

No. 678,994.

Patented July 23, 1901.

C. F. BURROUGHS.
VALVE FOR HYDRAULIC PRESSES.

(Application filed Nov. 6, 1900.)

(No Model.)

Fig. 1.

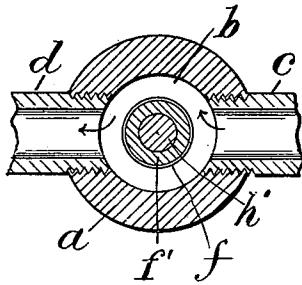


Fig. 2.

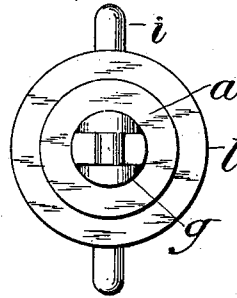


Fig. 3.

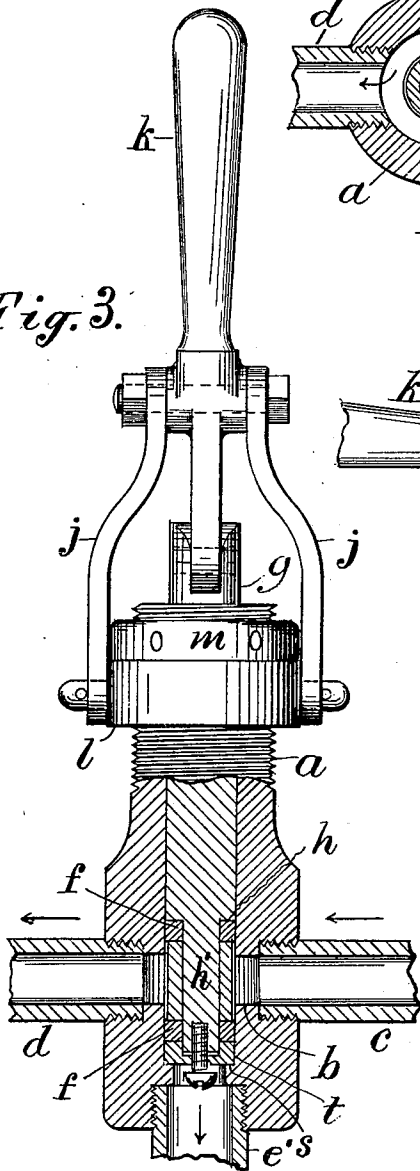
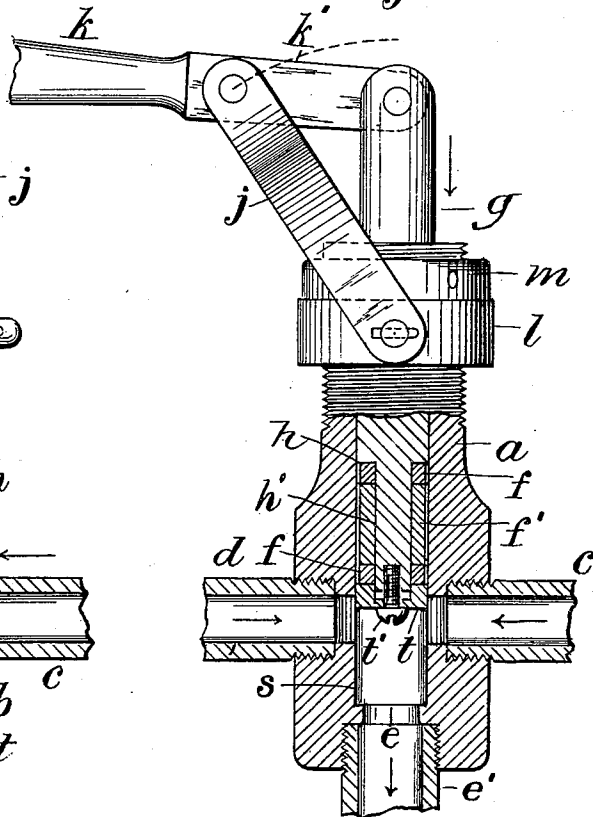


Fig. 4.



