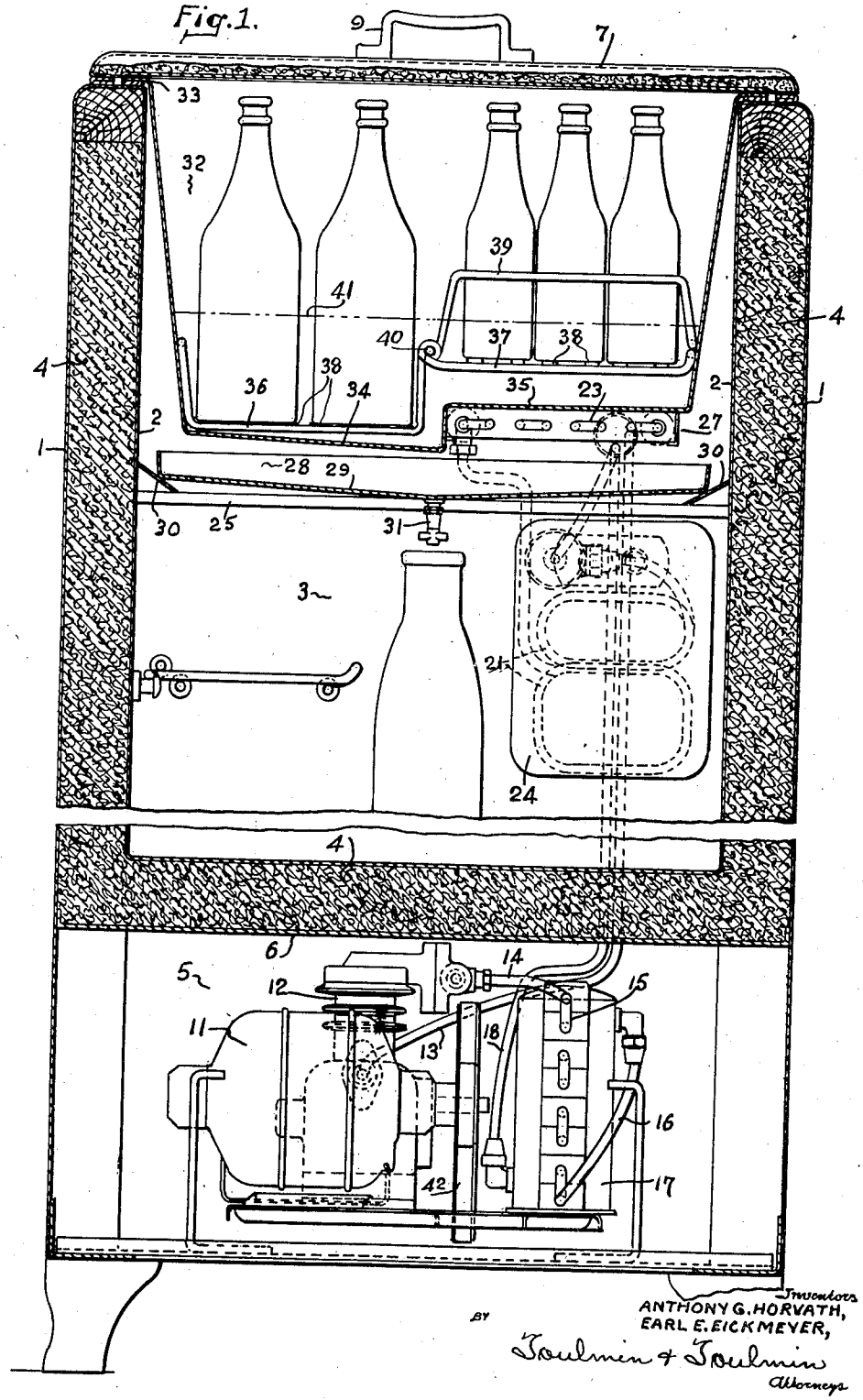
July 14, 1936. A. G. HORVATH ET AL 2,047,415

REFRIGERATOR

Filed Nov. 20, 1933 6 Sheets-Sheet 1

Fig. 1.



