

(No Model.)

2 Sheets—Sheet 1.

D. HEINS. WATER PURIFYING FORCE PUMP.

No. 553,910.

Patented Feb. 4, 1896.

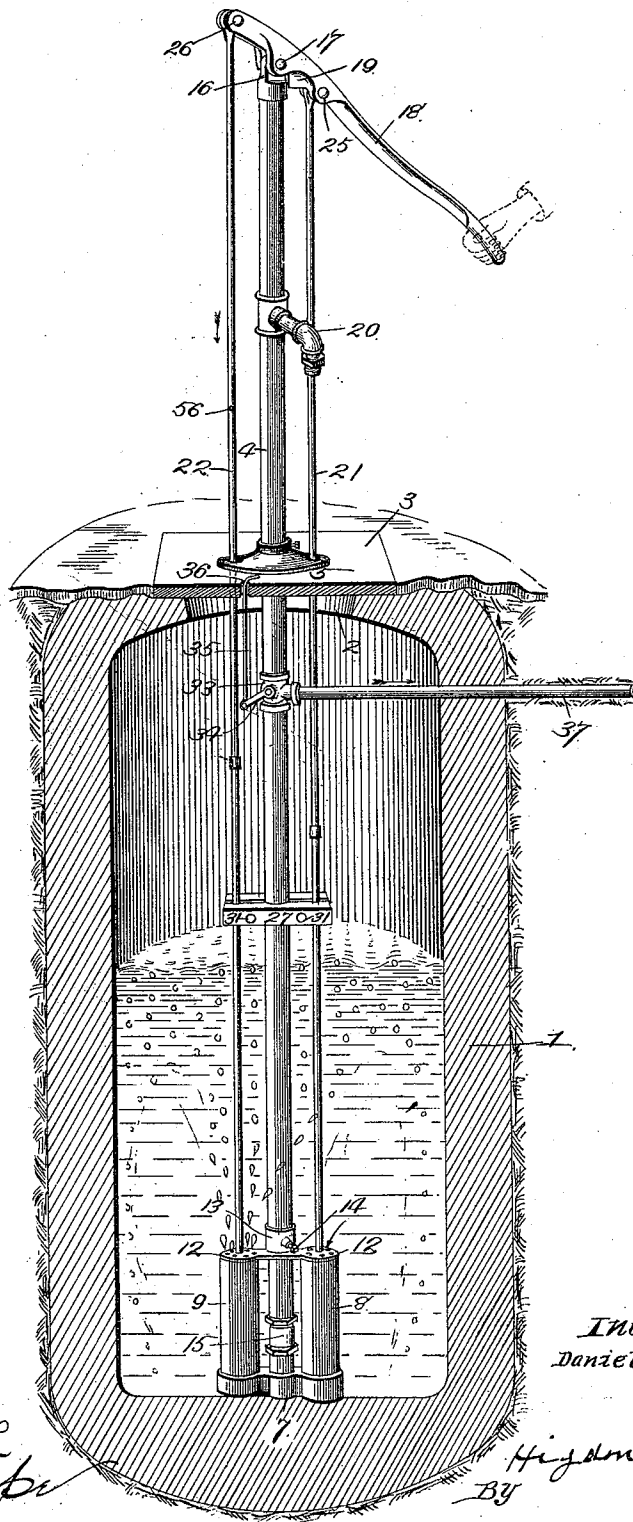


Fig. 1.

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Fig. 2.

