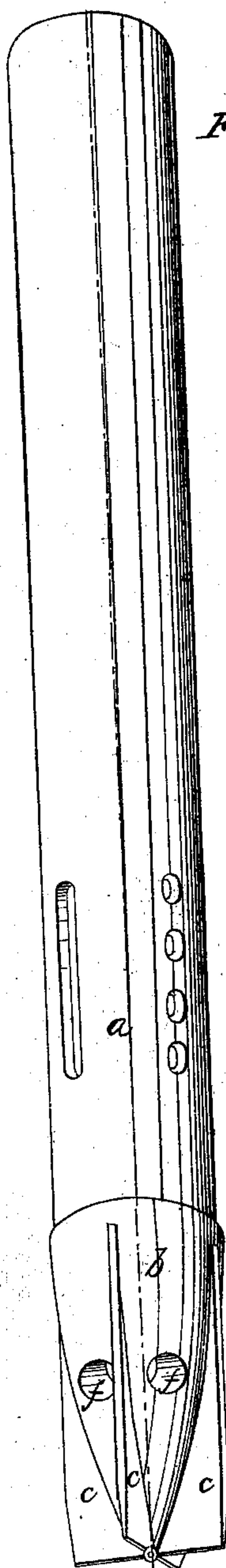


*S. Waite,*

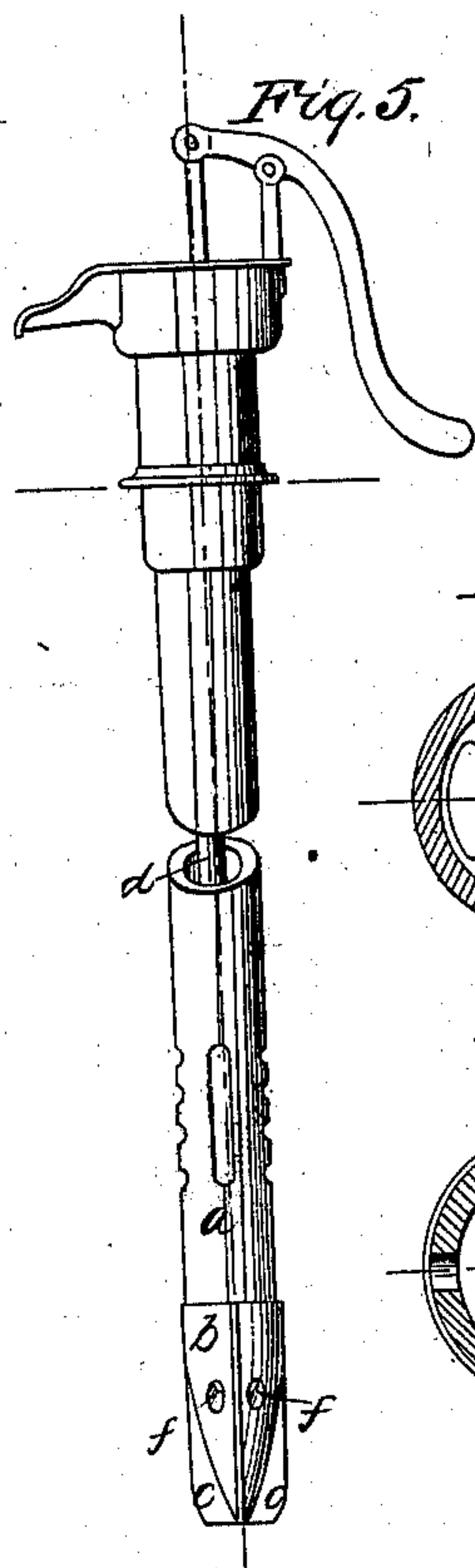
*Well Tubing.*

*N<sup>o</sup> 68,917.*

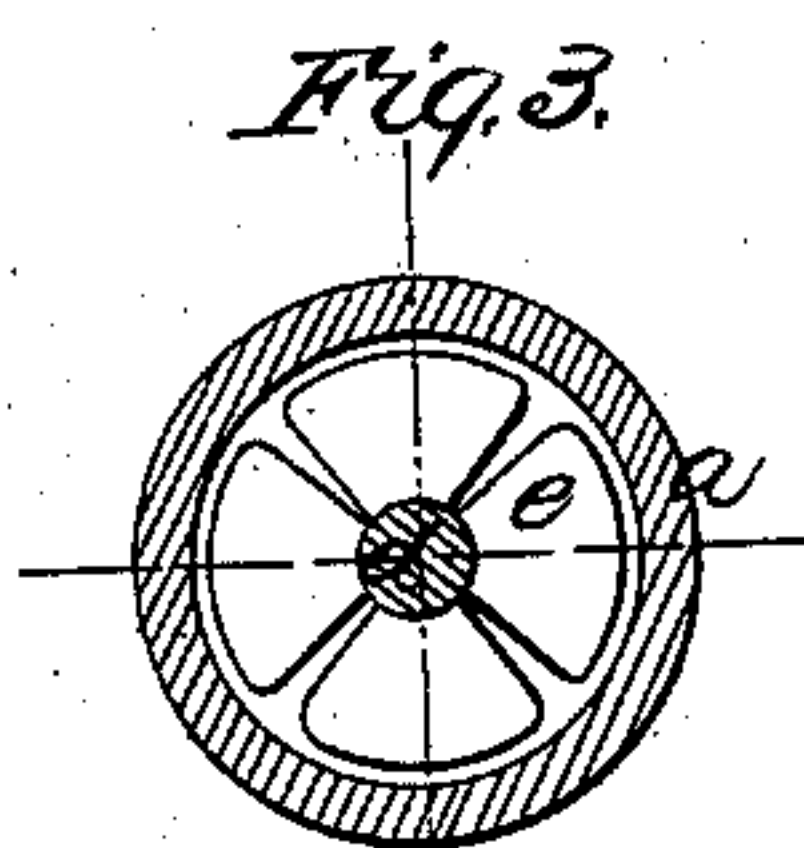
*Patented Sep. 17, 1867.*



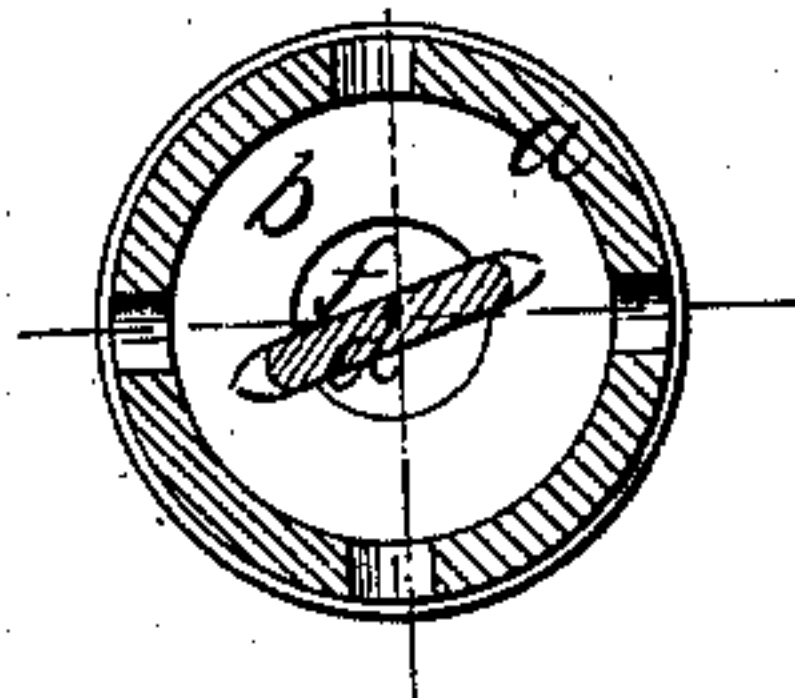
*Fig. 1.*



