Nov. 28, 1933. V. V. TORBENSEN 1,936,889

REFRIGERATION UNIT

Filed Nov. 24, 1930 3 Sheets-Sheet 1

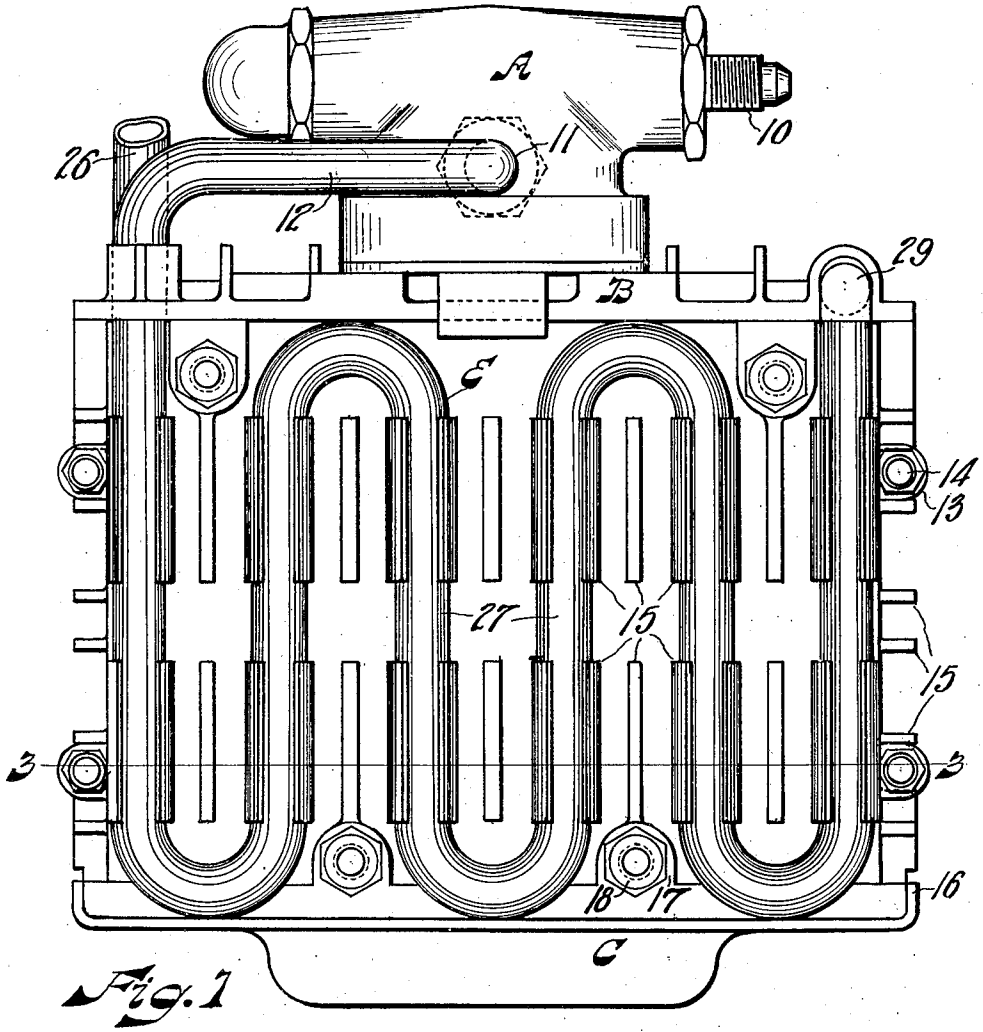


Fig. 1

INVENTOR
V. V. Torbensen
BY
C. J. Heinkel.
ATTORNEY

Nov. 28, 1933. V. V. TORBENSEN 1,936,889

REFRIGERATION UNIT

Filed Nov. 24, 1930 3 Sheets-Sheet 2

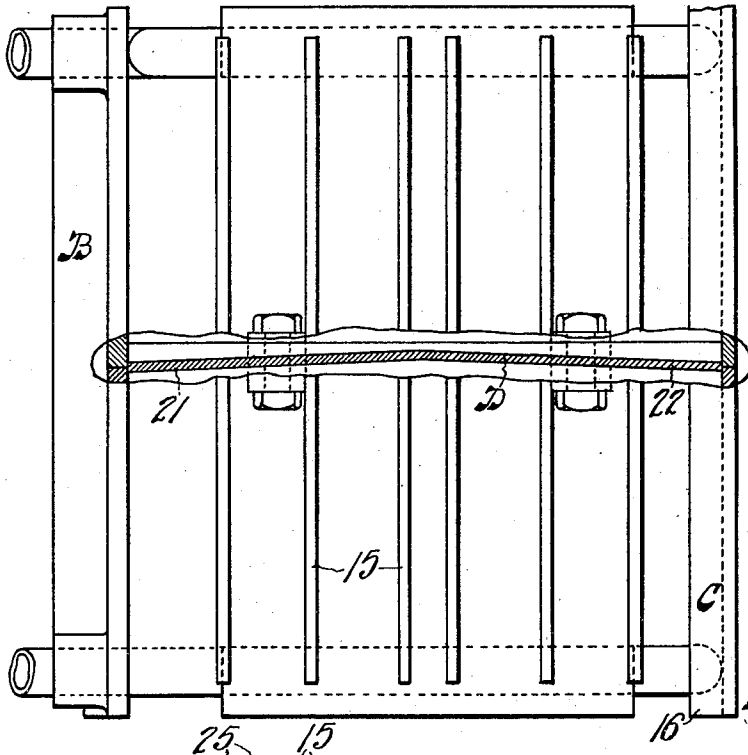


Fig. 2

