(No Model.) 3 Sheets—Sheet 1.

J. SCHEUERECKER.

REFRIGERATING APPARATUS.

No. 493,120. Patented Mar. 7, 1893.

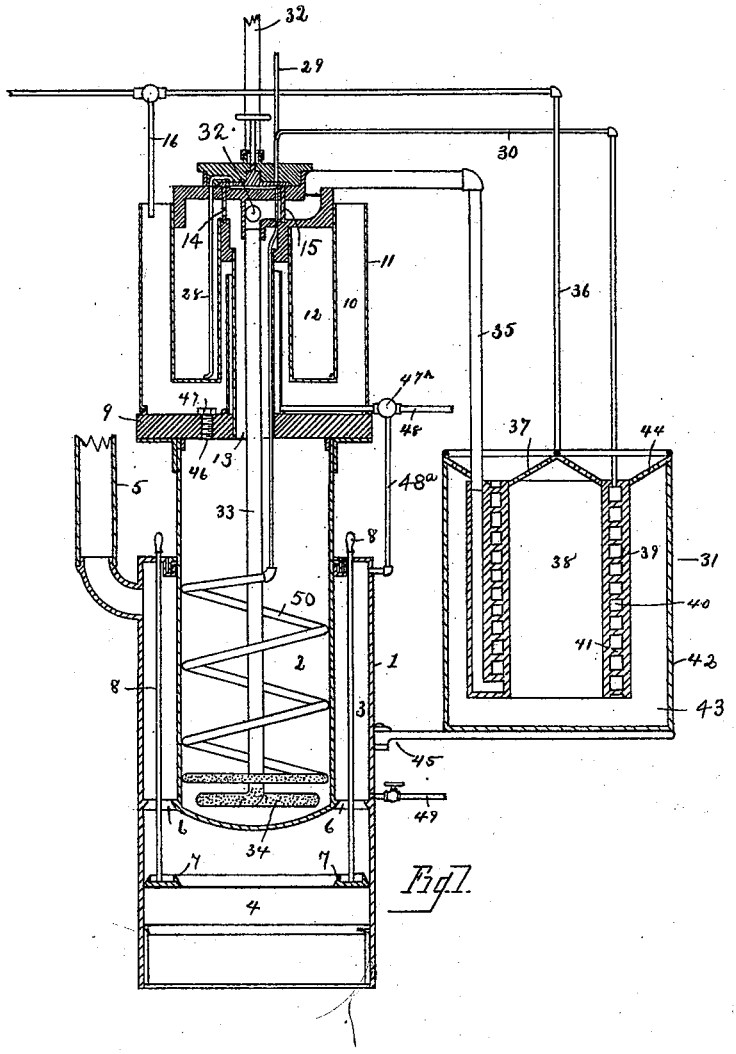

Fig 1.

WITNESSES

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INVENTOR

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(No Model.) 3 Sheets—Sheet 2.