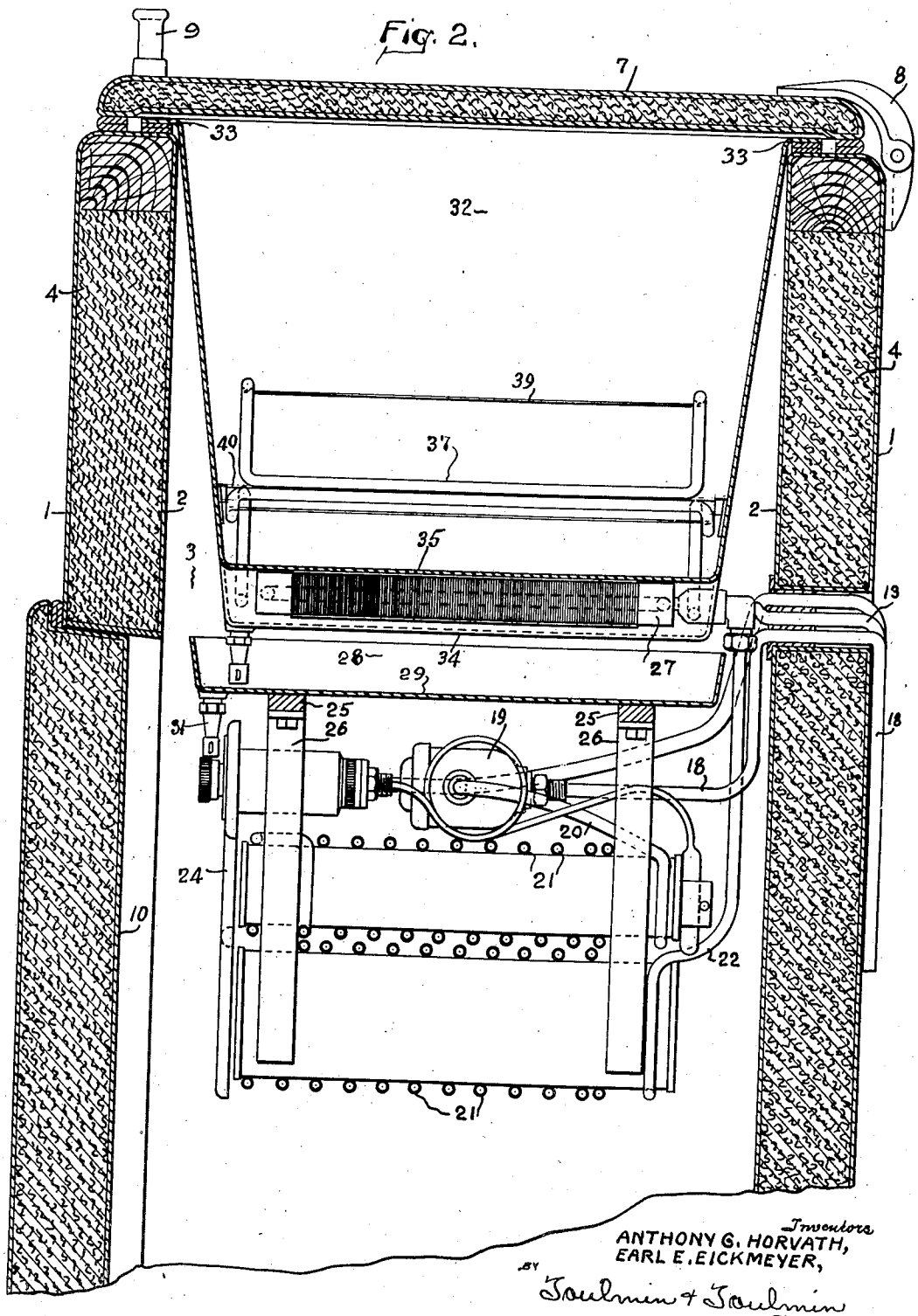
Inventors
ANTHONY G. HORVATH,
EARL E. EICKMEYER,
BY Toulmin & Toulmin
Attorneys

July 14, 1936. A. G. HORVATH ET AL 2,047,415

REFRIGERATOR

Filed Nov. 20, 1933 6 Sheets-Sheet 2

Fig. 2.