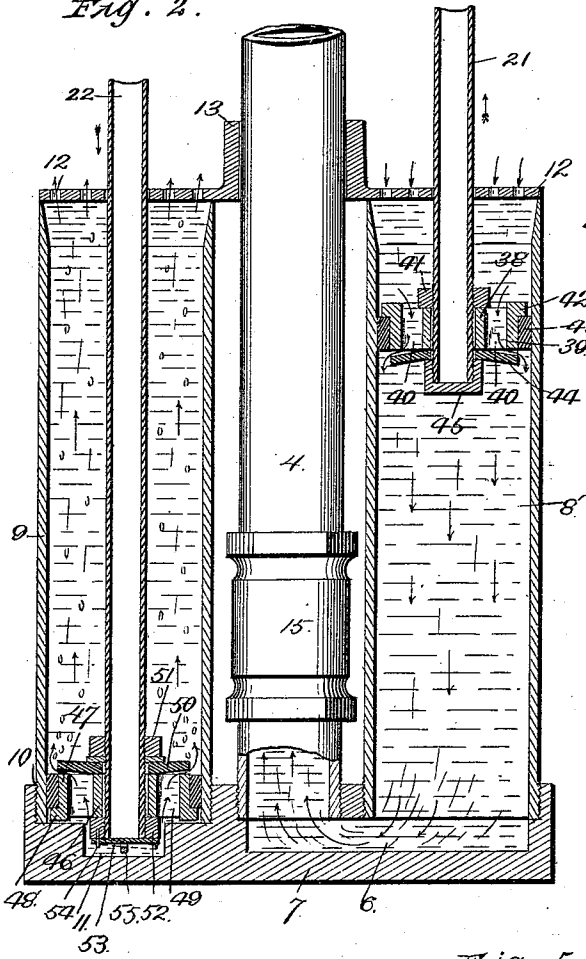


Fig. 3.

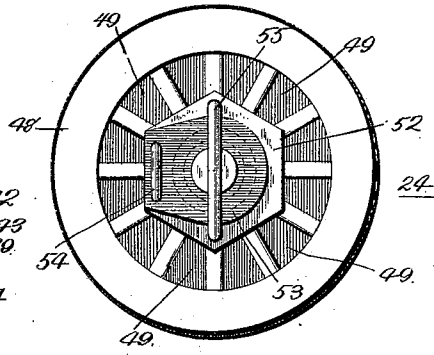


Fig. 4.

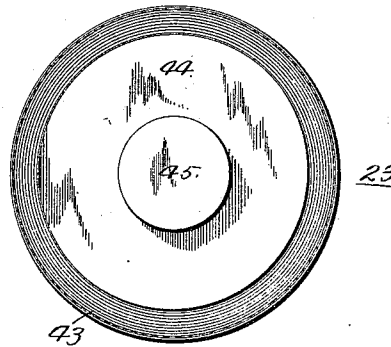


Fig. 5.

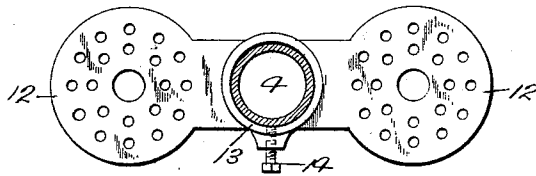
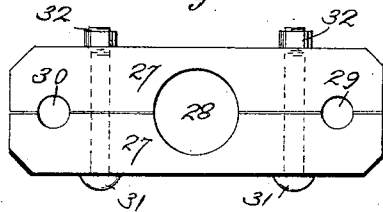


Fig. 6.



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UNITED STATES PATENT OFFICE.

DANIEL HEINS, OF CARROLLTON, MISSOURI.

WATER-PURIFYING FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 553,910, dated February 4, 1896.

Application filed April 5, 1895. Serial No. 544,555. (No model.)

To all whom it may concern:

Be it known that I, DANIEL HEINS, of Carrollton, Carroll county, Missouri, have invented certain new and useful Improvements in Water-Purifying Force-Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to water-purifying force-pumps, or that class which discharge air into the lower end of a cistern for purifying purposes.

The object of the invention is to provide a pump of this character whereby the water is discharged by the down or power stroke of the water-piston and fresh air is discharged into the lower end of the cistern upon the up or return stroke of the water-piston.

A further object of the invention is to provide a pump of this character which is positive and reliable in action, and is simple, durable, and inexpensive of construction.

Other objects of the invention will appear in the following description, and the novel and peculiar features of construction and combinations of parts will be pointed out in the appended claims.

