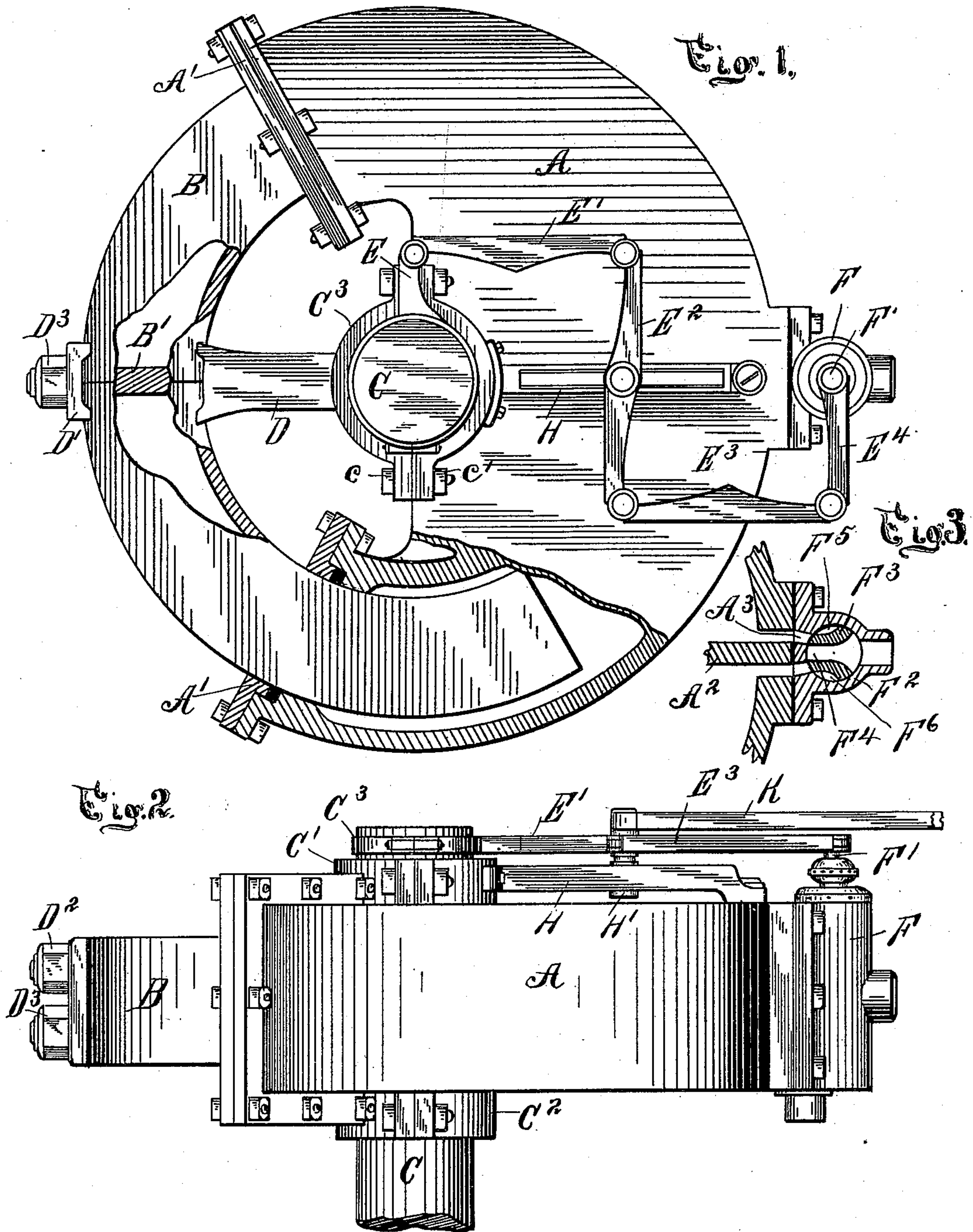


(No Model.)

L. M. SANDERS.
STEAM STEERING GEAR.

No. 471,142.

Patented Mar. 22, 1892.



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LOUIS M. SANDERS, OF HANCOCK, MICHIGAN.

STEAM STEERING-GEAR.

