G. L. VAIL.

ICE MAKING SYSTEM.

APPLICATION FILED DEC. 21, 1908.

979,112.

Patented Dec. 20, 1910.

4 SHEETS—SHEET 1.

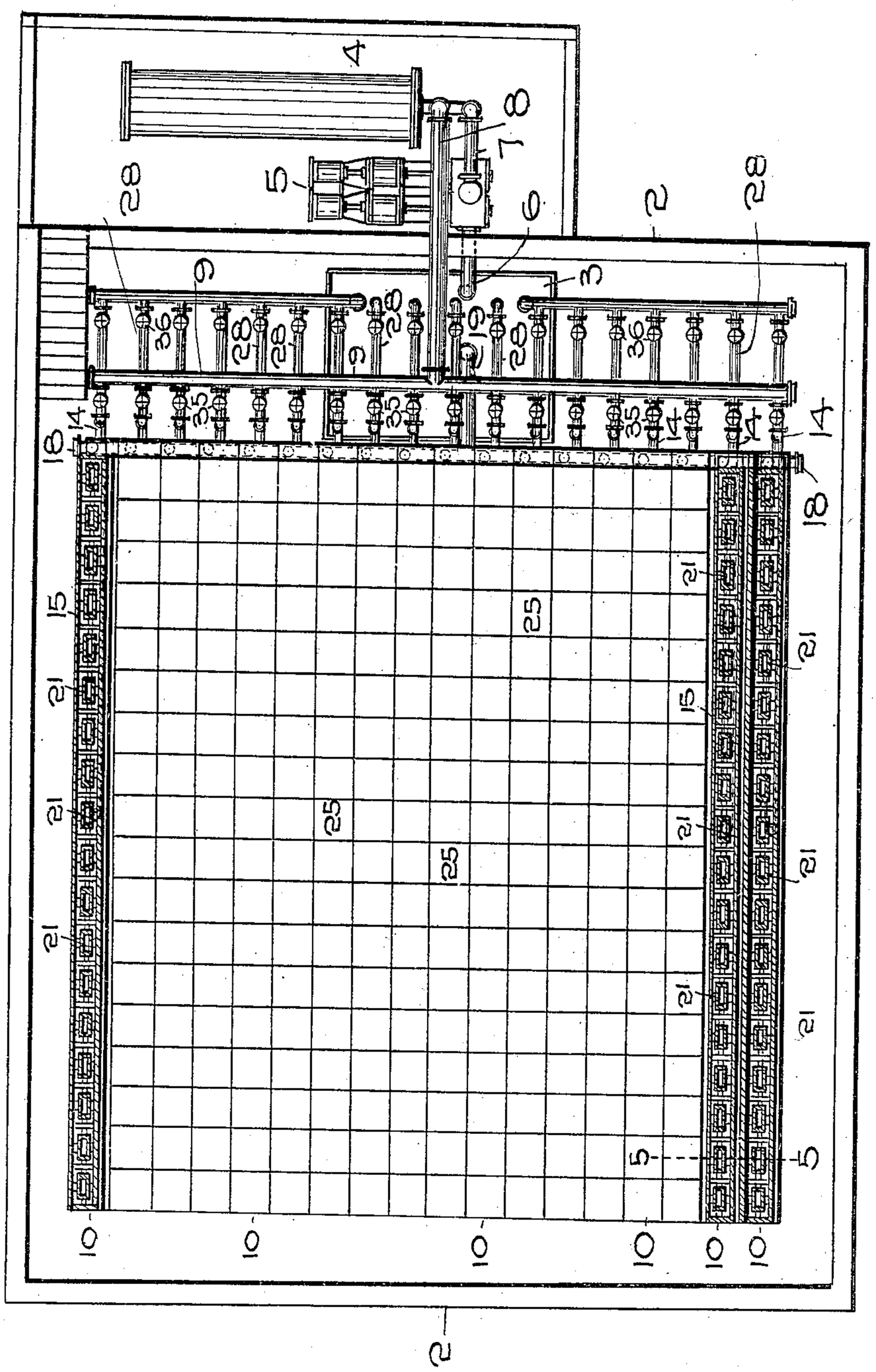

FIG. 1

WITNESSES:

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4 SHEETS—SHEET 2.

