T. S. GRIMES.

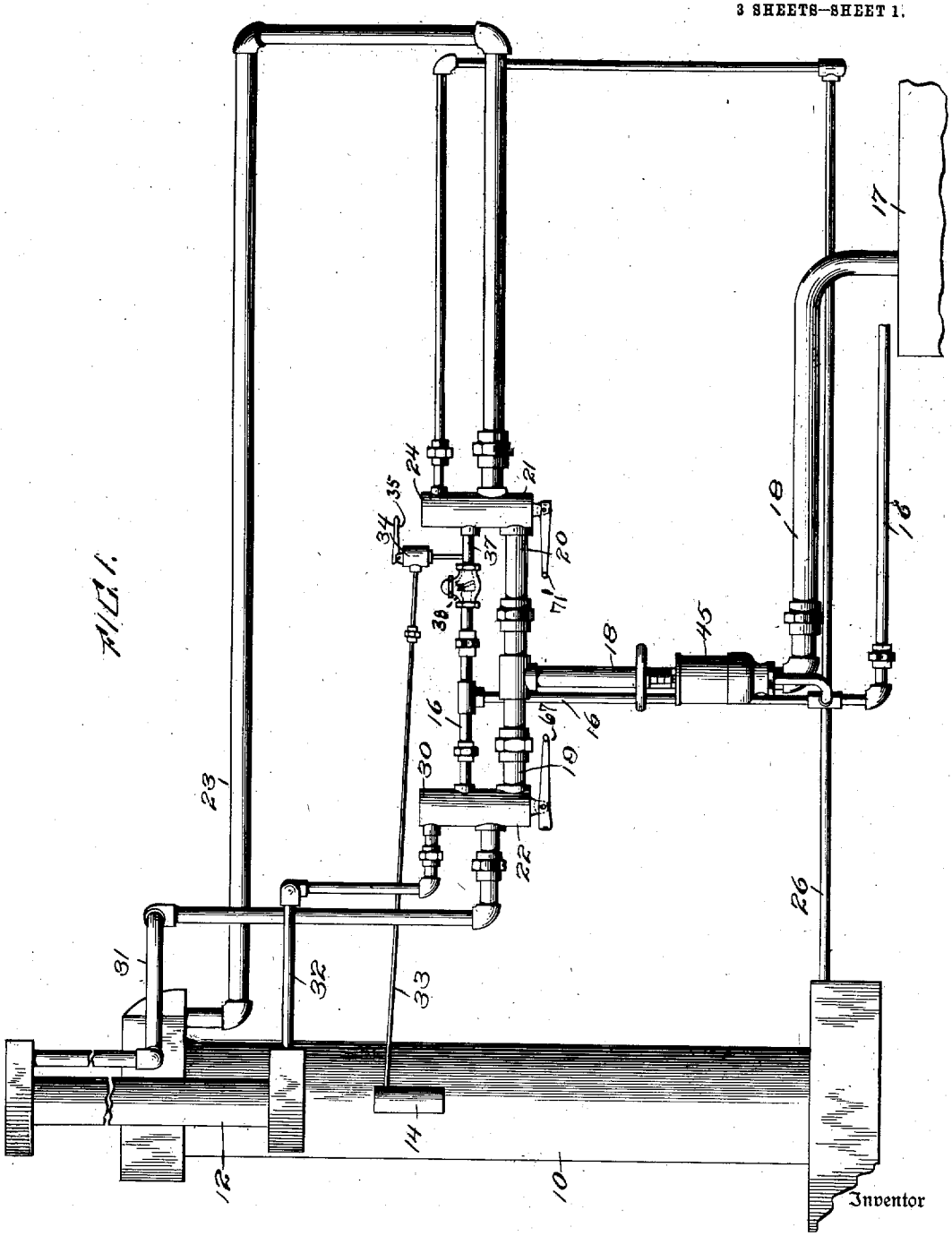
MEANS FOR OPERATING HYDRAULIC PRESSES.

APPLICATION FILED JUNE 3, 1913.

1,120,474.

Patented Dec. 8, 1914.

3 SHEETS—SHEET 1.



Witnesses

R. S. Trogner.

H. C. Anson

Inventor

T. S. Grimes

By Mason Fenwick & Lawrence

Attorneys

T. S. GRIMES.

MEANS FOR OPERATING HYDRAULIC PRESSES.

