

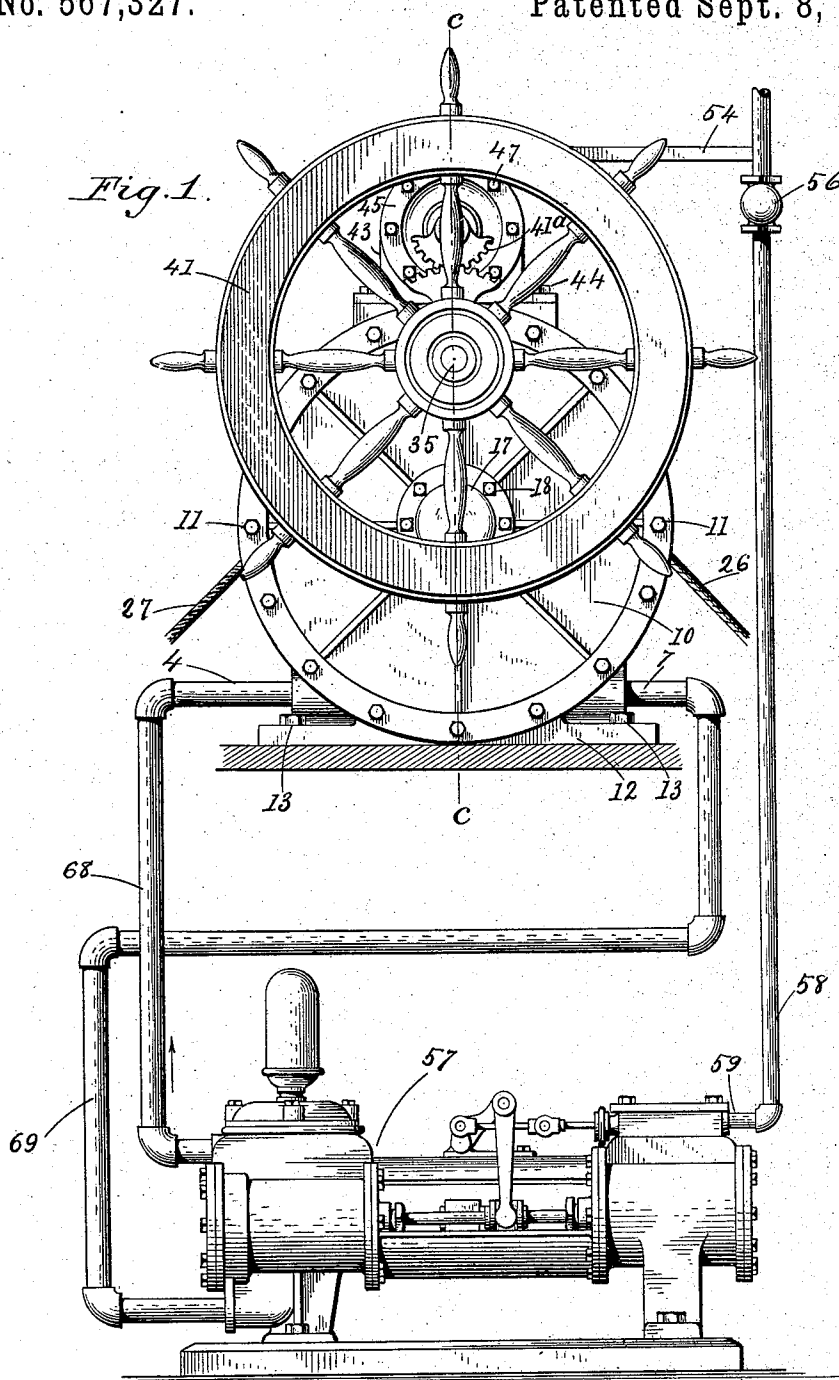
(No Model.)

3 Sheets—Sheet 1.

D. L. VOLKER.
STEERING GEAR FOR VESSELS.

No. 567,327.

Patented Sept. 8, 1896.



Witnesses:

Emil Neuhart.
A. Langster.

Daniel R. Volker Inventor
By *James Sangster.* Attorney.

