

No. 702,994.

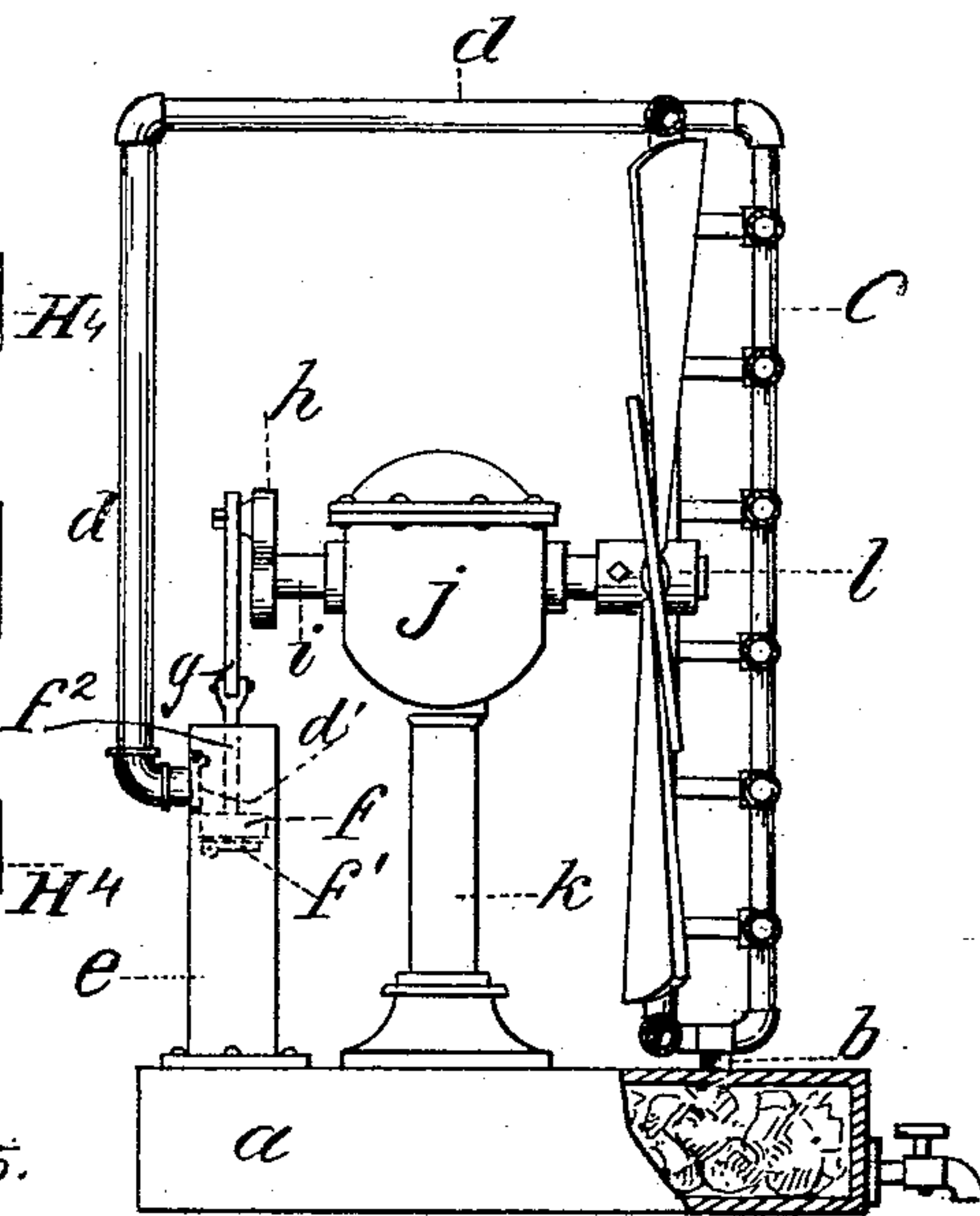
