

D. M. TERRY.
 Steam-Vacuum Pump.

No. 200,881.

Patented March 5, 1878.

Fig. 1.

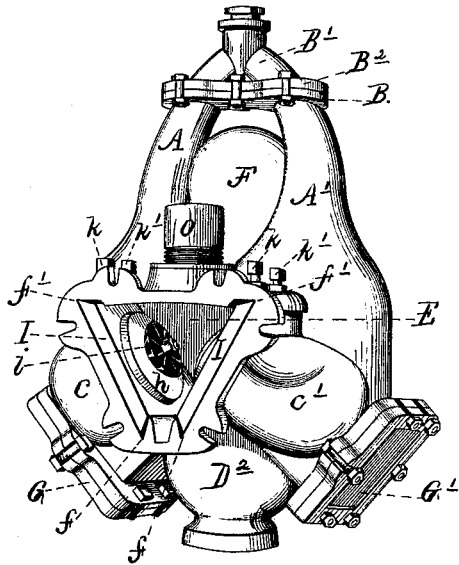


Fig. 2.

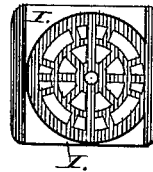


Fig. 3.

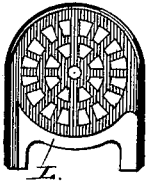


Fig. 4.

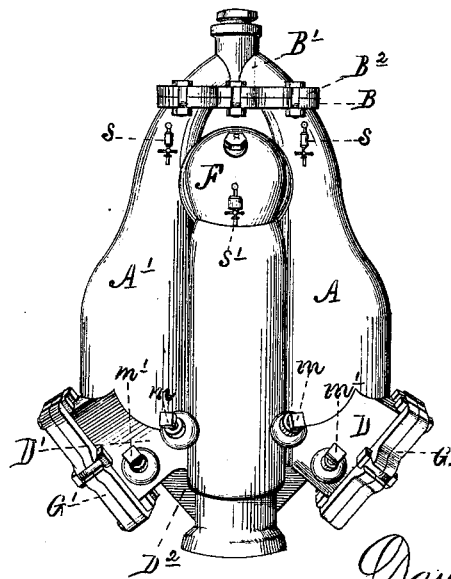


Fig. 5.



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UNITED STATES PATENT OFFICE.

DANIEL M. TERRY, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN STEAM VACUUM-PUMPS.

Specification forming part of Letters Patent No. 200,881, dated March 5, 1878; application filed April 20, 1877.

To all whom it may concern:

Be it known that I, DANIEL M. TERRY, of Jersey City, Hudson county, State of New Jersey, have invented certain new and useful Improvements in Steam Vacuum-Pumps or Pulsometers, of which improvements the following is a specification.

This invention relates to that class of steam vacuum-pumps technically designated as "pulsometers," in which the operation is sustained by steam-pressure brought directly upon the liquid as the forcing element, while the subsequent condensation of the steam furnishes the lifting power to supply the pump, which action is maintained by the purely functional conditions of alternate pressure and vacuum.

It consists in certain improvements in the valve arrangements controlling the induction and eduction water-ways.

The details of construction and operation will hereinafter be fully described and pointed out.

In the accompanying illustrations, which form an essential part of this specification, Figure 1 represents a front view, in perspective, of a pump in which is fully embodied my invention, the eduction-chamber being shown open, so as to show the arrangement of valves and seating. Fig. 2 is a rear view, also in perspective. Fig. 3 is a plan view of the valve-seats for the induction-chambers. Fig. 4 is a plan view of the valve-seats for the eduction-chamber. Fig. 5 is a plan view of the valve-guards, which secure the flexible valves to the valve-seats and limit their motion.

The same letters of reference found in the various figures of the drawings will locate and point out corresponding parts.

This invention has for its base the steam vacuum-pump patented by Hall on September 24, 1872. The improvements herein detailed have for their object the entire eradication of the many faults found in the pulsometers as heretofore constructed. Such faults have been caused by the imperfect operation of the valves, the forms previously used soon wearing out, causing the pump to fail in its duty. A further difficulty was found in the inability to reach and repair said valves; also, in the

inability to obtain a steady flow of water, it being discharged in a series of irregular pulsations, accompanied with a ramming motion and jar, which not only racked the pump, but was objectionable in many ways. The troubles incident on starting the pump gave great annoyance, it being necessary to fill the vacuum-chambers with water from an exterior supply before the pump would operate.

