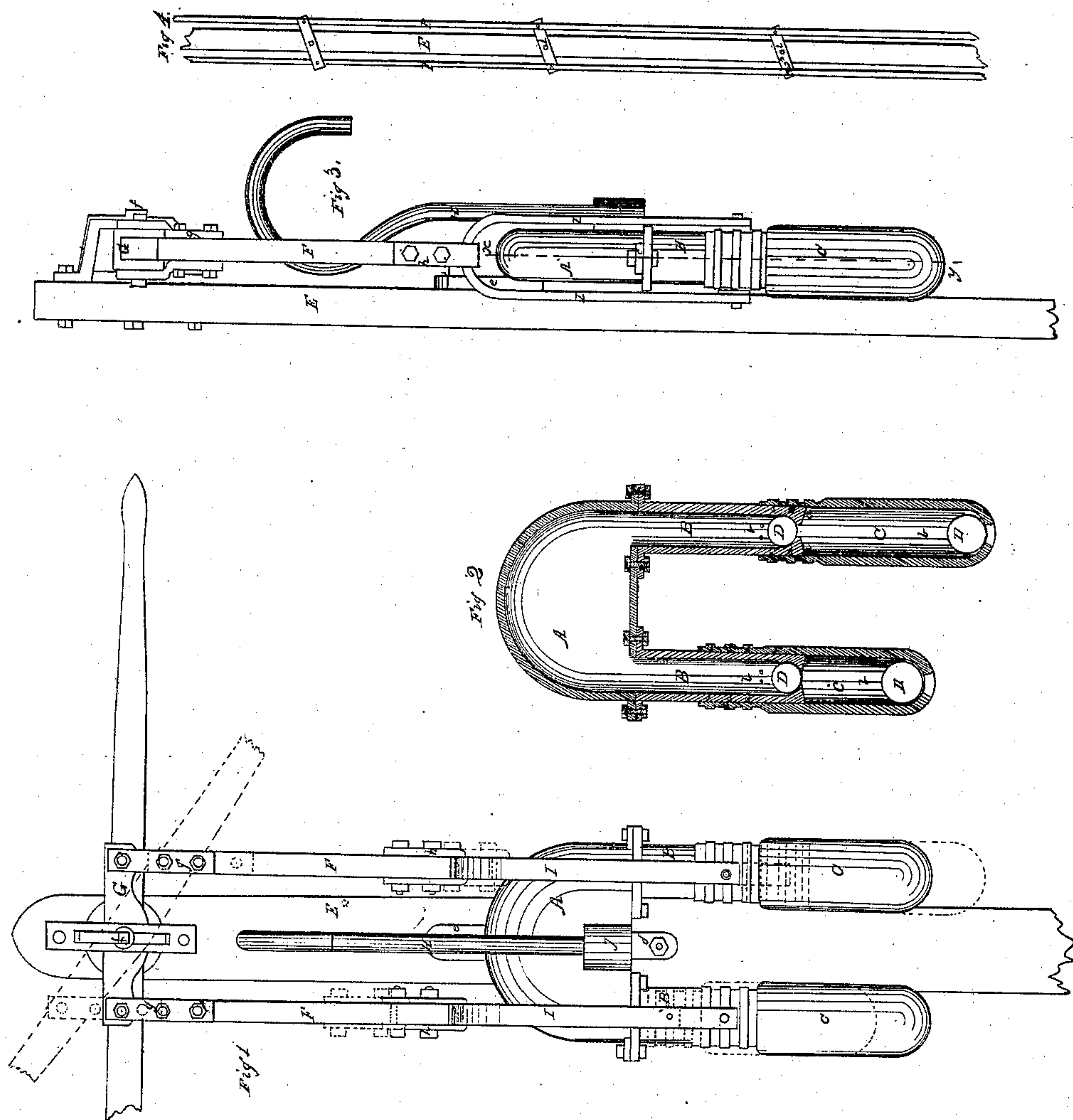


*J. A. Morrell,*  
*Double-Acting Pump,*  
*N<sup>o</sup> 70,244,*  
*Patented Oct. 29, 1867.*



Witnesses.  
*at test*  
*W. W. W. W. W.*

Inventor.  
*James A. Morrell*  
*By L. L. Bond his atty*

# United States Patent Office.

JAMES A. MORRELL, OF CHICAGO, ILLINOIS.

Letters Patent No. 70,244, dated October 29, 1867.

## IMPROVEMENT IN 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, JAMES A. MORRELL, of the city of Chicago, in the county of Cook, and State of Illinois, late of St. Charles, Missouri, have invented certain new and useful Improvements in Force-Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a front view.

Figure 2, a vertical section on line *x y* of fig. 3.