Referring to the accompanying drawings, which illustrate my invention, Figure 1 is a perspective view of a pump embodying my invention placed in operative position in a cistern, shown in vertical section. Fig. 2 is a vertical sectional view, on an enlarged scale, of the air and water cylinders and their respective pistons located at the lower end of the pump. Fig. 3 is an inverted plan view, on an enlarged scale, of the air-cylinder piston. Fig. 4 is an inverted plan view, on the same scale, of the water-cylinder piston. Fig. 5 is a horizontal section of the stand pipe or tube, taken just above the said cylinders. Fig. 6 is a plan view of a guide-block for the piston-rods.

In the said drawings, 1 designates an ordinary cistern, having an opening 2 at its upper end, which is planked over or otherwise suitably covered, as at 3. Extending vertically and centrally of the cistern is the stand pipe or tube 4, having its lower end contiguous to the bottom of the cistern and its upper end projecting some distance through the cover 3 and supported in its vertical position by the

casting or flange 5, which is bolted or otherwise suitably secured upon said cover. The lower end of the stand pipe or tube 4 communicates with one end of the passage 6 in the transversely-extending casting 7, which rests upon the bottom of the cistern. Communicating with the opposite end of said passage 6 and extending vertically upward is the water-cylinder 8. A similar cylinder 9 is arranged at the opposite side of the stand pipe or tube 4 and engages the threaded cavity 10 in said casting. The stand-pipe 4 and the water-cylinder 8 preferably are also screwed into the casting, in order to provide a secure, yet detachable, connection. The casting 7 is also provided with a second cavity, 11, which communicates with but is diametrically smaller than the cavity 10. The upper end of each cylinder is closed by a perforated screen 12, to prevent the entrance into said cylinders of trash and other foreign substance, and said screen at its middle is provided or formed with an annular sleeve or collar 13, externally embracing the stand pipe or tube 4 and secured rigidly thereon by a set-screw 14. Contiguous to its point of communication with the passage 6 the stand pipe or tube is provided with a coupling 15, containing an ordinary check-valve.

The upper end of the stand pipe or tube is closed by a cap, from which projects vertically a lug 16, and pivotally mounted upon said lug, as at 17, to swing in the vertical plane of the cylinders at the bottom of the cistern, is a lever 18, provided contiguous to the stand-pipe and toward its handle end with a depending V-shaped lug 19, which is adapted to limit the downstroke of the handle and the water-piston and the upstroke of the air-piston. The stand-pipe, at a suitable height above the cover 3, is provided with a suitable discharge-nozzle 20, and projecting through said cover at opposite ends of said pipe are the piston-rods 21 and 22, carrying at their lower ends, respectively, the water-piston 23 in the water-cylinder, and the air-piston 24 in the air-cylinder. Said piston-rods are pivoted at their upper ends to the handle 18 at opposite sides of and at equal distances from the pivot 17 of said handle, as shown at 25 and 26, respectively. As said piston-rods are of considerable length, it is essential that they

be guided in their vertical reciprocation by a guide-block. Said guide-block comprises the similar strips 27, of wood, preferably, which are provided with registering semicircular notches to form the central opening 28 to fit snugly around the stand-pipe, and the openings 29 and 30 to embrace loosely the piston-rods 21 and 22, respectively, and thus prevent them buckling under the heavy working strain to which they are subjected, particularly the piston-rod 21. Said blocks are clamped firmly in position upon the stand-pipe by means of the bolts 31 and nuts 32 engaging the threaded ends of said bolts.

At a convenient point upon the stand-pipe, preferably contiguous to the upper end of the cistern, is located a coupling 33, containing an ordinary two-way valve, having a handle 34 at one end. Said handle is pivotally connected to the lower end of pull-rod 35, which extends vertically through an opening in the cover of the cistern, and is bent to form a handle 36, of the form shown, or of any other suitable or preferred form. Communicating with said coupling 33 is the laterally-extending pipe 37, which may terminate in faucets in the kitchen or other apartment of the house or building, or at any other place required.

