

Feb. 20, 1923.

T. McLEOD

1,446,261

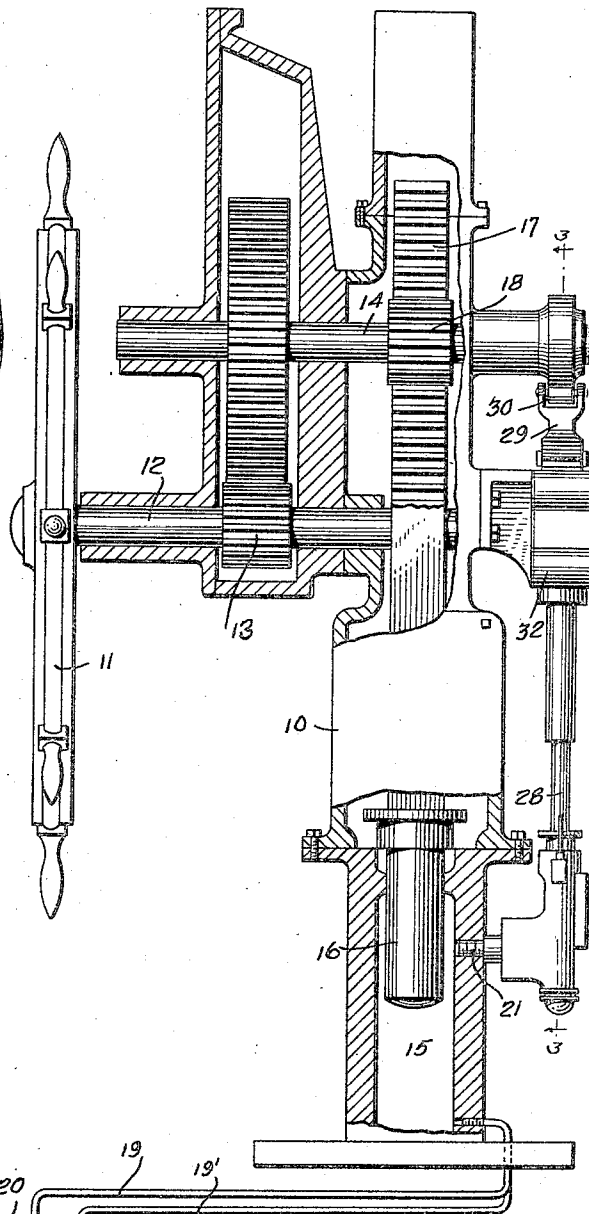
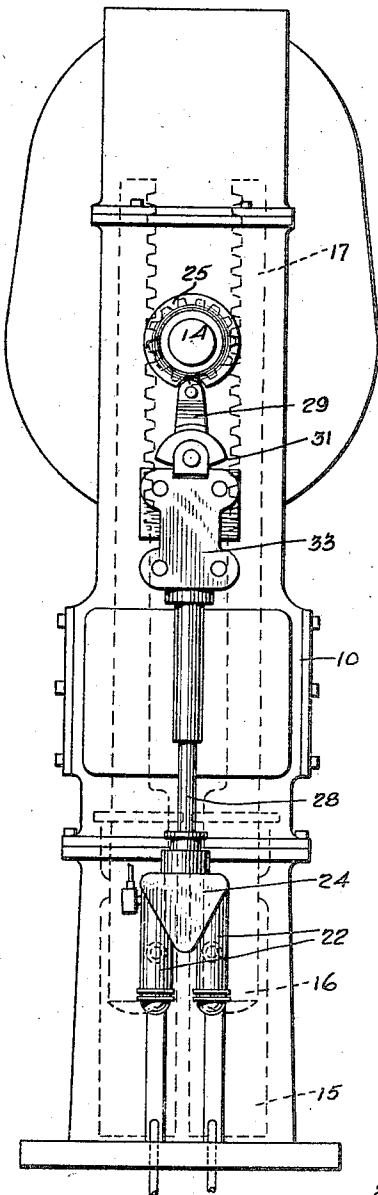
CONTROL APPARATUS

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2 sheets-sheet 1

Fig. 1.

Fig. 2.



