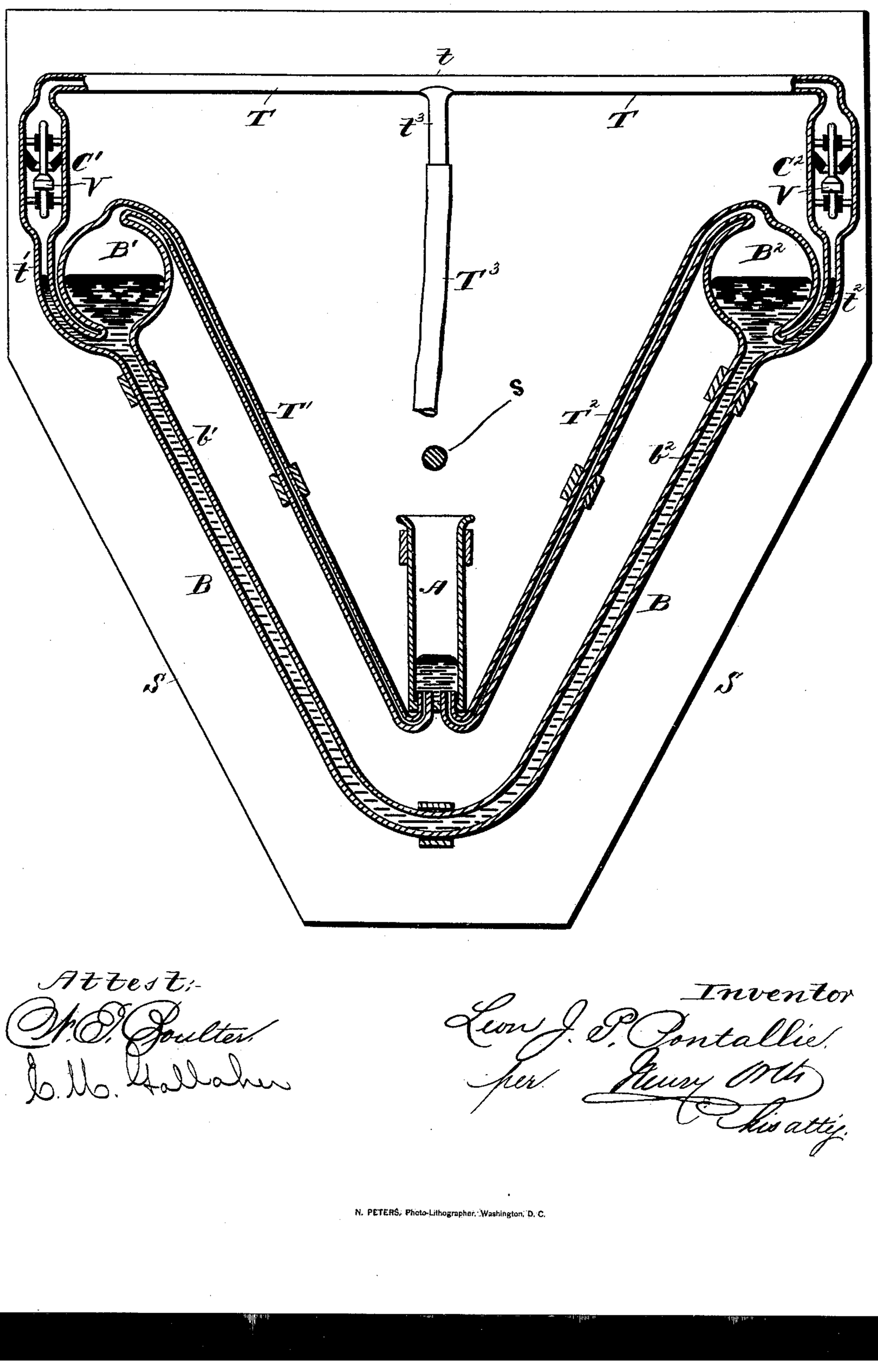
(No Model.)

L. J. P. PONTALLIÉ.

OSCILLATING PUMP.

No. 386,717. Patented July 24, 1888.



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UNITED STATES PATENT OFFICE.

LEON JULES PIERRE PONTALLIÉ, OF ST. MALO, FRANCE.

OSCILLATING PUMP.

SPECIFICATION forming part of Letters Patent No. 386,717, dated July 24, 1888.

Application filed June 20, 1887. Renewed June 23, 1888. Serial No. 278,024. (No model.) Patented in France November 20, 1886, No. 179,726.

To all whom it may concern:

Be it known that I, LEON JULES PIERRE PONTALLIÉ, a citizen of the French Republic, residing at St. Malo, in the French Republic, have invented certain new and useful Improvements in Oscillating Pumps, (for which I have obtained Letters Patent in France, dated November 20, 1886, No. 179,726;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of oscillating double-acting suction and force pumps in which mercury is employed to perform the function of the ordinary piston or plunger.

The object of my invention is the production of such a pump designed for producing a vacuum, and more especially adapted for use for producing the vacuum in the bulb or globe of incandescent electric lamps; and it consists in the construction of the pump, substantially as hereinafter fully described, and as set forth in the claims.

