June 17, 1930. J. D. COCHIN 1,764,005

CONTROL VALVE FOR LIFTING DEVICES

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Fig. 1.

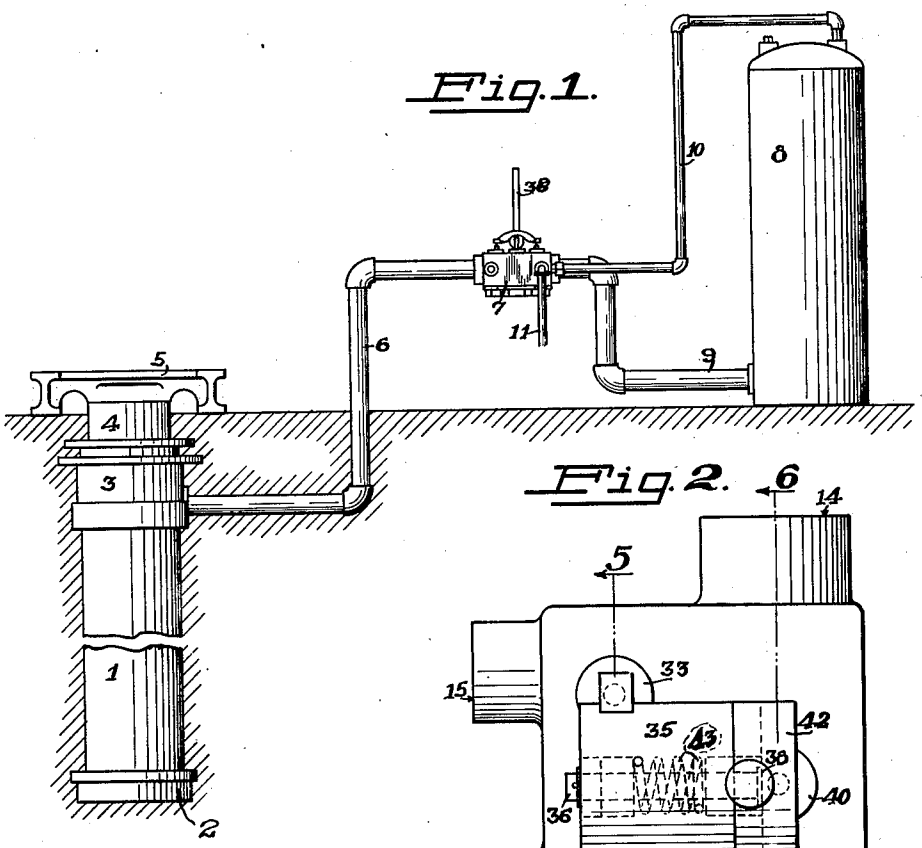
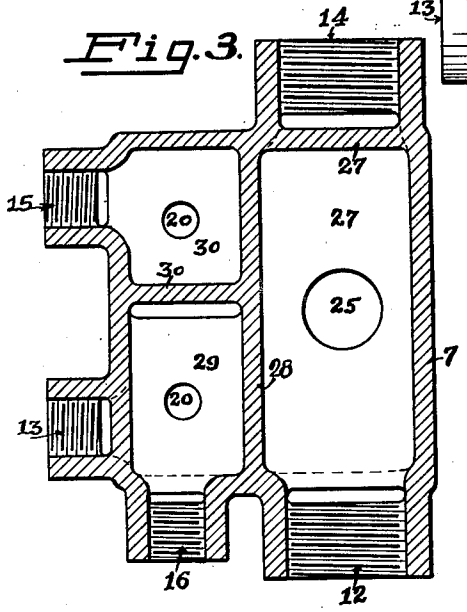


Fig. 2.

Fig. 3.



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Fig. 5.

