

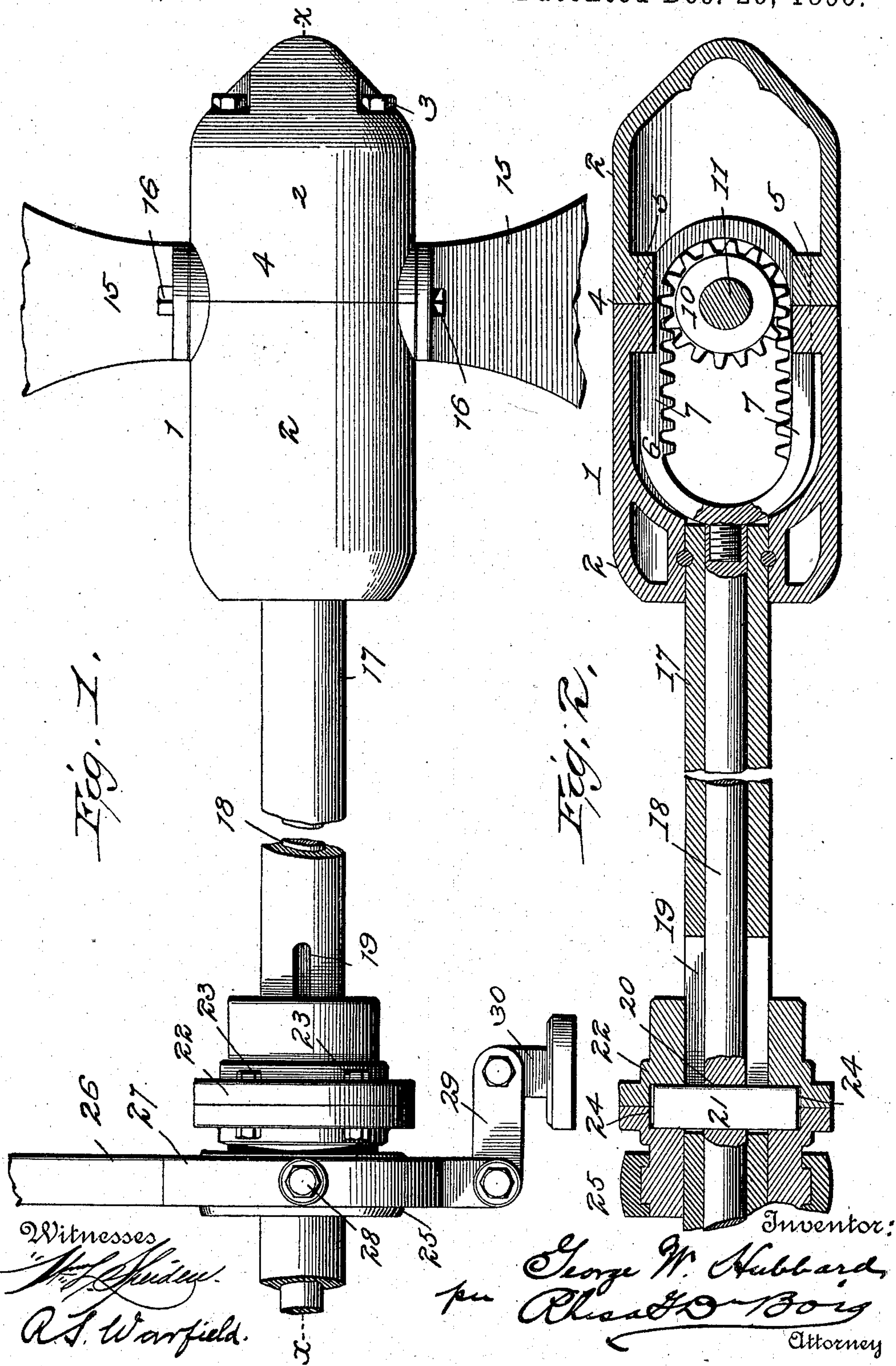
(No Model.)

2 Sheets—Sheet 1.

G. W. HUBBARD
SCREW PROPELLER.

No. 573,977.

