T. MALCOLMSON.

Pump-Piston for Artesian Wells.

No. 166,394. Patented Aug. 3, 1875.

FIG. I.

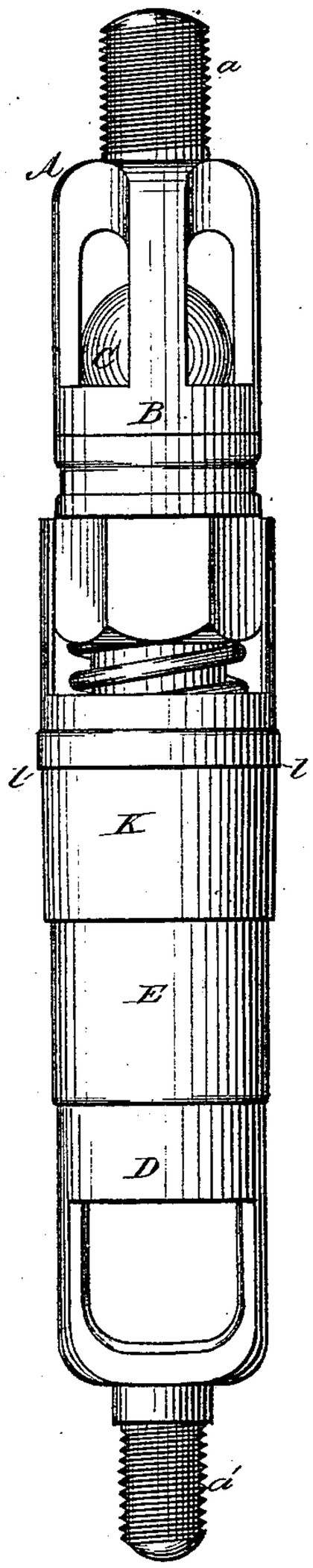


FIG. II.

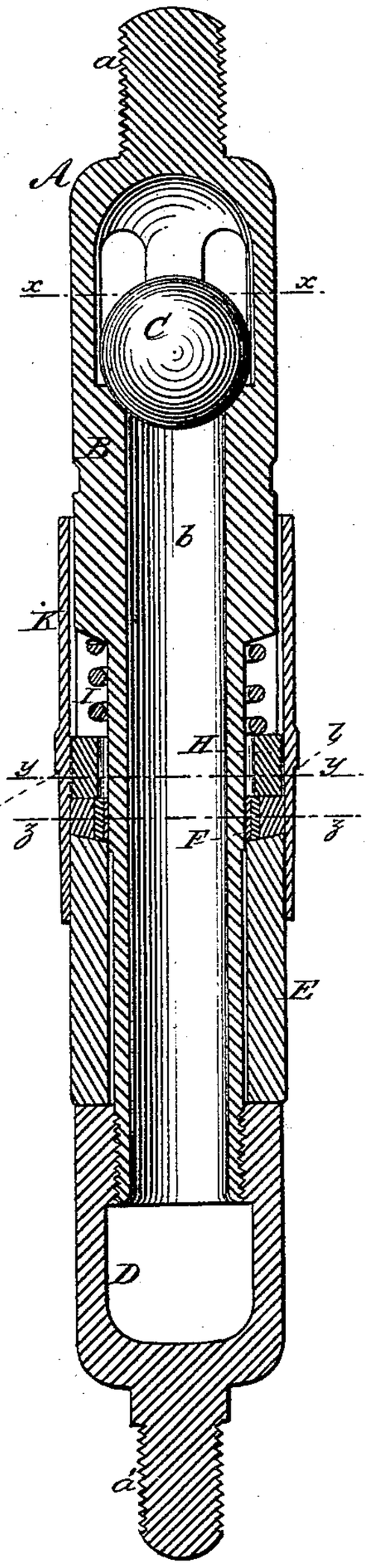


FIG. III.

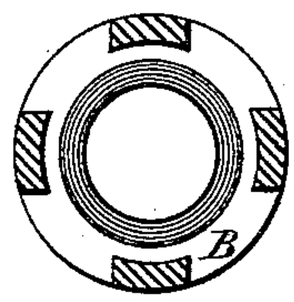


FIG. IV.

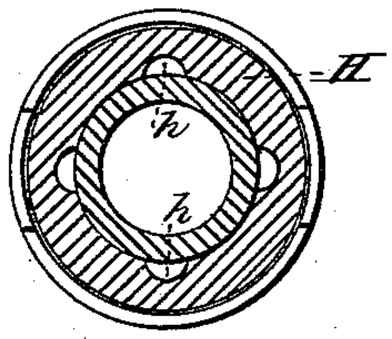
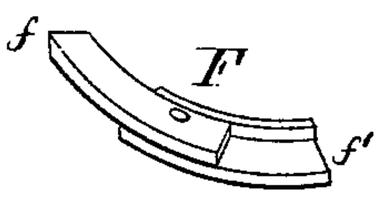


FIG. V

FIG. VI



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UNITED STATES PATENT OFFICE.

THOMAS MALCOLMSON, OF OIL CITY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO DAVID L. TRAX, OF SAME PLACE.

