C. P. HOWARD.

DOUBLE ACTING PUMP.

No. 174,959. Patented March 21, 1876.

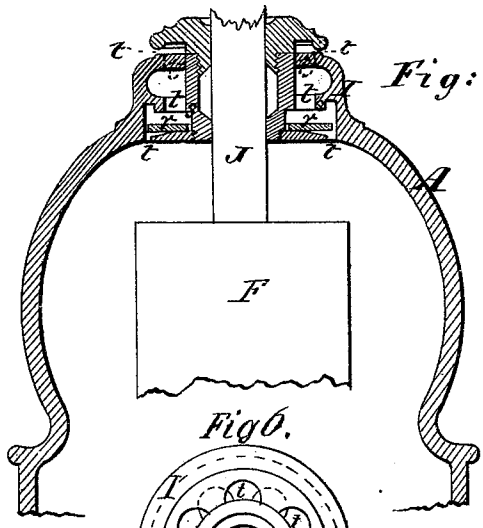

Fig. 5

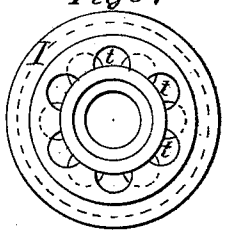

Fig 6.

Fig. 1

Fig. 3

Fig. 2

Fig. 4.

Witnesses.

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CHARLES P. HOWARD, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN DOUBLE-ACTING PUMPS.

Specification forming part of Letters Patent No. **174,959**, dated March 21, 1876; application filed December 14, 1875.

To all whom it may concern:

Be it known that I, CHARLES P. HOWARD, of Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Double-Acting Pumps for railway sleeping-cars and other purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical central section of my improved pump. Fig. 2 is a horizontal section at the line *x x* of Fig. 1, looking downward. Fig. 3 is a horizontal section at the line *y y* of Fig. 1, looking downward. Fig. 4 is a horizontal section at the line *z z* of Fig. 1, looking upward; and Fig. 5 is a modification of my invention, and Fig. 6 a top view of the valve-chamber shown in Fig. 5.

Similar letters of reference in the several figures indicate corresponding parts.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts, as hereinafter described and specifically claimed, in a double-acting lift and displacement pump, specially applicable to railway sleeping-cars, whereby many serious objections to the pumps at present used on sleeping-cars are avoided, and an economical, perfect, and durable pump is provided, which can be readily applied to the marble slabs without drilling bolt-holes through the marble.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents the pump stock or reservoir, having a discharge-nozzle, B, at its base. The base of the stock is formed with a flange, *a*, and below this flange the reservoir is extended downward a suitable distance, and forms a piston-cylinder, A^1. Upon this cylinder a screw-thread, *b*, is cut on the outside, and on this screw-thread an annular flange-collar, *c*, is screwed when the pump is to be fastened in position upon a marble slab, C, of a sleeping-car.

It will be seen that the cylinder is passed down through an opening, *d*, in the marble slab, and its flange *a* rests upon the slab, so as to cover the opening *d*, and that the flange-collar *c* screws up against the under side of the slab, so as to cover the opening *d* and confine the pump firmly in position.

By this construction the expense resulting from the necessity of employing skilled mechanics to drill several bolt-holes through the marble in order to set the pumps in working order is saved.

At the bottom of the cylinder A^1, on its lower head A^2, a tubular central screw-coupling collar, *e*, is formed, and this collar has an annular shoulder, *f*, provided on its inner surface, and above this shoulder a beveled valve-seat, *g*, is provided in the upper surface of the lower cylinder-head A^2. A circular beveled valve, D, provided with extended guides D^1, having stops or stems D^2 on their lower extremities, is fitted upon the valve-seat *g*, and its guides occupy a place within the collar *e*, and the stems D^2 underhang the shoulder *f*, so that when the valve is raised it is guided by the guides D^1, and limited in its movement by the stops D^2 coming against the shoulder *f*. The face of the valve D is nearly flush with the bottom of the cylinder-head A^2, and when the piston comes down upon it no air remains between it and the valve D.

