

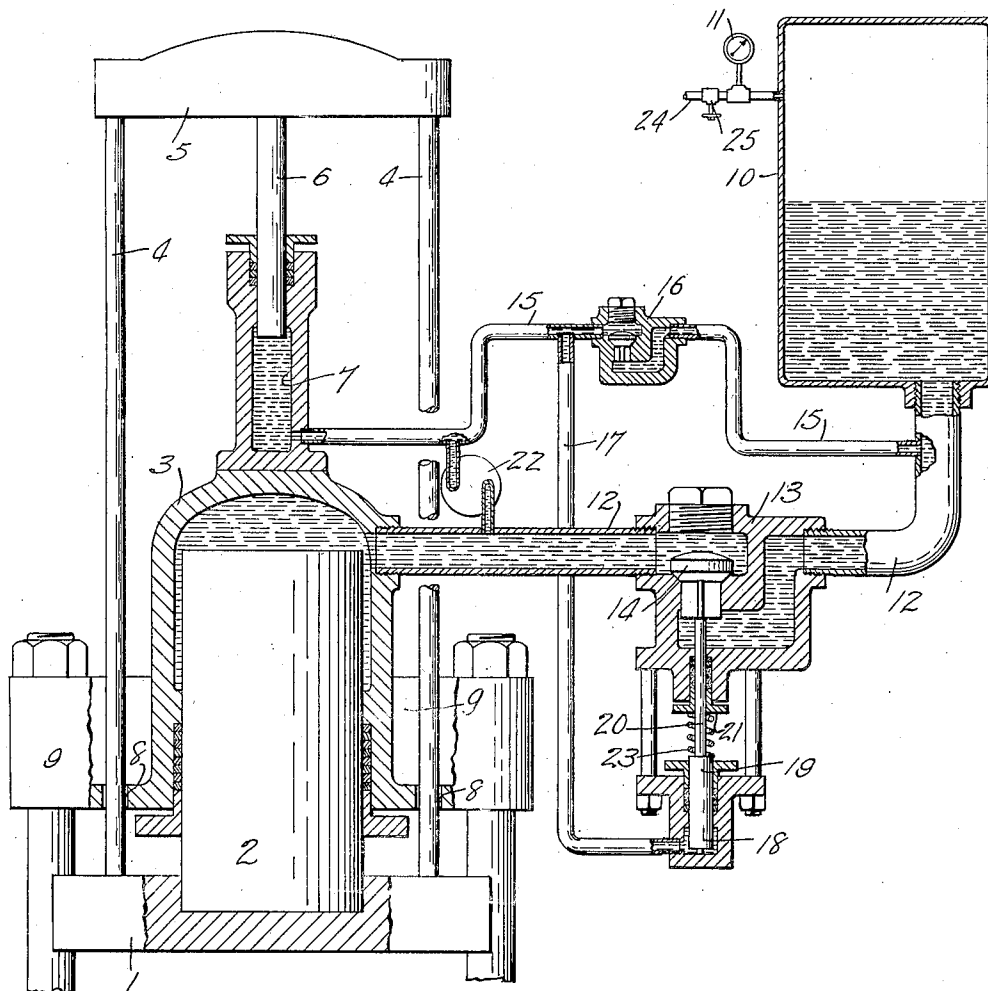
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HYDRAULIC PRESS AND THE LIKE

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HYDRAULIC PRESS AND THE LIKE

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This invention relates to hydraulic presses and particularly to hydraulic press systems of the type using one main ram by which desired operating pressure on the platen is obtained, and one or more auxiliary or pull-back rams to return the platen to normal position when the main ram is not effective.

An object of this invention is to provide an improved system of press operation with which the control and operation of the press will be made as simple and convenient as possible; which will require a minimum of manual attention for operation; and which will be particularly economical in the use of high pressure fluids.

A further object of the invention is to provide an improved system of press operation with which very rapid operation of the rams is obtained; with which the entry of dirt or other foreign matter to the press will be effectively prevented, and which will not require the operation of valves under full hydraulic pressure.

