

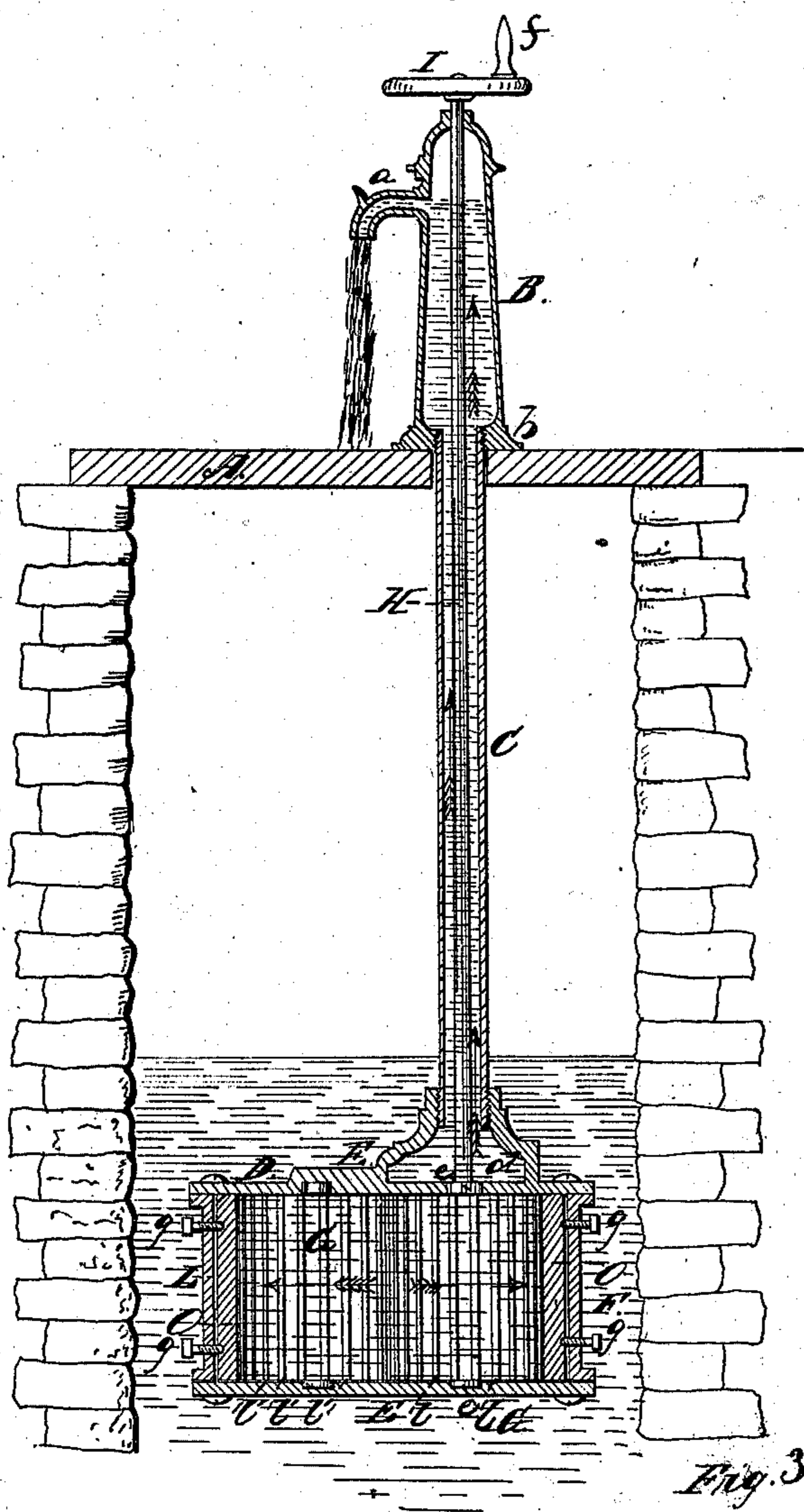
*D. D. Hardy,*

*Rotary Pump,*

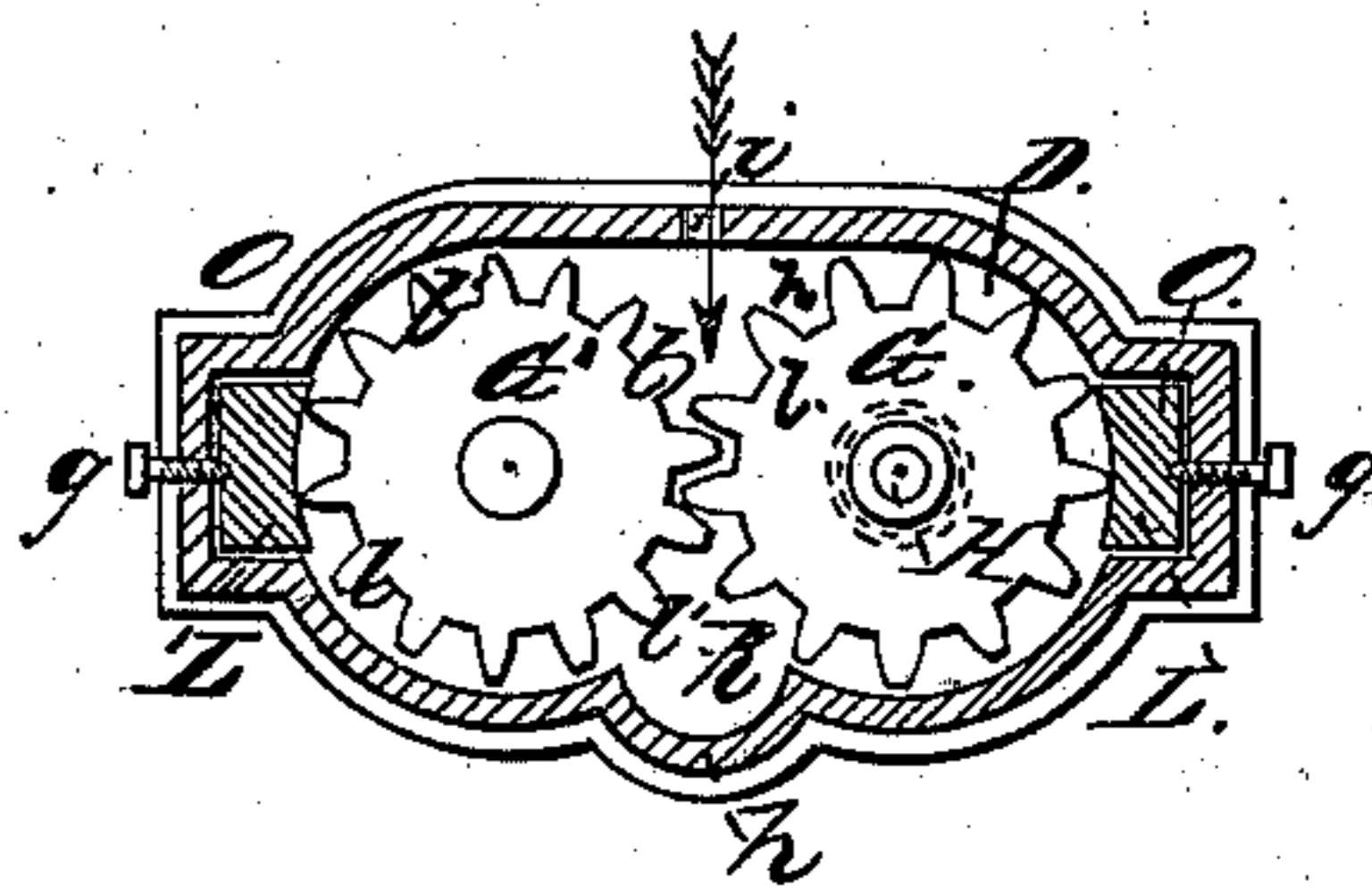
*N<sup>o</sup> 81,778*

*Patented Sep. 1, 1868.*

