No. 738,767. PATENTED SEPT. 15, 1903.

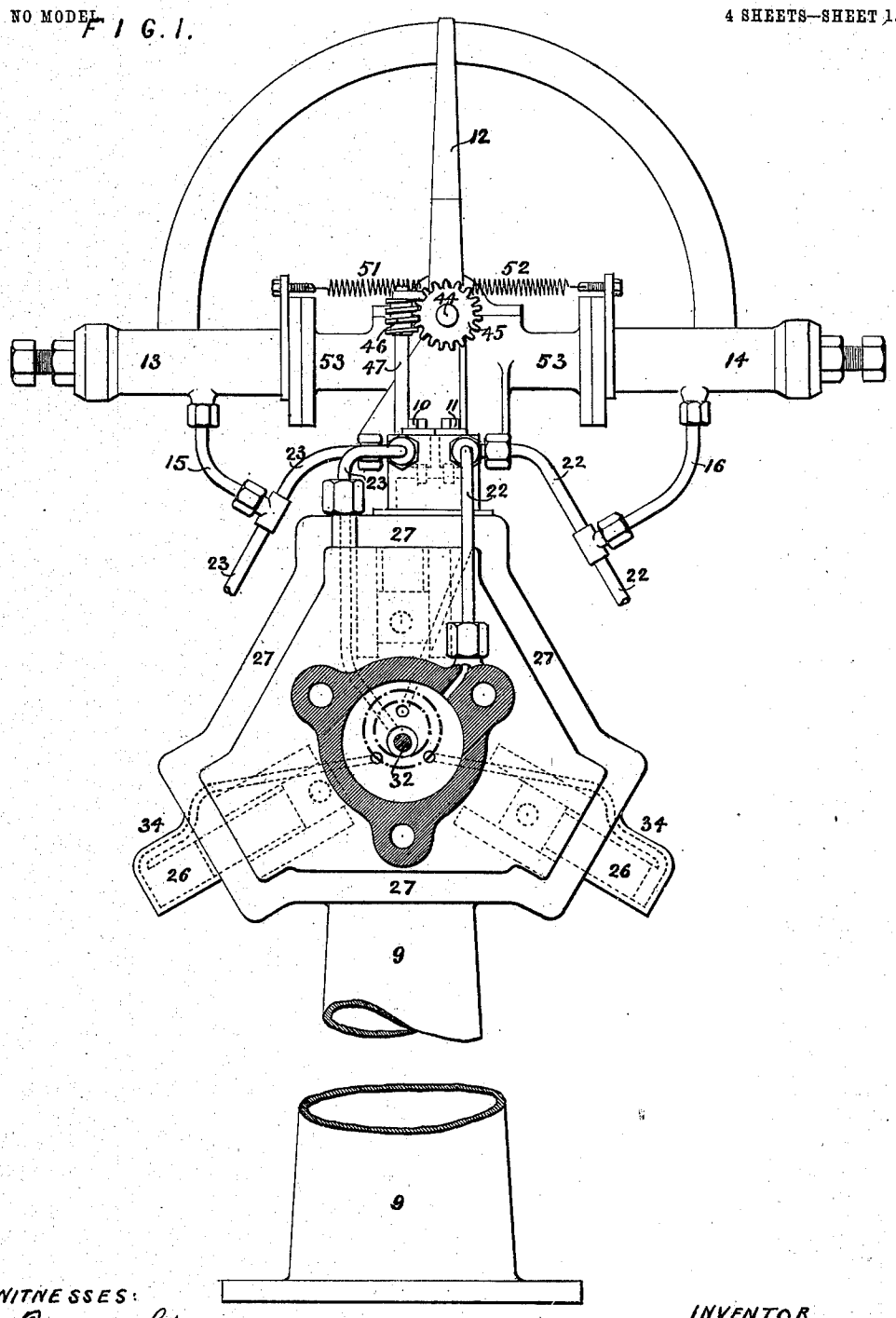
A. B. BROWN.

TELEMOTOR APPARATUS FOR SHIPS OR THE LIKE.

APPLICATION FILED FEB. 25, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

FIG. 1.



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NO MODEL. 4 SHEETS—SHEET 2.

FIG. 4.