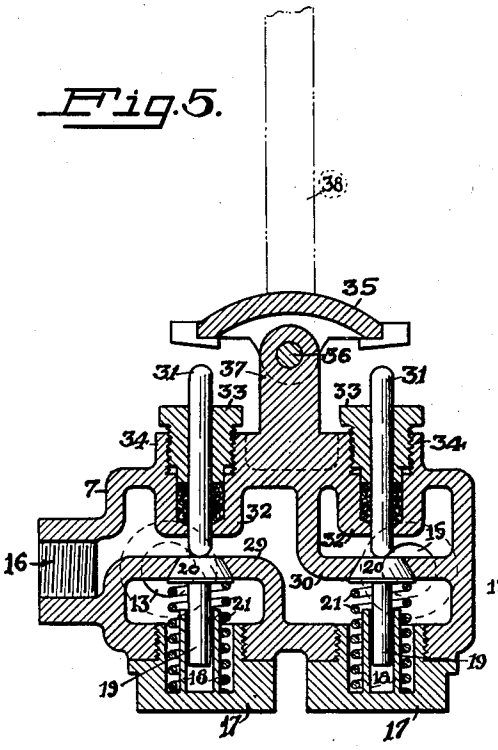


Fig. 4.

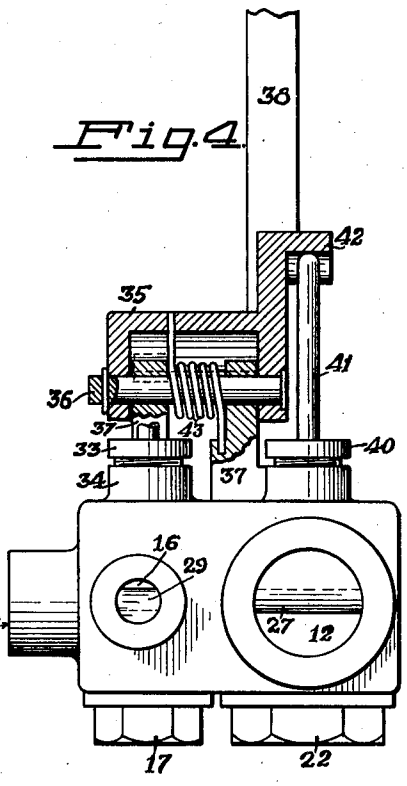
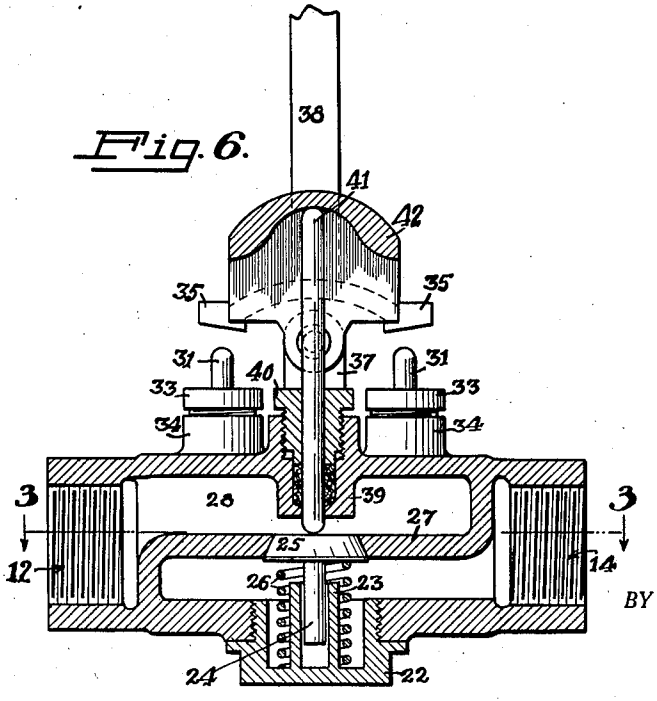


Fig. 6.



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UNITED STATES PATENT OFFICE

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CONTROL VALVE FOR LIFTING DEVICES

Application filed June 25, 1928. Serial No. 288,050.

This invention relates to improvements in control valves used with lifting devices.

An object of my invention is to provide improvements in valves used with lifting devices to control the movement thereof.

Another object of my invention is to provide improvements in control valves used with lifting devices, wherein is embodied a construction adapted to regulate the movement therethrough of liquid and compressed air.

Another object of my invention is to provide a valve for use with lifting devices having embodied therein novel means for controlling the movement of liquid to a lifting device, whereby the latter may be raised and lowered.

