

HOOD & MONROE. Evaporating Apparatus.

No. 14,813.

Patented May 6, 1856.

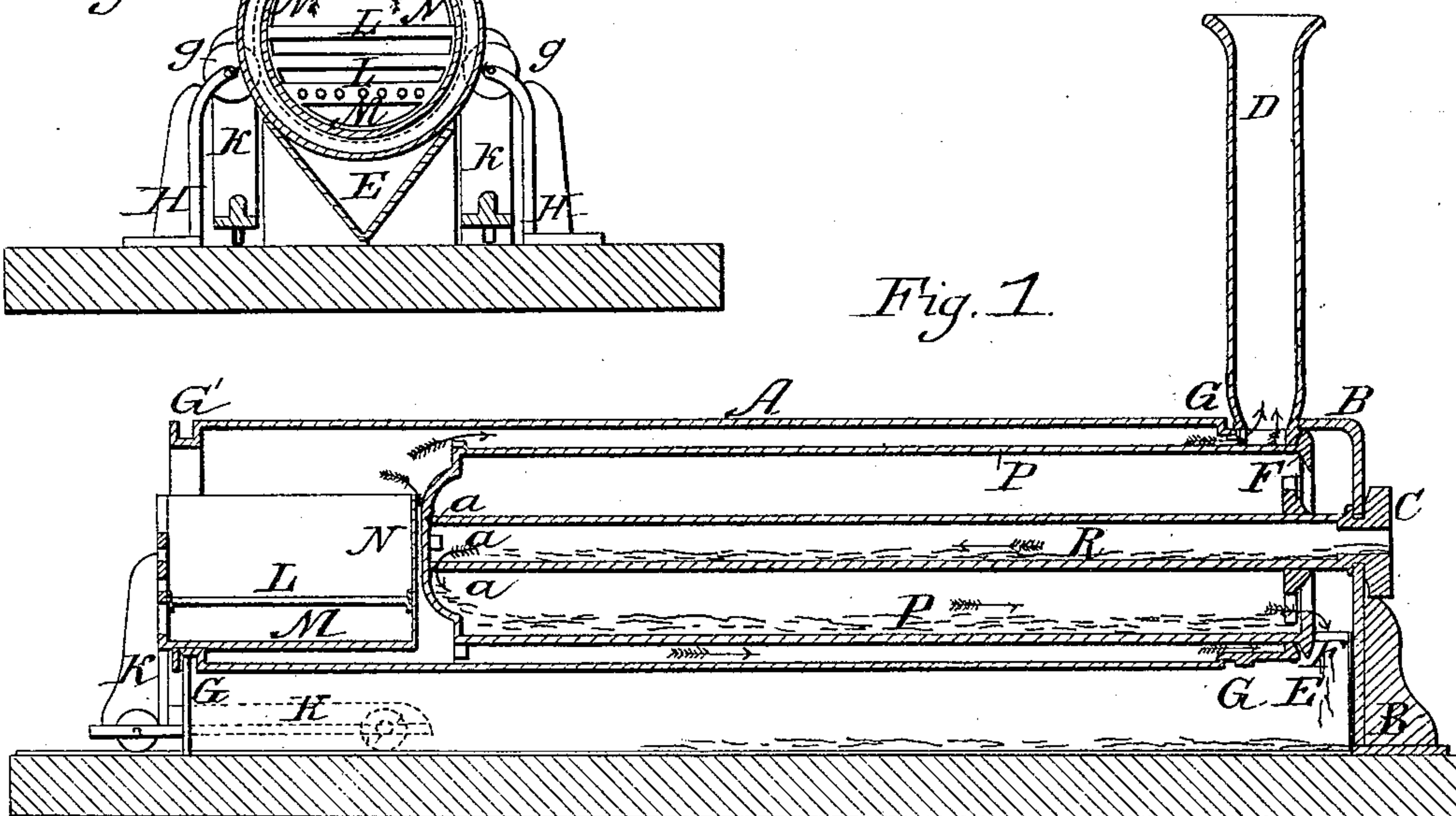
