July 1, 1947. R. K. SEDGWICK 2,423,120

VALVE ARRANGEMENT

Filed Dec. 30, 1943 3 Sheets-Sheet 1

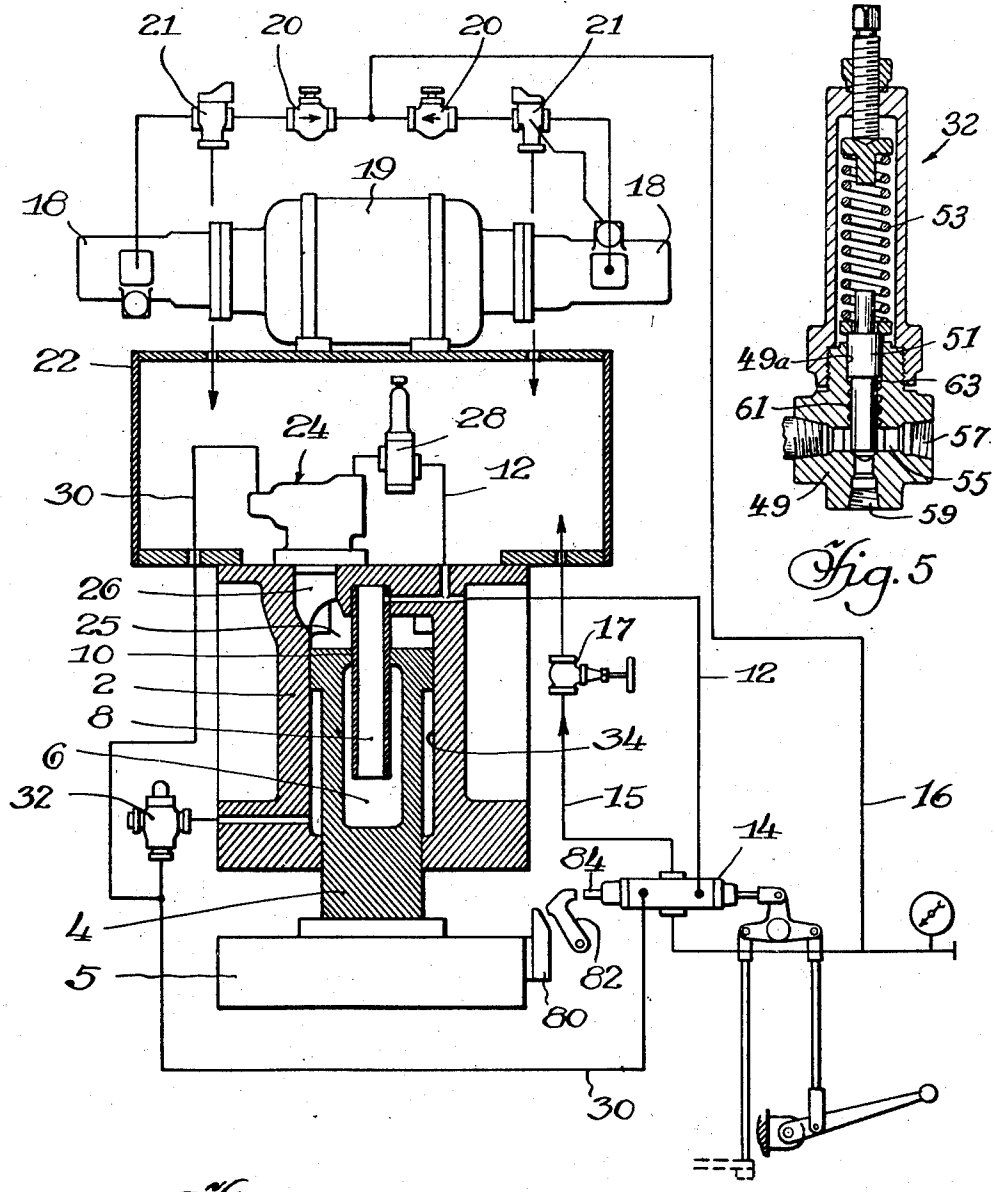


Fig. 1

Fig. 5

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VALVE ARRANGEMENT