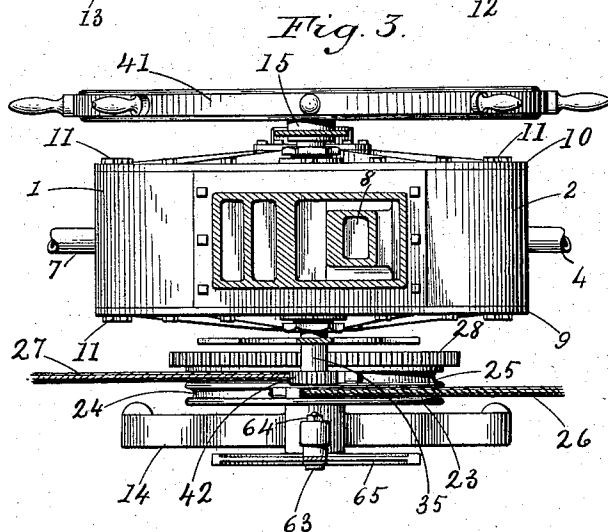
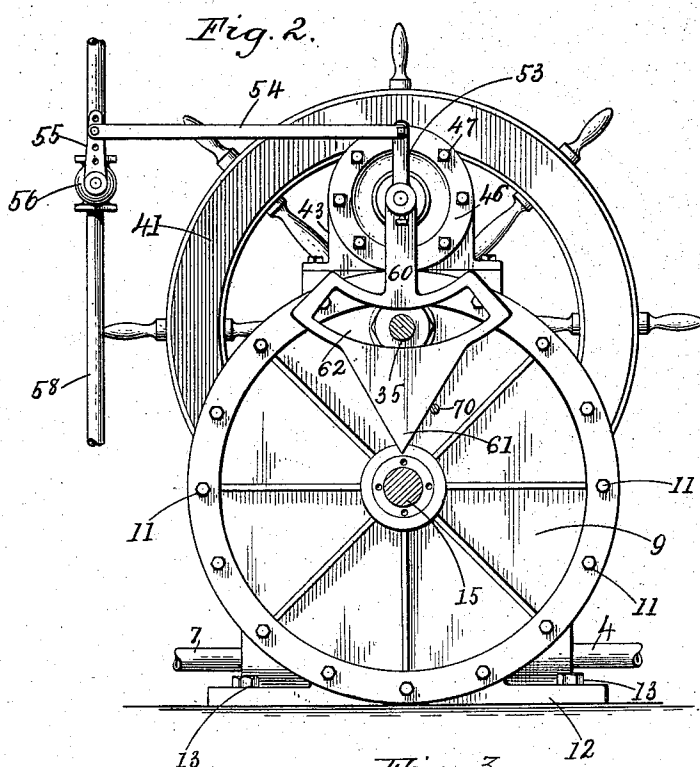
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3 Sheets—Sheet 2.

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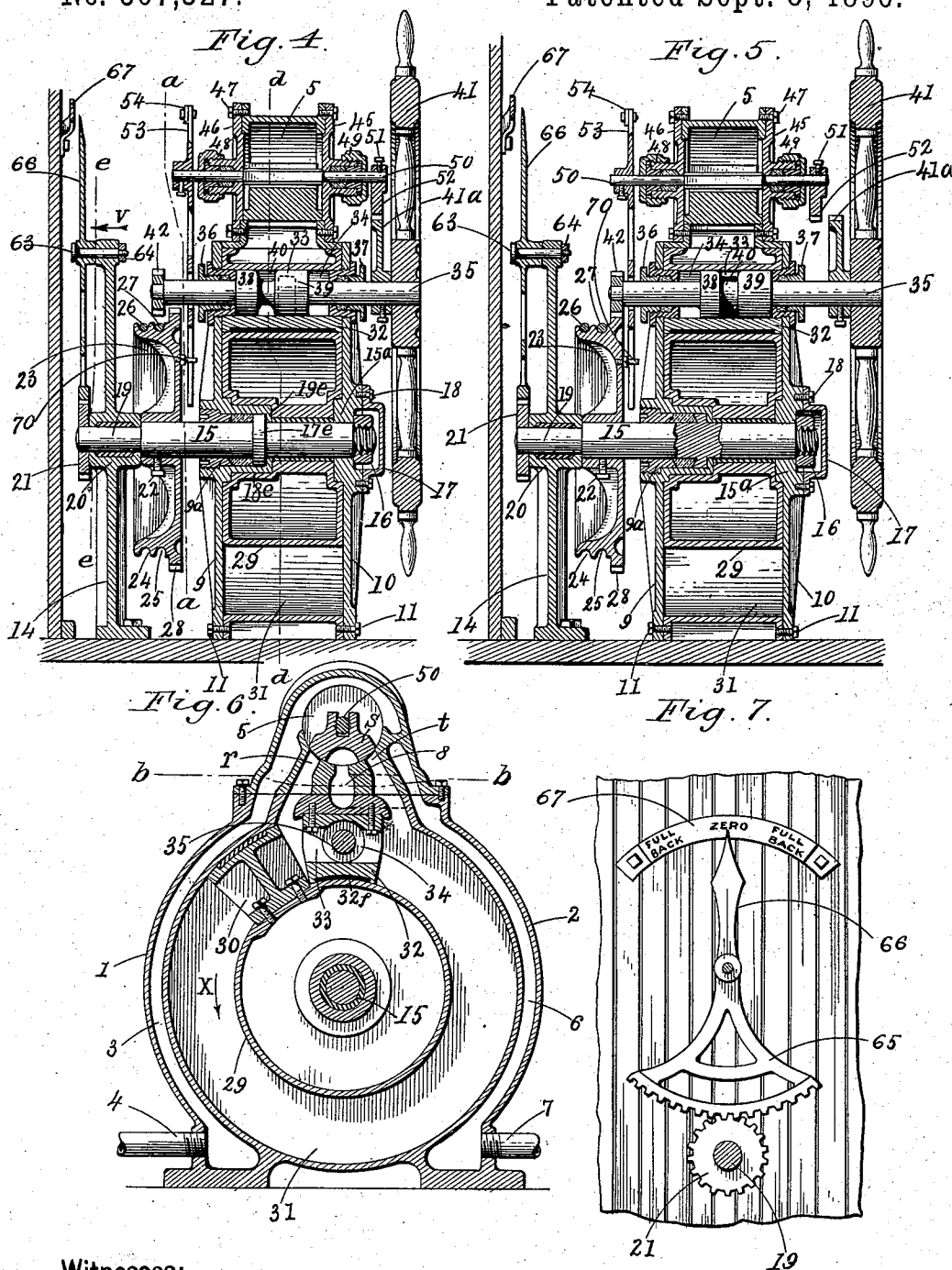
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UNITED STATES PATENT OFFICE.

