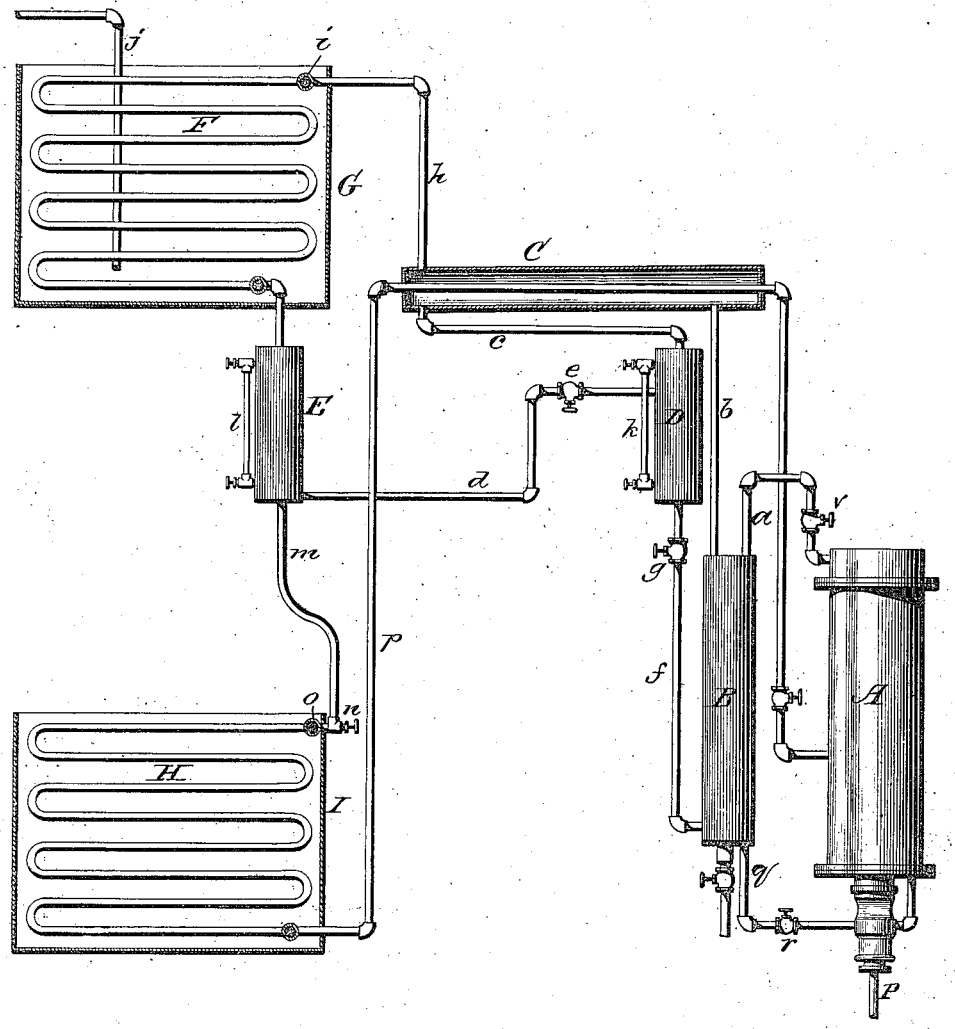
(No Model.) 2 Sheets—Sheet 1.

J. SCHUEHLE.

ICE MACHINE.

No. 342,543. Patented May 25, 1886.

Fig. 1.



Witnesses:
Chas. J. Williamson.
L. L. Miller.

Inventor:
Jacob Schuehle.
per Chas. H. Fowler
Attorney

(No Model.) 2 Sheets—Sheet 2.

