Nov. 24, 1931. W. L. BODMAN 1,833,633

REFRIGERATOR

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Fig. 2.

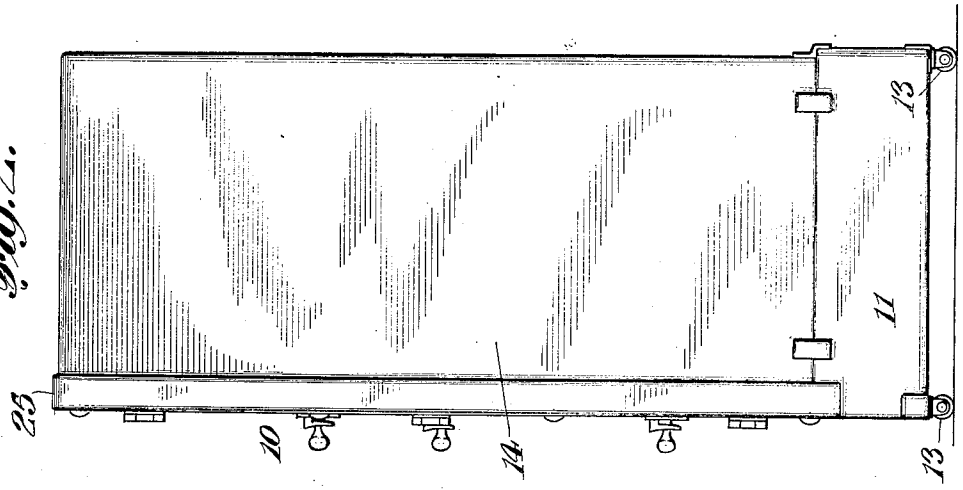
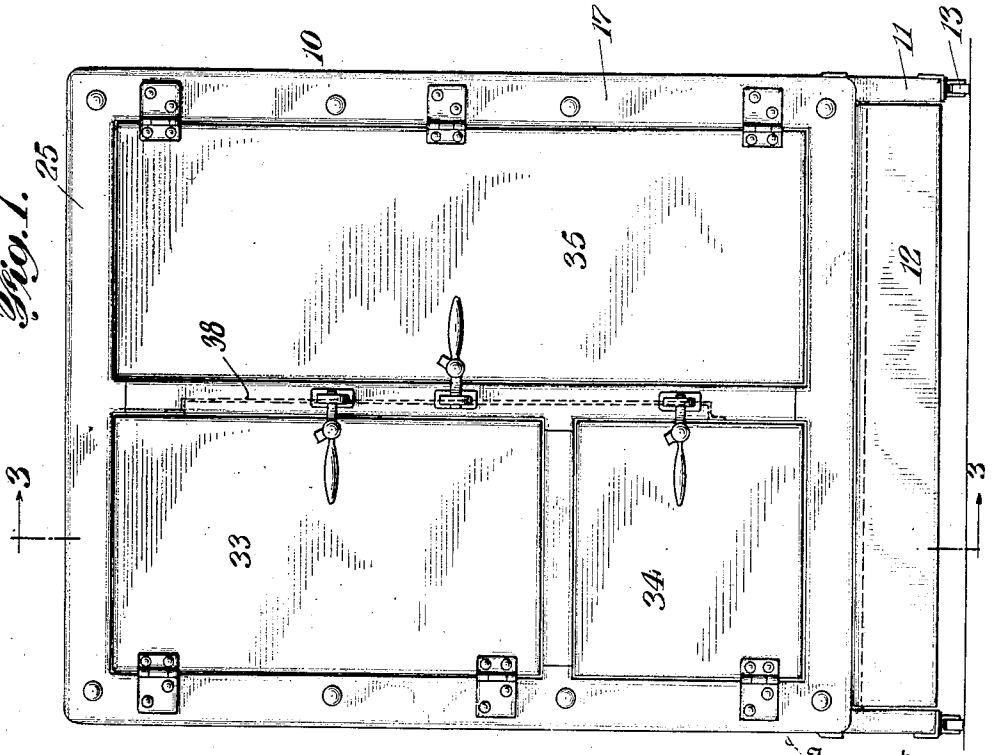


Fig. 1.



Inventor,
Walter Light Bodman,
By his Attorney,
Ramsay Hoguet.

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REFRIGERATOR

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Fig. 4.

