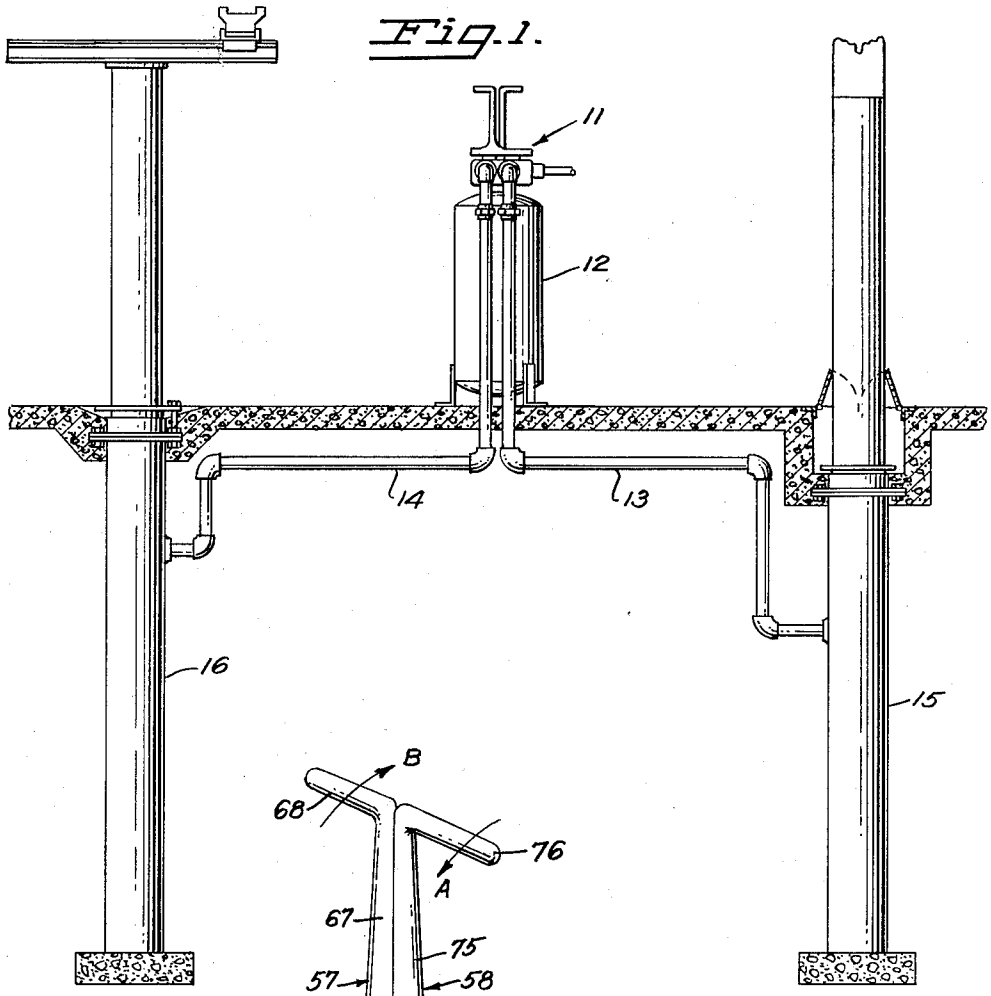
Nov. 13, 1951 J. D. COCHIN 2,574,624

CONTROL VALVE MECHANISM

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Fig. 1.



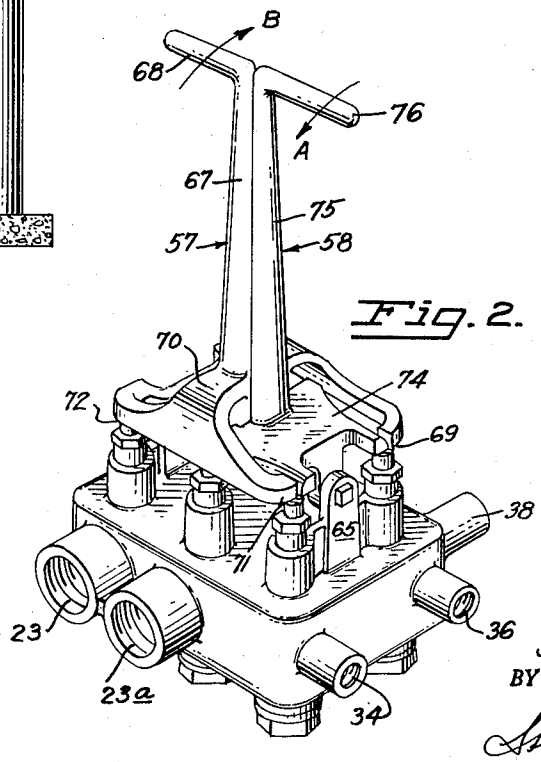


Fig. 2.