Patented Dec. 29, 1896.



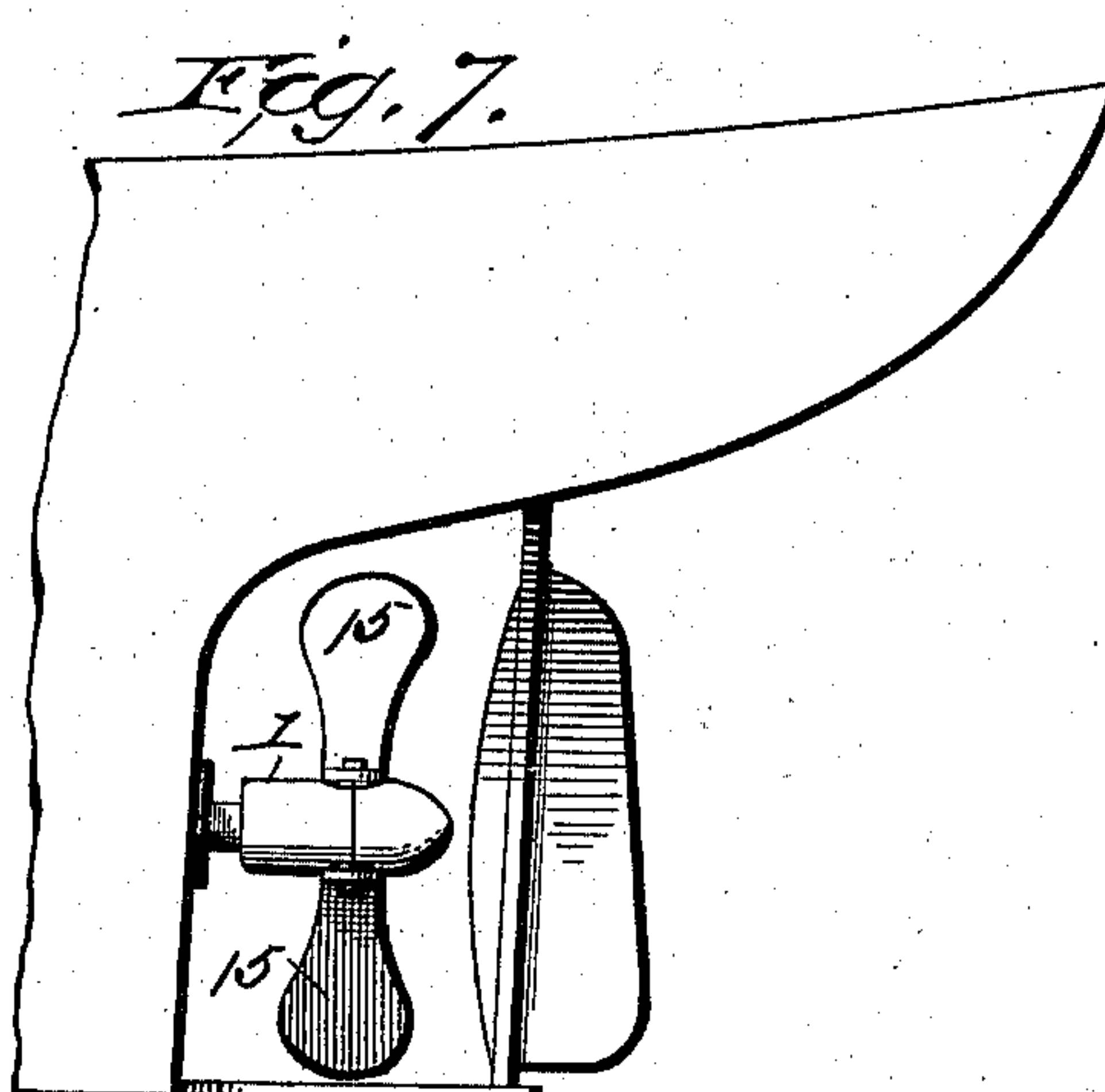