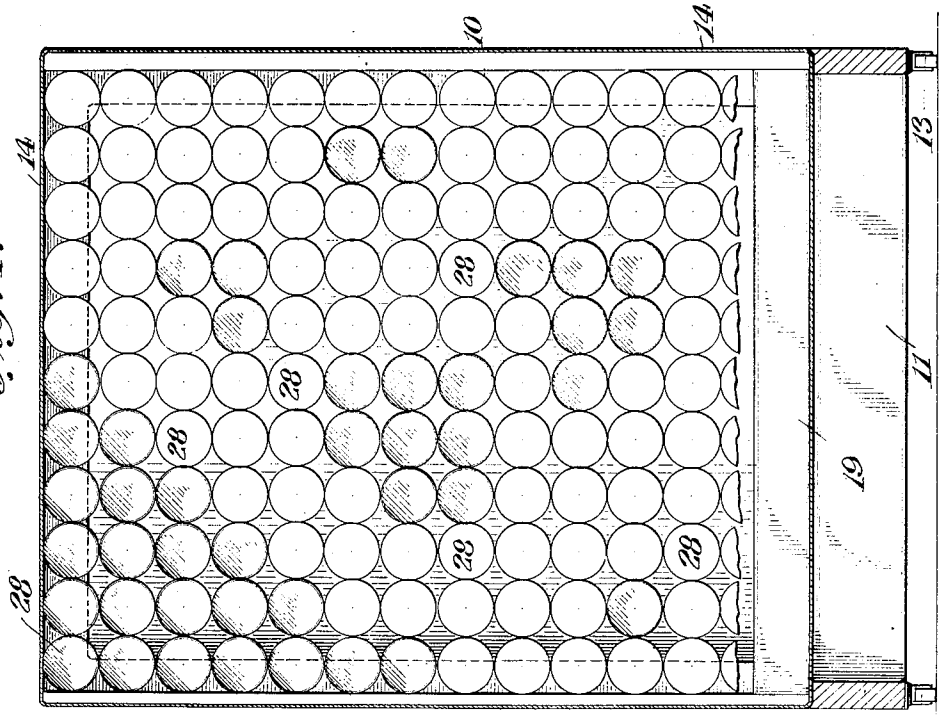
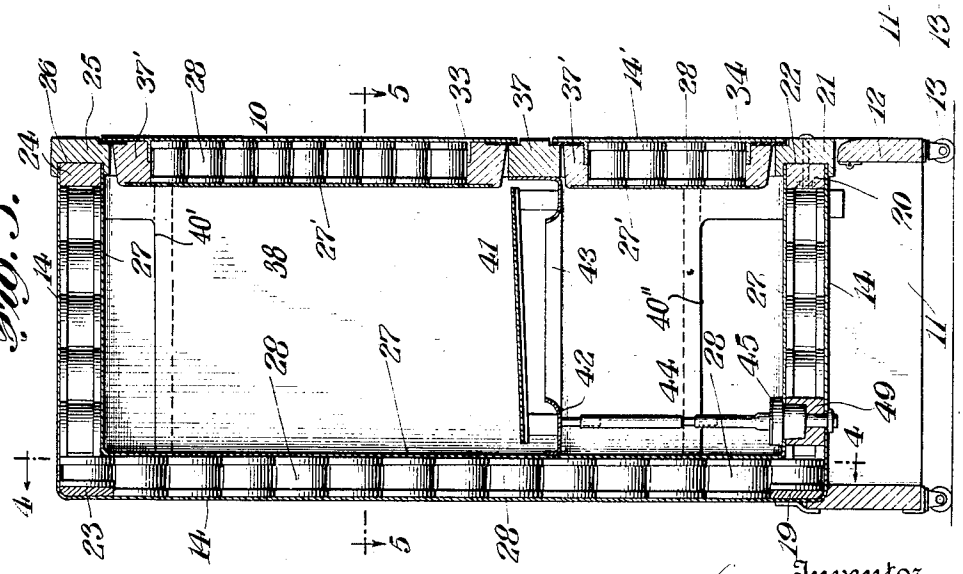


Fig. 3.



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REFRIGERATOR

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Fig. 7.

