C. WHITE.

VALVE CONTROL MEANS.

APPLICATION FILED JULY 6, 1917.

1,264,727.

Patented Apr. 30, 1918.

2 SHEETS—SHEET 1.

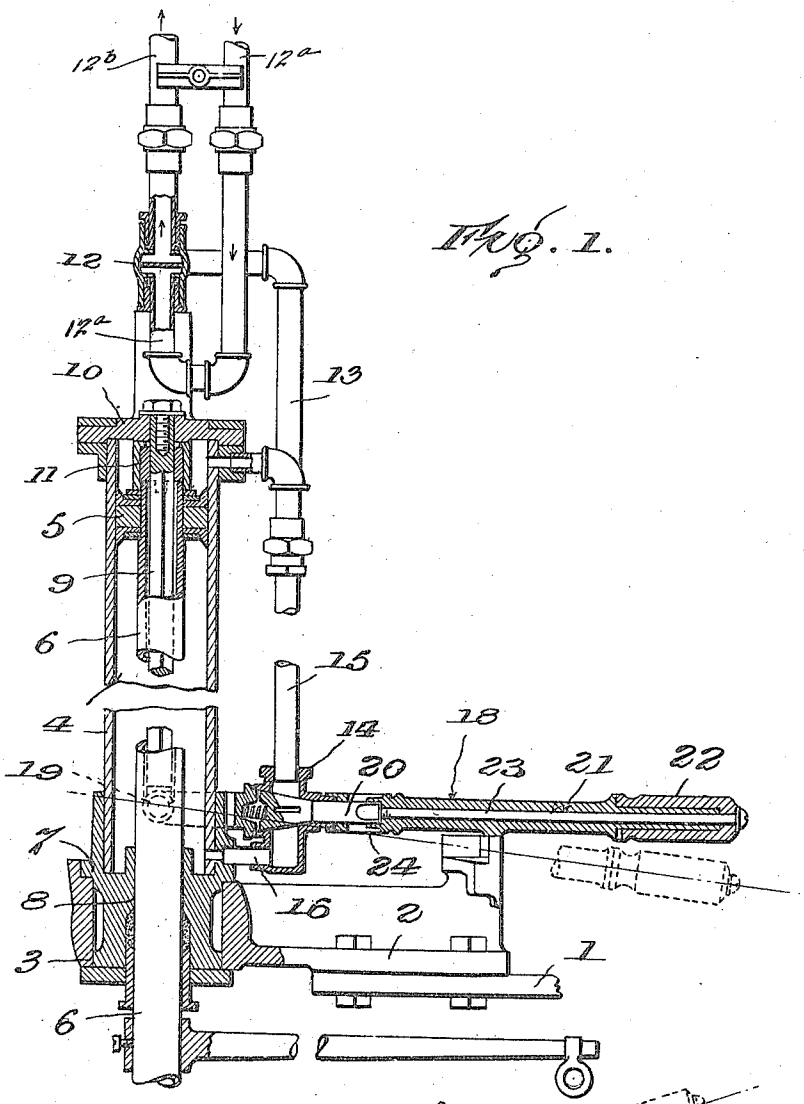


Fig. 1.

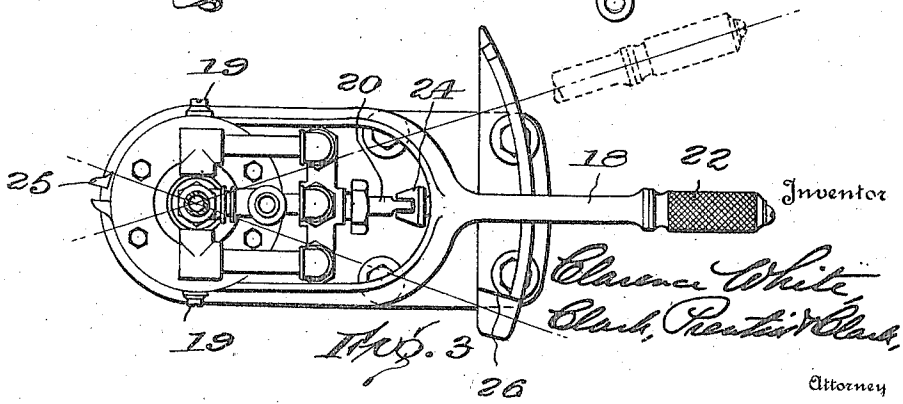


Fig. 3

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2 SHEETS—SHEET 2.

Fig. 2.

