No. 663,185. Patented Dec. 4, 1900.

A. T. OTTO.

MARINE MOTOR.

(Application filed May 6, 1899.)

(No Model.) 3 Sheets—Sheet 1.

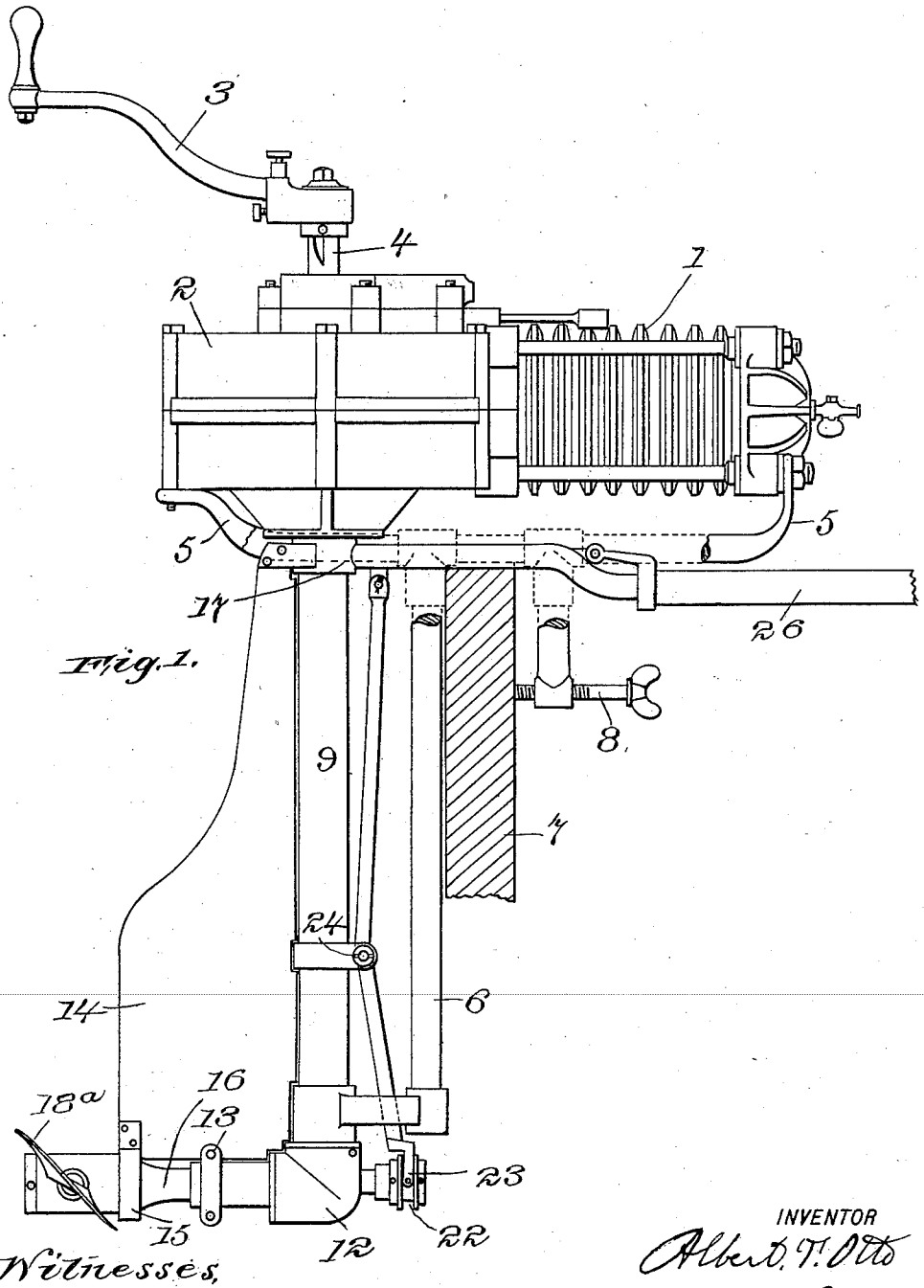

Fig. 1.

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Fig. 2.