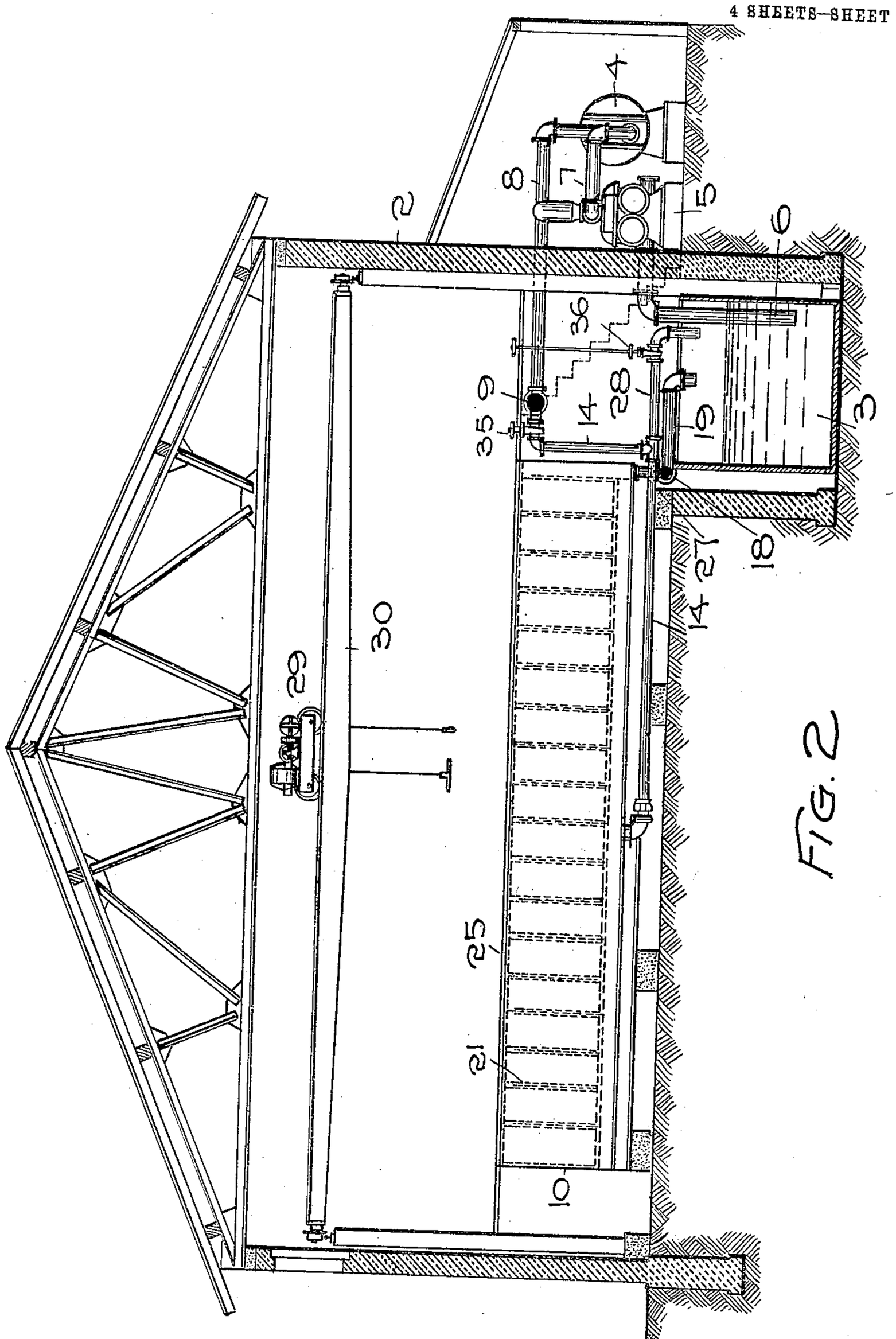

FIG. 2

WITNESSES:

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4 SHEETS—SHEET 3.