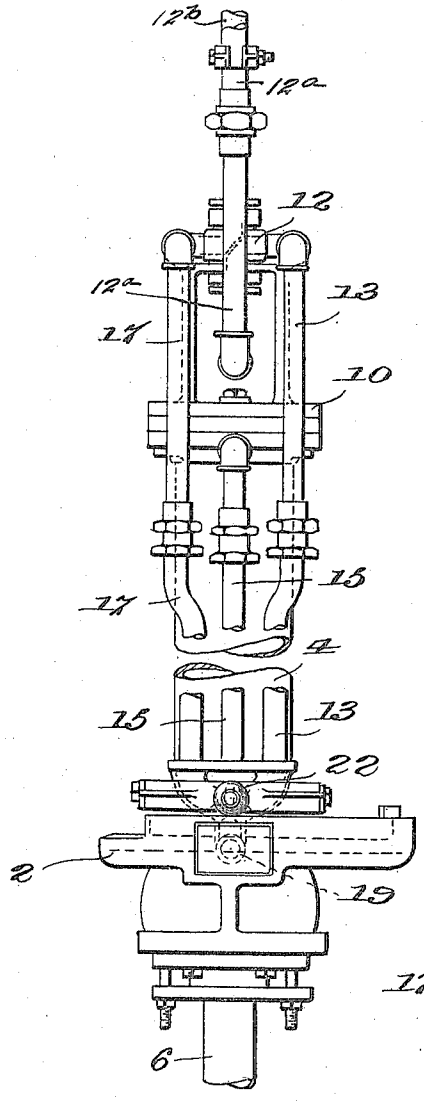


Fig. 4.

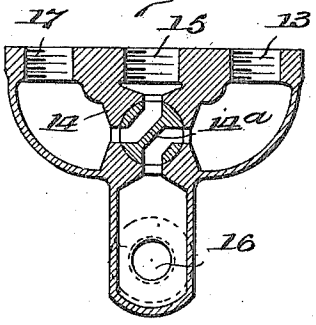


Fig. 5.

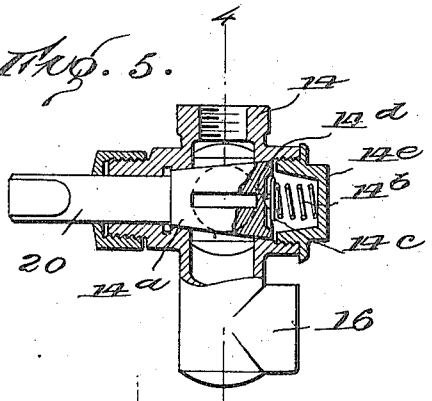
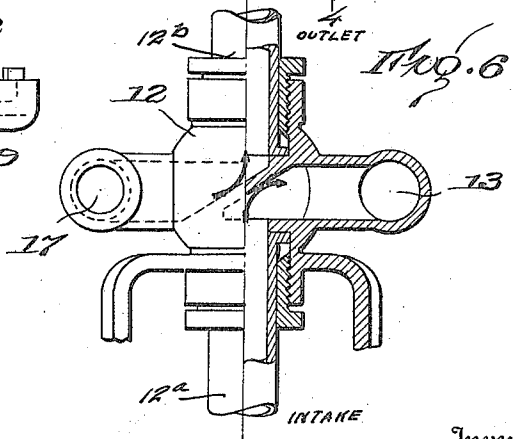


Fig. 6.



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UNITED STATES PATENT OFFICE.

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VALVE-CONTROL MEANS.

1,264,727. Specification of Letters Patent. Patented Apr. 30, 1918.

Original application filed July 6, 1917, Serial No. 179,069. Divided and this application filed July 6, 1917. Serial No. 179,070.

To all whom it may concern:

Be it known that I, CLARENCE WHITE, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Valve-Control Means, of which the following is a specification.

This invention relates to improvements in motors and motor control means and pertains to hydraulic motors for use in hoisting machinery and cranes and in particular to the valve and valve handle used in the control and adjustment of this apparatus.

One object of the invention is to provide a valve and valve handle so designed that the valve may not be actuated when the handle is locked in certain specified positions.

A further object of the invention is to provide a rotatably mounted valve member which may have a single control handle for rotating the valve member and actuating the valve elements to control the flow of fluid through the valve.

The invention is adapted for use in connection with a fluid motor, rendering it possible for the operator to have perfect control with one hand of all the necessary functions and movements of the motor and leaving the other hand free.

The invention is adapted also for use in combination with hoisting machinery consisting of a reciprocating fluid motor mounted on a support and comprising a single manual device to turn the motor on its vertical axis and control the application of fluid power to the motor to raise and lower the piston rod of the same.

