

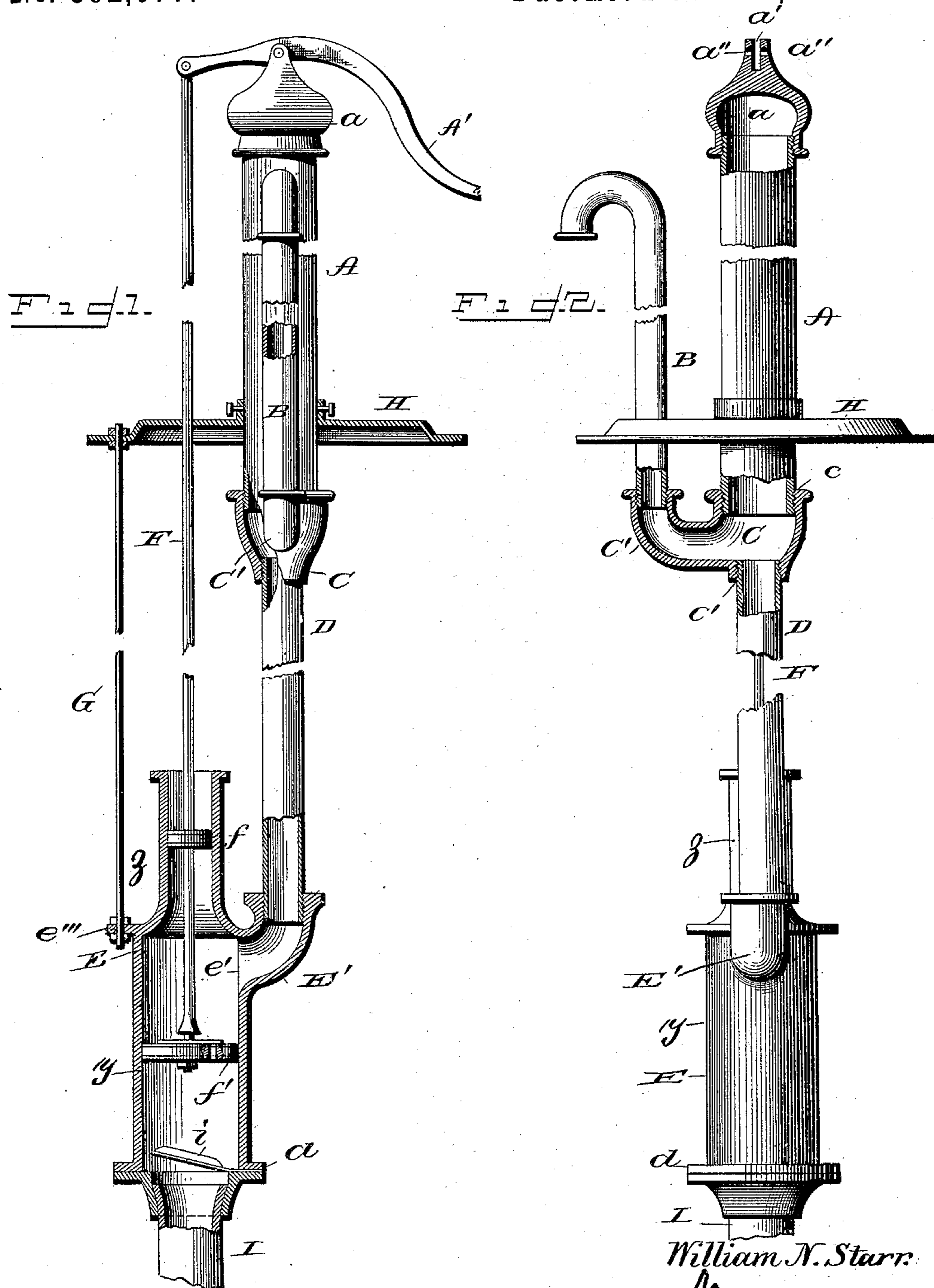
(No Model.)

W. N. STARR.

PUMP.

No. 392,077.

Patented Oct. 30, 1888.



WITNESSES

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[Signature]

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UNITED STATES PATENT OFFICE.

WILLIAM N. STARR, OF ASHLAND, OHIO.

PUMP.

SPECIFICATION forming part of Letters Patent No. 392,077, dated October 30, 1888.

