

C. H. HALL.

Improvement in Steam Vacuum-Pumps.

No. 131,525.

Fig. 1.

Patented Sep. 24, 1872.

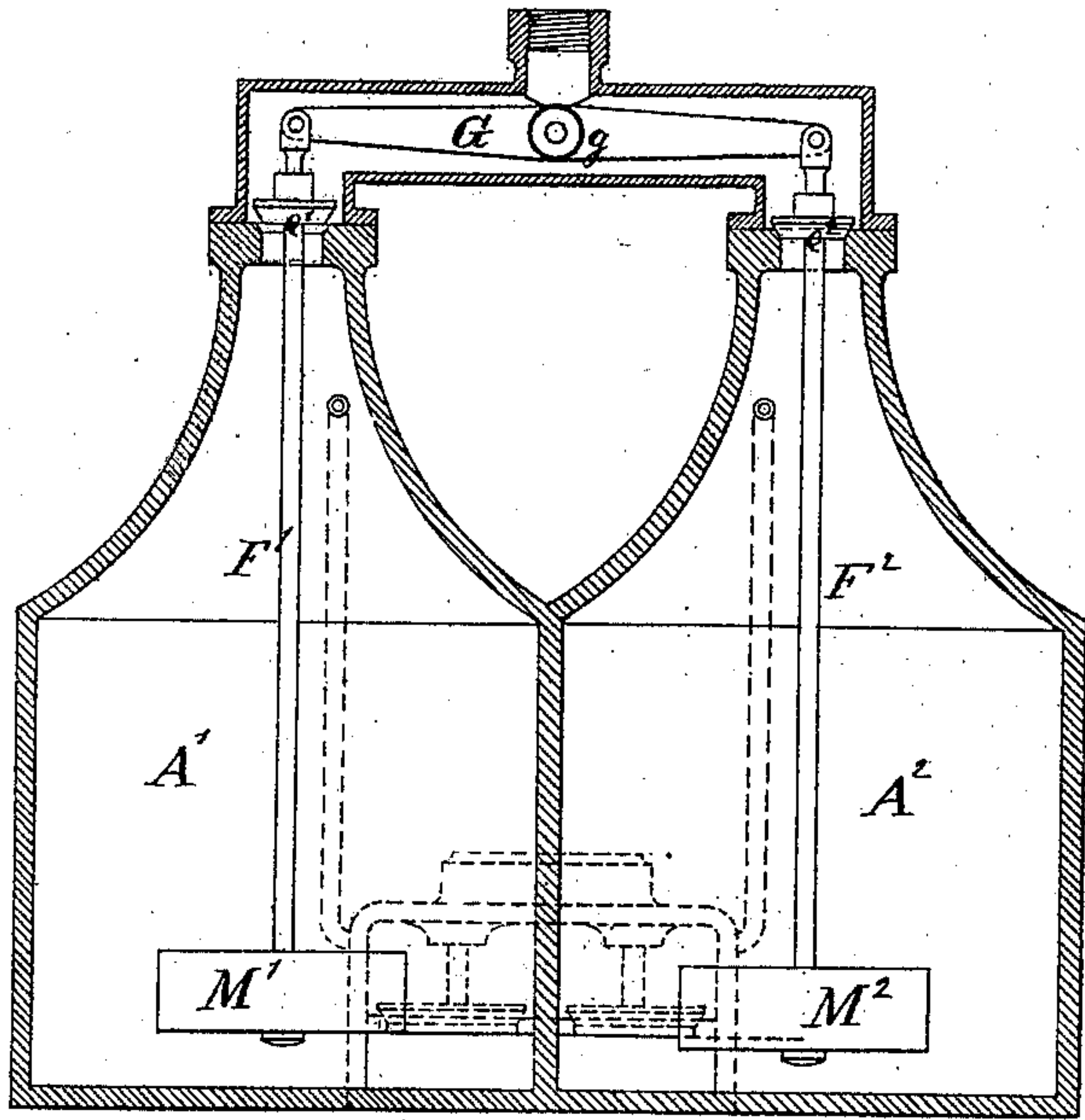
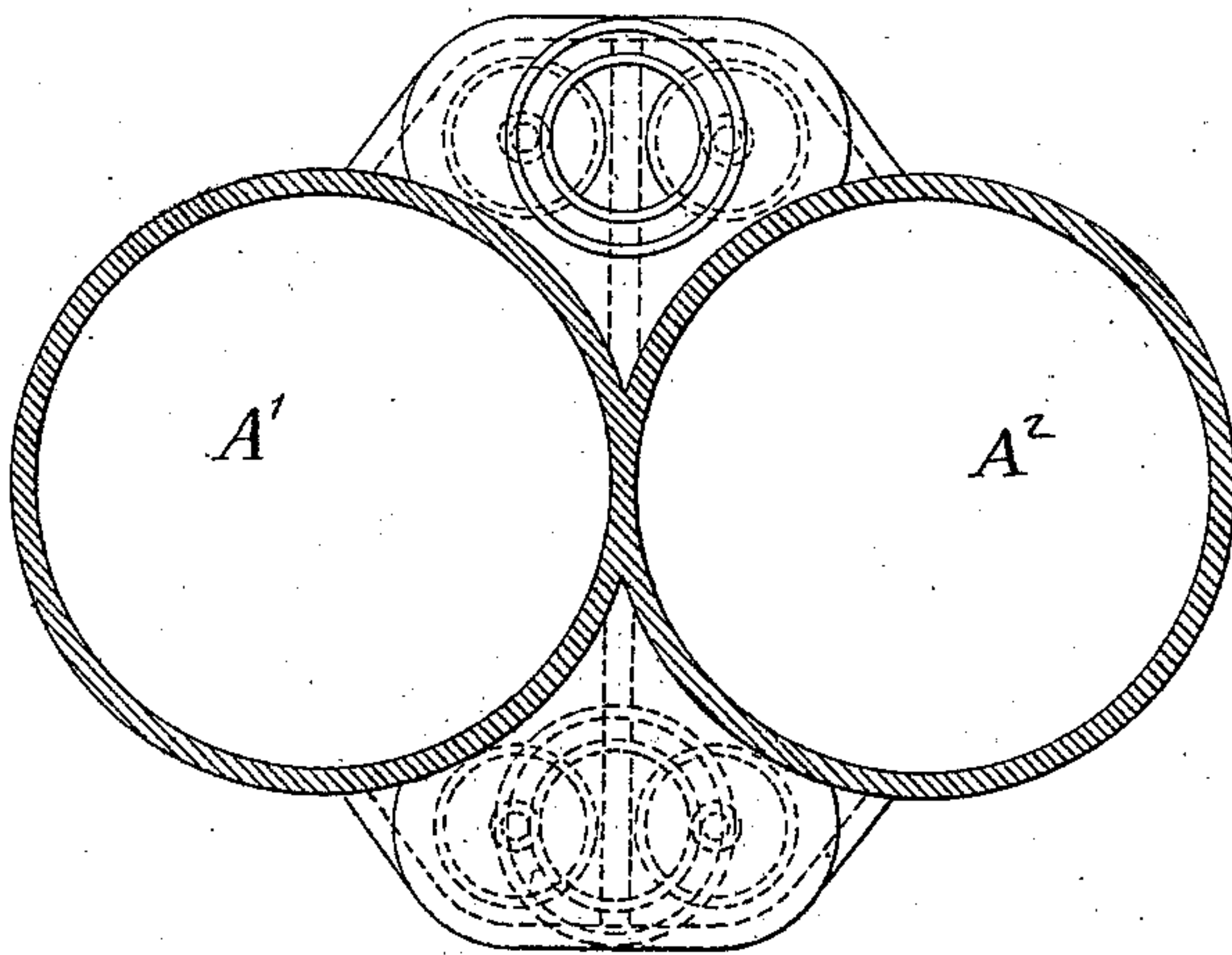