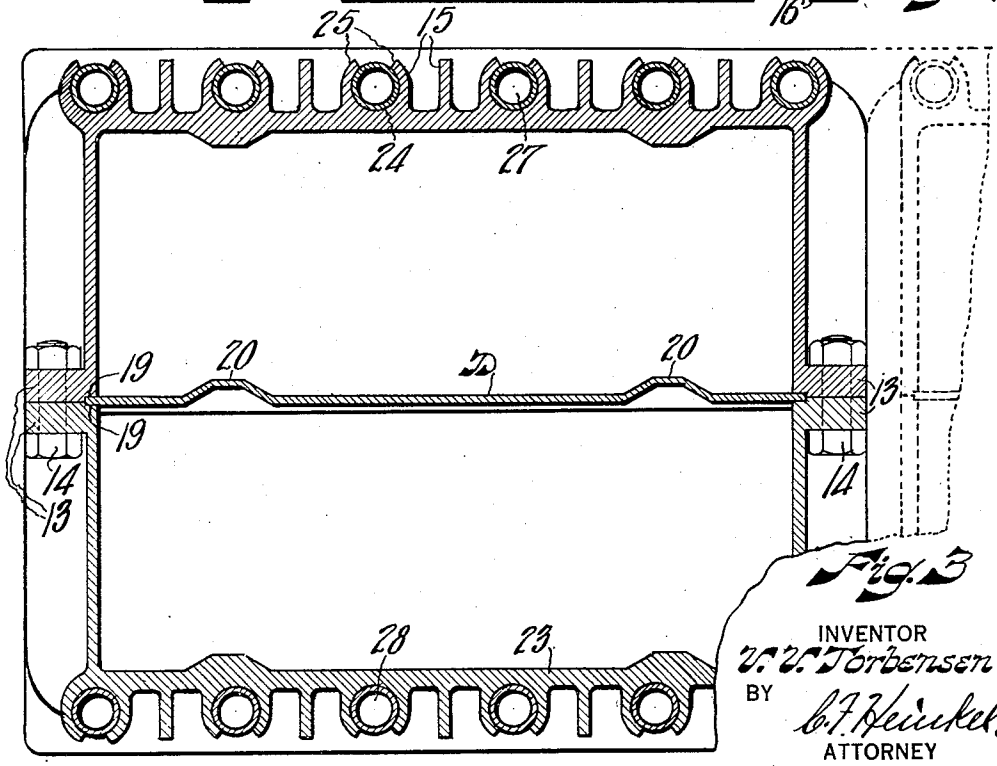


Fig. 3

INVENTOR
V. V. Torbensen
BY
C. J. Heinkel,
ATTORNEY

Nov. 28, 1933. V. V. TORBENSEN 1,936,889

REFRIGERATION UNIT

Filed Nov. 24, 1930 3 Sheets-Sheet 3

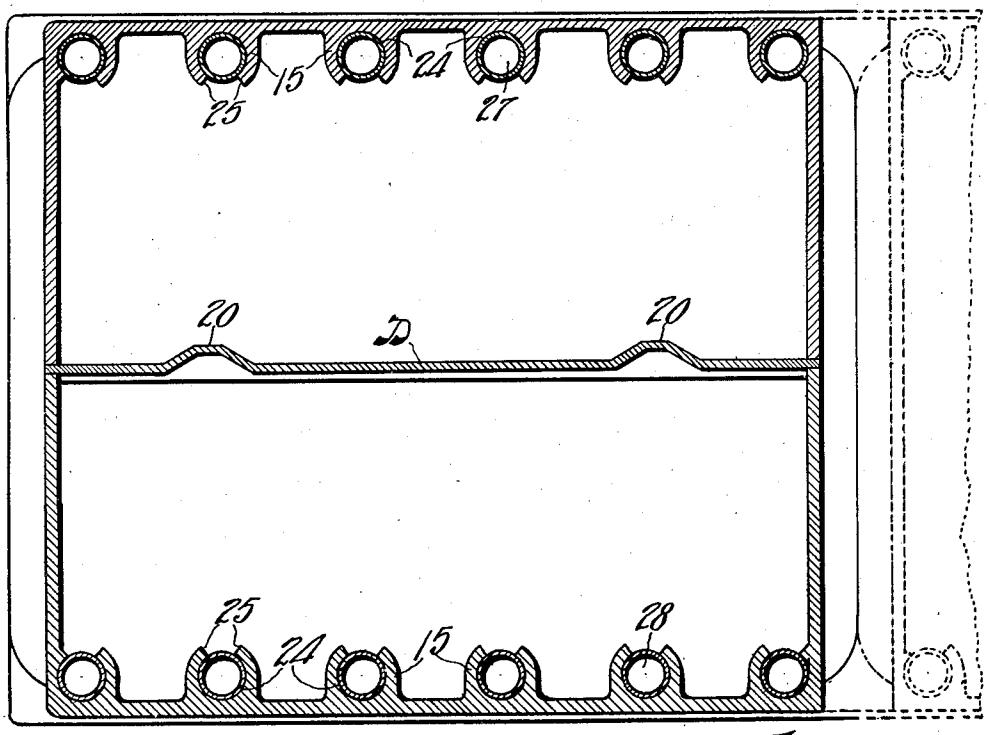


Fig. 4

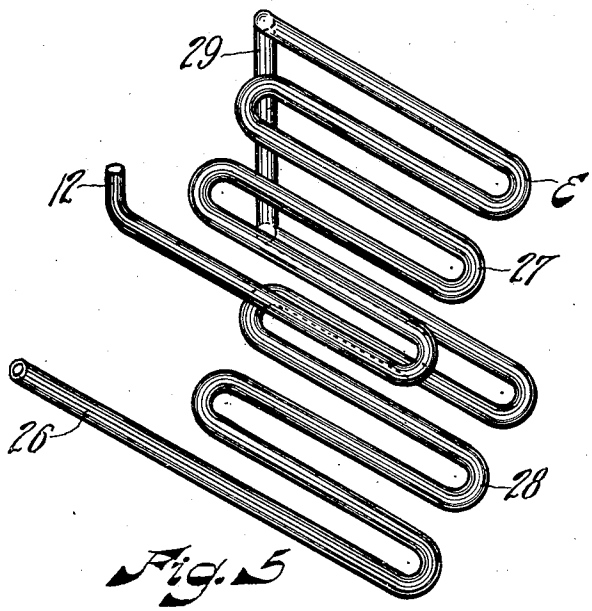


Fig. 5

INVENTOR
V. V. Torbensen
BY
C. F. Reinckel.
ATTORNEY

Patented Nov. 28, 1933 1,936,889

UNITED STATES PATENT OFFICE

1,936,889

REFRIGERATION UNIT

Viggo V. Torbensen, Cleveland, Ohio

Application November 24, 1930
Serial No. 497,771

19 Claims. (Cl. 62—95)

My invention relates to freezing units generally and more particularly to refrigeration units into which articles can be inserted for reduction of temperature thereof.