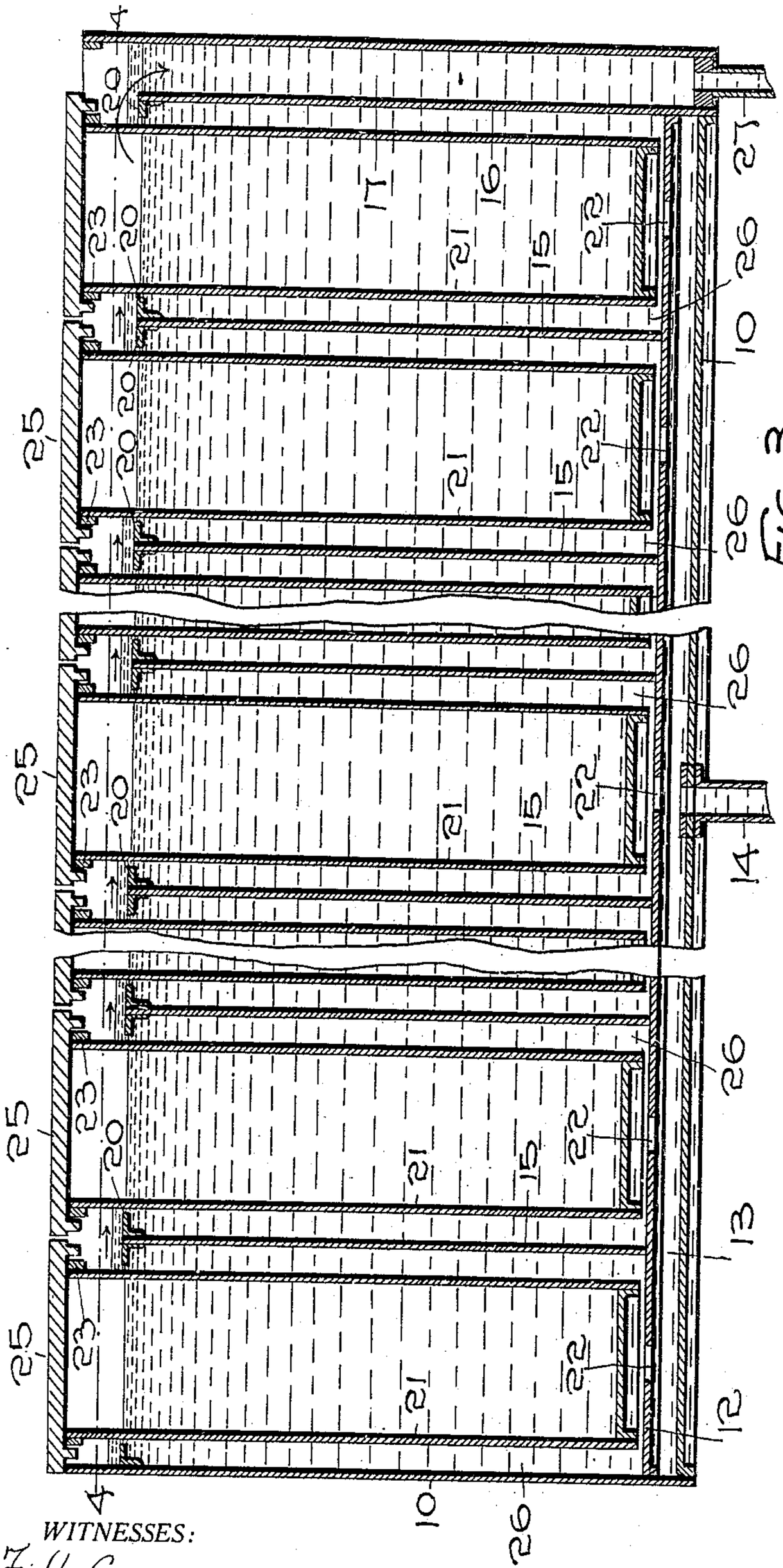

FIG. 3

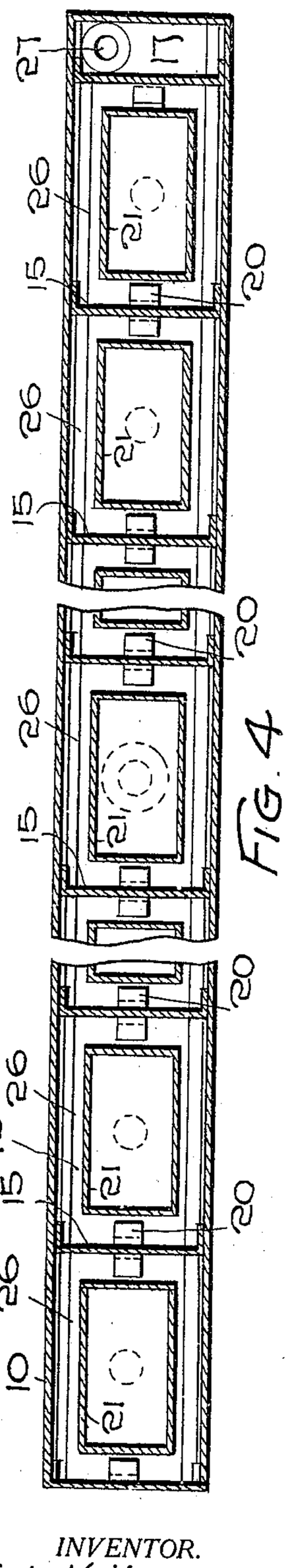

FIG. 4

WITNESSES:

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APPLICATION FILED DEC. 21, 1908.

