(No Model.) 3 Sheets—Sheet 1.

J. SEDLACEK.

REFRIGERATING MACHINE.

No. 602,199. Patented Apr. 12, 1898.

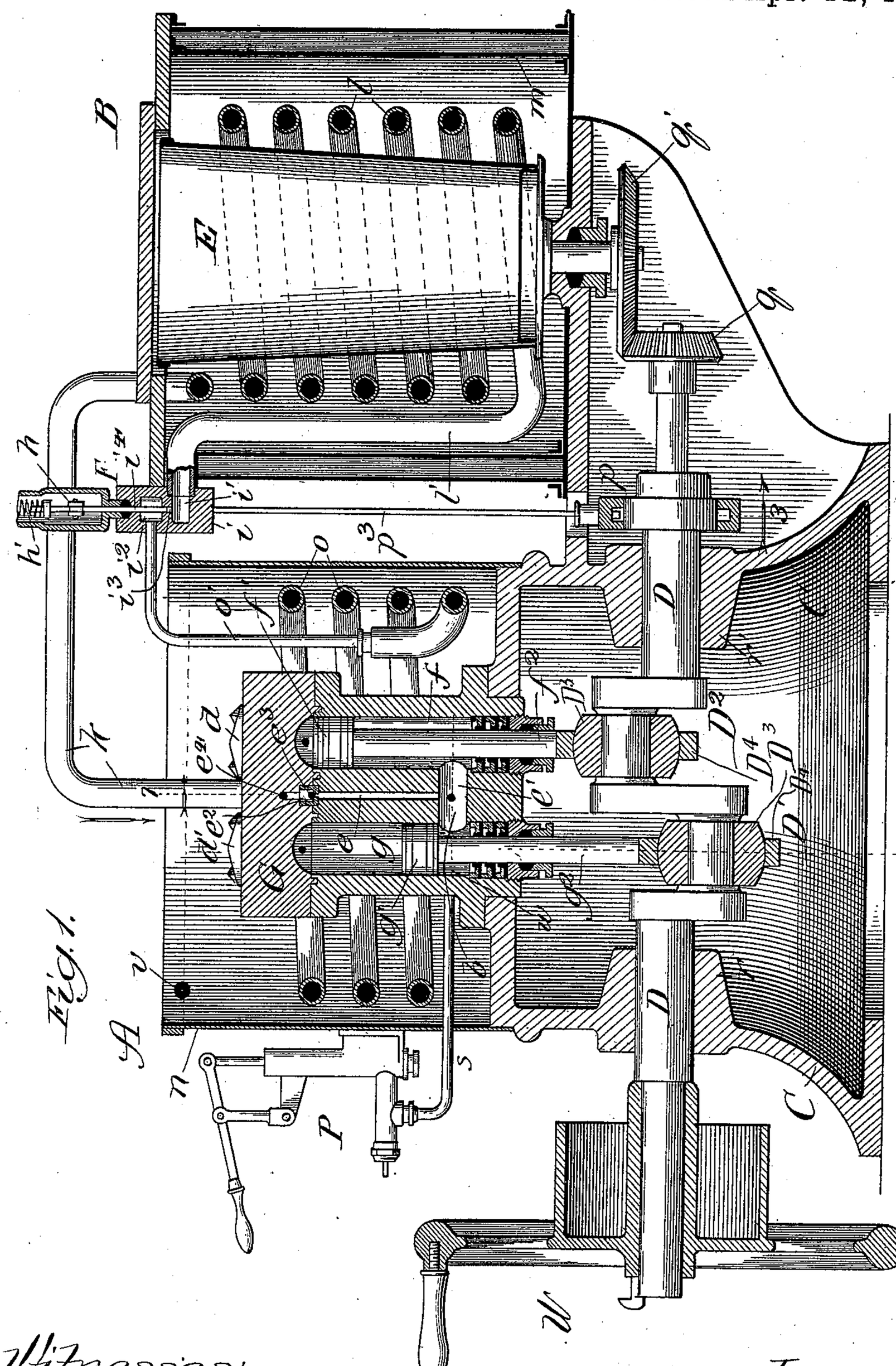

Fig. 1.

