

(No Model.)

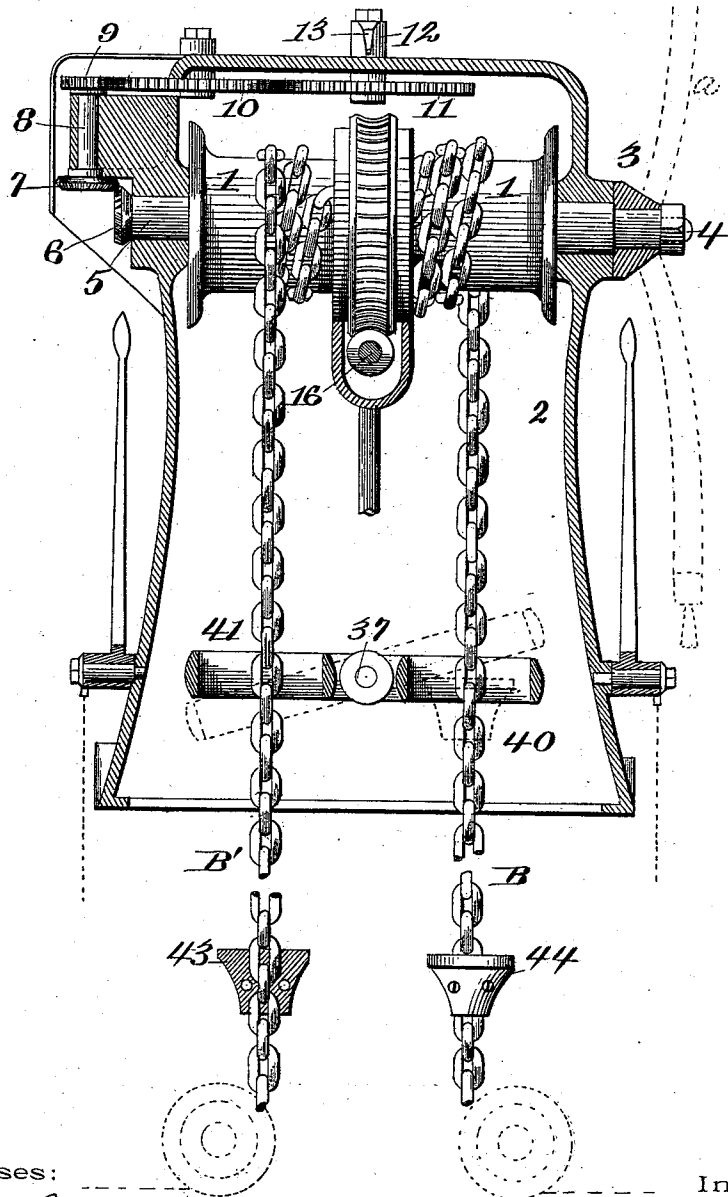
3 Sheets—Sheet 1.

H. G. ROBINSON.

STEAM AND HAND STEERING APPARATUS.

No. 537,309.

Patented Apr. 9, 1895.



Witnesses:

Thompson,
C. K. Davies.

Inventor.

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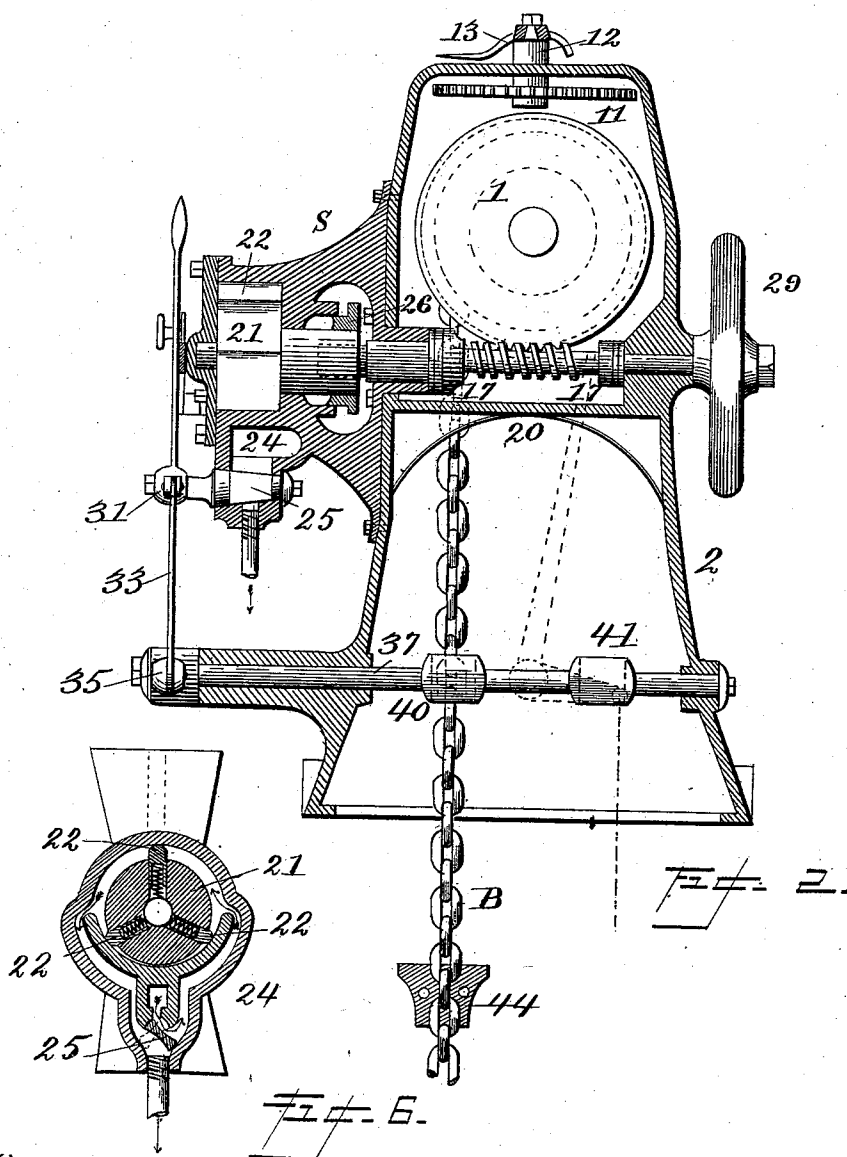
(No Model.)

