

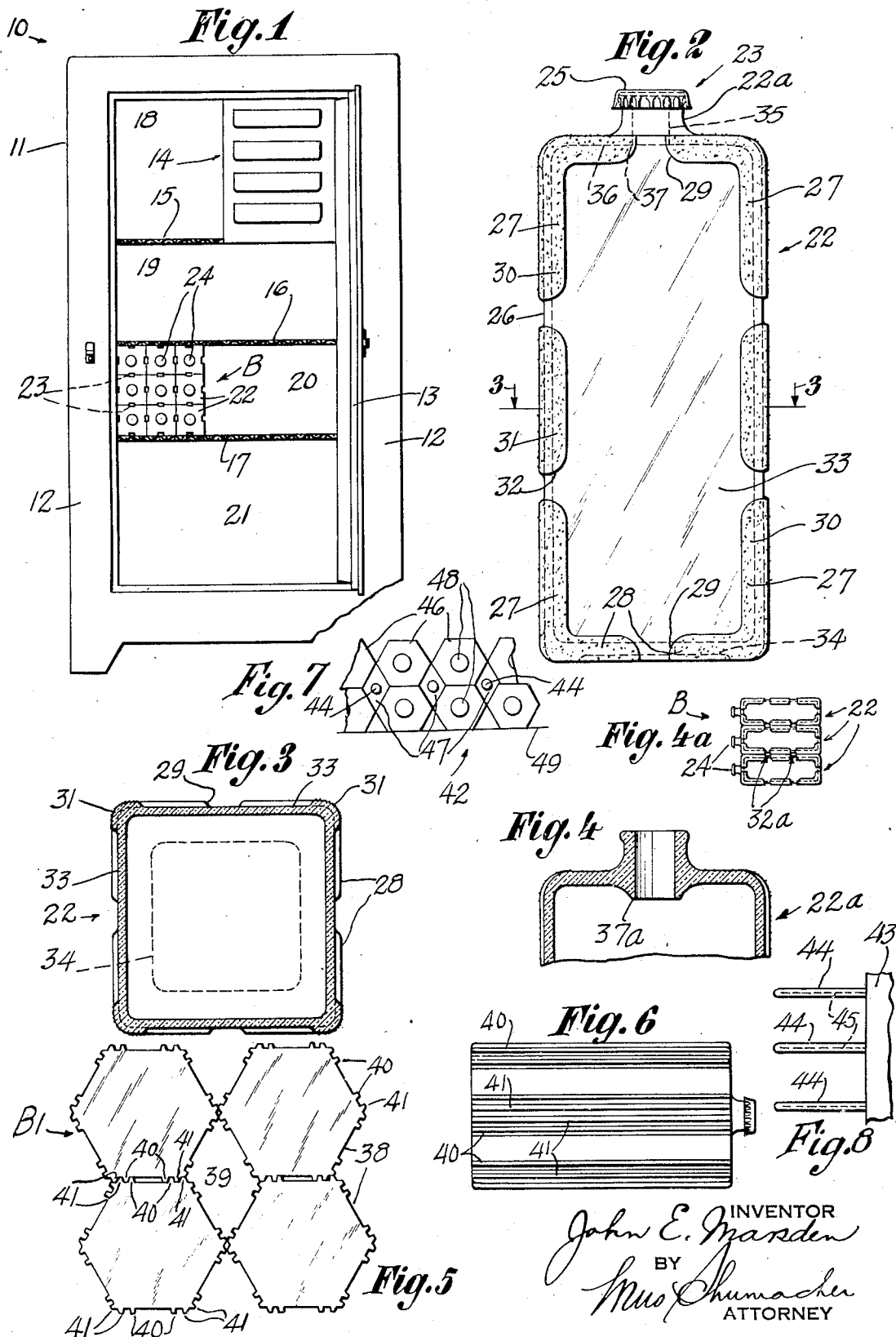
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HEAT EXCHANGE CONTAINERS AND BATTERIES THEREOF

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HEAT EXCHANGE CONTAINERS AND BATTERIES THEREOF

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This invention relates to heat exchange containers and to groups thereof arranged in batteries to be placed in refrigerators.