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Lute J. Miller.

Inventor:
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(No Model.) 3 Sheets—Sheet 2.

J. SEDLACEK.

REFRIGERATING MACHINE.

No. 602,199. Patented Apr. 12, 1898.

Fig. 3.

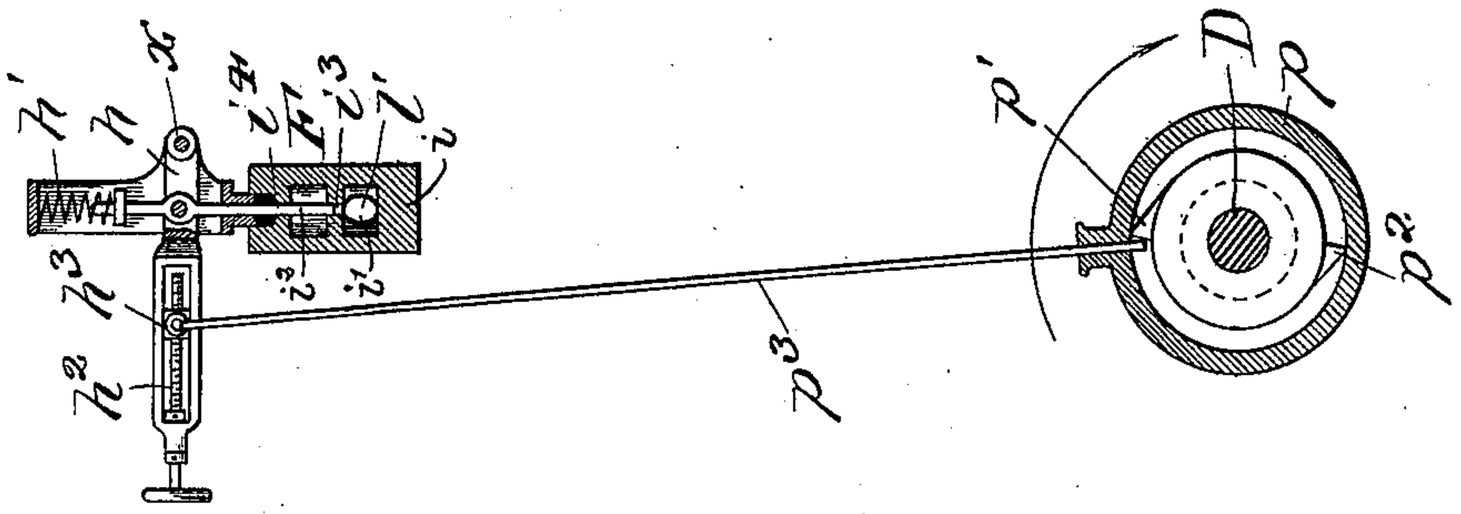
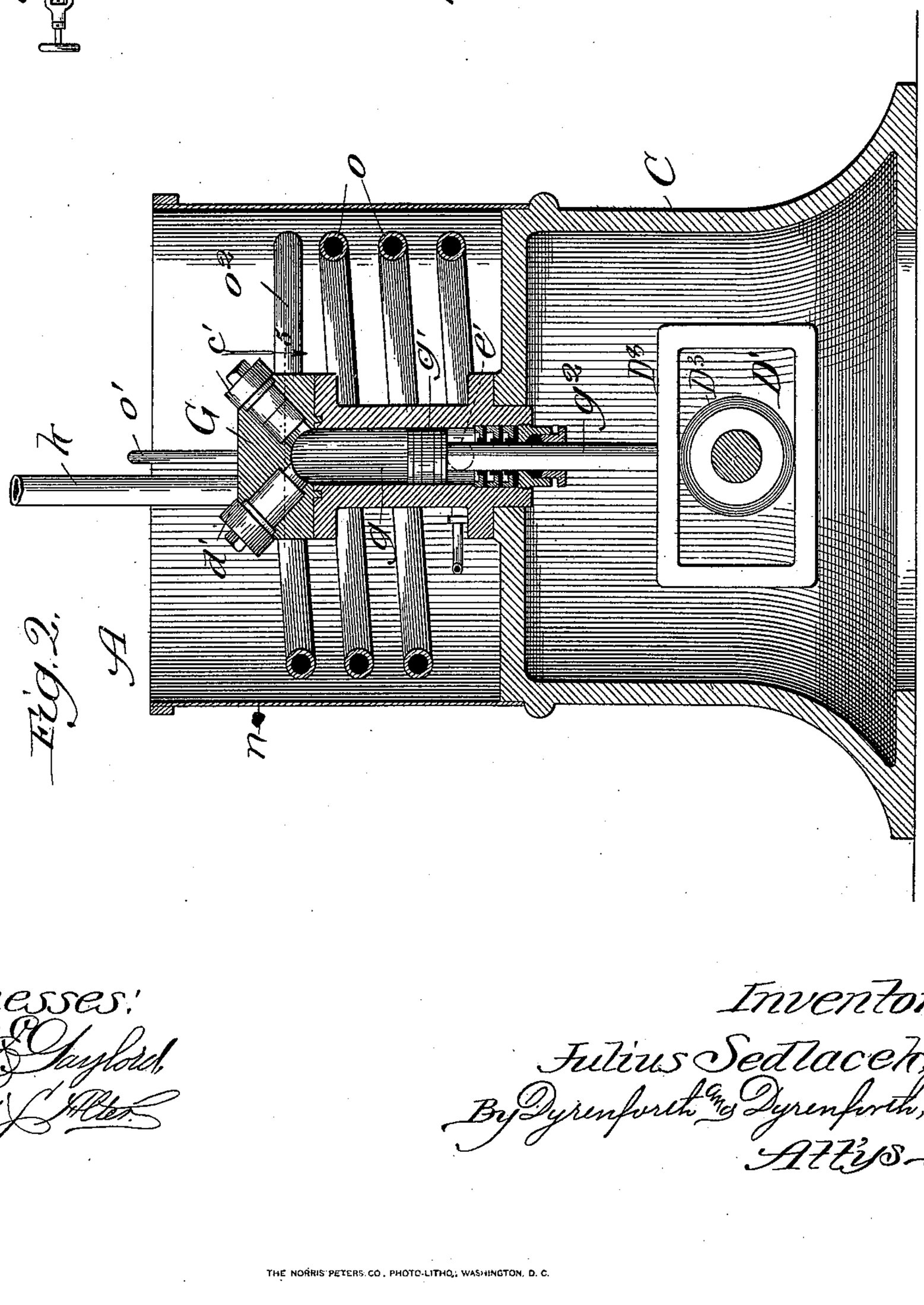


