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C. W. A. KOELKEBECK.
VALVE.

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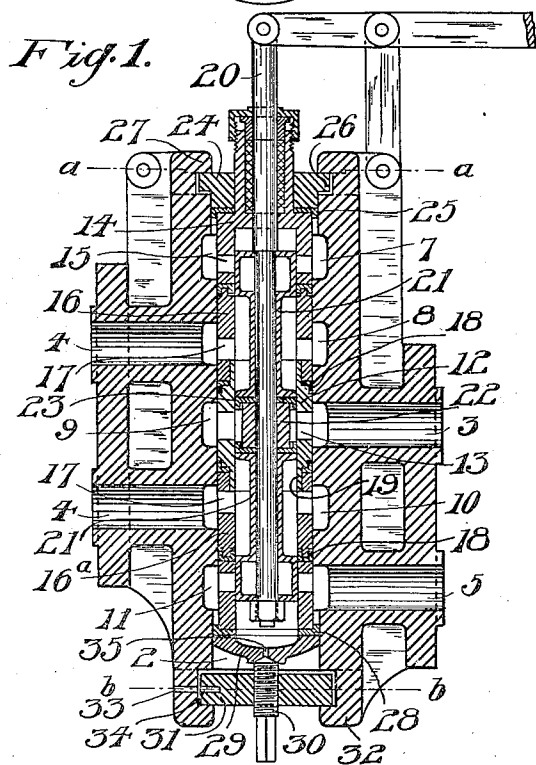
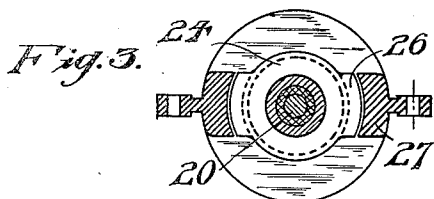
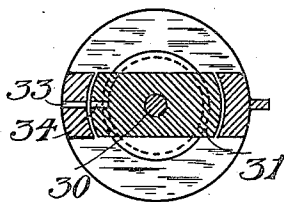
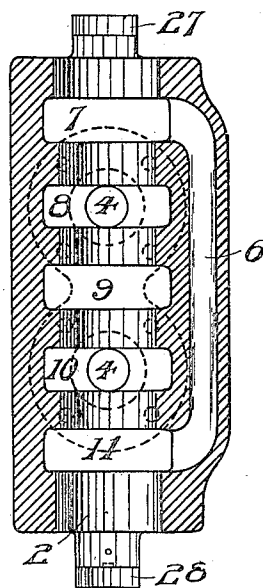


Fig. 2.



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VALVE.

No. 863,405.

Specification of Letters Patent.

Patented Aug. 13, 1907.

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To all whom it may concern:

Be it known that I, CARL W. A. KOELKEBECK, a citizen of the United States, residing at East Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Valves, of which the following is a specification.

The object of my invention is to provide a new and improved valve, more particularly an improved hydraulic valve; and to this end my invention consists, of a new and improved hydraulic valve, in certain features of construction and in the combination and arrangement of parts, all as fully hereinafter described and claimed.

In the accompanying drawing which illustrates an application of my invention Figure 1, is a central vertical sectional view of a valve constructed in accordance with my invention; Fig. 2 a sectional view of valve-casing taken at right angles to the view of Fig. 1; Fig. 3, a part plan and a part sectional view taken on line *a-a* of Fig. 1; and Fig. 4 a view similar to Fig. 3, taken on line *b-b*, of Fig. 1.

Referring to the drawing the valve-casing or housing is formed with a central-opening 2, running throughout the length of the same and with a fluid-supply-passage 3, two machine-passages 44, waste or exhaust-passage 5 and a by-pass 6. A series of annular-chambers 7, 8, 9, 10 and 11 surround the central-opening and communicate with the fluid-passages above referred to.

Located in the central-opening 2, is a series of loose removable bushes comprising, in the valve illustrated, a central bush 12 having a port 13, upper-bush 14 having a port 15, intermediate bushes 16 and 16* each having a port 17 and a lower-bush also formed with a port. Cup-leathers 18 18 are placed between the ends of the bushes and the cup-leathers adjacent to the central-bush are set back out of contact with the plunger, for this purpose the central bush is provided with annular projections 19 extending over the intermediate bushes.

The valve-plunger as illustrated and as preferred comprises, valve-stem 20, spools 21 21 and spacing-ring 22. Pressure controlling cup-leathers 23 are mounted on valve-stem 20 and are held in place thereon between the ring and the inner ends of the spools.

The upper end of the central opening is closed by a bonnet 24 and interposed between the bonnet and the upper-bush is a sealing cup-leather 25. Bonnet 24 is provided with projecting-arms 26, adapted, when the bonnet is placed in position in the casing, to register with lugs 27 formed on the casing. The function of said arms and lugs is to prevent a vertical movement of the bonnet after the parts entering into the construction of the valve have been assembled. At the lower end of the lower bush I employ another sealing cup-leather 28. This cup-leather is held in position by the said lower bush and a saucer-shaped plate 29. Plate 29 is

supported on an adjusting-screw 30 which latter extends through a plate or bar 31. Said plate or bar 31 is held in position by lugs 32 formed on the lower end of the casing. For the purpose of preventing the plate 31 from turning or becoming disengaged from the lugs 32 during the operation of adjusting the bushes and cup-leathers by turning the adjusting-screw 30, small holes 33 and 34 are formed in the casing and plate into which a pin, not shown, may be inserted.

