

UNITED STATES PATENT OFFICE.

BIRDSILL HOLLY, OF LOCKPORT, NEW YORK.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 39,259, dated July 14, 1863.

To all whom it may concern:

Be it known that I, BIRDSILL HOLLY, of Lockport, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a central vertical section of a pump-cylinder with my improvements applied thereto; Fig. 2, a perspective view of the piston detached; Fig. 3, a perspective view of the independent valve ring or support, and its valve-ring detached.

Like letters of reference indicate corresponding parts in all the figures.

In ordinary pumps the lower or induction valve is formed by cutting it out of the proper form and size from the center of the leather disk that forms the packing between the bottom of the cylinder and the base of the pump. The valve is thus stationary, and cannot be removed for repairs, except by detaching the bolts and separating the cylinder and base.

My invention consists, first, in the employment of an independent ring or support, B, Figs. 1 and 3, of suitable size and weight, to which the lower valve, C, is secured by a leather hinge, *a*, or in any convenient manner. This ring is made hollow or open inside, as shown at *b*, the opening being of sufficient size to receive a raised flange, *d*, of the rim below, which flange forms the valve-seat; and it also has on its periphery, at proper distances apart, vertical ribs *e e*, or equivalent, projecting a little beyond, which ribs fit closely but easily within the pump cylinder A when in place, while the main periphery does not touch at all. A portion, *f*, of the valve-support is made thinner and of less weight than the other sides, as represented most clearly in Fig. 3. This valve-support, resting thus loosely in the pump-cylinder, can be removed at any time for repairs or otherwise without trouble and without taking apart the pump. This is a great convenience, and saves much time and expense. In these respects it is much superior to a valve-support that is secured in place by screw-threads. The support is retained in place by its own weight, which is sufficient to more than counterbalance the tendency to rise as the piston is ordinarily

worked, the valve opening readily for the passage of the water. If, however, from an intense action of the pump, it should have a tendency to rise, the thin light side *f* will do so first, the ribs *e e* thus binding against the sides of the cylinder, as their support is inclined, and preventing it from being displaced. The device accomplishes this result perfectly, holding the support in place under all circumstances, so that the valve will shut down closely on its seat. In addition to these advantages, by the use of the ribs I bring only those projecting portions of the periphery in contact with the sides of the cylinder, thus preventing the oxidation of the metal standing in the water from making it fast to the cylinder, as it would do if the whole periphery came in contact with the same. In order to use this peculiarly-shaped valve ring or support, it is necessary that the flange *d*, forming the seat, should project up, as indicated. This forms a thin rim with a plane surface, on which the valve strikes and packs perfectly. The seat must be of the form to make the valve and support operative. In addition to thus forming a seat, it serves as a base of resistance to the rising of the valve-support by the latter wedging between it and the sides of the cylinder, when the said support is inclined.

My invention further consists in the peculiar form and construction of the induction-valve attached to the ring or support above described, and its connection with the piston and eduction-valve above. The result desired to be secured by the arrangement is to trip or open both valves to allow the water to run back, to prevent freezing in cold weather. To accomplish this effect, I make the valve C with its rear part, or that which forms the projection *g*, of greater vertical thickness than the opposite forward portion, *h*, the device being thus of angular or beveled shape on top when shut down on the seat. This angle is such that when the valve is opened to allow the passage of water, and sufficiently to trip the upper valve, (as hereinafter explained,) its top will rest horizontally, or approximately so, in which position it is shown both in Figs. 1 and 3.

In order to operate with this valve, and to produce the desired result, the piston D and its valve E must both be of peculiar construction and arrangement. The piston consists of

a base-ring, *i*, having a vertical flange, around which fits the ring of the upper portion, *k*, with the packing *l* intermediate, as usual. The base-ring has a central hub, *m*, with radial arms, leaving intermediate spaces, *n n*, for the passage of the water. Into this hub screws the end of the piston-rod *G*, passing loosely through the bearing *o* of the upper portion, *k*, and having a nut, *p*, screwing on top, above the latter, to tighten the parts, as clearly represented in Fig. 1. Within the open space between the parts *i* and *k* of the piston rests the eduction-valve *E*, having sufficient vertical motion to allow the passage of the water, and sliding up and down on the piston rod *G* by means of a central hole, *q*, which rod thus serves as a guide to the valve. From the bottom of the valve, at a suitable position, projects a stem, *r*, downward through one of the spaces, *n n*, sufficiently far to trip the upper valve when the parts are all in the proper position. The two principal parts of the piston are thus united by the piston-rod *G*, passing through both, and are tightened by means of the nut *p*, while at the same time the central shank of the piston-rod serves as a guide to the valve as it rises and falls within, thus allowing the water to escape freely, and always keeping the valve in place, so that it shuts tightly over the port. When the piston is depressed to its lowest position in the cylinder, as represented in Fig. 1, its bottom will strike the projection *g* of the induction-valve *C* and trip it, raising it to the horizontal position indicated. When in this position, the upper valve will also be tripped by the contact of its stem *r* with the surface of the lower valve, no matter what is the position in which it strikes.

In the drawings, the stem is represented as striking the lower valve on the opposite side from the contact of the piston with its projection *g*, but it is manifest that it may strike it in any position (with the stem and projection in coincidence or right-angled to each other) with the same effect, since when the lower

valve is open, with its upper surface in a horizontal position, the upper valve must be tripped. This is of the greatest consequence, since the support *B* of the induction-valve is loose, and the valve may be turned in any direction in the cylinder.

It is obvious that the ordinary induction-valve, which assumes an inclined position when open, would not answer the purpose, as the upper valve would be tripped on but two parts of its surface—viz., at its stem and on the opposite side—those parts at right angles thereto having but little elevation by the opening of the valve.

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

1. The valve ring or support *B*, provided with the ribs *e e*, or equivalent, and with one side, *f*, made lighter than the other, for the purpose of retaining said support in place in the cylinder, substantially as herein set forth.

2. In combination with the support *B* and its valve *C*, the thin raised valve-seat *d*, arranged substantially as described.

3. The inclined inductive-valve *C*, so formed that when tripped for the admission of the water its upper surface will assume a horizontal position, or approximately so, substantially as herein set forth.

4. In combination with the induction-valve *C*, the eduction-valve *E*, provided with a stem, *r*, and the piston *D*, arranged and operating substantially as specified.

5. The arrangement and combination of the piston *D*, composed principally of the parts *i k*, the valve *E*, the piston-rod *G*, and nut *p*, substantially as and for the purpose herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

BIRDSILL HOLLY.

Witnesses:

T. R. BAILEY, Jr.,
J. R. CLAPP.