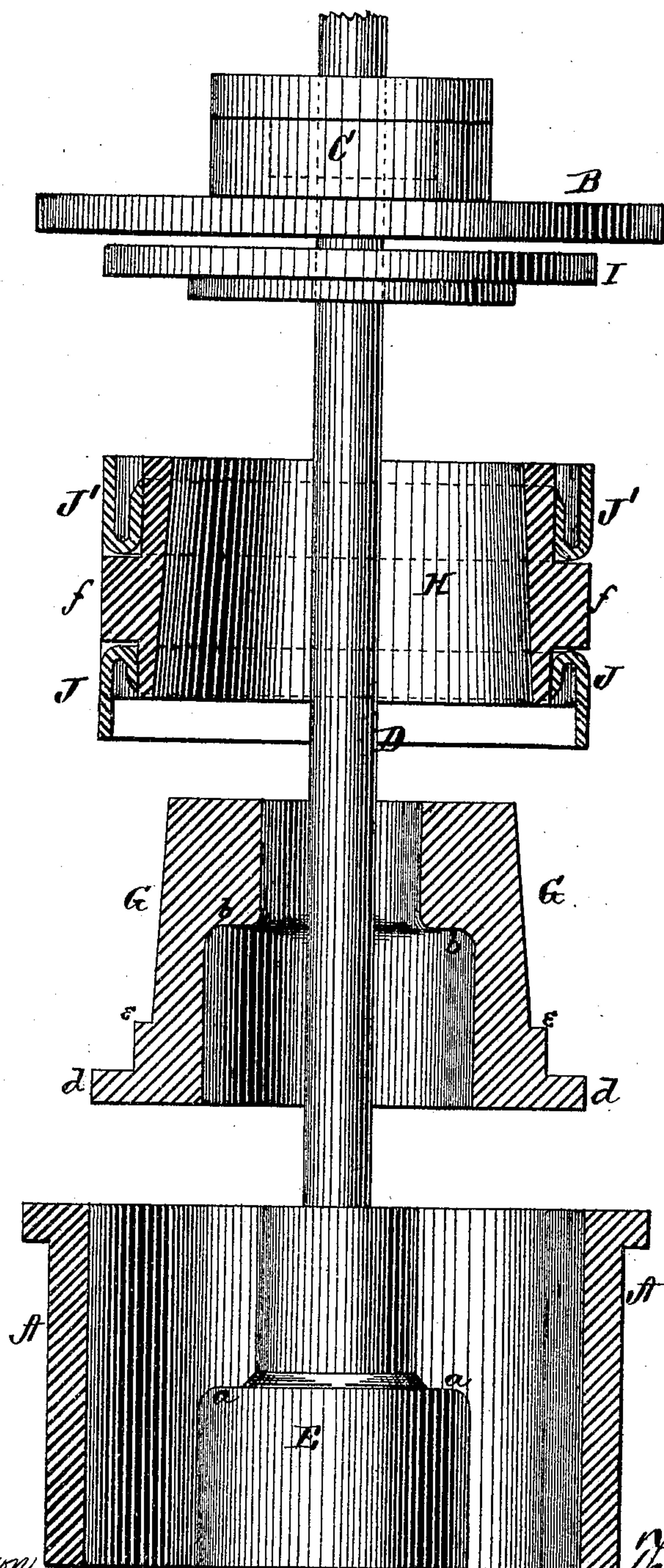


T. CRITCHLOW.  
Hydraulic-Piston.

No. 132,445.

Fig. 1.

Patented Oct. 22, 1872.



Witnesses:  
Jas. O. Hutchinson  
C. L. Ewert.