DANIEL L. VOLKER, OF BUFFALO, NEW YORK.

STEERING-GEAR FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 567,327, dated September 8, 1896.

Application filed September 16, 1895. Serial No. 562,632. (No model.)

To all whom it may concern:

Be it known that I, DANIEL L. VOLKER, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Steering-Gear for Vessels, of which the following is a specification.

My invention relates to that kind of steering-gear adapted to be operated either by hand or power. Its advantages are that it occupies but a comparatively small space in a boat, it is easy and certain in its action and can be instantly adjusted to be operated either by hand or power without removing the hands from the steering-wheel, and is simple and durable in its construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 represents a front elevation of the whole apparatus complete. Fig. 2 is a vertical section on or about line *a a*, Fig. 4, showing a rear elevation of the steering device. Fig. 3 is a horizontal section on or about line *b b*, Fig. 6, showing the steering-wheel and a plan view of the mechanism below the valve-case. Fig. 4 is a vertical cross-section on or about line *c c*, Fig. 1, showing the parts in position for operating by power. Fig. 5 is a similar section showing the parts in position for operating by hand. Fig. 6 is a vertical section on or about line *d d*, Fig. 4. Fig. 7 represents a vertical section on or about line *e e*, Fig. 4, looking in the direction of the arrow V.

Referring to the drawings in detail, 1 and 2 represent the peripheral sides of the cylindrical case. The side 1 is provided with a water-passage 3, extending around up from the water-inlet 4 to the valve-chamber 5. The opposite side 2 is provided with an outlet water-passage 6, extending from the outlet 7 up around that side of the cylinder and communicating with the exhaust-passage 8 from the valve-chamber. (See Fig. 6.) The cylinder-heads 9 and 10 are secured to the sides of the cylinder in the usual way by bolts 11. (See Figs. 1, 2, and 3.) The bottom of the cylinder is provided with a supporting-base 12, by which it is secured to the floor or deck of a vessel by bolts 13. (See Figs. 1 and 2.) Back of the cylinder is located a supporting-frame

14, in which is mounted the rear end of the main shaft. (See Figs. 3, 4, and 5.) The main shaft 15 is mounted centrally in the cylinder-case, the front end being mounted in a suitable bearing-box 15^a in the head 10. A screw-nut 16 (shown in Figs. 4 and 5) is rigidly secured on a reduced screw portion, so as to rest against a shoulder on the shaft, and prevents it from being moved longitudinally rearward or out from its bearing, and a cap 17, closely fitted and secured by bolts 18, (see Figs. 1, 4, and 5,) renders the cylinder water or steam tight at that end of the shaft.

