

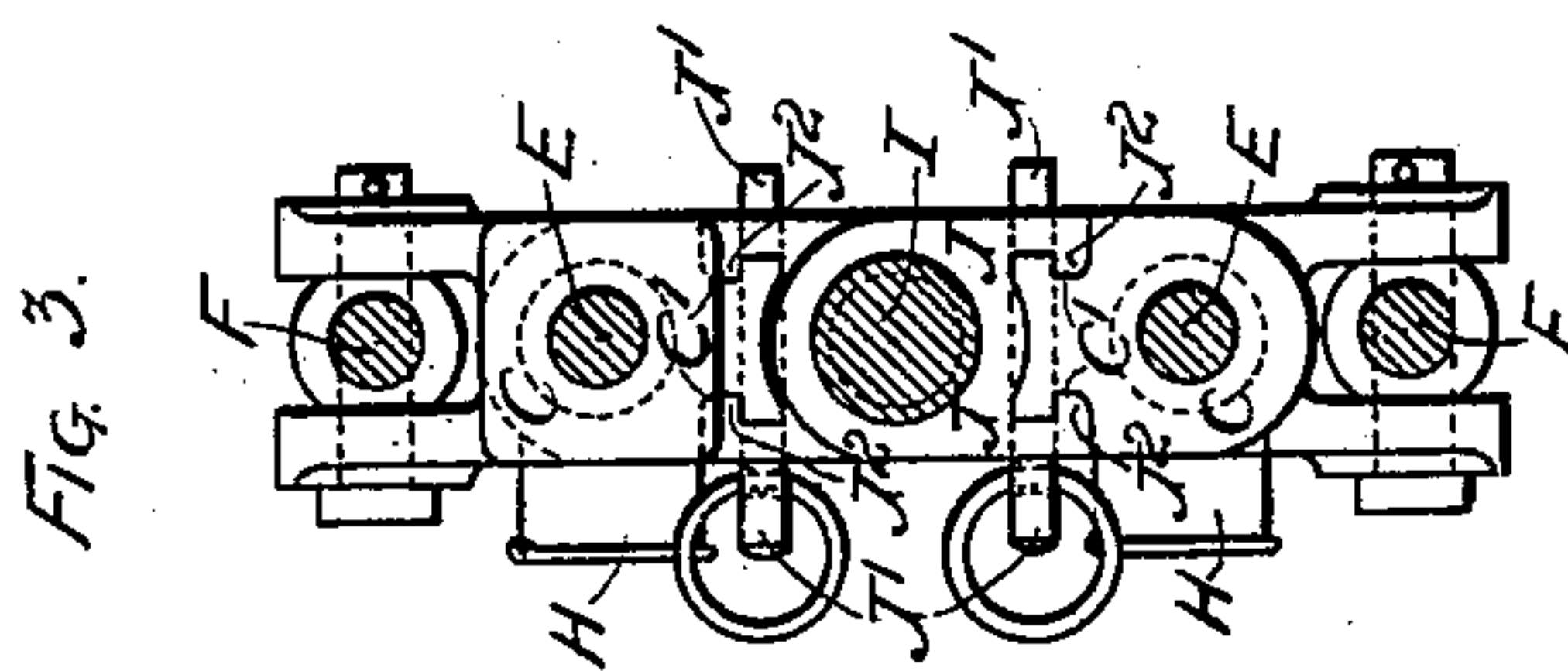
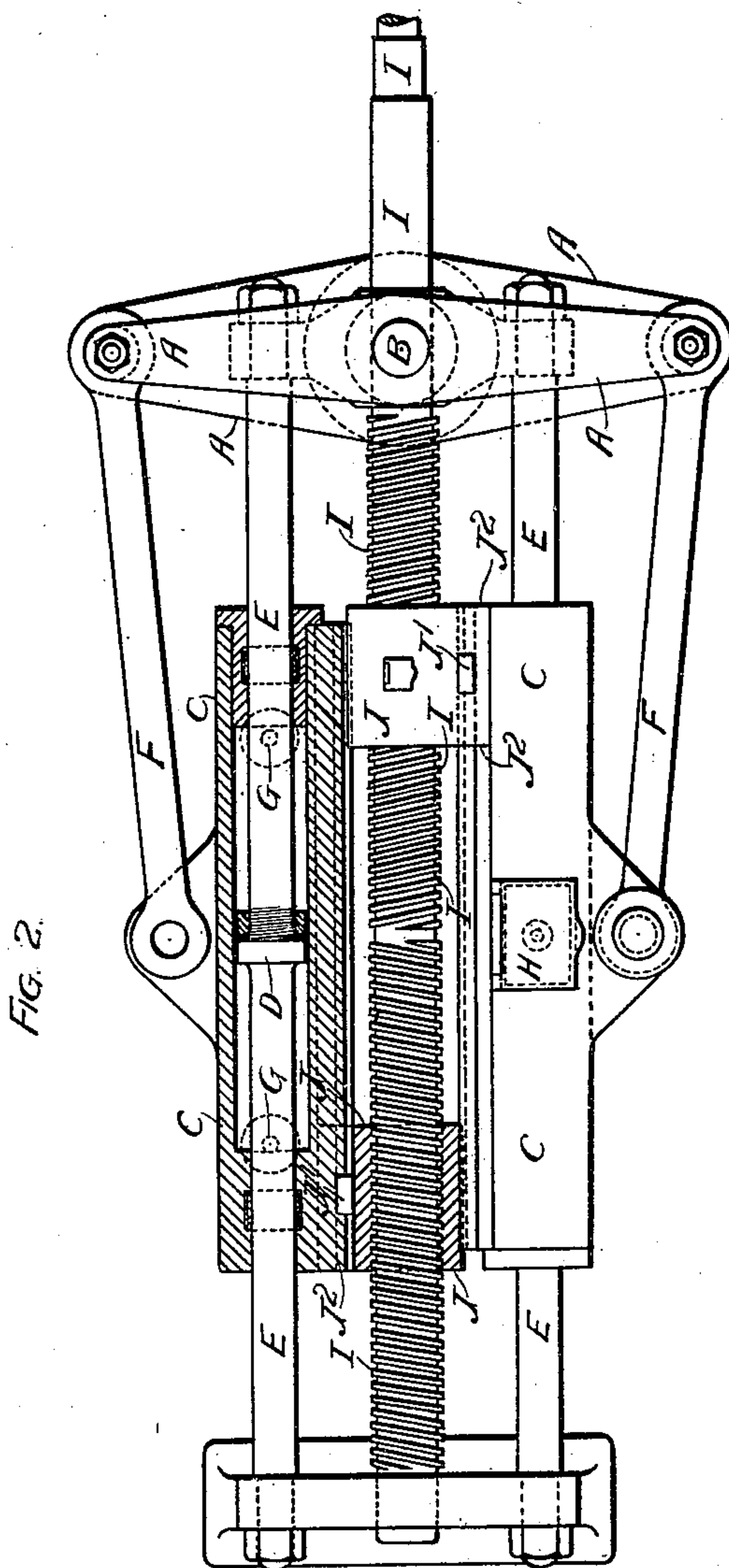