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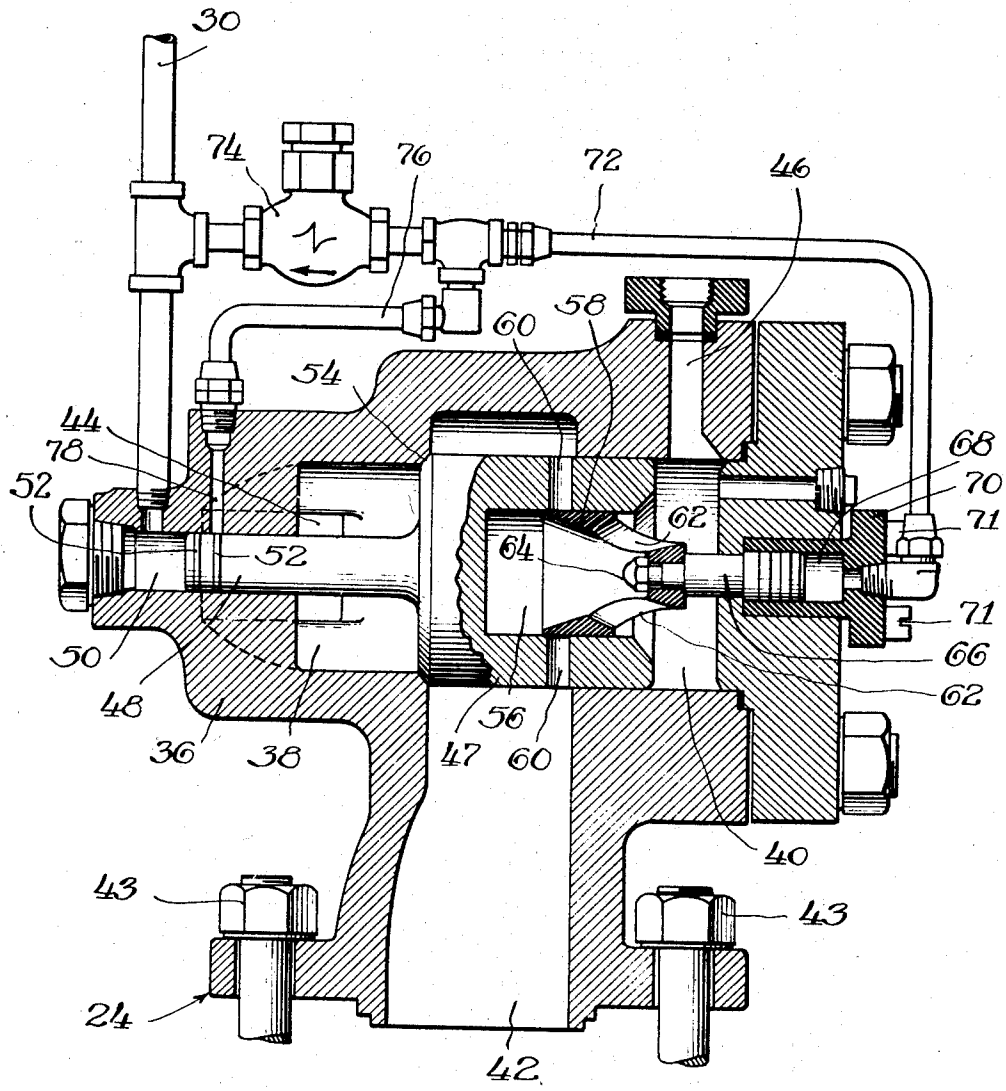


Fig. 2

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VALVE ARRANGEMENT

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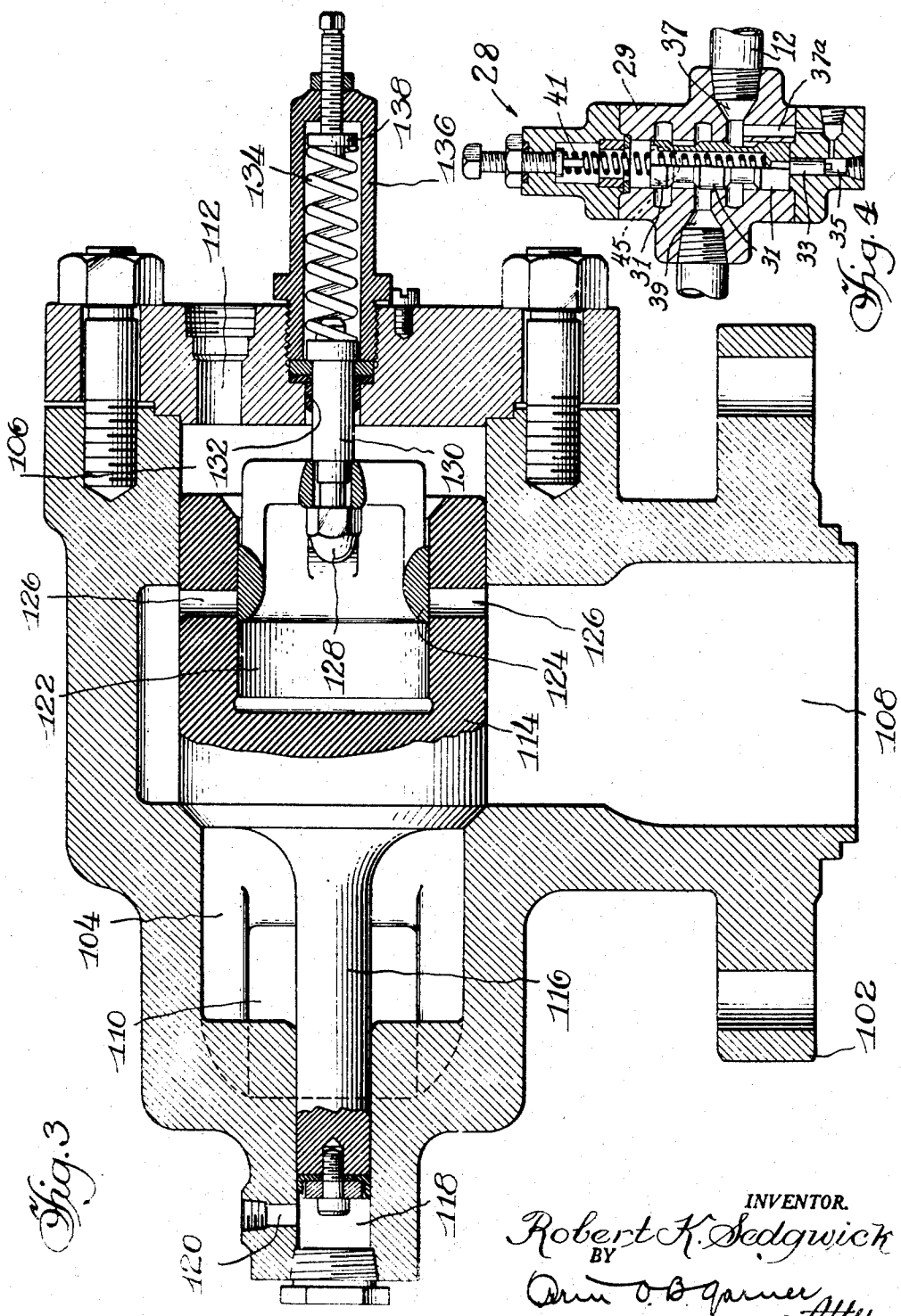


