April 14, 1925. 1,533,863

A. JOHNSON

REFRIGERATOR

Filed May 26, 1923 2 Sheets-Sheet 1

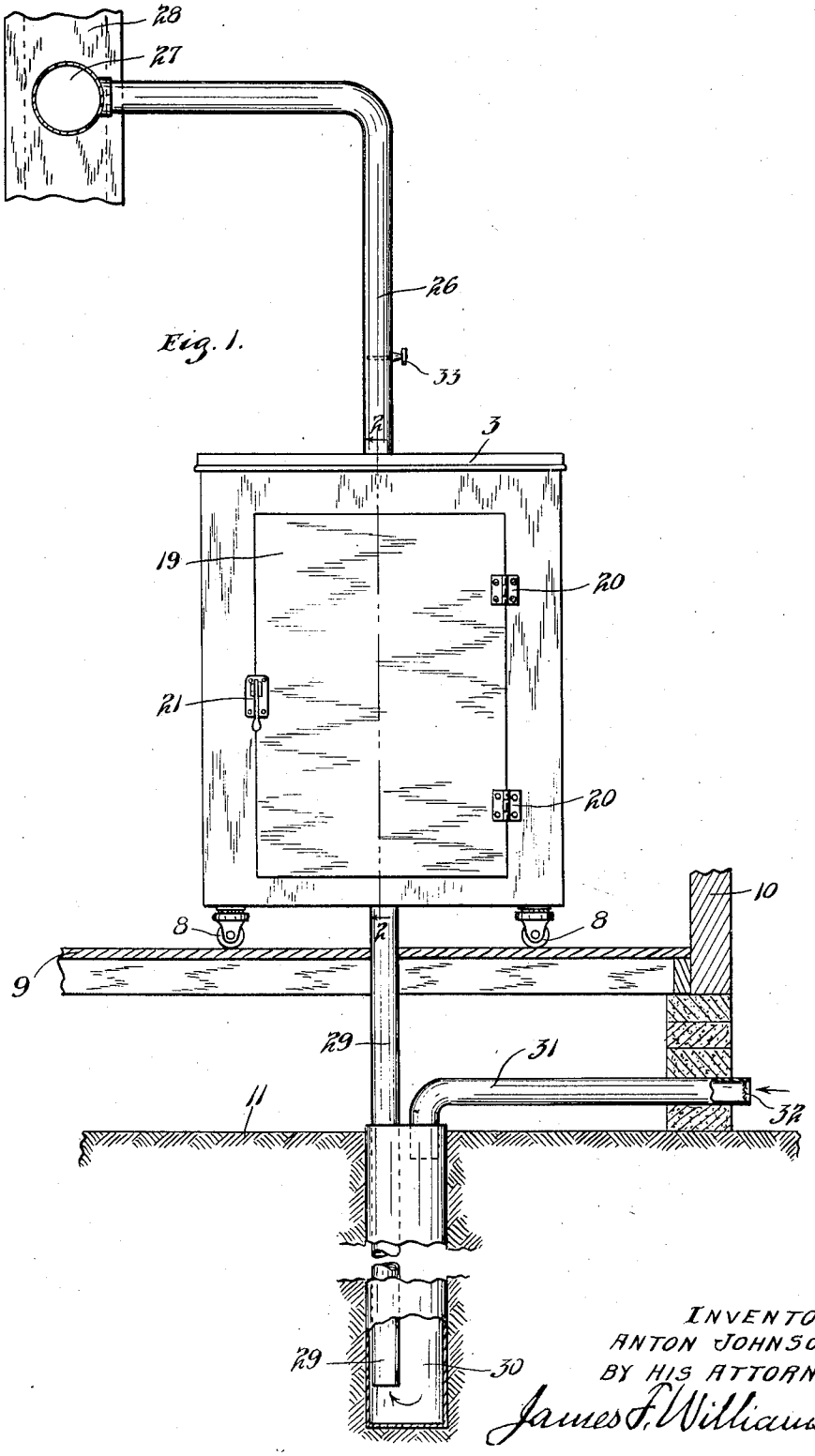


Fig. 1.

