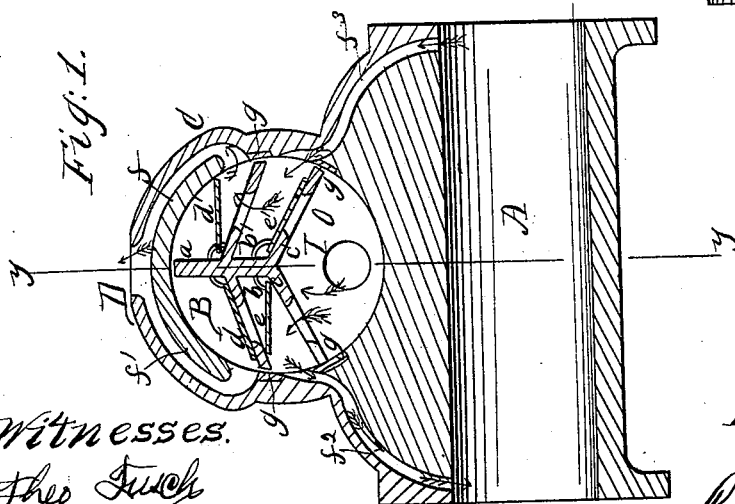
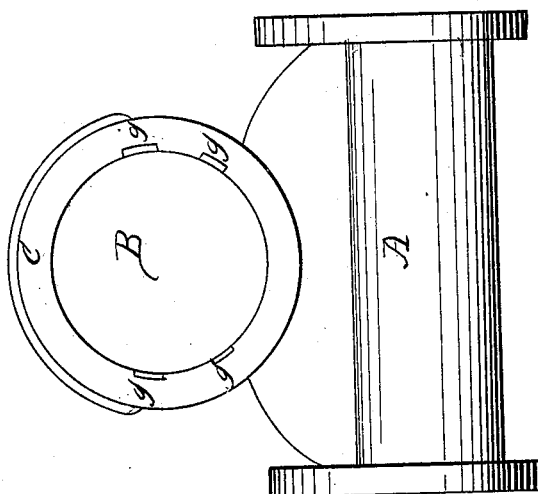


Patented Dec. 12, 1865.



Theo Tuck
John Thurn

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UNITED STATES PATENT OFFICE.

C. A. STILLMAN, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO C. B. COTTRELL AND NATHAN BABCOCK, OF SAME PLACE.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 51,522, dated December 12, 1865.

To all whom it may concern:

Be it known that I, C. A. STILLMAN, of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Steam-Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation of the piston and valve-chambers of a pump made according to my invention, the line of section being shown at *x*, Fig. 2. Fig. 2 is a sectional elevation, taken at right angles to the preceding section, on the line *y* of Fig. 1. Fig. 3 is an outside elevation of the pump with the head of the valve-cylinder left off.

Similar letters of reference indicate like parts.

This invention relates more particularly to the class of pumps called "steam-pumps," because they are driven by the direct force of steam, through the medium of steam cylinders and pistons, as in the steam-engine.

It consists in a novel construction of valves and a new arrangement of water-passages whereby the course of the water is made more direct.

A is the cylinder, and C the valve-chamber, of the pump. The valve-chamber is made or bored tapering, instead of being made a true cylinder within. These parts may be cast together.

B is the valve-box, and it consists of several radial arms, *a c c'*, whose ends are received into circular heads *h h*, which heads are of a diameter to allow them to be received within the valve-chamber C. Said valve-box is made tapering likewise, so that it will fit within the valve-chamber, the heads *h h* consequently being of different diameters. Between the larger head and the adjacent end or head of the valve-chamber I leave a water-space, to which the water that comes into the valve-chamber through the passage I has free access. The effect of this construction is that the pressure of the water will hold the valve-box tight in the valve-chamber while the pump is in operation, and when the pump is out of operation the valve-box can be readily

removed, because then the pressure of the water is taken off, and the tapering form of the valve-box, and of the sides of the valve-chamber, enable one to take the box out without difficulty. Another effect of this construction is that the valve-box will not wear loose, but its wear will be taken up, because the box will be forced farther along in the valve-chamber by the pressure of the water on its larger end.

The valve-box should be made of such metal as will not be readily corroded or oxidized; and the interior of the valve-chamber should be fitted with strips of brass, or other metal not easily corroded, which may extend throughout the entire length of said chamber. *g g g* designate such strips in this example of my invention, and they are to be secured in place in the process of casting the chamber, said strips being placed in the mold so that the molten iron is cast about those sides which are to be embedded in the walls of the chamber. Their position is to be directly opposite the edges, respectively, of the radial arms *c c'* and of the upper arms *b b'*, and their purpose is to present to the edges of said arms such surfaces as will not become rusted by the action of the water, so that the valve-box B may be easily removed at pleasure.