Fig. 4

Fig. 3

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UNITED STATES PATENT OFFICE

2,423,120

VALVE ARRANGEMENT

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Application December 30, 1943, Serial No. 516,207

10 Claims. (Cl. 121—46.5)

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My invention relates to hydraulic circuits and more particularly to a circuit comprising a prefill valve for an hydraulic press or the like.

My invention comprehends a novel prefill valve operable to supply low pressure fluid, such as oil, to the press cylinder as the ram moves toward the work to engage the platen therewith, said valve being operable to supply high pressure fluid to the press cylinder after the platen has engaged the work.

The general object of my invention is to design a prefill valve, such as above described, having a minimum number of manufactured parts and capable of long life in service.

A further object of my invention is to provide an arrangement in which the main valve stem moves to closed position before high pressure fluid is admitted to the press, thus preventing the high pressure fluid from passing through the valve and into the tank which contains the reservoir of low pressure fluid.

Another object of my invention is to design a valve in which the valve stem is maintained in closed position until pressure is bled off from the press cylinder preparatory to pulling back the ram from the work, thus preventing shocks to the tank resulting from admission thereto of sudden violent surges.

In the drawings:

Figure 1 is a diagram of an hydraulic circuit utilizing my novel prefill valve.

Figure 2 is a sectional view through the prefill valve, illustrating the parts thereof in detail.

Figure 3 is a sectional view generally comparable to Figure 2 but illustrating a modification of my novel prefill valve.

Figures 4 and 5 are longitudinal sectional views, respectively, of the high pressure inlet valve and the holding valve of the circuit shown in Figure 1.

Describing my invention in detail, the press comprises a cylinder 2 and a ram 4 reciprocal therewithin, said ram carrying a platen 5 for engagement with the work, as will be clearly understood by those skilled in the art. The ram 4 is hollowed out as at 6 to form a chamber enclosing a hollow tube 8, the chamber 6 being machined at its upper end as at 10 to afford a substantially liquid-tight fit with the tube 8. Actuating fluid, such as oil, under pressure is conveyed to the tube 8 through the high pressure pipe line 12 connected to an operating valve 14 of conventional design, fluid being conveyed to the valve 14 through the supply line 16 which is connected to the pumps 18, 18 through conventional check valves 20, 20 and conventional relief valves 21, 21. It may be noted that the valve 14 is adapted in its neutral position to direct pressure fluid from the line 16 to the tank 22 through a line 15 with a conventional stop cock 17 therein. The pumps are driven by a motor 19 supported on a tank

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or reservoir 22 within which is mounted the prefill valve, generally designated 24, and hereinafter more fully described, said valve communicating with the cylinder space constituting the advance chamber 25 above the ram 4 through a passage 26 in the top of the cylinder 2.

The high pressure line 12 is connected to one end of the prefill valve through the high pressure inlet valve 28 of conventional design, and the opposite end of the prefill valve 24 is connected to the high pressure pull back line 30, which is connected through a conventional holding valve 32 to the pull back chamber 34 in the cylinder 2 intermediate the ends of the ram 4. The pull back line is connected to the operating valve 14.