Fig. 2.



A

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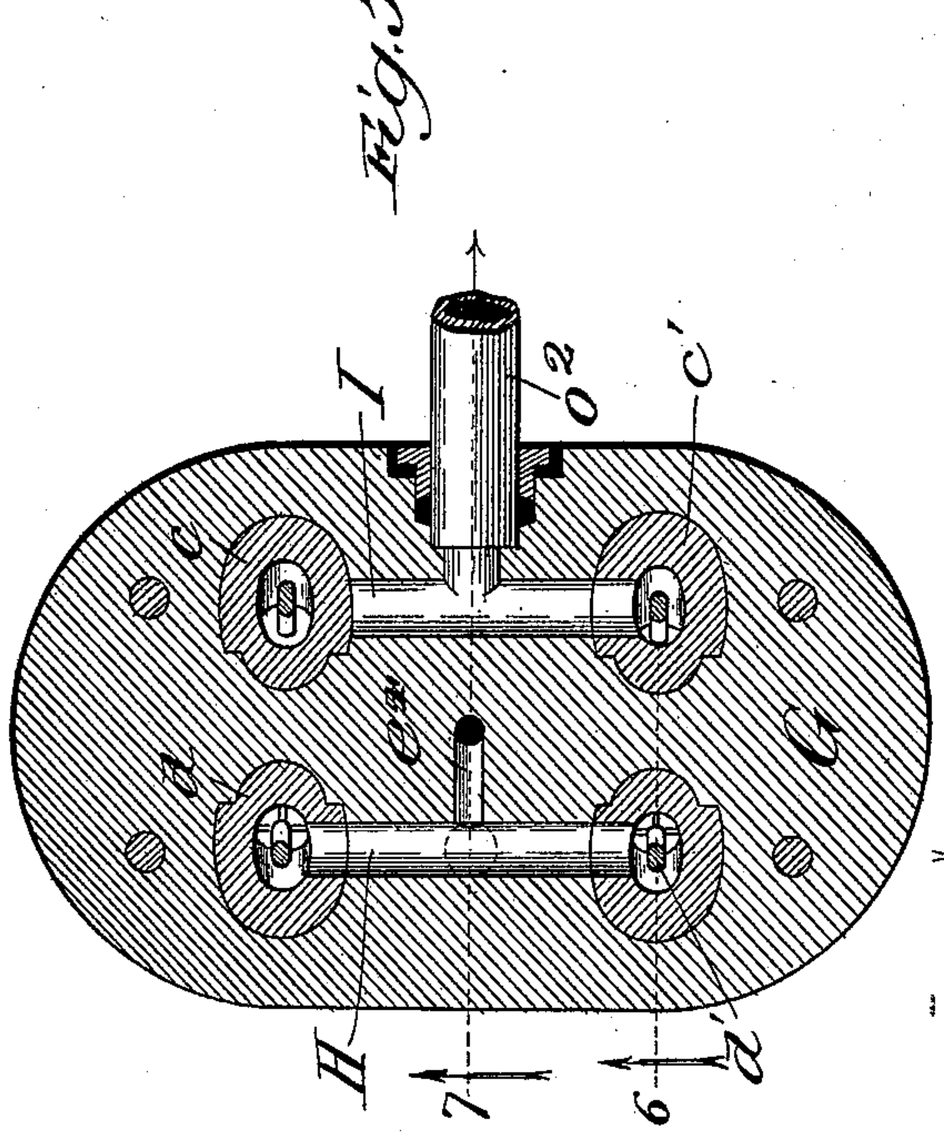
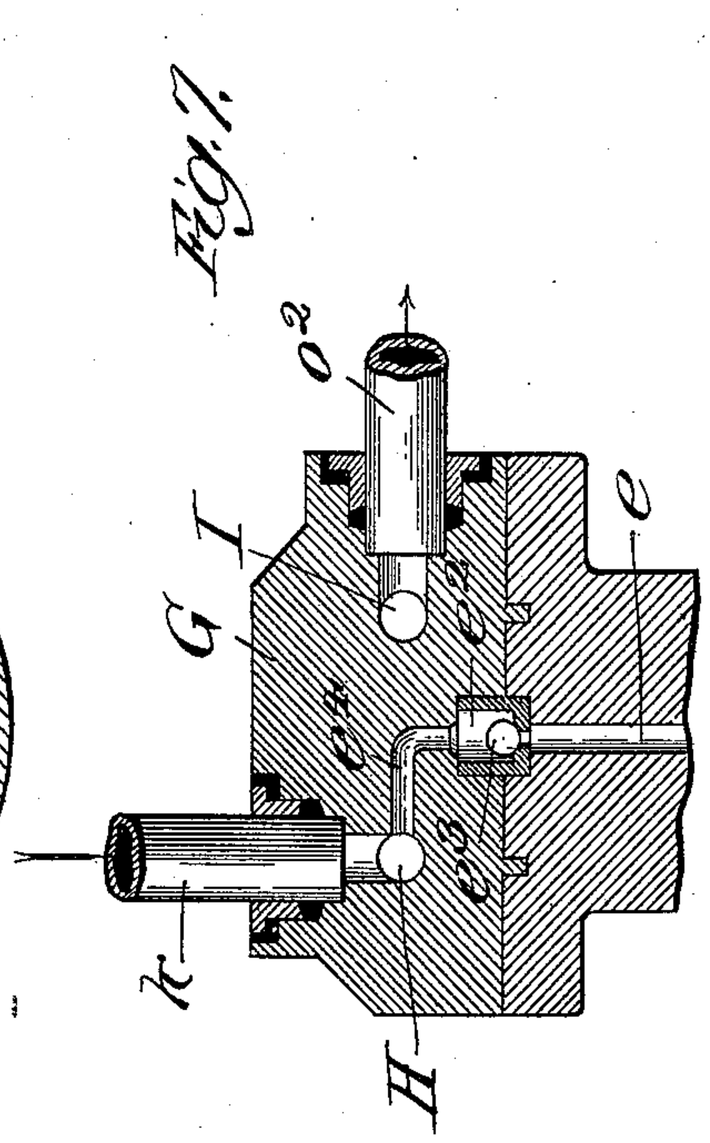
(No Model.) 3 Sheets—Sheet 3.

