Dec. 9, 1941. L. T. ARGO 2,265,260

MECHANISM FOR SELECTIVELY OPERATING VALVES

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FIG. 1.

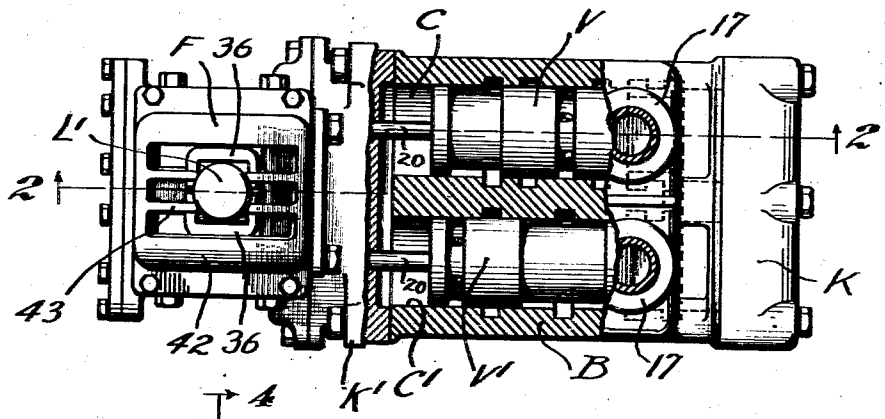


FIG. 2.

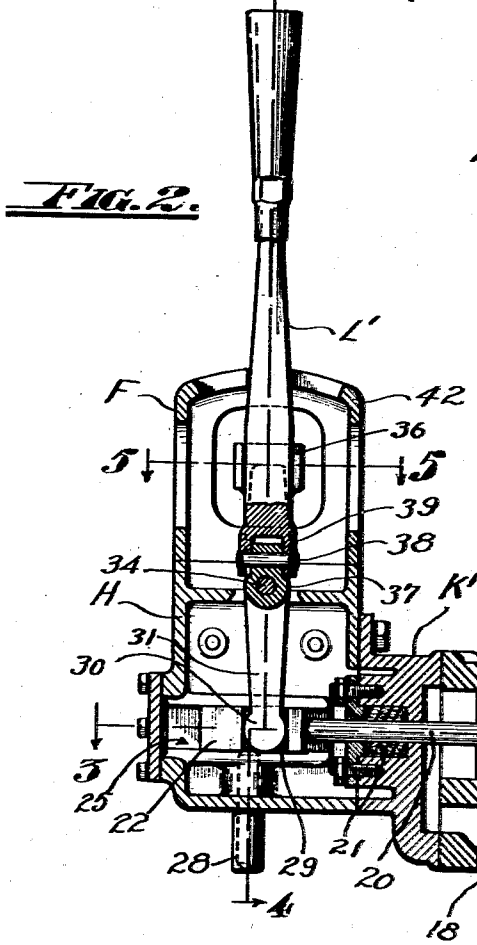
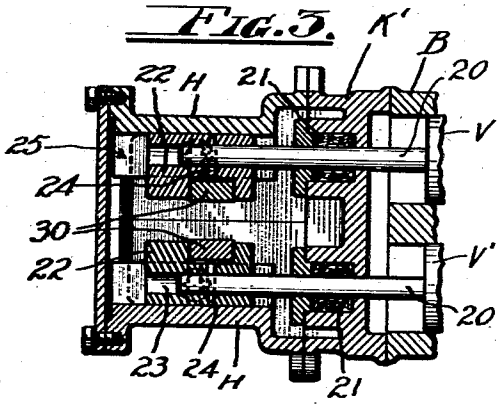


FIG. 3.