One object of this invention is to provide a container of such improved construction that when a plurality thereof are arranged compactly in a stack, the heat exchange medium or gas is adapted to flow between said containers for a desired temperature to be produced therein.

Another object of the invention is the provision in a refrigerator or the like, of an improved battery of liquid containers having heat transmitting walls coacting with each other to produce passages through which a heat exchange gas may freely flow, whereby the temperature of the liquid can be quickly and efficiently reduced.

Another object of the invention is to furnish an improved device of the type mentioned wherein the containers are adapted to interengage with each other for maintaining the stack, and the individual containers being nevertheless readily removable at will.

Another object of the invention is to construct a container of the nature set forth, having improved flow restricting means whereby an overflow of effervescent liquids therein is materially retarded.

Another object of the invention is to provide an improved refrigerating unit including refrigerating elements and individual containers removably positioned therearound.

Another object of the invention is to provide a device of the class alluded to of improved simplified construction, and which is inexpensive to manufacture, durable, reliable and efficient in use, and particularly adapted to be conveniently stored in a compartment of a refrigerator.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid and other objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated on the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a view in front elevation of a refrigerator having a battery of the containers stored therein, embodying the invention.

Fig. 2 is an enlarged view in vertical elevation of a container embodying the invention.

Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary vertical sectional view of a modification of the invention.

Fig. 4a is a view taken either in plan or side elevation of a battery of the containers.

Fig. 5 is a view in end elevation of a modified battery of containers.

Fig. 6 is a side view of one of the containers shown in Fig. 5.

Fig. 7 is a fragmentary diagrammatic view in front elevation of a device showing a modification of the invention.

Fig. 8 is a fragmentary plan view showing the modified refrigerating means.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which this invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawing, 10 denotes a device embodying the invention. The same may include any heat exchange means such as a conventional refrigerator 11. The same may have the usual insulated side walls 12 and door 13, a refrigerating means 14, and a plurality of shelves 15, 16, 17 which may be of a reticulated wire framework, providing intercommunicating compartments 18, 19, 20 and 21 in the refrigerator.

In one of the compartments, such as 20, is disposed a battery B of containers such as 22 which are disposed in close compact relation in any suitable manner, as for instance, by being placed flat on top of each other and in contacting side by side relation. The construction of the containers 22 is preferably such that, regardless how the individual containers are placed in the battery B, channels or openings such as 23 are provided whereby the cold air in the refrigerator is adapted to circulate between the containers to facilitate rapid and thorough cooling thereof. The containers may be arranged with their capped neck portions 24 extending in the same forward or other suitable direction to afford a convenient means for taking hold of a bottle as desired and removing the same.

It will be perceived that the battery B constitutes a complete self sustaining unit which

can be conveniently placed in the refrigerator, with a high degree of compactness, and without the possibility of the containers rolling or otherwise moving from their predetermined position.

5 Since the battery of containers is disposed between reticulated shelves, the cold air is adapted to circulate therearound so as to enter the openings 23 and also to travel upwardly between the containers as will be described hereinafter.