The valve 28, which is shown in detail in Figure 4, comprises a casing 29 with an internal cylindrical bore affording a substantially fluid-tight slidable fit for three cylindrical spools 31 of a valve stem having a piston 33 mounted on its lower end and received within a complementary cylinder 35 in the casing 29. The casing comprises ports 37 and 39 connected respectively to the line 12 and the prefill valve 24. The port 37 is connected to a passage 37a in the casing 29 communicating with the cylinder 35. Thus high pressure fluid in the line 12 is transmitted to the cylinder 35, thereby acting on the piston 33 to raise the valve stem to its open position against the resistance of an adjustable spring 41, whereupon fluid may pass from the line 12 and the port 37 to the port 39 and thence to the prefill valve 24 for a purpose hereinafter described in connection with the operation of the prefill valve. When the line 12 is exhausted, as hereinafter described, the spring 41 moves the valve stem to its closed position accommodating unrestricted flow of fluid from the port 39 to the tank 22 through a port 45 in the casing 29, said port 45 being indicated by a dotted line in Figure 4.

It may be noted at this point that the function of the holding valve 32 is to maintain a predetermined pressure in the pull back chamber 34, thus holding the ram in elevated position, as seen in Figure 1, until the desired pressure is built up within the chamber 6 to move the ram into engagement with the work. The valve 32 is shown in detail in Figure 5 and comprises a casing or body 49 with a cylindrical bore 49a receiving a stem or spindle 51 spring pressed to its closed position by an adjustable spring 53. The casing 49 comprises a chamber 55 connected by ports 57 and 59, respectively, to the chamber 34 and the line 30, and the casing 49 comprises a spiral groove 61 connecting the chamber 55 to a piston area 63 on the spindle 51. Thus pressure within the chamber 34 is transmitted through the port 57 to the chamber 55 and thence through the spiral groove 61 to act on the piston area 63, thereby urging the stem 51 to its

open position, whereupon fluid may flow from the chamber 34 to the line 30 on the advance stroke of the ram 4, as hereinafter described. Upon release of pressure in the chamber 34, the spring 53 moves the stem 51 to its closed position. It will also be understood that pressure in the line 30 on the retraction stroke of the ram 4 is operable to move the stem 51 to its open position, thereby admitting pressure fluid from the line 30 through the port 59, the chamber 55 and the port 57 to the return chamber 34.

Referring now to Figure 2 wherein the prefill valve 24 is illustrated in detail, it will be seen that the valve comprises a body 36 having a cylindrical chamber 38 at one end thereof and a cylindrical chamber 40 at the opposite end thereof, both chambers communicating with the intervening outlet passage 42 which is connected to the before-mentioned passage 26 in the top of the cylinder 2, the body 36 of the prefill valve being secured to the top of said cylinder by means of stud and nut assemblies 43, 43. At each side thereof the body 36 comprises the cored inlet opening 44 for the chamber 38, an inlet opening 46 also being provided for the chamber 40, said opening 46 affording a connection to the high pressure line 12.

The valve stem 47 is provided at one end thereof with a cylindrical portion afforded a sliding fit within the chamber 40, the opposite end 48 of the stem 47 being a pistonlike member of reduced diameter and extending through the chamber 38 into the cylinder 50 formed within the body 36. A plurality of piston rings 52, 52 are provided for the pistonlike element 48 of the valve stem.

The larger-diameter portion of the valve stem 47 is provided with a seat 54 intermediate the ends of the stem for cooperation with a complementary seat portion of the body 36 formed at the inner extremity of the chamber 38, and the larger-diameter portion of the stem is hollowed out as at 56 to form a cylindrical chamber within which a ring valve 58 reciprocates, said ring valve being operable in its closed position to close the inner extremities of the ports 60, 60, extending through the valve stem and communicating with the chamber 56 therewithin.

The ring valve 58 comprises the ports 62, 62 therethrough affording means of communication between the stem chamber 56 and the body chamber 40, and the ring valve is mounted by means of a nut 64 on a pistonlike spindle 66 which reciprocates within a complementary cylinder 68 in the spindle cap 70, said cap being secured to the body 36 by means of the cap screws 71, 71.

The high pressure pull back line 30, as best seen in Figure 2, is connected to the cylinder 50 and comprises a branch line 72 communicating with the cylinder 68 through the one-way check valve 74. A by-pass line 76 is connected to the branch 72 at a point intermediate the valve 74 and the cylinder 68, and said by-pass line communicates with the cylinder 50 through a port 78 in the body 36.

The manner in which my novel prefill valve functions is best understood by a description of the operation of the press. Assuming that the operator desires to engage the platen 5 with the work, high pressure fluid is directed into the line 12 and at the same time pressure in the pull back line 30 is relieved and the same is opened to discharge by means of the operating valve 14. This causes pressure to be built up within the chamber 6 of the ram through the tube 8, thus causing the ram to move downwardly to engage the platen 5 with the work. Under these conditions, the stem 47 of the prefill valve 24 is in its open position with the seat 54 disengaged from the complementary body seat and with the ports 60, 60 disposed within the chamber 40. The manner in which the stem 47 is moved to its open position is hereinafter more fully described in connection with the retraction stroke of the ram 4. Thus, fluid is permitted to flow from the tank 22 through the openings 44, 44 of the body into the chamber 38 thereof and downwardly through the passages 42 and 26 into the cylinder space 25 which becomes increasingly large as the ram 4 moves downwardly.