Objects of my invention are: a simple, inexpensive, easily operable, and economically operable refrigeration unit; conveying refrigerating temperature more directly to articles than heretofore; reducing cost of production of the refrigeration devices now in use; reducing cost of freezing or refrigeration; and providing a device in which access to the interior as well as to the exterior thereof can be had easily and conveniently.

Other objects will be pointed out more specifically in this specification, or will become obvious or apparent, or will suggest themselves upon an inspection of this specification and the accompanying drawings forming a part thereof.

In the accompanying drawings mentioned above, I have shown one general type of refrigeration unit and one general type of casing and refrigerating tubes and the tubes on the outside of the casing in one instance and on the inside in another instance. In both instances, the tube extends over two opposite walls of the casing.

However, I am aware that my invention can be embodied in other types of refrigeration units and in other tube arrangements.

In the accompanying drawings mentioned above:

Fig. 1 is a plan view of a certain refrigeration unit embodying my invention and showing the refrigerating tubes on the outside of two opposite sides of the casing thereof.

Fig. 2 is a side view of Fig. 1 partly in section to more clearly show the partition in the casing.

Fig. 3 is a transverse section taken in a plane indicated by the line 3—3 in Fig. 1.

Fig. 4 is a section similar to Fig. 3 showing a one piece casing, two parts welded together, with a partition therein and the refrigerating tubes on the inside of the casing.

Fig. 5 is a perspective view of the refrigerating tube of Fig. 1.

Similar reference characters refer to similar parts throughout the views.

The unit shown has the device A in this instance attached to the casing which device has the inlet end 10 for connection thereto of a convenient refrigerant producing means of special or known design not shown in the drawings and also has the outlet 11 for connection thereto of the inlet end 12 of the refrigerating tube.

The casing is, in this instance, made of two duplicate parts each having the ears 13 projecting outwardly therefrom and the bolts 14 through the corresponding ears for tightly clamping and holding the two parts together.

The casing strengthening and temperature radiating ribs 15 are provided on walls of the casing.

The body of the casing is open at both ends in this instance and has the head B on one end thereof to close that end and also has the cover C removably on the other end to close the same for refrigeration of articles and to open the same for insertion and removal of articles into and from the casing.

The flange 16 of the cover telescopes over a part of the casing and may be made to fit sufficiently tight to the casing for necessary sealing and to hold the cover on the casing.

As an additional holding means for the cover on the casing, the ears 17 may be provided to extend inwardly of the casing and over corresponding bosses in the casing and the screws or bolts 18 extending through the ears and bosses.

The device A is shown as being attached to the head B in this instance.

The partition D divides the casing into two chambers each of which can receive articles to be refrigerated, such as pans with water to be frozen into ice or other articles wherein the temperature is to be reduced.

The partition is held in position through the counter-sinks 19 in the casing parts and the bolts 14 which hold the parts together.

The two part casing affords easy and convenient and economical production of the casing, easily taken apart for cleaning or inspection and easily assembled. The casing can, of course, be made in one piece with the partition therein as by casting for instance.

The partition has the elevated article contact ridges 20 on the top thereof for pans or other articles to rest upon and not having the entire contactable surface thereof in contact with the partition so that the entire contactable surface cannot freeze onto the partition and the articles can be removed easily.

The spaces between the bottom of the articles and the top of the partition, adjacent to the ridges affords a ready means for drainage to further prevent freezing of articles onto the partition.

Parts of the partition, 21 or 22 for instance, may slope downwardly to increase the drainage.

The top of the wall 23 of the casing can and preferably has the same or equivalent features as the top of the partition.

