Oct. 11, 1938. F. H. STROUP 2,132,766

HAND CONTROLLED VALVE

Filed March 19, 1937

FIG. 1.

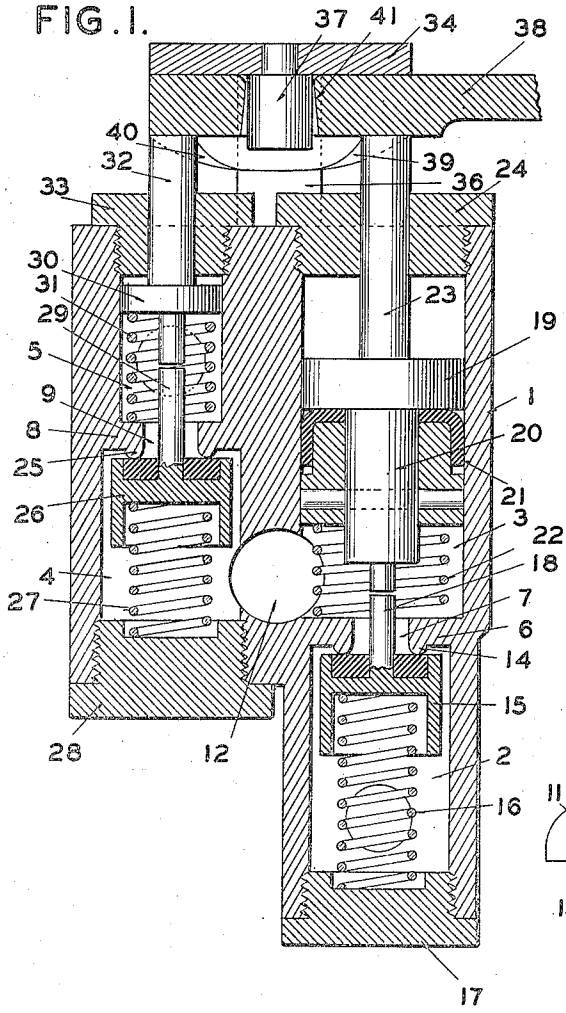


FIG. 2.

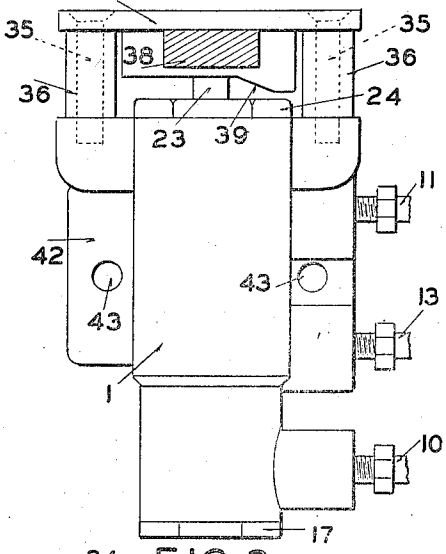


FIG. 3.

