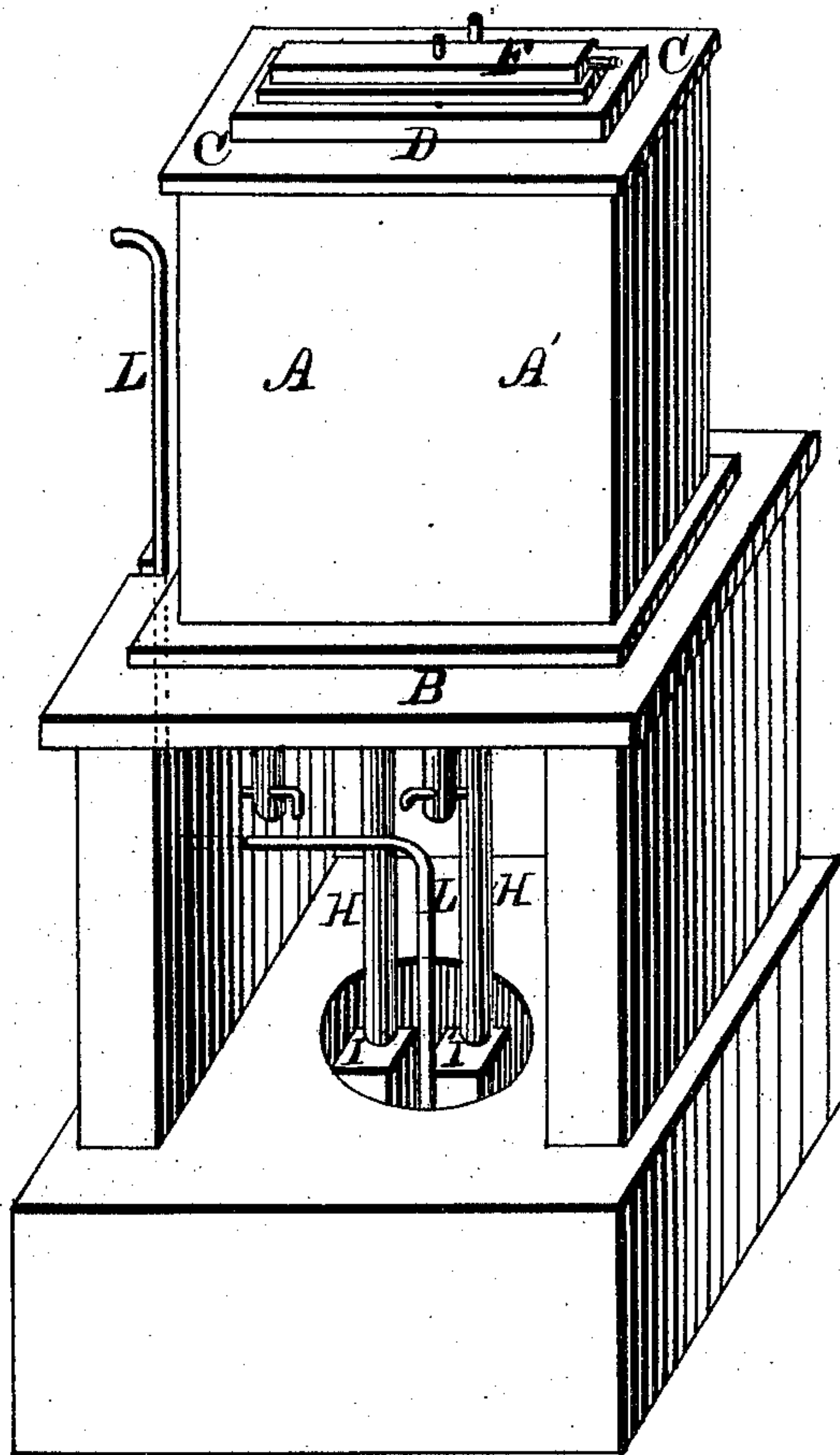


3 Sheets--Sheet 1.

L. CHASE.
Apparatus for Raising Water.
No. 143,882. Patented Oct. 21, 1873.

Fig. I.



WITNESSES:

*Jas. E. Hutchinson
 Harry Coleman.*

INVENTOR.

