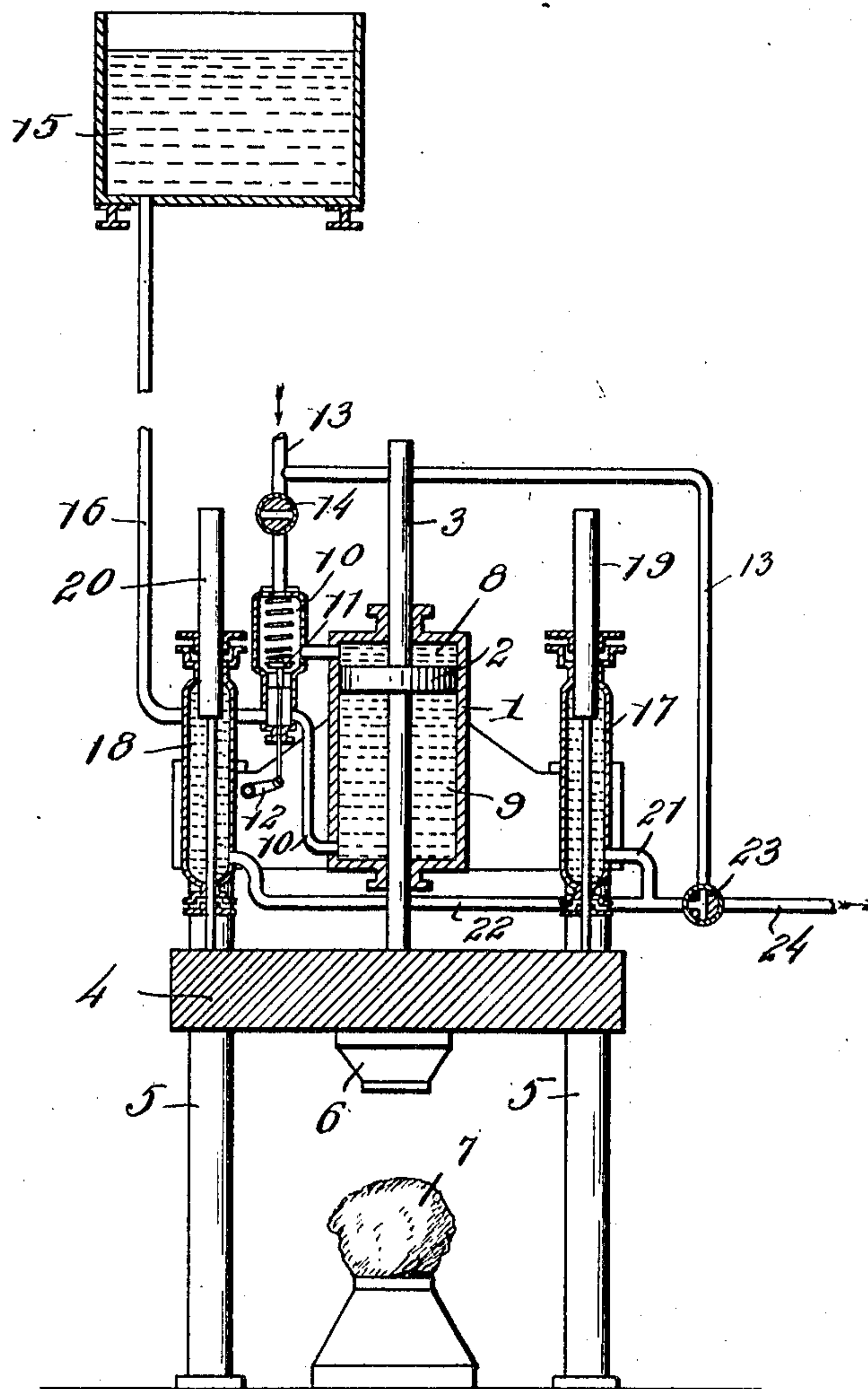


No. 871,078.

PATENTED NOV. 12, 1907.

W. ASTFALCK.
HYDRAULIC PRESS.

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HYDRAULIC PRESS.

No. 871,078.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Original application filed October 19, 1906. Serial No. 339,704. Divided and this application filed April 16, 1907. Serial No. 368,476.

To all whom it may concern:

Be it known that I, WILAND ASTFALCK, engineer, a subject of the German Emperor, and residing at 21 Schlossstrasse, Tegel, near Berlin, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Hydraulic Presses, of which the following is a specification.

The present invention relates to hydraulic presses and more particularly to means for supplying fluid to and discharging fluid from the press cylinder of such presses.

In my co-pending application, Serial No. 339,704, filed October 19, 1906, of which the present case is a divisional application, I have described and claimed a construction in which a reciprocatory means alternately exerts pressure upon a fluid to cause said fluid to pass from a supply chamber to the press chamber and vice versa. The aforesaid application illustrates several embodiments of this idea but only those embodiments are claimed specifically in which a supply cylinder communicates with the press cylinder and has its piston connected to the press piston in such a manner that the down-stroke of the pistons causes fluid to pass under pressure from the supply cylinder to the press cylinder and the up-stroke of the piston causes the fluid to return under pressure to the supply cylinder.