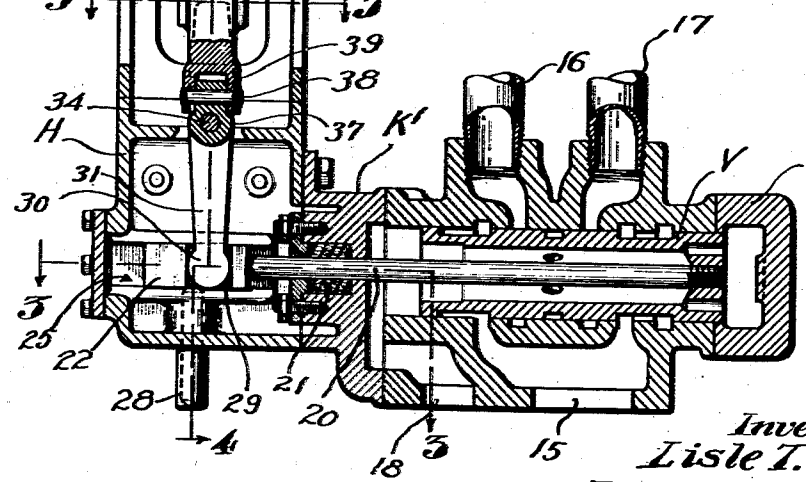


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FIG. 4.

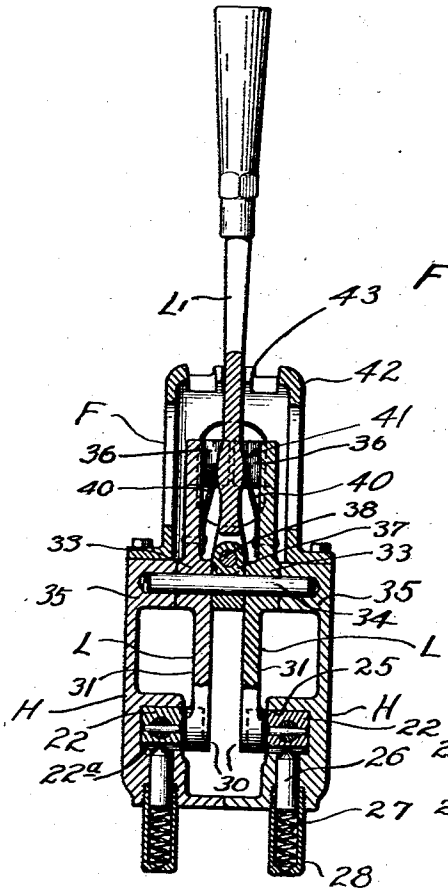


FIG. 6.

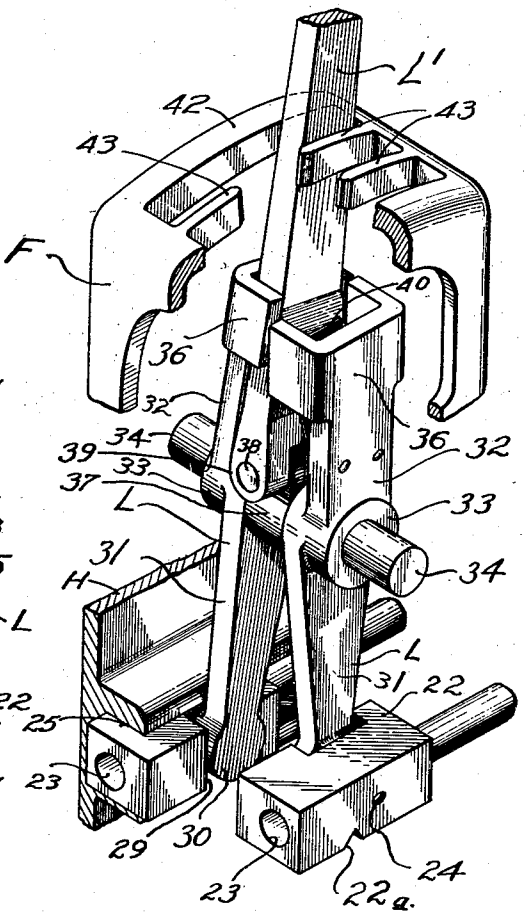
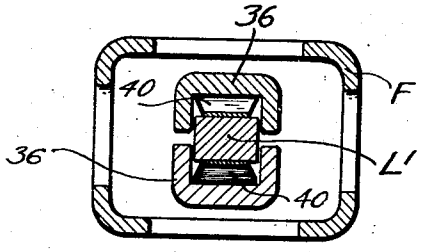


FIG. 5.