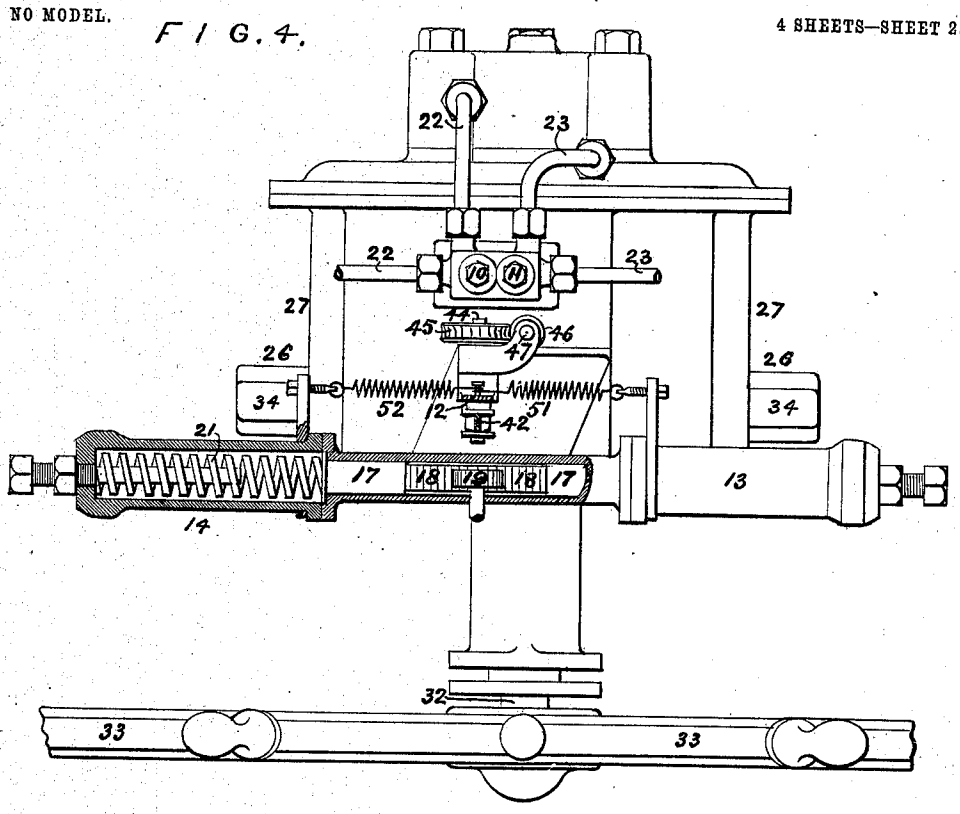
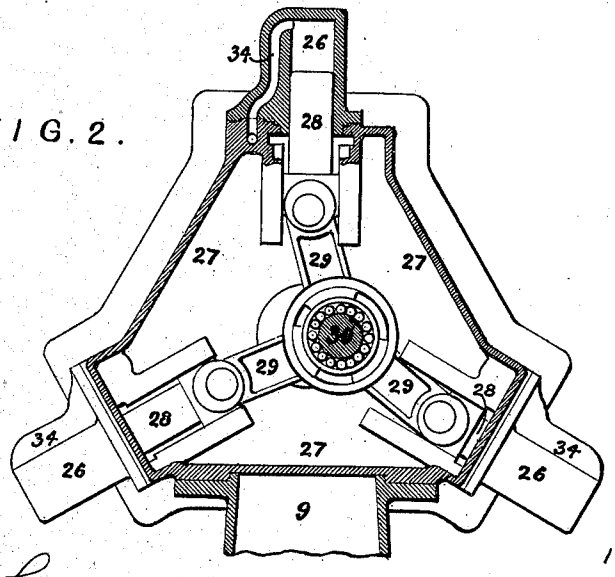


FIG. 2.



