(No Model.)

C. HUEBNER.

HYDRAULIC JACK.

No. 338,598. Patented Mar. 23, 1886.

Fig. 1.

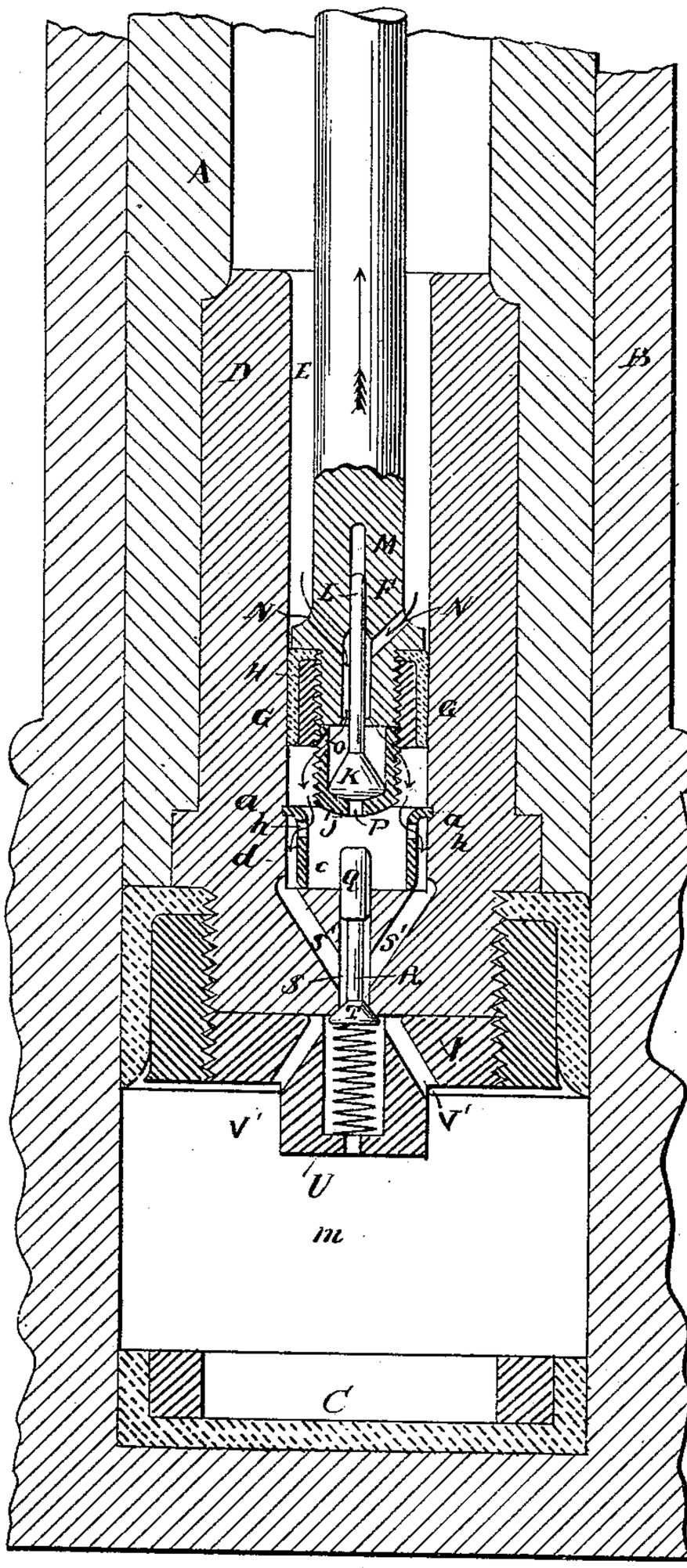

Fig. 2.