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4 SHEETS—SHEET 4.

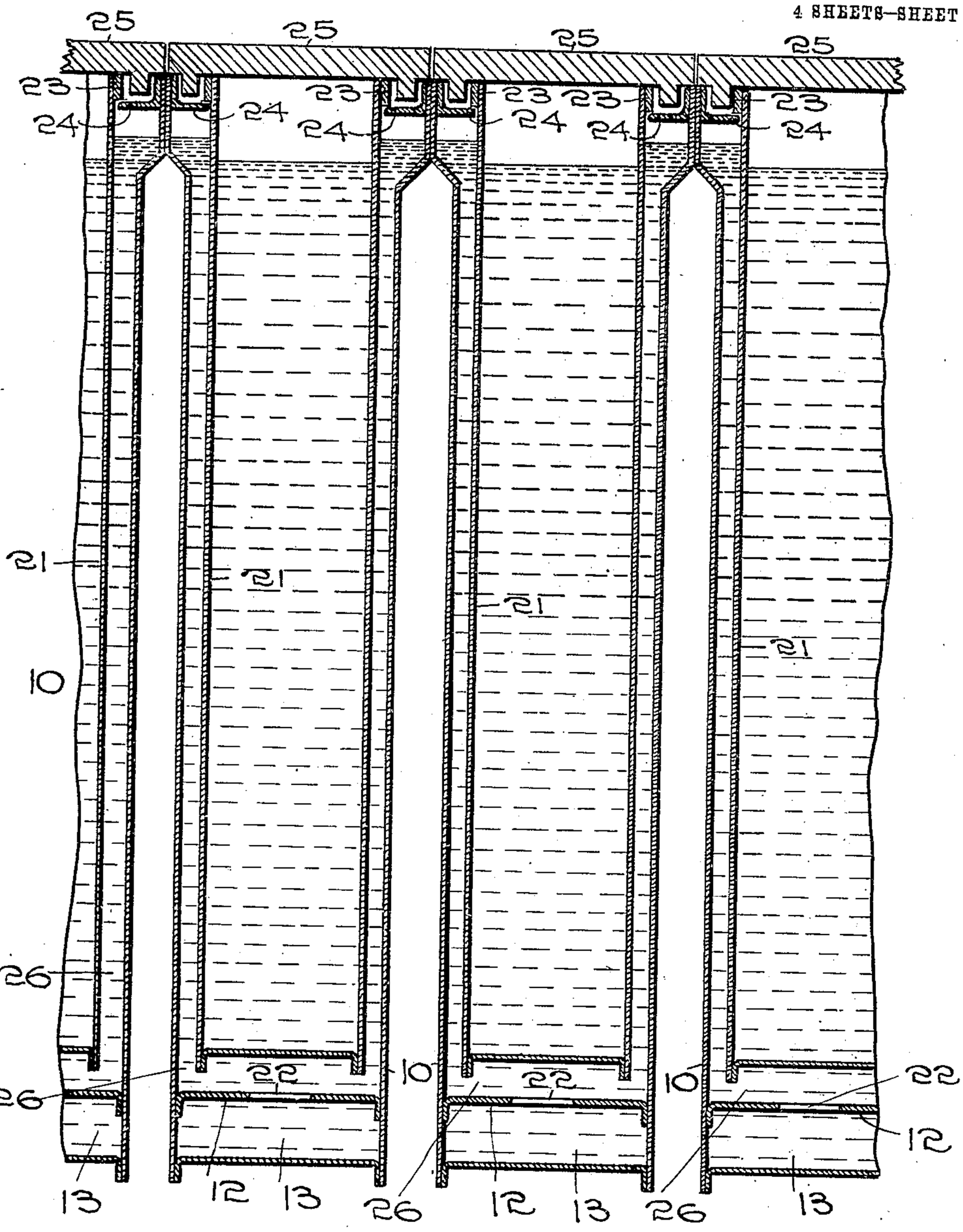

FIG. 5

WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE L. VAIL, OF DENVER, COLORADO.