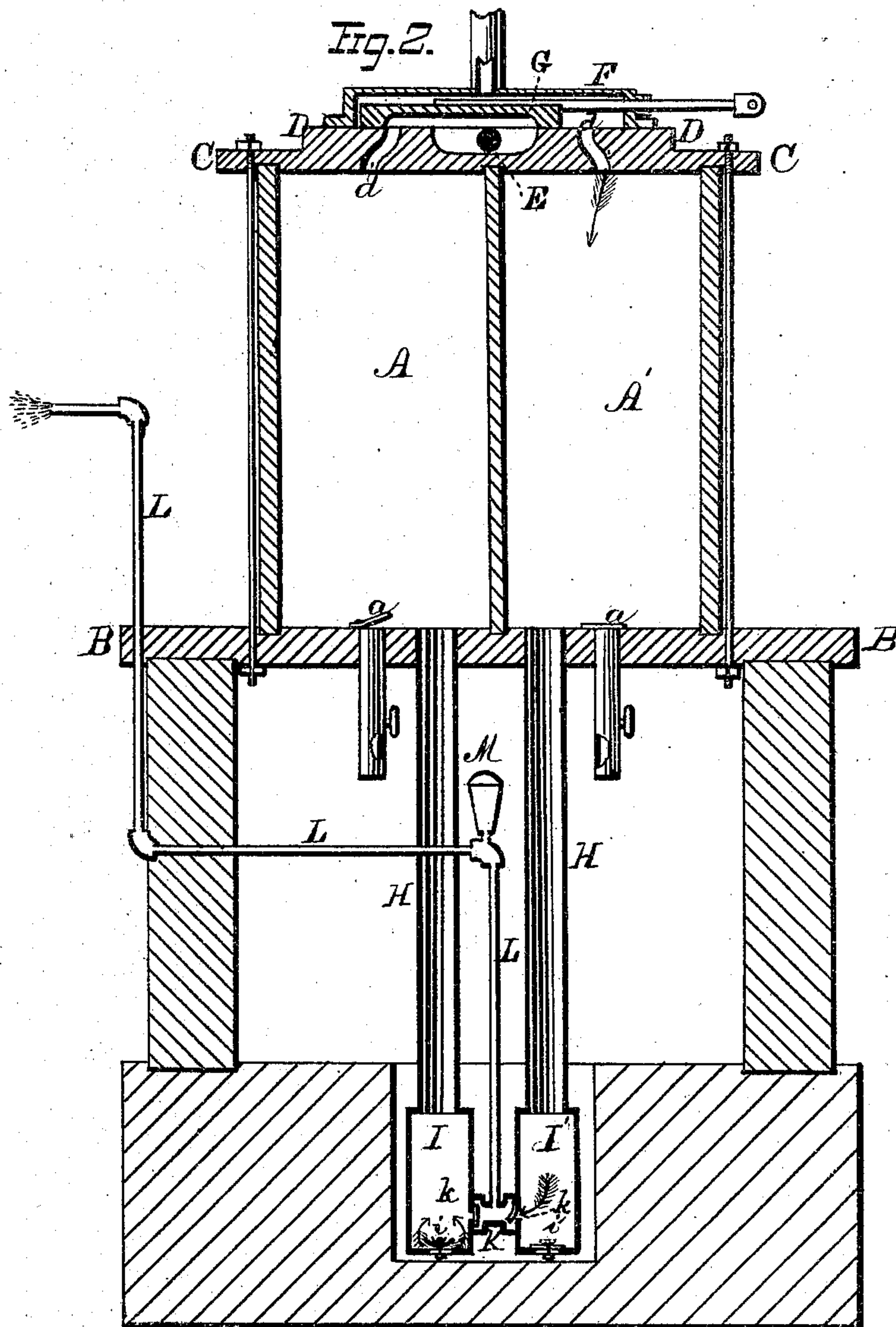
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L. CHASE.

Apparatus for Raising Water.

No. 143,882.

Patented Oct. 21, 1873.