IMPROVEMENT IN PUMP-PISTONS FOR ARTESIAN WELLS.

Specification forming part of Letters Patent No. **166,394**, dated August 3, 1875; application filed April 23, 1875.

To all whom it may concern:

Be it known that I, THOMAS MALCOLMSON, of Oil City, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Pump-Pistons for Artesian and other Deep Well or Oil Pumps, of which the following is a specification:

In the drawing accompanying these specifications, Figure 1 is a side elevation of my improved piston. Fig. 2 is a vertical section of the same. Fig. 3 is a cross-section on line *x x*. Fig. 4 is a cross-section on line *y y*. Fig. 5 is a cross-section on line *z z*. Fig. 6 is a view of a portion of the packer.

The main object of my invention is to provide a pump-piston that is not so easily worn out or liable to get out of order as those now generally used; and it consists in substituting for the leather cup-packing now in use a metallic piston-packing of peculiar segmental pieces set out by springs and hydrostatic pressure, and providing a ready means of detaching and replacing the same. As is well known, the leather cup-packings are very soon worn out. The working barrel of the pump is often cut in channels and ridges by the grit or sand which embeds itself in said leather cups. This necessitates the drawing out of the tubing and reboring of the barrel, as well as replacing of the cup-packing. My present improvement entirely obviates these difficulties, as the piston with its metallic packing can be used a very long time before any perceptible wear takes place, and even when the barrel wears my piston will adjust itself to the worn barrel.

In the drawing, A represents the piston made in two main portions, which are provided at their upper and lower ends with screw-threads *a a'*, to attach it to the sucker-rods with the upper one, and to draw the standing box with the lower one, in these respects not differing from ordinary pistons for artesian wells. The main portion B of the piston has a hole, *b*, through it, which is closed at its upper end by a ball-valve, C, arranged in a suitable cage. The lower end of the portion B screws into the female end D for the ready removal of the ring E, packing-rings, and follower hereinafter described. The ring E might, however, be made in one piece with the end D, if preferred, by which the piston could be made shorter. The upper end of ring E is slightly beveled, and into it the segmental packing-rings F fit. They consist of an inner and outer set, *f f'*, which break joints with each other, and are forced outward by a steel split spring, G, against the shell. The follower H is forced down upon the packing-rings by a coiled spring, I, whose upper end bears against the shouldered end of the part B, and keeps them in place. The follower H is provided with several holes or recesses, *h h*, which allow to the fluid in the well free access to the inside of the segmental ring. The hydrostatic pressure of the column of fluid presses the ring firmly against the sides of the working barrel, thus making the ring fit perfectly close, and forming a perfectly-tight working piston. The bevel ends and the spiral spring keep the rings from being forced out too strongly.

The segmental rings F and the ring E can be made without any bevel, but the segmental rings F should then be made thinner, so that the hydrostatic pressure of the fluid will have less bearing. It is obvious that the segmental rings F can be made so slender that the hydrostatic pressure will not be able to overcome the friction between the surfaces of the rings F, follower H, and ring E. When I do not use the bevel I make the segmental rings three-sixteenths of an inch thick. If a greater bearing of packer on the working barrel is desired, I recommend the bevel.

When the piston is placed in position in the working barrel, and to prevent the segments of the packing-rings from catching on the upper end of said working barrel, a short, thin, tapering sleeve, K, is placed over them, which, in descending, remains in a counterbore in the upper end of the barrel by striking against the shoulder *l* thereon, while the piston passes down to its proper place.

The segmental rings F can be made in several different ways with equal effect. I consider that the preferable way is to make an L-ring, and another ring to fit onto the L-ring, so as to make the whole flat, so that the section of the double ring will be a rectangle. These rings can be cut into as many segments

as desired. I prefer five to any other number. An advantage is gained by riveting together alternate segments of each ring, as shown in Fig. 6. When this is done properly the tapering sleeve K can be dispensed with.

The view in Fig. 6 is taken upside down, the better to show the segments. If an entire ring, made on the same plan as that shown in Fig. 6, were inserted in Fig. 2, it would be absolutely necessary to have the smaller ring *f* toward the bottom of the piston.

This invention can also be applied to steam-pistons and piston-valves, if desired, as well as to the stuffing-box of piston-rods, with very slight modifications.

The advantages of my invention are, that it diminishes the friction usual in pumps; it prevents cutting and grooving of the barrel, and keeps it true; it prevents leakage, and it can be used a long time without perceptible wear; and steam can be introduced into the well without withdrawing the piston. This cannot be done with leather cup-valves or pistons.

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

1. In the piston A, consisting of parts B and D, the combination therewith of the tapering sleeve K, substantially as described.

2. The pistons A B D, with the segmental packing-ring F, spring G, and follower H, constructed substantially as set forth.

3. The combination of a piston, A B D, with the ring E, sleeve K, packing-ring F, and follower H, all arranged as specified.

4. The combination of a piston, A B D, ball-valve C, and sleeve K, with a ring, E, packing-rings F, spring G, follower H, and coiled spring I, all constructed and arranged as and for the purpose set forth.

THOS. MALCOLMSON.

Witnesses:
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