

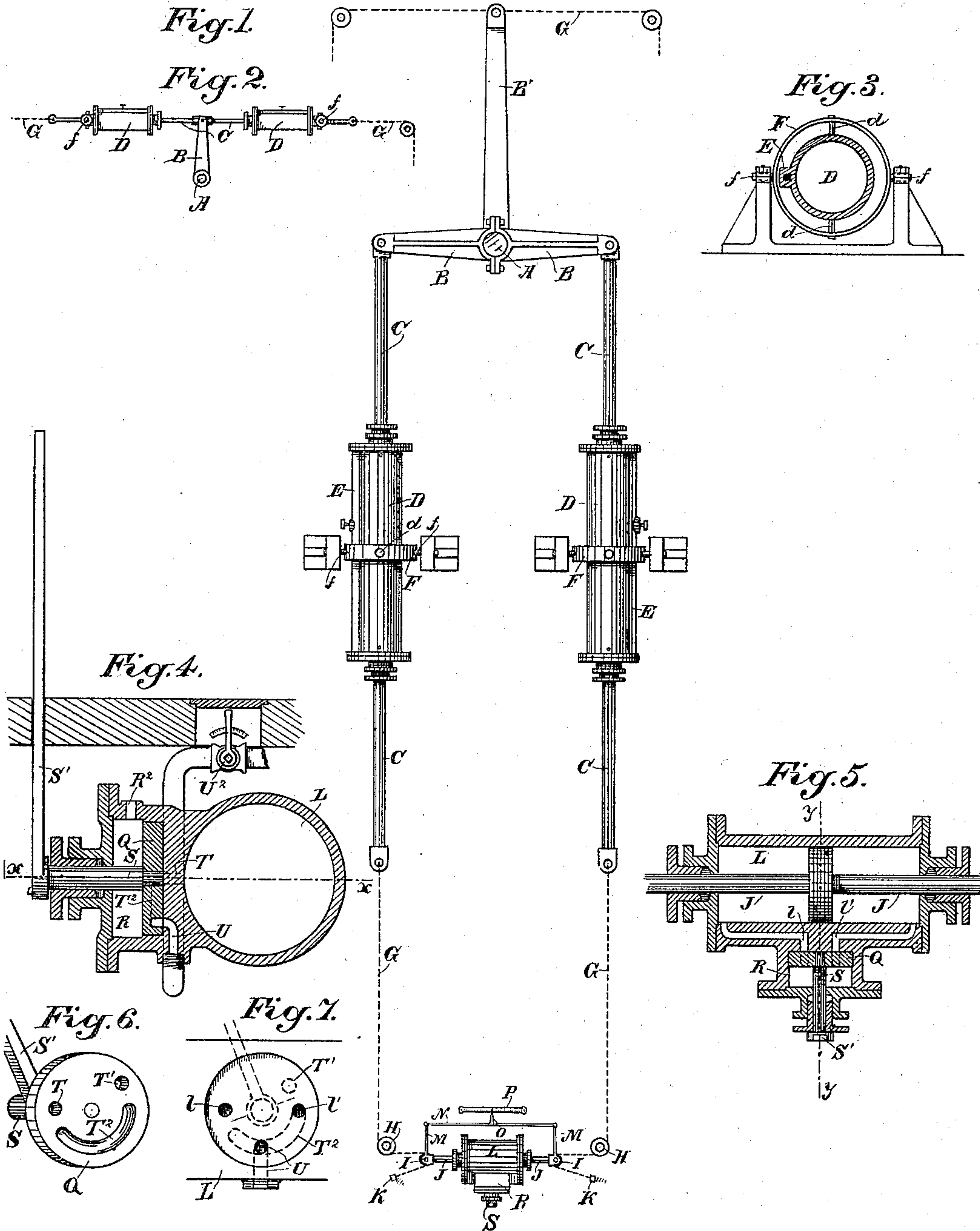
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J. CHRISTENSEN.
STEERING MECHANISM FOR VESSELS.

(Application filed Mar. 18, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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STEERING MECHANISM FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 641,192, dated January 9, 1900.

Application filed March 18, 1899. Serial No. 709,599. (No model.)

To all whom it may concern:

Be it known that I, JORGEN CHRISTENSEN, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Steering and Brake Mechanism for Vessels; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improvement in that class of apparatus for steering vessels by other than manual power and in conjunction therewith of a liquid brake or check mechanism.

It comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view of my mechanism. Fig. 2 shows the mechanism used with only one tiller-arm and the balance-cylinders hinged at one end. Fig. 3 shows the manner of swiveling the balance-cylinders. Fig. 4 is a cross-section through the steam-cylinder on line *y y*, Fig. 5. Fig. 5 is a horizontal section of the same on line *x x* of Fig. 4. Fig. 6 shows the inner surface of the steam-valve. Fig. 7 shows the valve-seat.

A represents the rudder-head, having a tiller arm or arms B fixed thereto and extending outwardly from the head, and the ends of these tiller-arms are connected with piston-rods C, which pass through cylinders D, having pistons fixed to the rods within the cylinders. The rods extend entirely through both heads of the cylinders, being suitably packed to prevent leakage, and the cylinders have connecting-passages E between one end and the other, as shown, so that when the pistons are moved in one direction the liquid within the cylinder will be forced slowly through the small passages to the opposite end. These cylinders are what are known as "liquid" balance or brake devices and prevent the rudder from being thrown too violently from side to side and serve to relieve the steering machinery of shocks which would otherwise be conveyed directly to it.

