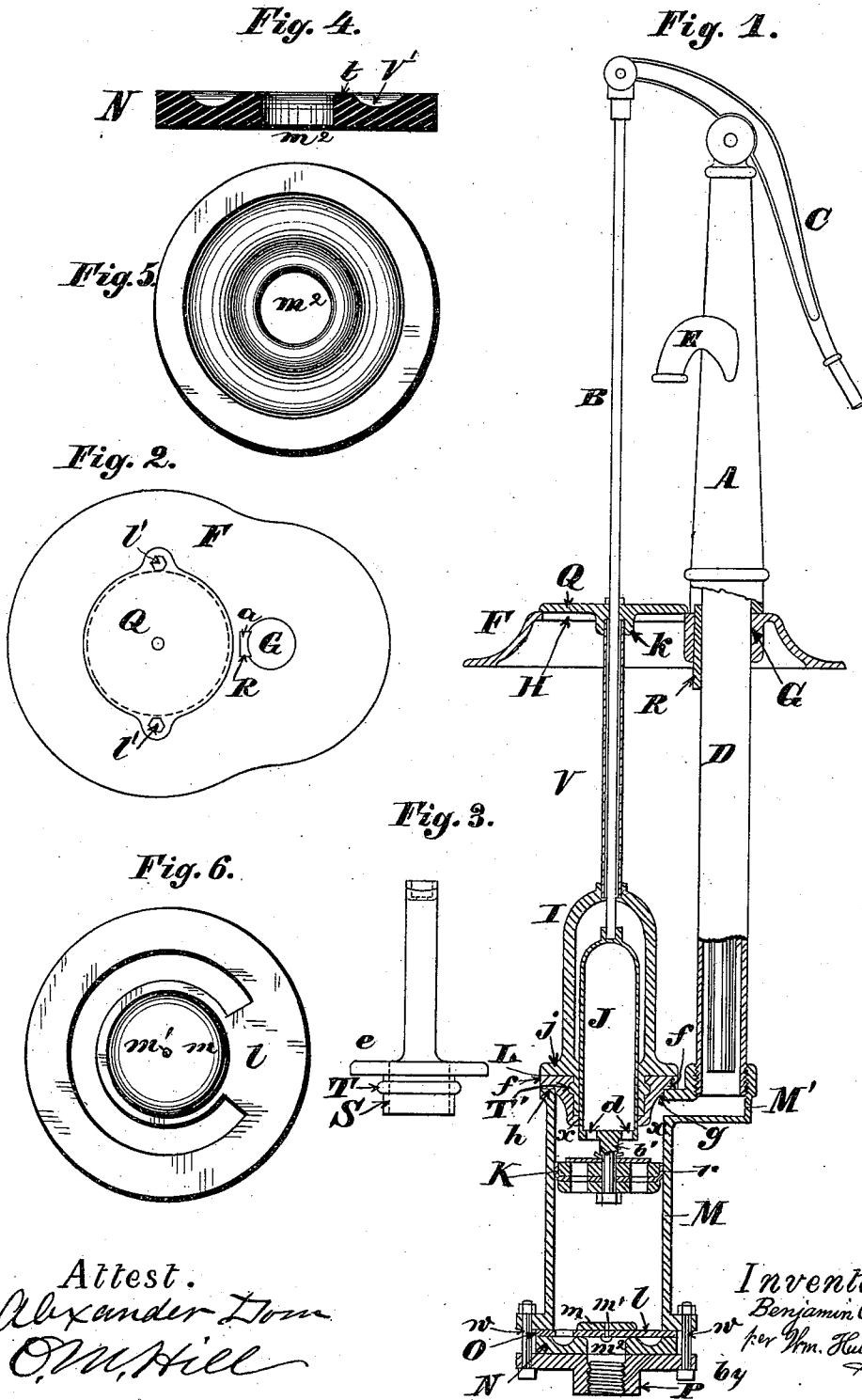


(No Model.)

B. C. VANDUZEN.  
PUMP.

No. 354,669.

Patented Dec. 21, 1886.



Attest.  
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# UNITED STATES PATENT OFFICE.

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## PUMP.

SPECIFICATION forming part of Letters Patent No. 354,669, dated December 21, 1886.

Application filed April 23, 1884. Serial No. 128,889. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN C. VANDUZEN, a resident of Winton Place, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The several features of my invention, and the various advantages resulting from their use conjointly or otherwise, will be apparent from the following description and claims.

For the purpose of illustration I will now proceed to describe the several features of my invention as applied to one of the many descriptions of pumps to which the features of my invention are applicable.