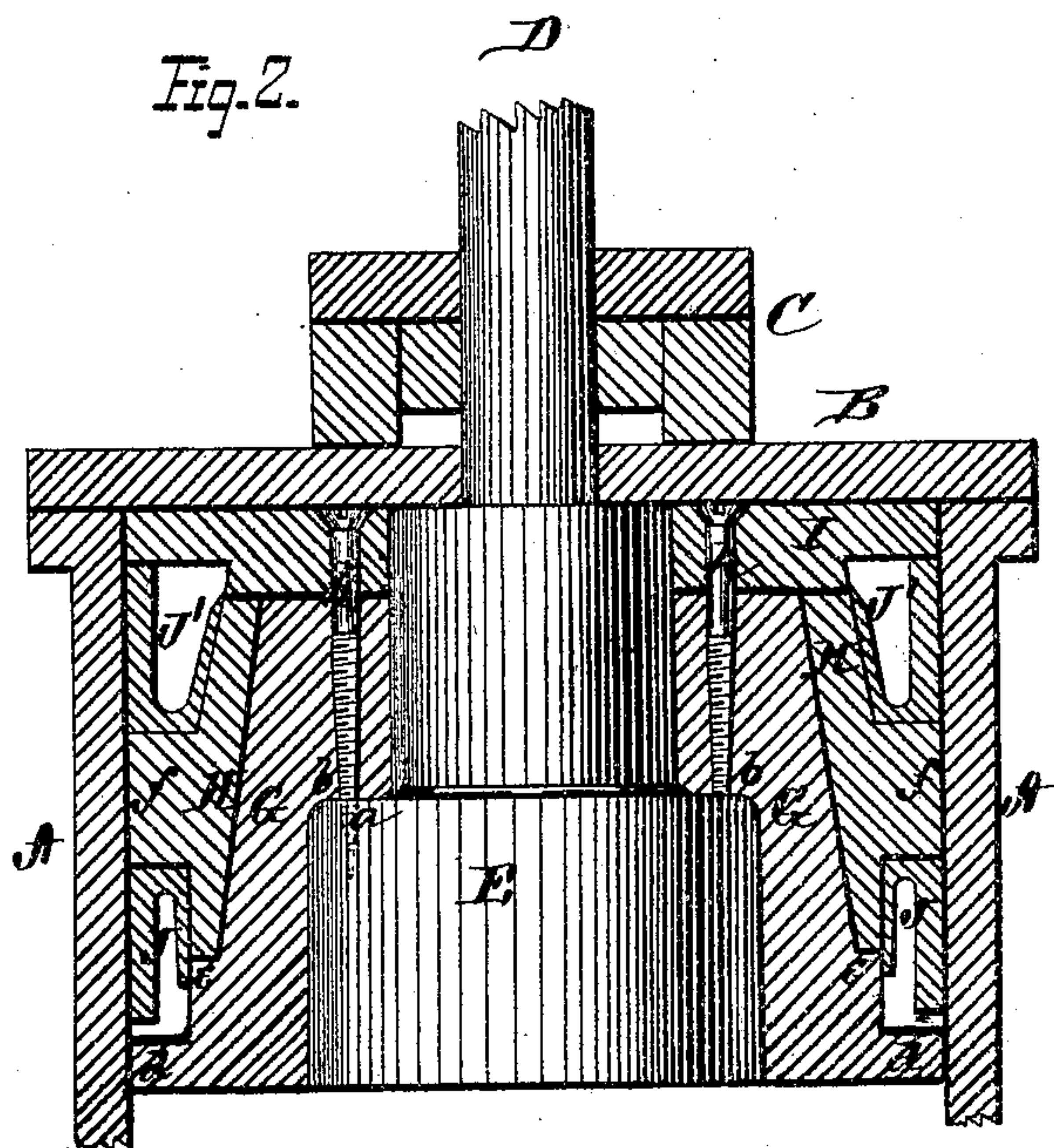
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# UNITED STATES PATENT OFFICE.

THOMAS CRITCHLOW, OF BALDWIN, PENNSYLVANIA.

## IMPROVEMENT IN HYDRAULIC PISTONS.

Specification forming part of Letters Patent No. **132,445**, dated October 22, 1872.