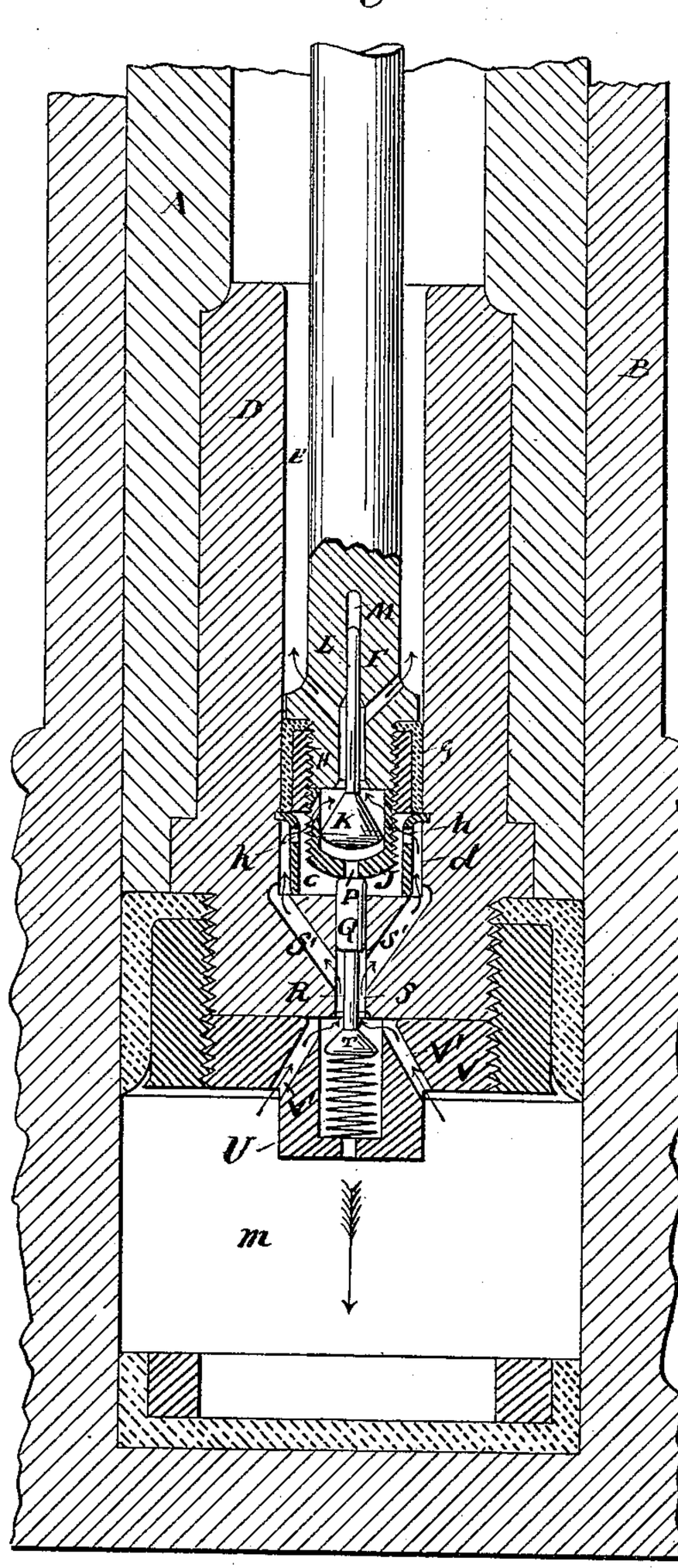

Fig. 3.

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HYDRAULIC JACK.

SPECIFICATION forming part of Letters Patent No. 338,598, dated March 23, 1886.

Application filed January 20, 1886. Serial No. 189,119. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HUEBNER, a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Hydraulic Jacks, of which the following is a specification.

The object of my invention is to provide certain new and useful improvements in hydraulic jacks for the purpose of preventing the water that rises from the chamber below the ram during the time that the ram descends from closing the valve in the piston.

The further object of my invention is to prevent the cutting of the packing on the piston by holes of a bushing provided for the purpose of preventing the water from closing the valve in the piston.

The invention consists in a bushing placed in the lower part of the pump-cylinder, and placed adjacent to the sides of the same, which bushing is of less diameter than the pump-cylinder, all as will be fully described hereinafter, and set forth in the claims.

In the accompanying drawings, Figures 1 and 2 are cross-sectional views of a hydraulic ram provided with my improvement, the parts being in different positions, and parts being broken out and others in section. Fig. 3 is a perspective view of the bushing.

Similar letters of reference indicate corresponding parts.

The ram A works up and down in the cylinder or casing B, and is provided at the bottom with the usual packing, C, of any well-known construction and fastened in any suitable manner, and in the said ram A the pump-cylinder D is fixed, and is provided with the longitudinal bore E, in which the piston F works, said piston being provided with an annular packing, G, held in place by the bushing H, screwed on the lower end of the piston, between the packing and the piston, which bushing H forces the packing outward and presses it snugly against the sides of the bore of the pump-cylinder D.

To the lower end of the bushing H an externally screw-threaded cap, J, is screwed, the upper surface of the bottom of which is made slightly concave, to fit snugly against the bottom convex surface of the valve K, formed on the lower end of the stem L, adapted to slide vertically in the longitudinal bore or aperture M in the lower part of the piston, the lower part of said bore M being widened. Channels N serve to conduct the water from the bore E of the pump-cylinder into the bore or channel M of the piston. The cap J is provided with side apertures, O, through which the water can pass in and out of the cap, and said cap is also provided with a bottom aperture, P, which can be closed by the valve K and by the valve Q, formed on the upper end of the stem R, mounted to move vertically in the bore S in the lower part of the cylinder D, said stem R being provided at its lower end with a valve, T, which is pressed upward by a spring, U, contained in a suitable recess in the cap V, held on the lower end of the pump-cylinder, which cap is provided with channels V′ for conducting the water into the bore S, said bore being connected by the channels S′ with the lower end of the bore E of the pump-cylinder D.