When the platen 5 engages the work, the resulting resistance to downward movement of the ram 4 causes pressure to be built up within the chamber 6 and the high pressure line 12 to a predetermined value at which the high pressure inlet valve 28 opens to permit communication between the high pressure line 12 and the chamber 40 through the inlet opening 46 of the prefill valve. The increasing pressure in the chamber 40 causes the stem 47 to move toward the left to its closed position until its seat 54 engages the complementary seat portion of the body 36 to close the inner extremity of the chamber 38, thereby cutting off the tank or reservoir 22 from the passage 42 of the prefill valve.

At this point, pressure builds up against the spindle 66 and the nut 64 associated with the ring valve 58, said spindle acting as a small piston. At a predetermined pressure, the one-way check valve 74 opens to permit discharge of fluid from the branch 72 into the pull back line 30, thus permitting the ring valve 58 and its spindle 66 to move toward the right to their open position in response to the increasing pressure in the chambers 40 and 56.

Thus, with the main stem 47 in its closed position and the ring valve 58 in its open position, high pressure fluid is permitted to pass through the inlet 46 and the chamber 40 through the ports 62, 62 and 60, 60 and into the passage 42 of the prefill valve from which the high pressure fluid is conveyed to the cylinder space 25 above the ram. This permits utilization of the full cross-sectional area of the ram in building up pressure against the work.

When it is desired to retract or pull back the platen 5 from engagement with the work, the high pressure line 12 is opened to discharge, and high pressure fluid is directed into the pull back line 30 which communicates with the pull back chamber 34 through the holding valve 32.

Pressure in the pull back line 30 is transmitted to the prefill valve cylinder 50, and as soon as the pressure in the chambers 40 and 56 has been sufficiently exhausted through the line 12, which is now open to discharge, the stem 47 is moved toward the right to its open position. It will be understood that the valve 28, as above described, is adapted in its closed position to accommodate flow of fluid from the prefill valve 24 to the tank 22. Thus, when the line 12 is opened to discharge and pressure fluid is admitted to the pull-back line 30 which is connected to the cylinder 50, the stem 47 may readily move toward the right, as seen in Figure 2, to its open position. In this connection it should be emphasized that the stem 47 does not move to its open position until pressure in the chambers 56 and 40 has been exhausted for the reason that the effective cross-sectional area of the larger-diameter portion of

the stem 47 is considerably greater than the smaller-diameter portion 48 thereof. By virtue of this arrangement, high pressure fluid is prevented from entering the tank 22 during a pull back operation, and it will be understood by those skilled in the art that this is a valuable feature in that it prevents damage to the tank 22 consequent upon the admission thereto of violent surges.

When the small end 48 of the stem 47 moves to the right, as seen in Figure 2, past the port 78, pressure is transmitted therethrough and through the by-pass line 76 and the branch line 72 to the cylinder 68, thus urging the spindle 66 and the ring valve 58 toward the left into their closed position for the next cycle of the press.

It may be noted that when the stem 47 is in its open position, the ports 60, 60 are disposed within the chamber 40, thereby preventing fluid from passing through the chambers 56 and 40 as the ram moves upwardly within the cylinder 2. Thus, the fluid from the cylinder space 25 above the ram is forced back into the tank 22 through the passage 42 and the chamber 38 of the prefill valve.

When the platen has been pulled back to its proper retracted position, the stroke control rod 80 (Figure 1), mounted thereon, engages the pivoted operating member 82 and by a cam action urges said operating member into engagement with the portion 84 of the operating valve, whereby the latter is operative in conventional manner to relieve the pressure in the pull back line 30, as will be clearly understood by those skilled in the art.

It will be understood that although the illustrated embodiment of my invention comprises an arrangement in which the prefill valve is mounted within the tank 22 so that the fluid therein may enter the prefill valve through the inlet openings 44, 44 in the body 36, if desired, the prefill valve may be disposed in a position exterior of the tank 22 and may be connected therewith by any suitable fittings associated with the inlet openings 44, 44.

Referring now to Figure 3 which illustrates a modification of my novel prefill valve, the body 102 comprises the spaced chambers 104 and 106 and the intervening outlet passage 108 communicating therewith. At each side thereof the chamber 104 is provided with an inlet opening 110 and an inlet passage 112 is provided for the chamber 106, said inlet passage 112 being adapted for connection to the high pressure line 12, and the inlet openings 110, 110 being adapted to permit passage of fluid from and to the associated tank.

The stem 114 is substantially identical with that described for the previous embodiment and comprises the pistonlike portion 116 of reduced diameter at one end thereof for reciprocation within the cylinder 118 formed in the body 102, said cylinder being connected by means of a port 120 to the pull back line 30, as in the previously described embodiment.

