No. 765,915. PATENTED JULY 26, 1904.

F. T. CABLE.

MANUALLY OPERATED STEERING MECHANISM.

APPLICATION FILED FEB. 7, 1903. RENEWED DEC. 23, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

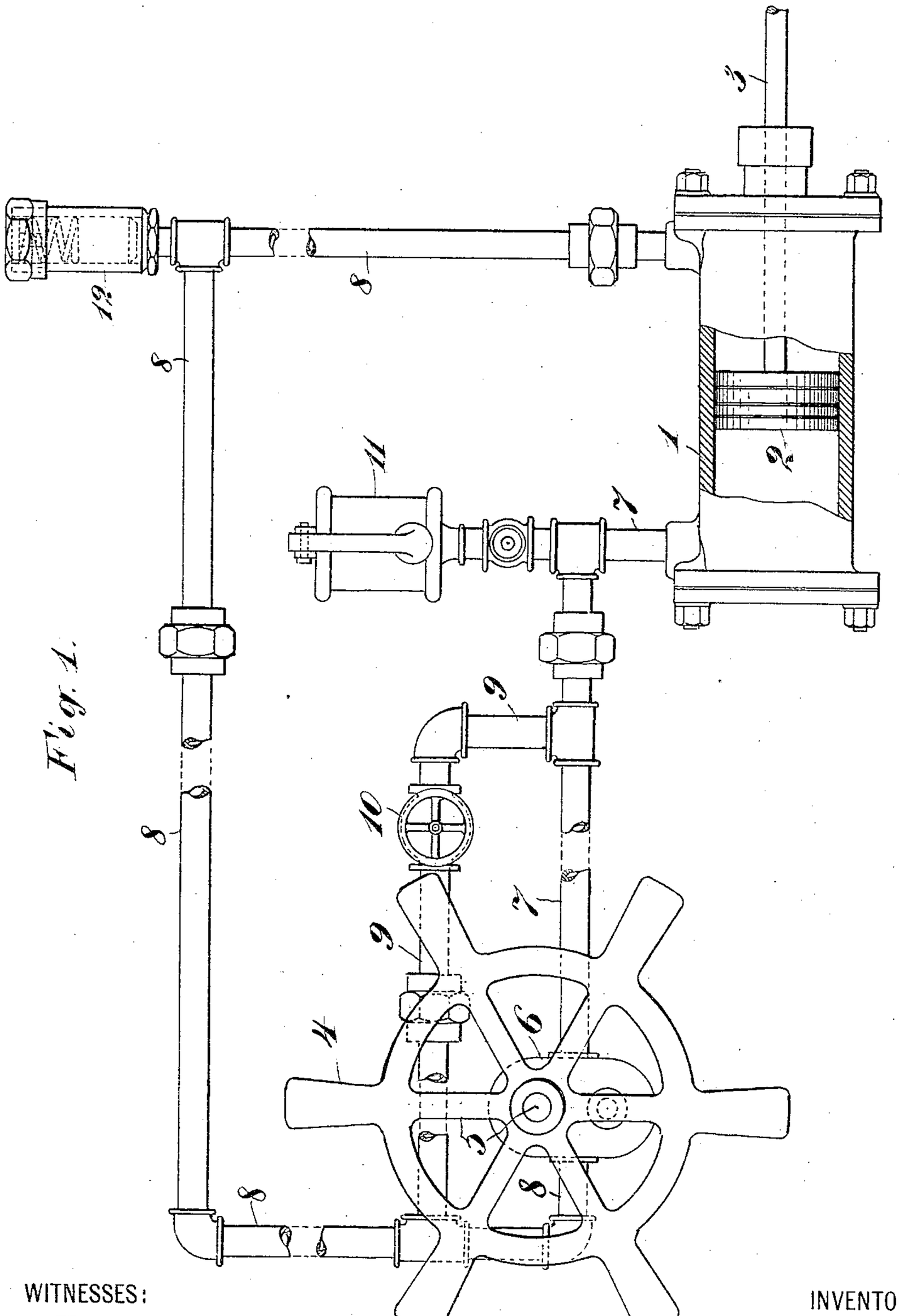

Fig. 1.