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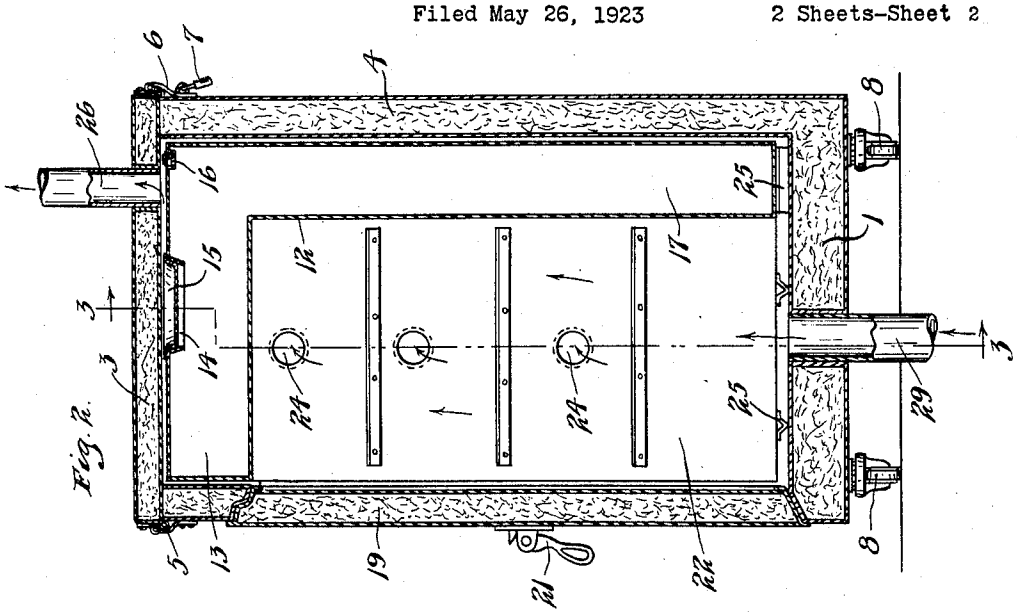


Fig. 2.

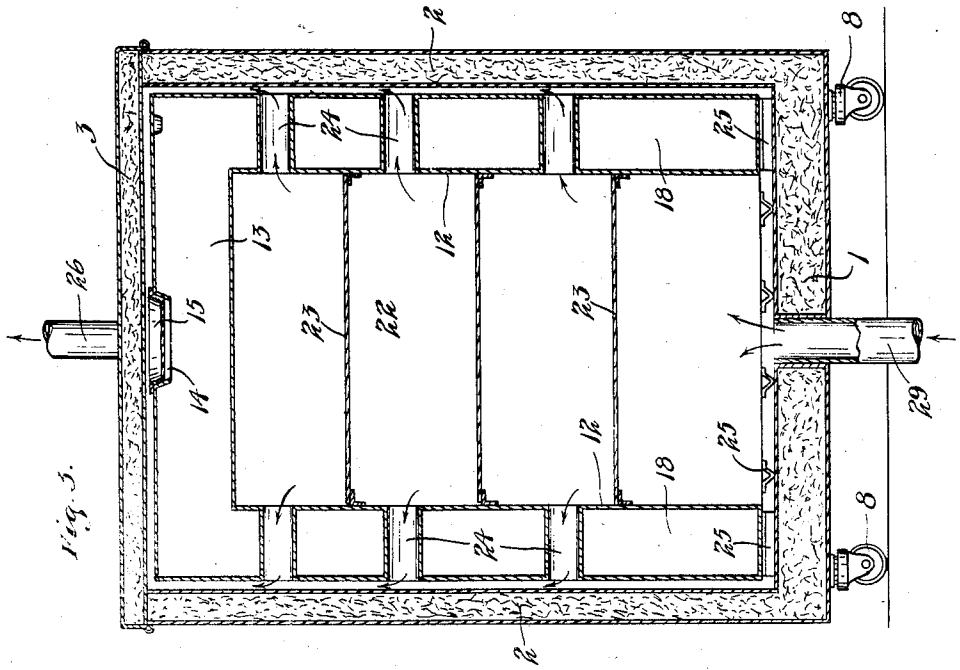


Fig. 3.

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Patented Apr. 14, 1925. 1,533,863

UNITED STATES PATENT OFFICE.

ANTON JOHNSON, OF HUNTER, NORTH DAKOTA, ASSIGNOR TO DAKOTA COOLER CORPORATION, OF FAIRMOUNT, INDIANA, A CORPORATION OF NORTH DAKOTA.

REFRIGERATOR.

Application filed May 26, 1923. Serial No. 641,612.

To all whom it may concern:

Be it known that I, ANTON JOHNSON, a citizen of the United States, residing at Hunter, in the county of Cass and State of North Dakota, have invented certain new and useful Improvements in Refrigerators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a refrigerator. Most of the refrigerators in use today are self-contained and any circulation of air taking place therein involves principally only the air contained in the refrigerator casing and any insulating effect is produced by the insulating material which is used in the refrigerator casing. It is well known that at a depth of a few feet in the earth there is an approximately uniform temperature and this temperature is quite low in the warm summer weather as compared with the temperature of the atmosphere above the earth and said temperature is also quite low compared with the temperature in a heated building.