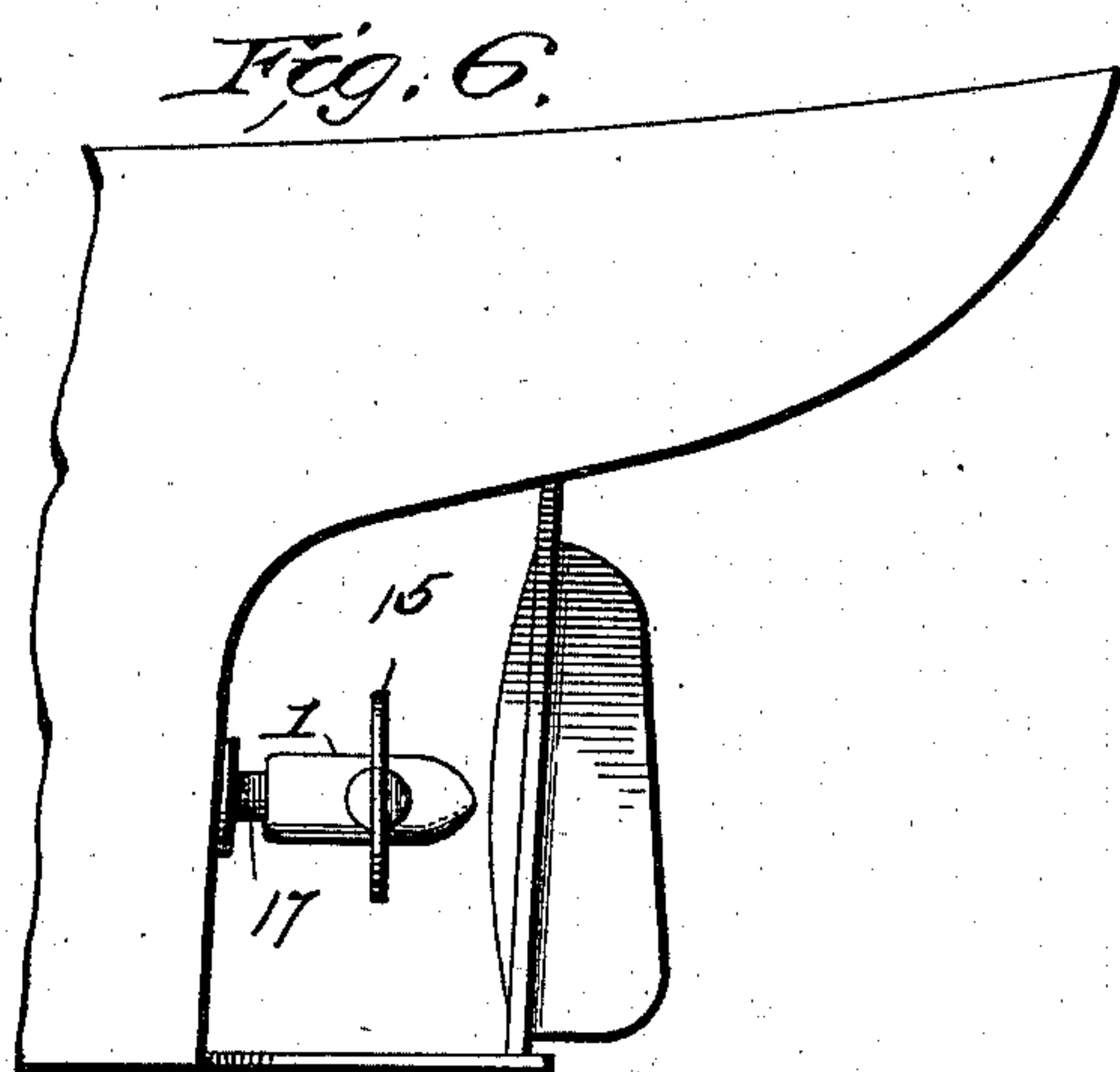
