

No. 679,696.

J. H. J. HAINES.  
ICE MACHINE.

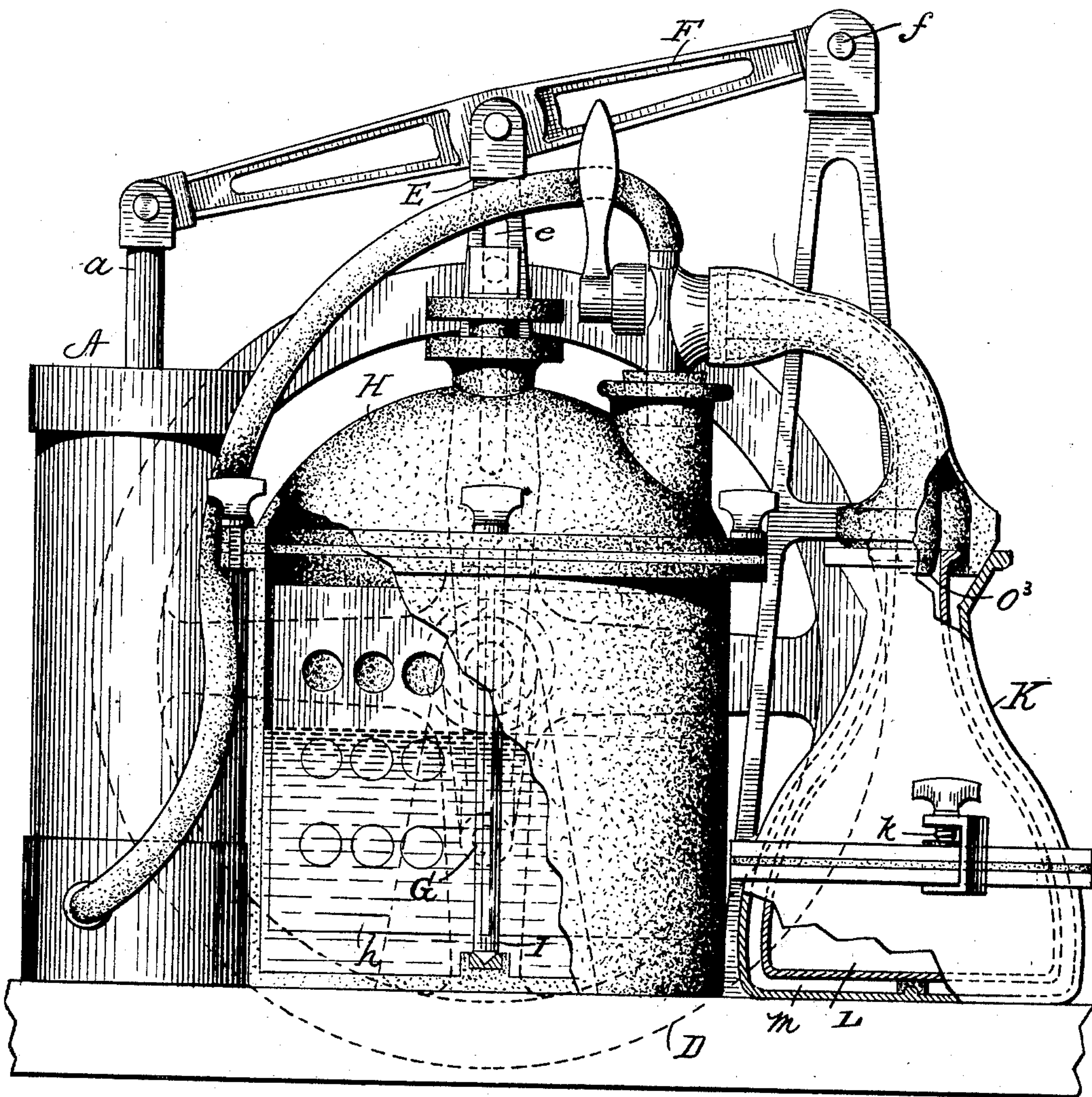
Patented July 30, 1901.

(No Model.)

(Application filed Mar. 20, 1901.)

3 Sheets—Sheet 1.

Fig. 1.