In the accompanying drawings, Figure 1 represents a vertical central section of one form of double-acting force-pump, the actuating-lever, actuating-rod, pump stock, and the upper portion of the discharge-pipe being shown in elevation. Fig. 2 represents a plan view of the base which sustains the pump at the platform. Fig. 3 represents an edge elevation of the brace-arch and extension for receiving the packing interposed between the arch and suction-cylinder, and looking from left to right toward that edge of the arch which is on the left hand in Fig. 1. Fig. 4 represents an enlarged vertical central section of the valve-seat of suction-cylinder, and Fig. 5 represents an enlarged top view of said seat. Fig. 6 represents a top view enlarged of the valve proper of the suction-cylinder.

A indicates a pump-stock of any suitable form.

B indicates the actuating-rod, operated by suitable means, preferably by a lever, C, pivotally fulcrumed to the head or top of the pump-stock.

To the stock A is connected the discharge-pipe D, passing up into the stock and communicating directly, or by means of a conduit in the pump-stock, with a discharge-orifice, E, of any suitable configuration.

The pump-stock and discharge-pipe D, and whatever of the lower portions of the pump is suspended and upheld by the pipe D, are all supported by the base F, provided with an opening, G, for the admission of the discharge-pipe D.

Where the cylinder or cylinders of the

pump are located in a vertical line to one side of the vertical line of the discharge-pipe D, and the withdrawal of one or more of said cylinders, or the parts of the pump working therein, is to be provided for without disturbing the base F, then the latter is to be provided with a suitable opening, as H. At the side of the opening G, and in base F, is a recess, *a*, formed for the reception of a key, R, adapted, when the discharge-pipe G is in place, to be driven into said recess *a*, and hold the discharge-pipe rigidly in place in the base F. To the lower or bottom portion of the discharge-pipe is secured, preferably by a screw-thread, as shown, a suction-cylinder, M. In the present instance a discharge-branch, M', of the cylinder is screwed over and onto the pipe D. In this cylinder M is the suction-piston K, having preferably a packing so placed as to allow the piston to be easily inserted into or withdrawn from the cylinder M without disturbing said packing.

In the present instance the packing *r* is turned upward at its outer edge. A suitable valve is connected to or combined with this piston, the preferable form of such valve being a discal valve, as shown. The piston K is preferably connected to the actuating-rod either directly as in a single-acting pump or by an intervening connection as a forcing-piston, or, as in the present instance, a hollow plunger, J.

I indicates a brace-arch, whose object and functions will be fully hereinafter set forth. The plunger J reciprocates within said arch. The upper end of this plunger J is preferably connected directly, as shown, to the actuating-rod, and the lower end is centrally provided with an extension or rigid connection, *b'*, connecting this plunger J to the suction-piston K. At the side of this connection *b'*, and in the lower end of the plunger J, is one or more openings, *d*. These openings serve to make communication between the space within plunger J and the interior space of cylinder M, and in this way enable plunger J to operate as an air-vessel in connection with the discharge-conduit D.

The brace-arch I is preferably upheld and supported and connected to cylinder M as follows: It is provided near its lower portion with an outwardly-extending annular flange, *e*. Be-

low this flange it is provided with a downwardly-extending annular extension, S, and this extension S is provided with an annular bead, T, the latter being so located as that a space is left between the flange *e* and the bead T. Upon this extension is slipped or placed a rubber or other elastic packing, L, of a peculiar shape—that is to say, the packing is an annular-shaped body adapted to fit against and closely embrace extension S, and consequently it has interiorly an annular recess, T', which receives and closely embraces the bead T of the extension S. This packing is provided at its upper end or portion with a horizontally-extending annular flange, *f*, of the diameter of the adjacent bearings of the annular flange *e* of brace-arch I and cylinder M. The packing has also a ledge or straight vertical portion, *g*, which fits closely within the cylinder M, and the flange *f* rests upon the bearing-surface *h* of cylinder M, and between it and the bearing-surface *j* flare *e* of the brace-arch. The lower end of this packing L is provided with a flange, X, extending inwardly and closely embracing the lower end of extension S of the brace-arch I and extending inwardly against the periphery of plunger J. Thus the packing L serves the double function of being a packing between the meeting-surfaces of the cylinder M and brace-arch I, and also of being a packing for preventing fluid in cylinder M from passing between brace-arch I and plunger J. The annular ledge *g* operates as a guide to guide the packing L and brace-arch into proper position in cylinder M.

The bead T of extension S, in connection with recess T' in the packing, serves to prevent the packing from slipping off of or from the extension S. Obviously the bead T might be formed on the inner side of the packing and the recess T' be formed on the outer side of the extension and accomplish the same purpose. Such change or reversal is included in my invention.