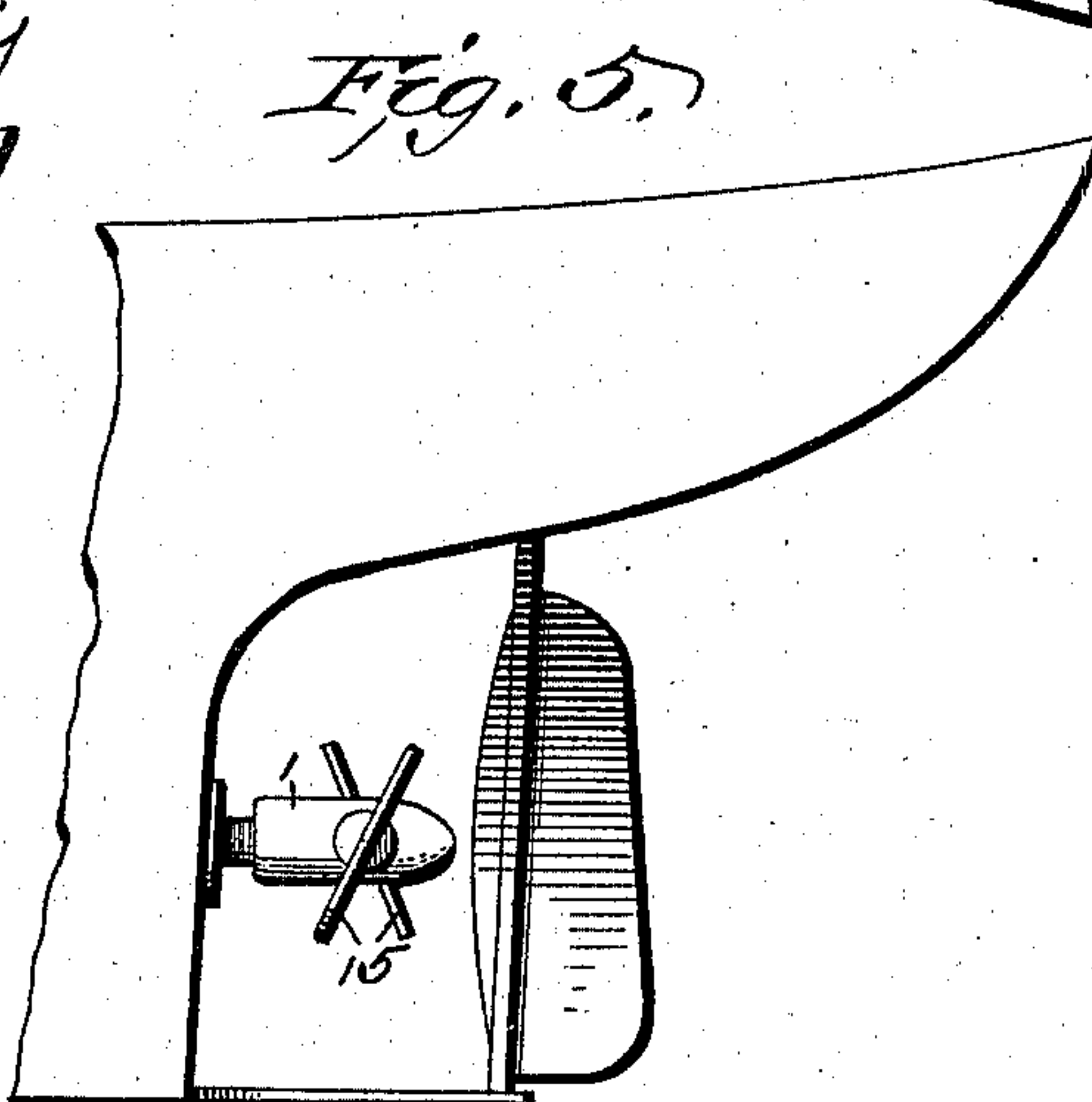
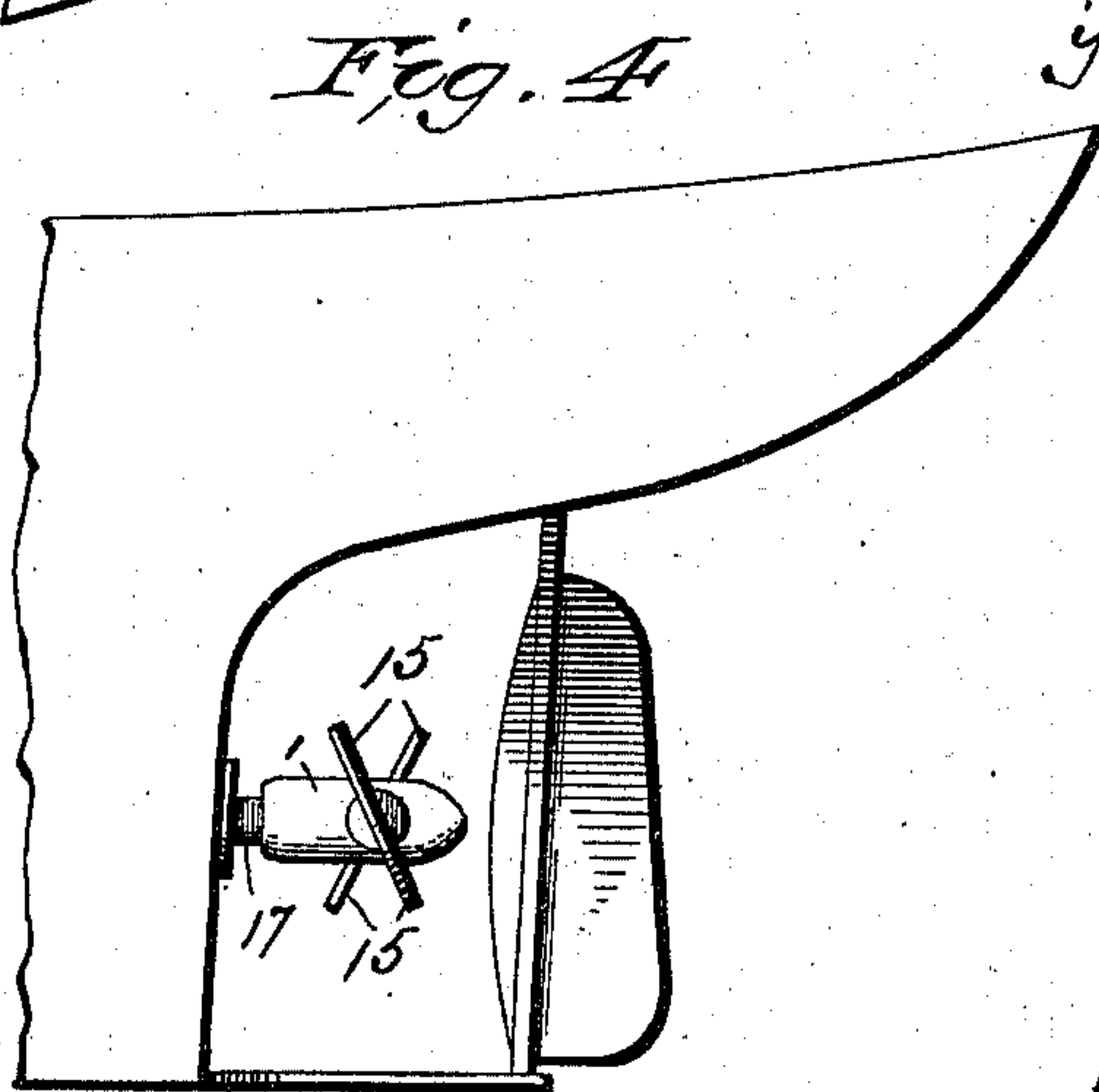