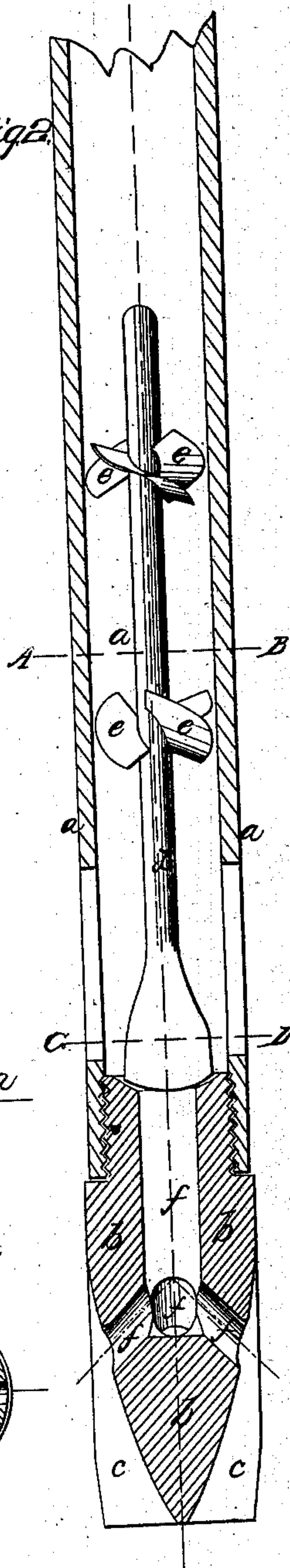
*Fig. 5.*



*Fig. 3.*



*Fig. 4.*



*Fig. 2.*

*Witnesses:*  
*Andrew B. Howland*  
*E. O. Adams*

*Inventor:*  
*Stephen Waite*



# United States Patent Office.

STEPHEN WAITE, OF NEW BEDFORD, MASSACHUSETTS.