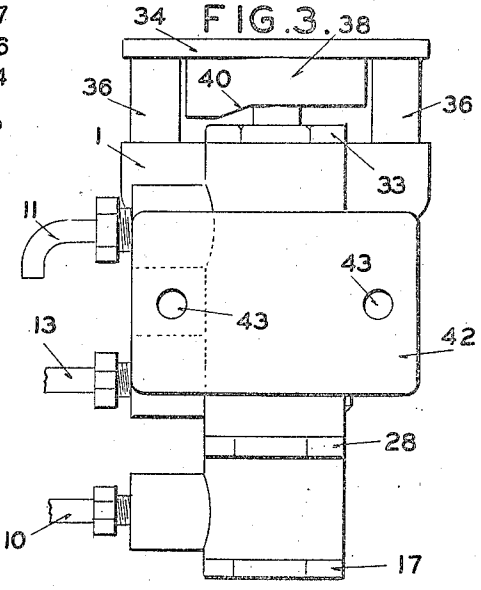
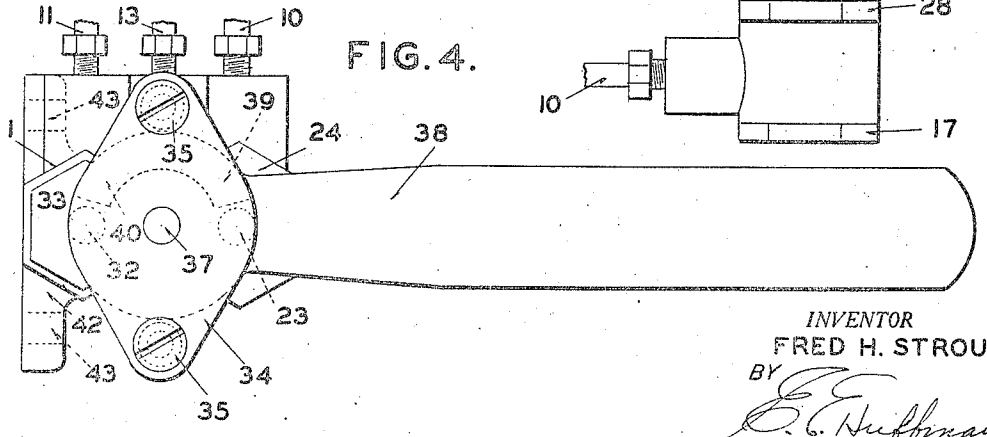


FIG. 4.



INVENTOR
FRED H. STROUP
BY
E. E. Huffman
ATTORNEY

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HAND CONTROLLED VALVE

Fred H. Stroup, Kirkwood, Mo., assignor to Wagner Electric Corporation, St. Louis, Mo., a corporation of Delaware

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7 Claims. (Cl. 277—20)

My invention relates to an improved hand-actuated control valve for use in fluid pressure operated apparatus, such, for example, as fluid pressure operated brakes.

One of the objects of my invention is to provide an improved hand-operated fluid pressure valve whereby the operator may control the valve either by the rotation of a pivoted handle or by a rocking movement of said handle in a plane at right angles to the plane of rotation.

Other objects of my invention will become apparent from the following description taken in connection with the accompanying drawing in which Figure 1 is a vertical cross-sectional view through the improved valve; Figure 2 is a front elevation of the valve; Figure 3 is a rear elevation; and Figure 4 is a top view showing the control handle in its inoperative position.

Referring to the drawing in detail, there is provided a casing 1 having chambers 2, 3, 4, and 5 therein. The chambers 2 and 3 are in alignment with each other and separated by a partition 6 in which is a passage 7 connecting the chambers. The chambers 4 and 5 are also in alignment with each other and separated by a partition 8 through which is a passage 9 connecting the chambers. The chamber 2 is connected to the source of pressure by means of a conduit 10 and chamber 5 is connected to the atmosphere by an exhaust conduit 11. The central portion of the casing separating chambers 3 and 4 is provided with a passage 12 to place the chambers in constant communication with each other and also with a conduit 13 leading to the fluid motor, such, for instance, as the power cylinder or cylinders of a braking system.

The partition 6 between chambers 2 and 3 is provided with a valve seat 14 and cooperating therewith is an inlet valve element 15 normally biased to closed position by means of a spring 16 interposed between it and the closure plug 17. The inlet valve 15 is provided with a stem portion 18 extending through passage 7 into chamber 3. A sealing piston 19 is slidably mounted within chamber 3 and integral therewith is a projection 20 for cooperation with extension 18 on the valve. A suitable packing 21 prevents leakage past the piston, the piston being biased, by means of a spring 22, to a position wherein the valve is permitted to close under its spring. The piston is also formed with a stem 23 extending through a closure plug 24 to the top exterior of the casing.

