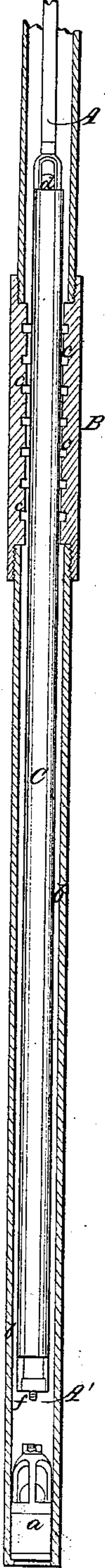


*W. B. Snow,*  
*Oil Pump.*

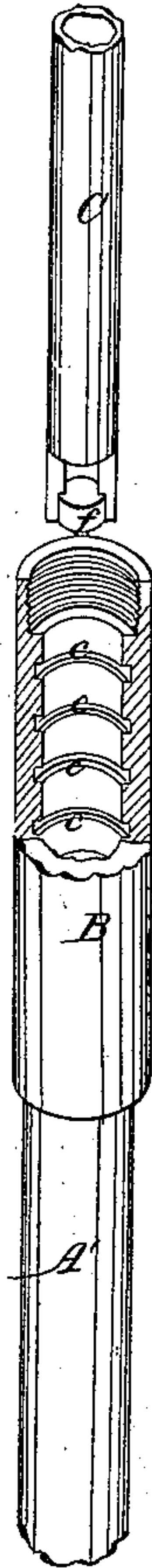
*N<sup>o</sup> 60,586.*

*Patented Dec. 18, 1866.*

*Fig. 1*



*Fig. 2*



*Witnesses.*  
*R. F. Osgood*  
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# United States Patent Office.

## IMPROVEMENT IN PUMPS FOR DEEP WELLS.

WILLIAM B. SNOW, OF TITUSVILLE, PENNSYLVANIA.

*Letters Patent No. 60,586, dated December 18, 1865.*

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM B. SNOW, of Titusville, in the county of Crawford, and State of Pennsylvania, have invented certain new and useful improvements in Pumps for Artesian Wells; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a central vertical section of my improved pump.

Figure 2, a perspective view of the metallic packing section with a part broken away to show the interior, and a similar view of the lower end of the piston.

Like letters of reference indicate corresponding parts in both figures.

My improvements are applicable to all deep-well pumps, but more especially oil pumps, where much difficulty is experienced from gas and sand. In oil pumps it has been considered necessary, heretofore, to employ a piston packed with leather, in such a manner that only the leather shall come in contact with the sides of the barrel to prevent cutting. But owing to the great wear of such pistons, from the immense pressure resting thereon, they must be repacked every few days, which not only occasions great expense and loss of time, but even when newly packed they are very inefficient in preventing leakage.

The principle of my invention consists in the employment of a metallic piston running through a metallic packing situated at the proper position in the tubing, whereby not only is the liquid raised comparatively without leakage, but the pump will endure for a long time, and the gas is allowed a free escape.

As represented in the drawing, A A' is the tubing in which the oil is elevated, extending from the top to near the bottom of the well in the usual manner. At a proper position a short section or diaphragm, B, is screwed into the tubing, as clearly shown in fig. 1. The portion A' of the tubing beneath this section is only of the proper length to receive the ordinary lower valve, *a*, and to allow the reciprocations of the piston C; but its interior diameter is a little greater than the outside diameter of the piston, so as to leave a space, *b*, all around the piston below the section, as represented. I prefer to make the section B of cast iron, and the tubing and piston of wrought-iron tube; but any desired material may be employed. I also prefer to provide the section with grooves, *c c*, of suitable number to form a liquid packing to the piston that passes through it. The piston is turned smooth on the outside, and its length is such, as to allow its necessary reciprocations in the section B, without being withdrawn therefrom at the extreme of the strokes. Under ordinary circumstances, in an oil well, the length of the piston is four feet and eight or ten inches, and the section through which it runs thirteen inches; but these proportions may be varied at pleasure. Also, if desired, a series of the sections may be used with a single piston running through them. I prefer to fit the piston in the section comparatively loosely; that is, so that it will pass up and down easily and leave a very little space around, but not sufficient to allow leakage, the object of which will be presently explained. The piston is provided at the top with the ordinary valve, *d*, and at the bottom with the usual screw, *f*, for connecting with the lower valve to raise it from the well for repairs. In the use of the long piston passing through the metallic packing section, as described, I secure several important advantages, as follows:

1. The packing is very enduring, and will not wear so as to produce great leakage till the pump is worn out. Ordinary leather packing requires replacing every few days, while this will last months.

2. The port or passage through the piston can be made of very large size to insure the ready flow of oil and gas through the same, since there is no packing around it to contract its size. Where leather packing is employed, the passage through the piston is necessarily contracted to give place for the leather.

3. In its upward stroke the piston, from its great length, will have a tendency to carry the liquid with it by reason of the friction against its sides; and this will, in a degree, counterbalance the tendency of the liquid to leak down through the metallic packing.

4. The space *b*, between the sides of the piston and the tubing, not only removes friction from the piston, but furnishes a passage for the gas outside the piston to rise and discharge through the section B. The comparatively loose fitting of the piston within its seat insures the escape of the gas, and at the same time prevents wear against the sides of the packing, the piston being, as it were, suspended in equilibrium.

5. The employment of the metallic packing section, B, in the tubing, dispenses with what is known as the



"working barrel," or the cylinder of the pump. Ordinarily, this cylinder is made of brass, and of such length that the leather piston will work up and down in it. It must therefore be finished and fitted accurately, which involves much labor and expense. By the employment of the packing section B, where the only bearing of the piston comes, I am enabled to make the part A' simply of iron tubing like that above. This construction not only lessens the cost and labor, but insures greater strength than usual. In ordinary oil wells the tubing is suspended in the well and does not touch the bottom. It sometimes drops into the well, and if the brass working barrel is employed at the bottom, owing to its want of stiffness and strength, it frequently becomes bruised, bent, or broken, and cannot be repaired. If iron is used its strength is such that it will usually resist the shock; and even if bent or broken, the cost of replacing is much less than brass. By the employment of the section B, as before described, it will be perceived that the position of the pump proper may be changed in the tubing with the greatest ease and facility, and the extreme simplicity of construction and action of the pump insures the most favorable result in the production of oil.

6. In ordinary pumps the piston wears the sides of the barrel by reason of the sand entering. Thus, that portion of the barrel in which the piston moves gradually enlarges, while the bottom in which the lower valve *a* rests, remains of the same size. As the barrel enlarges the piston is also enlarged as it is re-packed, and consequently when it is attempted to force it down to screw into said lower valve to raise it, the contraction of the barrel at that point will prevent. In my arrangement it will be perceived there can be no difficulty of this kind, nor can sand enter between the piston and the working barrel proper to wear the parts.

What I claim as my invention, is—

The grooved metallic packing section, or sections B, secured in the tubing of an Artesian well, in combination with an elongated piston, C, working through the same, the range of which is above and below said packing section or sections, they being of less interior diameter than the tubing, arranged substantially in the manner and for the purposes herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM B. SNOW.

Witnesses:

R. F. OSGOOD,  
W. A. LODER.