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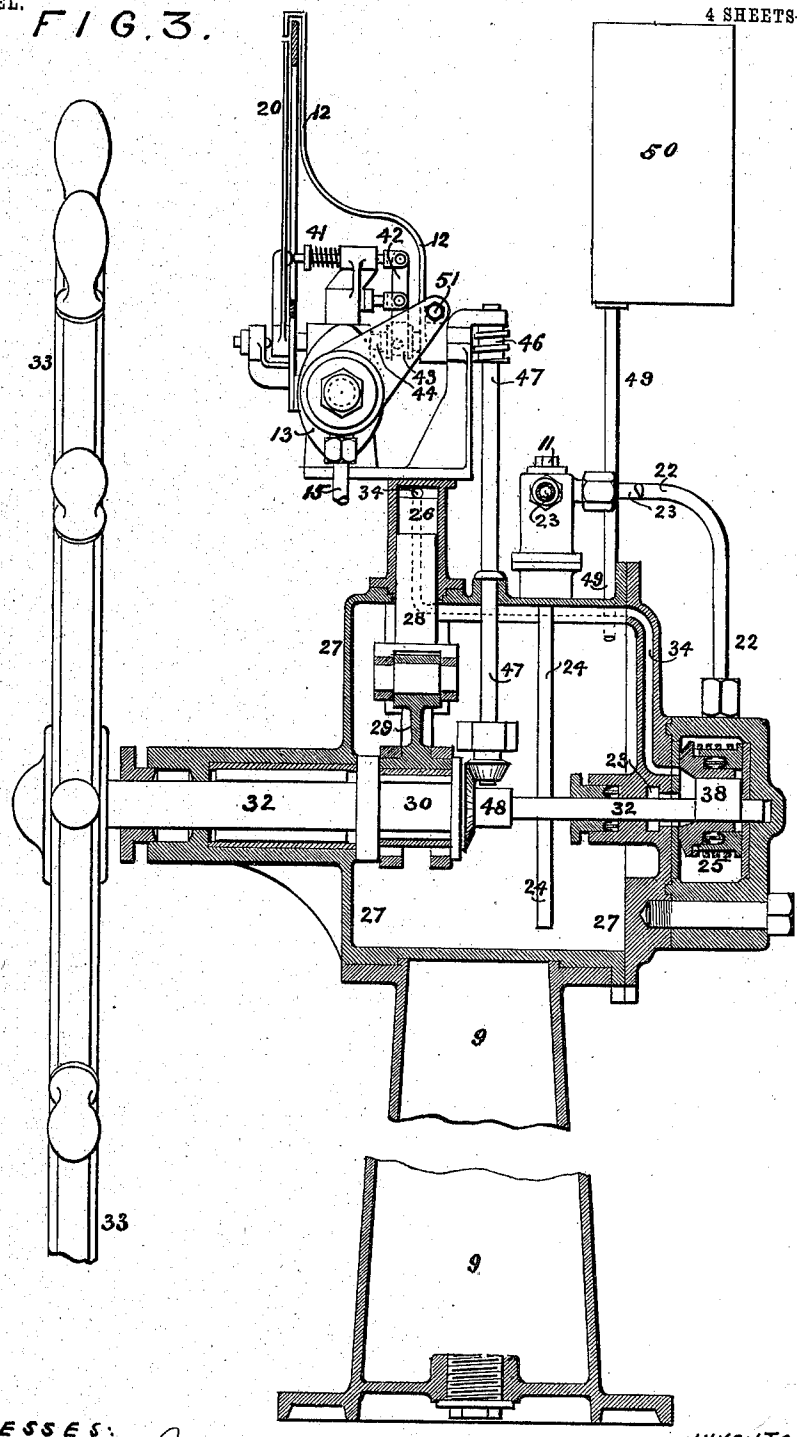
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TELEMOTOR APPARATUS FOR SHIPS OR THE LIKE.

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NO MODEL. 4 SHEETS—SHEET 3.

FIG. 3.



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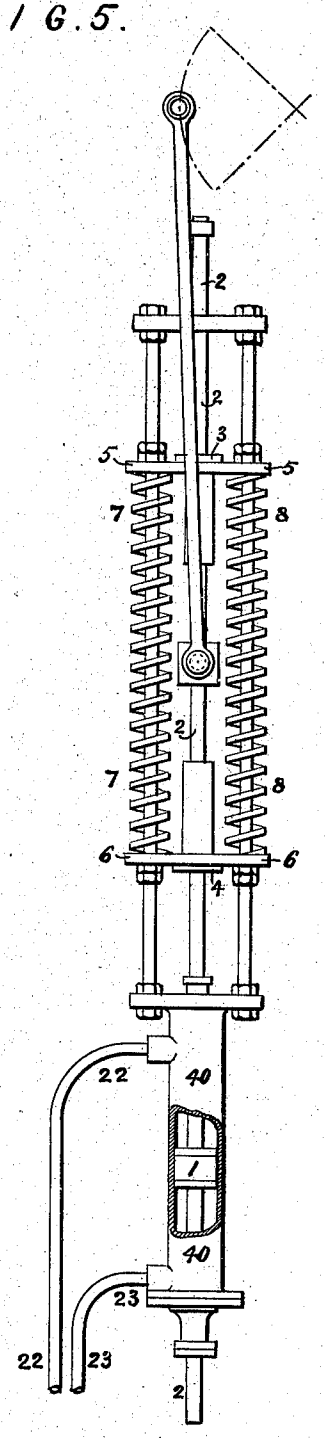
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TELEMOTOR APPARATUS FOR SHIPS OR THE LIKE.