SPECIFICATION forming part of Letters Patent No. 471,142, dated March 22, 1892.

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To all whom it may concern:

Be it known that I, LOUIS M. SANDERS, a citizen of the United States, residing at Hancock, county of Houghton, State of Michigan, have invented a certain new and useful Improvement in Steam Steering-Gear; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a plan view with parts broken away to show the interior. Fig. 2 is a side elevation. Fig. 3 is a horizontal section of the valve.

My invention relates to steam steering-gear for vessels, and is designed to provide a machine in which the steam operates directly over the rudder and directly on the rudder-post, as distinguished from mechanism in which the power is transmitted from the piston to the rudder through ropes or chains or through gear of any description. It is further designed to provide an effective mechanism that is simple and inexpensive, and by reason of the simplicity of its construction less liable to accidental disarrangement of its parts to render it inoperative.

My method of accomplishing the purpose of the gear is principally in the use of a semi-annular steam-cylinder and semi-annular piston working in said steam-cylinder, the whole so placed as to be concentric to the rudder-post. This construction permits me to attach the piston to the rudder-post or to an arm or lever extending out from it and to revolve the post by the movement of the piston without intermediate gear.

In the drawings, A is the steam-cylinder and is provided with the glands A' to form a steam-joint for the piston B. The steam-cylinder is in two compartments, with the wall A² between them, as shown in Fig. 3. The piston B is also divided into two compartments by the wall B'. (Shown by cutting away a section of the piston-wall in Fig. 1.)

C is the rudder-post and rotates freely in the journal-boxes C' C², which boxes are sup-

ported by the web of the steam-cylinder above and below. The piston B is rigidly connected to the rudder-post C through the tiller D and is attached to the tiller by means of the yoke D' and nuts D² and D³. The tiller D is formed integral with a section of the clamping-collar C³, the sections of which are clamped to the post by the bolts and nuts c c'. The valve-gear is made up of the links E, E', E², E³, and E⁴, connecting the rudder-post C and the valve-stem F'. The link E² is centrally pivoted to the block H, which slides in ways in the guide H. The link E and the link E⁴ are rigidly connected with the rudder-post and valve-stem, respectively.

F is a three-way valve of any suitable construction. I prefer, however, to construct it as shown in Fig. 3, in which F² is the valve-case.

F³ is a rotatable valve provided with the inlet-port F⁴ and exhaust-ports F⁵ F⁶. The walls of the valve between the inlet-ports and the exhaust-ports are adapted to cover the inlet-ports A³ of the respective compartments of the steam-cylinder at the same time, and the wall between the compartments of the steam-cylinder is adapted to just cover the inlet-port of the valve when the inlet-ports of the cylinder are closed. It is manifest that in this construction there is but one point where the valve is closed and that a movement in either direction from this position (shown in Fig. 3) will open one of the ports A³ for supply and the other for exhaust.

The arrangement of my valve-gear, whereby the valve is so operated as to admit steam to either compartment of the cylinder for the purpose of setting over the rudder to any desired angle, and then automatically controlling the steam in said cylinder, so as to maintain it in that position, is one of the principal features of my invention. This is accomplished as follows: Let it be understood that in the drawings, Fig. 1, the sliding block H' is in the center of the guide H and the rudder set straight. In this case the arm E, projecting from the rudder-post, and the arm E⁴, attached to the valve-stem, are at right angles

to the guide H. If the rudder from any cause be thrown to the right, it will cause the arm E to turn to the left and the valve to turn in the same direction through the operation of the links. This will admit steam to the left-hand compartment of the cylinder, causing the piston to revolve the rudder-post to the left, throwing the rudder back to its original position. This movement of the rudder-post is carried back to the valve, and as soon as the rudder has been returned to its straight position relative to the vessel the valve is closed. The operation would be the same if the rudder were thrown in the opposite direction. It is understood, then, that the operation of the link connection between the rudder-post and the valve is to automatically hold the rudder in one position, and that position is the one where the valve is closed.

If I desire now to cause the rudder to take any other position, such an adjustment must be made of the valve-gear as will allow the rudder to stand in the desired position when the valve is closed.