*Letters Patent No. 68,917, dated September 17, 1867.*

## IMPROVEMENT IN DRIVEN PUMPS.

*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, STEPHEN WAITE, of the city of New Bedford, county of Bristol, and State of Massachusetts, have invented a certain new and useful Improvement in Driven Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification, and in which similar letters represent similar parts in all the views.

My invention relates to an improved manner of constructing and operating the class of wells usually denominated "driven-water wells."

The usual method of operation is substantially as follows: After driving down a drill or rod of iron it is withdrawn; an iron tube is inserted in the hole thus formed, through which the water is drawn by a pump attached to the top of the tube, the latter serving both as a pump-barrel and curb for the well. It is provided with holes, slots, or any other simple means, at the lower end to admit the water, and when sunk to the required depth the pump is applied and the water and sand pumped out until a clear space is formed around the lower end of the tube, serving as a reservoir for the water. In different localities we have to penetrate the ground from ten to thirty feet, and have frequently to drive the drill or tube through boulders and strata of sand and other rock, requiring great force and strength to penetrate them. It is found impracticable to drive and withdraw a solid drill-rod more than about twenty feet, and for all below that depth we must dispense with the drill and drive the tube itself, in doing which serious difficulty occurs when the tube or pointed plug with which it is shod comes in contact with the side of a smooth rock and glances aside from a vertical line, in which case the hole must be abandoned, the tube withdrawn, and another spot tried; and on withdrawing the tube I have frequently found it split, shattered, or bent, and the point or shoe lost off entirely. When the tube is down to the required depth it is perfectly practicable to pump out all sand and gravel which may enter the tube by a pump adapted to that purpose, but sand and gravel (and especially quicksand) afterward enter and collect in the bottom of the pipe, causing great annoyance in pumping and using the water.

The object of my invention is, therefore, to arm the well-tube with a pointed shoe of such shape that it can be driven through or beside all obstacles without departing from a vertical line, and to provide a means for keeping the tube free from sand and sediment at all times.

Figure 1 is an outside view of the lower end of the tube with my improved drill-point or shoe.

Figure 2, a vertical section of the same, showing my method of keeping the tube free from sand and sediment.

Figures 3 and 4 are transverse sections on lines A B and C D; and

Figure 5 represents my improved point as combined with a tube and applied to a pump.

*a* represents the lower end of the well-tube, which is provided with holes, slots, or other cheap and suitable means for admitting water. I provide this tube with the drill-shaped point or shoe *b*, of the peculiar form shown, secured to the tube by a screw-thread or other equally strong method. It will be seen that the solid portion of the shoe tapers to a point, the better to force aside the sand, gravel, and rock which it must pass through. To enable it to cut through instead of to glance from the sidling surface of boulders, I provide the shoe with the wings *c c*, any desirable number of which may be provided, from two or three upward, thus presenting the sharp edges of these wings to the rock, instead of a single tapering point. By raising and slightly turning the tube when boring through hard rock all the advantages of a sharp cutting drill are obtained, while the solid tapering portion of the point serves as a wedge to force aside or split the rock. To keep the tube free from sediment I provide and insert a rotating apparatus, consisting of a rod, *d*, provided with two or more spiral wings *e e*, the lower end of the rod *d* being flattened like an ordinary reamer, and the whole apparatus resting loosely on the upper end of the shoe. I perforate the shoe *b* with the holes *f f*, or their equivalent. On the upward strokes of the pump the current of water acting upon the wings *e e* will turn the entire apparatus. The reamer-shaped point of the rod *d* thus scrapes and loosens the sand and sediment collected, which pass entirely out of the tube through the holes *f f* provided in the shoe for that purpose.

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

1. The within-described perforated drill-shaped point or shoe *b* applied to a perforated tube, *a*, and arranged in connection with a pump, substantially as and for the purposes set forth.

2. The within-described arrangement and combination of the rotating apparatus, the perforated shoe *b*, and perforated tube *a*, when applied to a pump, all being constructed and operated substantially as and for the purposes set forth.

Dated at Titusville, Pennsylvania, this twenty-seventh day of March, A. D. 1867.

STEPHEN WAITE.

Witnesses:

ANDREW B. HOWLAND,  
E. O. ADAMS.