Inventors
ANTHONY G. HORVATH,
EARL E. EICKMEYER,
BY
Toulmin & Toulmin
Attorneys

July 14, 1936. A. G. HORVATH ET AL 2,047,415

REFRIGERATOR

Filed Nov. 20, 1933 6 Sheets-Sheet 3

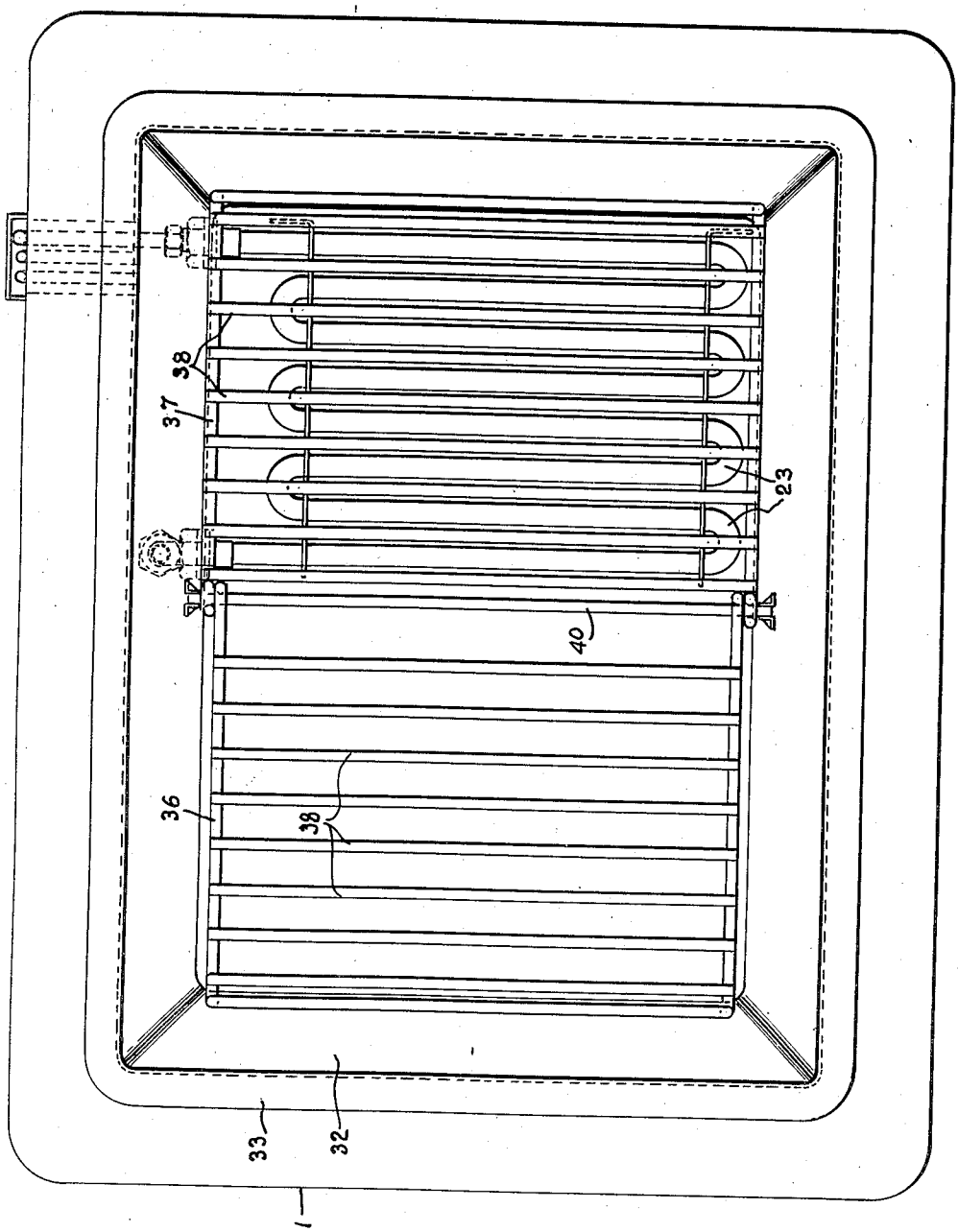


Fig. 3.