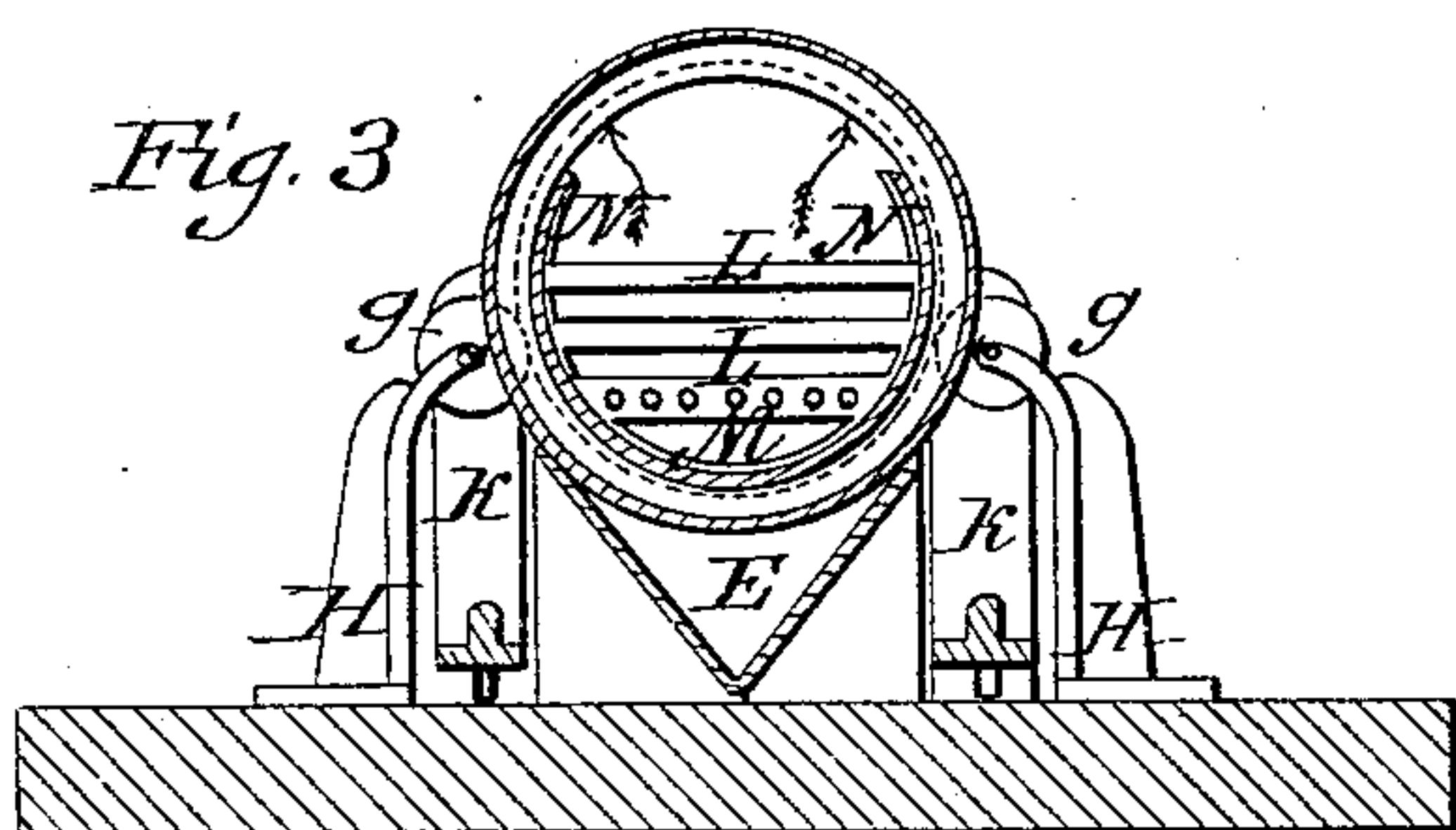
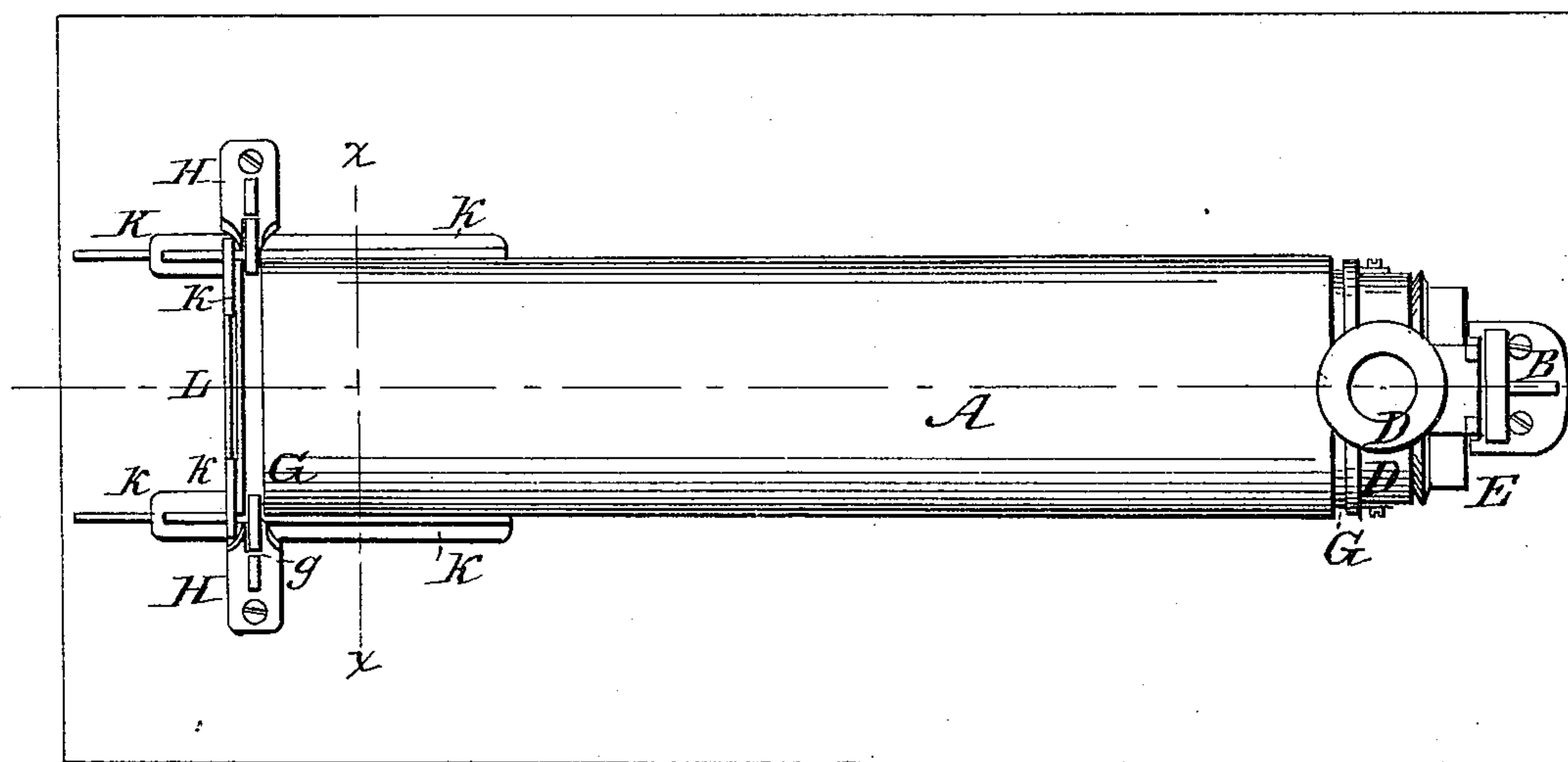