If I start from the position shown in Fig. 1 and move the sliding block H' toward the rudder-post C, the center of the link E² will move with it, and the link E' being immovable in that direction by reason of its connection with E the link E² will revolve and move the link E³ and arm E⁴ and cause the valve to revolve to the right from the position shown in Fig. 3. This opens the port to the right-hand compartment of the cylinder and causes the piston and rudder-post to revolve to the left. This will cause the arm E to move the link E' to the left and revolve the link E² and close the valve. The rudder-post will continue to revolve to the left until the valve is closed, when the valve-gear will operate to hold it in that position, as before explained. The position of the rudder to the right or left is thus determined by the position of the block H' on the guide H. The operation and locking of this block may be made through any suitable device and from any point on the vessel, as from the pilot-house. Fig. 2 shows rod K, that may be extended the length of the boat, or it may be a screw-rod and operate block H' by revolving the rod with a wheel. The block K can be held in any position by locking the operating device in the pilot-house.

While my invention is shown in use as a steam steering-gear, it may be used in other places where steam-power can be utilized, and I desire to secure the invention wherever used.

Any motive force—such as compressed air or water—may be used instead of steam without departing from my invention.

While I have described the cylinder and piston as being semi-annular, either may be more or less than one-half of the arc of a circle, depending upon the amount of throw to be given to the tiller. I prefer to make the

cylinder about two hundred and forty and piston two hundred and fifty-two degrees, as shown in the drawings.

What I claim is—

1. In a steam steering-gear for vessels, the combination of a rudder, rudder-post, and tiller, with a semi-annular steam-cylinder concentric to said rudder-post, a semi-annular piston mounted on said tiller and working in the opposite ends of said steam-cylinder, and valve-gear for admitting steam at will to either end of said steam-cylinder, substantially as described.

2. In a steam steering-gear for vessels, the combination of a rudder, rudder-post, and tiller, with a stationary semi-annular steam-cylinder concentric to said rudder-post, said semi-annular steam-cylinder provided with a web and journal-boxes to form bearings for said rudder-post, a semi-annular piston engaged with the tiller and working in both ends of said steam-cylinder, and valve-gear for admitting steam to either end of said steam-cylinder, substantially as described.

3. In a steam steering-gear for vessels, the combination of a rudder, rudder-post, and tiller, with a stationary semi-annular steam-cylinder concentric to said rudder-post, said steam-cylinder provided with a web to form a bearing for said rudder-post, a semi-annular piston engaged with the tiller and working in both ends of said cylinder, glands packing said piston and steam-cylinder, and valve-gear for admitting steam to either end of said steam-cylinder at will, substantially as described.

4. In a steam steering-gear for vessels, the combination of rudder and rudder-post, with a stationary semi-annular steam-cylinder concentric to said rudder-post, a semi-annular piston engaged with said rudder-post and working in said steam-cylinder, a three-way valve for admitting steam to either end of said steam-cylinder, a link-valve motion consisting of links E, E', E², E³, and E⁴, and sliding guide-block H', carrying central link E², whereby steam may be admitted to move the piston in either direction and automatically maintaining the same in said position, substantially as described.

5. In a steam steering-gear for vessels, the combination of a rudder, rudder-post, and tiller, with a semi-annular steam-cylinder concentric to said post, a semi-annular piston attached to the tiller and working in both ends of said steam-cylinder, a valve for admitting steam to either end of said steam-cylinder at will, and means for operating said valve from the pilot-house of said vessel, substantially as described.

6. In a steam-power device, the combination of a revoluble shaft with a semi-annular steam-cylinder concentric to said shaft, a semi-annular piston attached to said shaft and operating in said steam-cylinder, and

valve-gear for regulating the admission of
steam to said cylinder, consisting of links E,
E', E², E³, and E⁴, and sliding guide-block
carrying central link E², whereby steam may
5 be admitted to move the piston in either di-
rection and automatically maintain the same
in said position, substantially as described.

In testimony whereof I sign this specifica-
tion in the presence of two witnesses.

LOUIS M. SANDERS.

Witnesses:

CHARLES H. FISK,
MARION A. REEVE.