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UNITED STATES PATENT OFFICE.

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VALVE FOR HYDRAULIC PRESSES.

SPECIFICATION forming part of Letters Patent No. 678,994, dated July 23, 1901.

Application filed November 6, 1900. Serial No. 35,595. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. BURROUGHS, a citizen of the United States, of 141 Commerce street, Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Valves for Hydraulic Presses, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to that class of hydraulic valves in which a plunger is movable in a cylinder across a transverse port or passage and in which any packing upon the plunger is liable to be chafed or abraded by the edges of such passage.

The invention consists, primarily, in the combination, with the valve-casing or cylinder having a transverse passage intersecting its bore, of a plunger having expansible collars spaced to bear upon the cylinder at opposite sides of the transverse passage and means for expanding the collars when seated and for relaxing the collars when withdrawn from their seats. The relaxing of the collars avoids the wear and chafing of such packings when they are moved over the edges of the transverse passage.

The invention is especially applicable to the valves employed for connecting a hydraulic pump with a hydraulic press and in which the supply-pipe from the pump is connected with a waste pipe or reservoir when the pressure in the hydraulic press is discontinued. In such constructions the valve-plunger moves in a cylindrical bore, which is surrounded near one end by an annular chamber with which the supply-pipe from the pump and the delivery-pipe to the press are connected and through which they have free communication. The valve-outlet at the end of the cylinder is connected with the storage-reservoir for the fluid, and such outlet is closed by the hydraulic valve when it is desired to concentrate the pressure upon the press; but the press is relieved from such pressure and the fluid in the press is discharged to the reservoir when the valve opens the outlet.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a cross-section through the cen-

ter of the inlet and outlet *c d* in Fig. 3. Fig. 2 is a plan of the casing, plunger, and ring *l*. Fig. 3 is a side elevation of the valve with the lower half in section at the center line, and Fig. 4 is an edge view of the valve with the lower part in section at the center line.

a designates the cylinder-casing, having a cylindrical bore with outlet *e* at the lower end. The bore is surrounded near the outlet by an annular chamber *b*, and a shoulder *s* is formed in the bore between the chamber and the outlet *e*. The supply-pipe *c* from the pump connects to one side of such chamber, and the delivery-pipe *d* to the press connects with the opposite side of the chamber, so that the fluid from the pump can pass freely through the chamber *b* to the press when the outlet *e* is closed. (See Fig. 1.) The plunger *g* extends through the top of the casing for connection with a hand-lever and is reduced at the inner end, forming a shoulder *h* and a stem *h'*, upon which the valve-packings are secured.

The packings comprise expansible collars *f*, made of leather, rubber, or equivalent material, separated by a sleeve *f'* and clamped in place by a cap *t*, which is held movably upon the end of the stem by a screw *t'*. The parts are proportioned so that when the cap is pressed down against the shoulder *s* the collars or packings *f* bear upon the cylinder at opposite sides of the annular chamber *b*, and the expansion of the collars prevents the escape of fluid upward or downward from such chamber. A clearance is formed between the cap and the end of the stem, as shown in Fig. 4, which permits the edges of the cap to crowd the packings upward and expand the same when the cap is pressed down upon the shoulder *s*, as shown in Fig. 3.

When the plunger is raised, as shown in Fig. 4, the elasticity of the collars *f* presses the cap downward, slightly moving the sleeve *f'* upon the stem, which permits the contraction of the collars to their normal diameter and enables them to slightly clear the bore of the cylinder, as shown in Fig. 4. The collars thus avoid crowding against the corners of the chamber *b* as they are moved up and down, and the wear and chafing of the collars are avoided. In operating such valves means is

provided to open and close the plunger instantly, so as to operate the hydraulic press with rapidity.

