F. S. KOCHENDORFER.

HYDRAULIC PRESS.

APPLICATION FILED APR. 13, 1918.

1,307,586. Patented June 24, 1919.

Fig. 1.

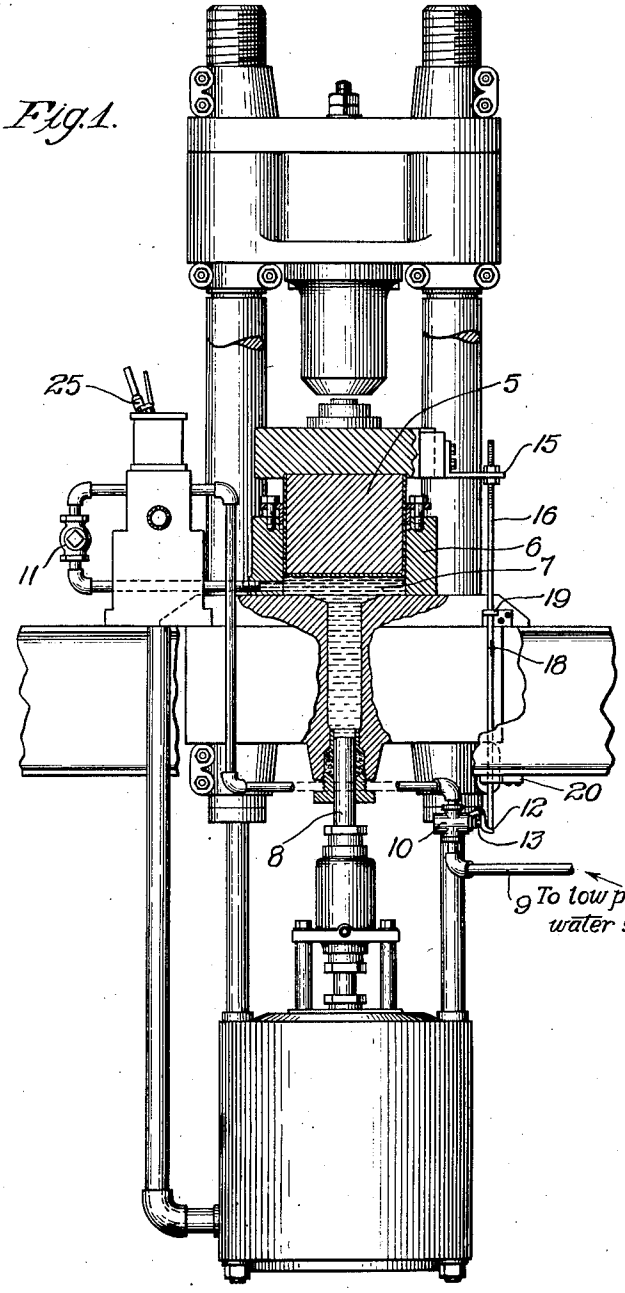


Fig. 2.

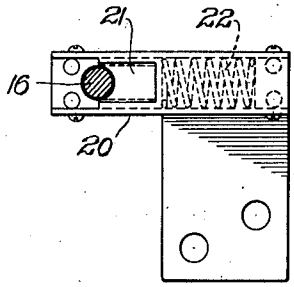
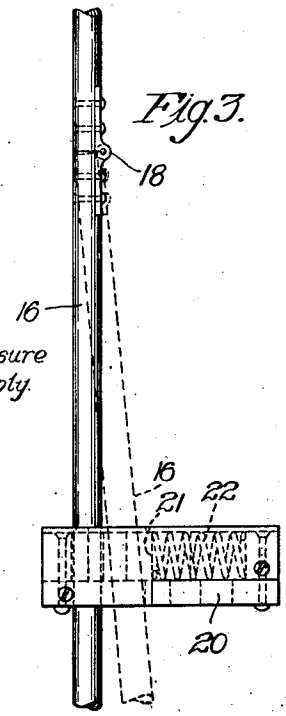


Fig. 3.



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UNITED STATES PATENT OFFICE.

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HYDRAULIC PRESS.

1,307,586. Specification of Letters Patent. Patented June 24, 1919.

Application filed April 13, 1918. Serial No. 228,401.

To all whom it may concern:

Be it known that I, FREDERIC S. KOCHENDORFER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hydraulic Presses, of which the following is a full, clear, concise, and exact description.

This invention relates to hydraulic presses, and more particularly to steam operated hydraulic presses in which a body of water beneath a movable ram is operated upon by a steam driven piston to move the movable ram against a stationary ram.

In presses of this type there is a certain amount of leakage of water from the chamber below the movable ram, and in order to insure that each stroke of the movable ram shall be uniform and of the same pressure as the preceding stroke, it is necessary to replenish the water lost by leakage before the beginning of each stroke in order to bring the movable ram to a predetermined level.

The object of this invention is to provide a simple, economical, and efficient means for automatically controlling the replenishment of the water under the movable ram at the end of each stroke of the ram.