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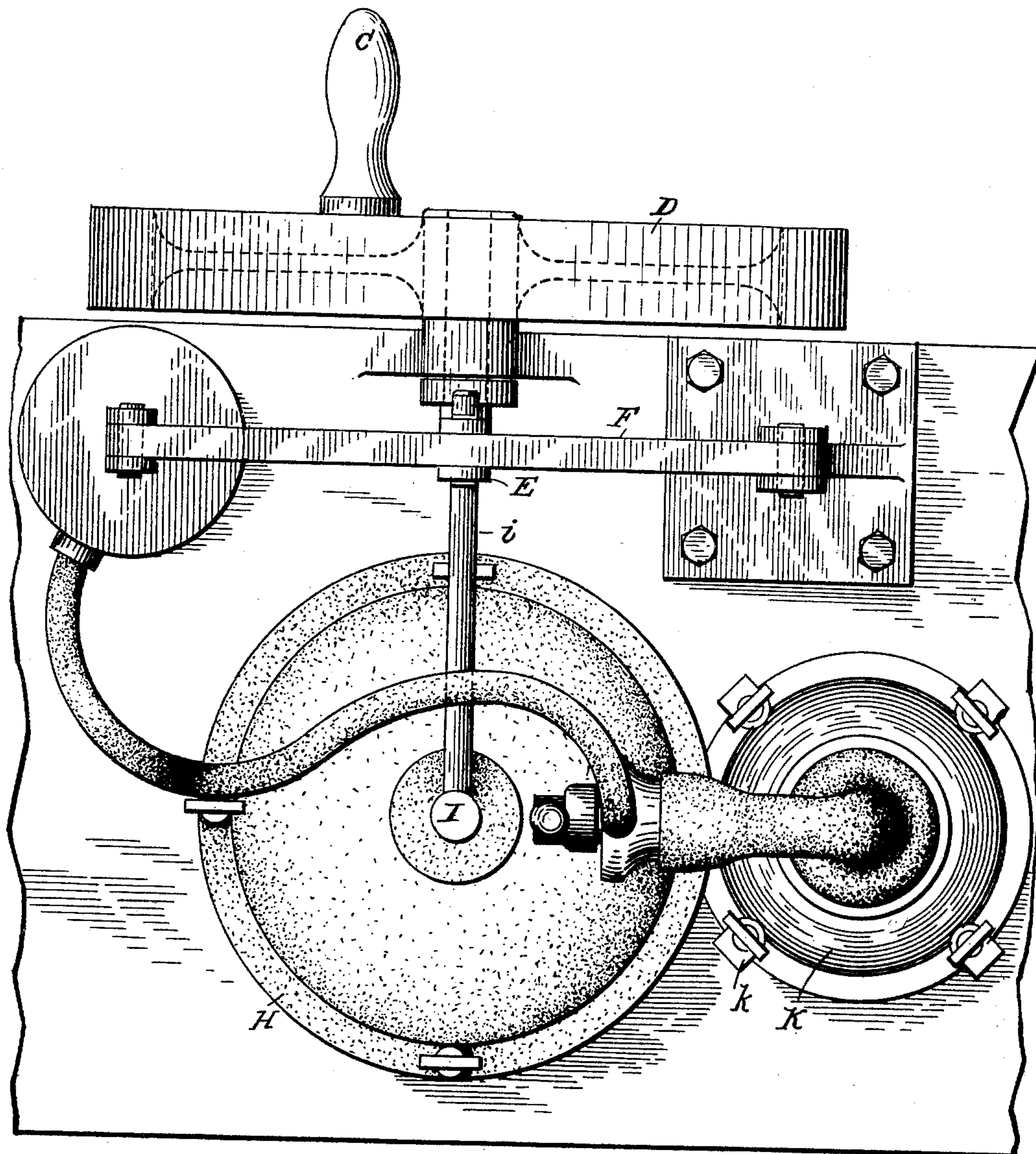
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3 Sheets—Sheet 2.

Fig. 2.