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UNITED STATES PATENT OFFICE

2,265,260

MECHANISM FOR SELECTIVELY OPERATING VALVES

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Application November 21, 1938, Serial No. 241,652

9 Claims. (Cl. 277—12)

My invention relates to any character of machine or apparatus embodying a plurality of valves which control the passage of pressure fluids to the various parts of the machine or apparatus for actuation of such parts. It has particular reference, although not necessarily, to excavating machines, such as road scrapers embodying hydraulic rams, as in bulldozers for actuation of scraper blades, or pressure fluid motors for actuation of bowls and aprons as in carrying scrapers, and where the supply of the pressure liquid to the rams or motors is controlled by manually operated valves.

In such excavating machines, the valves are individually operated by hand levers; and consequently in the operation of more than one valve to effect a predetermined movement of the scraper blade, bowl, apron, or other earth moving implement, it is necessary to actuate more than one hand lever. This confronts the operator with a series of manual operations which must be performed in sufficiently rapid succession to effect the required movement of the selected implement or implements, in order to produce the desired earth movement under and during forward progress of the machine. Failure of the operator to actuate the valves at the proper instant or in the required sequence greatly lowers the earth moving efficiency of the machine. Particularly is this true in self-propelled machines, where the operator is faced with the added operations of steering the machine and regulating its speed of travel.

It is a purpose of my invention to simplify the actuation of the valves in such excavating machines to attain maximum earth moving efficiency, and by the provision of a mechanism for selectively operating the valves through the actuation of a single lever.

It is also a purpose of my invention to provide such a mechanism which is particularly adaptable to hydraulic valves having various positions of adjustment, and wherein the mechanism is operable to secure any desired adjustment of the valves individually or collectively.

I will describe only one form of mechanism for selectively operating valves embodying my invention, and as applied to a pair of hydraulic valves, and will then point out the novel features thereof in claims.

In the accompanying drawings:

Fig. 1 is a view showing in top plan one form of valve operating mechanism embodying my invention as applied to a pair of hydraulic valves and wherein a part of the housing for the valves is broken away.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 2.

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

Fig. 6 is an enlarged fragmentary perspective view of the mechanism shown in the preceding views.

My invention in its present embodiment is shown applied to a pair of hydraulic valves V and V', which are of the piston type and movable in parallel cylinders C and C', formed in a valve body B and closed at one end by a cover K and at the other end by a cover K'. The construction of the valves is immaterial to the present invention, suffice it to say that each valve is movable axially to occupy a closed position and either of two open positions. In the closed position as shown in Figs. 1 and 2, each valve is positioned to prevent the passage of liquid from an inlet 15 to either of a pair of pipes 16 and 17, and from either of these pipes to an outlet 18, it being understood that the inlet and the outlet are adapted for connection to a source of liquid under pressure, while the pipes are adapted for connection to a hydraulic ram, so as to move the piston of ahe ram in one direction or the other within the cylinder, depending upon to which side of the piston the pressure liquid is delivered. In one open position of the valve, liquid is supplied to one pipe 16 or 17 and returned to the source of supply through the other pipe to move the piston of the ram in one direction. Conversely, in the other open position of each valve a reverse flowing of liquid is effected to move the piston of the ram in the other direction.

Each valve V or V' is provided with a rod or stem 20, which extends outwardly through a stuffing box 21 of the cover K', where it is adapted for connection to the mechanism for selectively operating the two valves in accordance with my invention.

In its present embodiment, my valve operating mechanism comprises a two-part housing H (Fig. 4), which is bolted or otherwise secured to the cover K' so as to receive the exposed ends of the valve stems 20. Socket members 22, in the form of metal blocks, are provided with longi-

tudinal openings 23 in which the rods 20 are extended and secured by means of pins 24.

The confronting inner walls of the housing H are shaped to form a pair of channels or grooves 25, in which the members 22 are slidably received and yet held against any turning movement. Latches in the form of pins 26 are employed to releasably secure the members 22 in one horizontal position of adjustment, in order to normally maintain the valves V and V' in closed position. Each pin 26 is vertically movable in the housing H and urged upwardly by a spring 27 contained in a cage 28. The upper end of each pin is of conical form to engage within a V-shaped groove 22a in the underside of the respective block 22, it being understood that the conical end will permit the proper patching engagement thereof within the groove, irrespective of the circumferential position of the pin.

