E. D. MEIER.

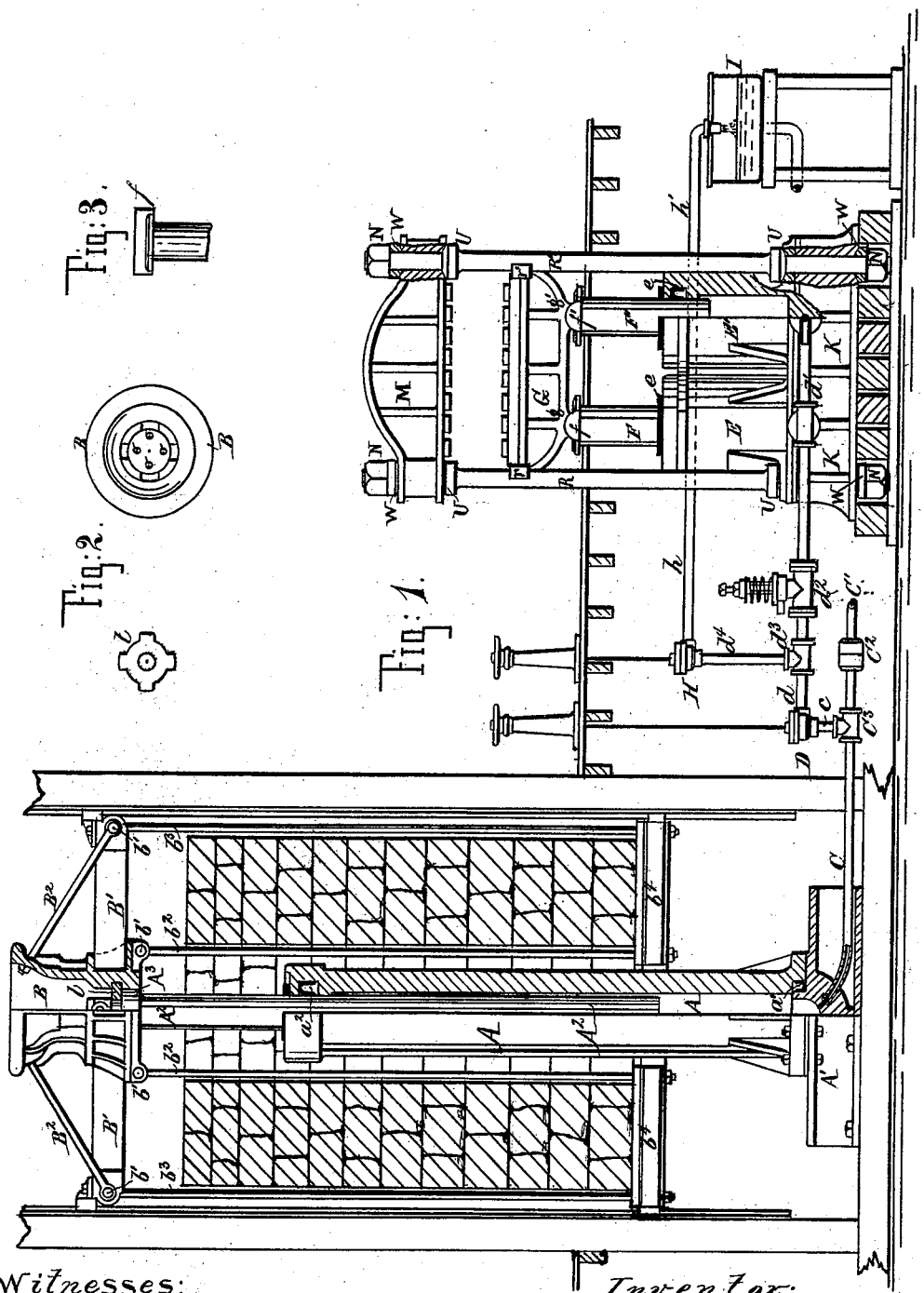
Hydraulic Compresses.

No. 169,280. Patented Oct. 26, 1875.

Fig. 3.

Fig. 2.

Fig. 1.



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UNITED STATES PATENT OFFICE.

EDWARD D. MEIER, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN HYDRAULIC COMPRESSES.

Specification forming part of Letters Patent No. **169,280**, dated October 26, 1875; application filed April 19, 1875.

To all whom it may concern:

Be it known that I, EDWARD D. MEIER, of St. Louis, Missouri, have invented an Improved Hydraulic Press, of which the following is a specification:

This invention relates chiefly to an improved combination of a hydraulic accumulator with hydraulic presses, to operate in the manner hereinafter to appear; also, this invention relates to certain detail constructions of parts pertaining to the accumulator and press, hereinafter to appear.

Of the drawing, Figure 1 is a sectional elevation of the accumulator, and further showing the pipe connections to the press proper, this latter having in section detail constructive features of the press. Fig. 2 is a plan view of lock-ring; also, same in crown-piece; Fig. 3, a detail of plunger-head of the press.