In the accompanying drawings,

Fig. 1 is a side elevation of apparatus used for elevating vehicles having my improved control valve applied thereto;

Fig. 2 is a top plan view of a control valve embodying my invention;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 6;

Fig. 4 is a side view of the control valve, showing a part of the manipulating mechanism broken away;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2; and

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 2.

Referring to the drawings, the numeral 1 represents a cylindrical shaped casing having its lower end closed by a bottom plate 2, its upper end provided with a re-enforcing ring 3, and its inside circumferential surface provided with a plurality of vertically extending grooves. Movably located inside the casing 1 and the ring 3, with its circumferential surface movably contacting with the inside surface of the casing, is a ram 4 which has a rack 5 secured to its upper end. Extending through the ring 3 to the inside of the casing 1, is a pipe 6 which is adapted to carry oil to the inside of the casing for the purpose of elevating the ram. The oil, delivered under pressure to the inside of the casing by a pipe 6, is forced downwardly inside the grooves located in the wall of the casing, and it thereafter exerts sufficient pressure on the bottom of the ram 4 to force it and the load located on the rack 5 in an upward direction.

The pipe 6 is suitably connected at its opposite end to the casing 7 of a control valve which is adapted to deliver oil with sufficient pressure to elevate the ram 4. Connecting the control valve 7 and an oil containing tank 8 is a pipe 9 which is adapted to carry oil from the said tank to the said control valve.

Connecting the tank 8 with the casing 7 of the control valve is a pipe 10 which is adapted to carry compressed air from the control valve to the tank. Leading from a source for supplying quantities of compressed air, and suitably connected to the casing 7 of the control valve, is a pipe 11 which is adapted to deliver sufficient quantities of compressed air for the satisfactory operation of the apparatus.

The control valve is enclosed by the casing 7 having openings 12, 13, 14, 15 and 16 therein through which quantities of compressed air and oil may enter the casing and pass therefrom. The pipe 6 is connected to the casing at the opening 14 through suitable threads located on the inside surface of the walls of the opening, while the other oil pipe 9 is similarly connected to the casing at the opening 12. The pipe 11 which furnishes quantities of compressed air for the operation of the apparatus is connected by suitable threads to the casing 7 at the opening 13, while the other compressed air carrying pipe 10 is similarly connected at the opening 16. The opening 15 in the casing 7 is a means for allowing quantities of compressed air not required for lifting purposes to escape from the control valve.

Removably screwed into the bottom of the casing 7 are two caps 17 having cylindrical shaped supports 18 extending vertically therein. Movably located in the supports 18 are valve stems 19 which carry valve heads 20, and extending around the said supports 18 with their ends contacting with the bottom of the caps 17 and the underneath side of the valve heads 20, are spiral springs 21 which tend to force the valve heads upwardly and

keep them seated on their valve seats, as will be later described.

Removably screwed into the bottom of the casing 7 is a cap 22 having a cylindrical shaped support 23 extending vertically therein. Movably located in the support 23 is a valve stem 24 which carries a valve head 25, and extending around the said support with its ends contacting with the bottom of the cap 22 and the underneath side of the valve head 25 is a spiral spring 26 which tends to force the valve head upwardly and keep it seated on its valve seat, as will be later described.

Secured to the top and bottom of the casing 7 at points adjacent the openings 12 and 14, is a partition 27 which extends horizontally through the inside of said casing at one side thereof. A hole of sufficient size and shape to provide a seat for the valve head 25 is located centrally in the partition 27.

Extending vertically from the top to the bottom of the casing 7 and disposed in a plane parallel to the line passing through the center of the openings 12 and 14, is a partition 28, which has an edge of the partition 27 secured thereto. A chamber connecting with opening 14 is thereby provided which is surrounded by the lower surface of the partition member 27, the bottom of the casing 7, one of the sides of the casing, and the partition 28. Another chamber, connecting with the opening 12, is provided above the partition 27.

Extending from the bottom of the casing 7 in an upward and horizontal direction with its edges secured to the partition 28 and a side of the casing, is a U-shaped partition member 29 which encloses a chamber located around one of the valve stems 19, and which is provided with a hole that forms a seat for one of the valve heads 20.