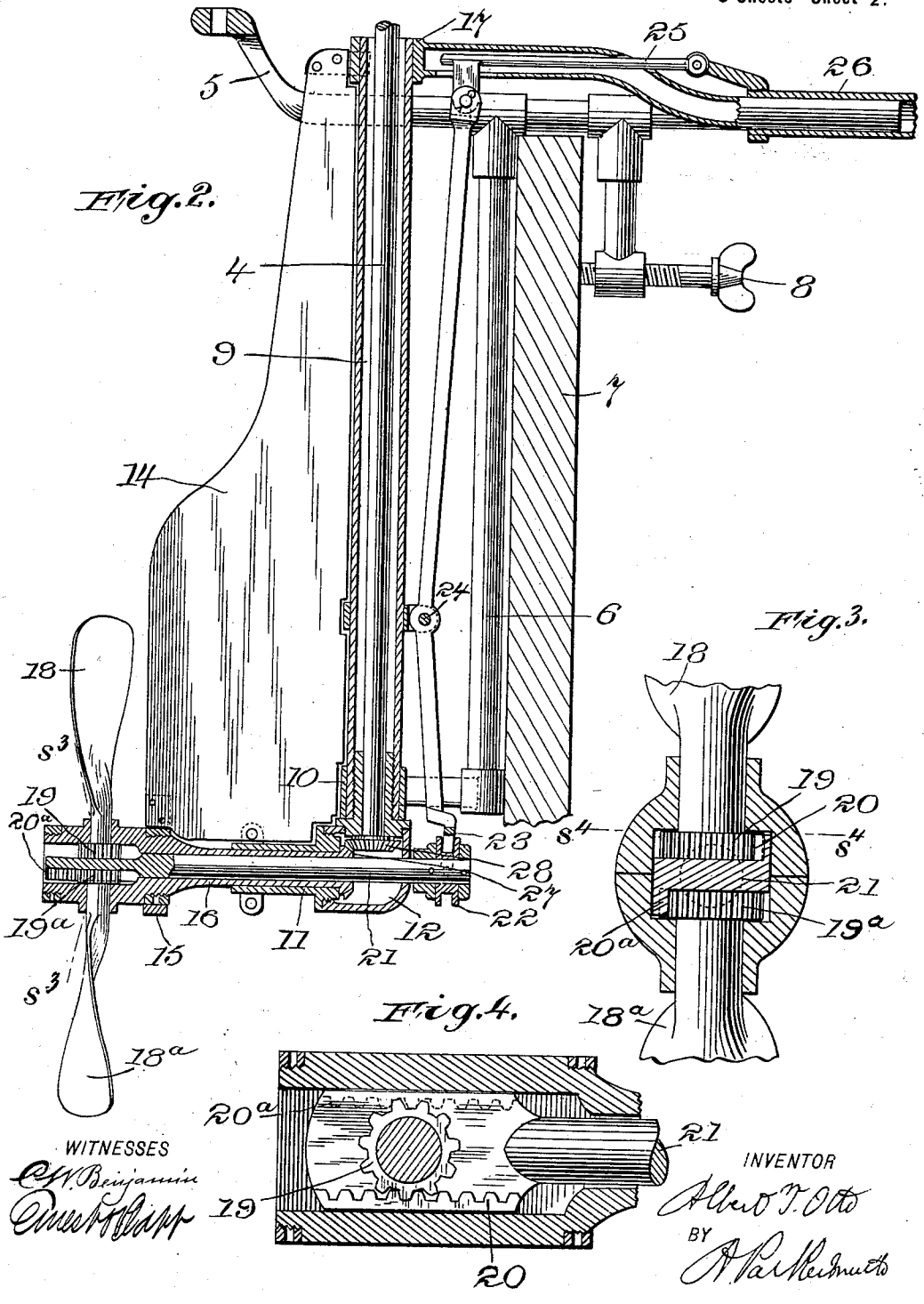

Fig. 3.

Fig. 4.