Figure 3, a side view; and

Figure 4, a front view of the supporting-post and operating-bars or rods.

Like letters refer to the same parts in all of the figures.

The nature and object of my invention consists in constructing a force-pump with the several parts in combination, as hereinafter set forth and claimed as new.

To enable others skilled in the art to make and use my pump, I will proceed to describe its construction and operation.

The air-chamber A is made of cast iron, as are also the stationary plungers B and cylinders C. The chamber is made hemispherical and flattened, as shown, or somewhat elongated, and is cast with flanches *c* at the lower face, and with a hollow projection, J, for the discharge pipe H on one side, and with brackets or projections *d* and *e* on the other, by which it is securely attached to the supporting-post E. It is cast hollow, as shown in fig. 2, and is about twelve inches across at the base, without the flanches, nine inches in height, and four inches in thickness. To the base of this chamber the stationary plungers or mains B are attached by flanches and bolts, as shown, the joints being packed by rubber bands or suitable packing. These plungers have the same external diameter as the internal diameter of the cylinders. Their internal diameter is about three and one-fourth inches, and they are about nine and one-half inches in length. At their lower ends they are contracted, so as to leave an orifice or opening of about one inch. I usually make the contraction curved on the interior, so as to permit the use of ball-valves, opening upwards. These valves are prevented from rising too high, or passing out, by the cross-rods *b*, placed about one-half of one inch above them. Below these plungers I attach the cylinders C, which are about one foot in length, and have an interior diameter of four inches. They are contracted at the lower ends, and provided with ball-valves D and cross-rods or bars *b*, similar to the plungers B. It will be obvious, however, that flat or other ordinary valves can be used; but I prefer ball-valves, as they are more durable, and less liable to get out of order by long use, or by the introduction of sand, gravel, or other substance. At their upper ends they are provided with one or more annular cavities *a*, which will not require packing, as the water in them will be sufficient for all practicable purposes. I usually make three of them, and below them I enlarge the diameter of the cylinders slightly, so that there will be only a neck closely fitted to the plungers, so as to avoid the trouble and expense of fitting and additional friction. They are hinged, near their upper ends, to bails or forks I of the connecting-rods F, which bails or forks are suitably attached to the connecting-rods, or made a part of them. These connecting-rods F are attached at their upper ends to a brake, G, which is pivoted to the supporting-post at *f*, as shown, or in any other suitable manner, and its arms may be extended by the use of wooden or other handles. It is designed to so connect the rods to the brake that they will lift the cylinders about six inches. H is the discharge pipe, which is screwed into or otherwise attached to the hollow projection J of the air-chamber, the opening being made as near the base of the air-chamber as practicable.

For deep wells I support the connecting-rods by placing cross-rods *i* (see fig. 4) at convenient distances, and pivoting them at the middle to the supporting-post, and at the ends to the rods F, so that the rods *i* will act as guides and supports, supporting the rods at convenient distances, so as to keep them steady in their action, and also insure their compensating action, for one cannot descend without causing the other to ascend. They may, however, be attached singly, so that each connecting-rod will operate independently, so far as the cross-rods *i* are concerned. The connecting-rods F are usually made of wood. As the strain is with the fibre of the wood, they will be found sufficient, and much lighter than iron. For deep wells they will require splicing.

In operation, the cylinders, with the plungers, are placed below the water line of the reservoir, and as one



cylinder or bucket is raised, the other will be depressed, or descend of its own weight, when the valve will rise and the water fill the vacuum. When it in turn is lifted, the valve will close, and the water will be forced into the hollow plunger, where it will be held by the valve until the operation is repeated. By duplicating the cylinders and plungers a continuous stream is produced, and being provided with an air-chamber, the stream can be delivered with great force, sufficient to throw it on to tall buildings, as tall as any are constructed, when fire-engines are not used; and as hose can be attached to it, this pump can be made exceedingly useful for quenching fires, for irrigating purposes, and for washing windows, carriages, &c. There being no suction—the whole operation being by lifting—it seldom if ever gets out of repair, or fails to operate, until worn out. As there is no escape for the air in the chamber, it will work well when entirely submerged, and in those wells, cisterns, or other reservoirs where the water line is variable.

Having thus fully described my force-pump, what I claim as new, and what I claim as my invention, and desire to secure by Letters Patent, is—

The air-chamber A, provided with the arms *d* and *e*, and with a side opening or cavity, J, cast with it, and also supporting two stationary plungers B, in combination with the cylinders C, constructed with necks having annular cavities, and with their internal diameters enlarged below the necks, as described, valves D, and bails I, the several parts constructed and arranged substantially as and for the purposes specified.

JAS. A. MORRELL.

Witnesses:

L. L. BOND,

E. A. WEST.