APPLICATION FILED FEB. 25, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

FIG. 5.



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No. 738,767. Patented September 15, 1903.

UNITED STATES PATENT OFFICE.

ANDREW BETTS BROWN, OF EDINBURGH, SCOTLAND.

TELEMOTOR APPARATUS FOR SHIPS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 738,767, dated September 15, 1903.

Application filed February 25, 1903. Serial No. 144,940. (No model.)

To all whom it may concern:

Be it known that I, ANDREW BETTS BROWN, a subject of the King of Great Britain and Ireland, and a resident of Edinburgh, in the county of Midlothian, Scotland, (whose postal address is Rosebank Ironworks, Edinburgh, Scotland,) have invented a certain new and useful Improved Telemotor Apparatus for Ships or the Like, (for which I have applied for British Patent No. 17,847, dated August 14, 1902,) of which the following is a specification.

My said invention has for its object to improve the construction and action of telemotor apparatus for working steering, telegraphing, indicating, and other apparatus from a distance, to some extent of the type described in my patent specification No. 707,382, as applied to steering machinery, and in order that my said invention and the manner of performing the same may be properly understood I hereunto append four sheets of explanatory drawings, to be hereinafter referred to in describing my improvements.

The actuating mechanism is shown in Figures 1 to 4, Fig. 1 being a back elevation with certain parts removed. Fig. 2 is a section of a part drawn to a larger scale. Fig. 3 is a vertical section, as at right angles to Fig. 1; and Fig. 4 is a plan, partly in section. The receiving apparatus is shown in plan in Fig. 5.

In carrying out my present invention the actuating mechanism, in connection with the hand-wheel 33, (or wheels,) consists of a three-cylinder pump 26 and mechanically-operated distribution-valve 25, as described in the earlier specification hereinbefore referred to; but the three plungers 28, working in their cylinders 26, instead of being actuated by an eccentric are actuated through connecting-rods 29 from a crank-pin 30 on the hand-wheel shaft 32. The fluid being pumped passes by pipes 34 to the distribution-valve 25, which is operated, as formerly, by an eccentric 38 on the hand-wheel shaft 32, this combination thus pumping the water in one direction or the other, accordingly as the wheel is turned, so that the fluid will pass, as formerly, through either of two pipes 22 23 to the receiving apparatus, Fig. 5. This receiving apparatus for actuating steering-gear or valves of steering-engines or the receiving parts of other apparatus to which the telemotor may be applied, may be such, for example, as is described in my patent specification No. 622,600; but it is constructed by preference as shown in Fig. 5, in which a piston 1 works in a cylinder, the connection from the piston-rod 2 to the mechanism to be actuated being through any suitable arrangement of floating lever, (not shown,) as is well understood. The piston-rod 2 has also on it two nuts 3 4, which can act on cross-heads 5 6, guided on rods in the framing, helical springs 7 8 being placed on the rods between the cross-heads. On the movement of the piston-rod in either direction one or other of the two cross-heads 5 6 is moved inward, the other remaining stationary, so that the springs 7 8 are compressed. When freed again, the springs will tend to return the piston 1 to mid-position, as is well understood in such apparatus.

The three pump-cylinders 26 are bolted to a casing 27, which, along with the pedestal 9, acts as a reservoir for the fluid, and to compensate for leakage past the receiving-piston 1 or elsewhere there is fitted on the top of the casing 27 a double-valve box containing two by-pass valves 10 11, connected, respectively, to the two pipes 22 23, running aft to the receiving apparatus, and also by a suction-pipe 24 with the reservoir 27, so that while the wheel 33 is being turned in one direction the fluid passing through one or other of the two pipes 22 or 23 opens the one or other of the two valves 10 or 11, connected with that pipe, and the necessary amount of fluid to make up for leakage is then sucked out of the reservoir 27. At the same time the pressure in the other pipe 22 or 23 holds the valve on that pipe shut, and vice versa.