Brace-arch I is kept securely against the packing L and the packing L securely against the cylinder M by any suitable means, preferably by the following means: The lower end of tube V enters and sits in a recess or cavity in the upper end of brace-arch I. The upper end of said tube V sits in a recess or recessed extension, *k*, of the cover Q. The cover Q is suitably secured to place upon the base, an approved and ordinary means being the bolts *V'*, passing through lugs on the cover and screwed or bolted to the base. When the bolts *V'* are thus screwed down, the cover will press down upon tube V and brace-arch I will be held firmly down upon the packing L and will compress this packing against cylinder M, and thus the brace-arch I will be held down to place by means of this pressure, and the packing L prevents any lateral movement of the said arch I; and the joint between plunger J and cylinder M will be fluid tight.

In the bottom of the suction-cylinder are the

suction-valve, valve-support, and seat of any desired form, but preferably of the following useful construction: The suction clapper-valve *l* preferably consists of, as usual, an annular portion of leather or any pliable substance, and this valve is preferably surmounted by a weight, *m*, connected to the valve *l* by a central screw, *m'*. This valve *l* rests upon an annular disk or plate, N, of rubber or other elastic material, (preferably of rubber.) The disk is preferably flat on the bottom and formed at the top into a raised or sand-seat, *t*, surrounded by an annular sand-groove, V'. This valve-seat N is provided with a central aperture, *m''*, passing vertically through the seat and within the annular sand-seat. The diameter of this annular disk N and the diameter of the valve *l* are preferably the same, and the diameter of each is enough to extend under the bearings of cylinder M and form the joints. The disk N rests upon a suitable plate or cap, as P. This plate P is suitably secured to the cylinder, preferably by bolts, as *w*, located at suitable intervals around the cylinder M. These bolts being tightened, the valve *l* and the disk N are tightly compressed between the plate P and the end of the cylinder M, and are thus held firmly in place and the joints between said parts are rendered fluid tight. The plate P is provided with a central aperture, P'.

The advantage of the sand-seat made of an elastic substance is that the seat repels the sand that would, if the seat were a non-elastic substance, bed itself into said seat. Thus the valve-seat is kept free from sand and is preserved for a long time. The advantages of a sand-seat made of rubber are that such a seat not only repels the sand and keeps itself free from sand, but also prevents the leather of the valve from corroding or hardening, as the latter does when it comes into contact with a metal seat.

The mode in which the pump I have now described operates is as follows: The piston K being lifted, the water is drawn up through valve *l* into suction-cylinder M, and the valve *l* closes. The piston K being depressed, the water in cylinder M passes through piston K, and the plunger J coming down presses a part of this water up into the discharge-conduit. The air in plunger J, compressed as piston K rose, now expands and conduces to render the flow through the discharge-conduit even and regular. As the piston K rises it draws up a fresh supply of water from the well, and also lifts up the water above it and forces into the discharge-conduit a portion of the said water which is above it and in said cylinder M. The air in plunger J, compressed as plunger descends, now expands and conduces to render the flow of water from the discharge even and regular. Obviously, that feature of my invention which consists in a base having an opening, G, combined with the discharge-conduit D and a key, R, may be applied to any pump carrying a discharge-conduit. Obviously, also,

that feature of my invention which relates to the rubber seat made of elastic substance, &c., is applicable to other pumps and to check-valves, foot-valves, &c.

5 While the various features of my invention are preferably employed together, one or more of said features may be employed without the remainder, and one or more of said features, in so far as applicable, may be applied to  
10 pumps of descriptions other than that herein specifically described.

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

1. The combination of brace-arch I, having  
15 extension S, provided with bead T, elastic packing L, having flanges *f* and X, the latter overlapping the end of extension S, suction-cylinder M, plunger J, piston K, rod B, and  
20 means for holding brace-arch I, packing L, and cylinder M firmly together, substantially as and for the purposes specified.

2. The combination of cylinder M, plunger J, brace-arch I, extension S and its bead T,  
25 packing L, having recess T', flange X, overlapping the lower edge of extension S and pressing against the plunger J, and piston K, rod

B, tube V, cover Q, and base F, substantially as and for the purposes specified.

3. The combination of cylinder M, plunger J, brace-arch I, extension S and its bead T, 30 and packing L, having recess T' and straight portion or shoulder *g* on said packing, and flange X, overlapping the lower edge of extension S and pressing against plunger J and piston K, rod B, and means for holding the brace- 35 arch I, packing L, and cylinder M firmly together, substantially as and for the purposes specified.

4. The combination of cylinder M, plunger J, brace-arch I, extension S and its bead T, 40 and packing L, having recess T' and flange X, attached to the said packing and overlapping the lower edge of extension S and pressing against plunger J and piston K, rod B, tube V, cover Q, base F, discharge-conduit D, stock 45 A, and key R, substantially as and for the purposes specified.

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Attest:

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