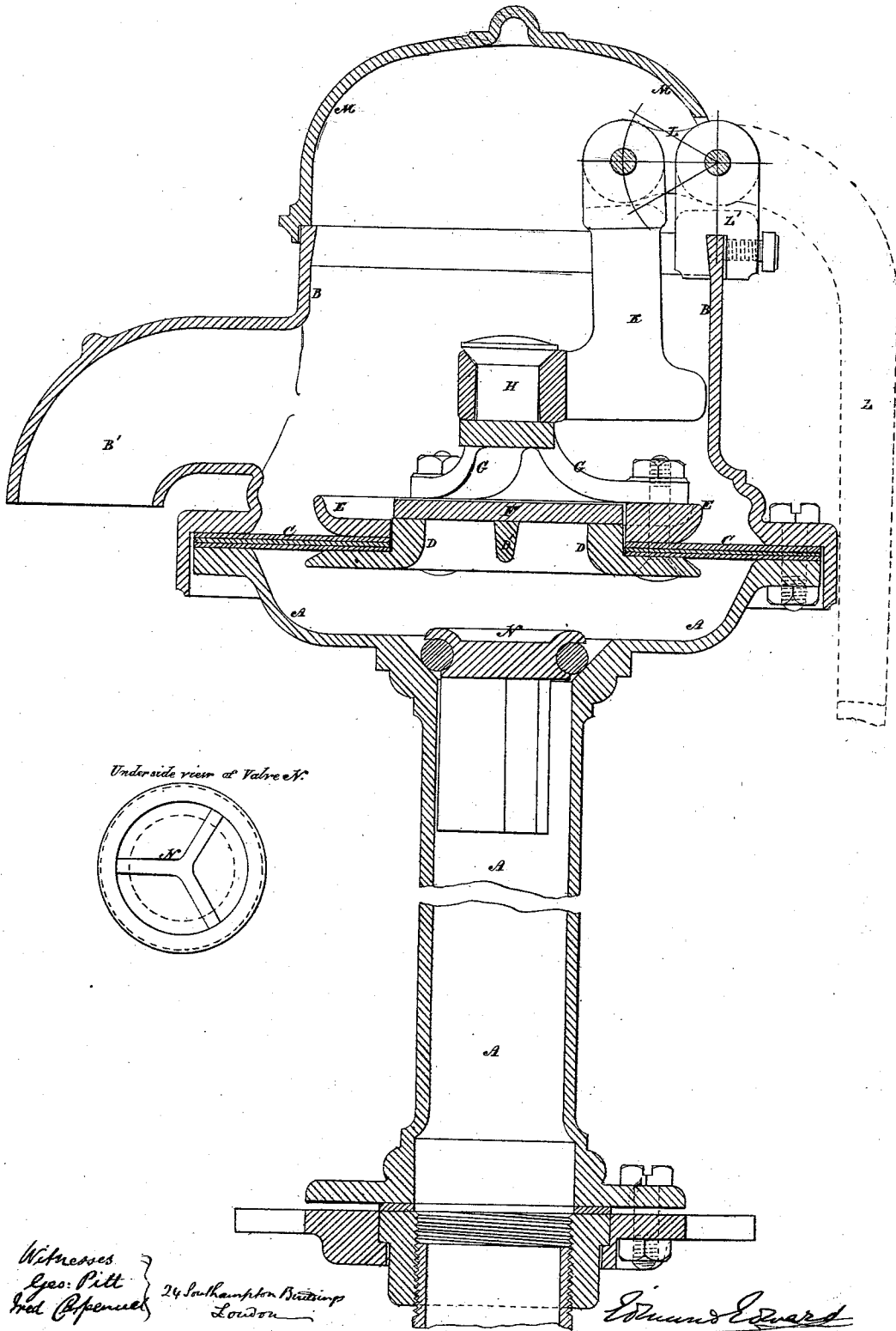


*E. Edwards,*

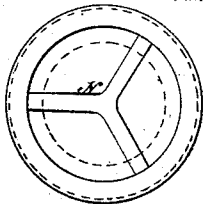
*Force Pump.*

*No. 104,289.*

*Patented June 14, 1870.*



*Underside view of Valve K.*



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# United States Patent Office.

EDMUND EDWARDS, OF WESTMINSTER, ENGLAND.

Letters Patent No. 104,289, dated June 14, 1870; patented in England August 6, 1868.

## 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, EDMUND EDWARDS, of Buckingham street, in the city of Westminster, England, civil engineer, a subject of the Queen of Great Britain, have invented or discovered new and useful "Improvements in Pumps;" and I, the said EDMUND EDWARDS, do hereby declare the nature of the said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof; that is to say—

This invention has for its object improvements in pumps, and the improvements relate mainly to that class of pumps in which flexible rings are employed in place of pistons or buckets.

The drawing hereunto annexed shows a vertical section of a hand-lift pump, constructed according to my invention.

A is a tube or barrel, to the lower end of which the suction-pipe is connected. The upper end of the tube A is expanded into a cup-shape.