In Figs. 1 to 3, the casing has the ribs on the outside thereof. Some of the ribs on two opposite walls of the body, top and bottom walls in this instance, being arranged in pairs, speced from each other a distance equal to the diameter of the hereinafter described portions of the refrigerating tube. The bottom of the space between the pairs of ribs being rounded of the same curvature as the outside of the tube. This for-

mation provides a series of grooves 24 for close contact of the tube parts onto the wall of the casing and this contact is augmented and the contact area of the tube parts on the casing is increased by the ribs bent over against the tube parts as seen at 25.

The refrigerating tube E, a one piece tube in this instance, has the inlet end 12 thereof connected to the device A and the outlet end 26 thereof may lead to a drainage but preferably leads back to the refrigerant producing means mentioned above to be used again for formation of refrigerant.

Intermediate the ends, the tube has two sinuous portions comprising the tube parts 27 and 28, respectively, and the connected part 29 between the two parts.

The parts 26 and 27 of the respective tube portions are arranged sinuously, repeatedly traversing or disposed back and forth as shown in Fig. 3.

Two tube portions are shown or used in the present instance but it is obvious that one only or three or more could be used to contact only one wall or three or more of them or to extend into the casing even without contact on a wall.

In Fig. 4, the casing has the ribs 15 and the grooves 24 on the inside of the casing walls.

The two tube portions are telescoped over the outside of opposite walls of the casing in the unit shown in Figs. 1 to 3 and over the inside of opposite walls of the casing in the unit shown in Fig. 4 from the head end of the casing while the head B is off of the body; there being sufficient resiliency or flexure in the tube part 29 to permit these two tube portions to spread sufficiently far apart to clear the ribs on the walls.

When the sinuous parts of the tube portions lie in the respective grooves; the ends of the ribs adjacent to the parts are then bent over against the respective parts and thereby hold the tube in position and firmly onto the bottom of the grooves and increase the contact area between the tube and the casing for better temperature radiation.

When the unit is in operation, the temperature in the tube is lowered and this lowered temperature is conveyed to the walls of the casing and to the fins in a direct manner due to the close contact of the tube on the casing and fins and thereby reduces the temperature effectively and efficiently in the casing for refrigeration purposes including the formation of ice in pans or otherwise.

In the unit shown in Fig. 4, the exposed part of the tube is directed into the interior of the casing. This feature results in more efficient refrigeration but has the disadvantage of, in some instances, permitting drippings from the tube onto articles in the casing. This type of unit is preferable when there is no dripping from the tube or when the dripping is not objectionable.

It is preferred that the walls of the casing and the ribs be made as thin as possible for quick radiation of temperature.

Any number of units, side by side as indicated in Fig. 4 or on top of each other may be inclosed in refrigerator boxes or in refrigerator cabinets.

When more than one evaporator unit is used, the tubes thereof can be connected in series or each tube can be indivually connected to the refrigerant producing means as best suits particular conditions to be met.

I am aware that my invention is applicabe for devices other than the unit specifically shown and described herein as mentioned above and I am also aware that changes and modifications can be made in the structure and arrangement of the elements or parts of the unit specifically shown and described herein, within the scope of the appended claims; therefore, without limiting myself to the precise application of my invention as shown and described nor the specific structure and arrangement of elements or parts as shown and described.

I claim:

1. A refrigeration unit including a casing, ribs on walls of said casing, a refrigerating tube suitably formed for telescopically imposing the same over walls of said casing and between certain ones of said ribs, and said certain ribs bent over against portions of said tube for increased contact area between said casing and said tube and to hold said tube to said casing.

2. A refrigeration unit including a casing, tube receiving grooves in walls of said casing, ribs adjacent to said grooves, a refrigerating tube suitably formed for telescopically imposing the same over said walls with grooves and disposed in said grooves, and said ribs bent over portions of said tube.

3. A refrigeration unit including a casing, ribs on said casing, and a refrigerating tube comprising a part formed to sinuously wind between said ribs on one side of said casing and a part formed to sinuously wind between said ribs on another side of said casing and connected to the firstly mentioned part.

4. A refrigeration unit, including a casing, ribs on said casing, and a refrigerating tube comprising a part formed to sinuously wind between said ribs on one side of said casing and a part formed to sinuously wind between said ribs on another side of said casing and connected to the first mentioned part and corresponding of said ribs bent against said tube to increase the contact area between sides of said casing and said tube.