ICE-MAKING SYSTEM.

979,112. Specification of Letters Patent. Patented Dec. 20, 1910.

Application filed December 21, 1908. Serial No. 468,510.

To all whom it may concern:

Be it known that I, GEORGE L. VAIL, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Ice-Making Systems, of which the following is a specification.

This invention relates to certain new and useful improvements in systems for producing artificial ice and it appertains more particularly to the improvements in the ice making system shown and described in the United States Letters Patent, No. 842,360, issued to me on the 29th day of January, 1907.

The system hereinafter to be described is the outcome of numerous observations and tests made while the older system was in use, and it differs therefrom in its operation and the results produced thereby, by being simpler in construction and therefore easier to erect, more economical in use, cheaper to manipulate and more reliable inasmuch as the stopping of pipes, which was a common occurrence in the other apparatus, has been averted, while its product is better and of a more even quality than that produced by the older method, by reason of a better, speedier and more uniform circulation of the cooling liquid by means of which the ice is frozen.

In the accompanying drawings, in the various views of which like parts are similarly designated, Figure 1, represents a plan view of the complete system, Fig. 2, a partly sectional elevation thereof, Fig. 3, a fragmentary, vertical, longitudinal section of one of the can holding tanks comprised in the system, Fig. 4, a horizontal section taken along the line 4—4 Fig. 3, and Fig. 5, an enlarged transverse section through a plurality of adjoining tanks, taken along the line 5—5 Fig. 1.

Referring to the drawings by numerals, let the reference character 2 designate the building in which the apparatus comprised in my improved system, is contained and 3 the reservoir, which being disposed below the floor of the building, supplies the heat-absorbing liquid. This liquid, preferably brine, is raised from the reservoir into a cooler 4 by means of a pump 5 and the therewith connected conduits 6 and 7 and from this cooler it is conducted through a pipe 8 to a main conduit or header 9, from where it is distributed to the various tanks which contain the cans in which the ice is produced.

The pump employed to raise the liquid from the reservoir as well as the cooler in which the brine is cooled, before it passes into the tanks, by the influence of ammonia or other refrigerant, may be of any suitable construction, which not forming part of the present invention, is neither described nor shown in detail.

The tanks above referred to and designated in the drawings by the numeral 10, are of elongate rectangular form and are arranged adjoiningly in a series which occupies the greater part of the building 2. Each tank as shown in Figs. 3 and 5 of the drawings, is provided with a false bottom 12 which being spaced from the bottom of the tank, forms a compartment 13, into which the brine coming from the cooler, is introduced by means of a valve controlled branch pipe 14, which connects with the afore mentioned header 9 and enters the compartment 13 approximately at its center. The space of the tank, above the false bottom 12, is divided into a number of compartments 26 by means of transverse partitions 15 which are supported upon the bottom plate 12 and terminate at a distance below the upper edge of the receptacle, and each of these compartments 26 is in communication with the subjacent compartment 13, by means of openings 22 in the false bottom 12.

The last partition at one end of the tank, which is designated in the drawings by the numeral 16, is spaced from the said end and extends through the compartment 13, to the true bottom of the receptacle, so as to form a chamber 17 into which the brine, when reaching a level higher than the partitions 15 and 16, flows to be returned to the brine reservoir 3 through a pipe 27 which leads from the bottom of the chamber 17 to a discharge header 18 which is disposed transversely below the series of tanks and which connects with a conduit 19, whose lower extremity projects into the reservoir.

The various partitions 15 and 16 are provided at their upper portions with laterally projecting lugs 20 which serve as guides for the water cans 21 which are suspended within the various compartments 14 in spaced relation to the false bottom 12. The cans 21 the sides of which are spaced at substantially equal distances from those of the compartments in which they are disposed, are

provided at their upper ends with a surrounding band 23, which, when the cans are in place, rests upon lugs 24 projecting from opposite sides of the tank and thus supports the can of which it forms part. Each can is, while the system is in operation, closed by means of a cover 25 and the various covers upon the cans contained in each tank of the series, adjoin each other and those of the cans in the next succeeding tank or tanks so as to form, collectively, a floor upon which the operatives stand during the discharge of their duties.