J. SEDLACEK.

REFRIGERATING MACHINE.

No. 602,199. Patented Apr. 12, 1898.





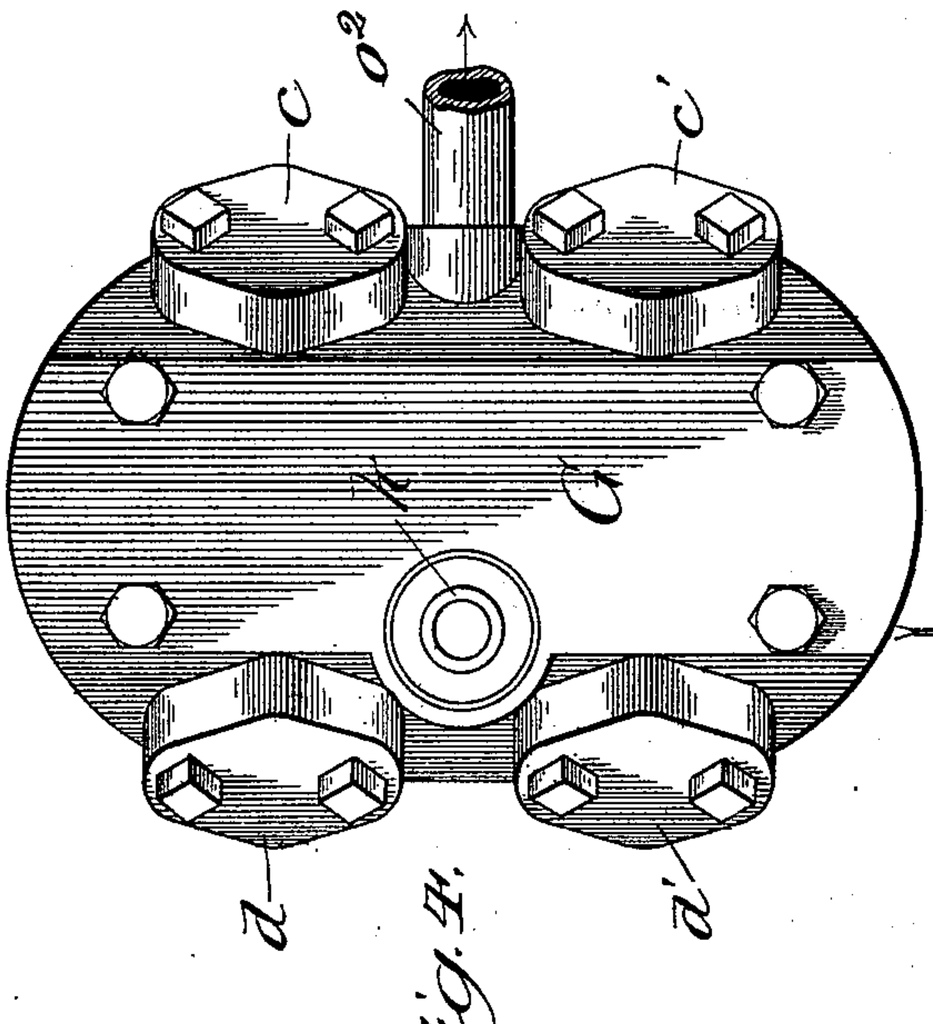


Fig. 4.