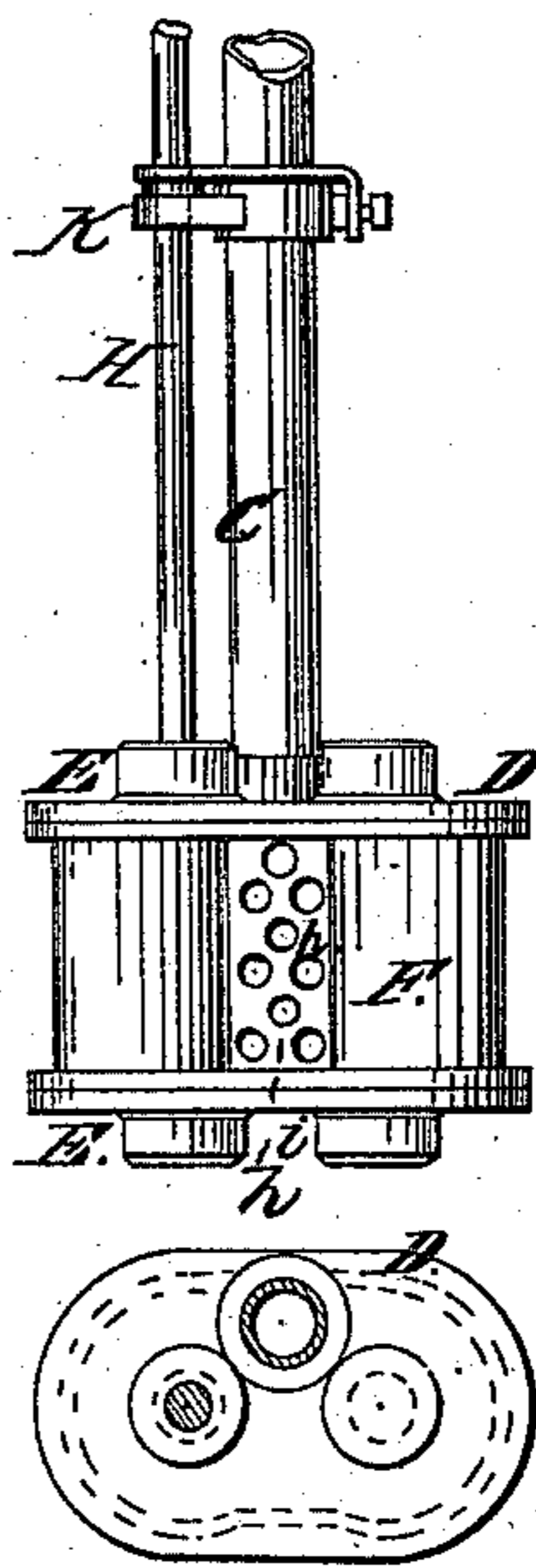
*Fig. 1.*



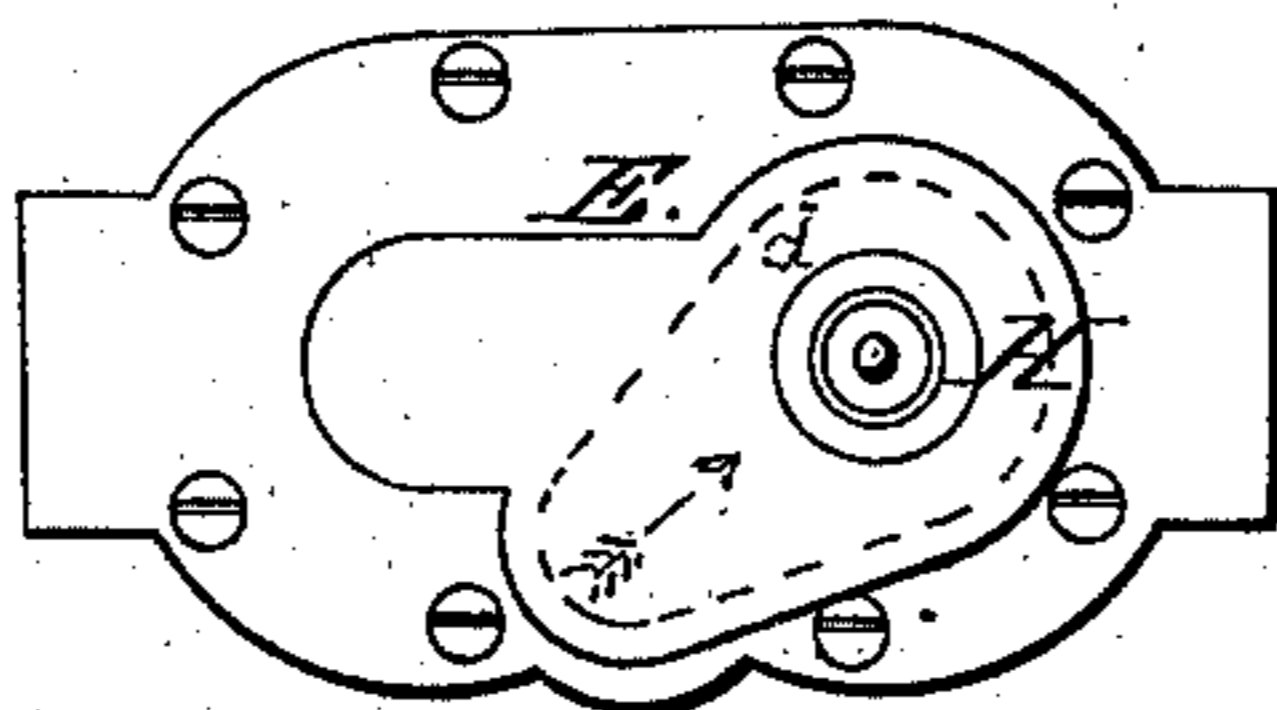
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



*Witnesses*  
*W. L. Fisher*  
*S. R. Russell*

*Inventor:*

*D. D. Hardy*

# United States Patent Office.

DEXTER D. HARDY, OF CINCINNATI, OHIO, ASSIGNOR TO THOMAS H. FOULDS,  
OF SAME PLACE.