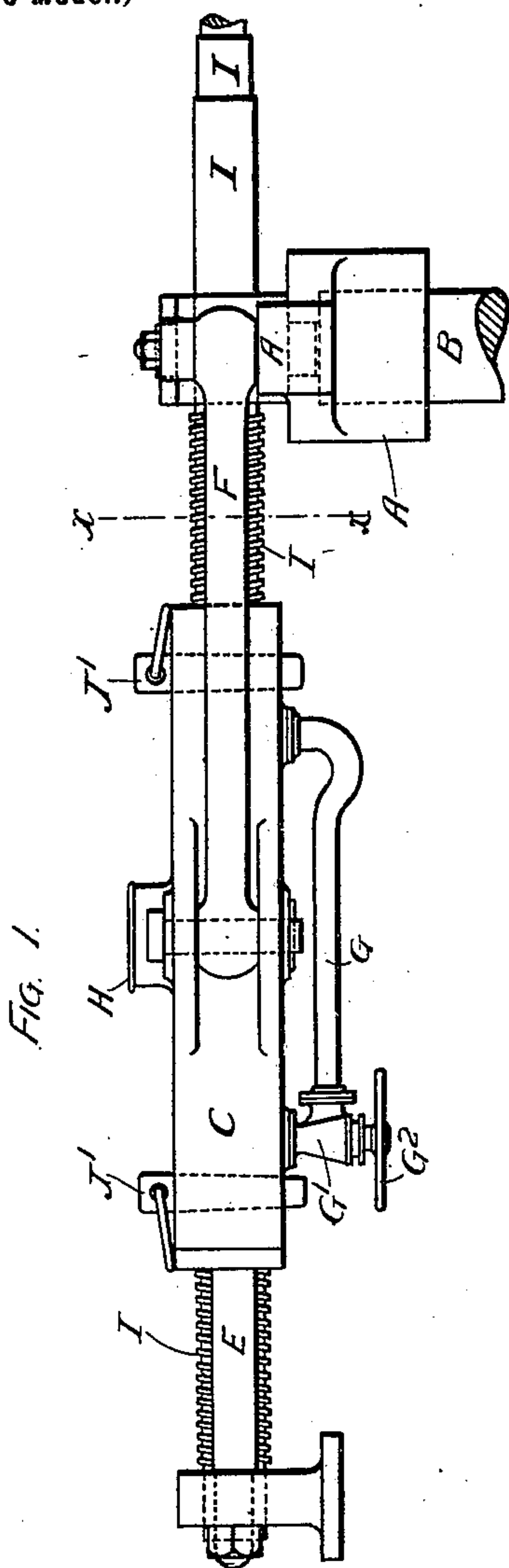
No. 669,301.