Referring now to the water-valve 23, 38 and 39 designate, respectively, inner and outer concentrically-arranged collars, and connecting said collars are radiating arms, so as to form a number of vertical passages 40. The inner collar is screwed upon the piston-rod 21 at its lower end until it comes in contact with an adjustable nut or collar 41 upon said piston-rod. The outer collar is formed at its upper end with an outwardly-projecting annular flange or shoulder 42, and is embraced externally by a packing-ring 43, of leather or equivalent material, which is prevented moving upwardly upon said collar by the overhanging shoulder 42, and fits snugly against the inner side of the water-cylinder 8.

A flexible washer 44, which forms, in connection with the passage 40, the valve proper, externally embraces the lower end of the piston-rod 21, and is clamped firmly against the under side of the collar 38 by means of a nut 45, engaging the lower end of said piston-rod 21. The piston-rod 21 is preferably tubular for the sake of strength and lightness. Therefore said nut 45 is in the form of a cap, which, while clamping said washer in position, also closes the lower end of the piston-rod 21. Said washer diametrically corresponds with the outer collar 39, so that upon the downstroke of the piston the several vertical passages 40 will be tightly covered by the pressure of the water upon said valve, while upon the upstroke of the piston the water entering through that portion of the screen 12 covering the cylinder 8 will pass downwardly through said passages to the bottom of the cylinder, forcing said washer away from the passages 40, as shown in Fig. 2.

Referring now to the air-valve, it will be

noticed that it is of precisely the same construction in all except one particular, to be presently described, as the water-valve 23, except that its position is reversed. 46 and 47 designate inner and outer concentrically-arranged collars, corresponding to the collars 38 and 39. The collar 47 is also provided with an outwardly-projecting annular flange or shoulder 48 at its lower end, corresponding to the similar flange or shoulder 42 of the collar 39. Said collars are also connected by radiating arms to form a number of passages 49 corresponding to the passages 40. At the upper end of the collar 46 is clamped the flexible valve 50 by a washer, and nut 51, externally engaging threads upon the piston-rod 22. The nut or collar 52 externally embraces the threaded lower end of the piston-rod below the collar 46 and carries a clack-valve 53, which is pivoted near its margin, as shown at 54, and is limited in its rise and fall by the cross-rod 55, extending below said valve, and also carried by said nut 52. The collar and clack-valve mounted upon the lower end of the piston-rod 22 depend, when the piston is at the lower end of the cylinder 9, into the offsetting cavity 11, as shown at Fig. 2. In order that air may be supplied to said cylinder, the tubular piston-rod 22, at a suitable point above the cover 3, is provided with an aperture 56. It will thus be seen that as said piston 24 rises air is drawn into the piston-rod 22 and, passing down through said pipe, forces the clack-valve 53 away from the lower end of the piston-rod and enters said cylinder. By the time the piston has reached the upper end of the cylinder said cylinder is charged with fresh air thus obtained, and as the piston begins its downstroke the air in the cylinder closes the clack-valve 53 by pressure and makes its way upward through the passages 49 and past the flexible valve 50, as shown by arrows, Fig. 2. It then escapes from said cylinder through the perforated screen 12, which tends to separate or scatter the same, so that practically all of the water in the cistern is quickly benefited by absorbing a large amount of free oxygen, which, as is well known, gives water its life and pleasant taste.

By disseminating fresh air in the water at each stroke of the air-piston it is apparent that it will be quickly and thoroughly purified and maintained in such state.

Two functions of the strainer 12 have been mentioned, viz: the wide distribution or spraying of air through the same, and the prevention of the entrance of trash or other foreign substance through the cylinders. It also has a third function, which will be appreciated by those employed in setting up the pump, viz: to prevent the pistons being pulled from the cylinders accidentally when the pump is being placed in operative position in a cistern.