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CONTROL VALVE MECHANISM

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Fig. 3.

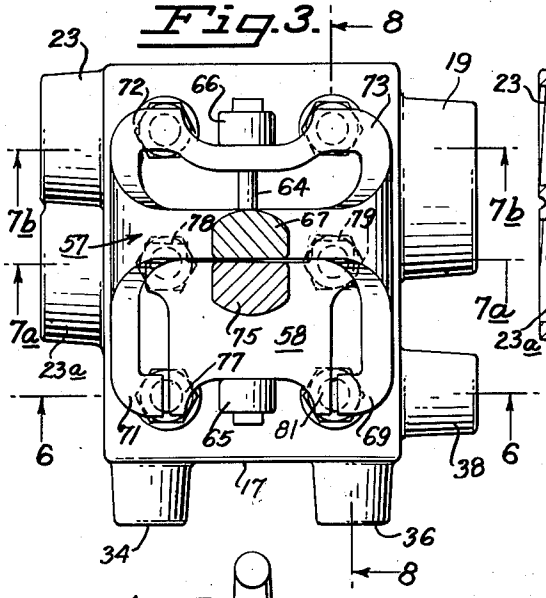


Fig. 5.

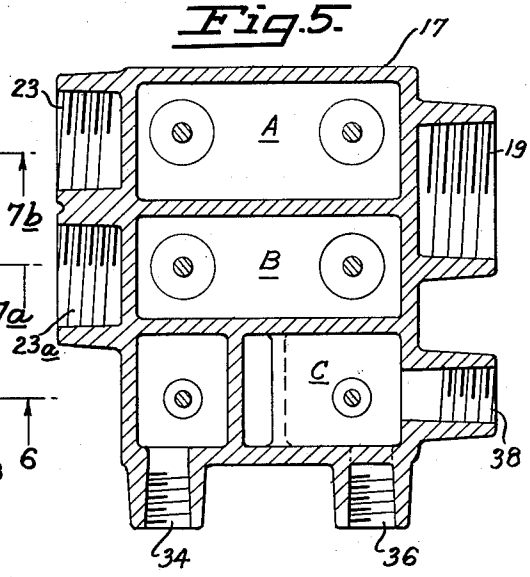


Fig. 4.