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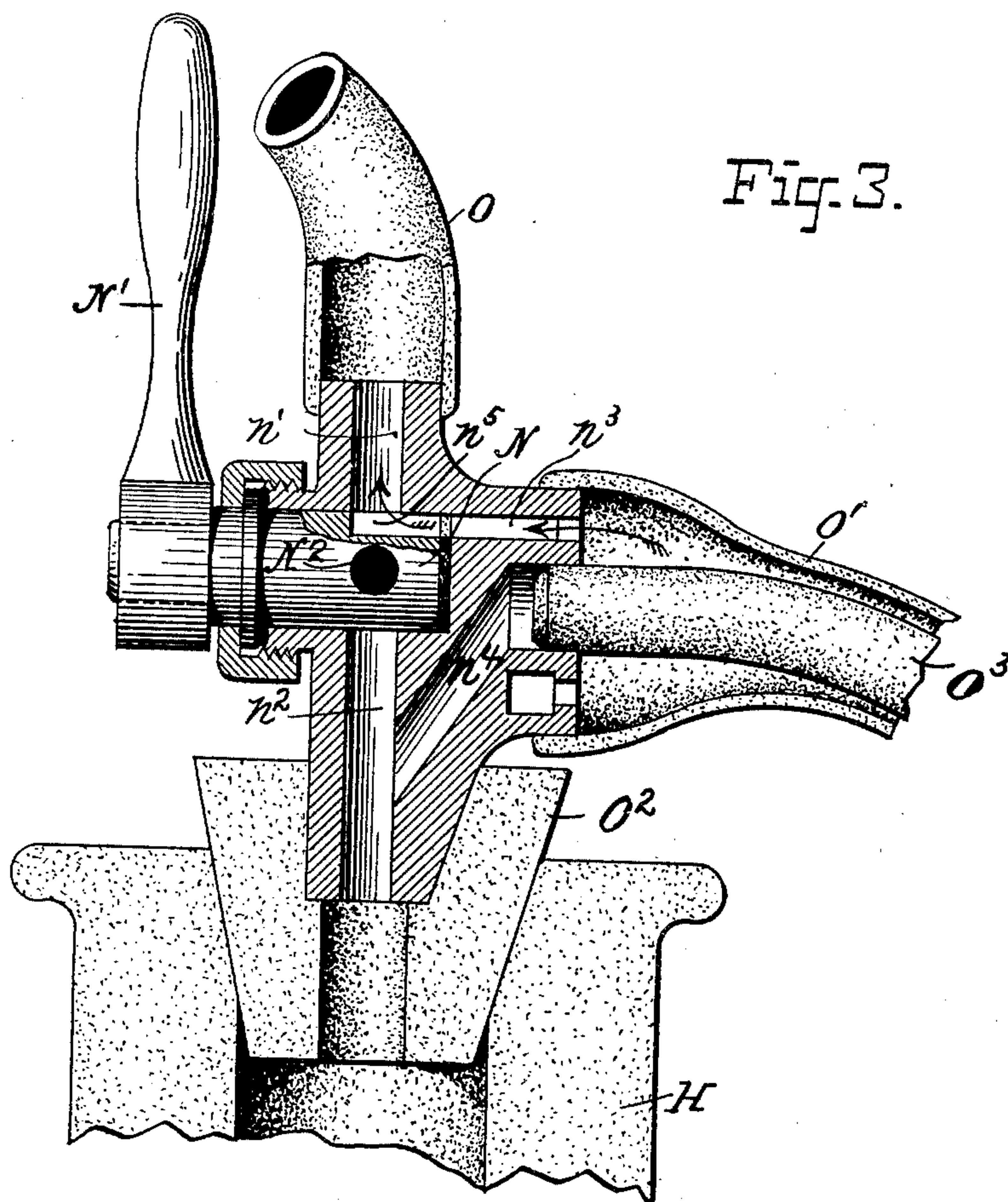
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

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## ICE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 679,696, dated July 30, 1901.

Application filed March 20, 1901. Serial No. 52,079. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. J. HAINES, of the city and State of New York, have invented a new and useful Ice-Machine, which is fully set forth in the following specification.

This invention relates to the construction of ice-machines, and more particularly to that class of ice-machines wherein low temperature is produced by means of a hygroscopic substance (such as sulfuric acid) and a vacuum. This method, while practical and effective, has not up to the present time, so far as I am aware, been brought within commercially economic limits, and the object of my invention is to provide an apparatus wherein ice can be manufactured or low temperatures produced for other purposes in an economical manner.

The improvements embraced in the invention can best be explained in connection with the accompanying drawings, wherein—

Figure 1 is an elevation of an apparatus constructed in accordance with the invention. Fig. 2 is a top plan view thereof, and Fig. 3 is a vertical section of the valve controlling communication between the elements of the system.