APPLICATION FILED JUNE 3, 1913.

1,120,474.

Patented Dec. 8, 1914.

3 SHEETS—SHEET 2.

FIG. 2.

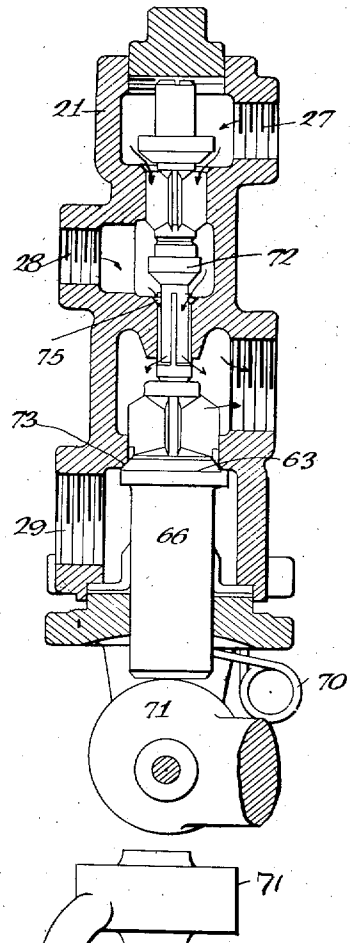


FIG. 3.

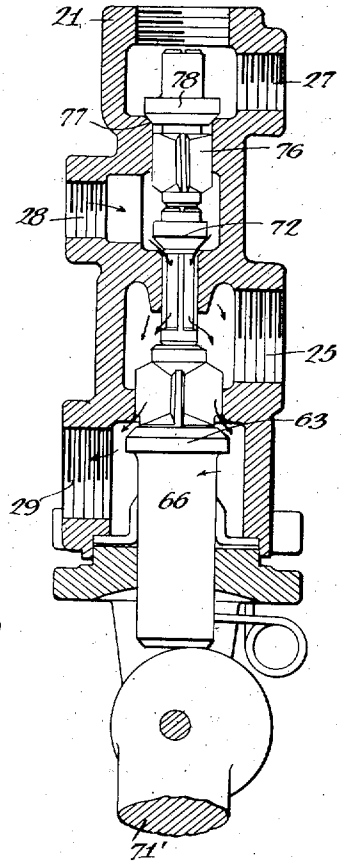


FIG. 4.

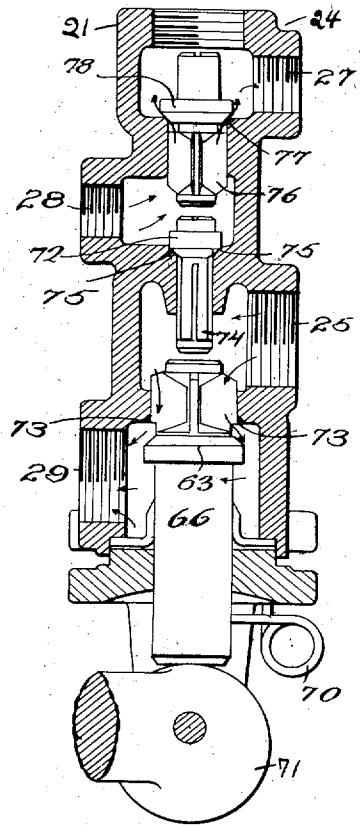
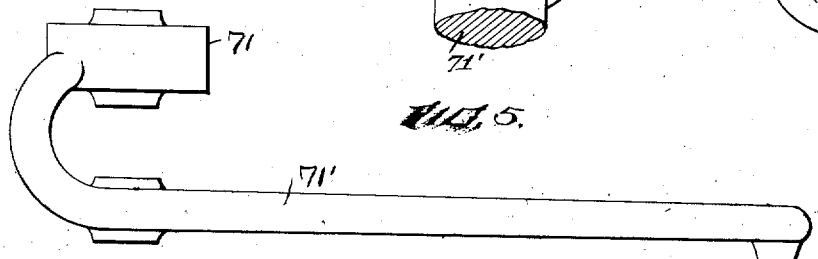


FIG. 5.



Witnesses

R. S. Rogner.

H. C. Hanson

Inventor

T. S. Grimes

By Mason Fenwick & Lawrence

Attorneys

T. S. GRIMES.

MEANS FOR OPERATING HYDRAULIC PRESSES.