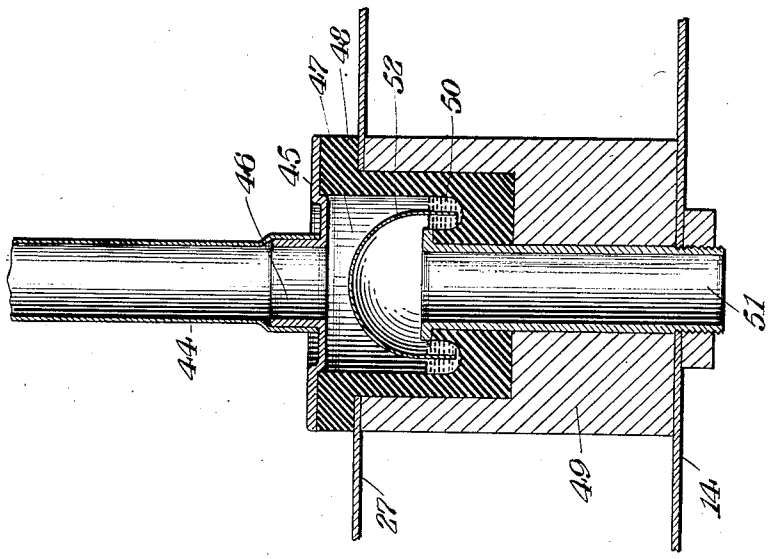


Fig. 5.

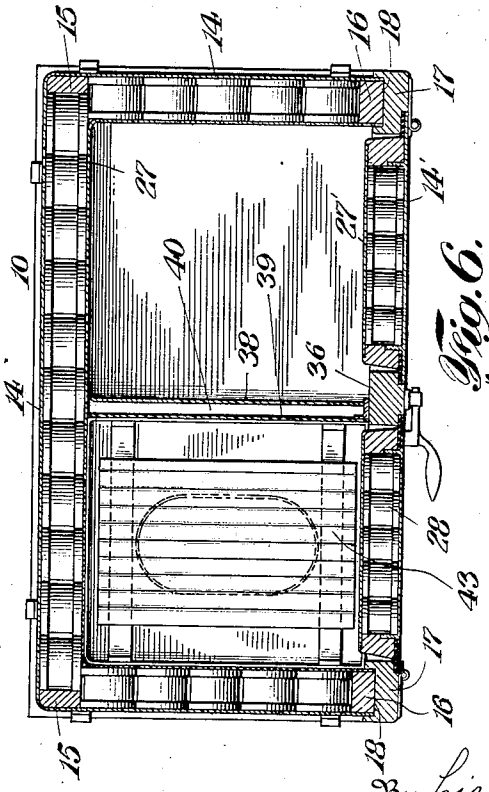
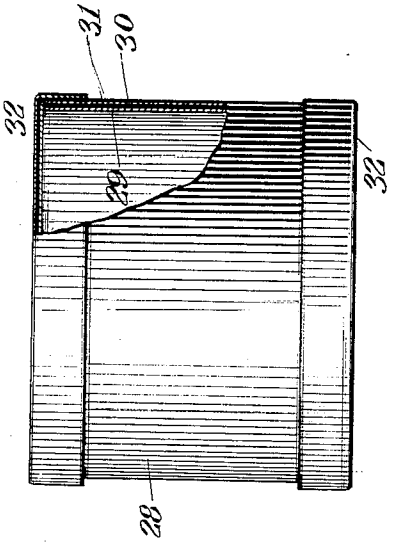


Fig. 6.



Inventor,
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Patented Nov. 24, 1931 1,833,633

UNITED STATES PATENT OFFICE

WALTER LIGHT BODMAN, OF NEW YORK, N. Y.

REFRIGERATOR

Application filed November 4, 1926. Serial No. 146,253.

My invention relates to improvements in refrigerators. Manufacturers have for various reasons found it desirable to make refrigerators having inner and outer walls of metal, preferably sheet metal, the walls being spaced apart and suitably braced. For many reasons such refrigerators are desirable, but certain practical objections have developed which it is the object of my invention to overcome. Such refrigerators must be light and strong, and where there are but two walls, an inner and an outer which must be spaced apart so that at no point do the walls contact, they must be braced to give them sufficient rigidity and to prevent them from buckling. It has been found in practice that where these refrigerators have been put into use, the cool inner wall by reason of imperfect insulation, would absorb the heat from the outer wall, thus cooling the latter and resulting in obnoxious sweating, that is to say the outer wall becomes cool, and the water present in the air of the room precipitates on the said wall to such an extent that it runs down and wets the floor. Furthermore, in the attempts to brace these walls, which are necessarily light, usually of sheet metal, imperfect insulation resulted, expensive bracing has been required, and undesirable weight has been produced. My invention is intended to overcome these difficulties, and produce a cheap, strong, well insulated refrigerator, which will because of its perfect insulation against heat be a much more economical refrigerator, and which has a system of bracing in nowise detracting from the insulation between the inner and outer walls, but rendering the body unusually strong and rigid.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a front elevation of the refrigerator embodying my invention.