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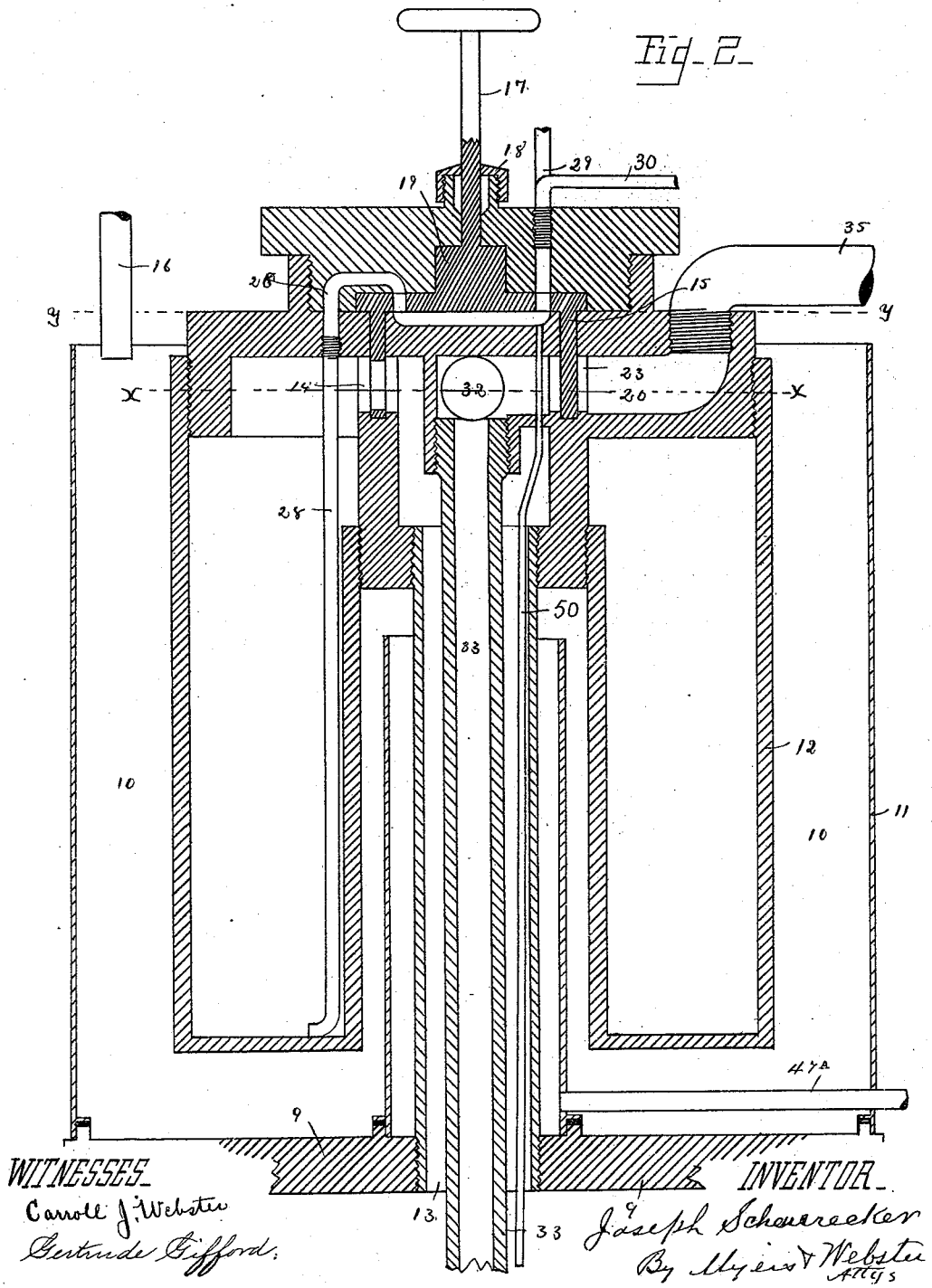
REFRIGERATING APPARATUS.

No. 493,120. Patented Mar. 7, 1893.

Fig. 2.



WITNESSES.
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REFRIGERATING APPARATUS.

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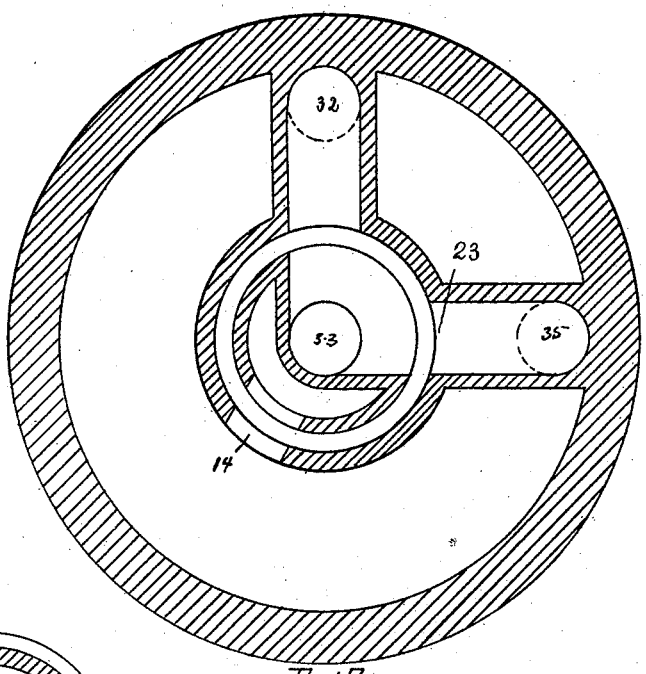

Fig. 3.