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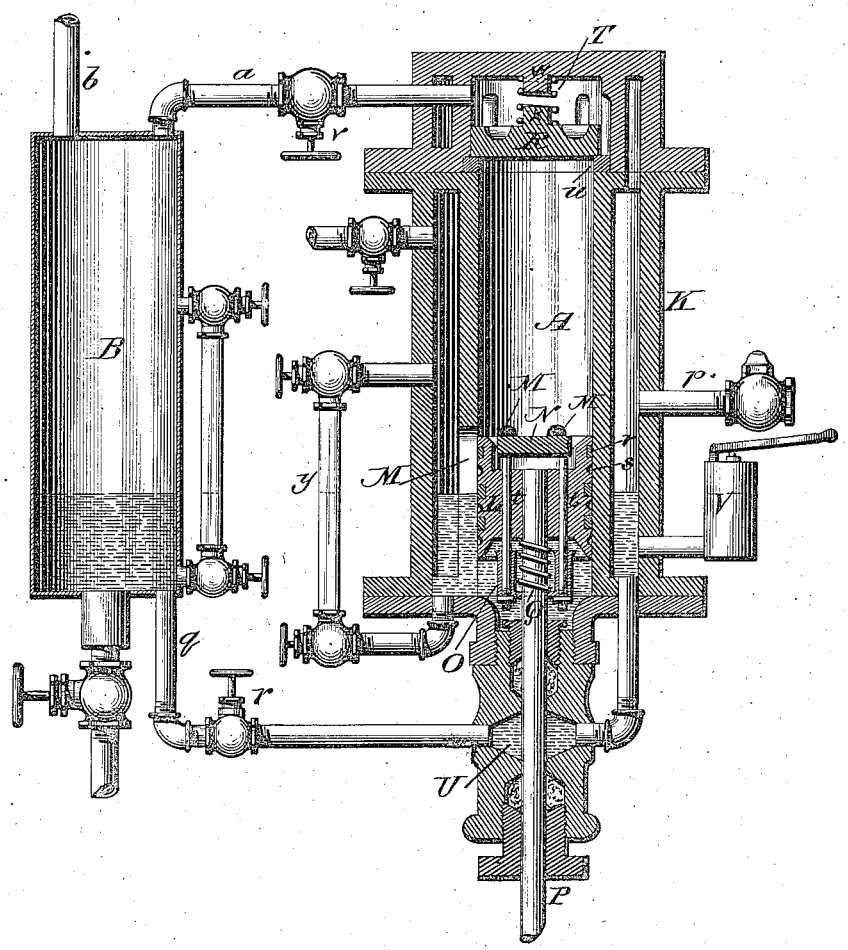
Fig. 2.



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Attorney.

UNITED STATES PATENT OFFICE.

JACOB SCHUEHLE, OF SAN ANTONIO, TEXAS.

ICE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 342,543, dated May 25, 1886.

Application filed March 16, 1886. Serial No. 195,130. (No model.)

To all whom it may concern:

Be it known that I, JACOB SCHUEHLE, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Ice-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings represent a side elevation of my invention, partly in section; and Fig. 2, a vertical section of the compressor and one of the oil-interceptors on an enlarged scale, with the several pipe-connections, valves, &c., in elevation.

The present invention has relation to that class of ice-machines wherein a liquefiable gas, preferably that of ammonia, is introduced in a compression-pump, and is compressed to a partly state of liquefaction, the pressure being subsequently removed, the liquefied refrigerating agent expanding through tubes, coils, tanks, or other chambers, and the frigorific effects produced by the volatile liquid again assuming its gaseous state is utilized for absorption of heat.

The invention therefore consists in an improved arrangement of coils, combined with successive oil-intercepting tanks, and certain improvements in the construction of the gas-compressor and its adjuncts, as will be hereinafter described, and specifically set forth in the claims.

In the accompanying drawings, A represents the compressing-cylinder containing oil in the lower portion thereof, as a compression medium to lubricate the piston and prevent leakage at that point. From the compressing-cylinder the compressed and partly-liquefied gas passes through the pipe *a* into the top of the vertical cylindrical oil-intercepter B, and thence through the vertical pipe *b* into one end of a second oil-intercepter, C. This interceptor C is supported in a nearly horizontal position, but yet with the end at which the refrigerant enters slightly higher, and the opposite end thereof has connected to its under side a pipe, *c*. This pipe carries the oil that may have passed to the interceptor C, and also any ammonia that may have liquefied, to the liquid-holder D, and as the ammonia will flood on top of the oil by opening the valve *e* of a pipe, *d*, it is allowed to flow through said pipe into a second liquid-holder, E, which I term the "main liquid-holder," and the oil that may have collected in the holder D is carried to the oil-interceptor B by slightly opening the valve *g* of a pipe, *f*, which connects the liquid-holder with the interceptor. The refrigerant passes from the interceptor C through the pipe *h* to the manifold *i* of the condenser-coil F, the coil being placed in a tank, G, into which water is admitted through the pipe *j*.

The liquid-holders D E are provided with glass gages *k l*, respectively, to indicate the amount of liquid therein. The refrigerant issuing from the coil F is conducted into the liquid-holder E, and thence through the pipe *m*, which is controlled by valve *n*, to the manifold *o* of the freezing-coil H, placed in the tank I. The cold gas is then conducted in the pipe *p* through the interceptor C, where it cools the heated oil-vapors coming from the compressor, and thence passes into the jacket K thereof. The interceptor B has a pipe, *q*, provided with a valve, *r*, for the purpose of admitting oil to the pump through the stuffing-box, and to regulate the supply as found desirable.