In the drawing, which illustrates my improved pump by a vertical section, the pump body or barrel B is formed of a V-shaped tube, whose legs b' b^2 terminate in a bulb or air chamber, B′ B², respectively. From the upper end of each bulb B′ B² extends a capillary tube, T′ T², respectively, which tubes are bent and extend downward. The termini of said tubes being bent upward project into a vessel, A.

It will be seen that the arrangement of the capillary tubes relatively to the air-chambers B′ B² and the vessel or exhaust-chamber A is such as to give them a V form also. A tube, T, connects both bulbs at their base and communicates with the legs b' and b^2 of the pump-body B. In the vertical connecting branches t' t^2 of the tube T is interposed a valve-casing, C′ and C², respectively containing each a gravity cone-valve, V.

The horizontal branch t of tube T has a third branch, t^3, for connection in any suitable manner with the vessel, bulb, or globe from which the air is to be exhausted. In the drawing I have shown a flexible tube, T³, attached to branch t^3 for this purpose, which connection T³ in practice is made impermeable to air by any suitable or preferred means.

The valves V in this apparatus do not perform the function of suction and force valves, but simply serve to prevent the mercury from flowing into the horizontal branch t of tube T, the vessel A performing the function of exhaust-valve.

The pump described is constructed wholly of glass, excepting, of course, the flexible connection T³, when such is used, and said pump is secured to a suitable support, S, provided with trunnions s, that have their bearings in a suitable stand on which the support and pump is oscillated, which stand I have deemed unnecessary to illustrate, for the reason that the pump may be pivotally connected with a support in many different ways.

The pump being primed with mercury so that the level thereof will stand about midway of the bulbs B′ B², and the mouth of the tubes t' t^2 in vessel A being sealed with mercury, the pump is oscillated—say from right to left, for instance—the mercury flowing into valve-casing C′, closing the valve V therein.

The air in bulb B′ and its capillary tube T′ is compressed and escapes through the mercury-seal in vessel A. A partial vacuum is thus produced in bulb B′, that causes the mercury in vessel A to flow up the capillary tube T′, sealing the same completely. At the same time air from the vessel, connected by tube T³ with tube T, is drawn into bulb B² through valve-casing C², whose valve is open. On reversing the position of the pump the air in bulb B², leg b^2, and capillary tube T² will be compressed. The valve V in valve-casing C² closes under the inflow of mercury, while the mercury in capillary tube T² is forced into vessel A and drawn into capillary tube T′ by reason of the partial vacuum formed in bulb B′, the compressed air in bulb B² escaping through the capillary tube T². The vertical branches t' t^2 of tube T being connected with the base of the bulbs B′ B², prevent any air from entering the valve-casings C′ C² during the operation of the pump, but admit air freely to the said bulbs as soon as the pump is sufficiently inclined to cause the necessary change in the level of the mercury.

It is obvious that the described pump may be readily employed as a suction and force pump by connecting the capillary tubes T′ T²

with a bulb, for instance, and constructing said bulb for connection with a vessel into which the air is to be forced. The valve-casings C′ C² and their valves may be dispensed with by making the vertical branches *t′ t²* of the tube T of such length as to prevent the mercury from entering the horizontal branch of said tube T during the operation of the pump. This, of course, would require inordinately long branches, the pressure being sufficiently great to elevate the mercury about seventy-six centimeters, the bulbs having a capacity of about one liter each, while the vessel A has a depth of about twenty centimeters and a diameter of about five centimeters. For exhausting the air from the bulbs of incandescent lamps, I have found that in order to produce the necessary vacuum the capillary tubes should be of such a length that the vertical distance from the mercury-seal in vessel A to the base of the chambers will be about seventy-six centimeters. Of course these dimensions may be varied at will, and according to the uses made of the pump, the degree of vacuum produced thereby being of course limited by the tension of the vapors of mercury.

Having described my invention, what I claim is—

1. The herein-described mercury vacuum-pump, comprising a tubular V-shaped pump-body, a V-shaped capillary tube formed by two tubes, an exhaust-chamber to which the lower end of said tubes is connected and which chamber contains a sealing medium to seal the said tube ends, and an air-chamber interposed between the upper end of said tubes and the ends of the legs of the V-shaped pump-body, said legs and tubes being connected to the bottom and top of the air-chambers, respectively, in combination with a suction-tube connected with the air-chambers at the base thereof, substantially as and for the purpose specified.

2. The herein-described mercury vacuum-pump, comprising a tubular V-shaped pump-body, a V-shaped capillary tube formed by two tubes, an exhaust-chamber to which the lower end of said tubes is connected and which chamber contains a sealing medium to seal the said tube ends, and an air-chamber interposed between the upper end of said tubes and the ends of the legs of the V-shaped pump-body, said legs and tubes being connected to the bottom and top of the air-chambers, respectively, in combination with a suction-tube connected with the air-chambers at the base thereof, and a valve interposed in the suction-tube in proximity to the air-chambers, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of May, 1887.

LEON JULES PIERRE PONTALLIÉ.

Witnesses:
CAMILLE CHARROPPIN,
JULES PAROD.