35, designates a drip-hole formed in plate 29, the purpose of which is to drain the valve of any fluid that may leak into the saucer-shaped plate. This is accomplished, while the valve is out of operation, by giving the adjusting-screw a single turn. Of course when the valve is in operation the screw fits tightly in its seat on plate 29 and the small opening 35 is closed.

In mounting the valve, or assembling the parts, the cross-bar or plate 31 is first preferably placed in position on its supporting-lugs 32, after which plate 29, the stationary cup-leathers and bushes, with the exception of the top-bush, are next inserted through the upper end of the central opening. These parts being in position the plunger is now placed within the central-opening and the top-bush placed in position. The bonnet is now slid down through the upper end of central-opening and turned so as to bring its arms directly under the engaging lugs formed on the upper part of the housing.

After the parts are assembled in the housing as above set forth, the bushes and cup-leathers are adjusted vertically to the desired positions by means of the adjusting-screw 30. By means of the adjusting-screw I am enabled to provide for the varying thicknesses of the cup-leathers employed in valves of this class and also in cases where the bushes are not of the exact required lengths.

Another characteristic feature of the present invention is the means employed for locking the parts in the valve-housing and maintaining said parts against vertical movement.

In valves of this type heads have heretofore been employed at the upper and lower ends of the central opening, which heads have been attached to the valve-housing by means of screw-bolts passed through the heads and engaged to the housing. Usually four bolts are employed for each head and the labor and expense necessitated by this construction in, for example, repacking the valve has been considerable. By the employment of the bonnet, lower plate and cooperating lugs formed on the housing as illustrated and above described the parts may be readily removed from the housing by turning the bonnet to free its arms 26 from the lugs 27.

The operation of my valve is similar to well known valves of this class, that is to say, when the plunger is in the position as shown by Fig. 1, the fluid-supply is cut

off from the machine-passages. Raising or lowering the plunger a sufficient distance permits the fluid to pass from the fluid-supply-passage to one or the other of the machine-passages and while fluid is passing to the machine through one machine-passage, exhaust-fluid passes through the other machine-passage to the main exhaust-passage and vice versa.

What I claim is,

1. In a valve of the class described, a valve-housing formed with a central-opening, fluid-supply, machine and exhaust-passages, a series of loose bushes, a plunger working in the central-opening, a screw for supporting and for vertically adjusting the bushes, and a cross piece engaging and supporting the screw.
2. In a valve of the class described, a valve-housing formed with a central-opening, fluid-supply, machine and exhaust-passages, a series of loose bushes, a plunger working in the central-opening, and means for locking the bushes in the housing comprising a plate located in the central-opening near the top thereof, a plate located in the opening near the bottom thereof, and lugs formed on the housing, said plates adapted to be turned to engage the lugs.
3. In a valve of the class described, a valve-housing formed with a central-opening, fluid-supply, machine and exhaust-passages, a series of loose bushes, a plate located near the lower end of the opening on which the series of bushes rests, and an adjusting-screw supporting the plate.
4. In a valve of the class described, a valve-housing formed with a central-opening, fluid-supply, machine and exhaust-passages, a series of loose bushes, a plate located near the lower end of the opening formed with an aperture, and an adjusting-screw supporting the plate.
5. In a valve of the class described, a valve-housing formed with a central-opening, fluid-supply, machine and exhaust-passages, a series of loose bushes, a plate located near the lower end of the opening formed with an aperture, and a centrally disposed screw supporting the plate and arranged to normally close the aperture of said plate.

6. In a valve of the class described, a valve-housing formed with a central-opening, a fluid-supply, machine and exhaust-passages, a series of loose bushes, a plate located near the lower end of the opening, a cup-leather interposed between the plate and the lower bush, and an adjusting-screw for supporting said plate.

7. In a valve of the class described, a valve-housing formed with a central-opening, a fluid-supply, machine and exhaust-passages, a series of loose bushes, a bonnet above the upper-bush provided with arms adapted to engage lugs on the housing, a plate below the lower-bush, a second plate or bar adapted to engage with lugs on the lower end of the housing, and an adjusting-screw extending through the lower plate or bar and supporting the first plate.

8. In a valve of the class described, a valve-housing formed with a central-opening, a fluid-supply, machine and exhaust-passages, a series of loose bushes, a plunger working in the central-opening, a bonnet adjacent to the upper-bush, a cup-leather interposed between the bonnet and upper-bush out of contact with the plunger, a plate adjacent to the lower-bush, a cup-leather interposed between the lower-bush and plate, said cup-leather out of contact with the plunger, an adjusting-screw supporting the lower-plate and bushes, and means for supporting the screw.

9. In a valve of the class described, a valve-housing having a main bore, a plunger located in said bore, fluid supply, machine, and exhaust passages, a series of bushes in the bore, and means for locking the bushes in the housing comprising engaging lugs formed on the housing adjacent to the top and bottom of the main bore and cross pieces located in the main bore and engaging the lugs.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

CARL W. A. KOELKEBECK.

Witnesses:

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WALTER J. HAMILTON.