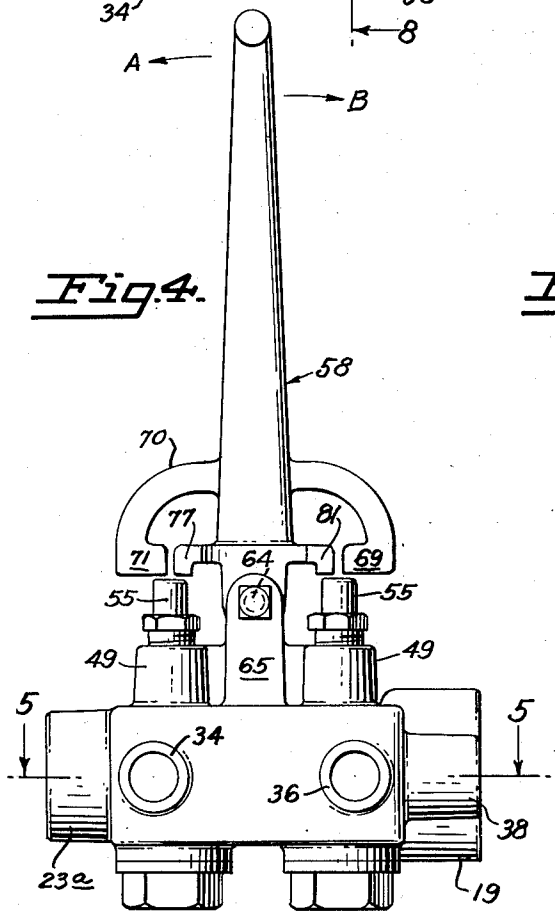
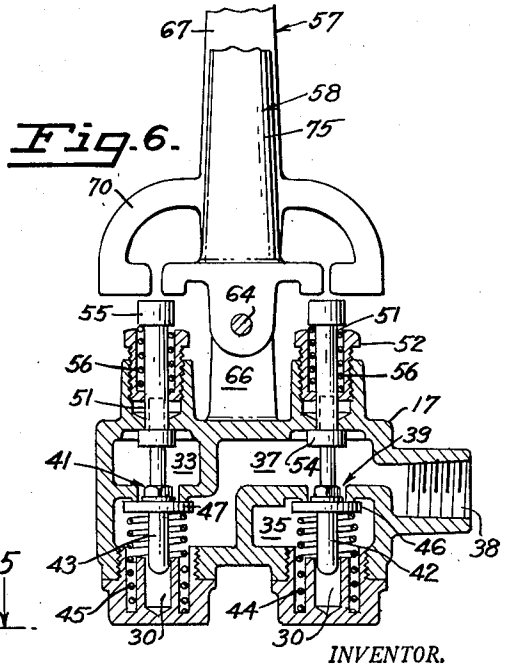


Fig. 6.



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CONTROL VALVE MECHANISM

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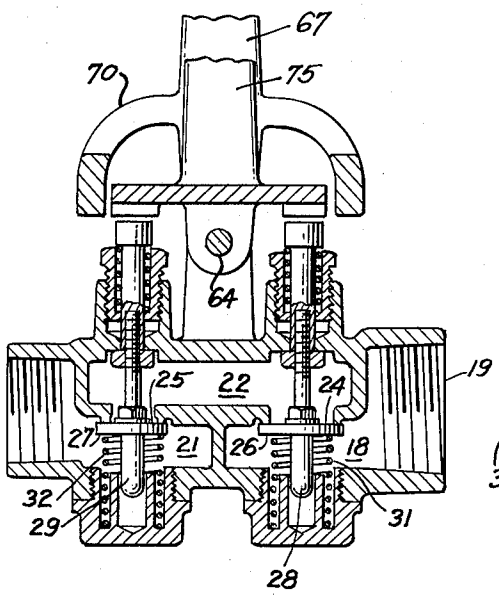


Fig. 7.

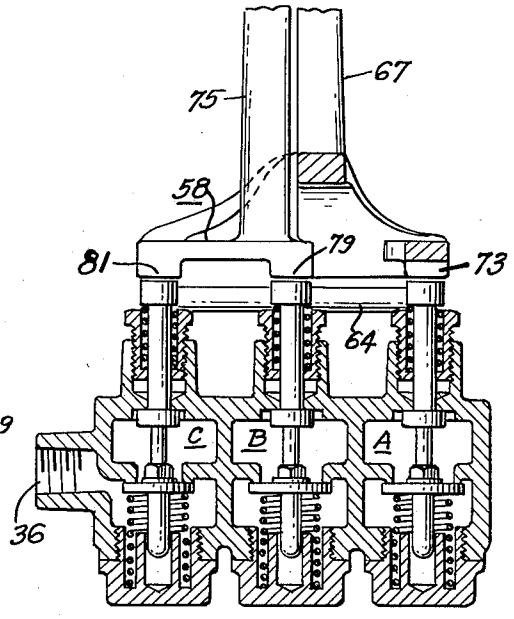
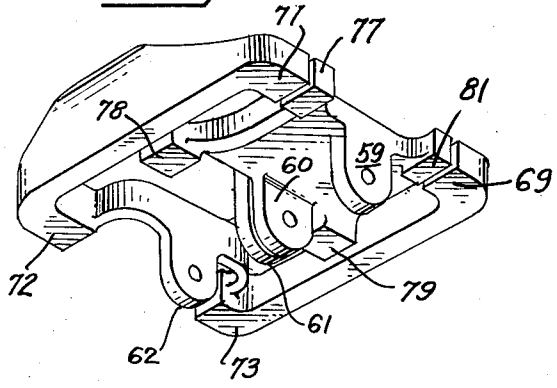


Fig. 8.