It is an object of this invention, therefore, to provide a refrigerator and means for circulating air therethrough.

It is also an object of the invention to provide a refrigerator having a casing formed with walls of insulating material and containing a receptacle for refrigerating material, the walls of which receptacle are spaced from the casing walls to provide an air space or chamber together with means for circulating cool air through this space.

It is a further object of the invention to provide such a refrigerator and to circulate air through the space mentioned which is taken from a point several feet below the earth's surface whereby the air is cooled and to cause said circulation by connecting the upper portion of said air space with a stack or chimney.

It is more specifically an object of the invention to provide such a refrigerator in which the receptacle for the refrigerating material forms a chamber adapted to contain the food or articles to be kept cool, which chamber is connected by conduits or passages with said air space surrounding the receptacle so that the air circulates through the food chamber as well as around the receptable carrying the refrigerating material.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to the same parts throughout the different views, and in which,

Fig. 1 is a view in front elevation of the refrigerator showing the circulating means connected thereto;

Fig. 2 is a central vertical section of the refrigerator taken on the line 2—2 of Fig. 1; and

Fig. 3 is a central vertical section of the refrigerator taken on the line 3—3 of Fig. 2, as indicated by the arrows.

Referring to the drawings, the refrigerator proper comprises a casing having a bottom wall 1, vertical walls 2 and a top wall 3. These walls are formed of spaced suitably connected plates having therebetween any well known insulating material 4. The top wall 3 is formed as a hinged lid being connected by the hinge 5 to the front vertical wall and having a staple and hasp securing means 6 at its rear side, a lock 7 being illustrated as inserted through the staple to prevent opening of the lid. The said casing is illustrated as supported upon suitable castors 8 disposed substantially at the bottom corners thereof, said castors being illustrated in Fig. 1 as supported upon a floor 9 of a building, a portion of one wall of which is shown as 10, said floor 9 being disposed some distance above the surface of the earth 11. The front vertical wall 2 of the refrigerator casing is provided with a door 19 carried by hinges 20 and held in closed position by a suitable latch 21. Disposed in said casing is a tank 12 having a top portion 13 which extends across the top of the refrigerator casing and has a top wall which is spaced from the top wall 3 and also has therein the opening 14 surrounded by a downwardly extending flange. The opening 14 is adapted to receive a closing lid 15 and the top wall of the tank is further provided with an air vent opening closed by a screw plug 16. The tank 12 also has depending portions or legs 17 and 18, the former extending down along the rear vertical wall 2 and the latter extending down along

the side vertical walls 2. The portions 17 and 18 also have their outer walls spaced from the vertical walls 2 of the refrigerator casing. It will also be seen from Fig. 2 that the front wall of the portion 13 of the tank and the front wall of the portions 18 extend along the front vertical wall of the refrigerator casing and are spaced a short distance therefrom. The tank 12 thus forms an interior chamber 22 which preferably is coextensive in dimension with the door 19, which chamber is adapted to receive the food or other articles or material which it is desired to keep cool. The chamber 22 has shelves 23 extending thereacross supported upon suitable angle strips secured to the sides of the portions 18. The chamber 22 also has means connecting the same with the spaces between the tank 12 and the walls of the casing, which means comprises the conduits or thimbles 24. The tank 12 is supported in spaced relation to the bottom wall 1 of the refrigerator casing by V-shaped strips 25 suitably spaced around the bottom of the tank.

The top of the space between the tank 12 and the walls of the casing is connected by a pipe or conduit 26 to a pipe 27 connected to a suitable chimney or stack 28. This stack 28 leads outside of the building or dwelling in which the refrigerator is disposed and projects at the top thereof just the same as an ordinary chimney. The bottom of the passage between tank 12 and the refrigerator casing has extending therefrom a pipe or conduit 29 which is carried through the floor 9 and projected several feet into the earth and, as illustrated, into a casing 30 sunk into the earth. The bottom of pipe 29 preferably will extend from four to seven feet into the earth. The other end of the pipe 29 is adapted to communicate with the atmosphere adjacent the surface of the earth and for this purpose in the embodiment of the invention illustrated, the casing 30 is connected at its top with a pipe 31, the outer end of which is shown as projecting from the wall of the building and preferably is provided with a filtering screen 32.

