(No Model.)

J. L. HORNIG.

STEERING APPARATUS.

No. 397,919. Patented Feb. 19, 1889.

Fig. 3.

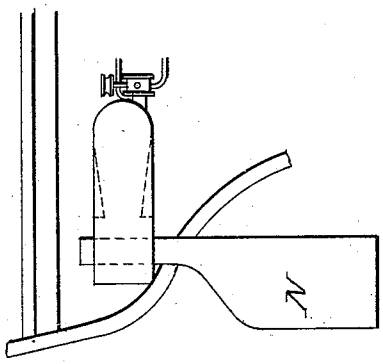


Fig. 4.

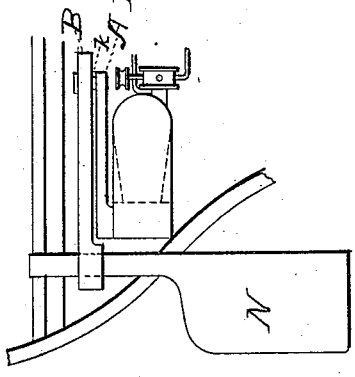


Fig. 1.

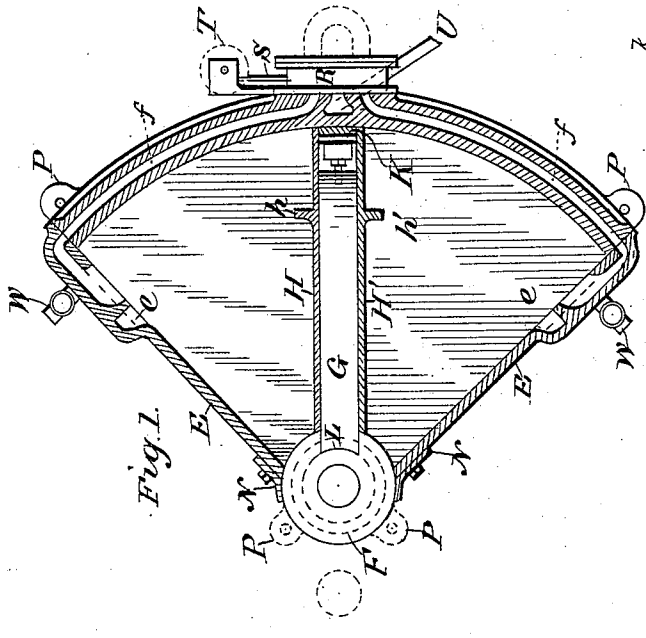
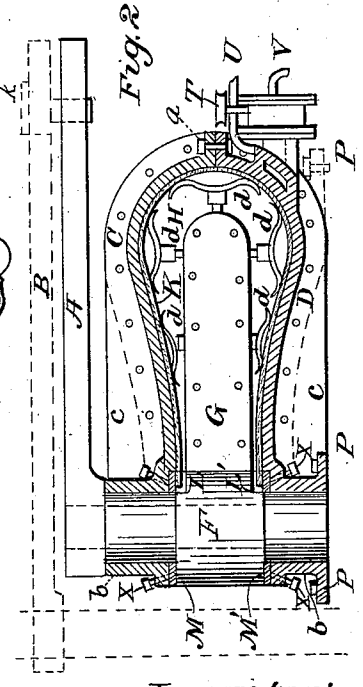


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JULIUS L. HORNIG, OF JERSEY CITY, NEW JERSEY.

STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 397,919, dated February 19, 1889.

Application filed April 9, 1888. Serial No. 270,041. (No model.)

To all whom it may concern:

Be it known that I, JULIUS L. HORNIG, of Jersey City, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Steering Apparatus, of which the following is a specification.

My invention relates to a new form of motor designed for use in moving the rudders of vessels for steering, and to the manner of connecting such motor with the rudder.

Heretofore in power-steering a cylinder has been used containing a piston which was moved in one direction or the other by the fluid admitted to the cylinder, and the piston-rod is connected with the rudder, so that the rectilinear movement of the piston is communicated to the rudder to turn it. This has the disadvantage of requiring too much room for the straight-moving piston-rod, which must move a long distance across the vessel to give the full movement to the rudder; and it also requires the placing of the motor at some distance from the rudder and the use of ropes or chains extending from the piston-rod to the rudder to communicate the motion thereto.

In my invention the motor has a motion similar to that to be given to the rudder, so that it can be attached directly to the rudder-post, if desired, or coupled to it in any suitable manner, and so space will be saved and the use of the rope or chain gearing avoided.