WITNESSES

W. E. Jones
A. H. Jones

INVENTOR

THOMAS McLEOD
BY *Mum & Co*
ATTORNEYS

Feb. 20, 1923.

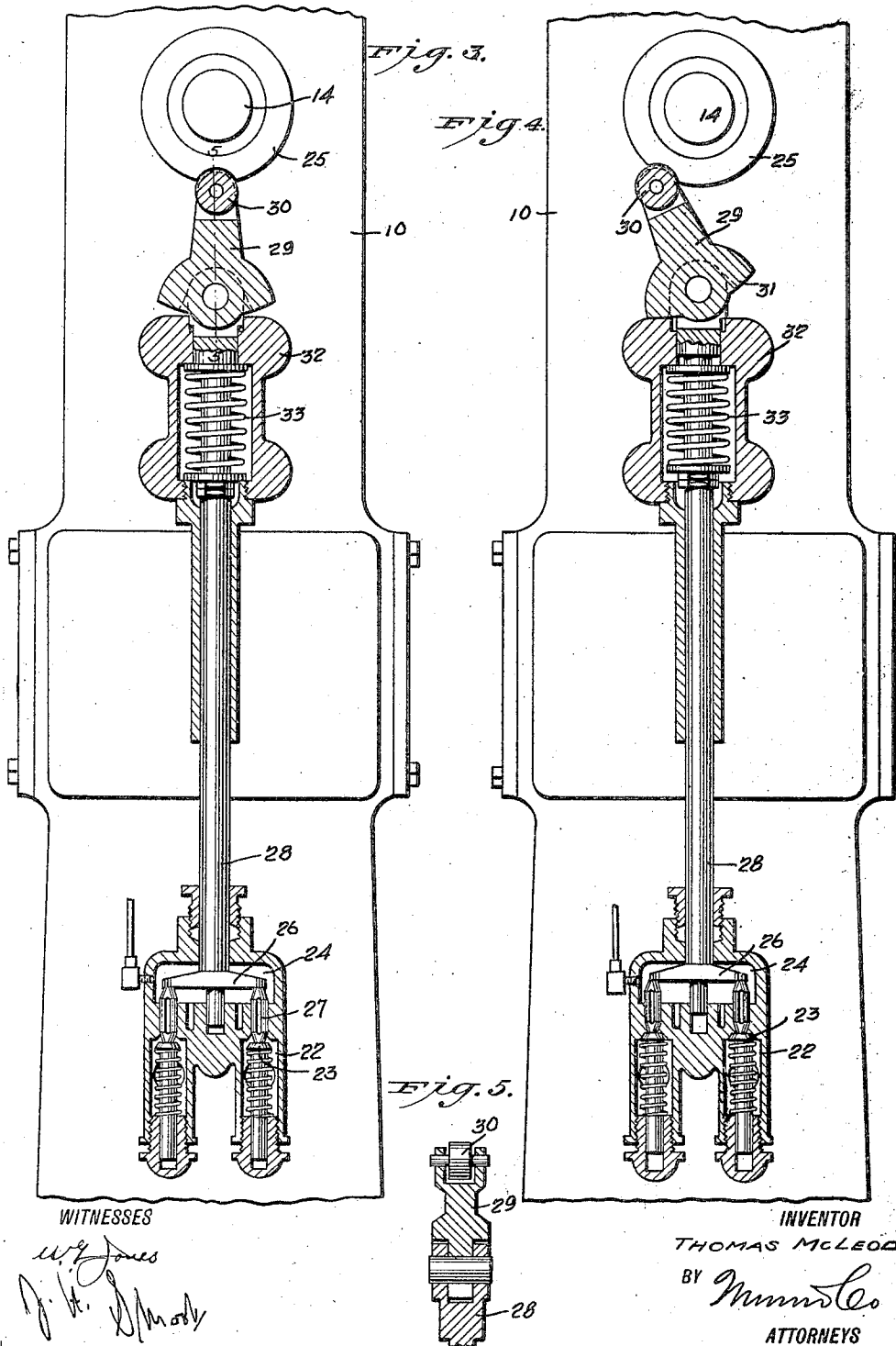
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UNITED STATES PATENT OFFICE.