Fig. 9.



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Patented Nov. 13, 1951

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2,574,624

CONTROL VALVE MECHANISM

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Application June 25, 1948, Serial No. 35,119

7 Claims. (Cl. 277—21)

1

This invention relates to an improved valve mechanism for selectively controlling the passage of fluids employed to operate particularly dual hydraulic mechanisms, such as dual hydraulic lifts, rams, elevators, jacks, or the like. The present invention also principally relates to an operating handle means to operate selectively a plurality of independently depressible actuating parts provided on valve mechanisms and on mechanisms. The present invention is generally related to that class of control valves described in my copending application Ser. No. 733,329, filed March 8, 1947, and to the valve mechanism described in my United States Reissue Patent No. 19,239, for Valve Lifting Devices, which said valve mechanism are particularly adapted to selectively control the passage of hydraulic liquids or other fluids to actuate hydraulic automobile lifting rams.

Frequently garage and service station operators, in servicing and repairing motor vehicles, prefer to employ two independently operated lifting rams which separately support the front and rear end of a vehicle, respectively, during lifting operations, in lieu of the more conventional single post standard type hydraulic lifting ram. Conventional installations of dual hydraulic lifting devices, because they generally include multiple separate and distinct valve mechanisms to operate each post or ram, are costly to install and maintain, and also attendant with their use is the added disadvantage that there is no conveniently located unitary valve control mechanism by which an operator can actuate both rams simultaneously by a single manual manipulation.

It is, therefore, a principal object of this invention to provide a single and a centrally located valve mechanism to control selectively the passage and flow of hydraulic fluids between an oil tank reservoir and a pair of hydraulic lifting rams, and to control selectively the passage of air into and out of the oil tank reservoir.

Another object of this invention is to provide operating handle means on a control valve for dual rams which has parts capable of individual operation, or which said parts may be operated manually simultaneously as a unitary handle means.

A further object of this invention is to provide a valve control mechanism for dual hydraulic rams which is compact in size, simple to install, and which incorporates various safety features to prevent accidental displacement of the rams.

Other objects of this invention will become apparent upon referring to the following specification and accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

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In the drawings:

Fig. 1 is a schematic view showing the valve mechanism in assembled operative relationship with respect to a pair of hydraulic automobile lifting rams and an oil tank reservoir.

Fig. 2 is a perspective view of the valve mechanism.

Fig. 3 is a top plan view of the valve mechanism partly in section.

Fig. 4 is a side elevational view of the valve mechanism.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4.

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

Fig. 7 is a sectional view taken on either line 7_a—7_a or line 7_b—7_b of Fig. 3.

Fig. 8 is a sectional view taken on line 8—8 of Fig. 3.

Fig. 9 is a perspective view illustrating the bottom portions of the operating handle mechanism.

Referring to Fig. 1 the valve mechanism to be more fully described herein is generally indicated at 11 and is shown attached to a liquid or oil reservoir tank 12. Valve mechanism 11 has separate conduit connections 13 and 14 to automobile lifting rams or posts 15 and 16 and has also a liquid conduit connection to the interior of tank 12. It will suffice initially for the proper understanding of this invention to relate merely that when gas under pressure is supplied from a compressor source (not shown) to oil tank 12, the oil therein will be forced upwardly into valve mechanism 11 which may be operated to dispatch selectively the oil through conduits 13 and 14 to rams 15 and 16 to elevate either or both of said rams according to commonly understood principles of hydraulics. Conversely upon proper manipulation of valve mechanism 11 compressed gas contained in tank 1 may be exhausted and oil from rams 15 and 16 allowed to return to tank 12 from said rams through conduits 13 and 14 to cause the said rams to lower.

As illustrated particularly in Fig. 5 the valve mechanism 11 comprises a valve casing 17 which is vertically partitioned to form a liquid or oil section A, a liquid or oil section B and a gas or air section C. The liquid or oil sections will hereinafter be referred to as "oil" sections and the gas or air section will hereinafter be referred to as an "air" section.