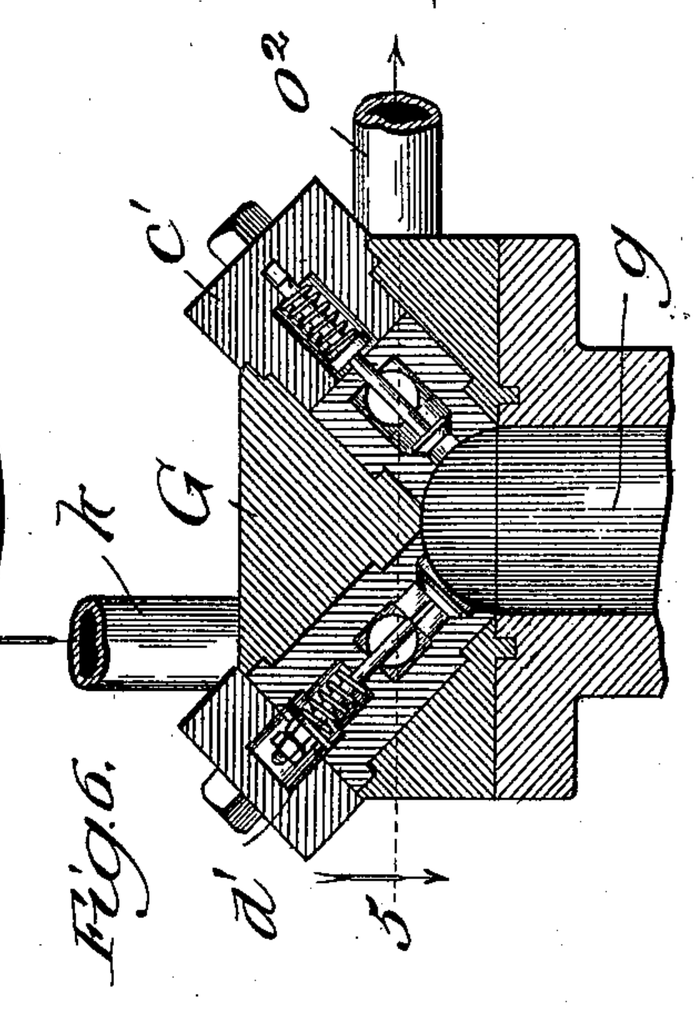


Fig. 6.

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UNITED STATES PATENT OFFICE.

JULIUS SEDLACEK, OF NUREMBERG, GERMANY.

REFRIGERATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 602,199, dated April 12, 1898.

Application filed February 26, 1897. Serial No. 625,128. (No model.) Patented in France December 21, 1892, No. 226,556; in Germany February 10, 1893, No. 82,733; in Italy March 28, 1893, No. 1,194; in Austria-Hungary May 6, 1893, No. 1,089 and No. 5,637, and August 30, 1893, No. 10,239; in Switzerland July 22, 1893, No. 7,363, and June 25, 1894, No. 8,798; in Belgium August 25, 1894, No. 85,843, and in England May 14, 1895, No. 9,530.

To all whom it may concern:

Be it known that I, JULIUS SEDLACEK, a subject of the Emperor of Austria-Hungary, residing at Nuremberg, Kingdom of Bavaria, Germany, have invented a new and useful Improvement in Refrigerating-Machines, (for which I have obtained patents in the following countries: Germany, No. 82,733, dated February 10, 1893; Great Britain, No. 9,530, dated May 14, 1895; France, No. 226,556, dated December 21, 1892; Switzerland, No. 7,363, dated July 22, 1893, and No. 8,798, dated June 25, 1894; Italy, No. 1,194, dated March 28, 1893; Belgium, No. 85,843, dated August 25, 1894, and Austria-Hungary, Nos. 1,089 and 5,637, dated May 6, 1893, and No. 10,239, dated August 30, 1893,) of which the following is a specification.

My invention relates to an improvement in the class of refrigerating or ice machines in which a gas liquefiable under mechanical compression, such as ammonia or carbonic-acid, is utilized to absorb by expansion the heat from a surrounding body to refrigerate or congeal the latter.