10 In Fig. 2 is shown one possible construction of a container or bottle 22. The same can be made of any suitable heat conducting material such as metal, glass, or other composition material. Preferably the container is made with an even number of side walls, and hence may be substantially rectangular in shape as shown. Said container may have a relatively short neck 22a that may be closed by a conventional cap 25 or other suitable closure. The side walls 26 of the container may be ribbed to afford openings between adjacent containers. Thus a series of ribs may be disposed along the edges of the container with the adjacent ends of the ribs spaced from each other at the sides and ends of the container. More particularly, angular ribs 27 may be provided extending along the corners of the container at all faces thereof, and those ribs may have arms 28 extending toward each other along the ends of the container, transversely thereof, said arms terminating in spaced relation to each other to provide openings 29 at the ends of the container. Said ribs may also have upright arms 30 which may terminate in relative proximity to the adjacent ends of the container, other ribs 31 being disposed therebetween, in spaced relation thereto, so as to provide lateral openings 32. Between the various ribs, on each face of the container, there is thus provided a recess 33, with which the openings 29 and 32 have communication. At the said openings, the container may have relatively square shaped edges, while the rib elements 29 and 31 may be relatively rounded at the corners of the container, and constitute a substantial reinforcement therefor. This reinforcement is important in an angular glass bottle so as to prevent breakage thereof due to defects in casting, or because of rough handling, and said ribs may thus be carried also along the bottom edges of the container, a recess 34 being formed at the bottom.

It will now be seen that, regardless how the containers 22 are placed upon each other in the sidewise position, the recesses 33 of adjacent containers form intermediate chambers, with which the passages 23 formed by the openings 29 communicate. The openings 32 of adjacent containers also communicate to form passages 32a transverse to the containers of the battery B, both in a horizontal and vertical direction. Thus the cold air or other heat exchange medium is adapted to readily flow between the containers for efficiently cooling the same, although the containers are disposed in compact relation and in contact with each other.

65 In order to retain the containers of the battery B in such relation that the different openings 29 and 32 are in communication with each other, means may be provided for suitably releasably interengaging the containers. Thus the surfaces of the ribs 27 and 31 may be made of a rough frictional character, so as to avoid unintended relative sliding movement between the containers. And yet this frictional engagement will not prevent a container from being removed as desired, the container being conveniently gripped

for this purpose by means of the capped portion 23.

The walls of the container 22 may be of any suitable thickness and can be relatively thin. The neck of the container is provided with a passage 35 which intersects the upper wall 36 of the container so as to afford a relatively sharp corner as at 37. If required the surface at 36 may be at an angle of approximately 90 degrees with the axis of the passage 35. Thus a sharp angle orifice effect is provided having a low coefficient of discharge, whereby the sudden overflow of liquid from the container upon removal of the cap, as caused by the expansion of gases in carbonated liquids is prevented or materially diminished.

In Fig. 4 is shown a modification of the invention wherein the container 22a may be of any conventional type or similar to that shown at 22, except that the orifice edge at 37 is prolonged inward as shown at 37a to provide an outlet having a still lower coefficient of discharge for increased restriction of any sudden foaming action or the like of a carbonated or fermented liquid in the container.

In Figs. 5 and 6 is shown a modification of the invention including a battery B1 of containers 38, each of which may have an even number of sides, such as six in number. Hence when the containers are placed upon each other with their side walls in contact, and adjacent rows built up, there are comparatively large hexagonal passages 39 produced extending longitudinally of the containers, and whereby the cold atmosphere of the refrigerator is adapted to freely circulate between the containers. To prevent the containers from slipping laterally out of engagement with each other, each side of each container may have a plurality of ribs extending therealong, such as the ribs 40, 41, the latter of which may be adjacent to the edges of the container, and the former positioned inwardly thereof but in relative proximity thereto. All of the containers may be exact duplicates of each other, so that said containers may be suitably interengaged, one container being slightly offset from the other, but not sufficiently to affect the stability of the battery. It will be noted that by this arrangement, any container may be readily removed longitudinally, with the different ribs 40, 41 sliding along each other, and yet lateral movement is retarded, so that the stability of the battery of containers is maintained.

The battery B1 may be mounted and used in the refrigerator 11 in the same manner as hereinbefore described for the battery B.