THOMAS McLEOD, OF NEWCASTLE-UPON-TYNE, ENGLAND.

CONTROL APPARATUS.

Application filed August 2, 1921. Serial No. 489,369.

To all whom it may concern:

Be it known that I, THOMAS McLEOD, a subject of the King of Great Britain, and a resident of Newcastle-upon-Tyne, England, have invented a new and Improved Control Apparatus, of which the following is a full, clear, and exact description.

My invention relates to a control apparatus, and more particularly to such a control apparatus as is commonly known as a telemotor.

It is a well-appreciated fact in connection with the control of vessels that considerable difficulty has been experienced. Thus, even in the most modern types of controls, it has been found that after the apparatus has been actuated to cause a certain operation on the part of the steering gear, it is difficult to manipulate the parts in such a manner as to insure a return of the steering gear control to exactly the position desired.

This is to be attributed to the fact that it has been customary on even the most advanced types of telemotors to provide valves, which would be seated when the control was in "dead ahead" or neutral position. Thus any pressure which remains within the main control cylinders of the steering apparatus would be incapable of escaping, and, consequently, although the operator might have the parts of the control in proper position to achieve a movement in a straight line, the parts of the steering gear would not be properly disposed to produce the result desired.

The objections incident to this difficulty are obvious, and it will readily be appreciated that in certain instances serious results might arise in this connection. With this in mind my present invention aims to provide new improvements in connection with a control apparatus and more particularly a telemotor, whereby this difficulty will be overcome, the structure operating to produce an instantaneous response upon the control being actuated to either neutral or to either side of the neutral position.

A further object of my invention is the provision of improvements of the character stated, which improvements will not involve any material complications of structure so that no objections will arise in this connection.

Still further objects of this invention will appear in the annexed specification taken in

connection with the drawings, which latter present a practical embodiment of the same, and in which:

Figure 1 is a rear view of a control apparatus embodying my improved construction;

Figure 2 is a transverse sectional view of the device as illustrated in Figure 1;

Figure 3 is a fragmentary sectional rear view taken along the lines 3—3 in the direction of the arrows indicated in Figure 2;

Figure 4 is a view similar to Figure 3, but showing the parts in a slightly different position; and

Figure 5 is a transverse sectional view taken on the lines 5—5 in the directions of the arrows indicated in Figure 3.

As in the construction of my previous British Patent No. 22,738, of 1911, I employ a control which includes a body 10, the actuating member of the control being preferably in the form of a handwheel 11 secured to a shaft 12 which, through gearing 13, transmits rotation to a shaft 14 when the said handwheel is rotated.

Contrary to the structure illustrated in the British patent, however, it will be noted that the pressure cylinders 15 are preferably arranged in the base of the body 10, which arrangement I have found to be more desirable. Rams 16 extend into these cylinders and these rams are continued in the form of a rack 17, each of which meshes with a common gear 18, which latter is associated with the shaft 14.

Accordingly when the handwheel 11 is rotated, one of the rams will be retracted from its cylinder, while the other will be projected into its cylinder and the fluid displaced from the cylinder into which the ram is being projected, will be caused to flow through a conduit 19 into the control cylinder 20. Also in the second cylinder from which the ram is being retracted, causing an influx of fluid into the same, the fluid will be free to flow through the second conduit 19' from the control cylinder, with which the latter is associated, into the cylinder 15. This will obviously cause the operation of the apparatus in that the control cylinders 20 form a part of the steering gear control proper as in the customary manner.

Also as in my prior construction, each of the cylinders 15 is tapped as at 21, and at these points conduits are connected, each

of which conduits terminates in a valve chamber 22. The flow through each of the latter is controlled by means of a spring pressed valve 23, and a common chamber 24 is connected to the openings of the valve chambers 22, the flow through which openings, as aforesaid, is controlled by means of the valves 23.

Heretofore the difficulty experienced has been attributed to the fact that when the wheel 11 was in its neutral position, the valves have been seated, so that any pressure remaining within the control cylinders and the cylinders 15, has been incapable of escaping. Thus, the pistons 20' within the control cylinders would not lie in the position desired.