The tank 12 is adapted to contain the refrigerating material, and while any suitable refrigerating material may be used, preferably this tank will contain the refrigerating compound disclosed and claimed in my pending application, S. N. 601,163 filed November 15 1922. The warmest air in the refrigerator will, of course rise to the top portion thereof and will pass into the pipe 26. This air will be replaced by air entering the refrigerator through pipe 29, casing 30 and pipe 31. The passage of air through the refrigerator is indicated by the arrows in Figs. 2 and 3 and it will be seen that the air rises in chamber 22 and passes through the conduits 24 into the space between the tank 12 and the casing walls. Some of the air will, of course, pass around the bottom of the tank 12 and into the space between the tank and the casing walls. The pipe 26 will be heated more or less in a building if the building is heated and a draft will thus be caused through this pipe which will cause the circulation through the passage around the tank 12 and through the chamber 22. Even in summer when there is quite a draft caused through pipe 26 by the same being heated adjacent the roof of the building. The air entering through the pipe 31 must pass to the bottom of the casing 30 before entering the pipe 29, or if the pipes 29 and 31 be made continuous the air must then also pass a considerable distance down into the earth. The air passing down into the earth is cooled and thus the air entering the bottom of the refrigerator will have a practically uniform and quite low temperature. This cool air passing around the tank 12 prevents any heat being transmitted to the tank from the outside of the refrigerator casing and thus greatly assists in the insulation of said tank. Any air entering the refrigerator is of low temperature and there is thus much less heat to be absorbed by the refrigerating medium. The circulation of the cool air about the refrigerator therefore results in a saving of refrigerating material and much less quantity of such material will be necessary. A damper 33 is provided in pipe 26 in order to regulate the circulation which, in some cases, may be too rapid.

From the above description it is seen that applicant has provided a simple and efficient construction of refrigerator and means for causing a circulation of cool air therethrough. The necessary connections can be made with little trouble and there will be no considerable additional expense in the installation. The refrigerator has been tried out in actual practice and the successful operation thereof amply demonstrated.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of applicant's invention, which, generally stated, consists in the matter shown and described and set forth in the appended claims.

What is claimed is:

1. A refrigerator comprising a casing having top, bottom and vertical side walls, a door in one of said vertical walls, a removable tank having a top portion with a top wall spaced from the top wall of said casing, and portions extending downwardly along the vertical wall of said casing and spaced therefrom, the said tank being supported in spaced relation from the bottom wall at the back and both sides of said tank by means of spaced supports, and having a chamber formed by the inner portions of

the side members and rear member of said tank and the lower portion of the overhanging part of said tank connecting the side members, the chamber thus formed being in alinement with said door.

2. A refrigerator comprising a casing having insulating top, bottom and vertical walls, a door in one of said vertical walls, means in said casing forming a comparatively narrow air space along the top wall and the vertical walls except that portion forming the door, a chamber in said casing adjacent said door, means connecting said chamber with said air space, and means for causing a circulation of cool air upwardly through said air space.

3. The structure set forth in claim 2, said last named means comprising a conduit connected to the top of said are space and communicating with a chimney, and a pipe connected to the bottom of said air space and extending several feet into the earth and having means for the entry of air therein disposed substantially at the earth's surface.

4. A refrigerator comprising a casing having insulating top, bottom and vertical walls, an insulating door in one of said vertical walls, a tank within said casing having spaced inner and outer walls, the inner walls forming a chamber having an open side alined with said door, the outer walls of said tank being spaced from said insulating walls to form a comparatively narrow passage, conduits connecting said chamber with said passage, a conduit connecting the top of said passage with a chimney, and a conduit communicating with the bottom of said passage and extending several feet into the earth and communicating at its other end with the atmosphere substantially at the earth's surface.

5. A refrigerator comprising a casing having insulating top, bottom and vertical walls, a door in one of said vertical walls, a removable tank for refrigerating material having a portion extending across the top of said casing and having legs extending down along said vertical walls except that portion occupied by said door, said tank having its outer walls spaced from the walls of said casing to provide a narrow air space, and also forming a chamber at its inner side, a plurality of conduits connecting said chamber to said air space at each side of said chamber, means connecting the top of said air space to a chimney, and means connected to the bottom of said air space and passing several feet into the earth and communicating with the atmosphere substantially at the earth's surface.

6. The combination with a refrigerator having a food chamber therein and an insulating space about the walls thereof, of a conduit connecting the top of said insulating space and chamber, a subterranean chamber, a conduit extending from the bottom of said insulating chamber to adjacent the bottom of said last mentioned chamber, and a conduit extending from adjacent the top of said subterranean chamber to the atmosphere substantially at the surface of the earth.

In testimony whereof I affix my signature.

ANTON JOHNSON.