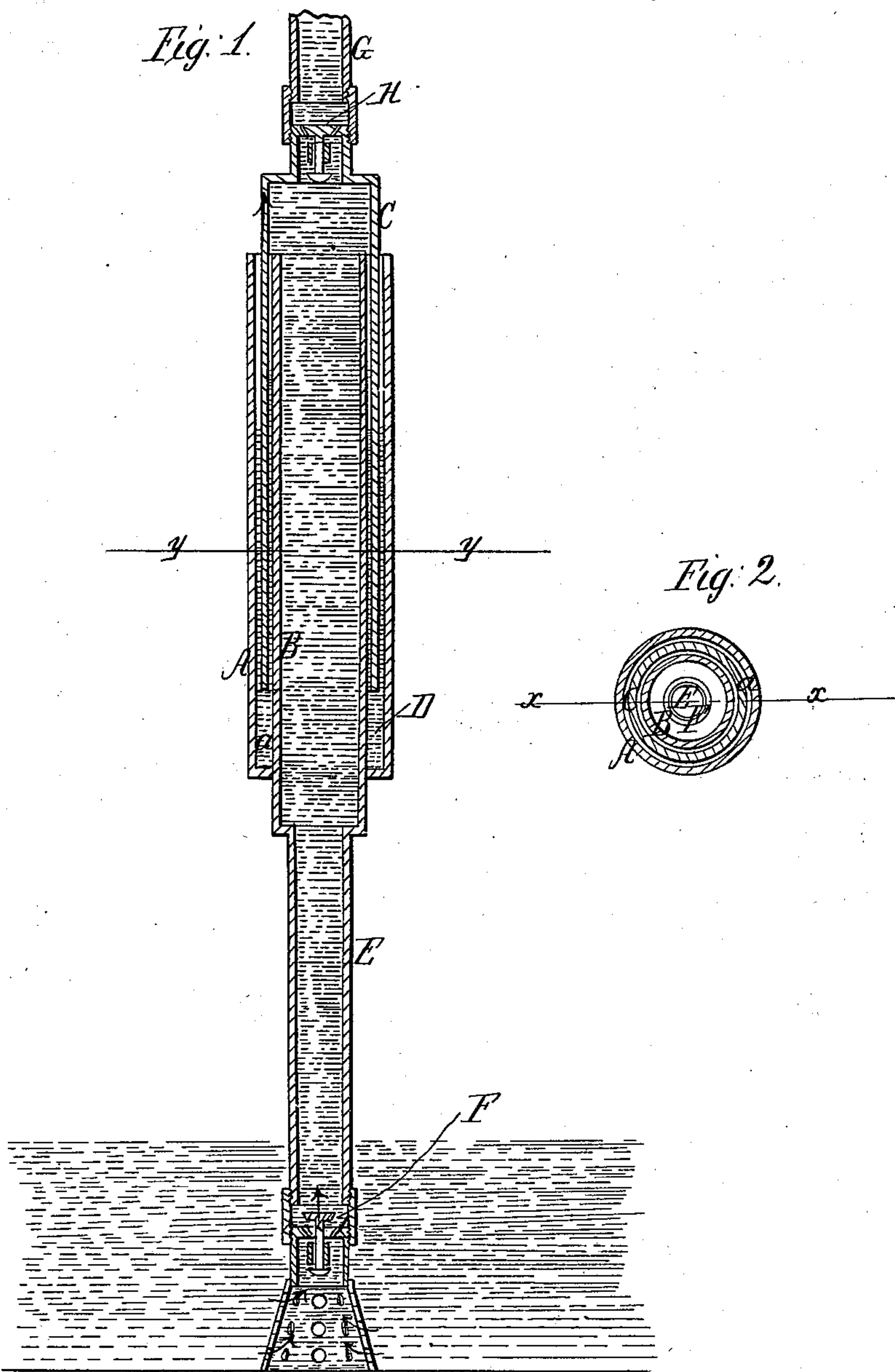


*P. Marcellin,*

*Pump Lift,*

*Nº 43,960,*

*Patented Aug. 23, 1864.*



*Witnesses;*  
*Henry Meier*  
*James P. Hall*

*Inventor,*  
*P. Marcellin*

# UNITED STATES PATENT OFFICE.

PAUL MARCELIN, OF CHAMBERY, FRANCE.

## IMPROVEMENT IN MERCURY-PACKED PUMPS.

Specification forming part of Letters Patent No. 43,960, dated August 23, 1864.

*To all whom it may concern:*

Be it known that I, PAUL MARCELIN, of Chambery, France, have invented a new and Improved Pump; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section of my invention, taken in the line *x x*, Fig. 2; Fig. 2, a horizontal section of the same, taken in the line *y y*, Fig. 1.

Similar letters of reference indicate like parts.

This invention consists in the employment or use of one or more reciprocating tubes or cylinders arranged so as to work within an annular chamber containing mercury, or other fluid or semi-fluid of a much greater specific gravity than the atmosphere, whereby a pump is obtained of exceedingly simple construction, and one which will operate with but little friction and a comparatively small expenditure of power.

In carrying out my invention I employ as the most practicable means that has as yet suggested itself to me two cylinders, A B, which may be of cast-iron, wrought-iron, or glass, one being fitted within the other and differing in diameter, so that a space, *a*, of suitable dimensions will be allowed between them to receive another cylinder, C, and a quantity of mercury, D, the space *a*, of course, being closed at the bottom. The cylinder C is allowed to work freely up and down within the space or chamber *a*, and the interior cylinder, B, extends down a trifle—say six (6) inches—below the cylinder A and the bottom of space *a*, and has a suction or independent pipe, E, attached to it, said pipe being provided with a valve, F, opening upward. The pipe E may be considerably smaller in diameter than the cylinder B. The reciprocating cylinder C has a force or eduction pipe, G, attached to its upper end, which pipe is provided with a valve, H, opening upward.

The operation is as follows: The pipe E is inserted in the well or reservoir from which the water is to be drawn or elevated, and a reciprocating motion is given the cylinder C by any suitable means. As the cylinder C rises the valve H in pipe G closes and a vacuum is produced within it, the mercury D in the space or chamber *a* serving as a seal and cutting off all communication between the interior of B and C and the external air. As C rises, therefore, the water into which the lower end of pipe E is inserted follows it, owing to the pressure of the atmosphere, the water opening valve F and passing up into B. The mercury D in the space or chamber *a* will be somewhat effected by the atmospheric pressure rising somewhat between B C, (see Fig. 1,) but not much, owing to its superior gravity. As the cylinder C descends or is forced down the valve F in E closes and the water in B is forced up through the valve H and ejected through the pipe G, the mercury D in *a* effectually resisting the pressure of the water produced by the descent of C.

It will be seen that the cylinder C operates with but little friction, as it works loosely in the mercury in space *a*.

The pump constructed as herein described would be single-acting, but by employing two cylinders, C, arranged so as to move simultaneously in opposite directions, a continuous stream may be thrown or raised.

I claim as new and desire to secure by Letters Patent—

A pump composed of one or more reciprocating tubes or cylinders communicating with induction and eduction pipes, and working within a chamber of mercury, or other fluid or semi-fluid of a much greater specific gravity than the atmosphere, said chamber being between two cylinders or tubes, and all arranged to operate in the manner substantially as herein set forth.

P. MARCELIN.

Witnesses:

JAMES P. HALL,  
HENRY MORRIS.