In Figs. 7 and 8 is shown a modification of the invention including a refrigerating means arranged to communicate with or otherwise to individually coact with the channel spaces provided between a plurality of closely stacked separately removable containers. The battery of the containers may include any number of containers in vertical and lateral relation, and the refrigerating means may include elements disposed in said channel spaces. The containers can be of any desired size, shape or construction, and may, for example, be like the containers 22 or 38. Thus the invention may include a device 42 having a refrigerating means 43 of any well known type, the same having a plurality of elements 44 uniformly spaced and connected thereto, so as to be supplied with a refrigerating or other heat exchange medium. The elements 44 may be tubular and may have any suitable pas-

sages, such as may be afforded by internal baffles 45, for causing a circulation of the said medium therethrough. Disposed around the elements 44 are containers 46 which may be arranged in vertical and lateral contact with each other so as to afford channels 47 therebetween for receiving the elements 44. The channel spaces may be of sufficient size, if desired, to afford passages for circulation of air, and hence the means 43 may be the only means for affecting the temperature in the entire refrigerator 11, and may be used in place of the unit 14. By this arrangement, an upper one of the containers 46 may be readily grasped at its closure means or neck 48 and removed from the battery, and may be replaced by another container whose temperature is to be changed. The elements 44 may aid in the proper spacing of the containers, and the containers may rest upon each other, with the lowermost containers resting upon a shelf 49 or the like.

By this invention a rapid and efficient refrigerating action may be obtained, owing to the large areas of adjacent elements and containers, and because the former are substantially enclosed in the latter. Nevertheless any container can be easily removed at will, and the elements can also be used to furnish refrigeration for other articles by circulation of the air.

It will be appreciated that various changes and modifications may be made in the device shown in the drawing, and that the same is submitted in an illustrative and not in a limiting sense, the scope of the invention being defined in the following claims.

I claim:

1. A closed container consisting of a heat conducting material, said container having a polygonal cross section, all sides of the container having longitudinal and transverse ribs terminating in spaced relation to each other to provide openings therebetween, whereby a battery consisting of a plurality of said containers disposed in side by side contact with each other includes channels extending through said battery.

2. A closed liquid container of heat conductive material and having a polygonal cross section of an even number of sides, said container having spaced transverse ribs providing open ended channels in each side thereof to constitute passages in a battery of the containers disposed in contact with each other and with said passages in coincidence and in registry with each other, and said container having a removable closure.

3. A liquid container of polygonal transverse section, each side of the container having angle shaped ribs, one arm of each of said ribs extending along an end of the container and the other arm along a longitudinal edge of a side thereof, the arms at the container ends being spaced from each other, and the arms at the container side edges terminating in spaced relation with each other, whereby openings are provided between said ribs.

4. A liquid container of polygonal transverse section, each side of the container having angle shaped ribs, one arm of each of said ribs extending along an end of the container and the other arm along a longitudinal edge of a side thereof, the arms at the container ends being spaced from each other, and the arms at the container side edges terminating in spaced relation with each other, and other ribs at the container side edges and spaced from the ends of said rib arms, whereby openings for circu-

lation of a cooling medium are provided between the different ribs, and said ribs reenforce the longitudinal corners of the container.

5. A liquid container of heat conductive material and adapted for use in refrigerators and having a cross section of regular form and uniform size, including a series of broken ribs of relatively uniform depth formed externally on the container walls and extending substantially throughout the length thereof, said ribs having frictional surfaces.

6. An elongated one piece liquid container consisting of heat conductive material and being of polygonal form in transverse section, said container having its longitudinal edges provided with external ribs extending therealong, said ribs reenforcing said edges and extending along the side walls of the container, said ribs being broken along the length thereof to afford ventilating recesses, and said ribs having frictional surfaces for holding the container with said recesses in a desired position.

7. A one piece liquid container consisting of a molded material and in the form of a regular polygon and having an even number of sides, each of said sides being closed and having a plurality of ribs spaced from each other so as to afford external open ended channel spaces for ventilation about the container, and said container having an end thereof provided with a removable closure.

8. A one piece liquid container having closed side and end walls, said side walls having each a plurality of uniformly positioned external ribs extending therealong to provide a single channel at each side, with said channels communicating with said end walls and said container having a removable closure.

