No. 669,235. Patented Mar. 5, 1901.

L. S. GARDNER.

STEERING APPARATUS.

(Application filed May 25, 1899.)

(No Model.)

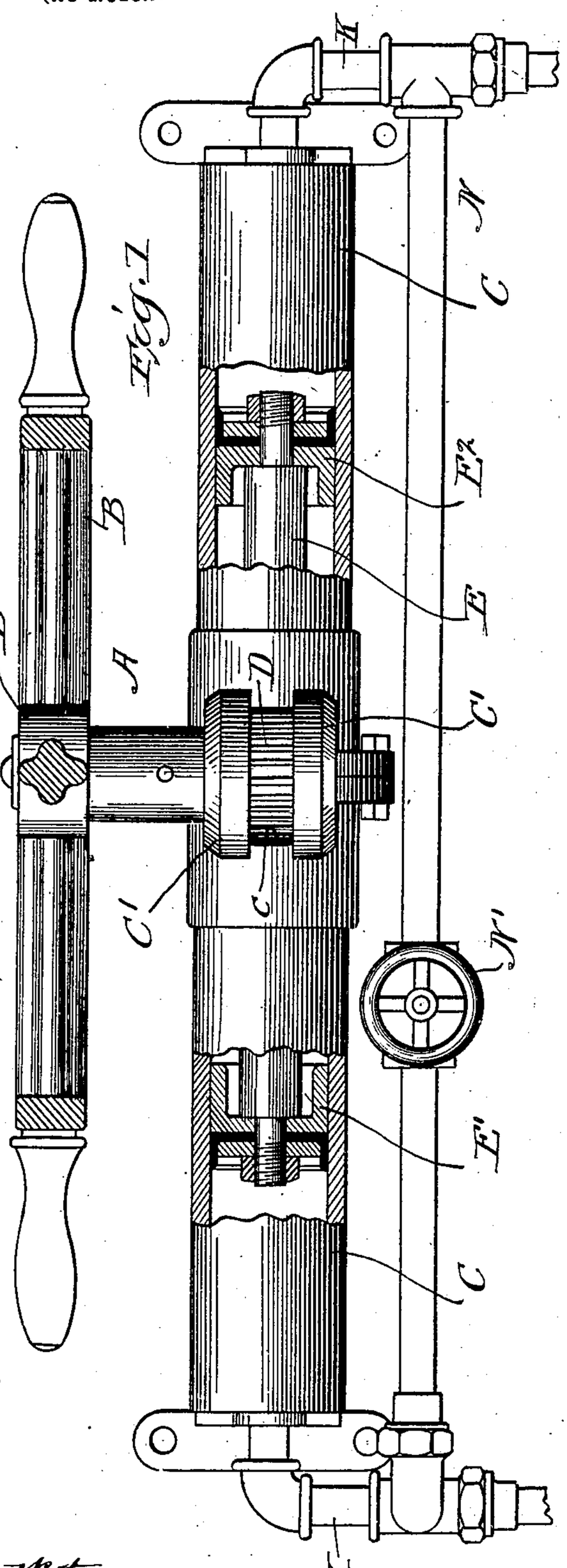

Fig. 1.