Figure 2 is a side elevation of the same.

Figure 3 is a vertical section on the line 3—3 of Figure 1.

Figure 4 is a vertical section on the line 4—4 of Figure 3 looking in the direction of the arrows.

Figure 5 is a horizontal section on the line 5—5 of Figure 3.

Figure 6 is a broken side elevation on an enlarged scale of a form of cell suitable for a bracing element between the walls of the refrigerator, and

Figure 7 is an enlarged detail section of a form of drain pipe and trap suitable for the refrigerator.

In carrying out this invention it will be apparent that the size, design, and style of the refrigerator can be varied to the same extent as in any refrigerator, and therefore, the drawings show a refrigerator which is simply by way of example.

The refrigerator body 10 is preferably though not necessarily mounted on a base 11 which should be of poor conductivity, as for example wood, and this has a conventional swinging member 12 at the front to permit access to the space beneath the refrigerator, while the base is also preferably mounted on casters 13 or the like. The refrigerator has its outer wall 14 formed of metal, preferably thin sheet metal, which can be a single sheet if the refrigerator is not too large, or which can of course be enlarged in the usual way. The space between the inner and outer walls of the refrigerator may be filled by the elements 28 hereinafter referred to, but strips of wood or the like can be used to fill out the corners. Thus in Figure 5 I have shown vertical members 15 and 16 at the back and front corners, the members 16 fitting in grooves 18 in the face plates 17.

At the bottom and back of the refrigerator a filling member is shown, and at the front lower corner is disposed a similar member 20 which fits in a groove 22 in the face plate 21. At the top and rear is a filling member 23, and at the front a similar member 24 fitting in the groove 26 of the horizontal face plate 25. These several filling members are not important and can be used or not as desired.

The inner wall of the refrigerator is likewise a metal plate 27 which is spaced apart from the outer wall 14 by the frame 18, and which like the outer wall should be continuous, forming a complete inner lining for the

refrigerator, except at the doors. The space between the walls 14 and 27 must be braced, or else the walls must be too heavy to be practical, and the bracing to be effective must be light and of poor conductivity. I have found that this result can best be obtained by using independent cells 28 which can be cartons of poor conductivity, and they are independent and fill the space between the inner and outer walls. They can be attached to the walls if desired, but this is not necessary. All that is required to effect perfect bracing and insulation is to simply have the cells fill the space between the walls. I have found that a desirable cell can be made as illustrated in Figure 6, with an inner wall 29 of paper, a layer of lead foil 30, and an outer wall 31 of paper or the like, the body thus formed having removable covers 32. This particular type of cell is not essential, although it is desirable, and I have covered this by a separate application for patent filed simultaneously herewith.

The cells can contain dead air or a partial vacuum, and they can be filled with non-conducting gas, as likewise can the space between the walls and around the cells be dead air, a partial vacuum or filled with gas. In any event it will be seen that I get good insulation between the inner and outer walls by this system, which is cheap and light and which also effects a very strong bracing of the walls.

In the example given I have shown the refrigerator provided with doors 33, 34 and 35 (see Figure 1) of conventional type and arrangement, but it will be understood that the door arrangement of the refrigerator and its internal arrangement, can be varied to suit tastes and requirements. The doors, however, should have the same insulation and therefore to provide for doors I have shown a vertical standard 36 and cross piece 37 forming a part of the frame to facilitate the hanging of the doors. These members likewise space the inner and outer walls of the frame, and the doors have suitable frames 37′ which space the walls, and the outer and inner walls 14′ and 27′ of the doors have the spaces between them filled by the cells 28 as described.

To illustrate the fact that the inner part of the refrigerator can be divided as required, I have shown a transverse vertical partition 38 (see Figure 5) forming a part of the inner wall, and a similar parallel partition 39 forming one wall of an ice box, these being separated in the center as shown at 40 but united at the edges, while openings can be left at top and bottom of the merged partitions as shown at 40′ and 40″ to provide for air circulation. If ice is used as a refrigerant I provide a suitable support 41 for ice which is carried by a transverse horizontal shelf 42, this being attached to the inner wall and to the frame member 37′ (see Figure 3), but it can be supported in any suitable way, as this forms no part of the invention. The shelf is shown with a central opening 43 for the circulation of air, and I have shown it provided with a conventional telescoping drain pipe 44.

