J. OLD.

PISTONS FOR DEEP WELLS.

No. 183,590. Patented Oct. 24, 1876.

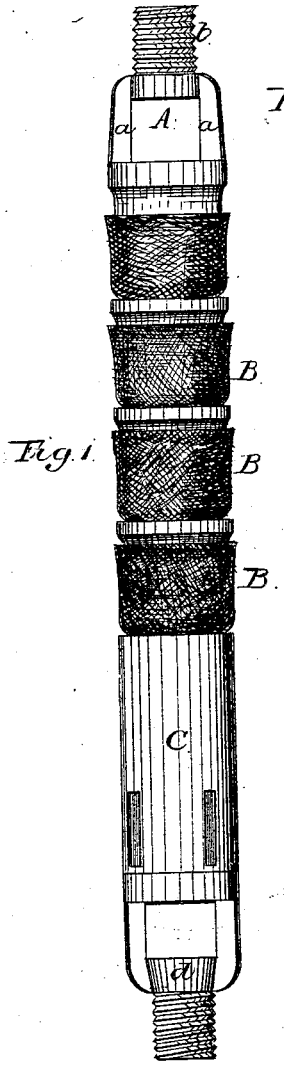

Fig. 1.

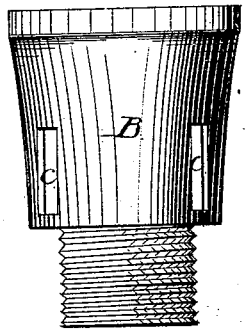

Fig. 2.

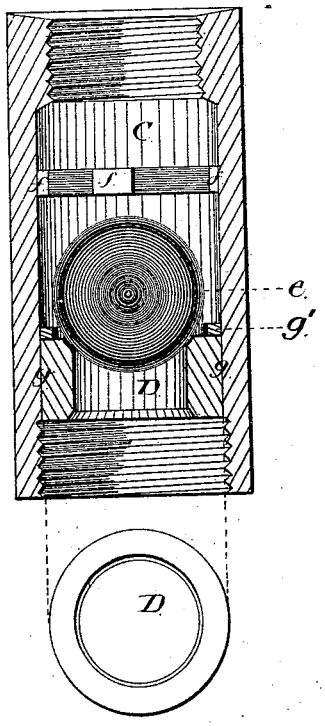

Fig. 3.

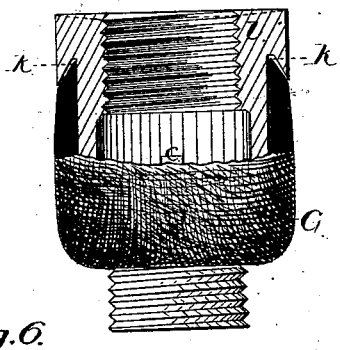

Fig. 4.

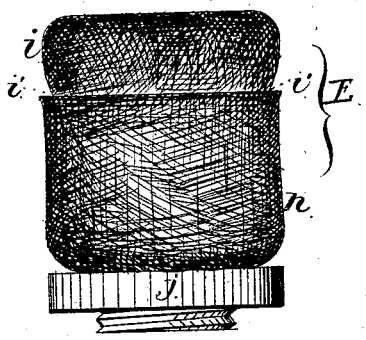

Fig. 5.

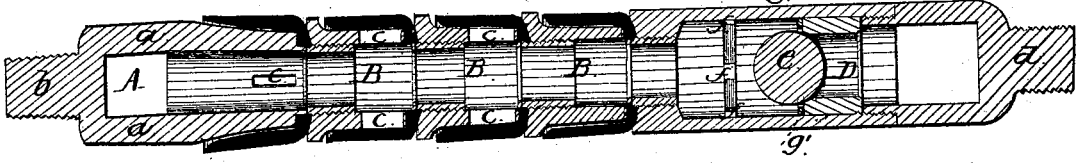

Fig. 6.

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UNITED STATES PATENT OFFICE.

JAMES OLD, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN PISTONS FOR DEEP WELLS.

Specification forming part of Letters Patent No. **183,590**, dated October 24, 1876; application filed September 9, 1876.

To all whom it may concern:

Be it known that I, JAMES OLD, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Pistons for Deep Wells; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of the same.

My invention has reference more particularly to improvements in the cylinder of the piston; also in the construction and arrangement of the cup-leather packing; and, lastly, to improvements in the valve-chamber and valve-seat.