The piston of the pump is made of two parts, E and F, between which packing G is clamped. The lower part E has an annular passage, *h*, through it, and at three or more points on the surface, inclosing the passage, are vertical wings *m*, and at the top of each of these wings a stop, *n*, overhangs the passage *h*. At the base of this passage a beveled valve-seat, *k*, is formed, and on this seat a beveled circular valve, *l*, (provided with a central stem, l^1, and a circular guiding-disk, l^2,) is fitted. The guiding-disk and valve move between the wings *m*, and are guided thereby, and their extent of movement controlled by the stops *n*. On the outer circumference of the part E of the piston a screw-thread, *w*, is provided, upon which the part F of the piston screws. The upper part of the piston consists of a cylinder having an annular internally screw-threaded flange, *o*, at its bottom. This cylinder is provided with a number of passages, *p*,

through its periphery, just above the flange *o*, through which water discharges into the reservoir on the down-stroke of the piston. The chamber of the cylinder F forms a continuation of the annular passage *h* through the piston. The upper end of the cylinder is closed tight, and no escape takes place from the cylinder except through the passages *p*. The cylinder is of a less diameter than the pump stock or reservoir A, and allows a space for water between it and said stock, as shown.

On the top of the piston E and F a valve-chamber, I, is constructed. This chamber is provided with a valve, *r*, and valve-seat *s*. Through the sides of the valve-chamber I a number of passages, *t*, for the passage of air are provided just below the valve, and in communication with the reservoir or stock A. Above the valve a hollow piston-rod, J, is screwed to the valve-chamber, and extended out through the top of the pump stock or reservoir, and to this a lever or handle is attached for moving the piston up and down.

From an inspection of the drawings, it will be seen that the piston-valve has its lower face nearly flush with the bottom of the piston, and that, therefore, no air can remain between the valves D and *l* when they meet, or when the piston is down upon the bottom of the piston-cylinder.

It will also be seen that while the cylinder F serves to contain air as a cushion for the regular discharge of the water, it also serves to hold a quantity of water; which water, when the piston is raised, is discharged into the reservoir, and from thence through the spout B. This cylinder also serves, on its descent, to displace a quantity of water, and to force it into the upper part of the reservoir.

It will be further seen that air is sometimes forced out of the reservoir, through the passages *t t* and valve *r*, into the hollow piston-rod J, and from thence into the open atmosphere, and that it is sometimes drawn in through them, according to the varying positions of the cylinder F and the surface of the water in the reservoir, and thus the resistance of the same to the rise and fall of water in the reservoir is avoided. The valve which permits the air to pass is arranged and constructed to be closed by an outward pressure of water against it.

By this construction and operation a steady, easy flowing stream is produced, whether the pump is worked gently or violently, and throwing or splashing of water upon the marble slab to which it is attached is prevented. Great ease of operation and smoothness of action are secured. The piston-rod is short and large, and therefore cannot be easily bent.

In Figs. 5 and 6 of the drawings I have shown a hollow perforated cylinder, F, combined with a water-valve and air passages in the upper part of the reservoir A, instead of through the piston-rod, and with air-passages *t t* "breaking joint," so as to prevent water from spattering out. This I intend as a modification of this feature of my invention shown in Fig. 1.

It may be proper to state that pumps adapted to be used on railway-cars have hitherto possessed many objectionable qualities; they have been either the ordinary single-acting lift-pump, which discharges the water in intermittent "gulches," or the single-acting force-pump combined with an air-chamber for giving a steady stream, which throws a small stream of water from the spout with such force as to splash the water out of the basin, while at the same time it requires considerable force to operate it. Another great objection is the expense and difficulty with which they are set up and put in working order on the marble slab, several bolt-holes having to be cut in the marble, and a skilled mechanic employed to attach them to the slab and make the necessary connections, all of which objections my invention overcomes, as hereinbefore shown.

I am aware of the patents granted to J. L. McPherson and to J. G. Murdock, and do not claim anything therein shown as my invention; but,

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

1. The hollow cylinder F, open at its bottom, and having apertures *p* in its circumference, and provided with an internally screw-threaded flanged extension below said apertures, in combination with the internally screw-threaded annular flanged portion E of the piston, substantially as and for the purpose described.

2. One or more channels, *t*, of communication between the reservoir A and the external air, in combination with the valve *r*, arranged to admit air into the reservoir and prevent the egress of water therefrom, substantially as described.

3. The combination of the guide-rings *m* in the piston E *o* with the guide-disk l^2 and valve *l*, whereby a guide stem extending below the valve-seat is rendered unnecessary, substantially as described.

4. The combination of the piston, the valve *l*, the cylinder-head A^2, and the valve D, all in such a manner that the lower surface of the valve *l* is nearly a continuation of the lower surface of the piston, and the upper surface of the valve D is nearly a continuation of the upper surface of the cylinder-head A^2, and all the said surfaces nearly coincide when the piston is in its lowest position, substantially as described.

In testimony that I claim the foregoing as my invention I hereunto set my hand in presence of two witnesses.

CHARLES P. HOWARD.

Witnesses:

FRANK L. HOWARD,

GEORGE C. BARNES.