In the hydraulic press forming the subject-matter of the present application, and which is also shown in the application before-mentioned, the press chamber and the supply chamber are combined into a single cylinder and the press piston and supply piston are combined into a single piston which reciprocates in the cylinder in such a manner that during the down-stroke of the piston the fluid is forced from one side of the piston to the other through a connection between the two ends of the cylinder, and during the up-stroke of the piston the fluid is returned through the connection to that end of the cylinder from which it was taken during the down-stroke of the piston. The lower end of the cylinder thus serves as supply chamber and the upper end of the cylinder serves as press chamber.

The invention is illustrated in the accompanying drawings, in which the figure is a vertical section through the improved press.

In the cylinder 1 reciprocates the piston 2 having a piston rod 3 with both its ends projecting outside of the cylinder. The lower end of the piston rod is secured to a slide 4 which is guided on pillars 5 and carries the press-ram 6 for operating on the work 7. The space 8 above the piston 2 forms the press chamber of the cylinder and the space 9 below the piston forms the supply chamber of the cylinder. A connection 10 provides communication between the supply chamber 9 and press chamber 8 and is provided with a valve 11 which can be controlled by lever mechanism 12. 13 is a high

pressure conduit leading from a suitable high pressure tank (not shown) and controlled by a valve 14. 15 is a tank arranged at a higher elevation than the cylinder 1 and communicating with the connection 10 through the medium of a pipe 16. The cylinder 1 is kept full of fluid from the tank 15 and any leakage that might take place in the cylinder 1 is compensated for by a supply of fluid from the tank. 17 and 18 are auxiliary cylinders or return cylinders which have pistons 19 and 20 having their piston rods secured to the slide 4. 21 and 22 are pipes leading from the lower end of the cylinders 17 and 18, and 23 is a three-way valve by means of which these pipes can be brought into communication with the high pressure pipe 13 or with an exhaust pipe 24.

The piston 2 is normally in the position shown in the drawing and is held in this position by the auxiliary cylinders 17 and 18 which have their pistons connected to the slide 4 and acted on by the high pressure fluid from the pipe 13, the valve 23 being in the position in which the pipe 13 communicates with the pipes 21 and 22. The valve 11 is normally open and both of the chambers 8 and 9 are filled with fluid and communicate with each other through the connection 10. When it is desired to start the operation of the press the valve 23 is turned 90° to bring the cylinders 17 and 18 in communication with the exhaust pipe 24, thus relieving the pressure on the pistons 19 and 20 and the weight of the pistons 2, 19 and 20 and the slide 4 will then cause the part to move downwardly. During the downward idle movement of the parts the fluid in the cylinders 17 and 18 will be forced out through the exhaust pipe 24 and the fluid in the supply chamber 9 will be forced under pressure, due to the weight of the parts, through the connection 10 to the press chamber 8. The downward movement or idle motion of the parts continues until the press ram 6 rests on the work 7 and has compressed the same to some extent due to the weight of the moving parts. When the parts have reached this position the valve 11 is closed by the lever mechanism 12 and the valve 14, which has hitherto been kept closed, is opened to permit the fluid from the high pressure pipe 13 to enter the press chamber 8 and force the piston 2 and press ram 6 downwardly to perform the pressing operation. During this movement of the piston 2 the fluid displaced from the supply chamber 9 cannot pass into the press chamber 8, the valve 11 being closed, but the fluid can pass into the pipe 16 and the tank 15.

When the pressing operation is completed the valve 14 is closed and the valve 11 is again opened to provide communication between the press chamber 8 and supply chamber 9. The valve 23 is then turned to the position in which there is free communication between the pipe 13 and the pipes 21 and 22 and high pressure fluid therefore enters the return cylinders 17 and 18 and their pistons 19 and 20 are forced upwardly and carry

along with them the slide 4 and the piston 2. During the upward movement of the piston 2 fluid is forced from the press chamber 8 to the supply chamber 9 and the transfer takes place under pressure due to the pressure exerted on the pistons 19 and 20 by the high pressure fluid from the pipe 13.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

10 The combination of a single cylinder having a press chamber and a supply chamber, a main piston reciprocating in both of said chambers, connection between opposite ends of the cylinder providing communication between the press chamber and the supply chamber permitting the reciprocation of the piston to and from pressing position to

cause fluid to pass alternately from one of said chambers 15 to the other, a return cylinder having its piston connected to said main piston, and means whereby high pressure fluid is alternately admitted to the press chamber and to the return cylinder to cause pressure to be exerted on the fluid in the press chamber when the main piston has 20 reached pressing position and to cause the piston of the return cylinder to return the main piston from pressing position.

The foregoing specification signed at Berlin, Germany, this twenty-first day of March, 1907.

WILAND ASTFALCK.

In presence of—

HENRY HASPER,
WOLDEMAR HAUPT.