Fig. 2.



UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SALT-EVAPORATORS.

Specification forming part of Letters Patent No. 14,813, dated May 6, 1856.

To all whom it may concern:

Be it known that we, B. L. HOOD and E. P. MONROE, the former of the city and county of Albany, and State of New York, and the latter of Charlestown, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Apparatus for Evaporating Salt or Saline Water, Lye, and other Liquids, which we denominate the "Rotary Evaporator;" and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of the apparatus, showing its internal structure and the location of the fire-box, black arrows exhibiting the course of the fluid through the apparatus, and red arrows showing the direction of the flame and smoke. Fig. 2 is a top view of the apparatus. Fig. 3 is a vertical section perpendicular to axes of cylinders, taken on line $x x$, looking toward the mouth of exterior cylinder and showing fire-box.

Similar characters of reference in the several figures denote the same part of the apparatus.

The object of our invention is the construction of apparatus for obtaining an extended evaporating-surface with a small supply of fuel, as well as to cause the evaporation to take place from the weaker portion of the liquid exposed to the evaporating-surface.

The nature of the invention consists in constructing the apparatus of two concentric cylinders with the space between them serving for the passage of the heat, and causing the concave surface of the inner cylinder and the convex surface of the outer cylinder to become the evaporating-surfaces, the inner cylinder being furnished with a central feed-pipe discharging the fluid at its inner extremity into the interior of the inner cylinder, whence it flows into a pan beneath, in which a portion of the surface of the outer cylinder is immersed. The operation is performed by the rotation of the entire cylindrical system, substantially as and with the effect to be set forth.

In the drawings, A is the external evaporating-cylinder.

B is the support of the cylindrical system and of the smoke-pipe.

C is the projecting portion of the central

feed-pipe, R, formed into a pulley, to which the rotating power is applied. A groove in this projecting portion of feed-pipe rests on support B, and thus constitutes one of the bearings of the cylindrical system.

D is the smoke-pipe, which encircles the space between the outer and inner cylinders, so that the smoke will pass, as shown by red arrows.

E is the pan containing the liquid to be evaporated by the external cylinder.

F is the end of the inner cylinder after it passes through the smoke-channel. It has a flange rising above the inner surface of the cylinder, so as to cause a certain amount of liquid to remain in the interior of the cylinder while the surplus discharges into pan E.

G is the end of outer cylinder tightly fitting under flange of smoke-passage, as shown in Fig. 1, to prevent the liquid from running into the smoke-channel from pan E.

H H are the supports for the front end of the cylindrical system. Each support has a friction-roller, g , entering groove G' of outer cylinder, and constituting the front bearing of the rotary system.

K K are the supports of the fire-box N.

L is the grate, and M is the ash-pit. The fire-box is so constructed as to traverse short rails, and is thus rendered capable of being withdrawn from the cylinder, either for replenishing the fuel or to prevent burning on the stoppage of rotation.

The inner cylinder, P, is connected with the outer cylinder by stays, which unite them without obstructing the draft-passage. The feed-pipe R is connected with the inner cylinder by stays at the smoke-stack end, and by junction with the head of the cylinder at the inner end, openings a being made in the said pipe for the passage of the liquid.

The operation of the apparatus is as follows: The liquid to be evaporated is introduced through pipe R and passes to pan E, as shown by black arrows. The fire being made, the fire-box N is run into the cylinder A. Power is then applied to pulley C, rotating the entire cylindrical system. The flame and heat passes, as shown by red arrows, and finds exit by pipe D. In its course this current heats both outer and inner cylinders from the side opposite to that in contact with the liquid, causing both cylinders to become effective in

the evaporating operation in the following manner: The liquid in passing through the inner cylinder is to some extent evaporated thereby before passing to the pan E, where the outer surface of the outer cylinder is constantly effecting evaporation from the portion of the liquid at the top of said pan. The residuum of each partial evaporation effected by this cylinder being of greater specific gravity than the body of liquid at the surface of the said pan, at once sinks to such a position as will preserve it *in equilibrio*, the higher or weaker portion of the liquid remaining at the top of the pan, thus causing the weaker portion of the liquid to be at all times presented to the evaporating-surface. In this manner the operation will continue until the desired salt is obtained in the bottom of pan E. Whenever the rotation is suspended the fire-box is immediately withdrawn, so that the liquid adhering to the cylinders may not be evaporated to dryness and, by burning, injure the product of evaporation and the apparatus.

The advantages may be thus stated: An ex-

tended evaporation-surface is obtained for economy of fuel, and from the nature of the evaporating-surfaces and the manner in which the liquid is presented they act continually on its weaker portion.

What we claim as our invention, and desire to secure by Letters Patent, is—

The construction of evaporating apparatus of two concentric rotary cylinders supplied with liquid, heated, and operating, substantially as set forth, to effect evaporation from the weaker portion of the liquid and economize fuel.

In testimony whereof we have hereunto signed our names before two subscribing witnesses.

BENJ. L. HOOD.

E. P. MONROE.

Witnesses to signature of B. L. Hood:

E. W. FORD,

WM. M. NETTEVILLE.

Witnesses to signature of E. P. Monroe:

GEO. PATTEN,

W. CROSSFIELD.