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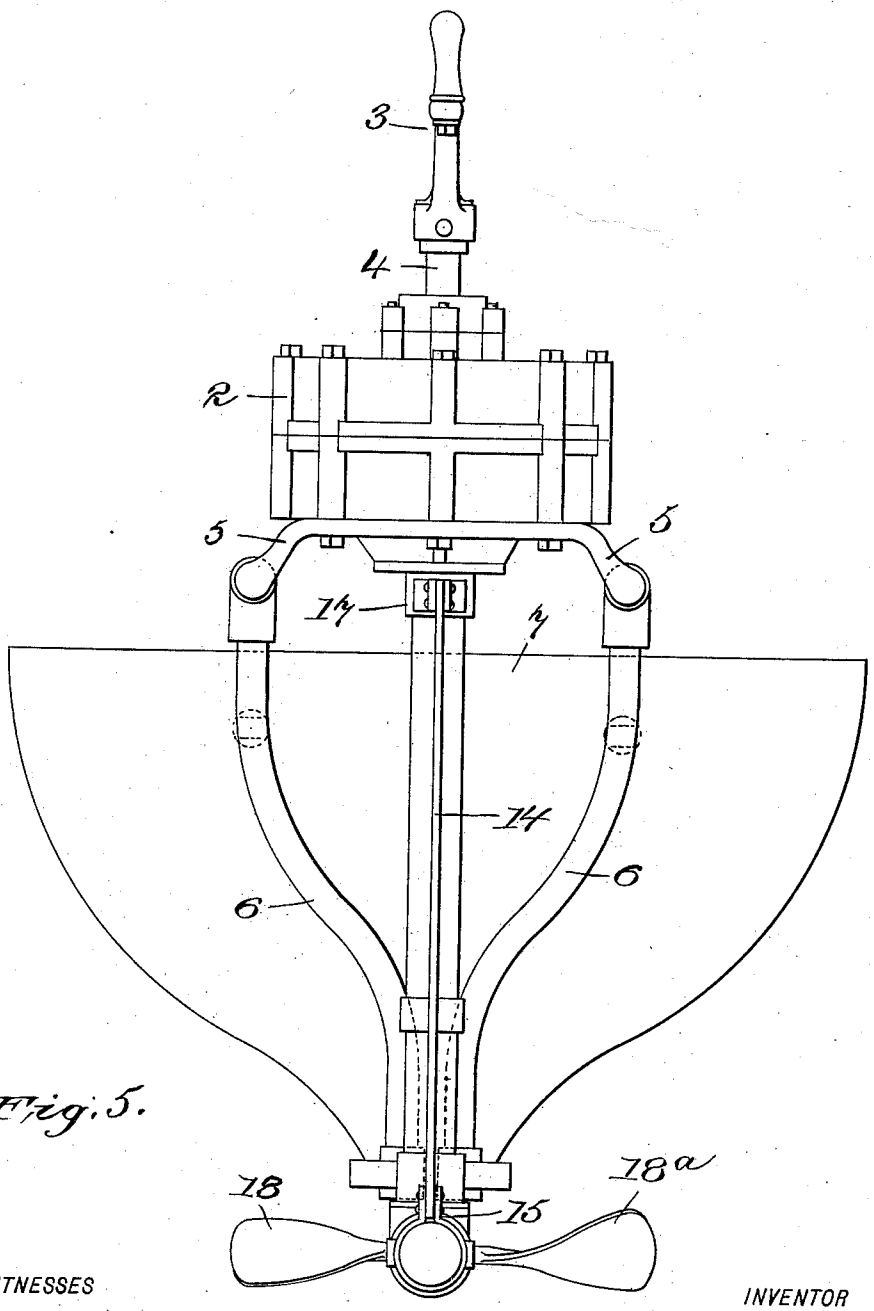

Fig. 5.

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ALBERT T. OTTO, OF NEW YORK, N. Y.

MARINE MOTOR.

SPECIFICATION forming part of Letters Patent No. 663,185, dated December 4, 1900.

Application filed May 6, 1899. Serial No. 715,796. (No model.)

To all whom it may concern:

Be it known that I, ALBERT T. OTTO, a citizen of the United States of America, and a resident of New York city, county of New York, State of New York, have invented certain new and useful Improvements in Marine Motors, of which the following is a specification.

My invention relates to marine propulsion; and it consists in an improved form of small-motor and screw-propulsion apparatus attachable to and removable from the stern of a boat, and more specifically consists of certain improvements on and simplification of the mechanism disclosed in my application, Serial No. 701,282, allowed January 12, 1899.