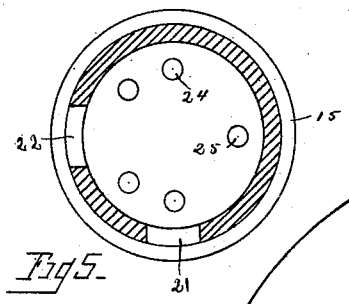

Fig. 5.

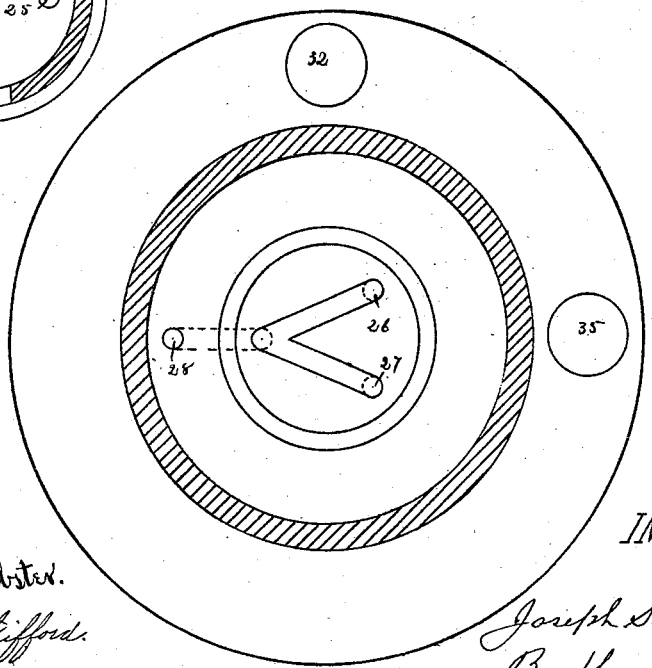

Fig. 4.

WITNESSES.
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INVENTOR.
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UNITED STATES PATENT OFFICE.

JOSEPH SCHEUERECKER, OF TOLEDO, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF SEVEN-EIGHTHS TO JOHN W. HAHN, OF SAME PLACE, AND E. E. PERRY, OF INDIANAPOLIS, INDIANA.

REFRIGERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 493,120, dated March 7, 1893.

Application filed November 7, 1890. Serial No. 370,677. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SCHEUERECKER, of Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in an Apparatus for the Manufacture of Ice and for Refrigerating Purposes; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form part of this specification.

My invention relates to an apparatus for the manufacture of ice and for refrigerating purposes, and has for its object to provide a compact and comparatively inexpensive apparatus for this purpose that can be adapted for domestic or commercial use.

A further object is to provide an apparatus especially adapted for the use of aqua ammonia as a cooling agent, with means for inducing a circulation of the cooling medium, without the use of pumps.

A further object is to store the anhydrous ammonia within a reservoir from which it may be led to a place of use, either for manufacturing ice, or for refrigerating purposes.

A further object is to economize in fuel in liberating the ammonia vapor.

A further object is to combine in one apparatus an ammonia receiver, a reservoir for anhydrous ammonia, a furnace for expelling the ammonia gas, and a cooling chamber, thereby simplifying and cheapening the construction.

The invention consists in the parts and combination of parts hereinafter described and pointed out in the claims.

In the drawings, Figure 1, is a longitudinal vertical section of an apparatus, constructed in accordance with my invention, with a freezer for manufacturing ice attached thereto, and showing a pipe for leading to any receptacle wherein refrigeration is desired. Fig. 2, is a longitudinal vertical sectional view of the receptacle for gaseous ammonia. Fig. 3, is a horizontal section on lines *x*—*x*, Fig. 2. Fig. 4, is a horizontal section on lines *y*—*y*, Fig. 2. Fig 5, is a bottom plan view of the valve for controlling the flow of ammoniacal gas.