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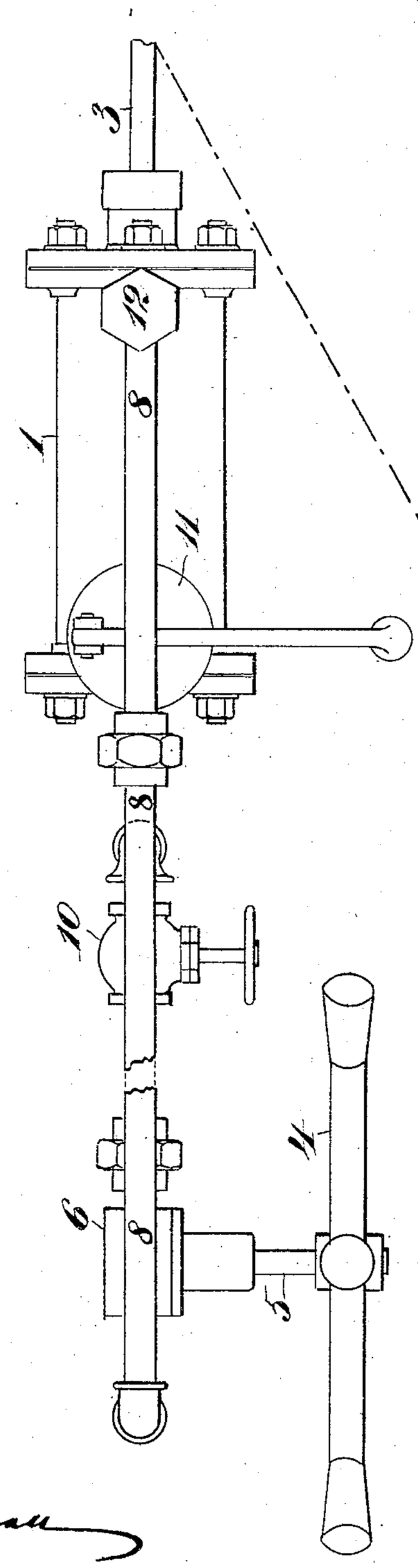
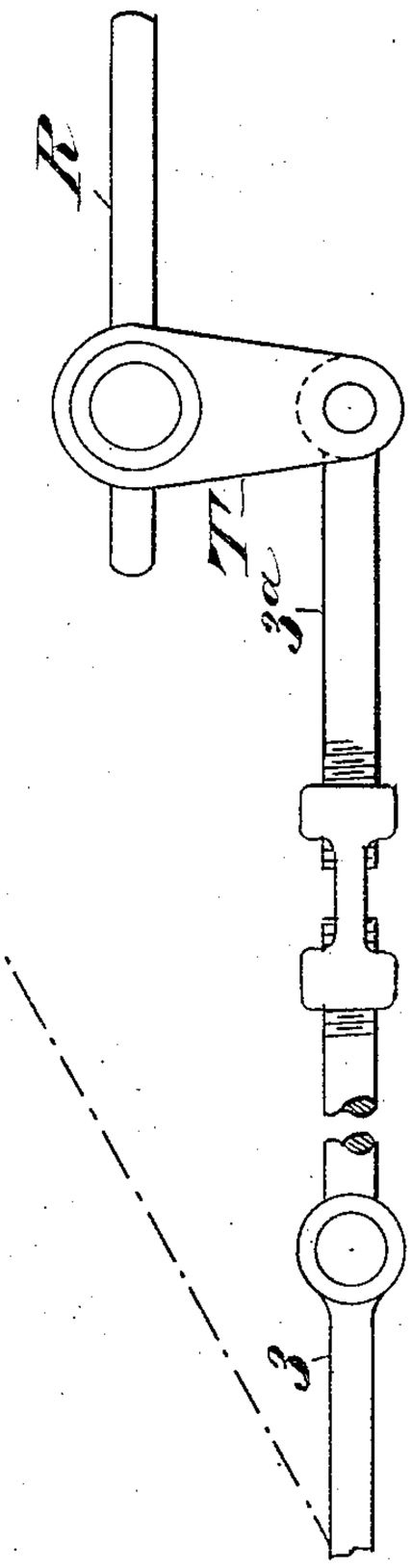
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.