Inventors
ANTHONY G. HORVATH,
EARL E. EICKMEYER,

By Toulmin & Toulmin
Attorneys

July 14, 1936. A. G. HORVATH ET AL 2,047,415

REFRIGERATOR

Filed Nov. 20, 1933 6 Sheets-Sheet 4

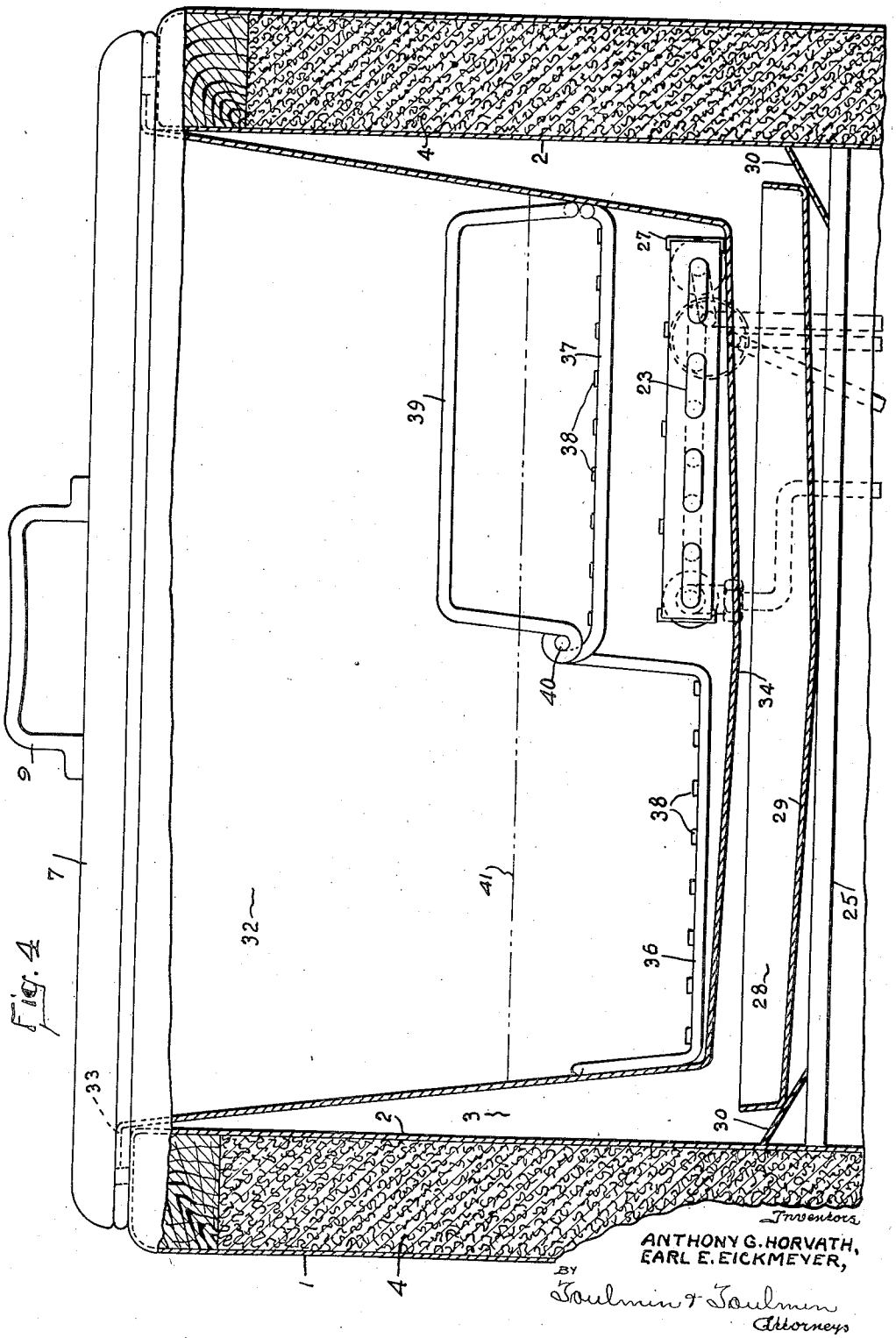


Fig. 4

Inventors
ANTHONY G. HORVATH,
EARL E. EICKMEYER,
BY
Toulmin & Toulmin
Attorneys

July 14, 1936. A. G. HORVATH ET AL 2,047,415

REFRIGERATOR

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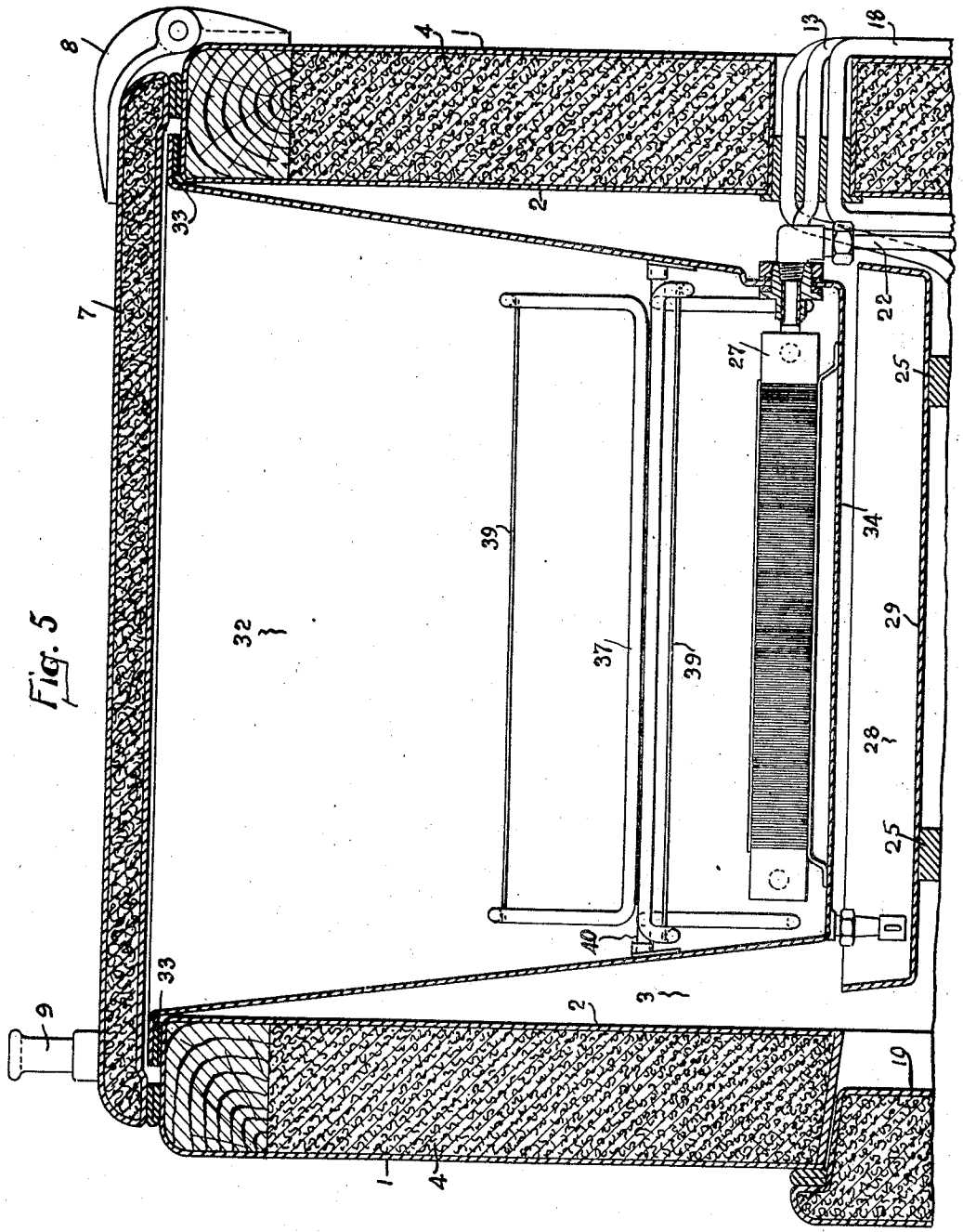