3 Sheets—Sheet 2.

H. G. ROBINSON.
STEAM AND HAND STEERING APPARATUS.

No. 537,309.

Patented Apr. 9, 1895.



Witnesses:

G. H. Johnson,
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Inventor.

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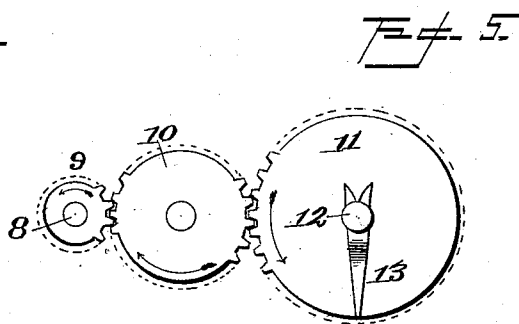
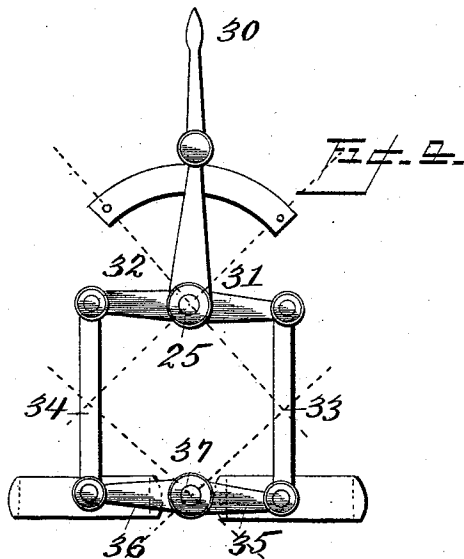
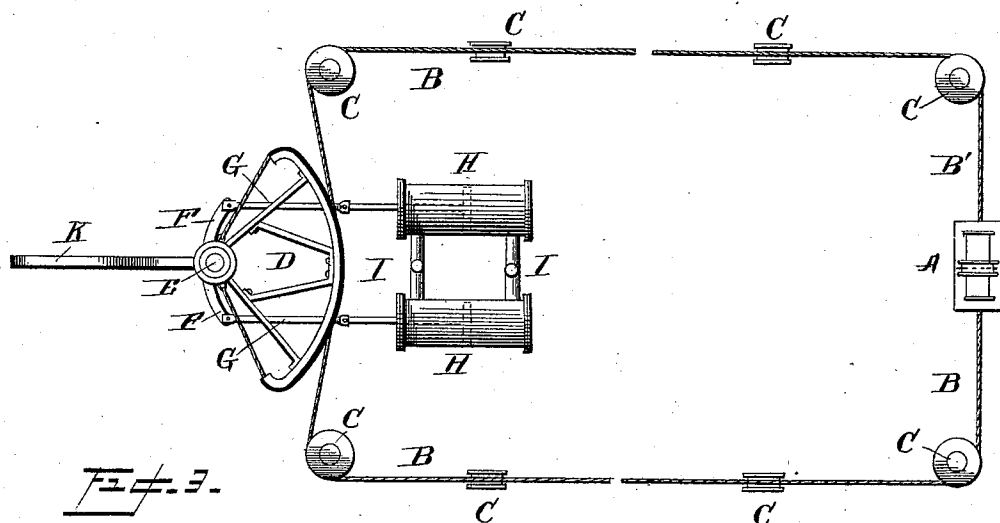
(No Model.)