Having stated the objects and described the figures employed to illustrate the means for carrying out these objects, I will now proceed to describe the apparatus in detail, like figures of reference indicating corresponding parts.

1 designates a jacket in which is arranged a portion of the ammonia still 2, which being of less diameter than the jacket, forms an annular chamber 3, surrounding the still, there being a furnace-grate 4, located directly beneath the bottom of the still, whereby the product of combustion entirely surrounds the same and finds exit through flue or pipe 5. At the base of the annular chamber 3 there is formed an annular seat 6, for an annular closure 7, suspended upon rods 8, which pass through the top of chamber 3 and serve to elevate the closure when it is desired to render the chamber water tight, or to be depressed when it is desired to heat the still.

9, designates a metal plate which serves as a top to the still and as a base to the water reservoir 10. Reservoir 10, comprises an outer casing 11, and an inner receptacle 12, for containing the anhydrous ammonia, the still and reservoir being in communication through the medium of pipe 13, which extends from the base 9 to the top of the reservoir and opens into the same at 14, by means of an opening, closed when desired by a valve 15. The relative diameters of reservoir 10 and receptacle 12 are such that an annular space surrounds the receptacle, thereby forming a water space in communication with a water supply pipe 16. Valve 15 is formed with a stem 17, extending through the top of the reservoir, and being suitably packed by a stuffing-box 18, the lower enlarged portion 19, being seated in the chamber formed in the head, and having an annular ring 20, depending from the head and perforated as at 21, and 22 to register with the opening 14 and an opening 23, respectively, there being perforations 24 and 25 which are adapted to register with perfora-

tions or channels 26 and 27, respectively, formed in the head, both being in communication with a pipe 28, leading to the bottom of the gas receiver, the former being in communication with a pipe 29, for leading the cooling fluid to the place of refrigeration, and the latter being connected with a pipe 30, leading therefrom to the ice forming receptacle 31.

32, designates a pipe leading from the place of refrigeration and in communication with a pipe 33, leading into the still, the lower coiled end 34, thereof being perforated to discharge the weak ammonia as it is returned from the refrigerator or ice machine in its circulation from the reservoir into the still, whereby a constant flow thereof is insured, pipe 35, leading from the ice machine and tapped into pipe 33, subserving the same purpose when the ice machine is in operation. Pipe 36, is tapped into the cold water main and leads to the ice machine 31 and discharges water upon the conical perforated diaphragm 37, arranged across the top of an inner chamber 38, surrounded by an outer casing 39, of a diameter to form an annular chamber 40. Between the casing 39 and the wall of chamber 38 is arranged a spiral diaphragm 41, leading from the top to the bottom thereof, thereby forming a tortuous passage for the cooling medium as it is discharged thereon through pipe 30, and led therefrom through pipe 35 back to the still.

42, designates an outer receptacle from which the chamber 38 and casing 39 are suspended, the diameter of the outer receptacle is such as to form an annular chamber 43, surrounding casing 39, the upper portion of the chamber being covered with a perforated diaphragm 44, and the entire ice-forming receptacle as thus constructed is supported upon a hinged bracket 45, which is adapted to be swung beneath to sustain the same, or from beneath to allow of removal of the receptacle.