Fig. 5

Inventors
ANTHONY G. HORVATH,
EARL E. EICKMEYER,
By
Toulmin & Toulmin
Attorneys

July 14, 1936. A. G. HORVATH ET AL 2,047,415

REFRIGERATOR

Filed Nov. 20, 1933 6 Sheets-Sheet 6

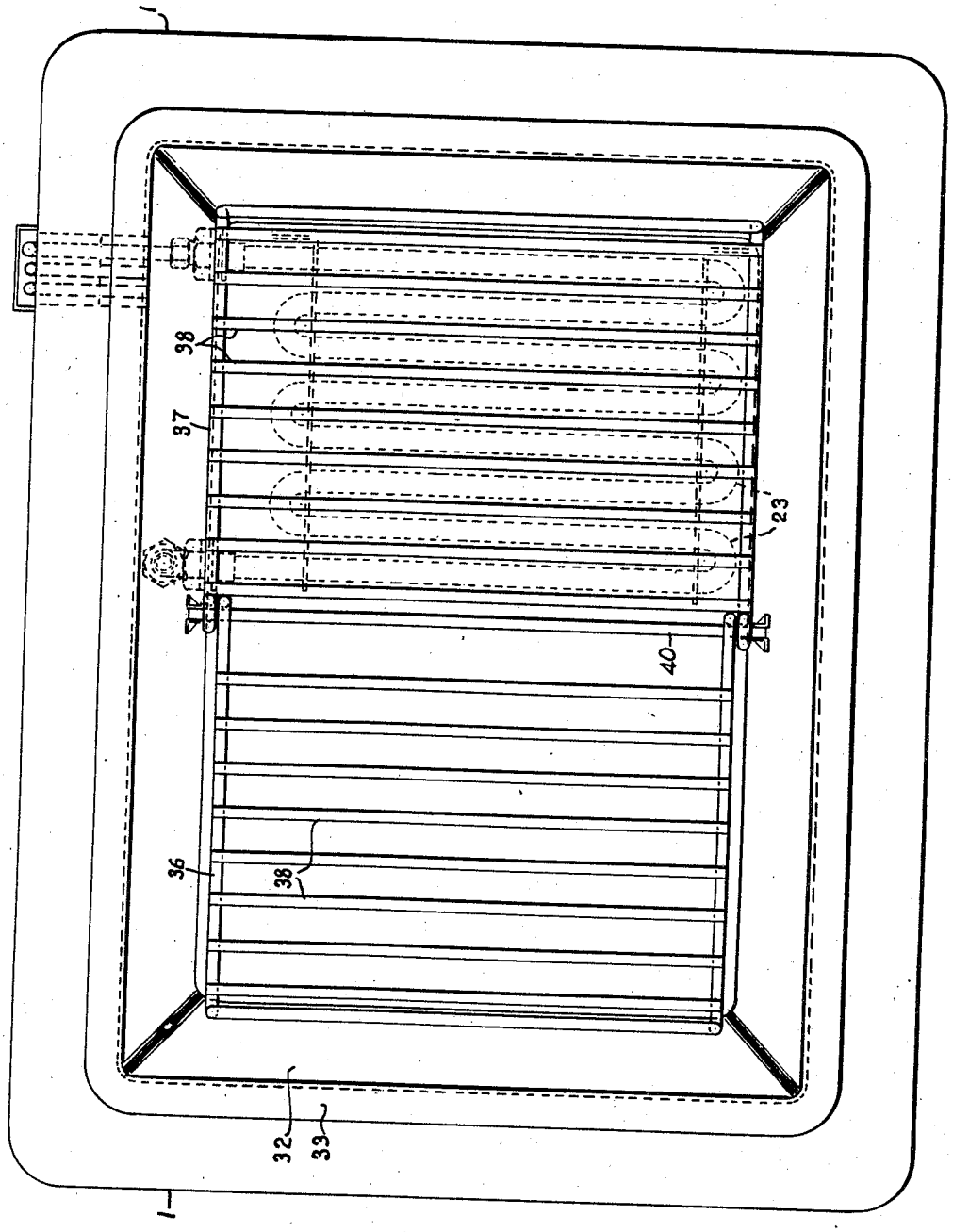

Fig. 6

Inventors
ANTHONY G. HORVATH,
EARL E. EICKMEYER,

By Toulmin & Toulmin
Attorneys

Patented July 14, 1936 2,047,415

UNITED STATES PATENT OFFICE

2,047,415

REFRIGERATOR

Anthony G. Horvath and Earl E. Eickmeyer, Dayton, Ohio, assignors to The Dayton Pump and Mfg. Company, Dayton, Ohio, a corporation of Ohio

Application November 20, 1933, Serial No. 698,738

16 Claims. (Cl. 62—116)

This invention relates to improvements in refrigerators, and has for its object to provide a refrigerator with separate compartments, each adapted to contain a special form of food and to preserve it free from contamination with the food or ingredients in the other compartment.

It is an object of this invention to provide a refrigerator having a plurality of refrigerating compartments, each having its own refrigerating element connected to and operated by a single condenser.

It is also an object of the invention to provide a refrigerator which has therein means for effecting a dry refrigeration and also means for effecting wet refrigeration.

It is another object to provide, in a refrigerator, a plurality of compartments, separate and distinct from each other and each provided with its own means of access.

It is a further object to provide a refrigerator having a plurality of compartments and heat-transmitting partitions between the compartments so that the heat may be transmitted readily from one compartment to another for refrigerating purposes.

It is an object to provide a common cabinet divided into a top compartment, which does not communicate with the rest of the interior of the cabinet, and a lower compartment; and the common cabinet has a lid for closing the upper compartment, while a door gives access to the lower compartment. The upper compartment is capable of containing liquids so that vegetables may be kept in a cool condition.

It is a further object to provide the usual cooling unit in the lower compartment, which has connected to it a supplementary cooling unit, either below the upper compartment but closely adjacent it, or within the upper compartment. If within the upper compartment then its cooling unit is immersed within the liquid in the upper compartment.

It is a further object to provide the upper compartment with a floor at different levels, and suitable racks for retaining whatever types of material may be in the upper compartment.