The invention consists of the novel construction and arrangement of parts together with the novel method of operation and will be more fully described and set forth in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section through the motor and control device.

Fig. 2 is a front elevation of the motor.

Fig. 3 is a plan view of the motor mounted as shown in section in Fig. 1.

Fig. 4 represents an enlarged transverse section through the control valve, showing the four way plug in position.

Fig. 5 is an enlarged partial section of the control valve, showing the four way plug in position.

Fig. 6 is an enlarged partial section of the manifold shown on the upper cylinder head.

In the drawings like numerals indicate like parts.

1 is a base on which is mounted a support 2 extending laterally to carry the motor. Set to turn in the bearing 3 and extending vertically through the support 2 is a reciprocating fluid motor having the pressure cylinder 4, piston 5 and piston rod 6. The lower cylinder head 7 is of heavy construction and provides bearing surface for engagement with the bearing surface 3 of the support, as well as suitable bearing surface 8 in which the piston rod 6 moves. The piston rod 6 is prevented from turning in the cylinder by a multi-sided guide rod 9 suspended in the center line of the cylinder 4 from the upper cylinder head 10 to which it is rigidly attached. The upper portion of the piston rod 5 is hollow to accommodate the guide rod 9 and the opening in the guide plate 11 which is keyed to or formed in the upper end of the piston rod conforms with the sides of the guide rod.

The piston rod 6 may be connected to any object to be moved. With the cylinder of the motor and the piston rod operating as a unit about their vertical center line, free to swivel in the support 2, the piston rod and work may be elevated or turned on its vertical axis.

Fluid power for raising or lowering the piston may be taken from any suitable supply providing sufficient pressure. This is received into a special double manifold 12, Figs. 1, 2 and 6, rigidly attached to the top of the upper cylinder head 10, from which point it is carried through the pipe 13 to the control valve 14, Figs. 1, 4 and 5. An intake pipe 12^a may be provided with a flexible hose supply connection, not shown, as may be desired. A pipe 15 leads from this valve to the top of the cylinder and another pipe 16 is connected to the bottom of the cylinder. An exhaust or outlet pipe 17 carries the discharge fluid back through the other side of the manifold 12 and through the outlet pipe 12^b. It will be observed that the various pipes and the valve structure are rigidly secured to and practically form a unit with

the motor and are adapted to turn therewith. Hose connections, not shown, may be used to permit the movement of the pipes 12^a and 12^b.

A lever 18 connected by trunnions 19 to the sides of motor, Figs. 1 and 3, is arranged to rest on top of the support 2 and provides means through said trunnion for turning the motor about its vertical axis on the support. The lever 18 is in direct alinement with the valve stem 20 of the valve 14 and is provided with a central longitudinal bore 21, Fig. 1. The grip 22 on the outer end of said lever operates the control valve 14 by means of a valve stem extension 23, inside of said bore 21, to which it is keyed and which is provided on its other end with a slotted socket 24 to fit the stem proper 20.

A four way cock is used as a control valve. Its construction and use will be apparent from the details illustrated in Figs. 1, 4 and 5. In these views Fig. 1 shows the relation between the valve and the general motor structure illustrating in dotted lines the position of the control lever in its locked position; Fig. 4 is a section through the valve and valve plug along the line 4—4 of Fig. 5, showing the four way feature; and Fig. 5 is an enlarged partial section through the control valve. The control valve 14 has as its body a four way connection provided with a central chamber designed to contain the plug 14^a provided with a valve stem 20. In Fig. 4 the plug 14^a is shown in position as are also the valve body connections for the intake pipe 13 on the right, the exhaust pipe 17 on the left, the pipe 15 on the top of the cylinder and a conduit 16 to the base of the cylinder. In Fig. 5 the valve 14 is shown with a valve stem 20 and plug 14^a in position. As shown in the drawings the plug is formed with a taper to allow for wear and insure a perfect fit in the valve chamber. A suitable spring 14^b is provided to insure a constant pressure against the plug body and a spring center 14^c operates to apply this pressure at the center of the plug end through its point 14^d and corresponding depression in the plug end. A plug nut cap 14^e serves to inclose the parts of the valve and hold this spring under slight compression. This spring is sufficiently light to permit the turning of the plug by means of the grip 22 on the outer end of the lever 18. As shown in Fig. 4 fluid pressure coming in through pipe 13 is directed by the valve to pipe 16 and the base of the cylinder, thereby operating to raise the piston. At the same time the other side of the plug is open to allow the fluid being forced from the top of the cylinder to exhaust from pipe 15 out through discharge pipe 17. In this position the valve stem 20 and slotted socket 24 are in their vertical positions. A quarter turn counter clockwise will reverse the direction of the power to the top of the cylinder and connect the bottom of the cylinder with the outlet pipe. In this latter position the slotted socket 24 is in a horizontal plane.