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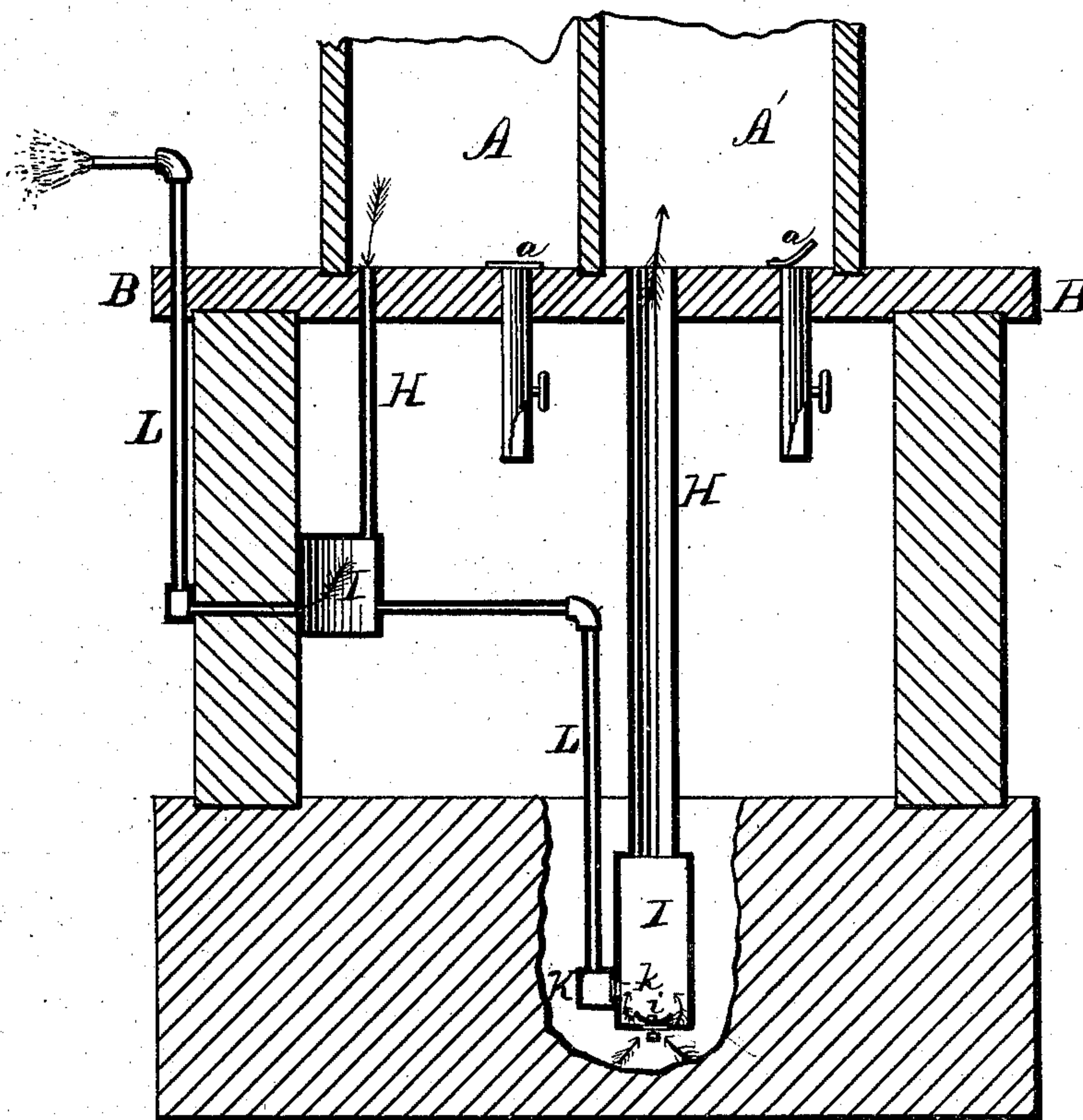
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Patented Oct. 21, 1873.

Fig. 3.



WITNESSES:

Jas. E. Hutchinson
 Harry Coleman,

INVENTOR.

Lorenzo Chase, by
 Prindle and Deane, his
 attorneys.

UNITED STATES PATENT OFFICE.

LORENZO CHASE, OF PORTLAND, MAINE, ASSIGNOR OF ONE-HALF HIS
RIGHT TO CHAS. W. CAHOON, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR RAISING WATER.

Specification forming part of Letters Patent No. 143,882, dated October 21, 1873; application filed
September 24, 1873.