The upper arms, *b b'*, extend from each side of the vertical arm *a*, in directions parallel, or nearly parallel, to the arms *c c'*. The arms *b b' c c'* are slotted nearly their whole length, as seen of the arm *c*, Fig. 2, the places of such slots being also seen in Fig. 1. These slots form valve-passages, which are governed by flat valves *d d' e e'*, whose inner edges are hinged in any suitable way to the vertical plate *a*.

The valve-box B, with its arms, is to be stationary in the chamber C, and the water-passages are so arranged as that the passages *f f'* open into said chamber above the arms *b b'*, respectively; and the passages *f² f³* open there-in above the arms *c c'*, respectively. The water-passage *f²* begins at the left-hand end of the cylinder A, and ascends with an easy curve toward the left-hand side of the valve-chamber C, which it enters immediately above the arm *c*. The passage *f³* leaves the right-hand end of the cylinder A, and enters the

right-hand side of the valve-chamber immediately above the arm *c'*. The water-passage *f* leaves the valve-chamber immediately above the arm *b'*, and ascends through the upper part of its wall to the discharging-port D. The water-passage *f'* leaves said chamber on its left-hand side immediately above the arm *b*, and ascends in like manner to the same port, D.

I is the inlet-port made through the back wall of the chamber C, and through the adjacent head of the valve-box, and communicating with the inlet compartment *o*, which lies beneath the radial arms *c c'*.

The operation of the pump is as follows: If a piston placed in the cylinder A moves toward the right hand, the water in the compartment *o* will be drawn through the valve in the arm *c*, and through the water-passage *f*² into the left-hand end of the cylinder A. When the piston retraces its course, the water will be forced back again through the passage *f*², closing valve *c*, and raising the valve *d*, so that it may pass into the water-passage *f'*, and so reach the eduction-port D. When the piston of cylinder A is moving towards the left, the water will be drawn into the right-hand end of said cylinder through the valve-passage in the arm *c'*, and will be afterwards expelled and forced through the valve *d'* and water-passage *f'* to the eduction-port in the like manner as explained of the other side of the valve-box B and valve-cylinder C.

By this construction I am able to provide water-passages and courses almost direct in their path from the respective ends of the piston-cylinder to the eduction-port, and to secure ample valve-passages within the valve-chamber or cylinder C. I also am enabled to provide valves of large area, so that they are acted upon and operated with great rapidity by means of the reciprocations of the piston of cylinder A. Moreover, on account of the inclinations given to the arms *b b' c c'*, whose upper faces form the seats of the valves, sediment, or sand, or foreign substances admitted to the pump will not be likely to be retained on said seats to keep the valves open and cause them to leak, but such foreign substances will fall and roll from beneath the valves toward the sides of the inclosing-chamber.

The valve-chamber C is shown open at one end, but such open end is in practice to be closed by a head like the head C', save that it is not to be perforated like that one. When the valve-box is to be removed to repair the valve or clear out any obstructions, it will be only necessary to remove one of the heads of the chamber C.

I have not thought it necessary to show both the heads of said chamber C, nor to show how the valve-box may be held stationary in its proper position, because the manner of construction and application of such head and the holding such valve-box stationary are not parts of my invention, and can be easily accomplished by mechanics of ordinary skill.

The edges of the arms *a, b, b', c*, and *c'* are to be ground to fit. It will be observed that the vertical radial arm *a* divides the upper part of the valve-chamber into two equal parts. It will be observed that the valves of my pump are hinged on the higher or upper sides of their seats instead of on their lower sides, as in the pump shown in the patent granted July 31, 1855, to H. R. Werthington. The object I have in view in hinging the valves on the upper or higher sides of their seats is to prevent dirt and obstructions from lodging upon them, and to cause them to remain always clear, being cleared by the action of the currents, there being nothing in the form of the valves or in the position of the hinges to retain any dirt upon the seats.

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

1. Making the valve-chamber C and valve-box B of tapering form, in contradistinction to the form of a true cylinder, so that the wear of the box will be compensated, substantially as described.
2. Forming a water-space between the larger head of the valve-box and the adjacent end of the valve-chamber, substantially and for the purpose above set forth.
3. Hinging the valves on the upper or higher sides of their seats, substantially as and for the purpose above set forth.

C. A. STILLMAN.

Witnesses:

M. M. LIVINGSTON,
J. P. HALL.