The shaft 15 (see Fig. 4) is provided with an enlargement or collar 17^e, rigidly secured to the shaft 15 or in one piece with it, and the inward-extending tubular portion 18^e of the head 9 is provided with a flange 19^e, which extends over the side of the collar 17^e to the shaft. The collar 17^e on the shaft 15 and the nut 16 hold the central portions of the cylinder-heads securely and thereby prevent them from springing or spreading outward while under pressure. The opposite end of the main shaft 15 passes through a stuffing-box 9^a in the cylinder-head 9 and is provided with a reduced portion 19, mounted in a box 20 in the supporting-frame 14. On the end of the shaft is rigidly secured a pinion 21. (See Figs. 4, 5, and 7.) Between the supporting-frame 14 and the cylinder-head 9 is mounted on the shaft 15 and rigidly secured to it by a set-screw 22 or other well-known means a grooved pulley 23, having two surrounding grooves 24 and 25. In the groove 24 is secured in the usual way the end of a rope, chain, or cable 26, the opposite end of which connects with the tiller at one side, and in the groove 25 is secured the end of a chain or cable 27, having its opposite end connected in the ordinary way with the tiller at the opposite side.

On the pulley 23, preferably formed integral with it, is a spur gear-wheel 28, (see Figs. 3, 4, and 5,) the office of which will appear farther on.

Within the cylinder-case is rigidly secured to the main shaft a drum 29, (see Figs. 4, 5, and 6,) having secured at one side a close-fitting piston 30, (shown in Fig. 6,) adapted to move in the annular space 31 as the drum 29 turns either way from one side to the other of a

stationary dividing portion 32. These movable portions may be fitted or packed in any well-known way to insure a close or water-tight or steam-tight fit.

5 The stationary dividing portion 32 is provided with an opening 33, extending in a longitudinal direction through it. (See Fig. 6.) This opening is also shown by the dotted lines 33 in Fig. 4. In a transverse direction
10 or transversely to the opening 33 is a cylindrical opening 34, which extends through both cylinder-heads. (See Figs. 4, 5, and 6.) Within the opening 34 is mounted the steering-wheelshaft 35 in stuffing-boxes 36 and 37,
15 (see Figs. 4 and 5,) and on the shaft 35 is rigidly secured two enlarged portions 38 and 39, adapted to fit water-tight within the opening 34 and leaving an opening 40 between them.

20 At the front end of the shaft 35 is rigidly secured the steering-wheel 41 and a sector-gear 41^a, and at its opposite end is rigidly secured a spur-pinion 42, (shown in Figs. 3, 4, and 5,) adapted to gear in with the spur-wheel 28, also shown in Figs. 3, 4, and 5. The parts 38 and 39, as well as the steering-wheel shaft 35, are adapted to be moved longitudinally within the opening 34, as well as to turn therein, the purpose of which will appear farther on. At the top of the cylinder is secured the valve-case 43, secured by bolts 44. It is provided with cylinder-heads 45 and 46, secured by bolts 47, and with stuffing-boxes 48 and 49, through which the valve-stem 50
35 passes. On the front end of the valve-stem is secured by a set-screw 51 or other well-known means a sector gear-wheel 52, adapted to gear in with the sector-gear 41^a on the steering-wheel shaft 35.

40 The opposite or rear end of the valve-stem 50 is provided with an arm 53, connected by a connecting-rod 54 with a steam-valve arm 55 for operating a valve 56 and admitting or shutting off steam for operating a hydraulic pump 57. The pipe 58, with which the valve 56 is connected, communicates with the pump at or about the point 59, and the opposite end connects with a steam-boiler of any well-known construction. The lower part of the arm 53 extends downward, forming a pendent arm 60, (see Fig. 2,) which extends outward each side and then downward to a point 61. In the extended portion is a curved slot 62, through which the steering-wheel shaft 35 passes. The object of the opening 62 is to allow the arm to be turned from side to side without interfering with the shaft 35, and the object of the pointed portion 61 is to cause the steam to be shut off automatically, as will appear farther on.

60 To the top of the frame 14 is pivoted by a bolt 63, secured by a nut 64, a sector-gear 65, adapted to gear in with the pinion 21 on the main shaft 15. The upper portion of the sector-gear 65 is provided with an index-hand 66. (See Figs. 4, 5, and 7.) Opposite or back of the index-hand is a curved index-plate 67,

on which is placed in the center the word "Zero" and at each side the words "Full back," or words to that effect, for indicating
70 the position of the rudder.

