(No Model.)

J. BEAN.

DEEP WELL PUMP.

No. 457,244. Patented Aug. 4, 1891.

Fig. 1.

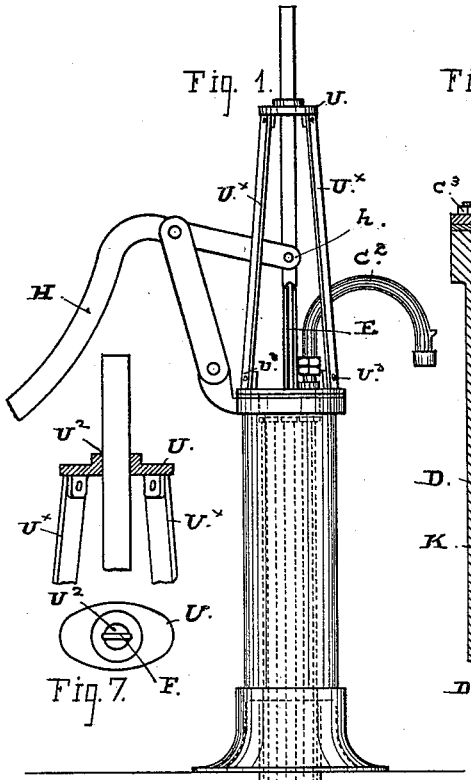


Fig. 7.

Fig. 2.

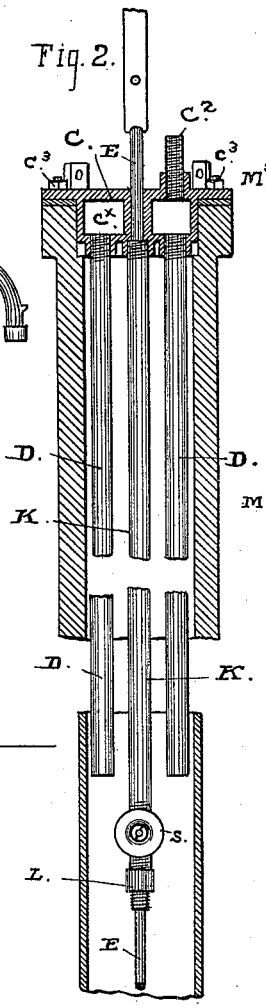
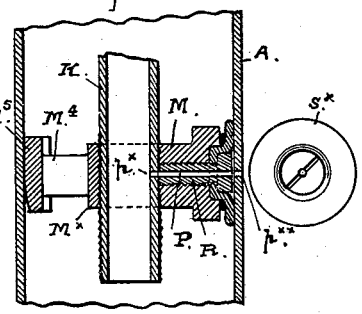


Fig. 4.



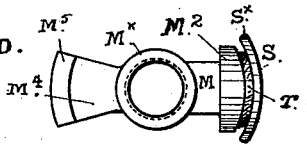


Fig. 5.

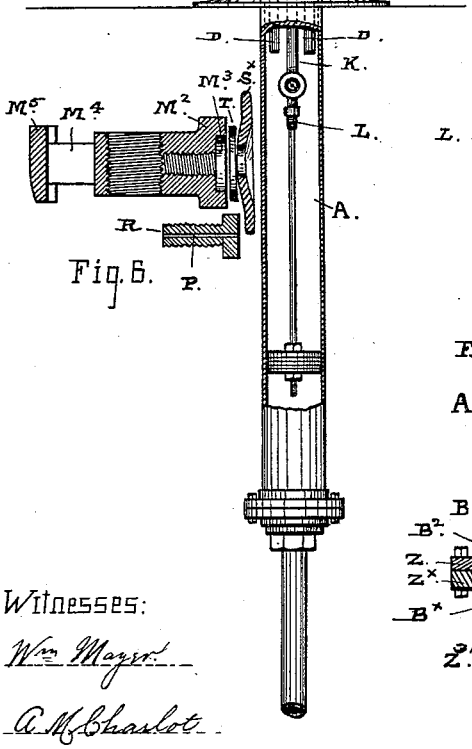
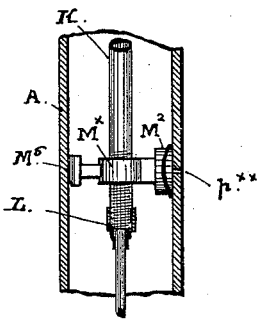
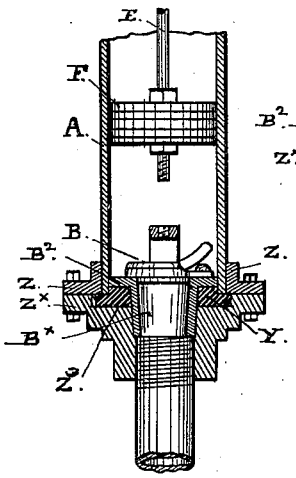