APPLICATION FILED JUNE 3, 1913.

1,120,474.

Patented Dec. 8, 1914.

3 SHEETS—SHEET 3.

FIG. 6.

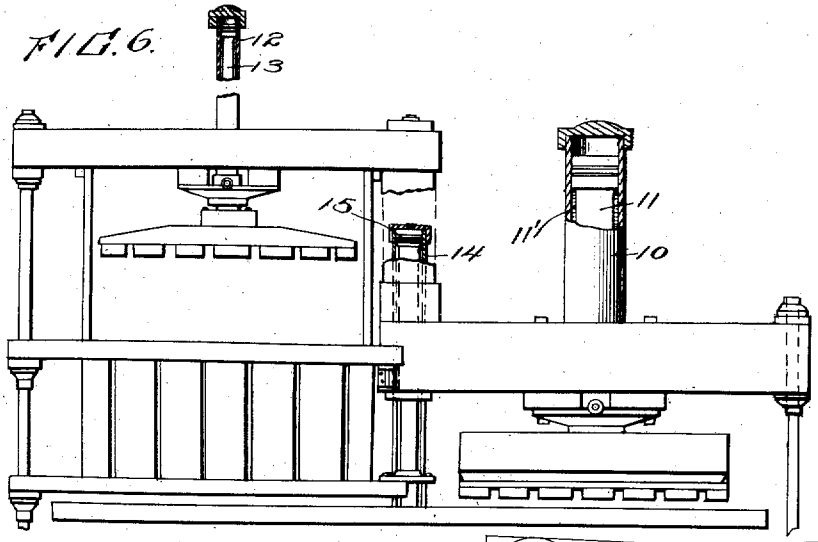


FIG. 7.

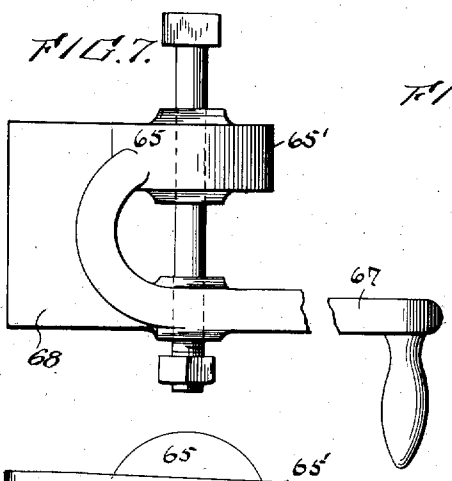


FIG. 9.

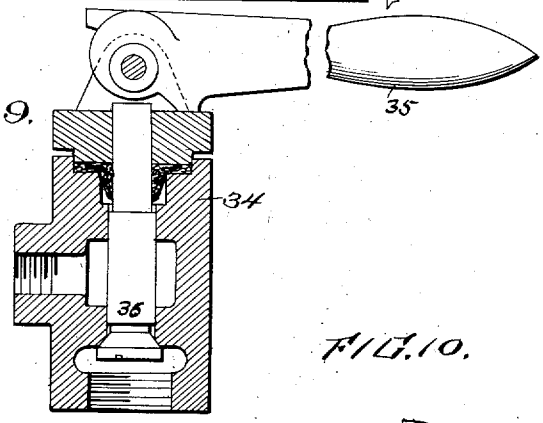
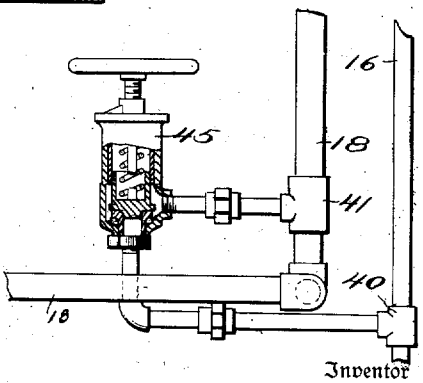


FIG. 10.



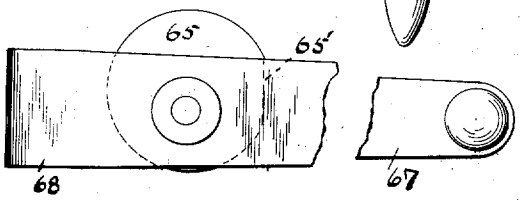


FIG. 8.