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NO MODEL. 3 SHEETS—SHEET 3.

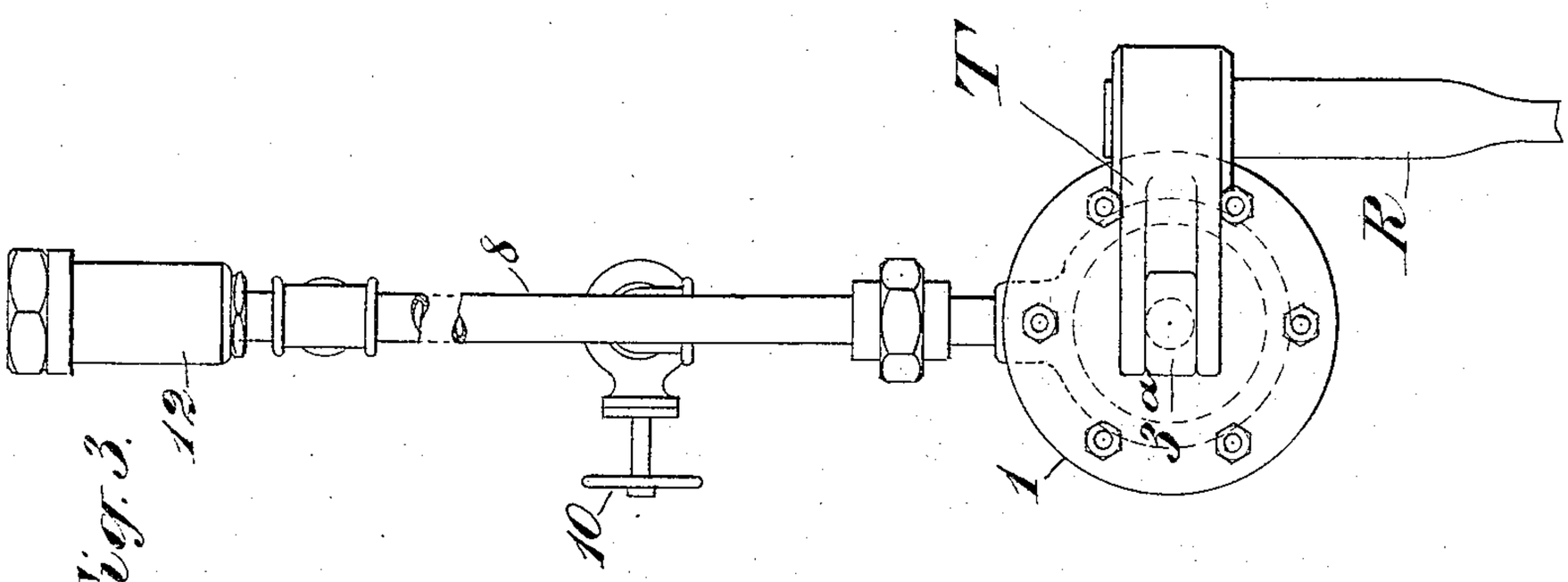

Fig. 3.