All of these faults, it is believed, have been cured by the present invention, and a pulsometer steam vacuum-pump produced that is absolutely perfect in its operations, effectually obviating all objections of every nature that have heretofore been raised against this class of pumps.

The pump consists, principally, of two bottle-shaped chambers, A A', joined together side by side, and having tapering necks, bent toward each other at their apex, where they meet and terminate, and are provided with flange-joint B. A cap, B¹, also having a corresponding flange-joint, B², is, by means of suitable bolts, attached to the top of these chambers A A'.

The bottle-shaped chambers, at their base, terminate in chambers or passages D D¹, which also connect with the vertical induction-chamber D², into which the water is conducted by an induction-pipe secured to the base of the pump.

The openings from the chambers D D¹ to the induction-chamber D² are shown best in Fig. 4. They are so formed in the base of the chambers D D¹ that the valves and their seats are easily inserted to cover the end. The delivery passage or chamber E, which is common to both chambers A A', is connected thereto by means of openings or passages c and c', which are governed by means of valves inserted into them in a vertical, or nearly vertical, position, as in Figs. 1 and 4.

All of these various parts thus far described, excepting the cap B¹, are cast in one piece of metal, the faces of the chambers D, D¹, and E being left open. The various chambers D, D¹, and E are closed by means of flanged covers G G', the flanges of which correspond with flanges on the chamber-faces on the pump-body, and the two are securely united by means of screw-bolts and nuts, as shown in

the drawings. Suitable vent-plugs may be inserted in these covers G G', for the purpose of drawing the water from the chambers to prevent freezing.

In the sides of the eduction-chamber E are formed recessed ways, being V-shaped at the base, as shown at *f f'*, and of the shape at the top as shown at *f' f'*.

I represents the valve-seat, which is shaped for insertion into the recessed ways *f f'*, and it is beveled on its top and bottom to conform to such ways, and is perforated, (see Fig. 6,) as shown, for the purpose of permitting the free passage of the water. The valves *h*, formed from pure vulcanized rubber of suitable thickness, are circular in form, and of sufficient diameter to cover the perforations in the valve-seats I.

i is the valve-guard, which is formed in the shape of a half-sphere. It is also perforated, and provided with a projecting base or neck, *a*, which passes through a hole in the center of the rubber valve, a screw-bolt passing through its center, and entering a screw-seat in the center of the valve-seat I, securing the valve *h* and valve-guard *i* in position thereon, as shown in Figs. 1 and 3. The object of this valve-guard is to prevent the rubber valve from opening too far, and it is perforated so as to permit the water to escape without undue pressure between it and the valve as it opens.

The valve *h* and the valve-guard *i* are both secured in place upon the valve-seats I before they are inserted in the ways in the chamber E. Suitable packing may be introduced between the rear of the valve-seats and the face of the recessed beds, in order to make the seating water-tight. After the valve-seats I are inserted in the ways in chamber E, they are secured rigidly in place by means of set-screws *k k'*, (see Fig. 1,) which set-screws set the lower beveled edges down into the V-shaped recess, so that there is no escape therefrom, the same set-screws also holding them back against the face of the chamber-wall. Should the valve-seats become loose and leak, the ad-

justing-screws can be set up a little until the trouble is obviated. This arrangement obviates the necessity of opening the pump for that purpose.

Similar perforated valve-seats L, but with elongated bodies, also provided with rubber valves and metal valve-guards, are inserted on an incline in recessed ways in the base of the chambers A A'. The forward end of these valve-seats L is circular in form, (see Fig. 3,) and beveled on the edges, so as to slide in V-shaped recessed ways formed in the base of the chamber A A'. Packing is also inserted below these seats, and they are, by means of adjusting set-screws *m m'*, securely wedged into their beds, in the same manner as previously described in the case of valve-seats I. After the valves, valve-seats, &c., are inserted and secured in their various seats in the chambers, the flanged covers G G' are securely bolted in place, and the chambers and pump hermetically closed.

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

1. The combination of the perforated valve-seat I or L, having the edges beveled, flexible valve *h*, and perforated valve-guard *i*, for limiting the play of the valve, the whole arranged for use in a steam vacuum-pump, in the manner substantially as herein shown and set forth.

2. In combination with a steam vacuum-pump having valve-chambers E, D, and D', provided with V-shaped recesses *l* and *f*, the perforated valve-seats L and I, carrying suitable valves, and the retaining and adjusting set-screws or bolts *k* and *k'* and *m* and *m'*, inserted through the walls of the said chambers, the whole arranged, applied, and operating as and for the purposes as herein shown and described.

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Witnesses:

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