5. A refrigerating unit including a casing composed of two adjacent parts, a partition between said parts to provide two refrigerating compartments in said casing, means to receive and retain refrigerating tubing in contact with walls of said casing, and a clamping means to hold said adjacent parts together and thereby also retain said partition in position.

6. A refrigerating unit including two casings each having one side thereof open, both open sides facing each other to form said unit, a partition between said casings to provide two individual refrigerating compartments in said unit, a clamping means to hold said casings together and thereby also retain said partition in position, and means on said casings to receive refrigerating tubes and to hold the same in contact with walls of said casings.

7. A refrigerating unit including two casings each having one side thereof open, both open sides facing each other to form said unit, temperature radiating ribs on said casings, a partition between said casings to provide two individual refrigerating compartments in said unit, a clamping means to hold said casings together and thereby also retain said partition in position, refrigerating tubing between corresponding ones of said ribs and on and in contact with walls of said casings and sinuously formed for individual walls thereof, and said ribs adjacent to said tubing being bent against the corresponding tubing to increase the contact area of said tubing on said casings.

8. A refrigeration unit including a casing having ribs extending from walls thereof, a tube having parts thereof passing over walls of said casing and adjacent to at least some of said ribs, and at least some of said ribs bent over and against the corresponding parts of said tube for increased contact area between said casing and said tube and to hold said tube to the casing.

9. A refrigeration unit including a casing, a refrigerating tube suitably formed for telescopically imposing the same over at least opposite walls of said casing, ribs on said casing forming locating means for parts of said tube and bent over and against the parts to secure said tube in position and to increase the contact area between said tube and said casing and to intensify the contact.

10. A refrigeration unit including a casing, having grooves in walls thereof and a separately formed one piece refrigerating tube composed of suitably formed sinuous portions to releasably lay in said grooves when said tube is telescoped over said walls.

11. A refrigeration unit including a casing having tube receiving grooves in walls thereof and a separately formed refrigerating tube suitably formed for telescopically imposing the same over and release from said walls having grooves and disposed in said grooves when said tube is applied to said casing.

12. A refrigeration unit including a casing having positionally fixed walls, a refrigerating tube adapted to be removably extended over walls of said casing, and releasable means on said casing to hold said tube in position after the same is extended over said walls.

13. A refrigeration unit including a casing having positionally fixed walls, a removable refrigerating tube having sinuous portions in contact with walls of said casing, and releasable means for holding said sinuous portions in intimate contact with the corresponding walls.

14. A refrigeration unit including a casing having grooved wall portions, a refrigerating tube having sinuous portions in contact with grooved portions of outer surface of walls of said casing, and releasable means for holding said sinuous portions in said grooved portions and in intimate contact therewith.

15. A refrigeration unit including a casing, a refrigerating tube having sinuous portions in contact with grooved portions of inner surface of walls of said casing, and releasable means for holding said sinuous portions in said grooved portions and in intimate contact therewith.

16. A refrigeration unit including a casing, a refrigerating tube having two sinuous portions in contact with opposite walls of said casing, and releasable means on said walls to hold and intimately contact said sinuous portions to the corresponding one of said walls.

17. A refrigeration unit including a casing having a body open at each end and made of two jointed together halves, a refrigerating tube in contact with walls of both of said halves, and a closure member on each end of said body and each covering the corresponding open ends of both of said halves.

18. A refrigeration unit including a casing having a body open at both ends and made of two jointed together halves, a refrigerating tube in contact with walls of both of said halves, a partition between and held in position by the juncture of said two halves, and a closure member on each end of said body and each covering the corresponding open end of both of said halves.

19. A refrigeration unit including a casing having a body open at both ends and made of two jointed together separable halves, a refrigerating tube in contact with walls of both of said halves, a partition between and held in position by the juncture of said two halves, a closure member permanently on one of said ends and covering the corresponding ends of both of said halves, and a closure member removable on the other one of said ends and cover the corresponding ends of both of said halves.

VIGGO V. TORBENSEN.