D. J. HAVENSTRITE.

ICE MAKING APPARATUS.

APPLICATION FILED JAN. 10, 1908.

941,414.

Patented Nov. 30, 1909.

2 SHEETS—SHEET 1.

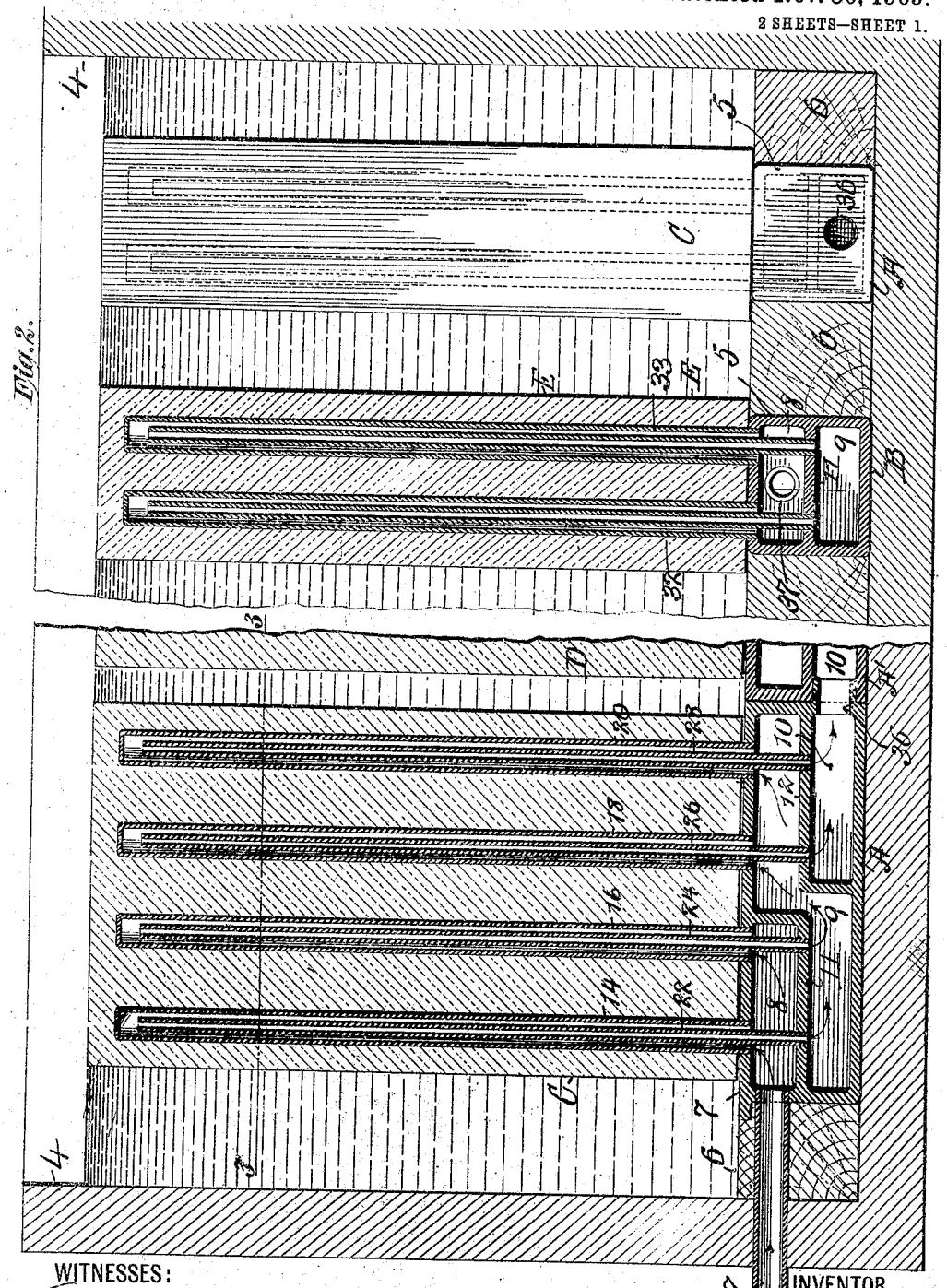

Fig. 2.

Fig. 1.