Inventor

T. S. Grimes

Witnesses

R. S. Trogner.

O. C. Samson

By Mason Fenwick & Lawrence

Attorneys

UNITED STATES PATENT OFFICE.

THADDEUS S. GRIMES, OF COLUMBUS, GEORGIA.

MEANS FOR OPERATING HYDRAULIC PRESSES.

1,120,474. Specification of Letters Patent. Patented Dec. 8, 1914.

Application filed June 3, 1913. Serial No. 771,560.

To all whom it may concern:

Be it known that I, THADDEUS S. GRIMES, a citizen of the United States, residing at Columbus, in the county of Muscogee and State of Georgia, have invented certain new and useful Improvements in Means for Operating Hydraulic Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means for operating hydraulic presses, and more particularly to presses employing a plurality of hydraulic cylinders.

In the accompanying drawings forming part of this application, Figure 1 is a diagrammatic view showing the cylinders and the system of distribution, Fig. 2 is a vertical section of a device for controlling the admission and discharge of fluid to and from the cylinders. Figs. 3 and 4 are similar views showing the controlling device discharging through other ports. Fig. 4 may be regarded as primarily representing controlling device 21, shown at the right in Fig. 1, but Figs. 2, 3 and 4 show relative positions of both controlling devices 21 and 22, the manner of referring to the views permitting this course. Fig. 5 is a side elevation of the handle and eccentric for operating the controlling device of the packing cylinder. Fig. 6 is a side elevation of a portion of a double box press, such as that shown in my patent referred to below, the upper bar of the lifting frame for the press boxes being shown at the bottom of the figure. Figs. 7 and 8 are detail views of the handle and flattened eccentric for operating the controlling device of the tramping cylinder. Fig. 9 is a section of the valve for the lifting cylinder. Fig. 10 shows the relief valve in section, and the connections therefor.

In my Patent No. 1,068,336, granted July 22, 1913, a double-box cotton press is shown, the boxes being mounted in a frame which is rotatable on a central support in order that each box may at the proper time be brought under a tramping plunger, operated by hydraulic means, and then under a packing plunger, similarly operated. A third hydraulic cylinder serves to raise the frame from the base, when shifting the boxes.

In the patent above referred to no particular means for controlling the hydraulic cylinders are shown or described, and the present application is filed for the purpose of illustrating and claiming constructions designed and intended for that purpose.

The cylinder carrying the tramping plunger, for convenience termed the tramping cylinder, and the packing cylinder, are each controlled by a device which might be termed a valve, but which in reality comprises a casing having a central bore, a port leading to the top of the cylinder, a port leading to the bottom of the cylinder, a port admitting fluid under pressure (located between the ports just mentioned), and a fourth port at the bottom of the casing through which water flows back to the pump tank. The casing is provided with three diaphragms, one being located between each two ports, each diaphragm having a valve seat and a separate valve member.

The valve members are positively controlled by an eccentric bearing against the lower member and causing that member to become seated and the other members to be unseated (Fig. 2). When the eccentric permits the lower valve member to become fully unseated, the position of the other members will be determined by fluid pressure (Fig. 4).

The controlling devices here described cooperate in the manner specified below, in the operation of tramping, packing and shifting the boxes, and controlling the flow of the fluid for building up or relieving the pressure as desired.

The packing cylinder is indicated by 10, its plunger by 11, the tramping cylinder by 12 and its plunger by 13. The smaller cylinder, termed the lifting cylinder, is shown at 14, and it is provided with a plunger 15. These cylinders are supplied with fluid under pressure by means of the main supply pipe 16 leading from a pump. A tank 17 receives the water flowing from the cylinders, this tank having connection with the controlling devices by means of discharge pipe 18 and connections 19 and 20.

Controlling device 21 is connected with the packing cylinder by service pipes 23 and 26. The former leads from the upper portion of the packing cylinder to the casing 24 of controlling device 21 and to port 25

thereof, while pipe 26 leads from the lower end of the packing cylinder to the uppermost port 27 of the same casing. Supply pipe 16 is connected with this casing by means of port 28 and water is discharged from the casing through the lowermost port 29, pipe connection 20, and main discharge 18. Casing 30 of controlling device 22 is similarly connected with the tramping cylinder 12 by means of service pipes 31 and 32, and also with supply pipe 16 and connection 19 of the main discharge pipe 18.