The primary object of my improvement is to provide means for preventing an excess of pressure of the gas which is forced past or behind the pump-piston by its action beyond the gas-pressure in the suction-chamber; and a further object is to prevent the lubricant for the pump from being forced by the action of the latter into the suction-chamber.

Referring to the accompanying drawings, Figure 1 is a view in vertical sectional elevation of a refrigerating-machine provided with my improvement; Fig. 2, a section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow; Fig. 3, a section taken at the line 3 on Fig. 1 and viewed in the direction of the arrow; Fig. 4, a top plan view of the section of the apparatus illustrated by Fig. 2; Fig. 5, a section taken at the line 5 on Fig. 2, viewed in the direction of the arrow and enlarged, or taken at the line 5 on Fig. 6 and viewed in the direction of the arrow; Fig. 6, a section taken at the line 6 on Fig. 5 and viewed in the direction of the arrow; and Fig. 7, a section taken at the line 7 on Fig. 1, viewed in the direction of the arrow and enlarged, or taken at the line 7 on Fig. 5 and viewed in the direction of the arrow.

The machine as shown is adapted to be operated by hand, though my improvement is applicable to the machine when arranged to be operated by other power.

A is the condenser.

B is the refrigerator, that shown being of the variety adapted for making ice.

The mechanism of the machine is supported on a suitable bed C, in which are provided bearings r and r' for a rotary crank-shaft D, containing the two cranks D′ and D². Each crank is surrounded by a sleeve D³, convex on its outer surface to fit the inner concave sides of a rectangular yoke D⁴, in which the thimble is confined and which is provided on the outer end of the piston-stem.

The shaft carries at one end means for driving it, shown as a crank-wheel W, and at its opposite end a beveled gear q, and just beyond the bearing r' there is provided on the shaft to rotate with it an eccentric p, carrying at diametrically opposite points the projections p' and p^2, affording strikers, Fig. 3.

The condenser A is formed with a tank n, rising from the bed C and containing the coiled pipe o. The refrigerator B is formed with a covered tank m, rising from the bed C and containing a coiled pipe l, surrounding a rotatable can E for the water to be congealed, the can being journaled at its bottom in the bed C and the journal carrying below the bed a beveled gear g', meshing with the gear q. The coil l is connected from its upper discharge end with the inlet end of the coil o by a suction-pipe k, and the discharge end of the coil o is connected by the pipe o', of reduced diameter, with a pipe l', affording the inlet to the coil l through an interposed valve device F. This valve device comprises a head i, containing the intercommunicating chambers i' and i^2, from the last-named of which the pipe l' leads, while the pipe o' leads into the chamber i^2. In the passage i^3 between the two chambers i' and i^2 there extends and closely fits therein a reciprocating valve i^4 in the form of a stem pivoted between its ends to a lever

h, fulcrumed on a suitable bearing at x, the valve being controlled by a spring h', confined against its upper end, tending to retain the valve normally in the passage i^3 to close it. The lever h carries an adjusting-screw h^2, working through a head h^3, confined in a longitudinal recess in the lever and carrying a rod p^3, which extends into the path of the strikers p' and p^2 on the eccentric p.

The function of the valve device F is to admit intermittently gas from the pipe o' into the pipe l' by the action of the eccentric in raising twice in each revolution the rod p^3 to raise accordingly the valve i^4 out of the passage i^3 and thereby open the latter, and by turning the screw h^2 to move the head h^3 toward or from the fulcrum x the extent of withdrawal of the valve may be decreased or increased according to desire to permit a lesser or a greater discharge of the gas.