The preferred form of apparatus embodying my invention is illustrated in the accompanying three sheets of drawings, in which—

Figure 1 is a side elevation of the completed apparatus with certain parts broken away. Fig. 2 is a vertical longitudinal section of the same with the motor removed. Fig. 3 is a detail section on line s^3 s^3 of Fig. 2. Fig. 4 is a detail horizontal section on line s^4 s^4 of Fig. 3. Fig. 5 is a rear elevation of the apparatus shown in Fig. 1.

Throughout the drawings like reference-figures refer to like parts.

Any convenient form of small motor may be used; but I have illustrated a small gasolene-motor having a horizontal cylinder 1, with piston and connecting-rod (not shown) directly connected to cranks concealed in a crank-chamber 2, the whole being supported on projections 5 of the main frame 6, which is attachable to and removable from the stern-board 7 of the boat by means of the clamping-screw 8 or equivalent apparatus. The crank-shaft 4 of the motor is the driving-shaft of the propulsion apparatus, and the motor is set in operation by a few turns of the handle 3.

The vertical oscillating sleeve 9 is journaled at its upper end in a bearing on the crank-chamber 2 and at its lower end in a projection 10 from the main frame 6. At the lower end of the oscillating sleeve 9 is the main bearing 11 for the hollow propeller-shaft, said bearing being supported from said sleeve by means of an elbow-casting 12 and also supported in part by the strap 13, fastened to the lower end of the rudder 14, which is also rigid with the oscillating sleeve 9. On the outer end of the rudder 14 is carried the outboard-bearing 15 for the hollow propeller-shaft 16. The vertical sleeve 9, rudder 14, and propeller-shaft 16 may all be oscillated by means of the tiller 17, attached to the upper portion of the sleeve 9.

Two propeller-blades 18 18^a are mounted in the outer end of the hollow propeller-shaft 16 and are adjustable thereon by means of the pinions 19 19^a on the inner end of the propeller-blades which respectively mesh with the short racks 20 20^a, carried by the longitudinally-sliding shaft 21, said shaft and the above-described gearing being all concealed within the hollow propeller-shaft.

On the forward end of the longitudinally-sliding shaft 21 is the grooved collar 22, into which the forked lever 23 takes. Said forked lever 23 is fulcrumed at 24 on the oscillating sleeve 9, and its upper end is connected by the link 25 to the handle 26, which slides longitudinally on the tiller 17. The driving-shaft 4, journaled at its upper end in the crank-chamber 2 of the motor and at its lower end in the oscillating sleeve 9, has the bevel-gear 28, which meshes with the bevel-gear 27 on the forward end of the hollow propeller-shaft 16.

The mode of operation of my invention is as follows: The motor being set in operation by a few turns of the handle 3, the driving-shaft 4 transmits rotary motion to the hollow propeller-shaft 16. When the propeller-blades are set in the position shown in Fig. 2, the propeller-shaft being rotated from left to right, looking toward the stern of the boat, the boat will be driven forward. The operator by swinging the tiller 17 will swing the whole oscillating frame, composed of the sleeve 9, rudder 14, propeller-shaft bearings, and propeller-shaft carried thereby, so as to drive the boat forward or to port or starboard in the same manner as the boat is ordinarily steered by the rudder alone.

The pitch of the screw-propeller blades may be adjusted so as to drive the boat faster or slower by moving the sliding handle 26 longitudinally along the tiller. When the sliding handle is in its foremost position, as shown in Fig. 2, under the previous assumption that the motor runs from left to right in the direc-

tion of the hands of a watch when looking down upon it, the boat will go ahead at full speed. If the sliding handle is moved back into its central position, then the pitch of the propeller-blades will be reduced to zero and the boat will stand still. If the sliding handle is shoved back to its rearmost position, as indicated in Fig. 1, the pitch of the propeller-blades will be reversed and the motor still running in the same direction continuously the boat will back at full speed. Of course the motor could be made to run in the opposite direction, and then the above-described arrangement would be reversed; but I prefer the arrangement as described, because then the longitudinally-sliding shaft 21 is in its rearmost position while the boat is going forward, and the pressure of the water on the front face of the collar 22 and the end of the sliding shaft will tend to keep it in that position. On the other hand, when backing the sliding shaft and collar will be in their foremost position, and whatever resistance is offered by the water to such backward motion will tend to hold the longitudinally-sliding shaft again in its proper position for that particular motion.

It is evident, of course, that the whole apparatus could be lifted out of the water for storage or repair by releasing the clamping-screw 8.