*Letters Patent No. 81,778, dated September 1, 1868.*

## IMPROVEMENT IN SUBMERGED ROTARY 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, DEXTER D. HARDY, of Cincinnati, in the county of Hamilton, and State of Ohio, have invented a new and useful Improvement in Pumps, of which the following is a full and clear description, reference being had to the accompanying drawings, making part of this specification.

The nature of my invention consists in a novel construction of a rotary pump, whereby the rotating pistons are arranged to be submerged, and are operated by a vertical rod, extending up through or by the side of the pipe connecting them with the hydrant or case above ground, as hereinafter explained.

Figure 1 is a vertical section of my improved pump in position, ready for operation,

Figure 2 is a transverse section through the pistons and case,

Figure 3 is a top plan view of the piston-case, and

Figure 4 is a side and top plan view of a modification of the same.

It has hitherto been customary to construct rotary pumps having two rotating pistons enclosed in a case, located above the surface, and connected by a tube with the water in the well or cistern below. Pumps thus constructed are objectionable for two reasons: first, that they are liable to freeze up, and thus become useless in the winter time; and second, because the water, being lifted by suction, it is difficult to keep the pistons and case sufficiently tight to form the necessary vacuum, especially when worn, and where the water has to be lifted to any considerable height.

It is to remedy these difficulties, and produce a pump that can be used at all times and in all situations, that is the object of my invention.

To make my improved pump, I provide two pistons, G and G', having teeth or flanges *i* projecting radially, and arrange them in a suitable case, F, in such a position that, as they rotate, their teeth or flanges will interlock like the teeth on gear-wheels, as shown in fig. 2, and as is customary in this class of pumps. These pistons are journaled in the heads of the case, with their ends fitting snugly against the heads, but not so tight as to interfere with their rotation. In each end of the case F is a vertical rectangular recess, L, as represented in fig. 2, and in these recesses are fitted packing-blocks O, having their inner faces curved to correspond with periphery of the pistons. Set-screws *g* are inserted through the ends of the case F, with their inner ends bearing against the rear faces of the blocks O, by which means the blocks are adjusted to compensate for any wear, and be kept close up to the flanges *i* of the pistons. A series of holes, *h*, serves to admit the water on one side of the case, from whence it is carried through between the pistons to their opposite side, from whence it rises to the top of the case, into a channel or recess, *d*, in the under side of the upper head, E, which leads to the outlet-pipe C, as represented in figs. 1 and 3.

The operating parts of the pump being thus constructed, are to be submerged, and are connected by a pipe, C, with the hydrant B, secured upon a platform, A, over the well or cistern, as clearly shown in fig. 1.

To operate the pistons, I connect a rod, H, to one of the pistons G, and extend it up through the pipe C, and through the hydrant B, and secure to its up end a hand-wheel, I, having a handle, *f*, attached.

Or, if preferred, the rod H may be connected to the other piston, G', and extend up outside of the pipe, as represented in fig. 4, there being bearings, R, attached at intervals, to hold the rod steady, and in place. It is also obvious that, if desired, a bevel-pinion may be attached to the top of the rod, H, and geared into a corresponding bevel-gear, placed on a horizontal shaft, having an ordinary crank attached for operating it, but this is more expensive, and therefore not considered preferable. In case the rod be located outside of the pipe, it may extend up outside of the hydrant, especially if the bevel-gear be used, but the plan represented in fig. 1 is the simplest and cheapest.

The pipe C is intended to be sufficiently rigid and strong to support the operating parts, and to hold them in position, without the aid of the framing generally used in other styles of submerged pumps.

It will thus be seen that, with a pump constructed and arranged as described, it cannot freeze, as the oper-

ating parts are constantly submerged, and the water left in the pipe immediately flows back, and escapes, the weight of the water causing the pistons to turn back sufficiently to permit its escape. At the same time, the pistons being submerged, force the water up the pipe, instead of lifting it by creating a vacuum, and hence do not need to work or fit as snugly as in those having the pistons placed above.

Having thus described my invention, what I claim, is—

A pump, consisting of the case, F, with the pistons G enclosed therein, connected by the pipe C with the hydrant B, and operated by the rod H, all substantially as described.

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