A further object of the invention is to provide an improved system of press operation with which the movable pressure platen may be operated rapidly in either direction with a minimum of control; which will require a minimum of inexpensive apparatus, and which will be relatively simple, convenient, durable, practical and inexpensive in construction.

Various other objects and advantages will be apparent from the foregoing description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawing, I have illustrated more or less schematically and diagrammatically a press operation system constructed in accordance with this invention.

In the illustrated application of the invention, the hydraulic press may be of any suitable construction, and may include a movable pressure platen 1, and the usual or any main piston 2 reciprocating in a main cylinder 3, which piston 2 and cylinder 3 together form a main hydraulic pressure ram by which the platen 1 may be subjected to

very high hydraulic pressures, and by which the platen 1 may be advanced to its work or load.

Rods 4 connect the platen 1 to a cross bar or beam 5, which is connected to or carries an auxiliary piston 6 that reciprocates in an auxiliary cylinder 7. This cylinder 7 may, for convenience, be disposed endwise or parallel to the cylinder 3, so that the pistons or plungers 2 and 6 will extend in opposite directions toward one another and into their respective cylinders, which are disposed endwise of one another. The auxiliary piston or plunger 6 and the cylinder 7 together constitute an auxiliary or pull-back ram by which the platen 1 may be returned to its normal or starting position, in which the main plunger or piston 2 extends into its cylinder 3 to a maximum extent. The rods 5 may be suitably guided in apertures 8 in a cross bar 9 of the press frame.

A source of fluid under pressure is utilized in connection with this system, and for this purpose I have found a closed or pneumatic tank 10 to constitute a very satisfactory source. This tank 10 is closed, so as to hold a gas, such as air, in its upper part and a liquid in its lower part. The gas in the upper part serves as a pneumatic chamber by which a pneumatic pressure is obtained on the liquid in the tank, which pressure at any time may be indicated if desired by suitable gage 11 connected to the upper part of the tank.

A main pipe or conduit 12 connects the lower part of the tank or reservoir 10 to the closed end of the cylinder 3, that is, to the main ram, and this conduit 12 contains therein a valve device 13 through which liquid must pass in moving between the tank or reservoir and main ram in either direction. This valve device has a pair of separate chambers connected by a free operated check valve element 14, which normally rests in a seat in the casing of the valve device, and which rises from its seat to permit free flow of liquid from the tank or reservoir 10 through the conduit 12 to the main ram.

A smaller and branch conduit 15 is connected between the tank or reservoir 10 such

as through the beginning of the conduit 12, and the auxiliary or pull-back ram, the branch conduit 15 also having in series therein a free operated check or one-way valve device 16 of any suitable construction which permits free flow of liquid from the storage tank or reservoir 10 towards the auxiliary or pull-back ram but preventing automatically any return flow towards the tank.

A pipe 17 may be connected at one end to the portion of the conduit 15 which extends between the check valve 16 and the auxiliary or pull-back ram 7, and at its other end is connected to a small hydraulic cylinder 18 into which extends a small piston or plunger 19. The piston or plunger 19 carries a stem 20 projecting through a stuffing box 21 in the casing of the valve device 13 and engageable beneath the check valve element 14, so that upon the building up of pressure in the cylinder 18, the plunger 19 will be ejected therefrom sufficiently to engage and move to open position the check valve element 14 and hold the latter in open position. Thus, when there is pressure in the small cylinder 18, the valve element 14 will be held in open position, so as to permit direct flow of liquid in either direction between the tank or reservoir 10 and the main ram. By reason of the connection of the pipe 17 to the portion of the conduit 15 which leads directly to the auxiliary or pull-back ram, the pressure in cylinder 18 will correspond closely to the pressure in the auxiliary or pull-back ram, and therefore, whenever the pressure is built up in the pull-back ram, the valve element 14 will be in a position to permit free flow of liquid between the main ram and the reservoir 10.