It is, however, necessary, to insulate the drain pipe so that it may not afford a conducting medium between the inner and outer walls of the refrigerator. As one way of getting this result I have shown in Figure 7 the lower part of the pipe 44 connecting with a cap 45 having a flange 46 to enter the pipe 44, this cap resting on an insulating member 48 which has a chamber 47 to receive the flow from the pipe 44. The insulating member 48 rests on a circular stud 49 which is disposed in the layer of cartons, and the chamber 47 has an annular recess 50 at the bottom to collect drainage water, and from this trap thus formed the water overflows and passes out through the pipe 51. A float valve 52 is arranged over the pipe 51. This particular arrangement while desirable is not claimed but it is shown because it is necessary to have complete insulation between the outer and inner walls of the refrigerator, and in the example which I have given to illustrate my improved construction, it will be observed that there is no good heat conducting element connecting the inner and outer walls of the refrigerator at any point. It will also be noticed that thin sheet metal can be used for the inner and outer walls, and that the light bracing cellular elements between the walls make the body strong and stiff, while at the same time maintaining a perfect insulation and lightness.

I claim:—

1. A refrigerator having a body formed of inner and outer metallic walls spaced apart and insulated from each other and cellular bracing elements of poor heat conductivity between the walls, said elements being placed in contact with one another along their sides.

2. A refrigerator having a body formed of separate inner and outer metallic walls spaced apart and insulated from each other, and independent cells of poor heat conductivity substantially filling the space between the walls, said elements being placed in contact with one another along their sides.

3. A refrigerator having a frame of poor heat conductivity, inner and outer walls of sheet metal spaced apart and insulated by said frame, and cells of poor heat conductivity extending from wall to wall to brace said walls, said elements being placed in contact with one another along their sides.

4. A refrigerator having a body formed with a wall of two plates spaced apart and insulated from each other, and cellular non-conducting elements substantially filling the space between the said walls, said elements

being placed in contact with one another along their sides.

5. A container comprising a top, bottom, and sides, each of said sides consisting of an inner and outer wall of sheet material, and separately formed reinforcing members between the walls, said members being closely arranged and substantially filling the space between the walls.

6. A container comprising a top, bottom, and sides, each of said sides consisting of an inner and outer wall of sheet material, and separately formed cylindrical reinforcing members between the walls, said members being closely arranged and substantially filling the space between the walls.

7. A container comprising a top, bottom, and sides, each of which consists of an inner and outer wall of sheet material, and separately formed reinforcing members between the walls, said members being closely arranged and substantially filling the space between the walls.

8. A container comprising a top, bottom, and sides, each of which consists of an inner and outer wall, and separately formed cylindrical reinforcing members between and secured to the walls, said members being closely arranged and substantially filling the space between the walls.

9. A container comprising a top, bottom, and sides, each of said sides consisting of an inner and outer wall of sheet material, and hollow cylindrical members between and extending transversely to the walls, said members being held in abutting relation and operating to reinforce the walls of said sides.

10. A container comprising a top, bottom, and sides, the bottom consisting of an inner and outer wall of sheet material, said inner wall being spaced from the outer wall and forming therewith a chamber, and separately formed reinforcing members, said members being arranged in close proximity to each other and substantially filling said chamber.

11. A container comprising a top, bottom, and sides, the bottom consisting of an inner and outer wall of sheet material, said inner wall being spaced from the outer wall and forming therewith a chamber, and hollow transversely extending cylindrical reinforcing members filling said chamber.

12. A container, comprising a top member, a bottom member, and side members, one of said members consisting of an inner and outer wall of sheet material and having separately formed reinforcing members disposed between the walls, said members being arranged in close proximity to each other and substantially filling the space between said walls.

13. A container, comprising a top member, a bottom member and side members, one of said members consisting of an inner and outer wall of sheet material and having hollow substantially cylindrical members disposed between the walls, said members being arranged in close proximity to each other and substantially filling the space between said walls.

In testimony whereof, I have signed my name to this specification this 26 day of October, 1926.

WALTER LIGHT BODMAN.