The main feature of my invention is the use, in connection with a rudder, of a pendulum engine or motor—that is, one whose moving part is a pivoted fan, piston, or body in a tight inclosing-case—which is moved by fluid-pressure with a pendulum movement on its pivot, which curvilinear movement is of course similar to that required for the rudder, which enables the piston or fan to be coupled directly to the rudder.

My invention further consists in various details of construction of the motor and of its connection with the rudder, as hereinafter set forth and claimed.

My invention is illustrated in the accompanying drawings, in which Figure 1 is a horizontal section of the pendulum-motor embodying my invention with the valve-chest in elevation; Fig. 2, a vertical longitudinal section thereof, and Figs. 3 and 4 illustrate different ways of connecting the motor with the rudder.

The motor consists of an air-tight inclosing-case, C D, which is fan-shaped in horizontal section, as shown in Fig. 1, and pear-shaped in vertical section, as seen in Fig. 2. The case is made in two parts—an upper part, C, and lower part, D—bolted together at *a* and closed by side pieces, E E. At its open end the upper and lower parts of the case terminate in sleeves *b b*, which are the bearings for the pivoted piston. The parts C and D have strengthening ribs or flanges *c c*. The moving portion or piston consists of a central body or core, G, on each side of which is a wide plate or flange, H, such plates nearly filling the case. Between these plates is a suitable packing-ring, K, which is constantly pressed outwardly by flat springs *d d*, secured to the core G.

The core G is connected with or preferably made in one piece with a cylindrical hub, F, having an enlarged middle part and fitting in the bearings formed by the sleeves *b b*. Packing-rings M M′ are placed between the sleeves *b b* and the shoulders of the hub provided with set-screws X X for adjusting their pressure, and packing-strips N N are placed at the junctions of the side pieces, E E, with the moving hub. It will be seen that the case is thus closed air-tight on all sides.

The case is secured to the deck or elsewhere by bolts passing through lugs P P. At the larger end of the case passages *f f* extend through the walls thereof to the interior of the case on each side of the moving body from the valve-chest R. This chest contains a valve whose function it is to open and close the passages *f f*, so as to admit the air, steam, water, or other fluid to either side of the moving body.

I prefer to employ such a valve and valve-chest as is set forth in my application filed February 23, 1888, Serial No. 265,063.

S is the valve-stem extending from the valve-chest and preferably arranged to be operated from a distance by means of a cord passing over grooved wheel T, which is geared to the valve-stem.

U is the inlet and V the outlet pipe for the fluid.

W W are relief-valves for the sides of th

case, whereby the same may be opened to permit the steering to be done by hand, if desired. The plates H H have each a rib, *h*, and the side pieces, E E, of the case have each a recess, *e*, whereby near the end of the stroke on each side an air-cushion is formed to stop the stroke gradually.

The connection of the fan or piston to the rudder N may be made directly, as in Fig. 3, the rudder-post passing through the hub, so as to turn therewith when the piston moves, or the hub may be connected by any suitable coupling or gearing with the rudder.

I prefer the mode of connection illustrated in Figs. 2 and 4, wherein an arm or tiller, B, extends from the rudder-post, and an arm, A, extends from the pendulum-hub parallel to the tiller and is coupled to it at *k*. It will be seen that by this arrangement the steering may be performed by hand by means of the tiller, or by a wheel suitably connected therewith when it is not desired to use the power-steering apparatus.

The pear shape for the piston I find to be that which enables the packing-strip K to be applied to the best advantage, as it brings the ends of the packing-strip K close down to the body G of the piston, where they project into the bearing part and enable the adjustable packing-rings M to be placed over it on each side and pressed closely down against it.

What I claim is—

1. In steering apparatus, the combination, with the rudder, of a motor consisting, essentially, of a stationary inclosing-case, a fan or piston swinging within such case, and means for varying fluid-pressure within such case, said fan or piston being connected with the rudder, whereby the rudder is moved positively in either direction, substantially as set forth.

2. In steering apparatus, the combination, with the rudder, of a pivoted body connected therewith, a stationary case inclosing said body, and means for varying fluid-pressure within said case, whereby said body is made to swing within the case and move the rudder, substantially as set forth.

3. In steering apparatus, the combination of the motor, consisting, essentially, of an inclosing-case, a fan or piston pivoted within said case, and means for varying fluid-pressure within said case with the arm connected with the pivot of said fan or piston, the tiller-arm connected with said pivot-arm, and the rudder connected with said tiller-arm, substantially as set forth.

This specification signed and witnessed this 7th day of April, 1888.

JULIUS L. HORNIG.

Witnesses:
WILLIAM PELZER,
A. W. KIDDLE.