Original application filed March 29, 1882, Serial No. 56,720. Divided and this application filed October 6, 1887. Serial No. 251,626.
(No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. STARR, a citizen of the United States of America, residing at Ashland, in the county of Ashland and State of Ohio, have invented certain new and useful Improvements in Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in force-pumps, and relates more particularly to that class which are suspended in the well, and in which the cylinders are located to one side of the pump-stock; and it consists in the construction, combination, and arrangement of the parts, as will be hereinafter fully set forth, and specifically pointed out in the claims, whereby I provide a force-pump which is simple, cheap, and effective, and which shall possess great strength and durability, in which the danger of leakage from imperfect joints is obviated, and in which several of the parts serve more than a single purpose, and which can be readily put together, and as easily taken apart for adjustment and repair, this application being a continuation of the application filed by me March 29, 1882, bearing Serial No. 56,720.

In the accompanying drawings, which illustrate my invention, Figure 1 is a vertical elevation or front view of a pump embodying my improvements, the parts being partly in section; and Fig. 2 is a side view partly in section.

A in the accompanying drawings refers to the main pipe, which is closed at its upper end by a suitable cap or covering-plate, *a*, which is preferably a casting, so as to make said pipe A not only serve the purpose of an air-chamber, for which it is primarily intended, but also serve as a support for the pump-handle A'. The cap *a* is provided with a vertical opening, *a'*, which is bisected by openings *a''*, through which passes a pivot-pin for attaching the handle or lever to the cap, which cap

is internally screw-threaded, while the pipe A at its upper end is externally threaded, so as to engage therewith.

The pipe A passes through the platform H, from which the pump is suspended, and this pipe is suitably secured to the platform by bolts or set-screws, so that the pipe can be vertically adjusted with respect to the platform.

B refers to the spout branch, the upper end of which is curved downwardly in the usual manner, so that the discharge end of this spout branch will project away from the pipe A and be at right angles with the pump-handle A'. The lower end of this spout branch is externally screw-threaded for engagement with a threaded opening in a casting, C, to which casting the lower end of pipe A is also attached. The spout branch, besides being connected to the casting C, is also braced by the platform H, and this spout branch or discharge-pipe is of such a length that its highest portion will be below the upper portion of the pipe A or air-chamber.

The casting C, hereinbefore referred to, is practically a three-way joint, and is made of a single piece, which is hollow and has internally-screw-threaded openings for the reception of the lower ends of the pipe or barrel A, discharge-pipe B, and the upper end of the pipe D, the offset C' being to one side of the openings *c* and *c'*, which are on a vertical line with each other.

E refers to the pump-cylinders, which comprise a lifting and a forcing cylinder, which are cast in a single piece and are provided with an offset, E', which is open at its upper end, said opening being internally screw-threaded for the reception of the pipe D. The opening *e'* between this offset and cylinder E is at a point above the upward limit of the stroke of the valved piston which operates in the cylinder *y*, and below the limit of the movement of the piston of the smaller cylinder, *z*, located immediately above the main cylinder *y*. The smaller cylinder, *z*, is formed integral with the main cylinder *y*, and the offset E' is on a vertical line with the main pipe A.

The casting E, comprising the cylinders *y* and *z* and offset E', is made of a single piece, each part being integral with the other, and

this casting is provided at a point opposite the offset E' with a projection, e''' , which is perforated for the reception of a brace-rod, G, the ends of which are screw-threaded for the reception of nuts for securing the same to the casting E and to the platform H. By locating the brace-rod G opposite the offset E', and consequently to one side of the pipes A and D, lateral strain will be prevented and the casting will hang or be suspended in a vertical position from pipe A and rod G, and movement of said casting will be prevented when the piston-rod is operated.

By making the cylinders y, z and offset E' of a single piece I am not only able to make them cheaply, but also obviate all liability of leakage and the necessity of adjusting the parts in setting up the pump, in addition to having all the parts rigid to each other.

At the bottom of the lifting-cylinder y , which is provided with a flange, d , is attached a tube or pipe, I, the lower end of which extends below the water-level, and adjacent to the upper end of this pipe I is located a valve. This suction-pipe I, the means for connecting the same to the cylinder, and the valve i are of ordinary construction and form, *per se*, no part of my invention, though they are essential to the operation of the pump hereinbefore described.

The piston-rod F at its upper end is pivotally attached to the short arm of the pump-handle and passes through an opening in the platform H, and to the lower portion of said rod is attached pistons f and f' , the lower piston, f' , being valved, while the upper one, f , fits snugly in the cylinder z .