The stem 114 is formed with a cylindrical chamber 122 therein for the reception of the ring valve 124 which is adapted to open and close the ports 126, 126 communicating with the stem chamber 122. The ring valve 124 is mounted by means of a nut 128 on the pistonlike spindle 130 which projects through an opening 132 in the body 102 for abutment with a coil spring 134 housed within a spring cap 136 secured in any

convenient manner to the body, the spring 134 being adjustably compressed against the spindle 130 by means of an adjustable spring button 138.

It will be understood that the embodiment illustrated in Figure 3 is substantially identical with that shown in Figure 2 except for the fact that the ring valve 124 is actuated to its closed position by the spring 134, whereas, in Figure 2 the ring valve is hydraulically actuated to its closed position. Thus, during the advance stroke of the ram 4 as pressure builds up in the prefill valve chamber 106, the stem 114 is urged to its closed position and thereafter, as pressure increases in the chamber 106, the ring valve 124 is urged to its open position, toward the right as seen in Figure 3, against the resistance of the spring 134. On the pull back stroke of the ram, the chamber 106 is exhausted and high pressure fluid is admitted to the cylinder 118 through the pull back line 30, thus urging the stem 114 to its open position with the ports 126, 126 disposed within the chamber 106. As soon as the pressure in the chamber 106 has been sufficiently exhausted to permit movement of the stem 114 to its open position, the ring valve 124 is urged to its closed position by means of the spring 134, and the valve is ready for the next cycle of the press.

It is to be understood that I do not wish to be limited by the exact embodiments of the device shown which are merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In an hydraulic circuit, a prefill valve comprising a body with spaced inlet chambers and an intervening outlet passage communicating therewith, a reservoir of low pressure fluid connected to one of said chambers, a high pressure line connected to the other chamber, a valve stem reciprocal within said last-mentioned chamber and afforded a sliding fit therein, said stem comprising a pistonlike portion of less diameter than the first-mentioned chamber and extending therethrough, a cylinder associated with said body and receiving the adjacent extremity of said piston like portion, a high pressure line connected to said cylinder, a chamber in said stem comprising a plurality of ports extending therethrough, a seat on said stem intermediate its ends for cooperation with a complementary seat portion on said body at the adjacent extremity of said first-mentioned chamber for closing the same in the closed position of the stem, said ports being so formed and arranged that they communicate with said passage in the closed position of the stem and are disposed within said second-mentioned chamber in the open position of the stem, a ring valve with a plurality of ports therethrough, said ring valve being reciprocal within said stem chamber for opening and closing the inner extremities of said first-mentioned ports in the open and closed positions respectively of said ring valve, a pistonlike spindle connected to said ring valve and extending through a complementary opening in an adjacent wall of said body, means for alternately admitting pressure to respective of said high pressure lines, and means associated with said spindle for moving said ring valve to its closed position when the pressure in said first-mentioned line is relieved,

said last-mentioned means comprising a port communicating with said cylinder intermediate the extremities thereof, said port being so formed and arranged that it is closed by said pistonlike portion in the closed position of the stem and is unobstructed by said piston like portion in the open position of the stem, another cylinder associated with said body and receiving the adjacent extremity of said spindle, a branch line connected to said last-mentioned cylinder and connected to said second-mentioned high pressure line through a one-way valve permitting flow of fluid from said last-mentioned cylinder and preventing flow of fluid toward said last-mentioned cylinder, and a by-pass line connected to said last-mentioned port and connected to said branch line at a point intermediate said valve and said last-mentioned cylinder.

2. In an hydraulic circuit, a prefill valve comprising a body with spaced chambers and an intervening outlet passage communicating therewith, an inlet for one of said chambers connected to a high pressure line, an inlet for the other chamber connected to a source of fluid under relatively low pressure, a cylinder stem having one end of greater diameter than the other, the large end of said stem being afforded a sliding fit within said first-mentioned chamber and the small end of said stem being of less diameter than that of said second-mentioned chamber and extending therethrough for reception within a complementary cylinder associated with said body, a high pressure line connected to said cylinder, a chamber in the large end of said stem, ports through said stem communicating with said last-mentioned chamber, a seat on said stem intermediate its ends for cooperation with a complementary seat portion at the adjacent extremity of said second-mentioned chamber for closing the same in the closed position of the stem, a ring valve slidingly fitted in said stem chamber, said ring valve being formed and arranged to close said ports in its closed position and to uncover said ports in its open position, ports through said ring valve, a spindle connected to said ring valve and having an extremity projecting through a complementary opening in the adjacent portion of said body, means cooperating with said extremity for moving said ring valve to its closed position when the fluid pressure in said first-mentioned chamber reaches a predetermined low level, and means for alternately admitting pressure to and relieving the pressure in respective lines, said first-mentioned means comprising a spring cap associated with said body, a spring mounted within said cap and bearing against said spindle, and means projecting externally of said cap for adjustably compressing said spring against said spindle.