In accordance with the general features of this invention, there is provided controlling means operated automatically by the movable ram when it drops below a predetermined position to control the flow of water into the chamber below the movable ram. This is preferably accomplished by means of a valve in a water inlet pipe, leading to a low pressure supply, which is controlled by means of a plunger connected with the movable ram. When the ram is below a normal predetermined position the plunger is caused to open the valve in the inlet pipe which permits the water to flow into the chamber below the movable ram until the ram is raised to its normal position, when the valve in the inlet pipe is closed.

In accordance with another feature of this invention, the plunger controlling the supply valve in the water inlet pipe is adapted to be moved laterally away from the valve to permit the draining of the chamber beneath the movable ram when desired. Preferably the plunger is provided with a hinged portion which is normally acted upon by resilient means to hold it in operative relation to the valve in the inlet pipe, but which resilient means permits the hinged portion to be swung laterally out of engagement with the inlet valve.

In the drawings illustrating this invention—

Figure 1 is a view in front elevation, with parts in section, of a steam hydraulic press embodying the features of this invention;

Fig. 2 is an enlarged detail view with the valve controlling plunger in section, illustrating the resilient means for permitting the disengagement of the plunger from the inlet valve, and

Fig. 3 is a detailed elevational view of the parts shown in Fig. 2.

As shown in Fig. 1, 5 designates a movable ram reciprocally mounted within a chamber 6 containing water 7 and adapted to be moved through the agency of a steam controlled piston 8. Water is supplied to the chamber 6 through an inlet pipe 9 within which is a valve 10 and a high pressure check valve 11, the latter valve being provided for the purpose of preventing the water being backed up into the supply pipe when the piston 8 is operated.

The valve 10 is provided with a bell crank lever 12 adapted to operate upon a plunger 13 which controls the opening and closing of the valve.

Secured to the movable ram 5 is an L-shaped bracket member 15 in which is adjustably supported a rod 16, the lower end of which is normally in engagement with the bell crank lever 12 of the valve 10.

The rod 16 is provided between its ends with a hinge 18 which permits the lower end of the rod to be swung laterally away from the lever 12. A guide 19, through which the rod 16 extends, is secured to the frame of the press above the hinged portion 18, and a second guide 20 is secured to the frame of the press near the lower end of the rod 16 and below the hinge 18. The lower guide 20 comprises a slide member 21, one end of which bears against the rod 16, the other end being engaged by a spring 22 which normally tends to move the slide 21 and the rod 16 into engagement with the lever 12. This

spring, however, permits the rod 16 to be swung laterally away from the lever 12 when it is desired to drain the chamber 6.

The operation of this invention is briefly as follows:

When the movable ram 5 is operated in response to the operation of the piston 8 and the piston 8 is withdrawn to its normal position, the ram 5 will drop downwardly carrying with it the rod 16 which, as it engages the lever 12, will open the valve 10 to permit water to flow into the chamber 6 beneath the movable ram. As the water flows into the chamber 6 beneath the movable ram 5 it gradually raises this ram and with it the rod 16 until the ram is raised to its normal operating position, when the pressure of the rod 16 upon the lever 12 will be relieved and the valve 10 will be closed against further flow of water. It has been found that the water through the feed pipe 9 may be supplied from any suitable low pressure source which is just sufficient to raise the ram 5, thereby making it unnecessary to use expensive high pressure pumps or other apparatus.

When it is desired to drain the chamber 6, the lower end of the rod 16 will be swung laterally out of engagement with the lever 12, thereby permitting it to slide past the lever 12. A drain pipe (not shown) may be connected with the chamber 6 in any suitable manner and provided with a valve which will permit the drainage of the cylinder, or the cylinder may be drained by removing the gland at the lower end of the chamber 6.

The operation of the piston 8 is controlled by means of a throttle valve 25 which may also control the draining of the chamber 6.

What is claimed is:

1. In a hydraulic press, a movable ram, a water chamber beneath said ram, a feed pipe for supplying water to said chamber, a valve in said feed pipe, a plunger carried by said movable ram, and a lever on said valve controlled by said plunger to determine the amount of water supplied to said chamber.

2. In a hydraulic press, a movable ram, a water chamber beneath said ram, a water supply pipe, a valve in said pipe, a plunger controlled by said ram for controlling said valve, and means for permitting the disengagement of said plunger from said valve.

3. In a hydraulic press, a movable ram, a water chamber beneath said ram, a water supply pipe, a valve in said pipe, a plunger controlled by said ram for controlling said valve, and resilient means for permitting the disengagement of said plunger from said valve.

4. In a hydraulic press, a movable ram, a water chamber beneath said ram, a low pressure water supply for supplying water to said ram, and means controlled by the movement of said movable ram for admitting water from said low pressure source to said chamber to raise said ram to a predetermined level.

5. In a hydraulic press, a movable ram, a water chamber beneath said ram, a supply pipe leading from a low pressure water supply source to said chamber, a valve in said supply pipe, and means controlled by said movable ram for controlling said valve to admit water from said low pressure supply to said chamber to raise the ram to a predetermined height.

In witness whereof, I hereunto subscribe my name this 27th day of March A. D., 1918.

FREDERIC S. KOCHENDORFER.