By the construction hereinbefore described it will be seen that I provide a pump having a forcing-cylinder, z , to which is connected directly a pipe for carrying the water therefrom, above which pipe is formed a compression or air chamber and a discharge-pipe or spout branch which is attached so as to communicate directly with both the pipe for carrying the water from the piston and the compression-chamber, said compression-chamber and discharge-spout extending above the platform, so that the compression-chamber may form a support for the operating handle or lever.

A pump constructed as hereinbefore described is intended and adapted for use in deep wells, and the pipe D, which connects the air-chamber with the cylinders, is of a length equal to the depth of the well, less about twenty feet, the cylinders being usually located not more than thirty feet above the water-level, so that the water can be raised to the cylinders by suction. By employing this connecting-pipe D it will be seen that the pump can be advantageously used in wells which are over thirty feet in depth, and when this pipe is not employed the pump will not operate satisfactorily in wells over thirty-four feet deep, as the water cannot be raised above that height advantageously by suction and atmospheric

pressure, and as the cylinders are suspended in the well at a great distance from the platform it is obvious that without the brace-rod, hereinbefore described, the cylinders would swing out of line with the piston-rod, especially as the construction of the cylinders is such that they would swing to one side. This brace-rod supports the cylinders and prevents them swinging off the center and is essential to the practical operation of a pump constructed in accordance with my invention. The ends of the brace-rods being screw-threaded and provided with nuts, this brace-rod can be adjusted to bring the pump-cylinders on a line with the piston-rod.

The operation of my invention is as follows: When the piston-rod F is reciprocated by the handle A' in the usual manner, the water will be drawn from the well through the pipe I, so as to fill the cylinder y , which, by reason of the valved piston f' , is both a suction and lifting cylinder, and the water will be raised above the valve f' , so as to fill the smaller cylinder, z , and the space in the offset E'. When the piston-rod is further reciprocated on the upstroke of the piston-rod G, the water will be lifted and forced through the main discharge-pipe D and enter the casting C, a portion thereof passing from the casting into the pipe A, the upper portion of the same forming an air-chamber, and after the air has been compressed therein sufficiently the water will be discharged through the spout branch by reason of the force applied on the downstroke of the piston-rod, which carries the piston F, thus providing a means whereby a continuous flow will be kept up as the piston-rod is moved either up or down, though the water in the cylinder is only raised on the upstroke, as the compressed air in the elongated air chamber or pipe A reacts upon the water contained therein and forces it out of the discharge-spout. It will also be observed that on the downstroke of the piston-rod the water contained in the small cylinder z is forced into the discharge-spout, and that the air-chamber and small cylinder act in conjunction with each other on the downstroke, so as to give a flow out of the discharge-pipe which is equal or even greater than the flow caused by the upstroke of the piston-rod.

I am aware that prior to my invention it has been proposed to provide a pump with cylinders the upper one of which is of less diameter than the lower one, and provide said cylinders with a piston-rod which carries a piston with a valve which moves in the lower cylinder and a tight piston for the upper cylinder, the discharge-pipe being located between the limit of the movement of the upper and lower pistons, as shown in the patent of G. C. Selfridge, dated September 4, 1860.

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

1. The combination, in a force-pump, of a pipe, A, secured to a platform so as to be vertically adjustable thereon, said pipe being

provided at its top with a slotted cap for piv-
oting the pump-handle thereto, a discharge-
pipe extending through the platform and com-
municating with the pipe A by a three-way
5 casting, a pipe, D, also attached to said cast-
ing, a suction and lift cylinder, *y*, and forcing-
cylinder *z*, a piston-rod carrying a piston and
valved piston, an operating-handle, and an ad-
justable brace-rod extending from the plat-
10 form to the opposite side of the cylinder from
the pipe D, substantially as shown, and for
the purpose set forth.

2. The combination, in a pump, of the three-
way joint C, made of a single piece and pro-
15 vided with internal screw-threads, a supply-
pipe, D, for conveying water to the lower open-
ing in said three-way joint, a discharge-pipe,

B, and a tubular support, A, forming an air-
chamber, an operating-handle pivoted to the
upper end of the air-chamber, the pipes A, B, 20
and D being externally screw-threaded for en-
gaging with the openings in the three-way
joint, cylinders *y* and *z*, having an offset be-
tween them to which the pipe D is attached,
and means for securing the pipe A adjustably 25
to the platform, the parts being organized
substantially as shown, and for the purpose
set forth.

In testimony whereof I affix my signature in
presence of two witnesses.

WILLIAM N. STARR.

Witnesses:

C. D. MASON,

J. S. WORTMAN.