*To all whom it may concern:*

Be it known that I, THOMAS CRITCHLOW, of Baldwin, in the county of Dauphin and in the State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Pistons; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

In machinery where hydraulic pistons are used, especially in steel-works or other heavy machinery, when the packing becomes worn so as to require new packing it is necessary to remove parts of the machinery to pull the piston out of the cylinder to put on the packing. In large works this necessitates the stoppage of the works sometimes for an entire day, involving a considerable loss of time and money. To obviate this difficulty and do the work in a comparatively short space of time is the object of my invention; and it consists in the construction of the piston in sections, slipping one over the other, so that by simply removing the cylinder-head parts of the piston may be drawn out, remaining on the piston-rod, and the packing-rings introduced and brought to their proper places, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 represents a part of the cylinder with the sectional piston, the removable parts thereof, as well as the cylinder-head, being moved up on the piston-rod; and Fig. 2 is a vertical section through the same parts when joined together within the cylinder.

A represents the end of the cylinder, and B the head thereof, provided with a stuffing-box, C, through which the piston-rod D passes. Upon the inner end of the piston-rod D is formed or attached a plunger, E, forming the central part of the piston. This plunger is provided with a circumferential offset, *a*, and is of the same length as the entire piston. On the plunger E is placed a cap, G, having an interior shoulder, *b*, corresponding with the

offset *a* on the plunger. Around the inner end of the cap G is a flange, *d*, of such size as to fit the interior of the cylinder. Above this flange, around the outside of the cap, is a square step or shoulder, *e*, and above the same the exterior of the cap is conical, decreasing in diameter, as shown in Figs. 1 and 2. The height of the cap G is just so much less than that of the plunger E that the top plate I of the piston will fill up the space and compensate for the difference. Around the cap G is placed a ring, H, which rests upon the step or shoulder *e* and extends up level with the end of the cap. The interior of this ring is conical to correspond with the exterior conical surface of the cap G, and on the outside of the ring is formed a circumferential flange, *f*, of such size as to fit the interior of the cylinder A. Between this flange *f* and the flange *d* of the cap G is thus formed a circumferential groove for the reception of the packing-ring J, and between the same flange and the plate I is thus formed a similar groove for the reception of the packing-ring J'. The plate I is of the same external circumference as the flanges *d* and *f*—that is, to fit the interior of the cylinder A. This plate fits around the upper end of the plunger E and has a disk or flange on its under side, fitting even with the exterior circumference of the ring H at the upper end. The parts are fastened together by screws *h* passing through the plate and part of the cap into the offset *a* of the plunger.

When the packing-rings are worn so as to necessitate their removal and the repacking of the piston, the piston is drawn as far to the end of the cylinder as possible. The cylinder-head B is then removed from the end of the cylinder and slipped up on the piston-rod; the screws *h h* taken out, and the plate I in the same way moved out as far as necessary. The ring H and cap G are then also drawn out, leaving but the plunger E in the cylinder. The old and worn packing-rings are then cut off, and the new ones put on in the following manner: Each ring is doubled and passed through the end of the cylinder A, so that it can be slipped over the plunger E and around the rod D. It is then passed through the cap G, when it may readily be slipped over the inner end of the ring H into its place. The other ring is passed through said ring and then slipped

into its place over the other end. The parts of the piston are then put together again and the cylinder-head secured in position, when the engine is ready for work again. This whole operation can be performed in a comparatively short space of time, obviating the necessity of stopping the works, as is now often the case, for a whole day at a time, thus effecting a great saving in time and money.

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

In combination with a cylinder, A, and pis-

ton-rod D, a sectional piston, composed of a plunger, E, two or more detachable concentric sections, G H, provided with packing J, and the top plate I, said sections and top plate movable upon the rod D, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of May, 1872.

THOS. CRITCHLOW.

Witnesses:

C. M. ALEXANDER,  
A. N. MARR.