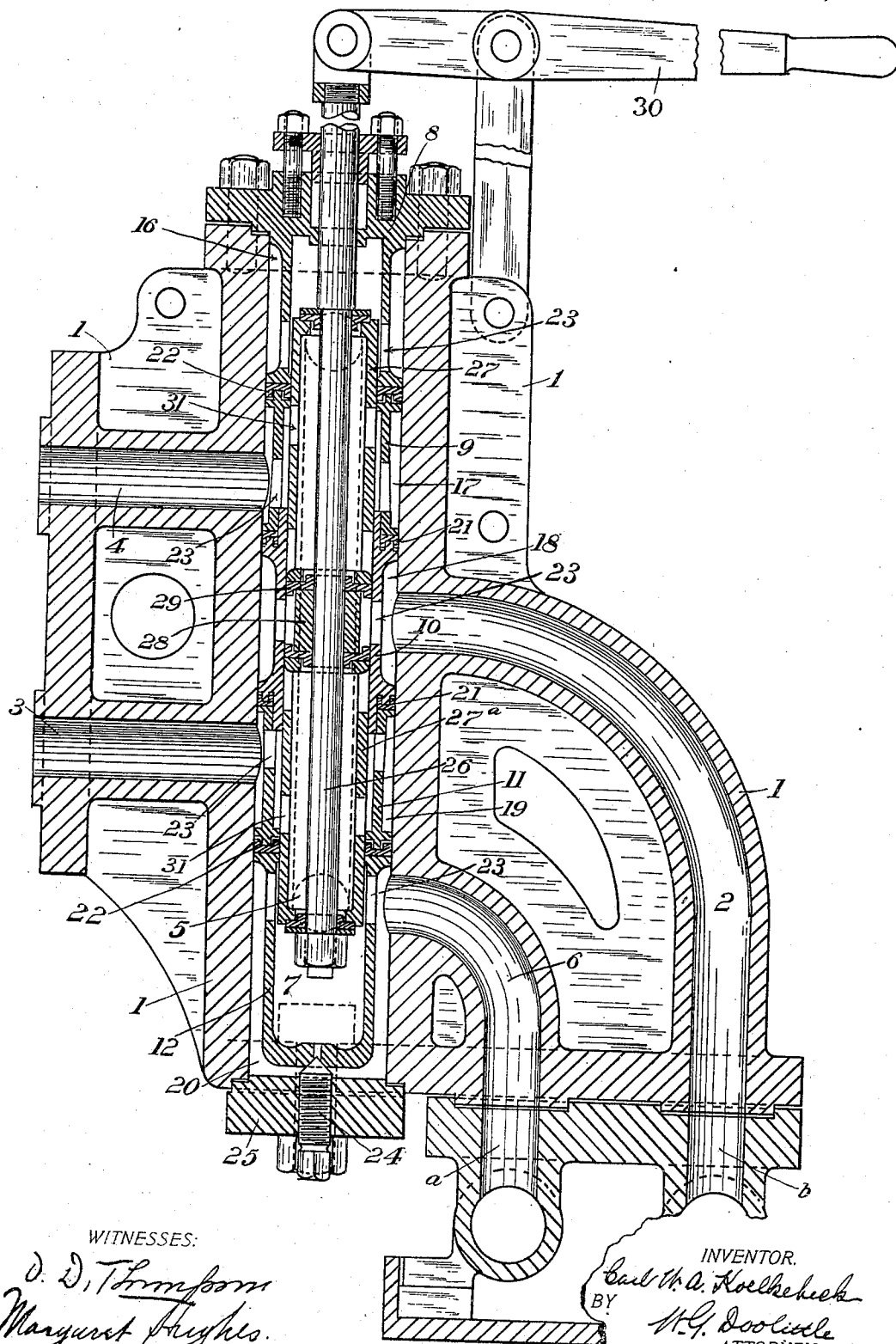


C. W. A. KOELKEBECK.
VALVE.

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WITNESSES:

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CARL W. A. KOELKEBECK, OF CLEVELAND, OHIO.

VALVE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL W. A. KOELKEBECK, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain 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 and more particularly a valve designed for use in connection with hydraulic machinery.

To this end the present invention consists of a new and improved valve and in the construction and combination of parts, all as fully hereinafter described and claimed.

In the accompanying drawing, which illustrates an application of my invention, the figure is a central vertical sectional view of a valve constructed in accordance with my invention.

Referring to the drawing, 1 represents the valve-housing or casing, provided with a fluid-supply passage or nozzle 2, machine passages 3, and 4, a by-pass 5, a waste or outlet passage 6, and an opening 7, which latter is provided with a smooth bore and extends vertically through the housing.

I desire to call particular attention to the location and arrangement of the supply, waste and machine passages. The supply and waste passages are both located on the same side of the housing, and the machine passages on the opposite side; such an arrangement allows the valve to be connected up with the supporting nozzles *a* and *b*, in such a manner as to permit the lower portion of the housing to overhang the supports, thereby permitting ready access to the bottom of the housing and particularly to the opening 7. Attention is also called to the smooth bore of the opening, 7; by the employment of such a bore I am enabled to entirely dispense with all core-work and at the same time provide an opening into which the cup-leathers may be placed and readily slid into the desired positions.