Lifting cylinder 14 is supplied by pipe 33 leading to valve 34 operated by lever 35 connected with valve member 36. Fluid is admitted to the casing of valve 34 from that portion 37 of the main supply pipe 16 which enters the casing of controlling device 21, and a check valve 38, located as shown in Fig. 1, permits the operation of controlling device 22 and cylinder 12 with its plunger, independently of the other cylinders and plungers. The check valve makes it possible to hold the fluid in the packing cylinder notwithstanding the operation of the other cylinder and the reduction in pressure incident thereto.

A relief valve, designated 45, is connected with the supply pipe 16 at the point 40, and with discharge pipe 18 at the point 41. By adjusting this valve the pressure may be varied from, say, 1200 pounds per square inch to 2000 pounds per square inch, the latter pressure being required for a large bale of dry fluffy cotton.

Within the casing 24 between the ports 25 and 29 is a diaphragm having a seat 73 against which closes upwardly the head 63 of a valve 66 whose stem projects above and below its head and at its lower end outside the casing. Here it makes contact with an eccentric 71 having an operating lever or handle 71′ by which the eccentric may be turned into various positions; and the valve is caused to descend and to open by water pressure, assisted by a spring 70 connecting the valve stem with the casing. Between the ports 25 and 28 is another diaphragm having a seat 75 upon which closes downwardly the head 72 of a valve 74 whose stem projects above and below its head and at its lower end stands above the upper end of the stem of valve 66 just described. The relative positions of parts are such that when the valve 66 is closed the valve 74 is lifted off its seat and opened wide, when the valve 66 stands partly open as seen in Fig. 3 the valve 74 is nearly closed, and when the valve 66 is wide open as seen in Fig. 4 the valve 74 is closed.

Between the ports 27 and 28 and above the valve last described is a diaphragm having a seat 77 upon which closes downwardly the head 78 of a valve 76 having a stem projecting down through the diaphragm and standing just above the stem of the valve 74 last described. The relative positions of parts are such that this valve 76 is closed when the valve 74 is partly or wholly closed; but is opened by water pressure, or by said valve 74 only when the latter is raised to its extreme height as seen in Fig. 2.

Within the casing 30 of the controlling device 22 the arrangement of valves is a duplicate of that just described, but as seen in Fig. 7 the eccentric 65 has a flattened portion 65′; and, as seen in full lines in Fig. 8 and dotted lines in Fig. 7, its handle 67 is preferably counter-balanced by a weight 68 whereby this eccentric will remain set in any position to which it is moved. In Figs. 2, 3 and 4 the main supply port 28 is shown on the same side of the casing as the main discharge port 29, and as the valve 66 serves only to control the discharge of water through the port 29 we may call this the "discharge valve." As the other two valves 74 and 76 control the service system, we may call them inlet and outlet service valves respectively.

On this understanding, the operation is as follows: With the parts standing in the working position illustrated in Fig. 2, water is forced in through the main supply port 28, passes down through the now open inlet service valve 74, out the port 25, and flows into the pipe 23 of the packing cylinder or the pipe 31 of the tramping cylinder, according to whether this is the packing control or the tramping control. In either case the water then passes through the service pipe to the upper end of the cylinder and above the piston or plunger therein (as seen at 11 in Fig. 6) with the result that its plunger is forced downward to its work. The water beneath the piston or surrounding said plunger, as indicated at 11′ in Fig. 6, is forced out the lower end of the same cylinder and driven along the other service pipe 26 or 32 into the upper service port 27, whence it follows the course of the arrows in Fig. 2 and flows through the now open outlet service valve 76 and mingles with the water being forced out the port 25. Hence it will be seen that by moving the handle 71′ or 67 to the right, the eccentric 71 or 65 raises the discharge valve 66 and closes it, leaving no escape through the main discharge port 29, the result being that the water supply through the port 28 is utilized to cause the forcible descent of the plunger within either cylinder. Having reached its lowest position, the plunger may be held there within the cylinder by turning the handle so that the eccentric occupies the position shown in Fig. 3 wherein the valves are moved to what might be called the "holding position" of parts. Here the

upper or outlet service valve 76 is closed because the water beneath the piston in the cylinder has been driven out and there is no necessity that this valve remain longer open. The lower or inlet service valve 74 is now partly closed, and its descent to this position permits the closing of the upper valve 76. The water flows along the course indicated by the arrows, and some of it is driven along the supply service pipe connected with the port 25—by means of which a certain amount of pressure is applied above the plunger in the cylinder to hold said plunger down—while the remainder of the water passes through the now partly open discharge valve 66 and the port 29, and returns through the discharge pipe 18 to the tank 17. In this position of parts pressure may be maintained on the bale indefinitely, and the handle 71′ or 67 remains set in a vertical position.