A short distance below the lower end of the bore E of the cylinder D an annular groove, *a*, is formed in the sides of said bore E, and into said groove *a* a flange, *b*, is passed, which is formed on the upper end of a bushing, *c*, placed in the lower end or bottom of the bore E in the cylinder D, so as to form an annular space, *d*, between the outer sides of said bushing and the sides of the bore E, which annular space *d* is in communication with the channels S′ for conducting the water upward into the lower part of the bore E. The bushing is of such size that the cap J on the lower end of the piston can pass into it.

To fasten the bushing in the lower part of the bore of the pump-cylinder, the bushing is rested on the bottom end of the bore, and then the flanged upper end of said bushing is expanded by means of a suitable expanding-instrument, so that the flange *b* is forced into the annular groove *a* in the bore E.

The bushing *c* is provided with a series of apertures, *h*, through which the water can pass from the annular chamber *d* into the bore E, as the flange closes the top of said annular chamber *d*, and prevents the water from passing from said chamber into the bore E otherwise than through said apertures *h*.

The remaining parts of the jack are of the well-known construction. The lower end of

the bore S is flared to form a seat for the conical valve T, and the lower end of the widened part of the bore M of the piston is also flared to form a seat for the conical valve K.

The operation is as follows: The piston of the pump is worked up and down in the usual manner. When the piston is moved upward, the water passes from the cistern above the pump through the bore E of the cylinder D, the channels N, into the lower widened part of the bore M, into the cap J, through the side apertures, O, of the same into the lower part of the bore E. The valve T is closed, and prevents the water from rising out of the chamber *m* when the piston is raised. When the piston is forced down, the valve K is raised, and closes the lower end of the bore M of the piston, thus preventing the water from being forced up through the channels N. The downward pressure exerted by the piston forces the water through the apertures *h* in the bushing *c*, into the annular chamber *d*, through the channels S′ and V′, into the chamber *m* below the ram, and thus the ram is raised slightly by the accumulated water. In this manner the ram is raised a short distance for each stroke, and the object above the ram resting on it is raised.

When it is desired to lower the load on the ram, the water must be permitted to pass from the chamber *m* up into the cylinder and above the pump-piston, and in order to permit such passage of the water the valve K must be lowered. If the water would strike the bottom of the valve K, it would immediately raise the same and press it against its seat, and thus interrupt the communication between the upper and lower parts of the bore E, and thus prevent the water from passing out of the chamber *m*.

By providing the bushing *c*, I prevent the rising water from pressing the valve K against its seat, as the water that rises from the chamber *m* is compelled to pass through the bores V′, S, and S′ into the annular chamber *d*, then through the apertures *h* in the bushing *c* and over the valve K, thereby exerting a downward pressure on said valve and keeping it open so that the water can pass through the apertures O into the cap J, and from the same through the bore M and channels N into the upper part of the bore E of the cylinder D, and then into the cistern. The piston F is lowered to rest on the flange *b*, thus causing the bottom of the cap J to press down the valve-stem B and keep valve T from its seat to permit the water to pass from the channels V′ into the channel or bore S.

The bushing is a very essential feature for the purpose of preventing the rising water from closing the valve K.

The bushing can be applied in any hydraulic jack, as it requires no change in the construction of the same, with the exception of the groove *a*, which is cut in the side of the bore of the cylinder.

In my improved jack the packing of the piston is not damaged, as said packing does not pass into the bushing and cannot be cut by the apertures in the bushing.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A hydraulic jack provided in the lower part of the bore of the cylinder in which the pump-piston works with a bushing forming an annular chamber which is in communication with the channels through which the water passes from the bottom chamber to the bore of the pump-cylinder, said bushing having apertures, and said bushing being of less diameter than the pump-piston, so that the piston cannot pass into it, substantially as shown and described.

2. In a hydraulic jack, the combination, with the casing, ram, and the pump-cylinder, which pump-cylinder has an annular groove in its bore near the lower end, of a bushing in the bottom of the pump-cylinder, which bushing is provided with an annular flange on its upper edge, which flange is forced into the groove in the bore of the cylinder, and which bushing has apertures in its sides, the diameter of the bushing being less than the diameter of the plunger and packing, so as to prevent forcing the packing into the bushing, thereby preventing the cutting of the packing by the edges of the apertures, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES HUEBNER.

Witnesses:
OSCAR F. GUNZ,
MARTIN PETRY.