Each socket member 22 is so mounted in the respective groove 25 that a portion of the member projects from the side of the groove (Figs. 4 and 6), and it will be noted that the openings 23 in the members are to one side of the center of the members so that the aforedescribed positioning of the members in the grooves can be attained. Those portions of the members 22 projecting from the channels or grooves 25 are formed with slots 29 in which are received the rounded heads 30 of a pair of actuating levers L.

Each lever L has a lower arm 31 and an upper arm 32 offset vertically with respect to the lower arm and connected thereto by a sleeve 33. Through the two sleeves of the levers an axle 34 is extended for supporting the levers for those pivotal movements necessary to effect actuation of the members 22. As shown in Fig. 4, the ends of the axle 34 are received in trunnions 35 formed on the inner walls of the housing H.

The upper lever arms 32 are formed with yokes 36, which are U-shaped and disposed in confronting relation to receive therein an operating lever L'. This operating lever extends upwardly through a box-like open-work frame F which is bolted on to the top of the housing H. By a swivel connection composed of a link 37 pivoted on the axle 34 between the sleeves 33 and a pin 38 extending through the link and ears 39 on the lever L' and at right angles to the axle 34, the lever is mounted for adjusting movements about the pin 38 as a center as well as for operating movements to operate the actuating levers L about the axle as a center.

In its adjusting movements the operating lever can occupy any one of three positions, namely, one in which it engages both yokes 36, another in which it engages only one of the yokes 36, and a third in which it engages the other yoke 36. In its operating movements the lever L' can move either actuating lever or both actuating levers depending upon its lateral adjustment about the pin 38. Thus by the single operating lever the actuating levers are selectively engageable to operate either or both depending upon whether one of the valves or both are desired to be opened or closed.

By means of a pair of springs 40 (Fig. 4) riveted at one end to the confronting sides of the lever arms 32 and bearing at the other against rounded enlargements 41 on the lever L', the operating lever is yieldably urged to what I term a neutral or intermediate position of adjustment wherein it engages both of the yokes 36.

The frame F is curved at its top to form a sector 42 provided with fingers 43 arranged to form three longitudinal slots and a single transverse slot (Fig. 1) in which the lever L' is movable to definitely guide the latter in its adjusting and operating movements.

In the operation of the mechanism, the operating lever L' is releasably held in the neutral position shown in Figs. 1, 2, and 4, by the springs 40, while the members 22 are held in the intermediate positions illustrated by the pins 26, and thus normally the stems 20 are secured in positions in which the two valves are closed. When it is desired to move both valves to either open position the operating lever, while remaining in its urged position, is rocked forwardly or rearwardly, thereby causing the lever to engage and move both yokes to rock both actuating levers forwardly or rearwardly. Through the heads 30 the members 22 are slid in the channels to axially move the valve stems and thus simultaneously open both valves.

When it is desired to open only one of the valves, valve V for example, the operating lever is adjusted laterally to engage only the yoke for the corresponding actuating lever. Thus, by now rocking the operating lever rearwardly, for example, as illustrated in Fig. 6, the corresponding actuating lever is rocked to move the corresponding member 22 and thus actuate the attached stem to open the valve V.

Inasmuch as the operating lever, when moved from vertical position, is maintained in engagement with either yoke or both yokes, it will be clearly seen that when returned to vertical position, either or both actuating levers are returned to vertical position to restore either or both valves to closed position, in which they are maintained by the pins 26.

From the preceding operation of the mechanism, it will be manifest that the single operating lever is laterally adjustable to be rocked in any one of three planes to open or close either valve or both valves simultaneously.

Although I have herein shown and described only one form of mechanism for selectively operating valves embodying my invention, it is to be understood that various changes and modifications may be made herein without departing from the spirit of my invention and the spirit and scope of the appended claims.

I claim:

1. In combination; a pair of valves each movable to occupy a closed position and either of two open positions; an operating lever; and means so operatively connecting the valves to the lever that by operation of the lever either or both valves can be moved to any of the three positions.

2. In combination; a pair of valves each movable to occupy a closed position and either of two open positions when moved in opposite directions from the closed position; an operating lever mounted for movement in either of three planes and in opposite directions from a neutral position; and means so connecting the valves to the lever that when the lever is in neutral position both of said valves are closed, when said lever is moved in one plane from neutral position one valve is moved to occupy either of its open positions depending upon the direction of movement of the lever from neutral position, when the lever is moved in another plane from neutral position the other valve is moved to occupy either of its open positions depending upon the direction of movement of the lever from neutral position, and when the lever is moved in the

third plane from neutral position both of the valves are moved to occupy either open position depending upon the direction of movement of the lever from neutral position.