3 Sheets—Sheet 3.

H. G. ROBINSON.
STEAM AND HAND STEERING APPARATUS.

No. 537,309.

Patented Apr. 9, 1895.



Witnesses:

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UNITED STATES PATENT OFFICE.

HALE G. ROBINSON, OF PORT HURON, MICHIGAN.

STEAM AND HAND STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 537,309, dated April 9, 1895.

Application filed January 8, 1894. Serial No. 496,092. (No model.)

To all whom it may concern:

Be it known that I, HALE G. ROBINSON, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in Steam and Hand Steering Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an apparatus for steering vessels, and indicating the position of the rudder. It is primarily a steam steering apparatus, but with provision for steering by hand in case of emergency.

The object of the invention is to place the control of the steering and signaling in the hands of the pilot, in the wheel house; also to improve the construction of the steering and signaling apparatus.

Figure 1 is a vertical cross section of the casing, showing the windlass and connected gearing, partly in section and partly in elevation. Fig. 2 is a vertical longitudinal section of the same parts. Fig. 3 is a diagram indicating the general relation of the parts from the steering wheel to the rudder. Fig. 4 is an elevation of the operating lever and its connections whereby the engine may be automatically reversed. Fig. 5 is a plan or diagram of the indicator driving gear, detached; Fig. 6, a vertical section of the rotary steam engine and its valve.

Referring to Fig. 3, A indicates the position of the steering apparatus, which is preferably at the pilot house of the vessel. The chains or cables B, B' pass from the steering apparatus, around guiding sheaves C, C, to the rudder head or quadrant D, which is preferably brought in-board from the rudder. The ropes or chains B and B' are connected to the rudder head, or quadrant D, and the extreme ends then secured to suitable stays on the quadrant, so that the rudder head may be relieved from strain when the rudder is shifted hard-a-port or hard-a-starboard. The rudder stock E, is provided with arms F, F, one at each side, which arms are connected to pitmen G, G, and these in turn to pistons operating in cylinders H, H. The cylinders H, H, are connected by pipes I, I, controlled by suitable valves, and are filled with a non-freezing liquid. The rudder K is controlled in its move-

ments, and protected from shocks, by this hydraulic buffer, which is old in a general way except it may be as to details.

The general arrangement above outlined may be departed from in numerous particulars, such being described as one way only in which my invention may be embodied. The main invention remains to be described.

The chains or cables B, B' by which the rudder is moved are carried by the windlass barrel 1, and one of the cables is wound up on said windlass as the other unwinds. Said windlass has its axial supports or bearings in the casing 2, and a hand steering wheel may be applied to the axis of said windlass, the position of this hand wheel being indicated in dotted lines *a*, Fig. 1, and the hub indicated at 3. The hub 3 may be held in place on the shaft by nut 4, or in other suitable manner, and may be replaced by a sleeve, or omitted altogether when the hand wheel is not in use. The hand wheel is intended for emergency use only, and will ordinarily be detached and hung up in the pilot house.

The axle 5 of the windlass or drum is provided outside its bearings with a bevel gear 6. This gear engages a gear 7 which is attached to a short shaft 8, and the shaft 8 has a gear 9 at its upper end. The gear 9 engages an intermediate 10, and this in turn engages a gear 11, which is fixed to a short shaft 12 having its bearings preferably in the top of the casing. The shaft 12 carries a hand or pointer 13. The train of gears described bears such relation to the drum and connections therefrom to the rudder, that any number of revolutions or part revolutions required to swing the rudder a given distance, will have a similar effect on the pointer 13, so that said pointer will move with the rudder, to the same extent, and will at all times indicate the position of the rudder.

The apparatus is intended primarily for use as a steam steering apparatus, and the mechanism for that purpose will now be described.

The windlass or drum 1 has a worm wheel 15 formed on or attached to its central portion, as shown, although the position is not vital. A shaft 16 extends across the casing, being supported in suitable bearings, and held between the bearings by fixed collars 17