Patented Mar. 5, 1901.

J. L. BOOTHMAN.
STEERING MACHINERY.

(Application filed Jan. 2, 1901.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES LEWIS BOOTHMAN, OF GREENOCK, SCOTLAND.

STEERING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 669,301, dated March 5, 1901.

Application filed January 2, 1901. Serial No. 41,788. (No model.)

To all whom it may concern:

Be it known that I, JAMES LEWIS BOOTHMAN, a citizen of the United Kingdom of Great Britain and Ireland, residing at 39 Ardgowan street, Greenock, in the county of Renfrew, Scotland, have invented certain new and useful Improvements in Steering Machinery, (for which application for a patent has been made, No. 1,851, dated January 30, 1900,) of which the following is a specification.

This invention, which relates to steering machinery, comprises a novel construction and arrangement of brake mechanism for the same, whereby the rudder is constantly maintained under control, and consequently the danger of accident when the ship is in heavy seas or when it is necessary to change from steam to hand power is diminished.

In the accompanying drawings, which illustrate the invention, Figure 1 is a longitudinal elevation, Fig. 2 a part plan and part horizontal section, and Fig. 3 a cross-section on the line $x x$, Fig. 1, of the improved controlling apparatus and its connections to the rudder-stock.

The liquid-brake apparatus is designed to prevent accidents to rudders in the event of the steam or hand steering-gear becoming disabled or breaking and to prevent the loose vibration which is the prime cause of so many accidents to rudders during heavy weather.