The construction of the apparatus and its operation having been fully set forth, I will now describe more minutely the compressor. The compressing-cylinder A is provided with a jacket, K, in the lower portion of which a certain quantity of crude lubricating-oil is kept to lubricate the piston L and seal its periphery against the interior of the cylinder. The walls of said cylinder have in their lower half a series of vertical slots, M, through which the lubricating-oil passes in and out as the piston is in motion, and also to permit the ammonia-gas to enter the cylinder above the piston when the latter is at the bottom of its course and has dipped into the oil. The piston is provided with packing-rings *r* and peripheral grooves *s*, to carry oil on its upward movement and lubricate the cylinder. The piston is provided at its upper end with a suitable seat upon which rests the valve N, said valve having stems *t* passing loosely through holes in the piston, and having their lower ends attached to a spider, O, playing on the piston-

rod P a short distance below the piston, the distance regulating the lift of the valve. Between the spider and the bottom of the piston is a spring, Q, coiled around the rod P, and serving to bring the valve to its seat. The valve-chamber in the upper end of the cylinder A contains the discharge-valve R, of greater diameter than the interior diameter of the cylinder, and rests upon a suitably-formed seat, consisting of a steel ring, *u*. A series of recesses, S, are formed around the interior of the valve-chamber and directly opposite the periphery of the valve R, through which the compressed ammonia-gas escapes into the valve-chamber and out through the discharge-pipe *a*, which is provided with a valve, *v*. Pendent from the center of the valve-chamber is a cylindrical projection, *w*, to guide and retain one end of the coil-spring T, while the opposite end is guided and retained by a similar projection, *x*, upon the top of the valve, the distance between the projections regulating the distance that the valve can be lifted off its seat. The valve-chamber has also between it and its jacket a space in communication with the gas-receiving chamber surrounding the cylinder A for the reception of cool gas to cool the walls of the valve-chamber. The lubricating-oil in the bottom of the cylinder is in communication with an oil-chamber, U, located between the two stuffing-boxes, through which the piston-rod passes, and at one side of the cylindrical jacket K is connected a glass gage, *y*, to show the amount of oil therein, an additional supply of oil being admitted by means of a suitable hand-pump, V. The intercepting cylinder B is also provided with a glass gage, *z*, to indicate the amount of oil therein.

The liquid-holder D, in connection with the main holder E, is considered of great importance, as it keeps condenser and freezing coils entirely free from oil, as it condenses the oil vapors besides a limited quantity of ammonia-gas, which latter expands by introducing it with the oil back to the pump-cylinder, and reduces the temperature of the oil down below freezing-point, and thereby keeps the stuffing-box perfectly cool, as well as cooling the pump. The construction of valve in the piston is also of importance, as it has comparatively little lift, and consequently lasts much longer, as well as allowing the liquid and gas to pass freely to top of piston.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an ice-machine, the combination of a gas-compressor adapted to contain oil in its lower end, two oil-interceptors communicating with each other and with the compressor, and one or more liquid-holders communicating with each other and with the interceptors, condenser-coils, and freezing-coils, substantially as and for the purpose set forth.

2. In an ice-machine, a gas-compressor and two oil-interceptors, one arranged horizontally, or nearly so, and the other arranged vertically and communicating with the compressor at both top and bottom, and with a chamber between the stuffing-boxes, in combination with two liquid-holders, one of which communicates with the interceptors and the other with the condenser-coils and freezing-coils, said holders also communicating with each other, substantially as and for the purpose specified.

3. In an ice-machine, a system of condenser-coils and freezing-coils and a gas-compressor adapted to contain oil in its lower end, and consisting of a jacketed cylinder provided with a valve at its upper end, having its chamber formed with a series of recesses, a piston at the lower end of the cylinder carrying a valve seated in the lower end of the piston, in combination with two oil-interceptors communicating with each other and with the compressor and one or more liquid-holders communicating with each other and with the interceptors, substantially as and for the purpose described.

4. In an ice-machine, a gas-compressor consisting of a jacketed cylinder having at its upper end a chamber formed with recesses and containing a valve and spring for retaining it on its seat, and the lower end of the cylinder adapted to contain oil and having a series of vertical slots, in combination with a piston and a valve seated therein, having stems which loosely pass through the piston and connected to a spider, and a spring for operating the valve, and an oil-interceptor communicating with the top and bottom of the gas compressor and with one or more liquid-holders and a second interceptor, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JACOB SCHUEHLE.

Witnesses:
E. M. FOWLER,
JOHN FOWLER.