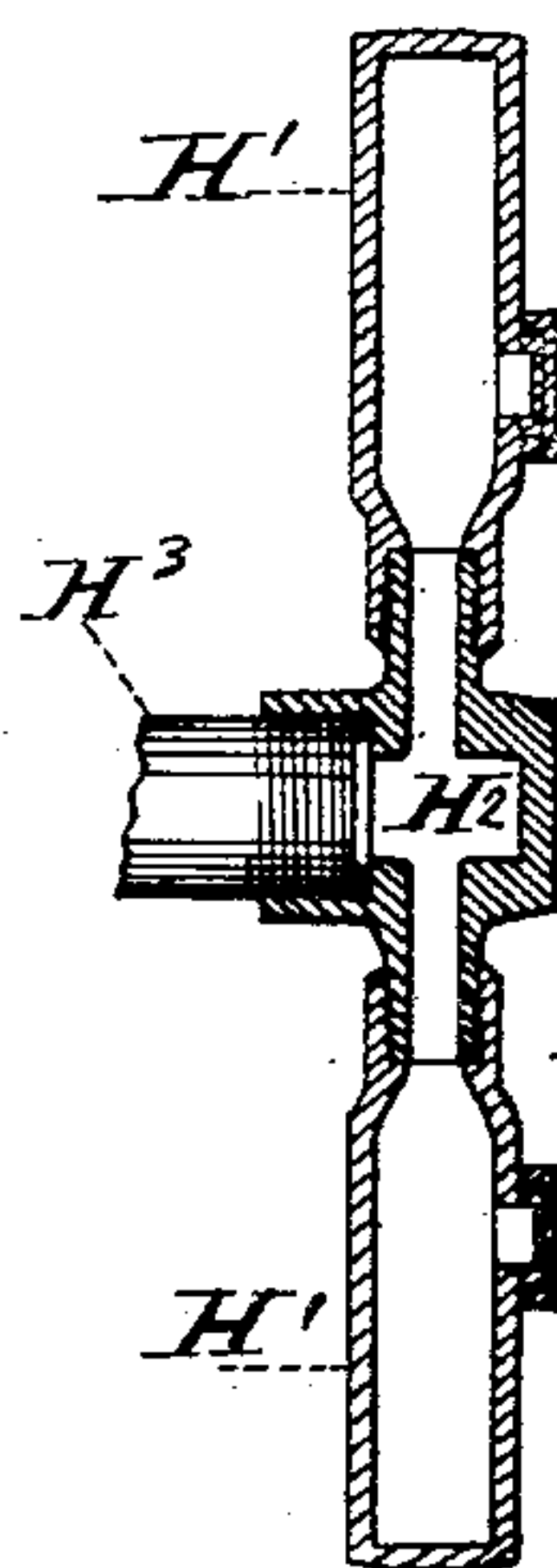
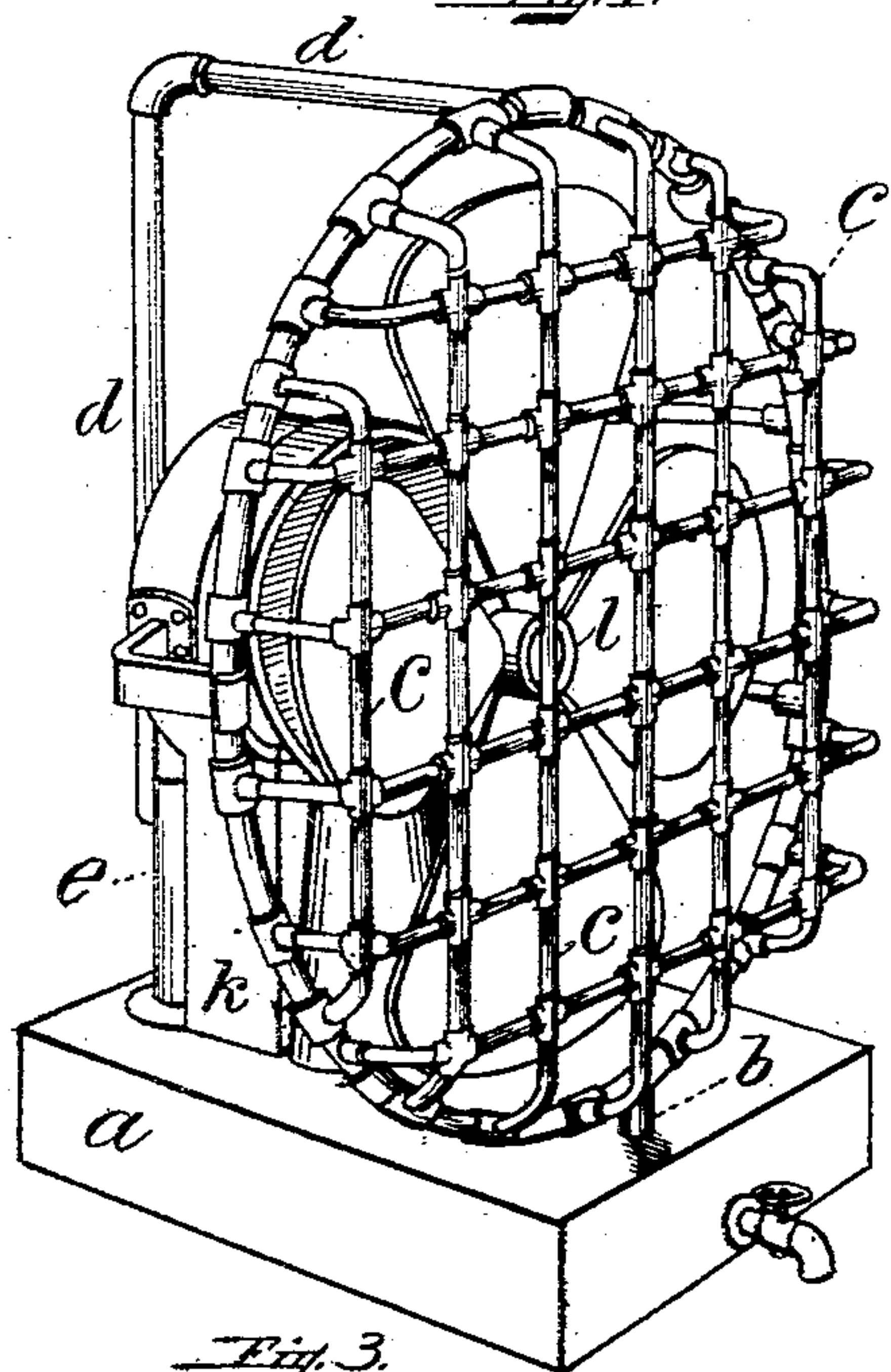