By turning the motor on its support 2 by the operating lever 18, Fig. 3, and a 90° turn of the control grip 22 the whole operation of turning the piston rod and arm 6^a, turning the power to the top of the piston for the downward movement of the latter, controlling the speed of the descent, reversing the power to the bottom of the piston for the upward movement of the piston and turning the piston and work again may be performed with one hand, leaving the other free.

The locking of the apparatus against accidental turning or reversing of power is a novel feature and is accomplished by the cooperation of the control lever 18 and a detent formed in the support 2. When the lever is swung to one side until stopped by the lug 25, Fig. 3, the lever is in position to drop behind the detent 26 in the support 2, Figs. 1 and 3. But before the lever can be dropped the power must be turned to the bottom of the piston which movement brings the slotted socket 24 in the valve stem connection to a vertical position. In this position only can the lever 18 be lowered behind the detent 26. When the lever 18 is in its lowest position, Fig. 1, the valve stem extension 23 with a slotted socket 24 drops below the center of the valve stem proper 20, rendering the connection inoperative, due to the difference in turning centers, thus locking the power to the bottom of the piston and thereby preventing the accidental operation of the motor.

From the foregoing it will be observed that the invention provides a construction permitting the turning movement or elevation of the piston and its work and the control thereof by a single element. Further it will be noted that upon the completion of the downward stroke of the piston and the power locked to the bottom of the piston, the operator may safely leave the apparatus without waiting for the piston to reach the upper position. In addition to these advantages over former constructions the invention provides a machine performing numerous operations all of which are under the direction of a single valve control device designed to be operated by one hand leaving the other free to attend to the manipulation of other machinery.

The invention is adapted for use in elevating machinery, crane construction, and as elevating means for use on docks, whether attached to a traveling platform, a railway car or mounted as a stationary power unit. As shown in Fig. 1 the piston rod 6 may have attached thereto a laterally extending arm 6^a to the end of which may be attached any suitable work. By this arrangement

the apparatus may be of important use operating as a crane for lifting objects and swinging them to different positions.

The present construction shows valve control means as used in connection with motor means. The present application is limited to the mounting of the valve and the design of the valve and valve handle, whereas the motor combination is claimed in the copending application Serial No. 179,069.

Changes in the design, the respective location of the parts, and means and material for conveying the source of power may be made without departing from the scope of the invention.

What I claim is:—

1. In combination, a valve, a control device for said valve comprising a two-part stem adapted to rotate on its axis when in the operative position, and a slotted socket on one of said parts constituting a receiving member, the other of said parts having a projecting end for engagement with said slotted socket, the said control device being in the operative position when the said two-parts are in alinement and said projecting end is in said socket and in the inoperative position when the parts are not in alinement.

2. In combination, a rotatably mounted valve member, and a control device for said valve member comprising a hollow lever for moving said valve, a two-part stem operating within said lever to adjust said valve, and a slotted connection between the said two-parts, said control device being in the operative position when said two-parts and the slotted connection are in alinement, and forming a single control element for the adjustment of said valve member and the rotary movement of said valve.

3. In combination, a rotatably mounted valve member, and a control device for said valve member comprising a hollow lever for moving said valve, a two-part stem operating within said lever to adjust said valve member, a slotted connection between the two-parts of said stem, and a limit stop and detent for rendering said control lever inoperative when the respective turning centers and the slotted connection of the two-parts of said stem are out of alinement.

4. A control device for valves comprising a two-part valve stem, and a slotted socket between the two parts, said control device being arranged to be in the operative position when the two-parts are in alinement and in the inoperative position when not in alinement.

5. A control device for valves comprising a two-part valve stem, and an adjustable connection between the two-parts, said control device being arranged to be in the operative position when the parts are in alinement and in the inoperative position when not in alinement.

6. A control device for valves comprising a two-part valve handle, and a slotted socket between the two-parts, said control device being arranged to be in the operative position when the two-parts are in alinement and in the inoperative position when not in alinement.

7. In combination with a valve, a control device therefor comprising a two-part valve handle, and an adjustable connection between the two parts, said control device being arranged to be in the operative position when the parts are in alinement and in the inoperative position when not in alinement.

In testimony whereof I affix my signature.

CLARENCE WHITE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."