

H. M. AUSTIN, JR.

VALVE.

APPLICATION FILED NOV. 21, 1914.

1,187,960.

Patented June 20, 1916.

2 SHEETS—SHEET 1.

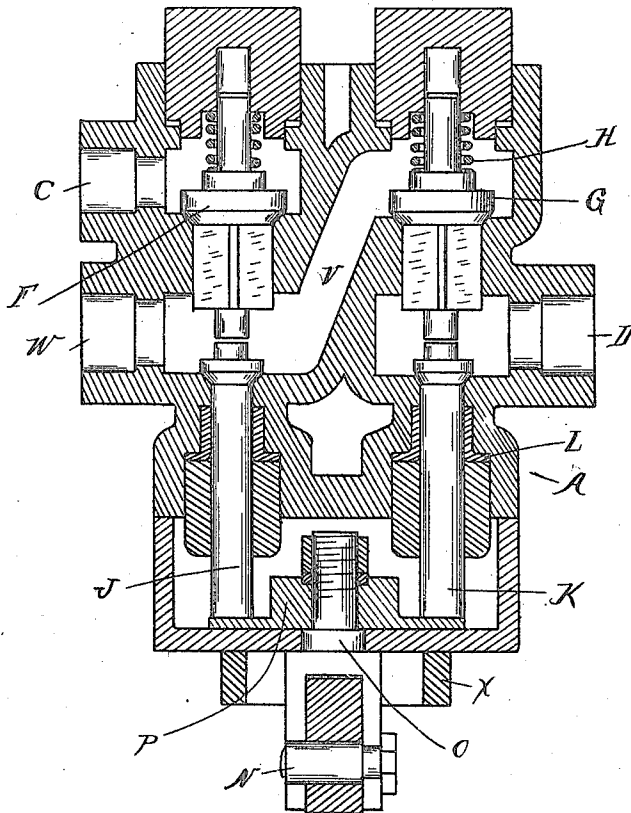


Fig. 1.

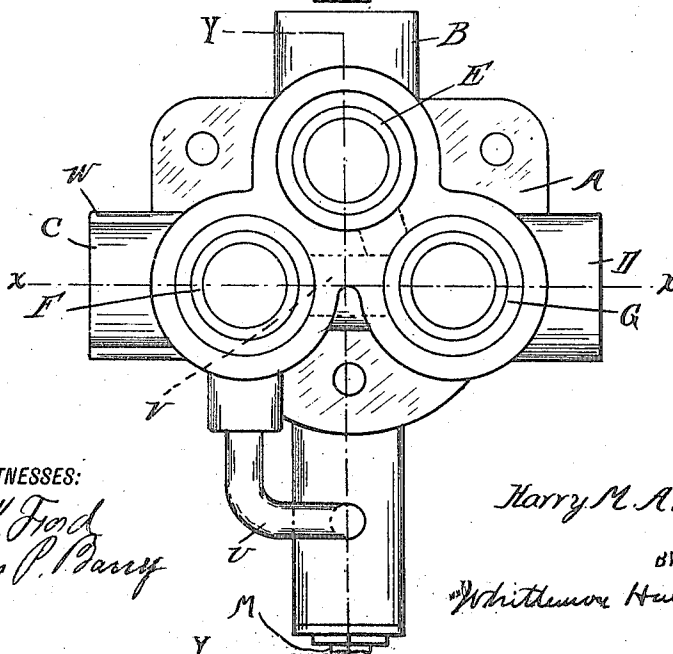


Fig. 3.