To raise either plunger within its cylinder, the handle is turned so that the eccentric occupies the position shown in Fig. 4, and the valves are therefore caused to assume what might be called the "lifting position" of parts. Here the discharge valve 66 is wide open and the water flowing from the upper end of either cylinder along the service pipe through the port 25 finds a free escape through the discharge port 29 and back to the tank. But the inlet service valve 74 is closed, so that the supply water flowing in through the port 28 lifts the valve 76 and flows out the port 27 along the service pipe 32 or 26 and causes the rise of the piston and plunger as seen at 11 in Fig. 6.

The connection of the supply pipe 16 with both controls and interposition of the check valve 38 in one branch thereof, are for the purpose of serving as a check upon the operator to prevent him from manipulating the controls in improper order. That is to say, after the parts of the proper control have stood in the lifting position of Fig. 4 for a sufficient length of time, the flow of water will cease and back pressure will close the check valve 38, thereby preventing the escape of any water from the packing cylinder when the pressure is relieved by actuating the tramping control. The latter device is then manipulated to effect tramping of the cotton in the other side of the press described above. As usual the plunger of the packing cylinder remains depressed while the bale is being tied, but this detail is well understood, and needs no further elaboration.

What I claim is:

1. In a device of the class described, a cylinder, a plunger therein, a casing having inlet and outlet ports connected with the upper and lower ends of the cylinder, said casing being also provided with main supply and discharge ports, a plurality of devices mounted in alinement within the casing for controlling the flow of water from the supply port through the remaining ports of the casing, and means for moving one of said devices manually and the others by the movement of the first.

2. In a device of the class described, a cylinder, a plunger therein, a casing having ports connected with the upper and lower ends of the cylinder, said casing being also provided with supply and discharge ports, a plurality of devices independently mounted within the casing, and mechanical means for simultaneously moving the said devices in the casing in one direction, the movement of certain of said devices in the other direction being controlled by fluid pressure.

3. In a device of the class described, a cylinder, a plunger therein, a casing having a plurality of ports and a bore connected with all of said ports, certain of the ports being connected with the upper and lower ends of the cylinder respectively, devices independently mounted within the casing for closing the bore between each two ports, and means for operating said devices simultaneously in one direction, their movement in the opposite direction being pressure-controlled.

4. In a device of the class described, a plurality of cylinders, plungers therein, a plurality of casings each having inlet and outlet ports connected respectively with the upper and lower ends of one of the cylinders, means within the casing for controlling the ports, single means for admitting fluid to both casings, and means for retaining fluid in one of the cylinders independently of the operation of the plunger in the other cylinder.

5. In a device of the class described, a plurality of cylinders, plungers therein, a plurality of casings each having supply and discharge ports and each having ports connected respectively with the upper and lower ends of one of the cylinders, means within each casing for controlling the ports, single means for admitting fluid to both casings, a third cylinder connected with said means last mentioned, a plunger for the third cylinder, and single means for retaining fluid in the third cylinder and in one of the other cylinders independently of the operation of the plunger in the remaining cylinder.

6. In a device of the class described, a plurality of cylinders, plungers therein, a plurality of casings each having supply and discharge ports and each having inlet and outlet ports connected respectively with the upper and lower ends of one of the cylinders, means within each casing for controlling the ports, single means for admitting fluid to both casings, a third cylinder con-

nected with said means last mentioned, a plunger for the third cylinder, and single means for retaining fluid in the third cylinder and in one of the other cylinders independently of the operation of the plunger in the remaining cylinder, the plunger of the third cylinder operating automatically when pressure is reduced in the cylinder, controlled in connection with the third cylinder, by said fluid-retaining means.

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

THADDEUS S. GRIMES.

Witnesses:

R. L. BRASWELL,

WM. F. LEIPE.