B is another tube, of larger diameter, which is screwed to A, with the flexible ring C between them, and which is formed with a delivery-spout B'.

The center of the flexible ring is held between a flange formed around the lower end of a short tube, B, and a ring, E, which fits around the upper end of the short tube.

The upper end of this tube forms a seat for the valve F, which is a loose disk of vulcanized India rubber, or other flexible material; two or more radial arms, D', passing across the water-way through the tube D, also serve to support the valve.

The valve is prevented from working off its seat by two (or it might be more) arms, G G, radiating from a central point above the disk, and bolted or attached at their outer ends to the ring E.

These arms allow the valve to rise sufficiently from its seat to allow of the free passage of water through it on the down-stroke.

The outer edge of the ring E is turned up, as shown, so that when the pump is at work the valve will always be covered with water.

Valves thus constructed may be adapted to the flexible diaphragms of other constructions of diaphragm pumps.

The arms G G; where they meet together, carry a pin, H, formed with a head. This pin is embraced by a curved link, K, which, at its upper end, is jointed to the short arm of a lever, L, the longer arm of which forms the lever-handle for working the pump.

The curved link K, near its lower end, is also formed with a projection to bear against the side of the tube B.

By thus jointing the short lever-arm of the pump-handle to the link K at a point intermediate between

the center of the diaphragm and the side of the tube B, I am enabled to employ a diaphragm of large diameter with a comparatively short stroke, while the end of the lower end of the link, working against the side of the tube B, prevents any undue strain coming upon any part of the diaphragm, as it enables an approximately vertical to-and-fro movement to be given to the center of the diaphragm.

A certain amount of free play is allowed between the pin H and the link K, where it embraces it, and by this means a still closer approximation to a vertical movement is given to the center of the diaphragm.

Where the end of the arm K works against the side of the tube B, a roller may be applied to it.

The pin upon which the lever-handle of the pump works is carried by a small upright bracket, L', the lower end of which is formed to embrace the upper edge of the tube B, and the bracket L' can be slid around the upper edge of the tube, and be fixed to it in any desired position.

The arm K being able to turn freely around the pin H, allows of the bracket L' being thus moved into any desired position.

In cases where it is not required to move the bracket carrying the handle, it can be fixed to the upper part of the pump, and the curved arm K can then be attached to, or form part of the ring E.

M is a cap for covering over the upper end of the tube B. A slot is formed in it to fit over the bracket L'.

This cap might, if desired, be arranged to turn up as on a hinge-joint upon the same pin as that on which the lever-handle works.

N is a valve at the top of the suction-pipe.

The valve-seat is of a conical form, as shown, and around the upper end of the movable portion of the valve is a groove, into which is sprung a ring of vulcanized India rubber.

The movable portion of the valve is also formed with a tail-piece of three leaves or feathers, and of such a length that the valve cannot get out of place unless the diaphragm be removed. Valves for other kinds of pumps may be similarly constructed.

The several parts of the pump are so shaped that they may be cast to form and put together in their rough state with little or no fitting, and may then be ready for use; and by this means the pumps may be constructed cheaper, and be more durable and efficient than pumps as heretofore made.

Pumps, such as above described, may also be formed into force-pumps by omitting the spout on the tube B, and leading from the latter a delivery-pipe in place of covering it over with a cap or cover, as above described.

In this case I form a water-tight joint at the point where the lever-handle passes through the tube B, by making the center or axis upon which the handle turns

pass through a stuffing-box, the lever working the diaphragm being within the stuffing-box, and the handle outside of it.

The diaphragm of the pump may be made of vulcanized India rubber, leather, corrugated sheet metal, or other suitable material, and the valves and casings of the pump may be of metal or earthenware.

What I claim is—

The combination of the annular flexible diaphragm, the short tube and the ring, clamping the inner edge of the said diaphragm between them, and forming a seat for the discharge-valve; all these parts being constructed to operate in combination as set forth.

Also, the combination of the discharge-valve, the short tube on which it rests, and the cup-shaped ring which surrounds it in such manner that the valve is always kept covered by water; all these parts being constructed to operate in combination as set forth.

Also, the combination of the annular flexible diaphragm, the clamping-ring and short tube, the disk-formed discharge-valve, and the radial arms which

form the cage for the said discharge-valve; all these parts being constructed to operate in combination as set forth.

Also, the combination of the annular flexible diaphragm, the discharge-valve, the clamping-ring and short tube, the pivoted curved connecting-link, and the lever-arm; all these parts being constructed to operate in combination as set forth.

Also, the combination of the pump-barrel, the lever-arm, the pivoted curved link and its guiding projection, with the cage of the discharge-valve and the flexible diaphragm; all these parts being constructed to operate in combination as hereinbefore set forth.

Also, the combination of the conical valve-seat, with a puppet-valve constructed with its periphery grooved, and with a ring of India rubber in said groove, as before set forth.

EDMUND EDWARDS.

Witnesses:

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