To overcome this difficulty the essence of my invention consists in having both of the valves 23 open when the apparatus is in its neutral or "dead ahead" position, and in preventing a flow of fluid from the valve chambers 22 when the parts are in a position other than that specified. With this in mind it will be seen that the shaft 14 is extended beyond the body 10 and carries a contact rim 25, which latter is formed with a cut-out portion. A shoe 26 extends into the chamber 24 and engages the valve stems 27 of the valves 23. Connected to this shoe is a bar 28 and an arm 29 is pivotally secured at the upper end of the bar 28, the arm carrying a roller 30 adapted to contact with the cut-out portion of the rim 25, it being further noted that the said arm is formed with shoulders 31 capable of coacting with the upper face of a guide member 32, which latter encircles the bar 28.

Thus, when the pistons 20' are to be actuated, the wheel 11 may be turned resulting in the operation of the rams 16 aforesaid, which operation will be transmitted by means of fluid pressure to the control cylinders 20. Simultaneously with this occurrence the arm 29 will be rocked to the position illustrated in Figure 4, at which point the combined tension of the springs associated with the valves 23, will be sufficient to overcome the tension of the equalizing spring 33, which is preferably associated with the bar 28. When this occurs, the bar 28 will be free to move upwardly against the tension of this latter spring, thus resulting in both of the valves 23 seating and obviously confining the fluid within one branch of the system. If it is now desired to proceed with the control in neutral position, or in other words, to cause the vessel to move "dead ahead," the wheel 11 is actuated to cause both of the rams 16 to be projected equidistant into their respective cylinders 15. When this occurs, the shaft 14 will have rotated to the position shown in Figure 3, at which position the arm 29 will lie in a line forming a continua-

tion of the bar 28, thus affecting and unseating both of the valves 23 as has been illustrated in the figure mentioned.

Assuming now that the pressure in the branches would not be quite equal, which would normally tend to result in an improper response on the part of the steering gear apparatus, it will be seen that by means of my improved construction, any excess of pressure may be relieved in that the fluid is free to flow through the opening 21 into the valve chamber 22 and so into the second branch of the system through the common chamber 24. By this it will be perfectly apparent that the parts will immediately return to their proper position upon the wheel 11 being manipulated to its neutral position, and thus it will be appreciated that the difficulties heretofore experienced will have been overcome.

From the foregoing it will be seen that all of the objects set forth in the preamble of the specification are accomplished and it will be further understood that numerous modifications of the structure might readily be resorted to without at least departing from the scope of my claims, which are:

1. A control apparatus including a shaft, cylinders, a member providing chambers, one of which is connected to each of said cylinders, a common chamber extending between the first named chambers, valves within said first named chambers for controlling the flow of fluid therefrom into said common chamber, a single movable element for operating said valves, a guide for said movable element, resilient means enclosed by said guide and engaging said element to yieldingly maintain the same in position to open said valves, and means connected to said movable element and controlled by said shaft for permitting said element to move against the tension of said resilient means to close said valves.

2. A control apparatus including a shaft, cylinders, a member providing chambers, one of which is connected to each of said cylinders, a common chamber extending between the first named chambers, valves within said first named chambers for controlling the flow of fluid therefrom into said common chamber, a single movable element for operating said valves, a guide for said movable element, resilient means enclosed by said guide and engaging said element to yieldingly maintain the same in position to open said valves, and a member pivotally connected to said movable element and rocked about its pivot by said shaft for permitting said element to move against the tension of said resilient means to close said valves.

3. A control apparatus including a shaft, cylinders, a member providing chambers, one of which is connected to each of said cylinders, a common chamber extending be-

tween the first named chambers, valves within said first named chambers for controlling the flow of fluid therefrom into said common chamber, a single movable element for operating said valves, a guide for said movable element, resilient means enclosed by said guide and engaging said element to yieldingly maintain the same in position to open said valves, and a member pivotally connected to said movable element 10 and rocked about its pivot by said shaft for permitting said element to move against the tension of said resilient means to close said valves, said member having shoulders thereon engageable with said guide when the 15 member is rocked about its pivot to limit said rocking movement.

THOMAS McLEOD.