The apparatus consists, essentially, in conjunction with a cross-head A (which may be made in two parts, as shown) upon the rudder-stock B, of one or more cylinders C, preferably two, each fitted with a piston D, secured to or formed on the stationary guide-rods E or framing of the right and left hand screw-shaft, (ordinarily forming part of the hand steering-gear,) the cylinders C being arranged to slide upon said guide-rods under the action of the cross-head A, and the cylinders C and pistons D being provided with stuffing-boxes and cup-leathers. The cylinders C are connected to the cross-head A by suitable links or rods F, and the cylinders C are filled with a liquid, preferably oil or a mixture of glycerin and water or other non-freezable liquid, and in the case of each cylinder communication is established, as shown, by means of pipes G, between the opposite ends of each

cylinder or between the ends of one cylinder and the corresponding ends of the other cylinder. On these pipes G are placed valves or stop-cocks G', whereby the communication between the ends of the cylinders C can be controlled and the resistance or velocity of the flow of the liquid from one end of the cylinders to the other regulated or stopped altogether. A small tank or reservoir H is also provided in connection with the pipes G to hold a supply of liquid to make up for any loss or leakage, and on the connection with the tank H is fitted a valve K (not shown, but of any ordinary non-return form) to prevent the return of the liquid to the tanks. A force-pump (not shown) is also fitted to the tank H in communication with the pipes G, leading to the cylinders C, by means of which the liquid can be forced in to the required degree of pressure. The cylinders C, containing the liquid, have external slotted grooves or recesses C' on that side next to the right and left hand screw-shaft I of the hand-screw steering-gear, with which engage tongues J² on the internally-screwed nuts or blocks J on said shaft.

The action of the apparatus is as follows: Assuming that steam-power is being employed to move the rudder, the cross-head A on the rudder-stock B, through the intervention of the links or rods F, moves the cylinders C in opposite directions along their guide or piston rods E. The liquid in these cylinders C is thereby forced to the ends of the cylinders farthest from their pistons D, the rudder thus being cushioned against shocks from heavy seas, and should it become necessary, through accident or other cause, to brake the rudder or hold it stationary in any given position the valves or stop-cocks G', through which the liquid passes, are closed by means of the hand-wheels G² on the spindles of the valves or stop-cocks G' and the passage of the liquid stopped. Thus any further movement of the rudder is prevented until the valves or stop-cocks G' are again opened.

When it is desired to work the rudder by the hand-gear, the steam steering-gear is disconnected and the cylinders C, containing the liquid, are made fast to the nuts or blocks J by means of cotters J', which are tapered on their four sides, so that when entered into

their sockets a tight fit is insured, the nuts or blocks J being thus connected with the rudder cross-head A. The rudder can then be worked by the hand-screw steering-gear in the ordinary way, the cylinders C being now moved by the nuts or blocks J traveling along the screwed hand-shaft I instead of by the cross-head A and links F, as described in reference to steering by steam-power, the cylinders now actuating the rudder cross-head instead of the cross-head moving the cylinders. The valves or stop-cocks through which the liquid passes are left full open when so steering.

15 Having now described the invention, what I claim, and desire to secure by Letters Patent, is—

20 1. In steering machinery the combination with a cross-head on the rudder-stock actuated by steam-power in the ordinary manner, of links connected to said cross-head, liquid-holding cylinders connected to these links and fitted to slide upon stationary pistons and pis-

ton-rods, pipes connecting the opposite ends of each cylinder, and regulating valves or cocks on said pipes, substantially as and for the purpose set forth. 25

2. In hand steering machinery the combination with the usual screw-threaded hand-wheel shaft, and screw-threaded nuts or blocks engaging said shaft, of liquid-holding cylinders connected by links to a cross-head upon the rudder-stock and each cylinder having its opposite ends connected together by pipes provided with regulating cocks or valves, stationary pistons and piston-rods upon which said cylinders are fitted to slide and a key or cotter for connecting the cylinders to the screw-threaded blocks, substantially as and for the purpose set forth. 30 35 40

In witness whereof I have hereunto set my hand in presence of two witnesses.

JAMES LEWIS BOOTHMAN.

Witnesses:

WALLACE FAIRWEATHER,
JNO. ARMSTRONG, Jr.