To move the plunger quickly and to press the cap firmly upon the shoulder *s* in closing the valve, I provide a toggle formed by jointing the hand-lever to the plunger and to links attached to the casing of the valve.

The hand-lever *k* is jointed at its inner end to the top of the plunger, and its adjacent portion *k'* is also jointed to links *j*, which are hinged at their lower ends upon the casing. An adjustable connection is provided for the links *j*, so as to vary the pressure exerted by the toggle upon the cap *t* when the plunger is pressed downward, and such adjustable connection comprises a ring *l*, carrying the pivots *i* and fitted movably to a threaded neck upon the top of the casing. The collar is adjusted by a nut *m*, which is fitted to the threaded neck and operates to resist the upward pull of the links when the handle is straightened, as shown in Fig. 3.

The straightening of the handle in line with the plunger forces the plunger downward and crowds the cap against the shoulder *s*, while the tipping of the handle sidewise, as shown in Fig. 4, serves to lift the plunger with the cap above the chamber *b*, thus connecting both the supply-pipe *c* and the delivery-pipe *d* with the outlet *e*.

The toggle serves as a means of quickly opening the valve and also of forcibly pressing it downward to compress and expand the collars *f* in the desired manner.

The essential part of the invention is the combination, with the plunger, of expansible collars spaced to bear upon the cylinder at opposite sides of its transverse passage, so that the collars may be expanded when seated in their working positions and contracted when moved therefrom, so as to avoid any pressure upon the corners of the passage. It is therefore immaterial what means be used for expanding the collars when seated and for relaxing them when moved from their seats.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In a hydraulic piston-valve, the combination, with the cylinder having transverse passage intersecting its bore, of a plunger having expansible collars spaced to bear upon the cylinder at opposite sides of the transverse passage, and means for expanding the collars when seated and for relaxing the collars when withdrawn from their seats.

2. In a hydraulic valve, the combination, with a cylinder having outlet at one end, of a chamber surrounding the cylinder-bore adjacent to such outlet with supply and dis-

charge passages connected thereto, and a plunger having expansible collars spaced to bear upon the cylinder at opposite sides of the chamber, and means for expanding the collars when seated and for relaxing the collars when withdrawn from their seats.

3. In a hydraulic valve, the combination, with a cylinder having outlet at one end and shoulder adjacent to such outlet, of a chamber surrounding the cylinder-bore adjacent to such shoulder with supply and discharge passages connected thereto, and the plunger having stem *h'* provided with the expansible collars *f*, the sleeve *f'*, and the movable cap *t* adapted to expand the collars at opposite sides of the chamber when the cap is pressed upon the shoulder.

4. In a hydraulic valve, the combination, with a cylinder having outlet at one end and shoulder adjacent to such outlet, of a transverse passage intersecting the cylinder near the outlet, expansible packings fitted to the stem of the plunger with a cap adapted to compress the same when in contact with the shoulder, and a hand-lever with toggle connection to the valve-casing and to the plunger to force the plunger toward the shoulder, substantially as herein set forth.

5. In a hydraulic valve, the combination, with a cylinder having outlet at one end and shoulder adjacent to such outlet, of a transverse passage intersecting the cylinder near the outlet, expansible packings fitted to the stem of the plunger with a cap adapted to compress the same when in contact with the shoulder, a hand-lever with toggle connection to the valve-casing and to the plunger, and means for adjusting the pivots of the toggle upon the casing to vary the pressure of the plunger upon the shoulder.

6. In a hydraulic valve, the combination, with a cylinder having outlet at one end and shoulder adjacent to such outlet, of a transverse passage intersecting the cylinder near the outlet, expansible packings fitted to the stem of the plunger with a cap adapted to compress the same when in contact with the shoulder, a hand-lever with toggle connection to the valve-casing and to the plunger, and a collar adjustable upon the head of the casing and carrying the pivots of the toggle, to vary the pressure of the plunger upon the shoulder, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES F. BURROUGHS.

Witnesses:

THOMAS S. CRANE.

F. L. MORTON.