An indicating-pointer 12, actuated through gearing from the hand-wheel shaft 32, as hereinafter described, is provided in connection with the actuating apparatus, and in order that the accuracy of this indicator may be tested and also to insure that the actual position of the piston 1 in the receiving apparatus will be correctly shown at the transmitting-station, there is provided a second indicating mechanism, which consists of two cylinders 13 14, connected by branch pipes 15 16, Fig. 1, with the two pipes 22 23, run-

ning aft. The fluid in these cylinders 13 14 is separated by a plunger 17, on which is cut a rack 18, Fig. 4, which, through a pinion 19, works a second pointer 20, Fig. 3. The plunger 17 (and consequently the pointer 20) is held in mid-position by two springs 21, inclosed one in the end of each cylinder 13 14, one only of these springs being shown in Fig. 4. A distance-piece 53, between the two spring-cylinders 13 14, and containing the plunger 17, is of smaller diameter than these cylinders, and a perforated diaphragm 54 is introduced at each end of the plunger 17, so that either of these springs 21 receives compression proportional with the compression imparted to the combined springs 7 and 8 of the receiving apparatus, Fig. 5, the plunger 17 being moved in either direction by the pressure in the pipes 22 23 15 16, according to which way the hand-wheel is turned. The diaphragm, away from which the plunger is moving, being larger in diameter than the plunger, prevents the spring held by it from following the plunger. This allows of the spring that is being compressed by the plunger 17 indicating the exact compression of the springs 7 8, Fig. 5, and therefore the position of piston 1, as the pointer 20, will move proportionately to the movement of the piston 1 of the receiving-cylinder 40.

When the pointer 20 leaves its central position, it releases a small spring 41, Fig. 3, on a spindle connected to the upper end of a lever 42, the lower end of which causes a conical clutch 43, sliding with a loose feather on the spindle 44 of a worm-wheel 45, to engage the boss of the pointer 12. The worm-wheel 45 gears with a worm 46 on the upper end of a spindle 47, driven by gearing 48 from the hand-wheel shaft 32. The pointer 12 will then indicate the actual number of revolutions of the hand-wheel, assuming no leakage in the system. When through leakage the hand-wheel has to make more than its normal number of turns to put the gear hard over, the pointer 12 will encounter one or other of the cylinders 13 or 14 and the conical clutch 43 will slip, allowing the worm 46 and worm-wheel 45 to still revolve. Assuming leakage, there is thus no limit to the number of revolutions the steering-wheel can make. When the wheel is let go, it flies back to mid-position, due to the action of the springs 7 8 in the receiving apparatus, as hereinbefore described, the three-cylinder pump 26 being then driven as a hydraulic motor. When the hand-wheel returns to mid-position, the reversal of the pressure in the branch pipes 15 16, aided by the spring 21, then under compression, will also cause the plunger 17 to bring back the pointer 20, and a detent on the back of this pointer presses in the spring-controlled spindle 41. This puts the clutch 43 out of gear, and the pointer 12 is then free to be also pulled back to the central position by means of springs 51 52 attached to it and to the cylinders 13 14.

To provide for expansion or contraction of the fluid caused by change of temperature or leakage, a pipe 49 is led from the casing 27 to a tank 50, so that this tank will take up any surplus fluid or supply any deficiency. The fluid used is preferably a non-freezing mixture consisting of glycerin and water.

What I claim as my invention is—

1. A telemotor apparatus comprising a hydraulic cylinder and piston, and pipes leading thereto, in combination with mechanism for forcing fluid through said pipes, consisting of three single-acting pumps and a distribution-valve connected therewith, a hand-wheel shaft and parts for operating such pumps and valve therefrom, two cylinders, a spring-controlled plunger in such cylinders, two pointers, gearing connecting the plunger with one pointer and the second with the hand-wheel shaft, a clutch connected with the second pointer, with means for putting it into and out of gear on the movement of the first pointer, and pipe connections leading to the hydraulic cylinder and also to the plunger-cylinders, substantially as described.

2. A telemotor apparatus comprising a hydraulic cylinder and piston, and pipes leading thereto, in combination with mechanism for forcing fluid through said pipes, consisting of actuating mechanism comprising a hand-wheel-operated pump and circular distribution-valve connected therewith, pipes leading from such valve to the hydraulic cylinder, two pointers, with means for operating one from the hand-wheel and the other by variations of fluid-pressure in the pipes, substantially as described.

3. A telemotor apparatus comprising a hydraulic cylinder and piston, and pipes leading thereto, in combination with mechanism for forcing fluid through said pipes, consisting of mechanism to indicate at the actuating-station the relative positions of the hand-wheel and of the hydraulic cylinder, comprising two cylinders connected with the fluid-pressure, a plunger and springs in such cylinders, a hand-wheel shaft, two pointers, gearing connecting the plunger with one pointer and the hand-wheel shaft with the second pointer, and means for putting the second pointer into and out of action on the movement of the first pointer, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANDREW BETTS BROWN. [L. S.]

Witnesses:
GEORGE COBB,
THOMAS CALEANDER.