A pump 22 is connected between the main ram and the pull-back ram, so as to transfer liquid in either direction between them and build up a hydraulic pressure in one ram, while withdrawing liquid from the other. Conveniently, this connection of the pump to both rams is accomplished by connecting the pump in parallel across the conduits 12 and 15 at points between the rams and the valves 13 and 16. Preferably the pump 22 is of the reversible type, so as to operate in either direction selectively and withdraw liquid from one ram and through it build up a pressure in the other ram. The pump is furthermore preferably of the type having a variable output with automatic controls, so that when set in operation in either direction, it will operate to build up a pressure in either ram and maintain such pressure at a predetermined value against leakage losses, the operation and pressure maintenance being automatic. Such a variable output pump may be, if desired, of the type known as the variable displacement type.

Pumps suitable for this purpose may be

obtained on the market from a number of different manufacturers, but as an example of a pump which illustrates one type that is satisfactory, reference may be had to U. S. Patent No. 1,578,233 issued March 23, 1926 to one Walter Ferris, and to a pump known in the trade as a Hele-Shaw pump. Such a pump may be used to obtain a reversible flow while the pump is running always in the same direction. That is, either side of the pump may be made the discharge side and the other the intake side at the will of the operator merely by changing the position of the cross head of the pump. Such a pump is also provided with suitable controls by which it can be automatically brought to a neutral position when discharging in either direction and when the pressure for which the pump and controls has been reached. The details of such a pump are set forth by way of one example in the U. S. patent referred to, and have been omitted from this disclosure in the interest of simplicity, since per se they form no part of the present invention, and since various pumps having similar operations, or performing similar functions may be used equally well for the purposes of this invention.

The check valve 16 may be of the ordinary check valve type, and should have, as also should the conduit 15, a size at least as large as the discharge connections on the pump. The tank or reservoir 10 should be of a capacity or size to hold oil or liquid in quantities sufficient to operate the press, and in addition sufficient capacity for air or gas above the maximum oil or liquid level, so that the drop in pressure in the tank will be within the desired limits as the liquid is withdrawn from the tank and conducted to the rams. The pull-back ram is usually of larger capacity than is actually required on the press in order to store up energy in the pressure reservoir, and this stored up energy is then used on the succeeding press operation to obtain rapid travel of the main ram into pressing position.

In the operation of such a press system, let the parts be assumed to be in the relative positions shown in the diagram of the drawing, in which the press platen 1 is in its retracted or starting position. The operator will set the controls of the pump 22 or otherwise manipulate it, to cause the pump to discharge into the conduit 12 and thus into the main ram, and during such operation, liquids will be withdrawn from the pull-back ram through the conduit 15 thus supplying the liquid to the intake side of the pump, and such pressure as may previously have been built up in the pull-back ram will immediately drop. Thereupon the liquid will flow freely from the tank or reservoir 10 through the large conduit 12 to the main ram, the

check valve element 14 opening freely for this transfer of liquid, and this transfer from the reservoir 10 to the main ram will continue until the resistance to the movement of the platen 1 causes the building up in the main ram of a pressure equal to the pneumatic pressure existing at the same time in the tank or reservoir 10.

When the main ram has met with resistance sufficient to cause the equalization of the pressures in the main ram and the reservoir, the free check valve 14 will seat itself automatically and close the conduit 12, owing to the stoppage of flow in the conduit 12. The pump will continue to discharge into the main ram, taking its liquid at the intake side from the pull-back ram, and also from the tank or reservoir 10, the valve 16 permitting free flow of liquid to the intake side of the pump from the tank or reservoir 10 whenever the quantity of liquid in the pull back ram is insufficient to supply the demands of the pump. This operation of the pump will cause the building up in the main ram of a hydraulic pressure which will operate the platen 1 still farther until the resistance offered to further movement of the main ram causes the building up in the main ram of a hydraulic pressure for which the controls of the pump 22 have been set. As that pressure is reached, the pump will operate idly or will deliver only sufficient liquid to maintain such pressure against leakage losses, and the pressure will be held on the press through the main ram. During this maintenance of pressure, the controls of the pump may cause the delivery to be reduced to what closely approaches zero, automatically.