In Fig. 1, 68 represents the pipe through which the water is forced from the hydraulic pump to the inlet-pipe 4 for operating the piston 30, and 69 the pipe through which the
75 exhaust water or other medium used passes from the outlet-pipe 7.

The steering-drum or grooved pulley 23 is provided with an inward-extending pin 70, which is rigidly attached to the pulley and
80 turns with it, and as the pulley turns, and when near the end of its stroke either way, the pin 70 comes in contact with the pointed portion 61, (see Fig. 2,) and moves it, so that, through the connecting-rod 54, it turns the
85 arm 55, thereby shutting off the steam and stopping the action of the pump. The steam is therefore shut off automatically at the end of each stroke of the piston in either direction, as will be readily seen from the construction above described. It also at the
90 same time brings the valve S to the position shown in Fig. 6, and thereby holds the piston 30 rigidly in its position, and also the rudder, so that it cannot be moved until the
95 valve is again operated.

The operation of the device is as follows, which operation is produced either by hand or by power by means of the steering-wheel 41, the hands at no time being required to be
100 moved therefrom during either operation: By reference to Fig. 5 the machine is shown in position to be operated by power, the pinion 42 and the spur-gear 28 being in engagement with each other, and the sector-gears
105 41^a and 52 being out of engagement, so that the valve S is not operated. The power is applied by the action of the steering-wheel, through the gear-wheels 28 and 42, directly to the steering drum or pulley 23, and thus the
110 steering is effected by hand-power alone. It will be noticed that while the machine is adjusted to be operated by hand-power alone the steering-wheel has been drawn forward, as in Fig. 5; thereby bringing the opening 40
115 between the enlarged portions 38 and 39 directly in front of the opening 33 through the stationary dividing portion 32, so that in this case the water offers no obstruction to the movement of the piston back and forth while
120 operating by hand-power. When it is desired to use the force of steam and water to do the steering, all that is necessary to do is to push the steering-wheel backward toward the cylinder. This operation brings into engagement the sector-gears 41^a and 52, as shown
125 in Fig. 4, and at the same time throws the spur-wheel 28 and pinion 42 out of engagement with each other, and also closes the opening 33 in the stationary dividing portion
130 32 by the portion 39, which now covers it, as shown in Fig. 4. All the steering-wheel has to do now is to operate the valve S, through the sector-gears 41^a and 52. It will now be

seen that by turning the steering-wheel so as to cause the valve *s* to uncover the port *r* and connect the exhaust with the opposite side of the steam-valve communicating with the hydraulic pump will be opened, so that the pump begins at once to operate and water is forced up through the inlet-pipe 4 and through the port *r*, thereby moving the piston 30 in the direction of the arrow *x*, Fig. 6, and turning the rudder in a direction corresponding therewith, in which direction it will move until the pin 70 causes the valve to be closed, in which position it will be held until the operator moves the steering-wheel to reverse the movement of the piston and turn the rudder in the opposite direction. That is, by reversing the movement of the steering-wheel the opposite port *t* is uncovered, the action of all the parts are reversed, and the rudder moved in the opposite direction.

I claim as my invention—

1. In a steering-gear for vessels, consisting of a cylindrical case, having an annular space in which the piston operates, the combination with a stationary dividing portion located in said annular space and having an opening through it communicating with the annular space at each side of the piston, of a shaft mounted within a transverse opening through the dividing portion and carrying the steering-wheel at its front end, and means located within the transverse opening mounted on said shaft so as to be operated by the steer-

ing-wheel for opening or closing communication between the annular space and the piston, for the purposes described.

2. In a steering-gear for vessels, the combination with the pulley to which the chains or cables are connected for operating the tiller and rudder, of an arm rigidly connected to the valve-stem, a connecting-rod connecting with the steam-valve and with an arm on the valve-stem, an extension from said valve-stem arm and a pin extending out from the inner side of the cable pulley, whereby the steam is shut off and the motion of the piston is stopped automatically at the end of each stroke.

3. In a steering-gear for vessels of the character above described, the combination with the cylinder-case, of a shaft having one end mounted in one cylinder-head, means for preventing it from being drawn therefrom, an inward-projecting sleeve extending from the opposite cylinder-head having an inside surrounding flange through which the opposite end of the shaft passes, and an enlargement on said shaft adapted to engage with the inside flange, for preventing the cylinder-heads from spreading, substantially as described.

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Witnesses:

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