 being fastened to the hub 17, as shown in Fig. 4.

In practice in order to produce a balanced effect from the blades as thus constructed it is desirable that part of the blades should be turned or feathered in one direction, while the remainder of the blades should be feathered or turned in the opposite direction, and, as shown in Fig. 4, it will be observed that the spirals or screws 25 that turn the blades A and B are of right-handed pitch, so that said blades will turn or be feathered in one direction, while the spirals or screw-threads 25 of the blades C and D are of opposite inclination, so that the said blades C and D will be feathered or turned in the opposite direction.

In the use of the propelling apparatus for a vessel as thus constructed it will be seen that by reason of engagement of the rolls 20 with the track 16 of the stationary cam 15 the blades will be successively thrown out away from their shaft during their operative stroke and will be drawn in toward the shaft while on their return or idle stroke, and that the spiral guideways or screw-threads of each of the blade-arms will turn or feather the blades as they are moved in and out, so that the blades will stand at right angles to their shaft while on their idle or return stroke, and will present their broad faces to the water during their operative stroke, one blade being turned or feathered as it is moved out in the direction traveled by the hands of a watch, while a succeeding blade is turned or feathered in the opposite direction, this opposite feathering or turning of the blades serving to produce a balanced action, so that the total resulting power from the use of the

paddle-wheel will tend to propel the vessel forward in a straight line.

I am aware that numerous changes may be made in practicing my invention by those who are skilled in the art, and while my apparatus for propelling a vessel has been especially designed for use in connection with a launch, small yacht, or other vessel of the type used more especially in inland waterways it is obvious that my apparatus may be applied to deep-sea vessels or to other uses of widely-different character, and although a propelling apparatus constructed according to this invention may with advantage be mounted in a submerged well in a boat's hull the construction is also capable of being differently applied. I do not wish, therefore, to be limited to the particular construction I have herein shown and described, nor to any particular way of mounting the same in a vessel; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a propelling apparatus for a vessel, the combination of blades revolving completely around an axis transverse to the length of the vessel, and means for feathering or turning the blades so that each blade will be parallel to the axis and transverse to the center line of the vessel during the operative part of its stroke, and in a plane at right angles to the axis and parallel with said center line during the idle or return part of its stroke, and for successively throwing each blade out from the axis, increasing its distance therefrom during the operative part of its stroke, and for successively drawing in each blade, decreasing its distance from the axis during the idle or return part of its stroke.

2. In an apparatus for propelling a vessel, the combination of the hub, radially-movable blade-carrying arms mounted in the hub, a cam for alternately extending and retracting the arms, and spirals or screw-threads for feathering or turning the arms.

3. In a propelling apparatus for a vessel, the combination of a hub, blade-carrying arms radially movable in the hub, a cam for alternately extending and retracting said arms, and spirals or screw-threads for feathering or turning the blades, a portion of said spirals being of right-hand pitch, while the remainder of said spirals or screw-threads are of left-hand pitch.

4. In an apparatus for propelling a vessel, the combination of a hub having radial guideways therein, a movable piece in each of said guideways, a blade-carrying arm pivoted in each of the movable pieces and having a spiral or screw-thread engaged by a guide-piece or nut, a track-cam, and a friction-roller journaled on each of the movable pieces and engaging the arms, whereby the propelling-blades will be alternately ex-

tended and retracted and will be feathered or turned to present the edges of the blades during their idle or return stroke, and the wide faces of their blades during their operative or working stroke.

5 5. In an apparatus of the class described, the combination of the hull of a vessel, a submerged well therein, a shaft arranged transversely in said well, bevel-gearing for turning
10 said shaft, a hub on the shaft, blades movably mounted in said hub, and means for radially extending and retracting said blades, and for feathering and turning said blades so that they will present their edges during
15 their idle or return travel, and their wide faces during the operative part of their travel.

6. A propelling apparatus having a rotata-

ble wheel provided with movably-mounted blades, means for moving said blades outwardly and inwardly, and means for swinging said blades on axes transverse to the axis
20 of rotation of the wheel.

7. A propelling apparatus comprising a rotatable wheel provided with movably-mounted blades, means for moving said blades radially, and means for swinging said blades on
25 radial axes.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OZRO P. SMITH.

Witnesses:

LOUIS W. SOUTHGATE,
MARY E. REGAN.