Fig. 2.



Witnesses;

Arnold Hornum.

W. C. Dwyer

Inventor;

C. H. Hall

By his attorney J. S. Sutton

# UNITED STATES PATENT OFFICE.

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

## IMPROVEMENT IN STEAM VACUUM-PUMPS.

Specification forming part of Letters Patent No. 131,525, dated September 24, 1872.

### CASE K.

*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-valves 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.

Figures 1 and 2 represent this form, in which the gravity of weights operates according as they are partially supported by the water or are left unsupported by the sinking of the water. Fig. 1 is a vertical section, and Fig. 2 is a horizontal section.

G is a lever, turning upon a pivot, *g*, and supporting the rod  $F^1 F^2$ , on which are fixed the steam-valves  $e^1 e^2$ . When one sinks to its

seat it necessarily pulls the other open. On the lower end of each rod  $F^1 F^2$  is a weight of cast-iron or other suitable material. The weight  $M^1$  is suspended from the rod  $F^1$ , and the weight  $M^2$  from the rod  $F^2$ . When the surface of the water sinks by the expulsion of the water to such a level as exposes a large proportion of the weight  $M^1$  above the surface, the opposite weight  $M^2$  will be entirely immersed by the rise of the water over it to fill the chamber  $A^2$ . Under these conditions the gravity of the weight  $M^1$  will be felt in proportion as the water falls and exposes a larger proportion of its mass above the water-line. As the water-level rapidly sinks the effect of the gravity contributes largely to pull the valve  $e^1$  into the shut position and to open the valve  $e^2$ . I have found by experiment that the loss of steam is slight when worked in this manner in uncoated vessels, 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 floats  $M^1 M^2$ , arranged to slide on the rods  $F^1 F^2$ , connected to the steam-valves  $e^1 e^2$ , and to each other by the lever G, all mounted within the steam-space to induce or aid in inducing the change of condition in the apparatus, as herein specified.

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

C. H. HALL.

Witnesses:

ARNOLD HÖRMANN,  
W. C. DEY.