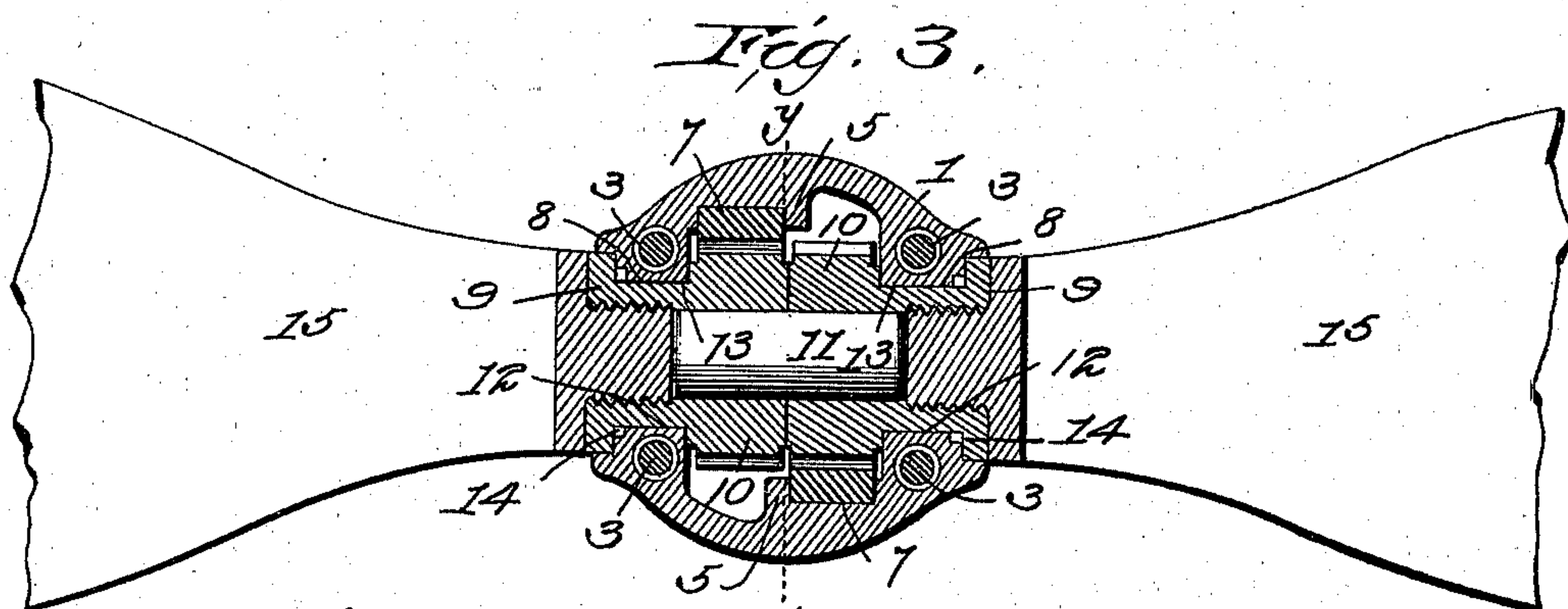
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2 Sheets—Sheet 2.