First, it consists in making the piston in two or more sections, each carrying a cup-leather packing; second, it consists in providing the cup-leather cylinders or sections with slots through which the fluid exerts pressure on the packing; third, it consists of an improved cup-leather packing; and, lastly, it consists of a reversible valve-seat secured within a cylindrical valve-chamber in such a way that it can be readily removed therefrom whenever it may be found necessary.

In the drawings, forming part of this specification, Figure 1 is a side elevation of the piston. Fig. 2 represents one of the middle sections with the cup-leather removed. Fig. 3 is a longitudinal section of the valve-chamber. Figs. 4 and 5 represent the improved arrangement of the cup-packing. Fig. 6 is a longitudinal section of my improvement.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A is the head of the piston, having a bridge, *a*, for the purpose of providing exits for the fluid, and a male screw, *b*, to connect it with the pump-rod. The lower portion is adapted to receive a cup-leather packing. The middle portion of the piston is composed of sections B B B, over the lower portion of each of which is placed a cup-leather packing. The general form of these sections is bell-shaped, whereby, when the cup-leathers are placed on them, their upper or open ends are flared outward, a feature possessing an obvious advantage. Each section has a male and female screw at opposite ends. When they are screwed together, the bell-shaped end of one section presses against the lower end of the next, and the bottom of the cup-leather is held securely between them. These sections, with the exception of the lowest one, are provided with slots *c*, through which the oil or other fluid presses on the cup-leathers and expands them, making them fit more closely the chamber in which the piston works. The position of these slots is such that the pressure of the fluid is exerted against the inside of the cups from the interior bottom upward, so that sediment will be forced out instead of accumulating in the cups. C is the valve-chamber, to the lower end of which is screwed the bottom piece *d* of the piston, similar in construction to the top, but having no packing. The ball-valve *e* works in the chamber C between the annular seat D and the stops *f*.

The valve-seat D is reversible, and may be readily removed from the valve-chamber in which it is placed so as to occupy the finished space *g* above the screw-threads, where it is held between the annular lug *g'* and the end of the bottom piece *d*. The reversible valve-seat itself I do not claim as my invention, but only in connection with the valve-chamber and the arrangement for securing it in place. It is made of an alloy of copper and tin, and is known as "hard brass." It makes a very superior serviceable valve-seat, and is more easily adjusted in its place than those now in use.

E is one of the improved cup-leather packings. It consists of a cup, *h*, placed on a straight section, in place of the bell-shaped packing-section described above. Over the top of the section is placed the cap *i*, the edge *i'* of which is feathered so as to fit within the cup *h*. When several sections provided with cup-leathers of this kind are used, rings *j* are placed between them. G is another form of cup-leather and section. In this the top of the cup is feathered, so as to fit in the groove *k* in the top *l* of the section. In the first of these, the main object is to confine the oil within the cups when it presses through the openings in the sections, and expands the packing. The sections are provided with slots like those in the sections first described. The same object is sought after in the second, only

here the cup is confined at the top and the expansion takes place in the body of the cup.

By constructing the piston in sections, as described, it may be lengthened or shortened at pleasure by removing one or more, or adding, as the case may be. Likewise, when a cup becomes injured, it may be removed without disturbing the remainder.

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

1. As an improvement in pistons for deep wells, a hollow cylindrical piston, composed of top piece A and valve-chamber C and intermediate packing-sections B, capable of being adjusted as to its length by the addition to it or removal from it of one or more of the sections B, substantially as described.

2. As an improvement in pistons for deep wells, the reversible valve-seat D made of hard brass, in combination with the valve-chamber C, bottom piece *d*, and annular lug *g'*, substantially as described.

3. As an improvement in pistons for deep wells, a piston composed of one or more hollow cylindrical packing sections, B, the top piece A, and valve-chamber C, substantially as described.

4. As an improvement in pistons for deep wells, one or more of the sections B, provided with slots *c*, so placed as to prevent the accumulation of sediment in the packing-cups, in combination with the packing-cups, the valve, and valve-chamber placed at the lower end of the piston, whereby the hydrostatic pressure is utilized to expand the packing and to force the sediment out of the cups, substantially as described.

5. As an improvement in pistons for deep wells, the slots *c* in the sections B, so placed with relation to the packing-cups that no sediment can accumulate in the bottom thereof, substantially as described.

6. As an improvement in packing-cups for pistons, the cup-packing E, composed of cup *h* and cap *i*, substantially as described.

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Witnesses:

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