Extending from the top of the casing 7 in a downward and horizontal direction with its edges secured to the partition 28 and two sides of the casing, is a partition member 30 which encloses a chamber located above the other of the valve heads 20 and which is provided with a hole that forms a seat for the said valve head. The partition members 29 and 30, a side of the casing 7, the top and bottom of the casing and the partition 28 enclose a chamber through which a quantity of compressed air may pass from opening 16 to opening 15.

Extending vertically above the valve heads 20 are movable pins 31, which rest on the said valve and are adapted to force them downwardly, as will be later described. The pins are held in position by lugs 32 extending downwardly from the top of the casing 7 and by nuts 33 which are screwed into projections 34 extending above the said casing. The said pins movably extend through the said lugs and nuts, and are adapted to be forced downwardly by the ends of a lever member 35 which is pivoted above the casing on a pin 36 that extends through the said member and two projections 37 located on the top of the said casing. The lever 35 is provided with an operating handle 38 and is so positioned on the casing that when it is moved in one direction it presses against one of the pins 31 located above one of the valve heads 20, thereby causing the said valve head to become unseated, and when it is moved in the opposite direction the other valve head 20 is unseated, and the former is allowed to again become seated.

Movably positioned inside a lug 39 and a nut 40, with its lower end contacting with the valve head 25, is a pin 41 which is adapted to unseat the said valve head upon the moving of the lever 35 in either direction. The pin 41 is moved downwardly to unseat the valve head 25 by an arcuate member 42 which is rigidly or integrally secured to the lever member 35.

A spring 43 encircling the pin 36 with its ends secured to the lever member 35 and a projection 37, tends to return the said lever member and the arcuate member 42 to a neutral or inoperative position.

In operation, the handle 38 upon being moved toward the opening 12 causes the lever member 35 and the arcuate member 42 to move in such a manner as to force the pin nearest the opening 16 and the pin 41 downwardly, thereby causing the valve head 20 in partition 29 and the valve head 25 in partition 27 to become unseated. A quantity of compressed air supplied by the pipe 11 enters the casing 7 through the opening 13 and passes upwardly through the hole located in the partition 29, around a valve head 20, and out through the opening 16 into pipe 10, which delivers the same to the tank 8. The compressed air so entering the tank forces a quantity of oil located therein through the pipe 9, from which it is delivered to the inside of the casing 7 through the opening 12. The oil entering the casing passes downwardly around the valve head 25 which has been forced downwardly by the pin 41, and through the opening in the partition 27. The said oil thereafter proceeds through the chamber located below the partition 27 to the pipe 6, from whence it is delivered to the casing 1 under pressure. The oil entering the casing 1 passes downwardly through the grooves located therein and exerts sufficient force on the bottom of the ram 4 to elevate it and the load positioned on the rack 5. Upon the release of the handle 38 the valve heads which were previously opened are allowed to close, thereby preventing any further compressed air from the pipe 11 from entering the casing 7.

The ram and its load may be lowered by moving the handle 38 in the opposite direction, thereby causing, through the lever 35

and the arcuate member 42, the other of the valve heads 20 which is located in the partition 30 and the valve head 25 to become unseated. The unseating of the valve head 20 allows the compressed air in the casing 7 to pass upwardly through the partition member 30 and escapes through the opening 15. The valve head 25 which has again been forced downwardly, allows the oil in the casing 1 to be forced by the load on the rack 5 through the pipe 6 into and through the casing 7, from whence it is delivered by the pipe 9 to the tank 8.

Although I have described my invention with considerable detail it is apparent to those skilled in the art that the same may be embodied in other forms having similar constructions and similar modes of operation. I therefore do not desire my invention confined to the exact construction shown and described but desire it to be included broadly within the spirit of the appended claim.

Having described my invention what I claim is:

In a control valve, a casing having a plurality of openings therein, a vertical partition extending from one end of the casing to the other end thereof, a horizontal partition extending through the inside of the casing at one side of the vertical partition, whereby two chambers are formed, each communicating with one of the openings in the casing, said horizontal partition having an opening therein for the passage of liquid from one chamber to the other, a plurality of partitions located in the casing at the opposite side of the vertical partition, whereby a plurality of chambers are formed which communicate with others of the openings, each of the last named partitions having openings therein for the passage of compressed air from one chamber to another, and means associated with the openings in the partitions for closing certain of the openings and opening other of the openings.

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