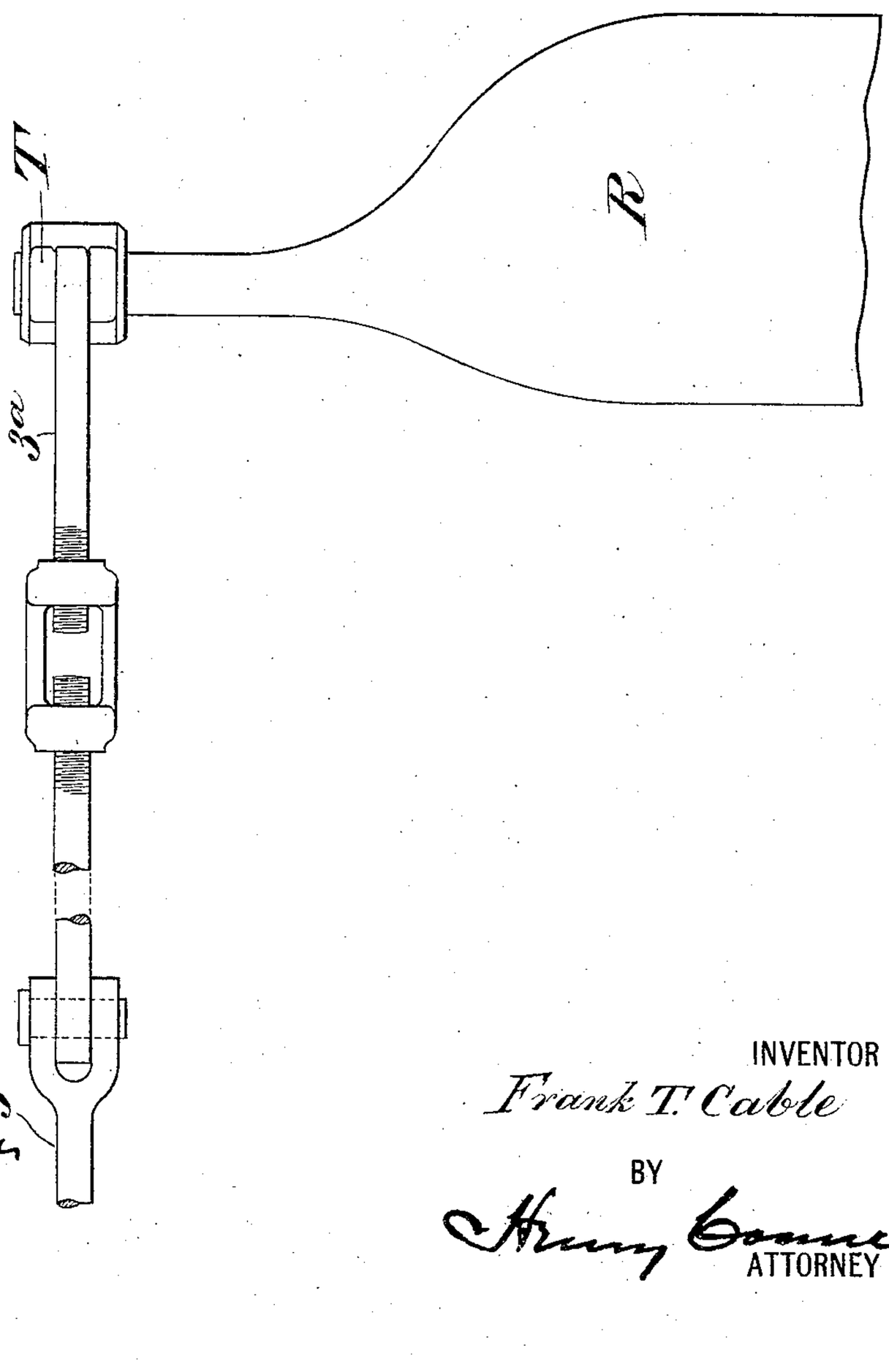

Fig. 4.

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No. 765,915. Patented July 26, 1901.

UNITED STATES PATENT OFFICE.

FRANK T. CABLE, OF NEW SUFFOLK, NEW YORK, ASSIGNOR TO ELECTRIC BOAT COMPANY, A CORPORATION OF NEW JERSEY.

MANUALLY-OPERATED STEERING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 765,915, dated July 26, 1904.

Application filed February 7, 1903. Renewed December 23, 1903. Serial No. 186,410. (No model.)

To all whom it may concern:

Be it known that I, FRANK T. CABLE, a citizen of the United States, residing at New Suffolk, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Manually-Operated Steering Mechanisms, of which the following is a specification.

This invention relates specifically to the class of devices employed for operating a rudder for steering, and particularly to that species of such devices where hand-power is employed to do the work. Obviously, however, the means set forth may be used for operating other devices or mechanisms of a similar character.