Fig. 6.





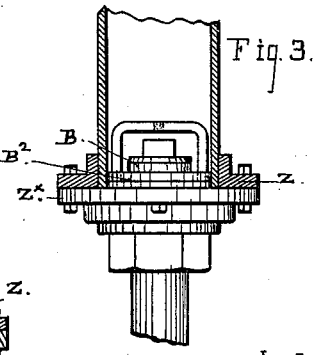


Fig. 3.

Witnesses:

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By Smith & Osborn

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UNITED STATES PATENT OFFICE.

JOHN BEAN, OF LOS GATOS, CALIFORNIA.

DEEP-WELL PUMP.

SPECIFICATION forming part of Letters Patent No. 457,244, dated August 4, 1891.

Application filed October 8, 1890. Serial No. 367,445. (No model.)

To all whom it may concern:

Be it known that I, JOHN BEAN, a citizen of the United States, residing in Los Gatos, county of Santa Clara, and State of California, have invented certain new and useful Improvements in Deep-Well Pumps, of which the following is a specification.

In deep-well pumps of the class to which the present improvements relate more particularly the upper portion of the water-space in the long tube of the pump, or what I have herein termed the "well-tube," constitutes an air-chamber, and the rod of the plunger or bucket extending upward through the head of the chamber is connected above it to the lever or handle for working the bucket. At the point where the rod works through the top or head it has been found difficult to make and preserve a tight joint that will prevent the escape of water, and yet will permit the rod to work smoothly without excessive friction, and the constant leakage at this point is not only a source of annoyance, but in situations where the pump is exposed to low temperature the pump-rod is often liable to be frozen and become fast. The purpose of the present invention is, mainly, to improve the construction in that respect; to prevent the water from collecting in the pump-rod casing and from escaping around the rod to the outside, and to permit the bucket, foot-valve, and all the parts to be raised and withdrawn from the well-tube for cleaning and repairs.

The features of the present improvements include a pump-rod casing in the air-chamber with a packing at the foot where the rod passes into it, and a waste-outlet or leakage-aperture from the casing above the packing to the outside of the pump-tube, whereby a constant drain-aperture is provided from the lower part of the rod-casing to the outside of the pump to carry off whatever water may pass above the packing and find its way into the casing.

Another feature of the invention consists in an improved joint and packing in combination with a removable foot-valve that is adapted to be raised and drawn out of the well-tube for cleaning or repairing the parts.

In this improvement the foot-valve is constructed with a tapering body and a flat projecting rim fitting into an elastic packing-ring that forms a seat for the rim and a close packing around the tapering body.

The nature of these improvements and the manner in which I have constructed and applied the same will be understood from the following description and the drawings that accompany this specification.

Figure 1 of the drawings is a view of the pump, with a portion of the well-tube and air-chamber broken away. Fig. 2 is a sectional view on an enlarged scale, showing the air-chamber, water-distributing chamber, well-tube, and foot-valve in longitudinal section. Fig. 3 is a section on an enlarged scale, showing the foot-valve and coupling at the bottom of the well-tube. Figs. 4, 5, 6, and 7 are views in detail of the parts of the waste-outlet or drainage from the pump-rod casing.