To reverse the press and retract the main ram, the operator sets the pump 22 to operate in the reverse direction, that is he reverses the pump 22, and this pump now discharges into the pull-back cylinder line, taking its suction from the large line leading to the main ram. Immediately thereupon the pressure in the main cylinder, which is now on the suction side of the pump, will drop and pressure will be built up in the pull-back cylinder, which is now on the discharge side of the pump. As the pressure is built up in the pull-back ram, and the adjacent section of the conduit 15, pressure will be built up in the branch pipe 17, so as to cause an operation of the small plunger 19 and through it a forced opening of the valve element 14. This valve element will be held open so long as the pressure in the pull-back ram is maintained and while this valve element 14 is held open, the liquid in the main ram may flow freely back into the tank or reservoir 10 so as to permit of the passage of surplus liquid from the main line back to the storage tank.

The pull-back ram 7 is of a smaller ca-

capacity than the main ram, and for that reason the surplus liquid from the main ram must be allowed to return freely to the storage tank in order that the pull back ram may continue to return the main ram to starting position. The pull back ram is, however, of such size that acting under the pressure of the pump, it will return the main ram against the pressure exerted in the air tank. During this operation it will be understood that the valve 16 is closed automatically so that the discharge of the pump 22 will not be to the tank 10, but to the pull back ram. As the liquid in the main ram returns through the check valve device 13 to the tank 10, the liquid level in the tank will rise to its maximum point, and the air pressure in the tank will be built up to the point at which the operation started.

During these operations it will be noted that when the pump is discharged into the pull-back cylinder, the return liquid from the main ram will be in excess of that required to supply the suction side of the pump, but that when the pump is discharging into the main ram, the pull-back ram will not supply sufficient liquid to the intake side of the pump, and the necessary difference is made up from the tank 10 through the check valve 16. In order to obtain a quick return or closing of the valve element 14 when the pump 22 is reversed, so as to discharge into the main ram, a small helical spring 23 may be provided around the stem 20 so as to act between a shoulder on the same and the stuffing box and bias the plunger 19 into its retracted position in which it releases the valve element 14. This gives a very quick return to the plunger 19 and thus a quick release or closing of the valve element 14.

At the beginning of the pressure stroke of the main ram, the air pressure in the tank 10 tends to send the main ram piston forwardly or downwardly faster than it can actually travel. The fluid in the pull-back ram must all pass through the pump and the pump displacement has a limited maximum value. Hence the pressure in the pull-back ram will build up and control the speed of the forward or pressure stroke of the main ram or platen. This speed is approximately the same as the speed of the main ram on the return or pull-back stroke.

If one desires to admit air to the tank or reservoir, such admission may be made through a pipe 24 controlled by a valve 25, the pipe 24 leading to the upper part of the tank. This pipe connection may include therein the gage 11 if desired.

As a specific example, and for the purpose of illustration only, such press systems have been constructed and successfully operated having a twenty-inch main ram, two

pull-back rams having together a net area of sixteen square inches, a five H. P. pump with three-quarters inch connections, and a three-quarters inch check valve in the conduit 15. The conduit from the tank 10 to the main ram was a three-inch pipe, and the air pressure carried was about fifty pounds, which dropped to about forty pounds in a 140 gallon tank. With such a press system, the applicant has been able to obtain very fast speed of operation of the rams, the auxiliary equipment is very simple and inexpensive, and the system is entirely closed, so that no dirt or other foreign matter can enter. It will be noted that there are no operating valves which must be opened or closed under full hydraulic pressure, and the entire system may be controlled through the control of the pump 22.

A four way valve might, if desired, be used to control flow of liquid from a pump of the usual type, or from an accumulator system, instead of a reversible pump.

It will be obvious that various changes in the details, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim as my invention:—

1. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure connected to both of said rams, valve means normally permitting free flow of said fluid to both rams and preventing return flow to said source automatically, means for transferring fluid between said rams in either direction selectively, and means operable automatically during transfer of said fluid to said pull-back ram for operating one of said valve means in a manner to permit direct return of the surplus fluid from said main ram to said source.

2. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure connected to both of said rams, a free check valve in each connection of said source to said rams to permit free flow from said source towards said rams but prevent return flow, means for transferring fluid between said rams in either direction to vary the effectiveness of said rams, and means operable automatically during transfer of said fluid to said pull-back ram for opening said check valve in the connection to said main ram to permit direct return of surplus fluid from said main ram to said source.

3. In a hydraulic press system, a main ram, a pull-back ram, means including a reversible pump connected at its opposite sides to said rams to cause a flow between said rams in either direction, a storage

reservoir for an operating fluid under pressure, connected to said main ram, a pipe connecting said pull-back ram and said reservoir, a free check valve in said pipe operating to prevent flow therein to the reservoir, a combined pilot operated and free check valve normally preventing flow of said operating fluid from said main ram to said reservoir and having its pilot connected to said pull-back ram, whereby operation of said pull back ram will cause an opening of said combined valve while the pump is discharging into the pull back ram.

4. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure connected to both of said rams, valve means normally permitting free flow of said fluid to both rams from said source and preventing return flow to said source automatically, a reversible pump connected between said rams for transferring fluid between the same in either direction selectively and building up a pressure in either ram while withdrawing fluid from the other, and means operable by pressure in the output side of the pump when the pump is discharging into the pull back ram for establishing a connection for return flow from said main ram to said source of fluid.

5. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure, branch connections from said source to both of said rams, a valve in each of said connections permitting free flow of fluid from said source toward both of said rams and automatically preventing return flow toward said source, a reversible pump connected between said rams for transferring fluid in either direction between them selectively, to build up a pressure on one and withdraw fluid from the other, means operable automatically when the pump is discharging into the pull-back ram for establishing a connection for free return flow of fluid from said main ram to said source.

6. In a hydraulic press system, a main ram, an oppositely acting pull back ram, a source of fluid under pressure, branch connections from said source to both of said rams, a valve in each of said connections permitting free flow of fluid from said source toward both of said rams and automatically preventing return flow toward said source, a reversible pump connected between said rams for transferring fluid in either direction between them selectively, to build up a pressure in one and withdraw fluid from the other, means operable automatically when the pump is discharging into the cylinder of the pull back ram for establishing a connection for free return flow of fluid from said main ram to said source, said

last named means including a hydraulically controlled device connected to the pull-back ram and operating upon the valve in the connection between the main ram and said source to open the same upon the building up of pressure on the pull back ram.

7. In a hydraulic press system, a main ram, an oppositely acting pull back ram, a source of fluid under pressure, a pair of conduits connecting said source to said rams separately, a free check valve in each conduit permitting free fluid flow toward the rams and preventing return flow toward said source, a hydraulic device operable to open the free check valve in the conduit leading to the main ram, a pipe connecting said device and the conduit leading to the pull-back ram between the valve therein and the pull back ram, whereby the building up of pressure on said pull back ram will cause the operation to open position of the check valve in the conduit leading to the main ram, and means for transferring fluids between said rams in either direction selectively.

8. In a hydraulic press system, a main ram, an oppositely acting pull back ram, a source of fluid under pressure, a pair of conduits connecting said source to said rams separately, a free check valve in each conduit permitting free fluid flow toward the rams and preventing return flow toward said source, a hydraulic device operable to open the free check valve in the conduit leading to the main ram, a pipe connecting said device and the conduit leading to the pull back ram between the valve therein and the pull back ram, whereby the building up of pressure on said pull back ram will cause the operation to open position of the check valve in the conduit leading to the main ram, and a variable output reversible pump connected between said rams for transferring fluid between said rams in either direction selectively and building up and maintaining the desired fluid pressure on one ram while withdrawing fluid from the other.

9. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a closed tank containing a quantity of a gas, branch conduits connecting the lower part of said tank to both of said rams, each conduit having a free check valve therein permitting free flow of liquid to both rams and normally preventing return flow to said tank, a reversible pump connected between said conduits between the rams and said valves for transferring liquid between said rams in either direction and building up and maintaining a liquid pressure on one while withdrawing liquid from the other, and hydraulically controlled means actuated by the building up of pressure on the pull-back ram for opening the valve in the conduit leading to the main ram, whereby when

the pump is transferring liquid from the main ram to the pull back ram, the valve in the conduit to the main ram will be opened to permit free return to said tank of liquid in the main ram cylinder in excess of the requirements of the pump in operating the pull-back ram, the check valve in the conduit to the pull-back ram permitting flow of liquid to the intake side of said pump when the latter is discharging into the main ram cylinder to supply the excess of liquid required for the pump for delivery to the main ram and which is not supplied by the pull-back ram.

10. In a hydraulic press system, a main ram, a pull-back ram, a closed combined pneumatic and liquid storage tank connected to said main ram to convey thereto its contained liquid, a combined pilot operated and free check valve controlling the passage of liquid between said tank and said main ram, a conduit connecting the pull-back ram and said tank, a free check valve in said conduit preventing return flow towards said tank, a reversible pump connected to said conduit between said pull-back ram and the free check valve, and also to said main ram, and hydraulic means operated by pressure in said conduit between the free check valve and pull back ram for operating the combined pilot operated and free check valve into open position when the pump is discharging into said conduit.

11. In a system of operation for a hydraulic press having a main ram and a pull back ram and using a source of operating fluid under pressure, the method of operation which comprises first operating said main ram by fluid from said source and withdrawing fluid from the cylinder of said pull-back ram, until the pressure on said main ram approximately equals that of said source, then pumping fluid from said pull-back ram and source into the cylinder of said main ram until the desired pressure in the latter is obtained and maintained, then retracting said main ram by pumping fluid from the cylinder of said main ram into the cylinder of said pull-back ram and utilizing the pressure on the pull-back ram to concomitantly permit return flow of excess fluid from said main ram to said source.

12. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure connected to both of said rams, valves normally permitting free flow of said fluid to both rams and preventing return flow to said source automatically, a pump connected between said rams for transferring fluid between them in either direction selectively, and means operable automatically during transfer of said fluid to the cylinder of said pull-back ram for operating one of said valves in a manner

to establish direct return of the surplus fluid from said main ram to said source.

13. In a hydraulic press system, a main ram, an oppositely acting pull back ram, a source of fluid under pressure, a pair of conduits connecting said source to said rams separately, a free check valve in each conduit permitting free fluid flow towards the rams and preventing return flow toward said source, a hydraulic device operable to open the free check valve in the conduit leading to the main ram, a pipe connecting said device and the conduit leading to the pull back ram between the valve therein and the pull back ram, whereby the building up of pressure on said pull back ram will cause the operation to open position of the check valve in the conduit leading to the main ram, and a reversible pump connected between said rams for transferring fluid between said rams selectively in either direction and building up a pressure on one while withdrawing fluid from the other.

14. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure connected to both of said rams, valve means controlling flow of said fluid between each ram and said source, means for transferring fluid between said rams in either direction selectively, and means connected to the pull-back ram and operable automatically by the pressure on the pull-back ram when the fluid transfer is toward the pull-back ram for establishing an open connection between said source and said main ram.

15. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a source of fluid under pressure connected to both of said rams, a free check valve in each connection of said source to said rams to permit free flow from said source towards said rams but prevent return flow, means for transferring fluid between said rams in either direction to vary the effectiveness of said rams, and means by which the check valve in the connection to the main ram may be held open to permit direct return of surplus fluid from the main ram to said source during transfer of fluid from the main ram to the pull-back ram.

16. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a closed tank containing a gas and a liquid and connected to each of said rams, means also connected between said rams for transferring liquid between them in either direction, selectively, self-acting means preventing direct return from each ram to said tank, and means operable automatically during operation of the pull-back ram for establishing a connection between said main ram and said tank.

17. In a hydraulic press system, a main ram, an oppositely acting pull-back ram, a

closed tank containing a gas and a liquid and connected to each of said rams, means also connected between said rams for transferring liquid between them in either direction selectively, means preventing direct return from each ram to said tank, and means operable automatically during operation of the pull-back ram for establishing a connection between said main ram and said tank, said means being responsive to pressure on the pull-back ram and operable by the pressure on said pull-back ram during its operation for establishing a connection between said main ram and said tank.