The partition 8 between chambers 4 and 5 is provided with a valve seat 25 with which cooperates an exhaust valve element 26 biased against the seat by means of a spring 27 interposed between the valve element and a closure plug 28. The valve element is provided with an extension 29 which extends into chamber 5. The valve element 26 is adapted to be controlled by a plunger 30 slidably mounted in chamber 5 and biased to an inoperative position by a spring 31. The plunger is formed with a stem portion 32 which extends through a closure plug 33 to the top exterior of the valve casing.

A plate 34 is secured to the top of valve casing 1 in spaced relation thereto by means of a pair of screws 35 extending through tubular spacing posts 36. A pivot post 37 extends downwardly from the under side of this plate at a point midway between stems 23 and 32, and pivotally mounted thereon is a handle 38. The under side of the handle has integrally formed thereon cam surfaces 39 and 40, both positioned on one side of the handle. The cam surface 39 is adapted to cooperate with stem 23 and cam surface 40 is adapted to cooperate with stem 32. The handle, in addition to being pivotally mounted on pivot post 37, is also so mounted on the post as to be rockable in a vertical plane, that is, in a plane at right angles to its axis of rotation. This rocking movement is permitted by making the post receiving hole 41 of the handle of such size and shape that there will be sufficient clearance between the post and the surface of the hole. When the handle is rocked, it will fulcrum on opposite sides of plate 34. The casing 1 is provided with an integral attaching plate 42 having bolt receiving holes 43.

When handle 38 is in its inoperative position, as best shown in Figures 1 and 4, the inlet valve element 15 and the exhaust valve element 26 will both be biased to closed position against their respective seats by means of their springs. If it is now desired to admit fluid under pressure to the power cylinder, handle 38 may be rotated in a clockwise direction, as viewed in Figure 4, thus causing cam surface 39 to move stem 23 and piston 19 downwardly and thereby unseating the inlet valve element 15. The cam surface 40 will not, under these circumstances, operate the exhaust valve element 26 as it moves away from stem 32. Fluid may now flow from the source of pressure through conduit 10, chamber 2, passage 7, chamber 3, passage 12, and conduit 13 to the power cylinder. When sufficient fluid has been admitted to the power cylinder, valve 15 may be permitted to close by returning handle 38 to its original position.

If it is desired to exhaust the power cylinder,

handle 38 is rotated in a counter-clockwise direction, as viewed in Figure 4. This movement of the handle will result in cam surface 40 moving plunger 30 downwardly by means of stem 32, thereby unseating the exhaust valve element 26. The fluid under pressure in the power cylinder will now be free to pass to the atmosphere through chamber 4, passage 9, chamber 5, and exhaust conduit 11. The inlet valve element 15 will remain closed under these conditions.

If the operator does not desire to selectively control inlet valve element 15 and exhaust valve 26 by rotation of handle 38, he may control them by moving the free end of the handle upwardly or downwardly. When the free end of handle 38 is moved downwardly, the end thereof above stem 32 will fulcrum on the outer edge of plate 34 and, as a result thereof, stem 23 will be moved downwardly to thus cause piston 19 to act upon the inlet valve element 15 and open this valve. To close the valve, the handle need only be released and the valve element will be automatically seated under the action of its biasing spring 16. When it is desired to exhaust the power cylinder, the free end of handle 38 need only be moved upwardly, thus causing the portion of the handle above stem 23 to fulcrum on the inner edge of plate 34. This will move stem 32 and plunger 30 downwardly and open the exhaust valve element 26 so that the fluid under pressure in the power cylinder will be released. A selective control of the inlet and exhaust valve elements by a rocking movement of the handle has been found to be very advantageous when it is desired to apply or exhaust small increments of fluid pressure. The fluid pressure can be more readily controlled by a quick upward or downward movement of the free end of the handle than would be possible by rotation of the handle due to the fact that the springs operating upon the valves and the operating stems assist in the quick return of the handle to its normal inoperative position as soon as the operator's hand is released from the handle.