The object of the invention is to provide a simple device whereby the ordinary steering-wheel may be employed to shift the rudder and one wherein the rudder will stand wherever set by the steersman.

In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is a side elevation of the apparatus, the rudder and tiller being omitted for lack of room. Fig. 2 is a plan of the device. Fig. 3 is an end view as seen from the right in Fig. 2. Fig. 4 is a side view of the rudder and tiller. In Fig. 2 a part of the piston-rod, connecting-rod, the tiller, and the rudder are placed below the main portion of the figure.

R designates a rudder, and T its tiller.

1 is a cylinder, broken away in Fig. 1 to show a piston 2 therein. The piston-rod 3 extends to and is coupled to the tiller T through the medium of a connecting-rod 3^a.

The steering-wheel 4 is secured on the arbor 5 of a rotary pump 6. This may be of any good form of rotary force-pump. The pump is connected on one side by a pipe 7 with one end of the cylinder 1 and on the other side by a pipe 8 with the other end of said cylinder. A by-pass 9, having in it a cock 10, is provided for connecting the pipes 7 and 8 independently of the cylinder. 11 is a pump for filling the system with oil or other liquid, and 12 is an expansion-valve on the pipe.

The operation of the device is as follows: The entire system, including the cylinder, the pump, and the connecting-pipes, is filled with some liquid—as oil, for example—by means of the pump 11, and the by-pass 9 is closed by its cock. The piston 2 should be in the middle of the cylinder or at mid-stroke when the rudder is at "steady." By rotating the steering-wheel 4 in one direction the pump 6 takes the oil from one end of the cylinder and forces it into the cylinder at the other end thereof, thus shifting the piston in the cylinder and through the piston and its rod shifting the rudder. By turning the steering-wheel in the other direction the flow of the oil will be reversed and the piston shifted in the opposite direction. As the liquid in the system is practically incompressible, the rudder will always be sensitive to the least displacement of the oil in the cylinder, and it will be held steady and firm wherever set. As the oil cannot readily pass through the pump except when the arbor 5 is rotated, the rudder will be held where it may be set without the necessity of holding it in place through the medium of the steering-wheel.

If at any time oil leaks from the system and is replaced by air and the steering-wheel comes off its center, the rudder can be placed amidships or at steady by opening the by-pass and setting the wheel on its center. The by-pass is then again closed and the system filled with oil through the agency of the pump 6.

A rotary pump is preferred for operation by a steering-wheel; but the present invention is not restricted to any special form of hand-pump nor to any specific means for operating said pump by hand.

Having thus described my invention, I claim—

1. Means for operating a rudder for steering, comprising a cylinder, a piston therein, a piston-rod, means connecting said rod with the rudder, a manually-operatable rotary pump connected directly at its opposite sides with the respective ends of the said cylinder, and a liquid which fills the entire system, namely, the pump, the cylinder, and the pip-

ing, whereby reversing the direction of rotation of the pump reverses the direction of the flow of said liquid.

2. A manually-operated steering apparatus comprising a cylinder, a piston therein, means between said piston and the rudder whereby the movements of the piston are imparted to the rudder, a rotary force-pump, a steering-wheel fixed on the pump-arbor, pipes connecting the respective ends of said cylinder and the opposite sides of the rotary pump, and a liquid which fills the said system, namely, the cylinder, pump and pipes.

3. The combination with the rudder and its tiller, of the cylinder 1, the piston 2 therein, the piston-rod 3, the connecting-rod between said piston-rod and tiller, a rotary pump connected directly on its opposite sides with the respective ends of the said cylinder, and means for operating said pump by hand, substantially as set forth.

4. The combination with the cylinder 1, its piston and piston-rod, of the rotary pump 6, connected on its respective sides with the respective ends of the said cylinder, the by-pass about the pump, the wheel for operating the pump, and the liquid which fills the system.

In witness whereof I have hereunto signed my name, this 31st day of January, 1903, in the presence of two subscribing witnesses.

FRANK T. CABLE.

Witnesses:
WILLIAM J. FIRTH,
PETER A. ROSS.