- and 18. Suitable packing on the shaft between the collars and the bearings, serves to take the thrust. The engine may be unbolted from the casing to permit the removal of the shaft 16. The shaft 16 has a worm 20 rigid therewith, and by the rotation of this shaft 16 the worm wheel of the windlass may be actuated, and the windlass moved or held, as is common.
- 10 The shaft 16 is driven by a double acting rotary steam engine, S. As shown this engine has a piston 21 provided with extension arms 22, which are held out against the walls of the cylinder by springs, as is common.
- 15 The inlet port 24 is controlled by the rocking valve or cock 25, which may be turned to pass the steam round to the right, as indicated in full lines, Fig. 6, or in reverse direction, as indicated in dotted lines, or when the valve is in midway position the port will be closed altogether. Shaft 16 is preferably squared at the end, and enters the hub of the piston where the same extends through a stuffing box, 26.
- 20 The shaft 16 has a fly wheel 29, which serves not only to equalize the movement of the engine, but may also be used as a hand steering wheel in case of emergency, until the emergency hand wheel *a* can be applied, when usually the shaft 16 would be removed.
- 25 The valve 25 is primarily controlled by hand lever 30, which extends into convenient position to be grasped by the pilot. The lever 30 has arms 31 and 32, or the valve has such arms, extending in opposite directions. Links 33 and 34 are pivotally connected to these arms, and said links are pivoted to rigid arms 35 and 36, extending in opposite directions from rock shaft 37. Rock shaft 37 extends across the casing 2, and has its bearings therein, below the drum 1. At convenient positions along said shaft two arms 40 and 41 are arranged to project into proximity with the chains B and B'. These arms are preferably open links, through which the chains pass. Each chain has attached thereto a stop or contact piece (43 and 44). These stops are so arranged relatively to the arms 40 and 41, that one of the stops on the chain engages its arm when the rudder is shifted hard a starboard, and the other stop engages its arm when the rudder is hard a port. The engagement of one of these stops with the arm or lever projecting from shaft 37, serves to swing said arm and rock the shaft. This in turn rocks the arms 35 and 36, and through links 33 and 34, and arms 31 and 32, rocks the valve 25 and stops or reverses the engine. This will happen should the pilot have failed to turn off steam when the rudder is clear over to one side. This automatic reversal of the engine will generally go on, and the rudder be alternately swung from side to side by the reversal of the mechanism until the proper attention is paid to the steering.
- 65 In many of the States a plurality of means of communicating with the engine room from

the pilot house are required by law. I provide a convenient means for conveying such signals by means of levers V and W, connected to the casing and within easy reach of the pilot. These levers connect by wires *v* and *w* to the alarm whistles, bells, or whatever form of signal device may be used in the engine room.

My device has been described as a steam steering apparatus, but it is manifest that it might be driven by compressed air or other gas. It is also apparent that many changes may be made to adapt it to special circumstances. I have designed to make the apparatus very compact, and to place the entire control of the ship with the pilot; also to enable the pilot without leaving his position to know at all times the position of the rudder; and to make the device so far automatic that no serious harm would occur to the mechanism should the pilot be accidentally disabled, or be neglectful of his duty.

What I claim is—

1. In a steering apparatus, the windlass and connections to the rudder, the worm shaft gearing with the worm wheel of the windlass, said shaft having a polygonal end entering the hub of the rotary steam actuated piston, said piston being mounted on the casing which supports the windlass, all combined substantially as described.

2. In a steam steering apparatus, the windlass and connections therefrom to the rudder, the worm shaft gearing with said windlass, the rotary engine having its piston directly connected to said shaft, and the fly wheel on said shaft adapted also for use as a hand wheel, all combined substantially as described.

3. The supporting casing and the windlass thereon connected to the rudder substantially as described, the rotary engine supported on the main casing, and the worm shaft engaging the windlass, and directly connected to the rotary piston of the engine, but removable from its bearings to disconnect the engine from the windlass, all combined substantially as described.

4. The windlass and its connections leading to the rudder, the steam driving apparatus, and actuating mechanism carried by the rudder connections controlled by the movement of the rudder and itself controlling the engine when the rudder is shifted to extreme position, substantially as described.

5. The engine and its driving gear connected to the windlass, the rudder chains connected to said windlass, a rock shaft in proximity to said chains, stops on the chains and arms on the rock shaft actuated by said stops when the chains are in extreme position, and operative connections from the rock shaft to the engine valve.

6. The rotary engine and its rocking valve, the driving mechanism connecting said engine to the windlass, the rudder chains and stops thereon, and the rock shaft, its levers,

links, and arms, connected to and operating on the engine valve substantially as shown and described.

5 7. The supporting casing, the windlass supported thereby and connected to the rudder as described, the rotary engine supported on said casing and having its piston connected to the windlass by the worm shaft, as described, and the signal levers also mounted
10 on the casing within reach of the steersman while in working position to grasp the engine controlling lever, all substantially as described.

15 8. The combination with the windlass and gearing connected therefrom to the rudder, of an indicating hand or pointer, and an in-

intermediate train of gears actuated from the windlass and synchronously with the rudder, whereby the hand partakes of the movement of the rudder, substantially as described. 20

9. The combination with the windlass and its rudder controlling mechanism, of the bevel gears 7 and 8, the train of gears 9, 10, and 11, and the indicating hand 13 connected to move with gear 11, all substantially as described. 25

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

HALE G. ROBINSON.

Witnesses:

HENRY CLINE,
JAMES GILBERT.