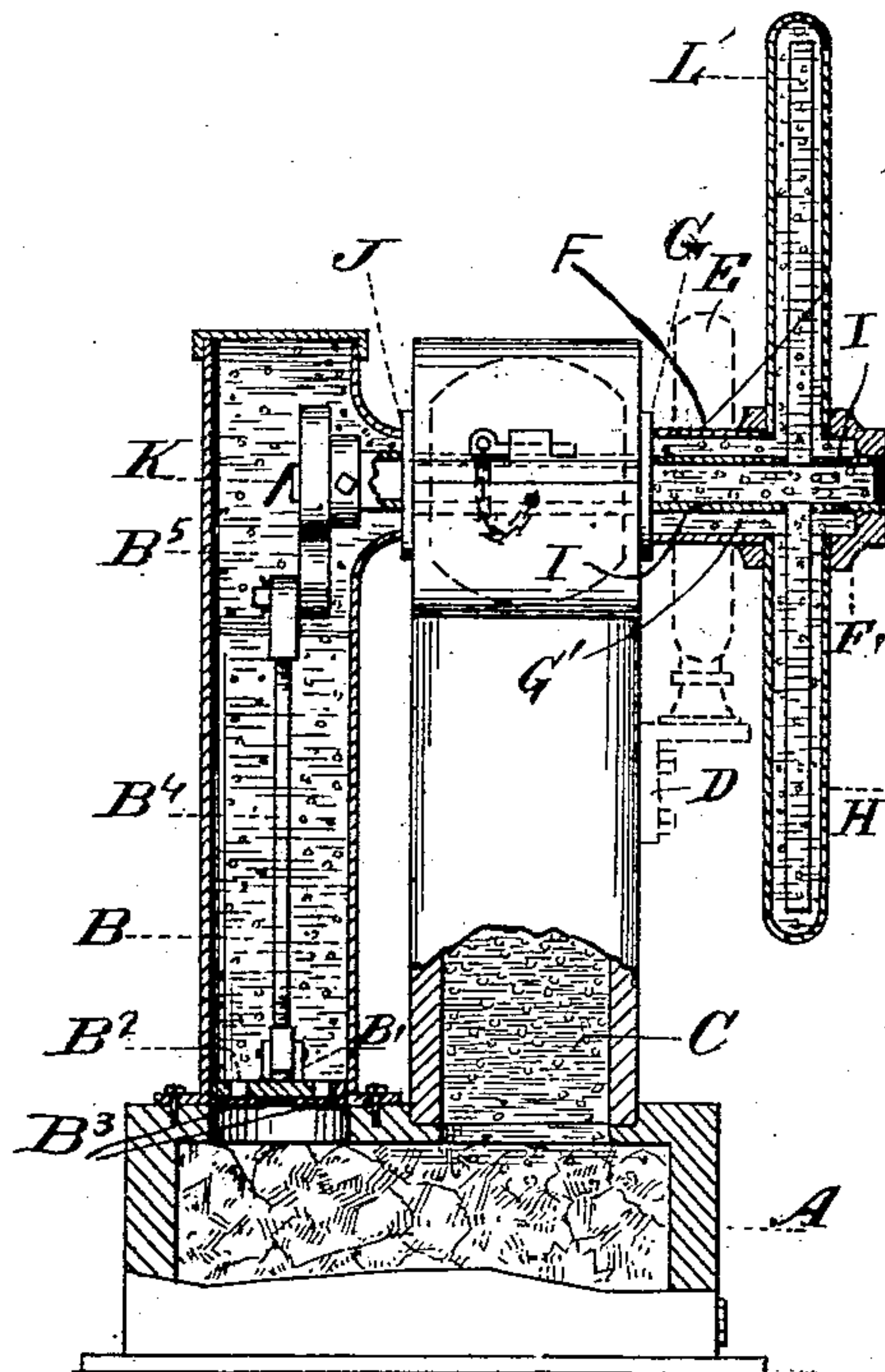