Oil sections A and B are identical in construction, and Fig. 7 illustrates the parts comprising both of the oil sections taken on either lines 7_a—7_a or lines 7_b—7_b of Fig. 3. Each oil section A and B comprises a lower chamber 18 in flow communication with a threaded orifice 19 which in turn has an oil conduit connection (not shown) to oil tank 12. Each of the oil sections A and B is also provided with a bottom oil chamber 21 which said chamber in the case of oil section A communicates with orifice 23 which, in the case of oil section B, communicates with orifice 23_a. Orifices 23 and 23_a each have respective oil conduits communicating with hydraulic rams 15 and 16 through pipes or conduits 13 and 14, and each of the oil sections A and B is provided with a pair of valves, 24 and 25, which are arranged to control the flow of oil between bottom oil chamber 18 and connecting chamber 22 and between bottom chamber 21 and connecting chamber 22, respectively. Valves 24 and 25 comprise valve heads 26 and 27 through which extend valve stems 28 and 29, which said valve heads are normally urged to closed position by action of valve springs 31 and 32 which act upwardly upon the under sides of the valve heads.

Air section C is partitioned to form an upper air chamber 33 in flow communication with air escape port 34, and a bottom air chamber 35 in flow communication with orifice 36 and to which said latter orifice is connected a suitable conduit (not shown) connecting with an air compressor (not shown). Air connecting chamber 37 is in flow communication with orifice 38 and a suitable conduit (not shown) connects with tank 12. A pair of valves, indicated generally at 39 and 41, having valve heads 46 and 47 through which extend valve stems 42 and 43, are normally retained in closed seated position by the upward action of valve springs 44 and 45.

A plurality of identical valve pins 51 are centrally bored at their lower ends to receive the upwardly extended ends of each of the valve stems 28, 29, 42 and 43 above described, and are slidably mounted in tubular plugs 52 which in turn are threadedly inserted in hollow bosses 49 which extend upwardly from the casing 17 in spaced parallel row formation. The bottom ends of valve stems 28 are disposed slidably in vertical stem guides or wells 30 which extend upwardly from the bottom of casing 17, and suitable springs 56 mounted on pins 51 engage the underside of caps 55 to normally urge the pins upwardly to a position whereby shoulders 54 provided on the lower ends of the pins abut against the inner top surface of casing 17 to limit maximum upward movement of the pins.

Application of fluid pressure upon the valve pins sufficient to overcome the action of the valve springs and springs 56 causes the valves within the casing to open, and conversely, when the pressure on the valve pins is released, the action of the said springs will bias the valves closed and return the pins to their normal upward position.

The preferably manual operated valve control mechanism comprises two independently movable members or operating levers, generally indicated at 57 and 58. The members or levers 57 and 58 are sometimes referred to herein and in the claims as "operating handles" or as "first operating handle" and "second operating handle." The bottoms of said members 57 and 58 are each provided with downward depending portions 59—60 and 61—62, respectively. The portions 59, 60, 61 and 62 are each provided with apertures aligned

with one another to receive a common pivotal supporting pin or bolt 64 supported at opposite ends by arms 65 and 66 which project upwardly from valve casing 17, and the longitudinal axis of bolt 64 represents the pivotal axis about which levers 57 and 58 may be rocked either in the direction of arrows A or B in the drawings.

Operating handle 57 comprises further a vertical shank 67 and a hand grip portion 68 which extends outwardly from, and at substantially right angles to, shank 67, and the lower end of shank 67 terminates in a bowed or arch-shaped bottom portion 70 from which extend a plurality of actuating arms 69, 71, 72 and 73. Actuating arms 72 and 73 overlie the valve pins which connect with the valves 24 and 25 located interiorly of oil section A, above described, and actuating arms 69 and 71 partially overlie the caps and pins which connect with the air valves 39 and 41 provided in air section C.