WITNESSES:

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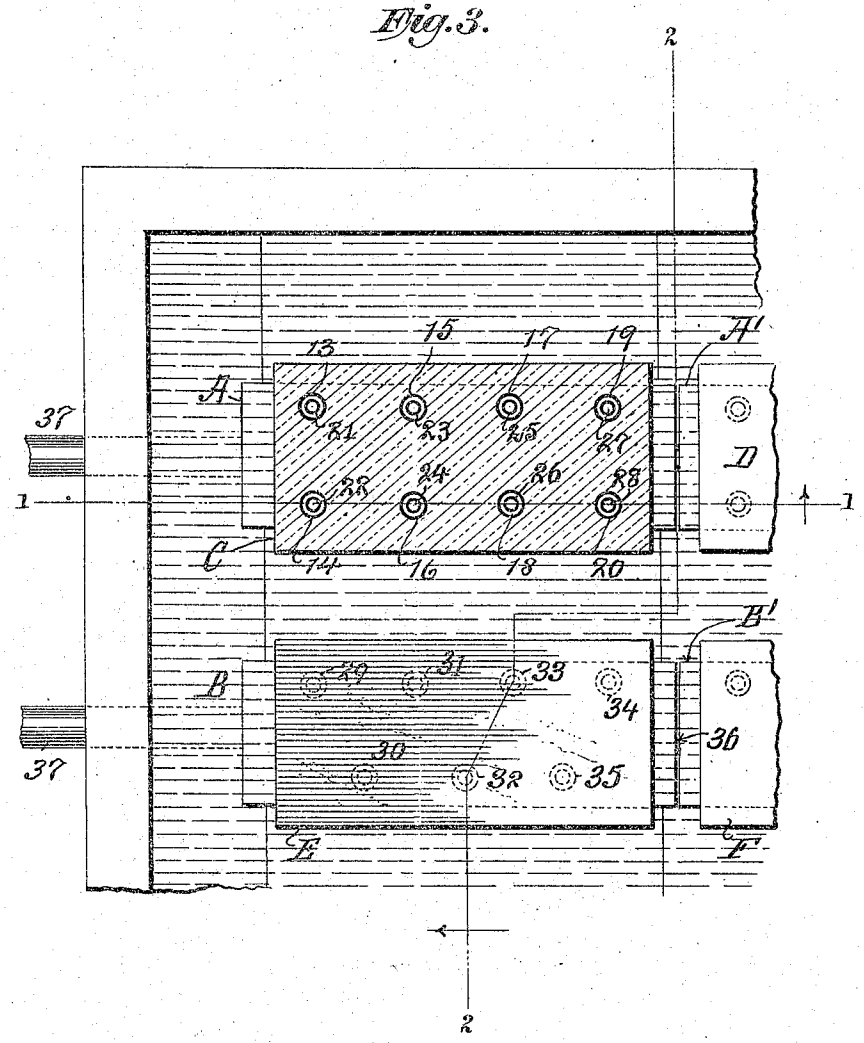
2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

DAVID J. HAVENSTRITE, OF NEWARK, NEW JERSEY.

ICE-MAKING APPARATUS.

941,414. Specification of Letters Patent. Patented Nov. 30, 1909.

Application filed January 10, 1908. Serial No. 410,076.

To all whom it may concern:

Be it known that I, DAVID J. HAVENSTRITE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Ice-Making Apparatus, of which the following is a specification.

The invention relates to ice making apparatus and more particularly to a construction thereof whereby a number of separate ice cakes may be formed in a freezing tank, which ice cakes can be individually removed.

In the embodiment of my invention hereinafter set forth, I disclose a tank for containing the water to be frozen, in which tank are disposed a plurality of separate parallel tubes, preferably fixed in said tank and extending upwardly from the floor thereof: the upper ends of said tubes are closed, and their inner construction is such as to permit the circulation of fluid within them. Said fluid may be either refrigerating fluid or thawing off fluid. The said tubes are also preferably arranged in groups, each group leading from a separate header, so that upon each header and upon its associated tubes and between said tubes and around the periphery thereof, is formed a separate ice cake, the sides of which are free from the sides of the adjacent cakes, and from the walls of said tank. After the ice cake is formed, as described, it is thawed off from tubes and header and may then be removed vertically out of the tank without disturbing said tubes and header.

The invention consists in the various combinations embodied in my said apparatus as more particularly set forth in the claims.

In the accompanying drawings—Figure 1 is a vertical section of my ice making apparatus and of a portion of the tank containing the same on the line 1. 1. of Fig. 3. Fig. 2 is a section on the line 2. 2. of Fig. 3, and Fig. 3 is a section on the line 3. 3. of Fig. 1.

Similar characters of reference indicate like parts.