The construction of the accumulator consists of the parts as follows: A is the cylinder; A^1, the bottom and foundation plate, to which the cylinder is bolted. A^2 is the plunger, fitted to work water-tight in the cylinder by means of the packing at a^1 a^2. B is the crown-piece, forming part of which are struts B^1 braced by the tie-rods B^2. (See Fig. 1.) From the crown-piece B a weighted case, or, as shown in Fig. 1, a loaded platform, b^4, is suspended by means of the rods b^1 b^2. The platform b^4 can be loaded with masonry, or, in case of an annular casing used, ore, sand, or the like heavy material can be adopted as weight, so as to cause the required pressure on the bottom of the plunger A^2. The crown-piece B and head of plunger A^2 are related to each other in constructive features in such wise that the plunger can readily be removed in order to facilitate repacking of the cylinder. For this purpose the plunger A^2 I form to have an enlarged head, A^3, Fig. 1, which fits loosely in the bore of the crown-piece B. The crown-piece B I further provide with a lock-ring, *l*, having projecting edges, (more clearly shown in Fig. 2,) and corresponding to the vertical slots *o* in said crown-piece. (See Fig. 2.) Said lock-ring can thus be dropped into or withdrawn out of the crown-piece. When inserted the lock-ring rests on top of the head A^3 of the plunger, and can be locked by simply turning said lock-ring until its projecting edges catch under the body of metal between the slots *o* of the crown-piece, and as shown in Fig. 1. A key is next inserted in any of the slots *o* to complete the locking or prevent the lock-ring from turning. When thus locked the accumulator can be actuated to rise or fall by the action of the plunger. To remove the plunger for the purpose above stated it is only necessary to proceed reversely by first allowing the weighted platform b^4 to drop to a rest; next, withdraw the key, unlock and withdraw the lock-ring, and, this done, the plunger can readily be slipped through the crown-piece, leaving it an easy matter to reach the cylinder and get at the packing.

The accumulator thus constructed I combine to a hydraulic press in manner following: Communicating with the accumulator bottom A^1 is a pipe, C, which further connects at C^1 with the press-pumps, (not shown in drawing,) but which supply water to the accumulator. C^2 is a check-valve to prevent the water from flowing back from the accumulator or press to the pumps. From the pipes C C^1 communication is made by pipe *c* to a force-valve, D, from which branch pipes *d d* communicate direct to the press cylinders or rams E E′. In case, therefore, the pumps have raised the accumulator, the check-valve C^2 is closed, permitting the translation of the pressure of the accumulator by means of the pipes *c d d′*, (with valve D open,) to operate the press. After each operation of the press the water from same is returned to the tank; therefore the pipe *d*, by a T-joint, d^3, and further pipe d^4, communicates to the exhaust-valve H, and from this by the pipe or pipes *h h′* to the supply-tank I. The valve D being closed and valve H open, the press returns its water therefore to the tank. Close the valve H when the accumulator is to operate the press. In the press-cylinders E E′ are fitted plungers F F′, packed by leather packing *e*. I improve the plungers F F′ by forming their heads to present rounded bearings, as shown at *f f′*, Figs. 1 and 3, on which the follower G rests, which I also form to present corresponding bearings *g g′*. (See Fig. 1.) The purpose of this feature is to enable G to assume an inclined position, if from any cause one plunger rises faster than the other. The follower G is guided in its ver-

tical movement by the further bearings *r r'* on the rods R R'. (See Fig. 1). K is the base or foundation plate of the press. M is the top or strain-plate. The rods R R' hold M and K firmly at their proper distance apart by means of nuts N, washers W, and collars U. (See Fig. 1.) These washers and collars have curved surfaces fitted to corresponding surfaces made in the plates M K, (see Fig. 1,) the purpose thereof being to enable M to give in any direction whenever the strain may be unequal in the rods R R', or when the top of the follower G may be other than parallel to the plate M, which will occur if the bale is packed unevenly, or is harder at one end than the other.

The press and accumulator thus combined, the operation thereof is as follows: By means of the pumps the water is forced from the tank I through the pipe C into the accumulator-cylinder A, thus raising the plunger A^2, and with it the weights hanging from the crown-piece B. When the weights have risen nearly to the top, open the valve D, when the water will pass through the pipes *d* d^1 into the ram, cylinders E E', forcing up the plungers F F' and pressing the bale previously laid on the plate or follower G between G and M. Now, close D, and, as soon as the ties have been fastened on the bale, open the valve H, when the plate G and plungers F F' drop by their own weight, exhausting the water from the cylinders E E' through the pipes *h h* into the tank. As the pumps continue to work without intermission the plunger A^2 and dependent weights will by this time be again near the top, and the operation can be repeated. By opening D quickly the plunger A^2 and its weights can be made to drop rapidly, and its acquired momentum utilized through F F' in pressing the bale. It is found that by this means the ultimate pressure may be made fully one-third greater than the initial pressure per square inch furnished by the pumps, while the check-valve in the pipe C can prevent this excess from affecting the pumps. By the improved combination of the parts here shown the press can be controlled at any point of its stroke according to the necessities of the case.

What I claim is—

1. The combination of the accumulator, constructed as shown and described, pipe C, having check-valve C^2, pipe *c*, its force-valve D, branch pipes *d* d^1, and rams E E' of a hydraulic press, the pipe *c* being further connected by a T-joint, d^3, to a pipe, d^4, having exhaust-valve H, and the pipes *h h'* leading to tank I, all said parts being arranged with relation to each other, and to operate in the manner and for the purpose set forth.

2. The combination of the crown-piece B, plunger A^2, having enlarged head A^3, the lock-ring *l*, all constructed as described and shown, so that the plunger can be removed without raising the weights hanging to it, thus facilitating the renewal of the packing a^2.

3. The improved features, viz., elastic rods R R', rounded collars U, and washers W, top and bottom plates M K, follower G, having bearings *g g'*, plungers F F' having bearings *f f'*, in combination with rams or cylinders E E', as herein shown and described, to operate as and for the purpose set forth.

In testimony of said invention I have hereunto set my hand.

EDWARD D. MEIER.

Witnesses:

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