A indicates the long tube that extends down into the well and has an inlet at the bottom, controlled by a foot-valve B. This tube is composed of several sections joined by screw-couplings for a deep well or is one single tube where the same is practicable. The space in the upper portion of this tube constitutes the air-chamber, and the end is closed by a hollow head C from the space $c^{\times}$, in which one or more water-tubes D D extend downward in the tube A to carry water into the head. The space in the tube A above the mouths of these water-tubes thus forms the air-chamber, while the space in the head is the distributing-chamber, from which the water is carried off through a nozzle, spout, or conducting-pipe C^2. The pump-rod E, on the end of which is secured the bucket F, extends upward in the center of the well-tube and air-chamber and through the head C to the outside, where a lever H is connected to it for working the pump by hand.

From the bottom of the head, where the rod passes through downward to a point below the mouths of the water-tubes, the rod is surrounded by a tubular air-tight casing K, having a close joint and packing L at the lower end, through which the rod works, and at the upper end fixed by a screw-threaded joint into the bottom of the head C. The rod has a smooth working fit in the central opening C^3 through the head, but no stuffing-box

or packing is used at that point. The packing at the lower end closes the casing and is sufficient to insure a tight joint under all ordinary conditions of work, as its construction is such that the water-pressure tends to hold the packing closely around the pump-rod; but as the packing wears and becomes set the water finds its way into the casing and accumulates in it, or, increasing in quantity, it finds outlet around the pump-rod, where it flows over the top and down the sides, not only to the great discomfort of those persons using the pump, but frequently to the serious obstruction of the pump, especially in cold climates, where the water is liable to be frozen around the pump-rod if allowed to collect and stand in the casing. In the present construction a waste passage and outlet is carried from the lower part of the casing to the outside through the side of the well-tube or air-chamber, to drain the casing of whatever water may accidentally pass, and the construction and combination of the parts by which I have overcome the objections before mentioned form an important feature of this invention.

Upon the lower end portion of the rod-casing, which is screw-threaded for that purpose, an arm or bridge-piece M is fixed by a threaded ring or socket M*, which takes over the threaded portion of the casing and is put on before the collar or sleeve N, that holds the packing on the lower end. The piece M, being of suitable length to extend from the casing laterally outward to the wall of the surrounding tube or chamber, is formed with a passage P, which is in line with both an aperture p^* in the side of the casing and an outlet p^{**} through the side of the well tube or chamber. The end of the part M has a circular cup-shaped head M^2, with a curved face corresponding in curvature with the surface of the well-tube and with a countersunk recess M^3 and a threaded hole for a screw-plug R. The head of the plug is somewhat smaller in diameter than the countersunk recess, and between it and the sides and bottom of the recess is held a cup-shaped washer S, having a rim S* that is somewhat broader than the face of the head behind it and extends beyond the edge of the head all around. Between the rim of the washer and the surface behind it a rubber ring T sets the rim of the washer outward against the tube-surface and allows the pressure of the water in the chamber to act against the back of the rim, so that a close joint is secured between washer and tube-surface all around the outlet-aperture.

On the opposite side of the casing, in line with the bridge-piece M, a brace M^4 is fixed from the casing to the wall of the well-tube for the purpose of holding the casing in line and keeping the head of the bridge-piece M tightly against the tube-surface. This brace is a part of the threaded socket M*, and is formed with a broad head M^5, the face of which is curved in a horizontal direction to fit the curvature of the tube, and is tapered in a perpendicular direction to give a face slightly wedge-shaped. The inner surface of the well-tube is smooth and flush for the entire length from the drain-aperture to the top, and by taking out the screws c^3 in the flange of the head C that part is raised, bringing with it the water-tubes, the casing, and the pump-rod and bucket. As the bridge-piece is fixed on the pump-rod casing it is brought up at the same time, and both the packing at the end and the parts of the drain-outlet can be easily reached for repairs.