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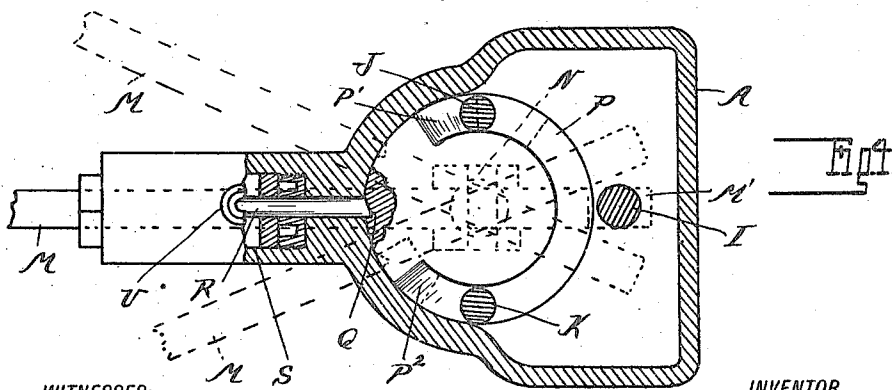
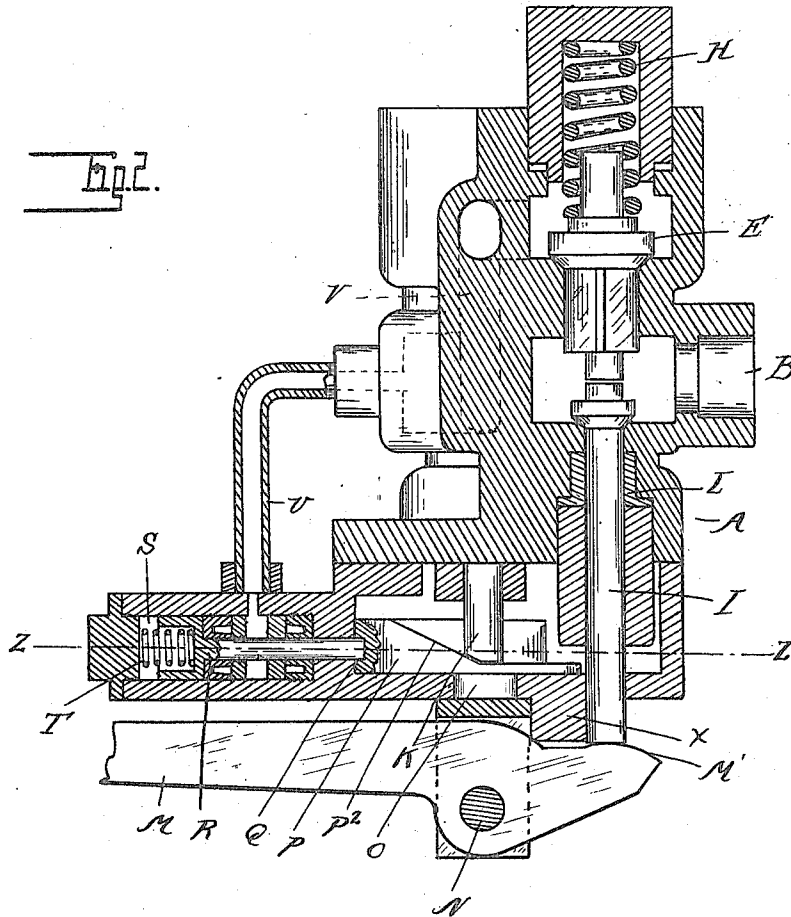
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VALVE.

1,187,960.

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To all whom it may concern:

Be it known that I, HARRY M. AUSTIN, JR., a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to valves designed for the control of motive fluids under different pressure, and it is the particular object of the invention to obtain a construction adapted for use in connection with hydraulic presses. In the operation of such presses it is frequently necessary to move the plunger of the press a certain distance while not under heavy load and then to complete the operation under load. Where the operating fluid is under high pressure force will be wasted in the initial movement of the plunger or piston while free from load. On the other hand if low pressure fluid is employed this will not develop a sufficiently high pressure for the final operation. Heretofore presses have been provided with connections for supplying the fluid at different pressures, so that the low pressure fluid will be used for the initial movement, and the high pressure fluid for the final compression. However, as these valves are independently operated by hand, there is danger that either the operator will waste the high pressure fluid by using it for the initial movement or that failing to close the low pressure valve the high pressure will be relieved.

With the present invention both high and low pressure fluids are controlled by a single valve mechanism so organized that when connection is made with the conduit for one fluid it is automatically cut off from communication with the conduit for the other fluid.

In the drawings,—Figure 1 is a vertical sectional view of the casing with the valve mechanism therein, taken on line *x—x* of Fig. 3; Fig. 2 is a similar view taken on line *y—y* of Fig. 3; Fig. 3 is a top plan view; and Fig. 4 is a sectional view partly in plan, taken on line *z—z* of Fig. 2.