To all whom it may concern:

Be it known that I, LORENZO CHASE, of Portland, in the county of Cumberland and in the State of Maine, have invented certain new and useful Improvements in Apparatus for Raising Water; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a perspective view of my apparatus as arranged for use. Fig. 2 is a vertical central section of the same upon a line parallel to the front of the apparatus; and Fig. 3 is a like view of the same, showing a modification in the construction and arrangement of parts.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to enable water to be raised by means of the direct action of steam, and without the intervention of the usual operative mechanism; and it consists, principally, in two or more chambers, provided with suitable openings and apparatus for the automatic and alternate admission and emission of steam and air, in combination with two or more water-chambers provided with ingress and egress openings and valves, substantially as and for the purpose hereinafter specified. It consists, further, in the construction and relative arrangement of the air and water chambers, and the air, steam, and water ports, substantially as and for the purpose hereinafter shown.

In the annexed drawings, A and A' represent two compartments, having, preferably, a rectangular shape in horizontal section, and arranged side by side upon a suitable base, B, which incloses their lower ends, and forms heads for the same. The upper ends of the compartments A and A' are inclosed by means of a head; C, upon the upper side of which is formed a valve-seat, D, that is provided with two inlet-ports, *d*, one of which latter communicates with the interior of each of said compartments, while an exhaust-port, E, situated centrally within said seat, communicates with the outer air. The valve-seat D is inclosed by

means of a steam-chest, F, which communicates with a steam-generator, and contains an ordinary D-shaped slide-valve, G, that, when caused to reciprocate horizontally, alternately admits steam to each compartment, and permits it to escape from the same. From the lower end of each compartment A and A' a pipe, H, extends downward to and opens into a chamber, I, which latter is provided at its lower end with an inward-opening valve, *i*, and at its side with an outward-opening valve, *k*, that opens into a pipe, K, which extends between and connects said chamber to the opposite similar chamber I' that is connected to or with the opposite compartment. From the upper side and center of the cross-pipe K a discharge-pipe, L, extends upward and outward, and, at some suitable point between its outer end and said pipe K, is provided with an air-chamber, M, of usual construction.

The apparatus being arranged so as to cause the chambers I and I' to be submerged in water, its operation is as follows: Upon the admission of steam to one of the compartments A, the air contained therein is compressed and forced downward into the water-chamber I, and, closing the inlet-valve *i*, forces the water contained within said chamber into and through the pipes K and L, from the latter of which said water is discharged. Steam is now cut off from the compartment A and admitted to the second compartment A', where it performs the same office as before described, while the steam contained in said compartment A is permitted to escape through the exhaust-port E, so as to relieve the air of said compartment from pressure, after which the water without the chamber I will open the valve *i'* and flow inward until said chamber is filled to the level of the exterior surface of said water, the operations of alternately filling and discharging said chambers being carried on so as to cause a substantially constant flow of water into the pipe L, which flow is rendered uniform and constant by the action of the air-chamber M. In order to prevent the formation of a vacuum within the compartments A and A', an inward-opening valve, *a*, is placed within the lower side of each, and, whenever the pressure is

greater without than within, opens and permits air to pass freely inward.

For use in mines, or other places where water requires to be raised to great heights, the apparatus may be arranged, as shown in Fig. 3, so as to cause one set of devices to receive the water at the height to which it has been raised by the preceding set, and to pass it upward to the third set, the number of the steam and water compartments, with their connecting mechanism, being limited only by the distance to which water is to be forced.

When desired, the compressing apparatus may be located at one point upon or above the surface of the ground, while the water-chambers may be placed at suitable points within a mine, and connected with the former by pipes having the necessary lengths.

The apparatus described is simple in construction, efficient in operation, costs materially less than ordinary pumping devices, and can be operated by persons possessing but slight skill.

Having thus fully set forth the nature and

merits of my invention, what I claim as new is—

1. Two or more chambers, provided with suitable openings and apparatus for the automatic and alternate admission of steam and air, in combination with two or more water-chambers provided with ingress and egress openings and valves, substantially as and for the purpose specified.

2. The construction and relative arrangement of the air-chambers *A* and *A'*, provided with the air-passages *H* and *a* and steam-ports *d* and *E*, and the water-chambers *I* and *I'*, provided with the water-passages *i* and *k*, and discharge-pipes *K* and *L*, substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of September, 1873.

LORENZO CHASE.

Witnesses:

JAMES KEEAZER,
WM. H. JERRIS.