From the foregoing description the operation will be apparent. A suitable quantity of aqua ammonia is introduced into the still through an orifice 46, in the base plate 9, and the orifice closed by means of a screw-plug 47. Closure 7 is lowered to allow the products of combustion to arise from a fire, which is now built upon grate bars 4. Valve 15 is turned to close communication of the reservoir 12 with pipes 29 and 30. The aqua ammonia within the still is heated to a degree to cause rapid evaporation of the same, and the anhydrous gas flows up through pipe 13 into the gas receiver until a sufficient pressure is maintained therein, (the fire in the furnace accomplishing this purpose in the space of about one hour,) when the valve is turned to admit the ammoniacal gas to pipe 29. If to be used for refrigerating purposes, only the closure 7 is raised to render the annular chamber 3 water tight and cold water is allowed to flow therein through pipe 48 and 48ª, as it is received from the water space in the reservoir water having been allowed to flow therein to cool the gas, thereby lowering the temperature of the liquid within the still, and the ammoniacal gas flows in its return from the refrigerator through pipe 32 and into the still. If it is desired to manufacture ice, the valve is turned to admit the cooling agent through pipe 30 into chamber 40 and passes through the tortuous passage 41, thereby reducing the temperature in chamber 38 and 43 to a degree to congeal the water as it is delivered thereto in minute jets or streams through the perforated diaphragms 39 and 44 with the effect of forming a solid body of ice within each chamber, when the bracket 45 is swung from beneath the receptacle allowing the same to be removed to withdraw the ice therefrom. It will be observed that by allowing the water to jet through the perforations in the diaphragms into a temperature lower than the normal temperature of the water, the water is purged of air which may escape upwardly through the perforations, thereby producing a clear crystal ice as a product. It will also be seen that the cooling medium can be used for refrigerating purposes as delivered through pipe 29 at the same time that it is used for the manufacture of ice through pipe 30.

In Fig. 1 is shown in dotted lines a supplemental coil of pipe 50 adapted to be opened to communicate with the reservoir for anhydrous ammonia, and deliver the same into the still to cool the contents where it is inconvenient to employ water for this purpose.

When it is desired to withdraw the water from reservoir 10, two-way valve 47ª is turned permitting the water to pass out of pipe 48, the pipe 49 inchamber 3 subserving the same purpose.

My apparatus is of the compact form that it may be adapted to household use for refrigeration, as its manipulation requires no skill, it only being necessary to build a fire in the furnace when the flow of gas from the receiver has ceased, and the capacity of the receiver may be such as to only require this every twenty-four hours or even longer. It may also be increased in size and capacity to be adaptable to commercial use, either in a continuous supply to several consumers, or for manufacturing ice in large or small quantities when it is desired.

What I claim is—

1. In an apparatus for the manufacture of ice and for refrigerating purposes, a still, a jacket or shell surrounding the same and forming an annular chamber, a furnace beneath the same, and a movable closure for opening or closing the annular chamber.

2. In an ice machine, the combination with the water tank, of an annular vessel arranged therein, said vessel being provided with a tortuous passage to receive a cooling medium,

and a perforated annular trough arranged in the top of the water tank and adapted to spray the water as it passes into said tank.

3. In an ice machine the combination with the still, of a water tank arranged above the same, an annular gas receiver, arranged within the water receptacle, pipes communicating centrally with the still and receiver, and pipes for carrying off the gas from the receiver.

4. The combination with a still, of a pipe extending centrally therefrom, a rotary valve arranged at the head of said pipe, an annular receiver surrounding said pipe, a water tank in which the receiver is located and the necessary pipes for conducting the gas from the receiver.

5. In an ice machine, the combination with a still having a pipe arranged therein, perforated at its lower portion, and adapted to lead cold ammonia from the place of refrigeration to the still, a pipe extending from the upper end of still, a gas receiver surrounding this pipe, a water receptacle surrounding the gas receiver, a pipe leading from the gas receiver, an annular receptacle to which this pipe leads, and a water tank surrounding the annular receptacle, and adapted to receive the water to be cooled.

6. In an ice machine the combination with the still of a water tank arranged above the same an annular chamber surrounding the still a water pipe connecting the water tank and annular chamber, an annular gas receiver arranged in the water tank, a central pipe communicating with the still and gas receiver, the valve, and pipes connected therewith for conducting the gas away.

7. In an ice machine, the combination with the still of a water tank an annular gas receiver, a central pipe connecting the still and receiver, the valve, and the coiled pipe 50 communicating with the receiver and extending into the still for the purpose of cooling the same.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH SCHEUERECKER.

Witnesses:
WILLIAM WEBSTER,
GERTRUDE GIFFORD.