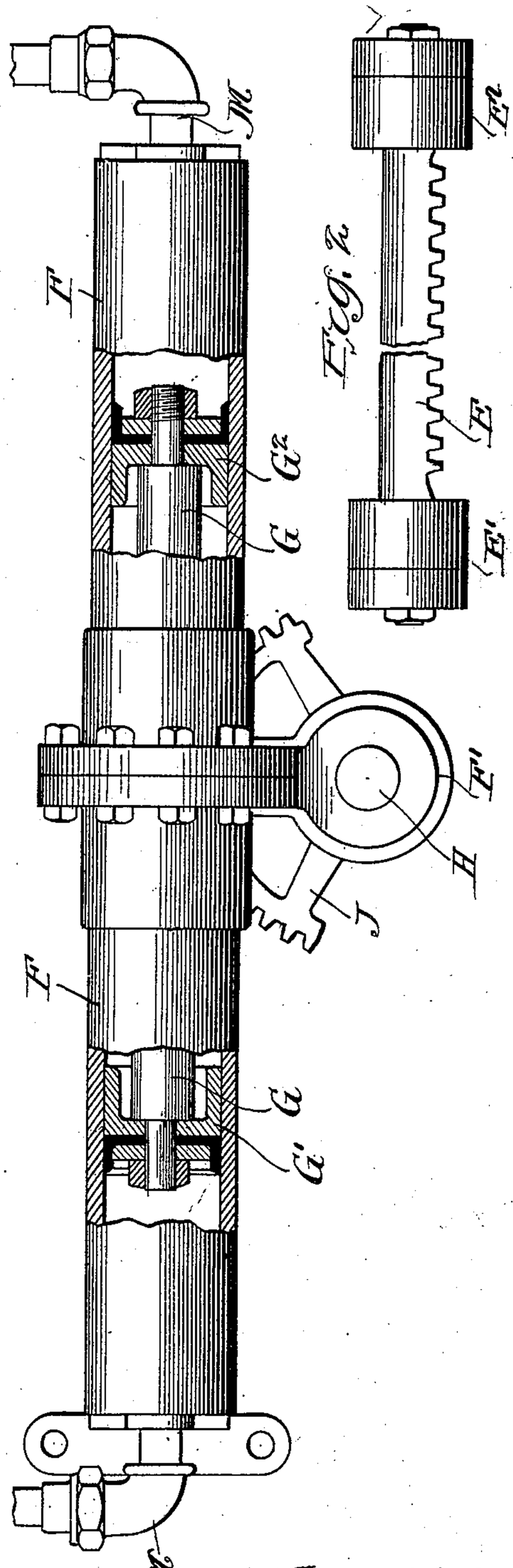

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

LEVI S. GARDNER, OF NEW ORLEANS, LOUISIANA.

STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 669,235, dated March 5, 1901.

Application filed May 25, 1899. Serial No. 718,300. (No model.)

To all whom it may concern:

Be it known that I, LEVI S. GARDNER, a citizen of the United States, residing at New Orleans, parish of Orleans, State of Louisiana, have invented a certain new and useful Improvement in Steering Apparatus; 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.

My invention has for its object the production of a steering-gear for boats, &c., which obviates the necessity of connecting ropes and cables and which when the hand steering-wheel is set at a desired point will, together with the rudder, remain in this position until intentionally moved.

It consists in a combination of devices and appliances hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of my apparatus with parts broken away. Fig. 2 is a detail of one of the double pistons and rack-bar.

In carrying out the invention, A represents a suitable shaft mounted in the bearings C′ on the cylinder C, the latter supported in any suitable manner from any desirable point.

B is a suitable hand-wheel engaged to the shaft by its hub B′. On the shaft, between the bearings, is a pinion D, said pinion being set into the top of the cylinder through a suitable slot *c*.

E is a rack-bar on the interior of the cylinder, provided on each end with a piston E′ E^2. F is another cylinder, suitably supported from any desirable point and provided also with an interior rack-bar G, having a piston G′ G^2 on each end, said rack-bar and pistons being exactly like the rack-bar E and pistons E′ and E^2.

H is the rudder-post, suitably supported vertically in the bearings F′ on the cylinder F. On the rudder-post is a segment-gear J, which passes through a slot in the face of the cylinder F and meshes with the rack-bar G.

Connecting the corresponding ends of the cylinders C F are pipes K M, and connecting these pipes is an equalizing-pipe N, with a valve N′ to control the flow through the equalizing-pipe.

In operation the pipes and cylinders beyond the pistons are filled with a suitable liquid—say glycerin. Now, as will be seen, when the wheel B is thrown it will through the pinion D move the rack-bar E longitudinally in the cylinder C. This movement will through the liquid be transmitted to the other rack-bar G, and the latter will through the segment J throw the rudder-post and rudder to the desired position.

In practice it has been found that by the use of the above construction when the hand-wheel is once set the rudder will not change its position until the hand-wheel has been intentionally moved.

What I claim is—

1. In a steering apparatus for boats the combination with rudder-post and hand-wheel, of intermediate apparatus for transmitting motion of the latter to the former, consisting of a reciprocating bar having a piston at each end connected with the hand-wheel, and a bar having a piston at each end connected with the rudder-post, and connecting-pipes between the two cylinders filled with fluid whereby the motion of one piston operates the other, substantially as described.

2. In a steering apparatus for boats the combination with the rudder-post and hand-wheel of intermediate apparatus for transmitting motion of the latter to the former consisting of a cylinder having therein a rack-bar, a piston thereon, a pinion connected with the hand-wheel and engaging said rack-bar, and another cylinder having a rack-bar therein and likewise provided with a piston, a segment connected with a rudder-post and engaging said rack-bar, pipes connecting the corresponding ends of each cylinder and a fluid in the pipes and cylinders beyond the piston substantially as described.

3. In a steering apparatus for boats the combination with the rudder-post and hand-wheel of intermediate apparatus for transmitting the motion of the latter to the former consisting of a cylinder provided on its interior with a rack-bar having a piston on each end, a pinion carried by the hand-wheel which meshes with the said rack-bar another cylinder provided on its interior with a rack-bar having a piston on each end, a segment carried by the rudder-post adapted to mesh with the lat-

ter rack-bar and pipes connecting the corresponding ends of the cylinders, substantially as described.

4. In a steering apparatus for boats the combination with the rudder-post and hand-wheel of intermediate apparatus for transmitting the motion of the latter to the former consisting of a cylinder having a double-ended piston connected with the hand-wheel and another cylinder having a double-ended piston connected with the rudder-post, pipes connecting the corresponding ends of each cylinder and an equalizing-pipe controlled by a valve and connecting said set of pipes and a fluid in said pipes and cylinders beyond the pistons, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

LEVI S. GARDNER.

Witnesses:

LOUIS GRIMEWALD,

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