4 is the tank containing the water to be frozen and having a substantially level floor. Said floor is made up of headers 5 having horizontal upper surfaces and placed end to end, and of spacing blocks 6 of wood disposed between said headers and having their upper horizontal surfaces registering with the upper surfaces of the headers. The construction of said headers is the same for all, and any desired number of them may be used. Each header consists of an outer shell 7, preferably of cast metal internally divided into three chambers 8, 9, 10, by the partitions 11, 12, which may be integral with the outer shell. Extending upwardly from the header are tubes which communicate directly with the chambers 8, 9, and are closed at their upper ends. Within said tubes and communicating with the chambers 9, 10, are smaller tubes open at both ends. These tubes are disposed in various ways: thus as shown in Fig. 1 and in connection with the header A, Fig. 3, the eight tubes 13, 14, 15, 16, 17, 18, 19, 20, are disposed in two rows. The tubes 13, 14, 15, 16 communicate with the chamber 8 and their inner tubes 21, 22, 23, 24 communicate with chamber 9. The tubes 17, 18, 19, 20, communicate with chamber 9 and their inner tubes 25, 26, 27, 28 communicate with chamber 10. As shown in Fig. 2, and in connection with the header B, the seven tubes are disposed in two rows but staggered, in which case the five tubes 29, 30, 31, 32, 33 communicate with chamber 8 and their inner tubes with chamber 9. The remaining two tubes 34, 35 communicate with chamber 9 and their inner tubes with chamber 10.

The headers which are disposed end to end as A, A′, B, B′, Figs. 1 and 3, are connected by short pipe sections or thimbles 36 extending from the chamber 10 of the next header. The end headers of each series A, A′, B, B′, are provided with inlet pipes 37, which extend through the wooden blocks 6 and the tank wall adjacent thereto.

The operation is as follows: Any suitable fluid refrigerating medium enters the headers by the pipes 37 and proceeds through the outer tubes connected with chamber 8 to the inner tubes and so to chamber 9; thence to the outer tubes communicating with chamber 9 to their inner tubes communicating with chamber 10, and so to the next header by pipe 36, or from the last header of the series back to the source of supply. The circulation of the refrigerating medium through all of the headers and tubes causes an ice cake to form between and around the peripheries of each group of tubes associated with any given header. Thus in Fig. 1, the cake C is formed on the group of tubes which are on header A, and in Fig. 2 will be seen two ice cakes C, E, each formed respec-

tively on the tubes associated with header A and header B. Of course, on the other headers as A′ B′, Fig. 3, other cakes of ice D. F. will in like manner be formed. These cakes of ice are not to be formed of thickness sufficient to cause the cake produced on one group of tubes to meet the cake on the adjacent groups of tubes: but each cake is to be formed separate and free from said adjacent cakes although in contact with the header at its lower surface. After said cakes are formed the supply of refrigerating material is cut-off, and a warm fluid is introduced into the headers and caused to circulate through the tubes in the manner already described, and in this way the several ice cakes are thawed off from the tubes and headers and being thus released may be lifted out of the tanks by any suitable means.

It will thus be seen that by this apparatus I produce a plurality of separate ice cakes each separately removable instead of one or more large cakes. Such cakes are more readily handled, and as they may be of suitable market size, do not require cutting into smaller blocks.

I claim:

1. In an apparatus for making plate ice, a tank having a substantially level floor, parallel tubes located at a distance from the vertical walls of said tank closed at their upper ends having substantially smooth external peripheries extending vertically upward from said floor of said tank and connected below said floor, and partitions in said tubes: whereby liquid circulation may be caused in said tubes and an ice cake formed upon said tubes free at its sides from the vertical walls of said tank.

2. In an apparatus for making plate ice, a tank having a substantially level floor, a header having its upper surface horizontal forming part of said floor, parallel tubes located at a distance from the vertical walls of said tank closed at their upper ends having substantially smooth external peripheries extending vertically upward from said header, and partitions in said tubes and header: whereby liquid circulation may be caused in said tubes and header and an ice cake formed upon said tubes and upon the upper surface of said header free at its sides from the vertical walls of said tank.

3. In an apparatus for making plate ice, a tank having a substantially level floor, a plurality of parallel headers having their upper surfaces forming part of said floor, spacing blocks between said headers forming the remainder of said floor, a series of parallel tubes located at a distance from the vertical walls of said tank closed at their upper ends having substantially smooth external peripheries extending vertically upward from said headers, and partitions in said tubes and headers: whereby liquid circulation may be caused in said tubes and headers and an ice cake formed upon the upper surface of each header and the tubes thereon, the said ice cakes being free from one another and each ice cake being free from the vertical walls of said tank.

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

DAVID J. HAVENSTRITE.

Witnesses:
GERTRUDE T. PORTER,
PARK BENJAMIN, Jr.