The advantages of my invention reside in its simplicity and lightness, resulting from the reduction of the number of parts, also in the strength resulting from having all the main parts rigidly connected together or journaled in the rigid oscillating frame formed thereby. Moreover, the gearing and adjusting mechanism for the propeller-blades being all concealed within the hollow propeller-shaft, there are no revolving projections to churn up the water and present useless resistance to the driving apparatus. In fact, the whole driving and adjusting mechanism is concealed within the right-angled line of pipe formed by the oscillating sleeve 9, the propeller shaft and bearing 11, and the hollow propeller-shaft 16. The entire control of the driving apparatus both in steering and backing is also produced by the motions of the single handle 26. A further advantage is, as hereinbefore described, that the action of the water through which the boat is moving normally tends to hold the reversing-gear in the proper position to effect the motion which produces that particular action of the water-pressure.

It is evident, of course, that various changes could be made in the details of the apparatus described without departing from the spirit and scope of my invention so long as the relative arrangement of parts shown in the drawings of the principle of operation disclosed in the specification is preserved, other forms of gearing for adjusting the propeller-blades might be substituted, the gearing for transmitting motion from the driving-shaft to the propeller-shaft might be changed, other means of supporting the propeller-shaft journal-bearings from the oscillating sleeve might be used, and certain of the improved features of my invention might be employed without others herein described. All such changes, however, I consider matters of form and not of substance, and the resulting apparatus will still be within the scope of my invention.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination of the stationary frame, the vertical sleeve journaled therein, the propeller-shaft, the journal-bearings therefor carried by the vertical sleeve, the driving-shaft journaled in said sleeve, gearing between the driving-shaft and the propeller-shaft, and means for oscillating said vertical sleeve about its axis, together with the rudder mounted on said vertical sleeve and the outboard-bearing for the propeller-shaft carried by said rudder.

2. The combination of the hollow propeller-shaft, adjustable propeller-blades, a longitudinally-sliding shaft within the hollow shaft, and gearing concealed within said hollow shaft connecting the propeller-blades with the longitudinally-sliding shaft, together with the grooved collar on the forward end of the longitudinally-sliding shaft, which projects beyond the hollow propeller-shaft, means for supporting the propeller-shaft on a hinge having a vertical axis, and the forked lever engaging with said grooved collar.

3. The combination of the hollow propeller-shaft, adjustable propeller-blades, a longitudinally-sliding shaft within the hollow shaft, and gearing concealed within said hollow shaft connecting the propeller-blades with the longitudinally-sliding shaft, together with the grooved collar on the forward end of the longitudinally-sliding shaft which projects beyond the hollow propeller-shaft, the oscillating vertical sleeve which carries the journal-bearings for the propeller-shaft, and the forked lever fulcrumed on said vertical sleeve and engaging with above-mentioned grooved collar.

4. The combination of the oscillating frame journaled at the stern of the boat, the propeller-shaft journaled in said frame, adjustable propeller-blades, the tiller which swings the oscillating frame, the longitudinally-sliding handle for said tiller, and mechanism carried by the tiller and oscillating frame connecting said sliding handle with the adjustable propeller-blades.

5. The combination of the oscillating frame journaled at the stern of the boat, the propeller-shaft journaled in said frame, adjustable propeller-blades, the tiller which swings the oscillating frame, the longitudinally-sliding handle for said tiller, and mechanism carried by the tiller and oscillating frame connecting said sliding handle with the adjustable propeller-blades, comprising a shaft slid-

ing longitudinally in the propeller-shaft, rack-and-pinion gearing between the sliding shaft and the inner ends of the propeller-blades, a collar on the forward end of the sliding shaft, a forked lever engaging the collar and fulcrumed on the oscillating frame, and a link connecting the upper end of the forked lever with the sliding handle.

6. The combination of the rotating propeller-shaft, the adjustable propeller-blades mounted on said shaft, an adjusting mechanism for said propeller-blades whereby the resistance of the water through which the boat is passing, normally tends to hold the propeller-blades in that position of adjustment which will move the boat in a manner to create said direction of water-pressure.

Signed by me at New York city, New York, this 1st day of May, 1899.

ALBERT T. OTTO.

Witnesses:
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LILIAN FOSTER.