Operating handle 58 is provided with a flat base portion 74, and a vertical shank 75 which extends upwardly therefrom to equal in height shank 67 of operating handle 57. A hand grip portion 76 extends outwardly from, and at right angles, to shank 75, and a plurality of actuating arms 77, 78, 79 and 81 extend outwardly from flat base portion 74. Actuating arms 78 and 79 overlie the caps and valve pins which connect with the oil valves in oil section B, whereas actuating arms 77 and 81 share an overlying position with actuating arms 71 and 69 over the caps and pins which connect with the valves located in air section C. In the construction of the operating mechanism, above described, it is seen that an operator may operate manually either operating handle 57 or 58 separately, or the operator may, for example, clasp both the hand grip portions 68 and 76 and together, with one hand, operate both the levers as a unitary handle. The arch-shaped or bowed portion 70 of lever 57 permits the flat base portion 74 of lever 58 to be rocked independently back and forth without in any way interfering with, or engaging any portion of, lever 67.

The operation of the valve mechanism will now be described. For example, in order to elevate ram 16 without elevating ram 15 operating lever 57 is moved manually in the direction of arrow B causing actuating arm 73 to depress the valve pin and stem connected to valve 24 in oil section A, thereby causing said valve 24 to open. Simultaneously, actuating arm 69 will engage and depress the valve pin and stem connected to valve 39 in the air chamber to thereby open the said air valve to permit air in lower air chamber 35 to fill air connecting chamber 37 and to pass into oil tank 12 through orifice 38. The compressed air in oil tank 12 causes oil from the tank to flow into the valve mechanism through orifice 19, and from there pass through open valve 24 in valve section A to fill oil connecting chamber 22. The oil under pressure flowing into connecting chamber 22 acts downwardly upon valve head 27 to overcome the action of valve spring 32 to force said valve open and to thereby permit oil under pressure to travel to ram 16 via orifice 23 and conduit 14 to elevate the said ram 16. Upon the operator's release of his grip upon operating lever 57, valve springs 31 and 34 operate to close the valves, and to thereby cut off the supply of compressed air into tank 12 and to shut off the supply of oil to ram 16; and springs 56 urge upwardly the valve pins engaging actuating arms 69 and 73 to cause operating lever 57 to rock to its vertical neutral position.

The lower ram 16 operating lever is moved

in the direction of arrow A causing actuating arms 71 and 72 to engage and depress the respective valve pins which connect with valves 25 and 41 provided respectively in oil section A and air section C thereby causing these said valves to open. Opening of air valve 41 permits the compressed air contained within tank 12 to escape therefrom to the atmosphere via orifice 38, air connecting chamber 37, upper air chamber 33 and air escape port 34. The weight of the ram 16 acting upon the oil forces the oil back through conduit 14, orifice 23, and bottom oil chamber 21 and thence around open valve 25 to oil connecting chamber 22. Oil entering chamber 22, under pressure from the ram, forces valve 24 open to permit the continuous flow of the oil through orifice 19 back into oil tank 12. The valve springs and the springs 56 engaging the pins cause the valves to close and operating lever 57 to rock to its normal vertical neutral position when an operator releases his grip upon the said lever, as above described.

The principles of operation of the valve mechanism to actuate ram 15 are identical with the mode of operation of ram 16 above described. Specifically, movement of operating lever 58 causes actuating arms 79 and 81 to open valve 24 in oil section B and valve 39 in air section C thereby permitting compressed air to enter tank 12 and to force oil through valve section B and conduit 13 connected to orifice 23_a into ram 15 to elevate said ram. Conversely, when operating lever 58 is moved in the direction of arrow A, actuating arms 77 and 78 open valve 25 in oil section B and valve 41 in air section C to permit the escape of air from oil tank C and to allow the oil from ram 16 to return to tank 12 in the manner as above described with respect to the operation of operating lever 57. The oil and air valve movements which take place in oil section B and air section C during raising and lowering operations of ram 15, are identical to the oil and air valve movements in oil sections A and C described above with respect to the raising and lowering of ram 16.

It is apparent from the foregoing discussion that by proper manipulation of operating levers 57 and 58 the rams 15 and 16 may be selectively raised or lowered. It is also obvious that an operator may actuate both the rams 15 and 16 simultaneously by manipulating levers 57 and 58 as a unitary handle in the manner hereinabove suggested.