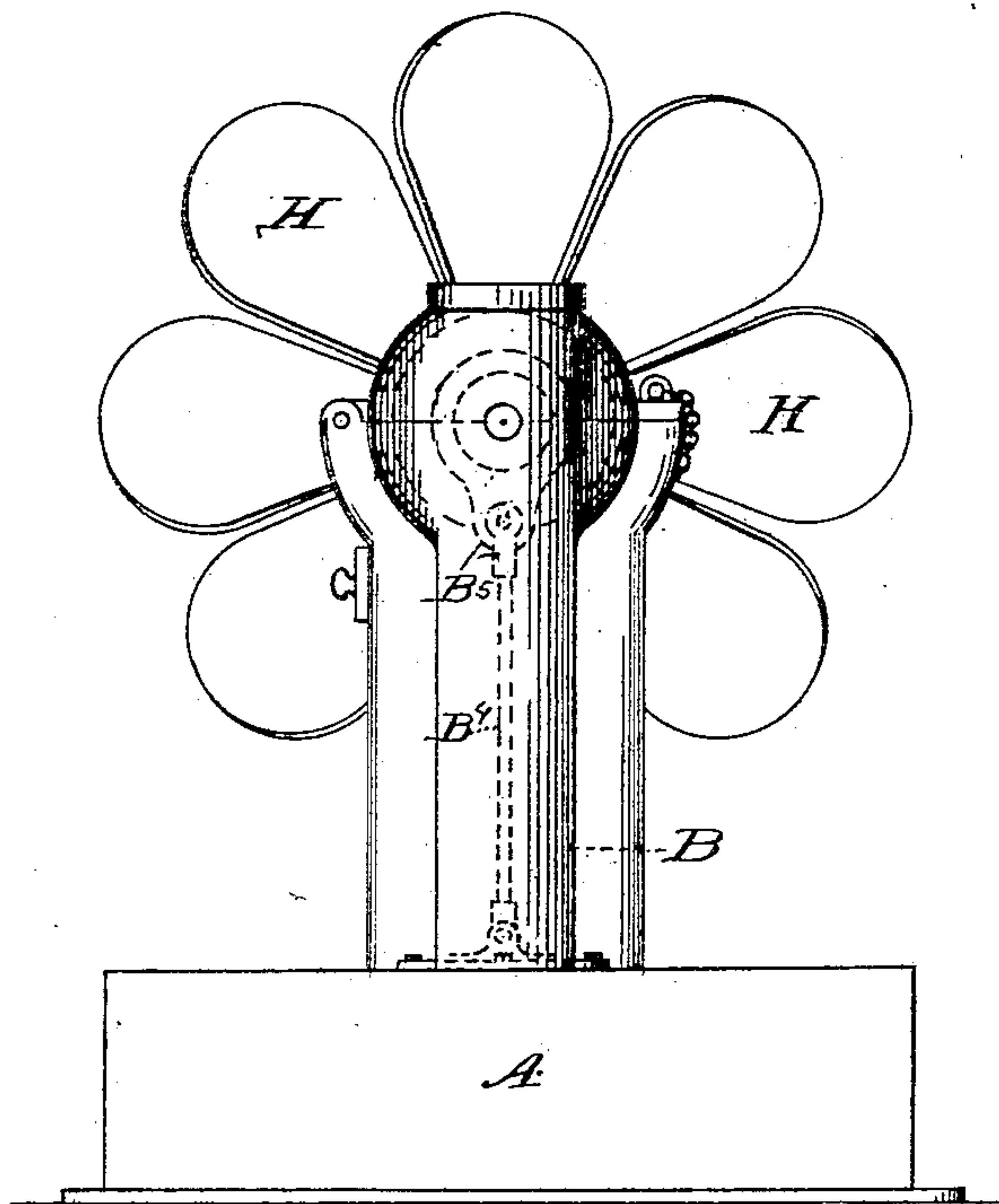
Patented June 24, 1902.