18. In a hydraulic press system, a main ram, a pull-back ram, means for transferring an operating fluid from either ram to the other selectively to determine the direction of press operation, and means connected to the main ram and controlled by the pressure in the pull back ram for receiving the surplus operating fluid therefrom during operation of the pull-back ram, storing said surplus under pressure, and redelivering it to said main ram automatically upon a fall of pressure on the pull-back ram below the pressure at which said surplus is stored, whereby the stored fluid is available to provide an initial low pressure operation of said main ram.

19. In a hydraulic press system, a main ram, a pull-back ram, means for transferring an operating fluid from either ram to the other selectively to determine the direction of press operation, means connected to said rams and controlled by the pressure on said pull-back ram for receiving the surplus operating fluid from the main ram during operation of the pull-back ram, storing said surplus under pressure and delivering said surplus under pressure automatically to both of said rams, upon a fall of pressure on said pull-back ram, whereby the stored surplus is available to provide an initial low pressure operation of said main ram, and to provide a supply of operating fluid to the intake side of said transferring means during operation of said main ram.

20. In a hydraulic press system, a main ram, a pull-back ram, a source of fluid under pressure, a valve controlled connection from said source to each of said rams, means for transferring fluid between said rams in either direction selectively, and means controlled automatically by pressure on said pull-back ram for causing an opening of the connection between said main ram and said source upon an increase of pressure on said pull-back ram above a selected pressure.

21. In a hydraulic press system, a main ram, a pull-back ram, a source of fluid under pressure, means for transferring fluid between said rams in either direction selectively, a connection from said source to each ram, a self-acting check valve for the con-

nection from said source to each ram and operable automatically to permit flow from said source to that ram when the pressure of said source exceeds the pressure on that ram, the valve in the connection to the main ram being automatically operable into open position by an increase in pressure on the pull-back ram above that on the main ram.

connection to the main ram having an operating pressure connection to the pull-back ram, whereby an increase in the pressure on the pull-back ram above a predetermined extent will open said main ram connection valve automatically and permit direct return of excess fluid from said main ram to said source. 70

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22. In a hydraulic press system, a main ram, a pull-back ram, a source of fluid under pressure, means for transferring fluid between said rams in either direction selectively, valve controlled means, mechanically free of said transferring means, for conducting a fluid from said source to each ram, normally limiting flow of fluid to a direction away from said source and operable automatically by an increase on the fluid pressure in the pull-back ram over the pressure on the main ram, to permit free fluid flow from said main ram to said source. 75

23. In a hydraulic press system, a main ram, a pull-back ram, a source of fluid under pressure, a reversible and variable delivery pump connected between said rams to transfer fluid between them in either direction selectively, a valve-controlled connection from said source to each ram, the valve in the connection to the main ram being mechanically free of and operable independently of said pump, whereby, during transfer of fluid from the pull-back ram to the main ram, said source may be directly connected to said main ram without passing through said pump for a selected initial portion of the stroke of the main ram. 80

24. In a hydraulic press system, a main ram, a pull-back ram, a source of fluid under pressure, means for transferring fluid between said rams in either direction selectively, a connection from said source to each ram, a valve in each connection, operable independently of the other valve, whereby during the initial power stroke of said main ram, fluid from said source may be supplied to said transferring means and also bypassed around said transferring means directly to said main ram, and then during the remainder of the power stroke supplied only to said transferring means. 85

25. In a hydraulic press system, a main ram, a pull-back ram, a source of fluid under pressure, means for transferring fluid between said rams in either direction selectively, a connection from said source to each ram, a valve in each connection operable independently of the other valve and of said transferring means, whereby during the initial power stroke of said main ram, fluid from said source may be supplied to said transferring means and also bypassed around said transferring means directly to said main ram, and then during the remainder of the power stroke supplied only to said transferring means, the valve in the 90

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