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Witnesses
A. S. Warfield

Inventor:
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UNITED STATES PATENT OFFICE.

GEORGE W. HUBBARD, OF CHICAGO, ILLINOIS.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 573,977, dated December 29, 1896.

Application filed June 10, 1896. Serial No. 595,017. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. HUBBARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Screw-Propellers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to propeller-wheels for vessels, its object being to so improve their construction that the angle of the blades relative to the axial line of the propeller-shaft may be changed at will from the interior of the vessel, and all the working parts necessary to effect the changes will be inclosed and entirely protected from the action of the water or any floating encumbrances in the water.

To this end my invention consists of the several details of construction and combinations of parts hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my improved propeller-wheel and the operating mechanism, the blades being broken away; Fig. 2, a longitudinal section on the line *xx* of Fig. 1; Fig. 3, a transverse section on the line *yy* of Fig. 1, the propeller-blades being broken away and set at a different angle to that shown in Fig. 1. Figs. 4, 5, 6, and 7 show the propeller-blades at different angles to the axial line of the propeller-shaft.

Similar reference-numerals indicate similar parts in the respective figures.

The hub or casing 1 is hollow and made of two sections 2 2, which, when the several parts are in position, are securely bolted together by the bolts 3, extending longitudinally of the hub, the point 4 being made water-tight. On the inside of the hub are formed guides 5 5, in which the rack-bar 6 is adapted to have longitudinal movement. This rack-bar has two arms 7 7, the teeth of which oppose each other, but the arms are not in the same plane, as shown in Fig. 3. The casing 1 is provided at opposite points with open-

ings 8 8, through which extend the hubs 9 9 of pinions 10 10, journaled within the casing on a pin 11 to have independent movement. The teeth of the pinions 10 10 engage the teeth of the arms 7 7 of the rack-bar 6, one arm being above one pinion and the other arm below the other pinion, so that when the rack-bar is given longitudinal movement the pinions 10 10 will turn in opposite directions. The hubs 9 9 are each provided with an annular groove 12, and the hub has interior annular collars 13 13, which fit into said grooves and prevent longitudinal movement of the hubs and pinions while permitting free rotary movement. Suitable washers 14 14 are interposed between the hubs and casing to make a water-tight joint. The blades 15 15 are screwed into the hubs 9 9, as shown in Fig. 3, and as an additional security the set-screws 16 16 may be used to prevent the blades from working loose.

17 is the main driving-shaft and is tubular, as shown. One end of this shaft is rigidly connected to the hub or casing 1 and its other end to the engine. Within the shaft 17 another shaft, 18, is supported to have longitudinal movement therein, and one end of the shaft 18 is securely attached to the rack-bar 6. At a suitable point in its length the shaft 17 is provided with an elongated slot 19, through which and a slot 20 in the shaft 18 a key 21 extends. This key locks the two shafts together to have common rotary movement, but the shaft 18 can have independent longitudinal movement within the shaft 17.

22 represents a sleeve made in two sections, which are secured together by bolts 23. This sleeve fits loosely over the shaft 17 and is provided with suitable recesses 24 to receive the ends of the key 21. On the sleeve 22 a strap 25 is fitted in the usual manner to permit the sleeve to turn freely therein but to move with it longitudinally on the shaft.

26 is a lever provided with a circular portion 27 to fit over the strap 25, to which it is pivotally connected by the pins or bolts 28 28. The lower end of the lever is pivotally connected to one end of a link 29, the other end of the link being pivoted to a fixed part 30 of the boat. The upper end of the lever may be operated by hand or otherwise to impart the necessary movement to the sleeve

22, and through it and the shaft 18 to the rack-bar 6, pinions 10 10, and blades 15 15. By this structure it will be seen that the angle of the blades relative to the axial line of the shaft may be changed by a slight movement of the lever 26, and that all the working parts are inclosed and isolated from the water and other extraneous matter that might interfere with their proper working.

10 In Figs. 4 and 5 I have shown the blades arranged at an angle oblique to the axial line of the propeller-shaft, and when in this position they will propel the vessel.

15 In Fig. 6 the blades are arranged at a right angle to the axial line of the shaft, and when in this position they can be revolved without changing the position of the vessel. This is often advantageous, since the engine can be used for other purposes, as running a pump or dynamo, without uncoupling it from the propeller-shaft.

20 In Fig. 7 the blades are arranged in lines parallel with the axial line of the shaft, and when in this position they do not drag or offer resistance to the movement of the vessel when it is being sailed without aid from the propellers.

Having described my invention, I claim—

30 1. In a propeller-wheel, the combination of a hollow casing or hub having opposite openings in its sides, a loose pin within the casing,

pinions journaled on the pin and having hubs projecting through the openings in the casing, a bar having two toothed arms engaging said pinions to move them in opposite directions, propeller-blades secured to the hubs of the pinions, and means to operate the rack-bar substantially as and for the purpose specified.

2. The combination with a hollow driving-shaft and a hollow casing or hub rigidly connected to it and having opposite openings in its sides, of a loose pin within the casing, pinions journaled on the pin and having hubs extending through the openings, propeller-blades secured to the hubs, a double rack-bar engaging with said pinions, a shaft connected to the rack-bar and extending longitudinally within the hollow driving-shaft, devices to connect the two shafts to have common rotary movement and permit the inner shaft to have independent longitudinal movement, and mechanism to move the inner shaft longitudinally, substantially as and for the purpose specified.

In witness whereof I affix my signature in presence of two witnesses.

GEORGE W. HUBBARD.

Witnesses:

J. G. SARVENT,
A. J. SHAW.