E. F. PORTER.

APPARATUS FOR COOLING AND AGITATING AIR.

(Application filed Dec. 20, 1897.)

(No Model.)



Witnesses:  
A. L. Messer  
C. V. Stewart

Inventor:  
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By J. S. Rusk  
Att'y



# UNITED STATES PATENT OFFICE.

EDWIN F. PORTER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE BAY STATE ELECTRIC HEAT & LIGHT COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## APPARATUS FOR COOLING AND AGITATING AIR.

SPECIFICATION forming part of Letters Patent No. 702,994, dated June 24, 1902.

Application filed December 20, 1897. Serial No. 662,540. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN F. PORTER, a subject of the Queen of Great Britain, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Cooling and Agitating Air, of which the following is a specification.

My invention relates to an apparatus for cooling and agitating air; and its object is to bring a volume of air into contact with surfaces which have been artificially cooled and then to circulate said air throughout an apartment for the purpose of lowering the temperature.

In carrying out my invention I circulate a cooling medium through a confining-chamber, the walls of which form cooling-surfaces and with which the air is brought in contact, lowered in temperature, and then circulated throughout the apartment to be cooled.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate constructions in which my invention is embodied, Figures 1 and 2 represent, respectively, a rear and a side elevation of an apparatus, with Fig. 2 partly in section to show the interior construction. Figs. 3 and 4 represent, respectively, perspective and side elevations of a modified construction in which the cooling medium is not circulated through the hollow blades, but through pipes forming a surface and located in proximity to the fan. Fig. 5 a detail sectional view of a fan in which the hollow blades are filled with a cooling medium.

Referring to Figs. 1 and 2, within a suitable hollow base A there is placed a suitable cooling medium, and communicating with said medium and secured to said hollow base are two hollow chambers B and C. Upon one side of the chamber C is a bracket D, supporting an electric or other motor E, (shown in dotted lines,) which is adapted to revolve the shaft F, which enters and communicates with the upper end of the chamber C through the stuffing-box G, and its opposite end terminates