Having thus described the mechanical construction and the arrangement of the various elements comprised in my improved system, its operation and the advantages it has over the older system as described in the before mentioned patent, will be readily understood.

After the cans 21 contained in the tanks 10 have been filled with water and closed by means of the covers 25, the brine contained in the reservoir 3 is raised by the pump 5 to be cooled in the cooler 4 whence it is conducted through the pipe 8 to the header 9 and from the latter by means of the conduit 14 to the compartments 13 of the various tanks comprised in the series. The brine, passing from the compartment 13, of each tank into the therewith communicating compartments 26, rises in the spaces between the walls of the latter and the respective cans 21 and by its refrigerating influence, causes the water contained in the latter to congeal. After the brine, which rises in the various compartments, has reached a level above the upper ends of the partitions 15 and 16, it overflows into the chamber 17 from where it is returned through the conduits 27, 18 and 19 to the reservoir. At the termination of the ice freezing process, the brine may be exhausted from the various tanks by means of valve-controlled drain pipes 28, which connect with the respective inlet pipes 14 and project into or above the reservoir 3. The purpose of draining the tank is to temper the ice before "pulling" in order to raise its temperature and thereby keep it from cracking, and the process of draining is accomplished by closing the valves 35 of the feed pipes and opening the valves 36 of the drain pipes 28. A lifting apparatus 29 which is mounted on a laterally movable track 30, above the series of tanks contained in the building 2, serves to raise and lower the cans 21 from and into the tanks 10.

Having thus described my invention what I claim and desire to secure by Letters Patent is:—

1. In an ice-making system, a tank containing a horizontal partition dividing its interior into two compartments and a plurality of vertical partitions dividing the upper compartment into a plurality of brine-receptacles which are individually in communication with the bottom compartment, cans mounted within the said receptacles in spaced relation to their walls, and means for introducing heat-absorbing liquid into the bottom compartment.

2. In an ice-making system, a tank containing a horizontal partition dividing its interior into two compartments and a plurality of vertical partitions dividing the upper compartment into a plurality of brine-receptacles which are individually in communication with the bottom compartment, cans mounted within the said receptacles in spaced relation to their walls, means for introducing heat-absorbing liquid into the bottom compartment, and means to exhaust said liquid from said tank after it has reached a predetermined level.

3. In an ice-making system, a tank containing a horizontal partition dividing its interior into two compartments and a plurality of vertical partitions dividing the upper compartment into a plurality of brine-receptacles, cans mounted within the said receptacles in spaced relation to their walls and means for introducing heat-absorbing liquid into the bottom compartment, the said horizontal partition having openings which establish communication between each of the said receptacles and the bottom compartment.

4. In an ice-making system, a tank containing a horizontal partition dividing its interior into two compartments and a plurality of vertical partitions dividing the upper compartment into a plurality of brine-receptacles and an overflow chamber adjoining the said receptacles, means to discharge liquid from the said chamber, cans mounted within the said receptacles in spaced relation to their walls, and means for introducing heat-absorbing liquid into the bottom compartment, the said horizontal partition having openings which establish communication between each of the said receptacles and the bottom compartment.

5. In an ice-making system, a plurality of tanks each containing a horizontal partition dividing its interior into two compartments and a plurality of vertical partitions dividing the upper compartment into a plurality of brine-receptacles which are individually in communication with the bottom-compartment, cans mounted within the said receptacles in spaced relation to their walls, a main conduit separately connected with the bottom compartment of each of the said tanks, and a means to supply heat-absorbing liquid to the said conduit.

6. In an ice-making system, a plurality of tanks each containing a horizontal partition dividing its interior into two compartments, and a plurality of vertical partitions terminating below the upper edge of the tank and dividing the upper compartment into a plu-

rality of brine-receptacles which are individually in communication with the bottom compartment, and an overflow chamber adapted to receive fluid overflowing the said vertical partitions, a main conduit separately connected with the bottom compartment of each of said tanks, a means to supply heat-absorbing liquid to the said conduit, and a main discharge-conduit separately connected with each overflow chamber.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE L. VAIL.

Witnesses:
G. J. ROLLANDET,
M. L. GEARY.