In the present case I have shown the cylinders D pivoted at the top and bottom in a surrounding ring F, and this ring is again pivoted at the points *f* at right angles with the cylinder-pivots, so as to allow the cylinder a universal movement, it being free to

turn vertically about the pivots *f* and to turn horizontally about the pivots *d*, so that it can follow the movements of the tiller-arms B as the rudder is turned, and these arms move in a horizontal arc of a circle. In this way the parts move freely and without binding.

From the ends of the rods C which extend through the cylinders, upon the opposite side from the tillers, chains or equivalent flexible connections G lead forward to the pilot-house, passing around suitable guide-pulleys H. Thence they pass around pulleys I, which are journaled in the ends of the piston-rod J, and lead to points K, where they are firmly anchored.

The piston-rod J passes through the steam or other pressure cylinder L, through which power is applied to move the piston in one direction or the other, and when the piston is thus moved it will act through the flexible lines G to pull the tillers in one direction or the other, and thus turn the rudder, while the balance mechanism of the cylinders D serves to relieve the more delicate parts of the working cylinder L from sudden shocks and strains from the rudder.

From each end of the piston-rod J project standards M, and between these extend a rod or connection N, which carries a pointer O. This pointer is movable over a scale P, which corresponds with the position of the rudder, so that the helmsman can at a glance see how the rudder stands.

In order to operate the piston within the cylinder L, I have shown a valve-gear which consists of a circular disk valve Q, turnable in a valve-chamber R by means of a central shaft S, passing out through a stuffing-box and having upon the outer end a lever-arm S', by which it may be turned. The valve Q has holes T T' made through it upon opposite sides of the center and a segmental groove or channel T² formed in its under face, as shown. Through the seat, upon which the valve turns, is made a channel U, which serves as an exhaust-passage when the channels T² and U are brought properly together. Steam is admitted into the valve-chamber R through a steam-pipe R², and in certain positions the disk valve Q covers all the ports, so that no steam passes into the cylinder. By turning the valve in one direction one of the ports T or

T' will be brought to coincide with the corresponding passage *l*, leading to the end of the cylinder *L*, and steam will be admitted to force the piston toward the opposite end.

5 When the valve is in this position, one end of the segmental passage *T*² will be brought in line with the passage *l'* from the other end of the cylinder, so that steam or other medium which may occupy the opposite end of

10 the cylinder can flow out through this passage and the exhaust-passage *U* in the valve-seat. By turning the valve in the opposite direction the other port *T'* will be brought in line with the steam-passage at that end of the

15 cylinder, and the opposite end of the segmental channel *T*² will connect with the passage from the opposite end of the cylinder, thus allowing the piston to be moved in the opposite direction. A cock *U*² controls the

20 exhaust-passage and permits its adjustment proportionately to the inlet-passages to prevent free movement of the piston. The usual cocks for the discharge of condensed water are fixed in the proper places. In this man-

25 ner the steering-gear can be handled with the greatest ease, and any strain upon the steering mechanism will be avoided. The regulated size of the exhaust-passage controls the movement of the piston at will.

30 Fig. 2 shows a modification in which a single tiller extends fore and aft, and the cylinders *D* in this case are fixed transversely to the vessel, the tiller-ropes in such a case changing direction around suitable guide-pulleys, so as to lead forward to the pilot-house, as

35 before described.

In some cases it may be found necessary or desirable to steer directly by hand. For this purpose I have shown a single tiller *B'*

40 extending from the rudder-head *A* fore and aft and made of sufficiently greater length to give the necessary purchase or power. The tiller-ropes *G* in this case are carried around suitable guide-pulleys and thence carried to

45 the pilot-house, where they may be connected with the usual wheel and axle or other operating mechanism.

Having thus described my invention, what I claim as new, and desire to secure by Letters

50 Patent, is—

1. The combination in a steering mechanism of a cylinder having a piston movable

therein, a piston-rod extending through both ends of the cylinder, means for applying a fluid-pressure upon either side of the piston 55 whereby it may be moved within the cylinder, tiller ropes or chains connecting with opposite ends of said piston-rod leading to the tiller of the rudder, and balance-cylinders interposed between the power-cylinder and the 60 rudder.

2. In a steering mechanism for vessels, a power-cylinder having a piston movable from end to end, a piston-rod to which the piston is fixed extending through both ends of the 65 cylinder with tiller-ropes connecting therewith and leading to the tillers of the rudder-head, liquid-balance cylinders interposed between the tillers and the power-cylinder, said balance-cylinders being journaled both vertically and horizontally whereby a universal 70 movement of said cylinders may be effected.

3. In a steering-gear for vessels, a power-cylinder contiguous to the pilot-house, having a piston movable therein, a piston-rod extending through opposite heads of the cylinder 75 with tiller-ropes connected therewith, direction-pulleys around which the tiller-ropes are led to points adjacent to the rudder, liquid-balance cylinders with pistons and piston- 80 rods, one end of which is connected with the rudder-turning tillers, and the other end with the tiller-ropes.

4. In a steering-gear for vessels, a rudder with a tiller or tillers, liquid-pressure balance, cylinders turnably pivoted and having pistons and rods therefor which extend 85 through the opposite cylinder-heads, connections between one end of the rods and the tillers, ropes connecting with the opposite 90 ends of the piston-rods and leading forward to the pilot-house, a power-cylinder therein, the piston-rod of which passes through both heads, and connections between it and the tiller-ropes, and inlet and exhaust valves for 95 the power-cylinder with means for regulating the passage of the fluid medium through both inlet and exhaust passages.

In witness whereof I have hereunto set my hand.

JORGEN CHRISTENSEN.

Witnesses:

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