A is a casing containing a plurality of valve chambers and connecting passages.

B is an inlet passage for the low-pressure fluid, C the inlet for the high-pressure fluid,

and D the outlet or exhaust passage for the fluid.

E, F and G are valves respectively controlling the low-pressure inlet, high-pressure inlet and exhaust. These valves are of the puppet type and are preferably arranged upon parallel stems.

H are springs for yieldably holding the valves in closed position.

I, J and K are valve-operating rods arranged in alinement with the stems of their respective valves and passing through packing glands L out of the casing A.

As specifically shown, the operating means for the valves comprises a lever M which is pivotally attached at N to a rotatable shaft O having a cam-wheel P mounted thereon. In the normal position of the parts the lever M is arranged in the plane of the operating rod I for the valve E, and by rocking said lever upon the pivot N a nose portion M' will press upon the rod I actuating the latter to unseat the valve E. The rods J and K are actuated by a rotation of the cam-wheel P in opposite directions from the position where the lever M is in the plane of the stem I, but normally the cam-wheel is locked from rotation by a detent Q. This detent, as shown, engages a notch in the periphery of the cam-wheel, and is secured to a piston R occupying a cylinder S, a spring T yieldably holding the detent in locking engagement. The cylinder S is connected by a conduit U with a passage V in the casing A, which passage is intermediate the valves E, F and G. In the initial position of parts, the pressure of the fluid in the passage V, conduit U and cylinder S will be insufficient to overcome the tension of the spring T, and consequently the detent Q will lock the cam-wheel P in the position shown in Fig. 1. Here the lever M will be in registration with the operating rod I for the valve E, and the valves F and G will be in closed position.

In the operation of the valve the passage V is connected through the outlet W to the conduit leading to the press, while the low pressure and high pressure inlets are connected respectively with a source of fluid under corresponding pressures. In the initial operation the lever M is rocked so as to lift the rod I and unseat the valve E. This will admit the low-pressure fluid from the inlet B to the passage V and through the

outlet W to the press. At the same time a portion of the fluid will pass through the conduit U to the cylinder S and will operate to open the piston R. While the fluid is filling the cylinder of the press or moving the plunger thereof when not under load, the pressure in the cylinder S is insufficient to overcome the pressure of the spring T, and consequently the detent Q remains in engagement with the cam-wheel P. This prevents the rotation of said cam-wheel or the opening of either of the valves F or G. When the press picks up its load the pressure of the fluid will rise until it will actuate the piston R and disengage the detent Q. The operator may then rock the lever M in the reverse direction to close the valve E, after which the lever may be moved laterally to rotate the shaft O and cam P until the lifting portion P' on said cam raises the rod J and unseats the valve F. This will admit the high-pressure fluid into the passage V to perform the high-pressure work in the press. The high-pressure fluid is prevented from exhausting into the low-pressure inlet by the seating of the valve E, which is arranged in such a way that the high-pressure tends to hold it to its seat. To further prevent any possibility of the valve E remaining open when the high-pressure valve F is open guides X are arranged to cooperate with the lever M and to hold the latter from turning while actuating the rod I. Thus, even when the latch Q has been released the operator is prevented from rotating the cam P until the lever M is returned to its normal position, releasing the rod I and permitting the valve E to close. To exhaust the pressure on the fluid after the completion of the operation of the press, the lever M is moved in the opposite direction, which rotates the shaft O and cam P until the lifting portion P² raises the rod K and unseats the valve G. This same movement of the cam releases the rod J and permits the valve F to seat, so that none of the high-pressure fluid will be exhausted.

With the construction of valve as described, the efficiency is greatly increased, as all of the movement which can be performed with low-pressure is accomplished with the low-pressure fluid, and the high-pressure fluid is used solely for the increased pressure required for the completion of the work. Furthermore the construction is such that it is impossible for the operator to use the high-pressure fluid until all of the work which may be performed by low-pressure fluid is accomplished; and it is equally impossible for the operator to make any adjustment by which the high-pressure fluid is exhausted either in the low-pressure supply or through the regular exhaust outlet.