3. In an hydraulic circuit, a prefill valve comprising a body with spaced chambers and an intervening outlet passage communicating therewith, an inlet for one of said chambers connected to a high pressure line, an inlet for the other chamber connected to a source of fluid under relatively low pressure, a cylindrical stem having one end of greater diameter than the other, the large end of said stem being afforded a sliding fit within said first-mentioned chamber and the small end of said stem being of less diameter than that of said second-mentioned chamber and extending therethrough for reception within a complementary cylinder associated with said body, a high pressure line connected

to said cylinder, a chamber in the large end of said stem, ports through said stem communicating with said last-mentioned chamber, a seat on said stem intermediate its ends for cooperation with a complementary seat portion at the adjacent extremity of said second-mentioned chamber for closing the same in the closed position of the stem, a ring valve slidingly fitted in said stem chamber, said ring valve being formed and arranged to close said ports in its closed position and to uncover said ports in its open position, ports through said ring valve, a spindle connected to said ring valve and having an extremity projecting through a complementary opening in the adjacent portion of said body, means cooperating with said extremity for moving said ring valve to its closed position when the fluid pressure in said first-mentioned chamber reaches a predetermined low level, means for alternately admitting pressure to and discharging pressure in respective lines, said first-mentioned means comprising another cylinder associated with said body and receiving the adjacent extremity of said spindle, and means for conveying high pressure fluid to said last-mentioned cylinder.

4. In an hydraulic circuit, a prefill valve comprising a body with spaced inlet chambers and an intervening outlet passage communicating therewith, a reservoir of low pressure fluid connected to one of said chambers, a high pressure line connected to the other chamber, a valve stem reciprocal within said last-mentioned chamber and afforded a sliding fit therein, said stem comprising a pistonlike portion of less diameter than the first-mentioned chamber and extending therethrough, a cylinder associated with said body and receiving the adjacent extremity of said pistonlike portion, a high pressure line connected to said cylinder, a chamber in said stem comprising a plurality of ports extending therethrough, a seat on said stem intermediate its ends for cooperation with a complementary seat portion on said body at the adjacent extremity of said first-mentioned chamber for closing the same in the closed position of the stem, said ports being so formed and arranged that they communicate with said passage in the closed position of the stem and are disposed within said second-mentioned chamber in the open position of the stem, a ring valve with a plurality of ports therethrough, said ring valve being reciprocal within said stem chamber for opening and closing the inner extremities of said first-mentioned ports in the open and closed positions respectively of said ring valve, a pistonlike spindle connected to said ring valve and extending through a complementary opening in an adjacent wall of said body, means for alternately admitting pressure to respective of said high pressure lines, and means associated with said spindle for moving said ring valve to its closed position when the pressure in said first-mentioned line is relieved, said last-mentioned means comprising a spring bearing against said spindle.

5. In an hydraulic circuit, a prefill valve comprising a body with spaced inlet chambers and an intervening outlet passage communicating therewith, a reservoir of low pressure fluid connected to one of said chambers, a high pressure line connected to the other chamber, a valve stem reciprocal within said last-mentioned chamber and afforded a sliding fit therein, said stem comprising a pistonlike portion of less diameter than the first-mentioned chamber and

extending therethrough, a cylinder associated with said body and receiving the adjacent extremity of said piston-like portion, a high pressure line connected to said cylinder, a chamber in said stem comprising a plurality of ports extending therethrough, a seat on said stem intermediate its ends for cooperation with a complementary seat portion on said body at the adjacent extremity of said first-mentioned chamber for closing the same in the closed position of the stem, said ports being so formed and arranged that they communicate with said passage in the closed position of the stem and are disposed within said second-mentioned chamber in the open position of the stem, a ring valve with a plurality of ports therethrough, said ring valve being reciprocal within said stem chamber for opening and closing the inner extremities of said first-mentioned ports in the open and closed positions respectively of said ring valve, a piston-like spindle connected to said ring valve and extending through a complementary opening in an adjacent wall of said body, means for alternately admitting pressure to respective of said high pressure lines, and means associated with said spindle for moving said ring valve to its closed position when the pressure in said first-mentioned line is relieved.

6. In a prefill valve, a body comprising spaced chambers and an intermediate outlet passage, an inlet opening communicating with each chamber, a stem having an end of relatively large diameter slidably fitted within one of said chambers and an end of relatively small diameter, said last-mentioned end being of less diameter than that of the other chamber and extending therethrough for reception within a complementary cylinder associated with said body, an inlet for said cylinder, a seat on said stem intermediate its ends for cooperation with a complementary seat portion on said body at the inner extremity of said other chamber for closing the same, a chamber formed in the large end of said stem, ports through said large end communicating with said last-mentioned chamber, said ports being so formed and arranged as to be disposed within said passage when said seat is in engagement with said seat portion and to be disposed within said first-mentioned chamber when said seat is out of engagement with said seat portion, a ring valve reciprocal within said stem chamber for opening and closing said ports, ports through said ring valve, a spindle connected to said ring valve and reciprocal within a complementary opening through said body, means for moving said spindle and ring valve inwardly with respect to said stem chamber for closing said first-mentioned ports when the fluid pressure in said stem chamber reaches a predetermined low level, said means comprising another cylinder associated with said body and receiving the adjacent extremity of said spindle, and inlet means for conveying actuating fluid to said last-mentioned cylinder.