in the hub F'. Within said hollow shaft F is a hollow shaft I, secured at its outer end to the hub F' and passes rearwardly through the top of the chamber C, through the stuffing-box J, and opens into the top of the chamber B, and a suitable check-valve K closes the end of the hollow shaft within the chamber B, which is supported over the chamber C by the stuffing-box J. An annular space is provided between the inner and outer shafts I and F, providing a passage G' for the cooling medium to pass through the chamber C into the hollow blades H, from which it returns through the tubes L to the inner hollow shaft I and then to the chamber B, from which it returns to the chamber A through the ports B<sup>2</sup> of the piston B', which ports are controlled by suitable flap-valves B<sup>3</sup>, which open as the plunger B' ascends to allow the return medium to pass into the chamber A. To the top of the plunger B' there is pivotally connected the connecting-rod B<sup>4</sup>, which at its upper end is pivotally connected to the eccentric-crank B<sup>5</sup>, fixed fast on the hollow inner shaft I and adapted in the revolution of the shaft to raise and depress the plunger B' in the chamber B, causing the circulation of the cooling medium from the chamber A through the chamber C, passage G', into the hollow blades H, and then from said blades returning through the tubes L, hollow shaft I, chamber B, back to the chamber A. As the shaft F is operated by the motor E and the shaft I is fixed fast to the hub of the shaft F, it follows that as the outer shaft F revolves the inner shaft I revolves, and with it the eccentric which operates the plunger B'. The fan in revolving operates the plunger in the chamber B through the connections previously described, causing the cooling medium to circulate through the hollow blades, reducing the temperature, and thereby cooling the air, which is agitated by the fan and circulated throughout the apartment.

Referring now to Figs. 3 and 4, within the hollow chamber a there is placed a suitable cooling medium, such as salt and ice, the brine of which passes up through the tube b into and through a screen c, consisting of com-



communicating pipes, and rearwardly through the pipe *d* to a suitable pump *e*, discharging the medium drawn through the pipe *d* through the valve *d'*, where it returns to the hollow chamber *a* as the plunger *f* of the pump moves upwardly and the valve *f'* opens and the valve *d'* closes. A suitable check-valve closes the lower end of the pipe *d* where it enters the pump to prevent return of the medium as the plunger ascends, but is adapted to open as the plunger *f* descends to allow the flow of the medium into the pump. A suitable connecting-rod *g* is pivotally connected to the eccentric-crank *h* and also to the piston-rod *f*<sup>3</sup>, fast on the shaft *i*, which is operated by a suitable motor *j*, supported by the stand *k*, resting on the base *a*. On the front end of said shaft there is fixed fast the fan *l*, having a number of blades which are adapted to revolve in the revolution of the fan *l*. In this construction the fan in revolving through the connections previously described operates the pump, causing the circulation of the cooling medium through the screen, which cools the air as it passes through, being blown by the revolution of the fan, after which the air is circulated throughout the apartment for the purpose of lowering the temperature.

In Fig. 5 is illustrated in section two hollow blades *H'* of a fan which communicates with a hollow hub *H*<sup>2</sup>, in which is fixed fast a solid shaft *H*<sup>3</sup>, which may be operated by a suitable motor to cause the revolution of the blades *H'* of the fan, which blades are secured fast, as shown, to the hub *H*<sup>2</sup>. In each blade there is an opening provided with a cover *H*<sup>4</sup> for the purpose of removing and refilling the hollow blades with the cooling medium. In this construction there is no circulation of the cooling medium; but the same is retained permanently in the blades until exhausted, and then a new supply is substituted. In all the constructions the object is to cool the air in an apartment by means of a cooling medium. To accomplish this, I use a fan for the purpose of bringing air in the apartment into contact with metallic surfaces cooled by a cooling medium. Thus the temperature of the air is lowered and by the

revolution of the fan circulated throughout the apartment. 50

By reason of the revolution of the fan a greater and more rapid cooling effect is produced on the temperature than would be the case if the air were allowed to circulate against a cooling surface by means of its specific gravity and a more equable temperature is produced. 55

I do not limit myself to the arrangement and construction shown, as the same may be varied without departing from the spirit of my invention. 60

Having thus ascertained the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is— 65

1. In an apparatus of the class described, a rotatable fan for creating a current of air and having passages leading through the same, a receiver for containing a cooling medium, a chamber leading from said receiver and connected with the passages in said fan, a chamber leading to said receiver and connected with the passages in said fan, and means for forcing the cooling medium through the passages of the fan, the chambers and the receiver. 70

2. In an apparatus of the class described, a rotatable fan for creating a current of air, and having passages leading through the same, a receiver for containing a cooling medium, a chamber leading from said receiver and connected with the passages in said fan, a chamber leading to said receiver and connected with the passages of said fan, and a pump located in one of said chambers for forcing the cooling medium through the passages of the fan, the chambers and the receptacle. 80 85 90

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of December, A. D. 1897.

EDWIN F. PORTER.

Witnesses:

A. L. MESSER,  
C. A. STEWART.