Although I have described the operation and construction of the operating mechanism with respect to its use and function on a valve mechanism which is adapted to control and regulate the flow of hydraulic fluids to dual hydraulic rams, it is obvious that my herein described operating mechanism and modifications thereof, constructed according to the teachings herein related, may be employed successfully to operate any valve mechanism, or any mechanism other than a valve mechanism which has a plurality of independently depressible actuating parts capable of selective actuation through movement imparted to them by manipulation of the operating members as herein described. For example, an operating mechanism of the type described might in some instances be employed to actuate a plurality of electric push-button type switches which are arranged in parallel row formation substantially corresponding to the arrangement and grouping of the depressible valve actuating parts described herein. In the claims the term "valve" is intended to include, and does include, other mechanisms than valves utilized for the flow control of fluids, as for example, electric push-button type switches as above set forth.

Although I have described my invention in some detail for purposes of clarity of description and by way of illustration and example, it is understood that certain changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. In an operating handle means for actuating selectively a plurality of independently depressible actuating parts projecting exteriorly of a valve, a first handle rockably mounted on a pivotal support located exteriorly of said valve, actuating arms extending laterally from opposite sides of said first handle, each of said arms superposed over a depressible actuating part and arranged to depress said part when said handle is rocked in a direction toward said part, a second operating handle rockably mounted on said pivotal support and having actuating arms extending laterally from opposite sides thereof, each of said arms on said second handle superposed over a depressible actuating part and arranged to depress said part when said handle is rocked in a direction toward said part, one of said actuating arms on said first handle and one of said actuating arms on said second handle arranged and positioned to share with each other an overlying position with respect to one of the said depressible actuating parts whereby said last named actuating part can be actuated by rocking independently the first or second handles and by rocking both said first and second handles simultaneously in a direction toward said last named actuating part, and means carried by each of said handles to facilitate gripping of said handles to move the same selectively independently and simultaneously.

2. In an operating handle means for actuating selectively a plurality of independently depressible valve actuating parts projecting exteriorly of a valve, a first handle rockably mounted on a pivotal support located exteriorly of said valve, actuating arms extending laterally from opposite sides of said first handle, each of said arms superposed over a depressible actuating part and arranged to depress said part when said handle is rocked in a direction toward said part, a second operating handle rockably mounted on said pivotal support and having actuating arms extending laterally from opposite sides thereof, each of said arms on said second handle superposed over a depressible actuating part and arranged to depress said part when said handle is rocked in a direction toward said part, one of said actuating arms on said first handle and one of said actuating arms on said second handle both arranged and positioned to share with each other an overlying position with respect to one of the said depressible actuating parts whereby said last named actuating part can be actuated by either rocking independently the said first or second handles, or by rocking both said first and second handles simultaneously, in a direction toward said last named actuating part, said first and second operating handles operable independently of one another, said first and second handles having vertical stems substantially equal in height to one another and disposed adjacent one another, corresponding individual hand gripping portions provided adjacent the top end of each

said stem, said hand gripping portions arranged and constructed to coact mutually to form a unitary hand gripping means for operating manually said first and second handles as a unit.

3. In an operating handle means for actuating selectively a plurality of individually depressible valve actuating parts extending exteriorly of a valve casing the combination comprising a pivot pin attached exteriorly of said casing, first and second independently rockable handles mounted adjacent one another on said pivot pin, first, second and third pairs of valve actuating parts extending exteriorly of said casing, the valve actuating parts of each said pair disposed on opposite sides of said pivot pin, said first handle provided with arms overlying said first pair of said valve actuating parts and arms partly overlying said second pair of valve actuating parts, said second handle having arms overlying said third pair of valve actuating parts and arms partly overlying said second pair of valve actuating parts, all of said arms on said first and second handles arranged to engage and depress the said respective valve actuating parts which said arms overlie when said first and second handles are rocked in the direction of said parts, individual handle operating means provided on said first and second handles for rocking independently said handles, said individual handle operating means on said first and second handles arranged and constructed to form a unitary handle operating means to rock both said first and second handles as a single handle unit.