It is an object to provide the lower compartment with a dry refrigeration, due to the dry air thereof, but the partition between the upper and lower compartments being of heat-transmitting material, such as metal, it will serve to form an additional cooling area for the respective compartments, and the liquid in the upper compartment will act as a storage medium for the storing of cold. Vegetables in the upper compartment are thus prevented from drying out, which they would do in the lower compartment, and they are prevented from contaminating foods in the lower compartment.

It is possible to enter either compartment without disturbing the contents or cold condition of the other compartment. Furthermore, the upper compartment containing bottles, makes it possible to select from the top whatever bottle is desired, which is not possible when bottles are stored in a compartment where access is from the side.

The upper compartment temperature is not disturbed by frequent opening of the compartment, due to the storage of cold in the cold water bath and because the cold air remains trapped in the compartment. Thus articles which are subject to more frequent attention would be segregated in the upper compartment.

These and other advantages will appear from the following description taken in connection with the drawings.

Referring to the drawings:

Figure 1 is a vertical section through a refrigerator, showing the arrangement of the compartments and the arrangement of the refrigerating agencies.

Figure 2 is a vertical section through the top of the refrigerator casing, showing the relation of two compartments and the refrigerating instrumentalities connected therewith.

Figure 3 is a top plan view of the refrigerator with the lid or cover removed, according to the form shown in Figure 4.

Figure 4 is a vertical section showing the top compartment of the refrigerator, and a modified form of compartment.

Figure 5 is a section taken at right angles to the section of Figure 4, showing the same parts of the refrigerator.

Figure 6 is a top plan view of the refrigerator shown in Figure 1.

The refrigerator has the usual body consisting of a framework having thereon an outside casing 1, an inside interior lining 2, spaced from the outside casing by means of an insulating material 4. The inside lining forms the cooling compartment 3, which has beneath it an operating compartment 5, separated therefrom by means of a partition 6 and insulating material, such as 4.

The cooling compartment 3 is closed at the top by means of a lid or cover 7 connected to one side of the casing by means of hinges 8. The opposite side of the cover or lid from the hinges has thereon a handhold or grip member 9. In order to have access to the interior of the casing there is provided in one side an opening which is closed by means of a door or closure 10, having the usual hinges and latch member.