The foot-valve has a stirrup with a threaded hole, and the end of the rod is screw-threaded, so that by running the rod down to the bottom of the well-tube and turning it around the foot-valve will be attached to the rod and can be drawn up with the other parts. Similar provision is made in other pumps of this class, however, and I claim no novelty for that feature of itself in my present invention; but the form of the rod and the socket or guide through which it works is different from those heretofore used, and besides being quite simple in construction it serves to hold the rod without excessive friction, and at the same time when the foot-valve or parts inside the well-tubes are to be removed it allows the rod to be readily screwed into the foot-valve stirrup and then drawn up and out of the tube without taking off the guide. This construction of the rod and guide will be understood from Figs. 1 and 7. The guide-plate U is supported above the top of the pump on three standards U*, and has a central circular opening U^2 about equal to the size of the cylindrical part of the pump-rod below it; but the top portion of the rod that works in the guide is flattened on opposite sides with the edges rounded to correspond to the curved edges of the opening. The lever H is pivoted at h to the flat part of the rod, and is detached when the rod is to be turned around in the guide to fasten the end into the foot-valve. The supports U* are fixed on the top of the head C by screws U^3. The foot-valve B is formed with a tubular body B*, somewhat tapering on the outside, and a flat flange B^2, projecting all around about equal in outside diameter to the bore of the tube, so that when seated on the bottom packing Y the flange covers it and fills the space between the walls of the tube. The bottom of the tube has a flanged head Z fitting a corresponding flange in the bottom-reducing coupling Z*, and the packing Y is clamped between the two flanges, which are drawn together by bolts and nuts. A recess Z^3 is formed in the bottom coupling to let in the packing, and the end of the tube is seated directly on the packing. This secures a tight joint and also serves to hold the packing in place. The packing is made of elastic material, preferably of rubber. When the foot-valve is pressed down into place, its flange

sets closely down against the packing, while the tapering body passing through the center aperture causes the packing to bind around the tapering surface, thus insuring a tight joint at the bottom of the tube.

It should be mentioned with respect to the general construction of the water-distributing chamber and pump-rod casing that the same parts constitute features of former inventions that have been made by me the subject of a prior application for Letters Patent filed in the United States Patent Office November 4, 1889, Serial No. 329,224, and no special claim is made, therefore, to such parts of themselves in the present invention.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a deep-well pump, the combination of a well-tube, a head or top having a water-distributing chamber with a depending water tube or tubes extending downward into the well-tube a pump-rod casing having a water-tight packing at the lower end and fixed at the top end into the bottom of the water-distributing chamber, the laterally-extending bridge-piece or arm, in which is a water-passage, an outlet-aperture in the surrounding well-tube and an aperture in the rod-casing connected together by the said water-passage and forming a drain-outlet from the rod-casing above the rod-packing to the outside of the well-tube, substantially as described.

2. In a deep-well pump, a pump-rod casing extending into the air-chamber, a well-tube having a water-tight packing on the lower end, and the bridge-piece having a laterally-extending passage which is in line with an outlet in the side of the casing and connects the same with an outlet-aperture in the side of the well-tube, the packing-disk extending beyond the head of the bridge-piece, and the brace on the opposite side of the casing, all in combination, as described.

3. In combination with the bridge-piece fixed on the rod-casing and having a longitudinal passage which is adapted to connect the space in the rod-casing with an outlet-aperture in the surrounding well-tube, of the packing-disk, clamp-screw, and elastic ring between the disk and the head of the bridge-piece, as and for the purpose set forth.

4. The combination, with the rod-casing having a water-tight packing at the lower end and a drain-aperture in the casing above the packing, of the bridge-piece having a screw-threaded plug with a longitudinal passage in line with the casing-aperture, a countersunk head on the outer end of the bridge-piece corresponding in curvature with the curved wall of the surrounding well-tube, a circular packing disk or washer having a projecting rim, the elastic ring behind the washer under the rim, and the brace on the opposite side of the casing in line with the bridge-piece, substantially as described.

5. In a pump having a stock formed of a tube, the combination of a removable top or cap, a pump-rod casing having its upper end fixed to the cap and extending downward, and a bridge-piece secured on the lower end of the rod-casing having a passage through it connecting an aperture in the casing directly with the outside of the pump through an aperture in the pump-stock, the said cap, pump-rod casing, and bridge-piece being removable, as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

JOHN BEAN. [L. S.]

Witnesses:
E. E. OSBORN,
B. H. NOBLE.