7. In a prefill valve, a body comprising spaced chambers and an intermediate outlet passage, an inlet opening communicating with each chamber, a stem having an end of relatively large diameter slidably fitted within one of said chambers and an end of relatively small diameter, said last-mentioned end being of less diameter than that of the other chamber and extending therethrough for reception within a complementary cylinder associated with said body, an inlet for said cylinder, a seat on said stem intermediate its ends for cooperation with a complementary seat portion on said body at the inner extremity of said other chamber for closing the same, a chamber formed in the large end of said stem, ports through said large end communicating with said last-mentioned chamber, said ports being so formed and arranged as to be disposed within said passage when said seat is in engagement with said seat portion and to be disposed within said first-mentioned chamber when said seat is out of engagement with said seat portion, a ring valve reciprocal within said stem chamber for opening and closing said ports, ports through said ring valve, a spindle connected to said ring valve and reciprocal within a complementary opening through said body, and means for moving said spindle and ring valve inwardly with respect to said stem chamber for closing said first-mentioned ports when the fluid pressure in said stem chamber reaches a predetermined low level, said means comprising a spring bearing against said spindle.

8. In a prefill valve, a body comprising spaced chambers and an intermediate outlet passage, an inlet opening communicating with each chamber, a stem having an end of relatively large diameter slidably fitted within one of said chambers and an end of relatively small diameter, said last-mentioned end being of less diameter than that of the other chamber and extending therethrough for reception within a complementary cylinder associated with said body, an inlet for said cylinder, a seat on said stem intermediate its ends for cooperation with a complementary seat portion on said body at the inner extremity of said other chamber for closing the same, a chamber formed in the large end of said stem, ports through said large end communicating with said last-mentioned chamber, said ports being so formed and arranged as to be disposed within said passage when said seat is in engagement with said seat portion and to be disposed within said first-mentioned chamber when said seat is out of engagement with said seat portion, a ring valve reciprocal within said stem chamber for opening and closing said ports, ports through said ring valve, a spindle connected to said ring valve and reciprocal within a complementary opening through said body, and means for moving said spindle and ring valve inwardly with respect to said stem chamber for closing said first-mentioned ports when the fluid pressure in said stem chamber reaches a predetermined low level.

9. In a valve, a body having spaced chambers and an intervening passage communicating therewith, inlets communicating with respective chambers, a stem reciprocal within one of said chambers and comprising means for closing the other of said chambers from communication with said passage in the closed position of the stem, a chamber in said stem, a port through said stem communicating with said stem chamber, said port being formed and arranged to be disposed within said passage in the closed position of the stem and to be disposed within said first-mentioned chamber in the open position of the stem, a valve member reciprocal within said stem chamber and formed and arranged to open and close said port in the open and closed positions respectively of said valve member, a port through said valve member connecting said one chamber with said stem chamber, actuating means for moving said stem to open position, said actuating means comprising a pistonlike portion on said stem of less cross-sectional area than that of said other chamber and extending therethrough, a fluid cylin-

der associated with said body, said piston-like portion being slidably fitted within said cylinder, and means for admitting pressure fluid to said cylinder, and actuating means for moving said valve member to its closed position, said last-mentioned means comprising a spindle connected to said valve member and extending into a complementary opening in said body, and operating means for said spindle.

10. In an hydraulic circuit for an hydraulic motor comprising a cylinder means including advance and return chambers and ram means reciprocal therein; the combination of a prefill valve including a body having a passage communicating with said advance chamber, said body comprising a high pressure fluid chamber and a low pressure fluid chamber communicating with said passage, a valve stem slidably fitted in the high pressure fluid chamber and comprising means for closing the low pressure fluid chamber from communication with said passage in the closed position of said stem, means for urging said stem to its open position comprising a cylinder associated with said body and receiving a portion of said stem, a chamber in said stem communicating with said high pressure chamber, a port through said stem communicating with the chamber therein and adapted to communicate with said passage in the closed position only of said stem, a valve member in said stem chamber for opening and closing said port, a port through said valve member permitting flow of fluid between said stem chamber and said high pressure chamber, said valve member comprising a pistonlike element slidably fitted within a complementary opening in said body, a source of low pressure fluid connected to said low pressure

chamber, a high pressure line connected to said high pressure chamber, a high pressure line connected to said return chamber and to said second-mentioned cylinder, means for alternately admitting pressure fluid to and discharging pressure fluid in respective lines, and actuating means associated with said element for moving said valve member to its closed position, said actuating means comprising a cylinder associated with said body and receiving said element, a connection between said second-mentioned line and said last-mentioned cylinder, said last-mentioned connection comprising a one-way check valve accommodating flow of fluid from said last-mentioned cylinder and preventing flow of fluid toward said last-mentioned cylinder, and a by-pass line connecting said second-mentioned cylinder with said last-mentioned cylinder.

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