In the operating compartment, which is in the lower part of the casing, there is a motor 11 for operating a compressor 12. In the intake side of the compressor is a suction pipe 13, while from

the outlet side of the compressor there extends a pipe 14, which leads from the compressor to the condensing coils 15, suitably supported adjacent the compressor and the motor. These coils are connected by means of a pipe 16 to a liquid tank 17, from which a liquid pipe 18 extends for conducting the refrigerating liquid from the tank to the refrigerating coils.

In the compartment 3 of the casing is a refrigerating unit 24, which includes a header 19 connected by a pipe 20 to the coils 21. These coils are connected by a pipe 22 to coils 23 of another refrigerating unit, which is connected to the pipe 13. The header 19 and the coils 21 form the lower refrigerating unit 24. Extending transversely of the cooling compartment and above the unit 24 is a plurality of bars 25, which have attached thereto brackets 26 for supporting the refrigerating unit 24.

Supported above the refrigerating unit 24 and above the bars 25 is a frame 27 for supporting the coils 23 of the second refrigerating unit. Between the two refrigerating units and supported by the bars 25 is a drip pan 28, which has a bottom 29. In addition to the bars 25, this drip pan is supported by means of supports 30 attached to the sides of the refrigerating casing. The bottom of the drip pan slopes downwardly and has extending therefrom a draincock 31.

This drip pan is between the two refrigerating units and partly serves to divide the whole refrigerating chamber into two compartments, one for dry refrigeration and the other for moist refrigeration. Supported in the top of the casing and by the walls thereof is a container 32, which has around its upper edges flanges 33 for engaging the tops of the walls of the container, and these flanges fit between the walls of the container and the cover or lid 7. The bottom of this container may be substantially flat or curved, as shown in Figure 4, with the upper refrigerating unit located therein, or the container may have a bottom having one part 34 beneath another part 35, so that a space is provided beneath the bottom and one side of one part thereof for the upper refrigerating unit, as shown in Figure 1.

When the bottom has no offset, such as that shown in Figure 1, the refrigerating unit is placed within the container adjacent the bottom, as shown in Figures 4 and 5. In the bottom of the container 32 there is a frame for supporting either bottles or vegetables in the container. This frame consists of two parts, a lower one 36 and a more elevated one 37, to one side of the lower part.

In the form of container shown in Figure 1 the part 37 is immediately above the upper refrigerating unit. This refrigerating unit is designed and intended particularly for refrigerating purposes in connection with the container 32. As shown in Figures 3 and 4, this frame may be provided with slats 38 for supporting vegetables, bottles and the like thereon. There also may be provided in connection with either one of the parts of the frame, a rack 39 for preventing bottles and the like, supported on the frame, from being tilted. This frame is held in position and partly supported by means of a transverse rod 40.

The container 32 provides an airtight compartment, separate and distinct from that part of the casing beneath the container. This container may contain a certain amount of water, the level of which is indicated by the numeral 41. This water being maintained in a cool condition is adapted to cool bottles of beer, and other liquids. This container may contain various kinds of vegetables that give off offensive odors which might contaminate any food being refrigerated in the other part of the refrigerator. This part of the refrigerator is well adapted to contain such foods or materials as must be maintained in a moist condition, while the part of the refrigerator beneath the container is adapted to dry refrigeration and contains those foods which must be kept free from an undue amount of moisture.

The pan 28 is for the purpose of catching the drippings that might be formed on the side of the container 32 and to prevent the drippings from contaminating any food being refrigerated in the lower part of the refrigerator casing. The motor operates the condenser by means of a belt 42, which may also operate a fan for forcing air over the condensing coils.

When it is desired to remove a bottle, or any other material contained in the container 32, the cover or lid 7 is elevated. This elevation of the lid does not affect the temperature of the part of the refrigerator beneath the container because the two are separated, and since the bottles contained within the container are partly immersed in water, the opening and closing of the lid will not materially affect the temperature of the articles within the container 32.

While this container is shown partly filled with water, it may be used without water and for refrigerating any kind of vegetable desired. The foods or other materials in the lower part of the refrigerator can be removed without disturbing the articles in the container. This is simply done by means of the opening closed by the closure or door 10.

The refrigerant, in the form of liquid, passes from the tank, through the pipe 18 into the header 19. From this header it passes as vapor around the coils 21. These coils serve to refrigerate the interior of the refrigerator, and particularly that part of the refrigerator beneath the container 32. The refrigerant having passed through the coils 21 enters the pipe 22, and from this pipe passes through the coils 23 of the upper refrigerating unit. After having passed through the upper refrigerating unit the refrigerant, in the form of gas, is drawn through the pipe 13 back to the condenser.