From the foregoing it will be apparent that upon the downstroke of the handle to the position shown in full lines, Fig. 1, the water-piston will force the water contained in its

cylinder in the direction indicated by arrows in Fig. 2, and up through the stand-pipe past the check-valve to the discharge-spout 20, and that as this action of the water takes place the air-piston rises, and its cylinder is charged with fresh air, as hereinbefore explained. As the handle is raised the air-piston is forced downward and the air is discharged from the cylinder into the water, and at the same time the water-piston rises to again permit the cylinder 8 to be charged. The check-valve, in the customary manner, prevents any back-flow of the water in the piston or the stand-pipe.

From the above description it will be apparent that I have produced a water-purifying pump which performs its heavy work with the power-stroke of the handle, and which keeps the water constantly purified by discharging fresh air therein at each reciprocation of the piston. When it is desired to discharge the water by way of the pipe 37, the handle 36 of the rod 35 is grasped and the valve in the coupling 33 operated in the usual manner.

It is apparent that slight changes in the form, arrangement, and detail construction of the parts may be made without departing from the essential spirit and scope or sacrificing any of the advantages of my invention.

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

1. A water-purifying pump, comprising a stand-pipe projecting down into a cistern, and provided with a discharge-spout at a suitable point, a handle pivoted at the upper end of said stand-pipe, a casting provided with a passage communicating with the lower end of the stand-pipe, a water-cylinder communicating also with said passage, a piston within the same adapted to permit water to pass through it at its upstroke, and to prevent water from passing through it upon its downstroke, an air-cylinder at the opposite side of the stand-pipe, a valved piston therein adapted to permit air to pass through it upon its downstroke, and to prevent water from passing through it upon its upstroke, a hollow piston-rod pivotally connected at its upper end to said handle at the opposite side of said stand-pipe, and carrying the air-piston at its lower end, and provided with a perforation at a suitable point externally of the cistern, and a valve at the lower end of said piston-rod, which permits air to enter the air-cylinder by way of said pipe upon the upstroke of the piston, and prevents the passage of air through said rod upon the downstroke of the piston, substantially as set forth.

2. In a water-purifying pump, the combination with a casting at the lower end of the

pump at the bottom of a cistern, provided with a cavity, and an air-cylinder fitting into the said cavity, of a pump-handle, a tubular piston-rod pivotally connected at its upper end to said pump-handle and provided with an aperture externally of the cistern, and an air-piston mounted upon said tubular piston-rod within said cylinder, and consisting of outer and inner concentrically-arranged collars, connected by radiating arms to form vertical passages, a packing-ring externally embracing the outermost collar, and internally embracing the said cylinder, and a flexible disk clamped upon the upper end of the innermost collar, and adapted to close said passages upon the upstroke of the piston, and to yield to air-pressure and open upon the downstroke of the piston, and a clack-valve at the lower end of the tubular piston-rod, which opens at the upstroke of the piston-rod to charge the cylinder with air, and closes at the downstroke of the piston-rod to prevent said air from passing up through said piston-rod, substantially as set forth.

3. A water-purifying pump, comprising a stand-pipe projecting down into a cistern and provided with a discharge-spout, a pivoted handle at its upper end, a pair of cylinders at its lower end, one of them an air-cylinder and the other a water-cylinder; said water-cylinder communicating with the lower end of the stand-pipe, piston-rods pivotally connected to said handle at the opposite side of said stand-pipe, and provided with water and air pistons, respectively, in said water and air cylinders, and a perforated strainer-cap covering the upper ends of said cylinders, substantially as set forth.

4. A water-purifying pump, comprising a stand-pipe projecting down into a cistern, and provided with a discharge-spout, a pivoted handle at its upper end, a pair of cylinders at its lower end, one of them an air-cylinder and the other a water-cylinder; said water-cylinder communicating with the lower end of the stand-pipe, piston-rods pivotally connected to said handle at opposite sides of the stand-pipe, and provided with water and air pistons, respectively, in said water and air cylinders, a perforated strainer-cap covering the upper ends of said cylinders, and provided with a central sleeve or collar embracing the stand-pipe, and a set-screw carried by said sleeve or collar and impinging upon said stand-pipe, substantially as set forth.

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

DANIEL HEINS.

Witnesses:

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E. HEINS.