To permit of opening the exhaust valve after the opening of the low-pressure inlet valve and before sufficient pressure is developed in the passage V to release the detent Q, said detent is preferably in the form of a latch permitting the rotation of the member O in one direction or toward the exhaust valve operating position.

What I claim as my invention is:—

1. The combination with high-pressure and low-pressure valves and a device to actuate the former, of means for locking said high-pressure valve actuating device from operation, and means actuated by pressure admitted through said low-pressure valve for unlocking said valve actuating device.

2. The combination with high-pressure and low-pressure valves and a device to actuate the former, of a common chamber to which pressure may be admitted from either of said valves, means for normally locking said high-pressure valve actuating device from operation, and means actuated by the pressure in said common chamber admitted by said low-pressure valve for unlocking said valve actuating device.

3. The combination with high-pressure and low-pressure valves, of a common chamber to which pressure may be admitted by either of said valves, means for alternatively operating said valves, means for locking said means to prevent the operation of said high-pressure valve, and means actuated by pressure in said common chamber for releasing said locking means to permit the actuation of the high-pressure valve.

4. The combination with high-pressure and low-pressure valves, of a common chamber to which pressure may be admitted from either of said valves, means for operating said valves permitting only alternative operation thereof, means for locking said means from initial operation of the high-pressure valve and means operated by pressure in said common chamber for releasing the locking means.

5. The combination with high-pressure and low-pressure valves of a common chamber to which pressure may be admitted from either of said valves, a common actuating device for said valves permitting of alternative operation thereof only, means for locking said device to prevent the initial operation of the high-pressure valve, means operated by the pressure in said common chamber for releasing said locking means, and an exhaust valve for the pressure in said common chamber operable only when both of said high-pressure and low-pressure valves are closed.

6. The combination with a casing containing high-pressure and low-pressure inlets, an outlet and a common chamber to which said inlets and outlet may be connected, of valves respectively controlling the connec-

tion between said inlets and outlet and said chamber; means for opening said valves permitting of alternative operation only, means for locking said means to prevent the initial opening of said high-pressure valve and means operated by the pressure in said common chamber for releasing said locking means.

7. The combination with a casing containing a low-pressure inlet, a high-pressure inlet, an outlet and a common chamber to which said inlets and outlet may be connected, of valves respectively controlling connection between said inlets and outlet and said chamber, a common actuating member for said valves permitting only alternative actuation thereof, means for locking said actuating member from initial engagement with said high-pressure valve, and means for releasing said locking means operated by a predetermined pressure in said common chamber.

8. The combination with a casing containing a low-pressure inlet, a high-pressure inlet, an outlet and a common chamber to which said inlets and outlet are connected, of valves respectively controlling connection between said inlets and outlet and said common chamber, a lever rockable to operate said inlet valve, a member on which said lever is fulcrumed rotatably thereby, cams on said rotatable member for respectively opening said high-pressure inlet and outlet valves in different positions of rotative adjustment, a detent for holding said rotatable member from actuation to operate said high-pressure valve, and means operable by a predetermined pressure in said common chamber for releasing said detent.

9. The combination with a casing contain-

ing a low-pressure inlet, a high-pressure inlet, an outlet and a common chamber to which said inlets and outlet are connected, of valves respectively controlling connection between said common chamber and said inlets and outlet, parallelly-arranged push-rods for respectively actuating said valves, a rotatable cam member for alternatively opening said high-pressure inlet and said outlet valves, a lever rockable to actuate said low-pressure inlet valve-actuating rod when in registration therewith, said lever being mounted on said rotatable member and forming an actuating means therefor, the position of registration being intermediate the positions for respective operation of said high-pressure inlet and exhaust valves, means for initially locking said rotatable member from actuation to its position for operating the high-pressure valve, means for releasing said locking means operated by a predetermined pressure in said common chamber, and additional means for preventing the rotation of said rotatable member while said lever is in the position to open said low-pressure inlet valve.

10. The combination with high-pressure and low-pressure valves, of means for positively operating said valves, the means for positively operating said high-pressure valve being normally locked but automatically released by pressure admitted through said low-pressure valve.

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

HARRY M. AUSTIN, JR.

Witnesses:

ALBERT F. KEEN,
WILLISTON A. KEEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."