In the condenser A and surrounded therein by the coil o is the compressor comprising a casting seated at its lower end in the bottom of the condenser afforded by the top of the bed C and containing the two chambers g and f, which communicate at their lower ends through the passage b, and the interposed vertical duct or by-pass e, which latter leads from a lubricant-chamber e' at its lower end in the passage b to a valve-chamber e^2, containing a valve e^3, preferably of the float-valve variety illustrated, the chamber being interposed between the duct and a passage e^4, communicating with the suction-pipe k. The passage e^4 and part of the chamber e^2 are formed in a head G, covering the chambers g and f. In the head G are cored out the suction-chamber H, into which the suction-pipe k leads, and the discharge-chamber I, from which the discharge-pipe o^2 leads to connect with the inlet end of the pipe-coil o. At opposite ends of the chamber H are provided the inwardly-opening spring-controlled suction-valves d and d', controlling the gas-supply from the pipe k to the chambers g and f, and at opposite ends of the chamber I are provided the outwardly-opening spring-controlled discharge-valves c and c', controlling the discharge from the chambers g and f to the pipe o^2. In the chambers g and f, respectively, are the pistons g' and f' on rods g^2 and f^2, extending through stuffing-boxes into the chambers and connected at their lower ends with the cranks D′ and D².

The opening shown at v in Fig. 1 is for the overflow of the condenser-water from the tank n, and at P is shown a pump for injecting the lubricant (as glycerin) into the chamber e', with which the pump communicates through a pipe s.

From the foregoing description of the mechanism the operation of the machine will be understood to be that of working the pistons g' and f' by turning the shaft D to alternately suck gas into the chambers g and f by their successive downstrokes and to force the gas by their successive upstrokes out through the discharge-pipe o^2, and turning the shaft furthermore regulates the supply of gas to the pipe l' and rotates the can E. As to the mechanism for these purposes, however, there is no novelty claimed in this connection. The gas which leaks or forces its way past each piston in its downstroke must be removed from underneath the pistons when its pressure reaches that of the pressure in the suction-chamber H. Then the accumulated gas below each piston enters the duct e by way of the chamber e' and escapes past the ball-valve e^3 into the passage e^4, whence it enters the suction-chamber, and any of the lubricant (the level of which is indicated at w in Fig. 1) that may be forced through the duct e will raise the valve e^3 against the mouth of the passage e^4, and thereby prevent the escape of the lubricant into the suction-chamber. Moreover, the position of the passage b enables the lubricant to afford a seal to the stuffing-boxes for the piston-rods g^2 and f^2.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a refrigerating-machine, the combination with the condenser and refrigerator of a suction-chamber into which the refrigerator-coil discharges, a discharge-chamber connected with the condenser-coil, a pair of piston-chambers having valve-controlled connection with said suction-chamber and valve-controlled connection with said discharge-chamber, pistons in said piston-chambers and oil-chambers therein behind the pistons, and a by-pass communicating at one end with said oil-chambers and provided with a float-valve having a seat above and below it, whereby gas is prevented from passing from the suction into said oil-chambers and whereby oil is prevented from entering the suction, substantially as described.

2. In a refrigerating-machine, the combination with the condenser and refrigerator of a suction-chamber into which the refrigerator-coil discharges, a discharge-chamber connected with the condenser-coil, a pair of piston-chambers intercommunicating through an oil-chamber at one end and each having a valve-controlled connection with said suction-chamber and a valve-controlled connection with said discharge-chamber, pistons in said piston-chambers, and a by-pass leading from said oil-chamber and provided with a float-valve having a seat above and below it, whereby gas is prevented from passing from the suction into said oil-chamber and whereby oil is prevented from entering the suction, substantially as described.

3. In a refrigerating-machine, the combination with the condenser and refrigerator of a compressor seated in the condenser-tank and surrounded therein by the condenser-coil, said compressor containing the piston-chambers g and f and communicating through an oil-chamber e', the head G of said compressor containing the suction-chamber H

into which the suction-pipe *k* leads, the discharge-chamber I communicating with said condenser-coil, the suction-valves *d* and *d'* and discharge-valves *c* and *c'*, pistons *g'* and *f'* in said piston-chambers, and a by-pass *o* leading from said oil-chamber to said suction-chamber and provided with a float-valve e^3 having a seat above and below it, whereby gas is prevented from passing from the suction into said oil-chamber and whereby oil is prevented from entering the suction, substantially as described.

JULIUS SEDLACEK.

In presence of—
DANIEL MEINECKE,
OSCAR BOCK.