Being aware of the possibility of modifications in the particular structure herein described without departing from the fundamental principles of my invention, I do not intend that its scope be limited except as set forth by the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A control valve mechanism comprising a casing having two valves therein, actuating stems for the valves extending to the exterior of the casing, a member operatively associated with said stems, means for mounting said member for rotative movement and for rocking movement in a plane at right angles to its plane of rotation, and means whereby said member may selectively move said stems by either a rotative or a rocking movement.

2. A control valve mechanism comprising a casing having two valves therein, actuating stems for the valves extending to the exterior of the casing, an operating handle, means for mounting said handle for rotative movement and for rocking movement at right angles to the plane of rotation, means carried by said handle for selectively moving said stems when the handle is rotated, and fulcrum means for said handle whereby said stems may be selectively moved by a rocking movement of said handle.

3. A control valve mechanism comprising a casing having two valves therein, two valve controlling stems extending to the exterior of the casing, a pivoted member for opening or closing each valve, said member being provided with cam surfaces for cooperating with the valve stems whereby said valves may be selectively opened or closed by rotation of the member on its pivot, and means permitting said member to rock on its pivot in a plane at right angles to its plane of rotation whereby the valves may be selectively opened or closed by a rocking movement of said member.

4. A control valve mechanism comprising a casing having two valves therein, an actuating stem for each valve extending to the exterior of the casing, a support spaced from the valve casing adjacent said stems, a handle positioned between said stems and the support, means for mounting the handle on the support for rotative movement and for rocking movement in a plane at right angles to the plane of rotation, cam means carried by the handle for selectively moving said stems by rotation of the handle on the support, and means for fulcruming the handle at different points on the support when the handle is rocked whereby one stem will be operated when the handle is rocked in one direction and the other stem will be operated when the handle is rocked in the opposite direction.

5. A control valve mechanism comprising a casing provided with two chambers and with one port communicating with one of said chambers, a second port communicating with the second chamber and a third port communicating with both of said chambers, a valve in the first named chamber for controlling communication between the third port and the first port, a valve in the second chamber for controlling communication between the second port and the third port, a valve stem for operating each of said valves, said stems extending to the exterior of the casing, and a handle pivotally mounted on the exterior of the casing at a point between the stems, said handle being provided with cam surfaces on the under side thereof for cooperation with the exterior ends of the stems whereby when the handle is rotated in one direction from a predetermined position one of said valves will be opened and when the handle is rotated in the other direction the other valve will be opened, said handle also being so mounted on its pivot that it is capable of slight rocking movement in a plane at right angles to the plane in which it rotates whereby said valves may be selectively operated by a rocking movement.

6. A control valve mechanism comprising a casing provided with two chambers and with one port communicating with one of said chambers, a second port communicating with the second chamber and a third port communicating with both of said chambers, a valve in the first named chamber for controlling communication between the third port and the first port, a valve in the second chamber for controlling communication between the second port and the third port, a valve stem for operating each of said valves, said stems extending to the exterior of the casing, a support spaced from and secured to the side of the casing from which the stems extend, a handle having a portion positioned between the support and the casing and pivoted to the under side of the support, and cam means carried by the under side of the handle portion for cooperating with the valve stems whereby the valves

may be selectively opened or closed by rotation of the handle.

7. A control valve mechanism comprising a casing provided with two chambers and with one port communicating with one of said chambers, a second port communicating with the second chamber and a third port communicating with both of said chambers, a valve in the first named chamber for controlling communication between the third port and the first port, a valve in the second chamber for controlling communication between the second port and the third port, a valve stem for operating each of said valves, said valve stems being mounted in said casing separate from said valves and extending to the exterior of the casing, a member for directly contacting and operating said stems and being mounted for rotative movement and for rocking movement in a plane at right angles to its plane of rotation, and means whereby said member may selectively move said stems by either a rotative or a rocking movement.

FRED H. STROUP.