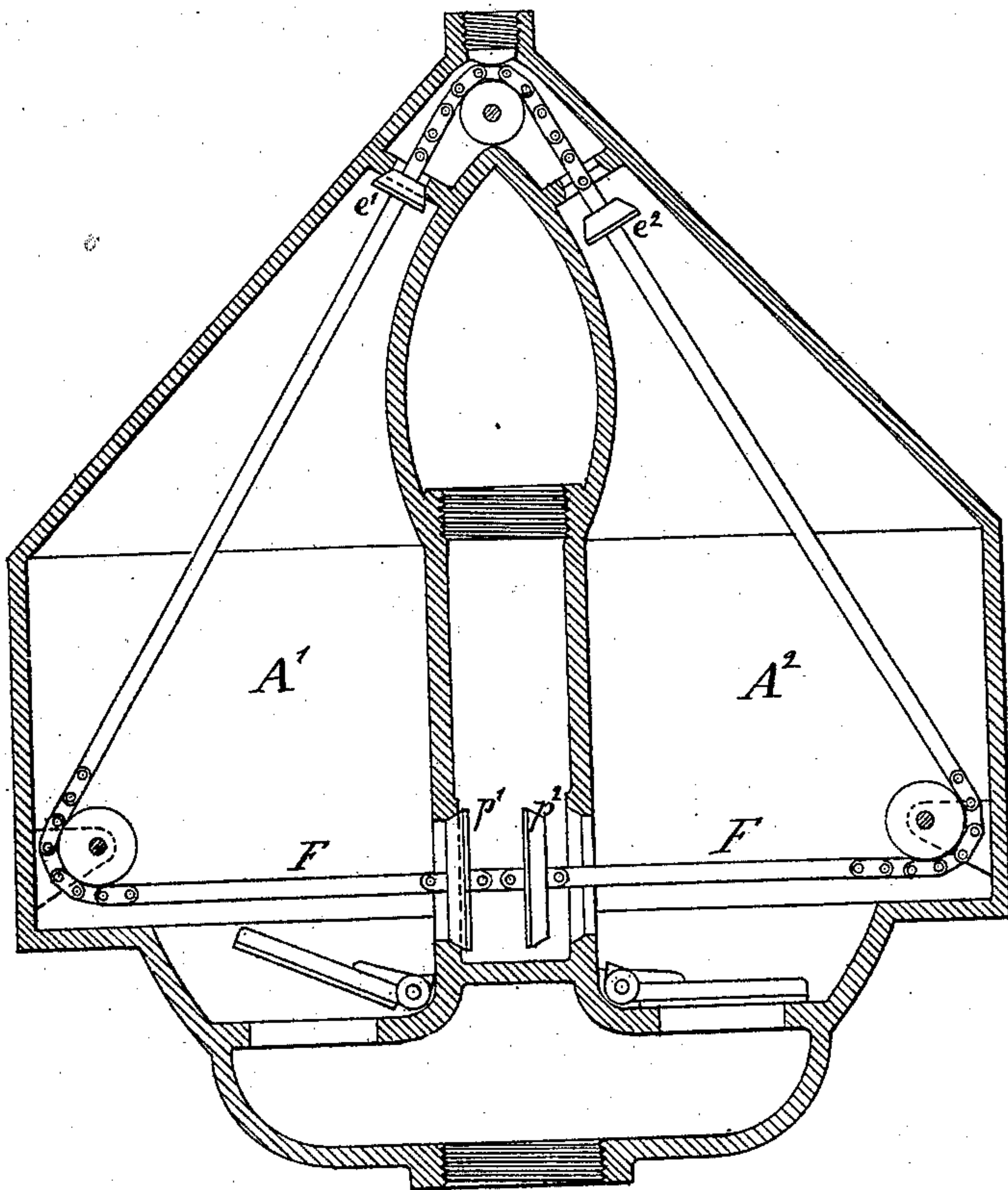


C. H. HALL.

Improvement in Steam Vacuum-Pumps.

No. 131,539.

Patented Sep. 24, 1872.



Witnesses:

Arnold Hornum.
W. C. Day
" "

Inventor:

C. H. Hall
by his attorney, J. L. Stetson

UNITED STATES PATENT OFFICE.

CHARLES H. HALL, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM VACUUM-PUMPS.

Specification forming part of Letters Patent No. 131,539, dated September 24, 1872.

CASE Y.

To all whom it may concern:

Be it known that I, CHARLES H. HALL, of New York city, in the State of New York, have invented a certain Improvement in Steam Pumping Apparatus, of which the following is a specification:

The invention relates to that class of pumping apparatus in which the steam is admitted into the same chamber or chambers with the water and presses upon the surface thereof. The working parts are small, relatively, to the capacity for pumping, and the apparatus constitutes an efficient pumping means, operating rapidly and reliably. I employ strong chambers provided with valves for admitting water and holding it against its return, and also with valves for allowing it to be expelled through another pipe, to be conducted to an elevated reservoir or to such other point as may be desired, and the operations of being filled with water and being discharged succeed each other by reason of a change of position of the steam valve or valves, governing the admission of steam from a boiler or steam-generator, which may be situated at a distance. There are two equal chambers in each set of the apparatus, the two filling and emptying alternately. The chamber which is filling with water should complete its filling before its mate is emptied, and the change of the steam-valve is effected automatically on the completion of the emptying of the discharging-chamber.

The following is a full and exact description of what I consider the best means of carrying into effect one form of the invention. The accompanying drawing forms a part of this specification.

The plan of this invention is shown in vertical section. Here the water-delivery valves $p^1 p^2$ are fixed at a little distance apart on a horizontal bar or rod, F, which forms a part of a flexible connection or chain passing around pulleys, and carrying the steam-valves $e^1 e^2$,

mounted as shown. The steam-valve e^2 is represented as open. The steam flows past it into the chamber A^2 and expels the water therefrom. So soon as the water is expelled, until the water-level has sunk below the upper edge of the discharge-orifice, a portion of the steam escapes, the surface is disturbed, and the instantaneous increase in the condensation induces a partial vacuum, which draws backward on the current of water being expelled, and by its action on the discharge-valve p^2 moves the rod F and its connections, closing the discharge-valve p^2 , and also closing the steam-valve e^2 , while it opens the steam-valve e^1 and also the discharge-valve p^1 . The steam entering in full force past the steam-valve e^1 expels water from the chamber A^1 , and the same round of operations is repeated—the water-induction valves serving their usual functions, as will be obvious.

I have found, by experiment, that the loss of steam is slight when worked in this manner in uncoated vessels of metal; but I propose in ordinary practice to coat the interior of each chamber with japan varnish, or with red lead and oil, or with a solution of rubber or the like, to serve as a durable non-conductor of heat. I can make the chambers and the several connections of lead, to pump acids, or of glass or other material for any special uses requiring such.

What I claim as my invention is as follows:

In combination with the chambers $A^1 A^2$, suitable water induction and eduction means, and provisions for receiving steam intermittently into each, I claim the connection F between the outlet-valves $p^1 p^2$, and the steam-valves $e^1 e^2$, arranged for joint operation, as specified.

In testimony whereof I have hereunto set my hand this 18th day of May, 1872, in the presence of two subscribing witnesses.

Witnesses:

C. H. HALL.

ARNOLD HÖRMANN,
W. C. DEY.