3. A mechanism for selectively operating valves having stems, comprising; members one for each of the valve stems adapted to be individually secured thereto; guides for supporting the members for movement with the valve stems; actuating levers one for each of the members pivotally connected to the respective valve stem; means for supporting the levers for pivotal movements to move said members and actuate the valve stems; and an operating lever movable to engage either or both of the actuating levers for actuating the same singly or together.

4. A mechanism for selectively operating valves having stems, comprising; members one for each of the valve stems adapted to be individually secured thereto; guides for supporting the members for movement with the valve stems; actuating levers one for each of the members pivotally connected to the respective valve stem; means for supporting the levers for pivotal movements to move said members and actuate the valve stems; yokes on the levers; and an operating lever pivoted to move in one plane to engage either or both of said yokes, and in another plane to move through the yokes either or both of the actuating levers.

5. A mechanism for selectively operating valves having stems, comprising; members one for each of the valve stems adapted to be individually secured thereto; guides for supporting the members for movement with the valve stems; actuating levers one for each of the members pivotally connected to the respective valve stem; means for supporting the levers for pivotal movements to move said members and actuate the valve stems; yokes on the levers; an operating lever pivoted to move in one plane to engage either or both of said yokes, and in another plane to move through the yokes either or both of the actuating levers; and means for urging the operating lever to a position in the first mentioned plane in which it engages both of the yokes.

6. A mechanism for selectively operating valves having stems, comprising; members one for each of the valve stems adapted to be individually secured thereto; guides for supporting the members for movement with the valve stems; actuating levers one for each of the members pivotally connected to the respective valve stem; means for supporting the levers for pivotal movements to move said members and actuate the valve stems; yokes on the levers; an operating lever pivoted to move in one plane to engage either or both of said yokes, and in another plane to move through the yokes either or both of the actuating levers; and a pair of springs secured to the actuating levers and engaging the operating lever for urging the latter to a position in the first mentioned plane in which it engages both of the yokes.

7. A mechanism for selectively operating a pair of axially movable valves having stems, comprising; a housing in which the valve stems are movably received; a pair of socket members fixed to the valve stems; grooves in the housing slidably receiving the socket members; a pair of actuating levers fulcrumed in the housing and having heads pivoted in the socket members to move the latter under actuation of the levers and to thereby actuate the valve stems to open or close the valves; yokes on the actuating levers disposed in opposed relation; an operating lever extending through the yokes and pivoted to swing about two axes, one of which permits the lever to be adjusted to engage either or both of the yokes, and the other axis to allow the lever to actuate either or both of the actuating levers according as the operating lever is adjusted to engage either or both of the yokes; and a frame slotted to restrict the operating lever to the adjusting and actuating movements aforedescribed.

8. A mechanism for selectively operating a pair of axially movable valves having stems, comprising; a housing in which the valve stems are movably received; a pair of socket members fixed to the valve stems; grooves in the housing slidably receiving the socket members; a pair of actuating levers fulcrumed in the housing and having heads pivoted in the socket members to move the latter under actuation of the levers and to thereby actuate the valve stems to open or close the valves; and means common to both of the levers for actuating either or both of the levers.

9. A mechanism for selectively operating a pair of axially movable valves having stems, comprising; a housing in which the valve stems are movably received; a pair of socket members fixed to the valve stems; grooves in the housing slidably receiving the socket members; a pair of actuating levers fulcrumed in the housing and having heads pivoted in the socket members to move the latter under actuation of the levers and to thereby actuate the valve stems to open or close the valves; yokes on the actuating levers disposed in opposed relation; an operating lever extending through the yokes and pivoted to swing about two axes, one of which permits the lever to be adjusted to engage either or both of the yokes, and the other axis to allow the lever to actuate either or both of the actuating levers according as the operating lever is adjusted to engage either or both of the yokes; grooves in the members; and spring-pressed pins engageable in the grooves for releasably securing the members against movement in the housing grooves.

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