In the drawings, A represents the cylinder of a vacuum-pump, and *a* its piston-rod. The pump may be of ordinary construction and operated in any suitable way. As shown, the operating means consist of a hand-crank C, attached to a fly-wheel D, and a pitman E, connected at its upper end to the pump-lever F, (pivoted at *f*), and at its lower end connected to wheel D at G. (See dotted lines, Fig. 1.)

H represents the vessel containing the sulfuric acid or other material which has a strong avidity for moisture. Within this vessel is an agitator, shown as formed of perforated plates *h*, attached to an upright shaft I. At its upper end this shaft has a horizontal arm or pin *i*, which passes freely through a slot *e* in pitman E. The vertical shaft I, stepped in a bearing in the bottom of the vessel, is shown in Fig. 1, and the horizontal arm *i*, attached to the shaft I and extending into the vertical slot *e* in pitman E, is shown in Fig. 2. The pitman E, being ec-

centrically connected to wheel D, has an oscillatory movement as well as a reciprocatory movement. The oscillations of pitman E will consequently impart an oscillatory movement to the agitator *h*. The agitator may of course be of any convenient description.

K represents the refrigeration or ice chamber. It is preferably formed in two parts united in a horizontal plane by screw-clamps *k* or otherwise, so that the upper part can be removed for inserting and removing the vessel L, in which the ice is to be formed. This vessel is herein shown as a carafe, such as is used in restaurants, the entire apparatus being of a form and description suitable for freezing water in such vessels. The forms and details generally may obviously be modified according to the specific use for which the machine is designed.

Between the outer vessel K and inner vessel L is a space *m*. In the operation of the machine a vacuum is formed in this space, it being found that the production of freezing temperature in vessel L is thereby greatly expedited. Vessel L is thus insulated by a vacuum.

The cock or valve N controls communication between the pump-cylinder and the vessels or chambers H, L, and *m*. The casing of valve N has three ports. Port *n'* leads by pipe O to the pump-cylinder, port *n*<sup>2</sup> leads through plug O<sup>2</sup> to the vessel H, and port *n*<sup>3</sup> leads by pipe O' to vessel K—that is to say, to the vacuum-space *m* between vessels K and L. The ice chamber or vessel L leads by pipe O<sup>3</sup>, inclosed in pipe O', and by passage *n*<sup>4</sup> to port *n*<sup>2</sup>. Consequently the vessel H and ice-chamber L are simultaneously connected with and disconnected from the pump.

In the position of the parts shown in Fig. 3 the vacuum-space *m* within vessel K is in communication with the pump-cylinder by way of pipe O', port *n*<sup>3</sup>, groove *n*<sup>5</sup> in the valve-port *n'*, and pipe O. A few strokes of the pump-piston serve to exhaust the air from space *m*. Valve-handle N'' is then turned through an arc of ninety degrees, which puts ports *n'* *n*<sup>2</sup> into communication through the hole N<sup>2</sup> through valve N. The vessels H and L are thus simultaneously put into communi-



cation with the pump-cylinder, while vacuum-chamber *m* is sealed by the displacement of the grooves *n*<sup>5</sup> in the valve *N*.

In practical operation the machine herein  
5 described produces fifteen pounds of ice for one pound of acid.

Having now fully described my said invention, what I claim is—

1. In an ice-machine the combination of the  
10 ice-chamber, a vacuum-chamber inclosing the same, a vessel separate from said vacuum-chamber, for containing the absorbing material, an exhaust-pump, and means for putting  
15 said pump in communication with said ice-chamber, vacuum-chamber, and absorbing vessel.

2. The combination of the ice-chamber, the vacuum-chamber surrounding the latter, the absorbing vessel the latter being in free com-  
20 munication with the ice-chamber, the exhaust-pump, and means for putting said pump alternately in communication with said vacuum-chamber, and with said ice-chamber and absorbing vessel.

3. The combination of the exhaust-pump, 25 the ice-chamber, the vacuum-chamber surrounding the latter, the absorbing vessel, and the three-way valve having a port communicating with the pump, a second port communicating with the said vacuum-chamber, and 30 a third port communicating with the ice-chamber and absorbing-chamber.

4. The combination with the exhaust-pump, absorbing-chamber, ice-chamber and pipe connections between said chambers and pump, 35 of a vacuum-chamber inclosing the ice-chamber, and detachably connected with piping leading to said pump, and means for connecting the latter alternately to said vacuum-chamber, and with said ice-chamber and ab- 40 sorbing-chamber.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN H. J. HAINES.

Witnesses:

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