4. In an operating handle means for actuating selectively a plurality of individually depressible valve actuating parts extending exteriorly of a valve casing the combination comprising a pivot pin attached exteriorly of said casing, first and second independently rockable handles mounted adjacent one another on said pivot pin, first, second and third pairs of valve actuating parts extending exteriorly of said casing, the valve actuating parts of each said pair disposed on opposite sides of said pivot pin, said first handle provided with arms overlying said first pair of said valve actuating parts and arms partly overlying said second pair of valve actuating parts, said second handle provided with arms overlying said third pair of valve actuating parts and arms partly overlying said second pair of valve actuating parts, all of said arms on said first and second handles arranged to engage and depress the said respective valve actuating parts which said arms overlie when said first and second handles are rocked in the direction of said respective parts, and individual hand gripping means provided on said first and second handles for rocking manually independently said handles, said individual hand gripping means on said first and second handles arranged and constructed to form a unitary hand gripping means for manually operating both said first and second handles simultaneously as a single handle unit.

5. In a valve mechanism for selectively controlling the hydraulic flow of liquid back and forth between a tank and two hydraulically operated mechanisms and for controlling the flow of compressed gas into and out of said tank, the combination comprising a valve casing partitioned to form first and second liquid chambers and an air chamber, said first liquid chamber having a pair of normally closed valves therein to control the passage of liquid between a tank and a first hydraulic mechanism, said second chamber having a pair of normally closed valves therein to control the passage of liquid between said tank and a second hydraulic mechanism, said air chamber having normally closed valves therein to control the passage of air into and out of said tank, each of said valves in said first and second liquid chambers and said air chamber provided with valve actuating portions extending exteriorly of said casing, a first means located exteriorly of said valve casing to actuate simultaneously a valve actuating portion connected to a valve in said first liquid chamber and a valve actuating portion connected to a valve in said air chamber, and a second means independently operable with respect to said first means to actuate simultaneously a valve actuating portion connected to a valve in said second liquid chamber and a valve actuating portion connected to a valve in said air chamber, said first and second means arranged and constructed to form a unitary manual operating means to actuate simultaneously valve actuating portions connected to valves located in said first and second liquid chambers and said air chamber.

6. In a valve mechanism for selectively controlling the hydraulic flow of liquid back and forth between a tank and two hydraulically operated mechanisms and for controlling the flow of compressed gas into and out of said tank, the combination comprising a valve casing partitioned to form first and second liquid chambers and an air chamber, said first liquid chamber having a pair of normally closed valves therein to control the passage of liquid between a tank and a first hydraulic mechanism, said second chamber having a pair of normally closed valves therein to control the passage of liquid between said tank and a second hydraulic mechanism, said air chamber having normally closed valves therein to control the passage of air into and out of said tank, each of said valves in said first and second liquid chambers and said air chamber provided with valve actuating portions extending exteriorly of said casing, a first operating handle having parts overlying and engageable with said valve actuating portions connected to the valves in said first liquid chamber and valve actuating portions connected to said valves in said air chamber, a second operating handle independently operable with respect to said first operating handle having parts overying and engageable with said valve actuating portions connected to said valves in said second liquid chamber and valve actuating portions connected to said valves in said air chamber, said first and second handles arranged and constructed to form a unitary manual operating handle means for actuating simultaneously valve actuating portions connected to valves in said first and second liquid chambers and said air chamber.

7. In an operating mechanism for actuating selectively a plurality of individually depressible valve actuating parts projecting exteriorly of a valve, first and second individually rockable members mounted on a pivotal support disposed exteriorly of said valve, first and second individually depressible valve actuating parts located respectively on opposite sides of said pivotal support, a first pair of actuating arms projecting laterally outwardly from opposite sides of said first rockable member, one of said actuating arms of said first pair overlying partially said first actuating part and the other of said actuating arms of said first pair overlying partially said second actuating part, each of said actuating arms of said first pair arranged to depress the valve actuating part which it respectively overlies when said first rock-

able member is rocked toward said part, a second pair of actuating arms projecting laterally outwardly from said second rockable member, one of said actuating arms of said second pair overlying partially said first actuating part and the other of said actuating arms of said second pair overlying partially said second actuating part, each of said actuating arms of said second pair arranged to depress the valve actuating part which it respectively overlies when said rockable member is rocked toward said part, said first and second rockable members arranged with respect to one another and said depressible actuating parts whereby either of said rockable members may be operated to depress either of said actuating parts toward which said member is rocked without imparting movement to the other of said rockable members, and means comprising handle means provided on both said first and second

rockable members to permit both of said members to be rocked simultaneously in the same direction as a unitary handle.

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