Located within the opening 7 I employ a series of removable and adjustable bushings, comprising sections 8, 9, 10, 11 and 12; these bushes are cut away as shown to form annular-chambers 16, 17, 18, 19 and 20, and form a characteristic and important feature of my invention. Held in position by the sectional bushing are controlling-cup-leathers 21, and sealing-cup-leathers 22. The sections 8, 9, 10, 11 and 12 of the bushing are

each provided with an annular-port 23, registering with the annular chambers; and said chambers in turn are in communication with the supply, machine and exhaust passages. The upper section 8 of the bushing has a flanged portion which rests on the valve-housing and the lower section 12 rests upon an adjustable screw 24, passed through a cap 25, closing the lower end of the opening 7. The middle section 10 of the bushing, it will be noted, overlaps the adjacent sections 9 and 11 and the cup-leathers 21. A plunger, comprising stem 26, spools 27 and 27*, spool 28, and Z-shaped cup-leathers 29, is located within the sectional bushing, and is operated therein by lever-arm 30. Each of the spools 27 and 27* is provided with ports 31, adapted to be moved into and out of registry with the ports of the bushing. The Z-shaped cup-leathers held in contact with the valve stem as shown prevent any leakage of high-pressure fluid into low-pressure fluid along the valve stem.

What I claim is:

1. A valve having a valve-housing provided with supply, machine and exhaust passages and a central opening having a smooth bore extending vertically through the housing, a plunger, a series of loose removable bushings formed to provide annular-chambers between the wall of the opening and the bushings, sealing cup-leathers between the bushings, the lower bush of the series provided with a cross-piece, a cap closing the lower end of the opening, and a supporting and adjusting screw extending through the cap and in contact with the cross-piece of the lower bush, substantially as set forth.

2. A valve having a valve-housing provided with supply, machine and exhaust passages and a central opening extending through the housing, a plunger, a series of removable bushings formed to provide annular-chambers between the wall of the opening and the bushings, the upper bush of the series being flanged and projecting from the central opening, the lower bush of the series provided with a cross-piece, a cap closing the lower end of the opening, and a supporting and adjusting screw extending through the cap and in contact with the cross-piece of the lower bush, substantially as set forth.

3. A valve having a valve-housing provided with supply, machine and exhaust

passages, and a central opening extending through the housing, a plunger, a series of removable bushings formed to provide annular-chambers between the wall of the opening and the bushes comprising a central bush formed with portions overlapping the adjacent bushes, an upper flanged bush projecting from the central opening, a lower bush provided with a cross-piece, cup-leathers held between the meeting ends of the bushes, a cap closing the lower end of the opening, and a screw projecting through the cap and in contact with the cross-piece of the lower bush, substantially as set forth.

4. A valve having a valve-housing provided with supply, machine and exhaust passages, and a central opening extending through the housing, a series of removable ported bushings formed to provide annular chambers between the wall of the opening and the bushings, a plunger comprising a stem, a central-spool, upper and lower ported spools and Z-shaped cup-leathers held in contact with the stem between the ends of the central-spool and the adjacent ends of the upper and lower spools, and means for vertically adjusting and supporting the bushings comprising a cap closing the lower end of the opening and a screw extending through the cap and in contact with the lower bushing, substantially as set forth.

5. The combination with supporting nozzles, of a valve of the class described, comprising a valve-housing having supply, machine and waste passages and an opening extending vertically through the housing, a series of loose bushings in the opening, a plunger comprising a stem, a central-spool, upper and lower ported spools and Z-shaped cup-leathers held in contact with the stem between the ends of the central spool and adjacent ends of the upper and lower spools, said supply and waste passages located on one side of the housing projecting downwardly and respectively communicating with and resting upon the supporting nozzles, and means for vertically adjusting and supporting the bushings comprising a cap closing the lower end of the opening and a screw extending through the cap and arranged in contact with the lower bushing.

6. A valve having a valve housing provided with supply, machine and exhaust passages, and a central opening having a

smooth bore extending vertically through the housing, a plunger comprising a stem, a central-spool, upper and lower ported spools and Z-shaped cup-leathers held in contact with the stem between the ends of the central spool and adjacent ends of the upper and lower spools, a series of bushings formed to provide annular-chambers between the wall of the opening and the bushings, sealing cup-leathers between the bushings, the upper bush flanged and projecting out of the central opening, means for vertically adjusting the bushings comprising a cap and a screw, and the lower bush supported on the adjusting screw, substantially as set forth.

7. A valve having a valve-housing provided with supply, machine and exhaust passages, and a central opening extending through the housing, a series of loose removable ported bushings, a plunger comprising a stem, a central-spool, upper and lower ported spools arranged out of contact with the stem and Z-shaped cup-leathers held between the central-spool and the adjacent ends of the upper and lower spools, said cup-leathers each having a portion in contact with the stem and extending vertically thereof to prevent the leakage of high pressure fluid along the valve-stem, substantially as set forth.

8. The combination with supporting nozzles *a* and *b*, of a valve comprising a valve-housing having supply, machine and waste passages and an opening extending vertically through the housing, a series of loose bushings in the opening, a plunger comprising a stem, a central-spool, upper and lower ported spools and Z-shaped cup-leathers held in contact with the stem between the ends of the central spool and adjacent ends of the upper and lower spools, said machine passages located on one side of the housing and the supply and waste passages on the opposite side of the housing, said supply-passage in communication with the supporting nozzle *b*, and the waste-passage in communication with the supporting nozzle *a*.

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

CARL W. A. KOELKEBECK.

Witnesses:

M. S. WOOD,
C. A. FARRAR.