By having the refrigerant pass through two sets of coils all of the refrigerating qualities have been taken advantage of. When the refrigerant passes into the header 19 it vaporizes because of the reduced pressure, and continues to take up heat as long as it is expanding and until it has all been converted from a liquid to a vapor. Should any of the vapor formed in the coils 21 have entrained therein particles of liquid, this liquid may be gasified in the upper unit, which serves to cool the coils and add to the refrigerating qualities of the whole combination. By this means all of the chilling effect of the refrigerant is made use of.

We desire to comprehend within our invention such modifications as may be embraced within the claims and the scope of the invention.

Having thus full described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a refrigerator, a casing having an upper compartment for moist refrigeration, said upper compartment comprising a pan having a flange resting upon the casing, an intermediate compartment for dry refrigeration and a lower com-

partment, and operating mechanism in the lower compartment connected to the other compartment for reducing the temperature thereof.

2. In a refrigerator, a casing forming a refrigerating chamber having a door in one side and an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber engaging the container, and a drip pan beneath the container.

3. In a refrigerator, a casing forming a refrigerating chamber having a door in one side and an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, a drip pan beneath the container, and a refrigerating unit between the pan and the container.

4. In a refrigerator, a casing forming a refrigerating chamber having a door in one side and an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, a drip pan beneath the container, a refrigerating unit above the pan, and a second refrigerating unit beneath the pan.

5. In a refrigerator, a casing forming a refrigerating chamber having a door in one side and an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, a drip pan beneath the container, a refrigerating unit above the pan, a second refrigerating unit beneath the pan, and a common means for supplying a refrigerant to both units.

6. In a refrigerator, a casing forming a refrigerating chamber having a door in one side and an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, a drip pan beneath the container, a refrigerating unit above the pan, a second refrigerating unit beneath the pan, and a common means for supplying a refrigerant to both units, said units being so connected that the refrigerant passes from one unit to the other.

7. In a refrigerator, a casing forming a refrigerating chamber having a door in one side and an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, said container having an offset bottom, and a refrigerating unit in the offset part of the bottom.

8. In a refrigerator, a casing forming a refrigerating chamber having an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, said container having an offset bottom, a drip pan beneath the container, and a refrigerating unit in the offset part of the bottom between the bottom and the pan.

9. In a refrigerator, a casing forming a refrigerating chamber having an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, said container having an offset bottom, a drip pan beneath the container, a refrigerating unit in the offset part of the bottom between the bottom and the pan, and a second refrigerating unit beneath the pan.

10. In a refrigerator, a casing forming a refrigerating chamber having an open top, a container supported by the casing in the top of the chamber, a common closure for the container and the top of the chamber, said container having an offset bottom, a drip pan beneath the container, a refrigerating unit in the offset part of the bottom between the bottom and the pan, a second refrigerating unit beneath the pan, and a common means to supply a refrigerant to both units.

11. In a refrigerator, a casing forming a refrigerating chamber having an open top, a watertight container supported by the casing in the top of the chamber, a common closure for the container and the top of the container, an article-supporting frame in the container, a refrigerant unit in the container, a refrigerant unit beneath the container, and a common means for supplying a refrigerant to both units.

12. In a refrigerator, a casing forming a refrigerating chamber having an open top, a watertight container supported by the casing in the top of the chamber, a common closure for the container and the top of the container, an article-supporting frame in the container, a refrigerant unit in the container, a refrigerant unit beneath the container, and a common means for supplying a refrigerant to both units, said units being so connected that the refrigerant will pass through the last-named unit to the first-named unit.

13. In a refrigerator, a casing forming a refrigerating chamber, a heat-conducting partition in the chamber, a drip pan beneath the partition, a refrigerating unit beneath the pan, and common means for supporting the pan and the unit.

14. In combination, a refrigerator cabinet, a lid closing and opening the top of the cabinet, a door closing and opening the side of the cabinet, a partition separating the top of the cabinet from the bottom, a pair of refrigerating units, one located to refrigerate the contents above the partition and the other to refrigerate the contents below the partition, a plurality of horizontally disposed coils comprising the upper refrigerating means adjacent the bottom of the upper compartment formed by the partition, and a plurality of horizontally disposed coils for receiving trays suspended within the lower compartment below the partition, said coils being interconnected one with the other and connected to a common compressor for refrigeration purposes.

15. In a refrigerator, a cabinet, a pan suspended through the top of the cabinet, a closure for the top of the cabinet closing the top of the pan, a refrigerating means associated with the bottom of said pan, a second refrigerating means connected therewith but spaced therefrom in the refrigerator space below said pan, and means in the second refrigerator means for the storage of material therein.

16. In a refrigerator, a cabinet, a pan suspended through the top of the cabinet, a closure for the top of the cabinet closing the top of the pan, a refrigerating means associated with the bottom of said pan, a second refrigerating means connected therewith but spaced therefrom in the refrigerator space below said pan, and means in the second refrigerator means for the storage of material therein, the first refrigerator means being so arranged as to be immersed in a body of liquid in said pan.

ANTHONY G. HORVATH.
EARL E. EICKMEYER.