9. A molded one piece liquid container of regular polygonal form and consisting of a heat conducting material, the side walls of said container having ribs of uniformly equal size for the different sides affording plane surfaces for flatwise support of the container, there being a plurality of said ribs extending along each side of the container adjacent to the edges thereof, said ribs providing external open ended channels extending to the end walls of the container.

10. A battery of elongated closed liquid containers of regular polygonal transverse section, said containers being separate of each other, each of said containers being of approximately regular polygonal form, said containers resting in longitudinally horizontal position on each other with the side walls of the containers being in contact with each other, the different containers having spaced uniformly arranged ribs coacting with each other to provide open ended channels therebetween extending along the containers.

11. A battery of separate multisided liquid containers adapted to be compactly disposed side by side in a refrigerator, adjacent containers in side by side contact with each other each having external ribs on the several sides thereof coacting to afford spaces between the containers for access of a cooling medium therebetween, and said containers having individual removable closures.

12. A battery of closed separate liquid containers adapted to be compactly disposed in a refrigerator, said containers each having external ribs coacting with each other to afford spaces between the containers for access of a cooling medium therebetween, whereby said spaces have a depth twice the thickness of the ribs and said

ribs having frictional surfaces to maintain the containers in said coaction.

13. A refrigerator having a battery of individual heat conducting liquid containers of elongated form resting flatwise upon each other and in side by side contact relation, said containers having means for spacing portions of said containers in vertical and lateral directions for affording spaces therebetween, said spaces communicating with the exterior of said battery, whereby a cooling medium in the refrigerator is adapted to circulate through said spaces.

14. A refrigerator having a battery of individual heat conducting elongated liquid containers of regular polygonal form in transverse section resting flatwise upon each other and in lateral contact with each other, said containers having means for spacing portions of said containers for affording spaces therebetween in vertical and lateral relation, said spaces communicating with the exterior of said battery, whereby a cooling medium in the refrigerator is adapted to circulate through said spaces, and each of said containers having an end closure means including a short neck and a removable closure therefor.

15. A battery of elongated separate closed liquid containers adapted to be compactly disposed in a refrigerator, said containers being each in the shape of a regular hexagon disposed so as to rest side against side flatwise upon each other, and in lateral side by side relation with longitudinal corners of the different containers in contact with each other, whereby channel spaces are provided between said containers for the circulation of a cooling medium.

16. A battery of elongated separate closed liquid containers adapted to be compactly disposed in a refrigerator, said containers being each in the shape of a regular hexagon disposed so as to rest side against side flatwise upon each other, and in lateral side by side relation with longitudinal corners of the different containers in contact with each other, and the flat sides of said

containers each having spaced ribs to provide ventilating spaces between the sides of the containers that are in flatwise contact with each other, and said containers having removable end closures.

17. A liquid container of polygonal form in cross section and having an external edge lying in a side wall thereof, said container having a plurality of integral external ribs extending therealong and spaced from each other to afford an opening at said edge of the container, said ribs having portions extending beyond said side wall at said edge.

18. A one piece liquid glass container of polygonal cross section and having a side wall thereof provided with integral projecting portions forming seats that lie in a plane extending along said side wall, said projecting portions being spaced from each other to form open ended channels therebetween so arranged for different containers that said channels are in continuous transverse register with each other to form open ended ventilating passages when said containers are disposed in coincidence and in side by side contact of said walls with each other.

19. A one piece liquid glass container of polygonal cross section and having its side walls provided with integral projections forming flat seating surfaces disposed along planes parallel to the respective walls of the container, said projections being spaced from each other to afford channels therebetween that are open ended along the respective planes, the area of said seating surfaces being substantially greater than the areas of said channels, whereby a plurality of contacting containers will have said channels in registry with each other to provide open ended ventilating passages therebetween, and the different projections being slidably engaged along the seating surfaces to permit said registry to occur without interlocking of projections and channels of the different containers.

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