

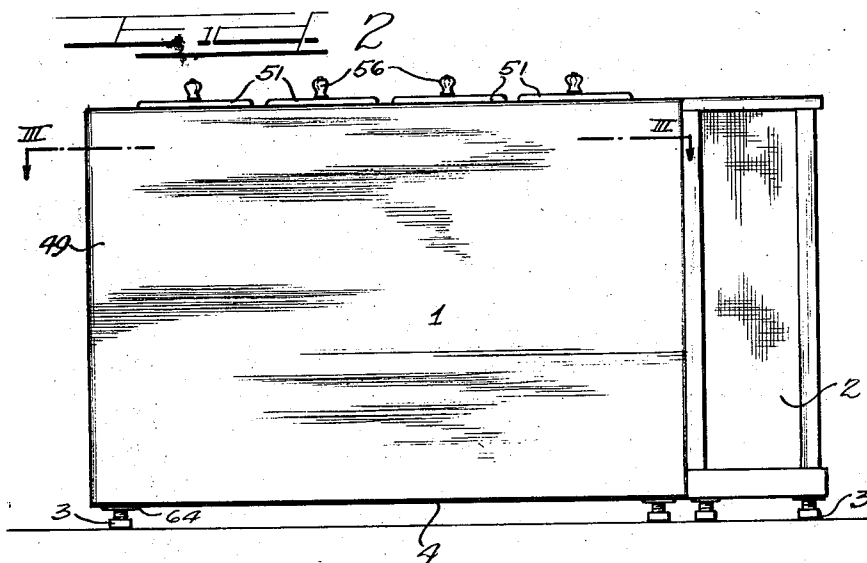
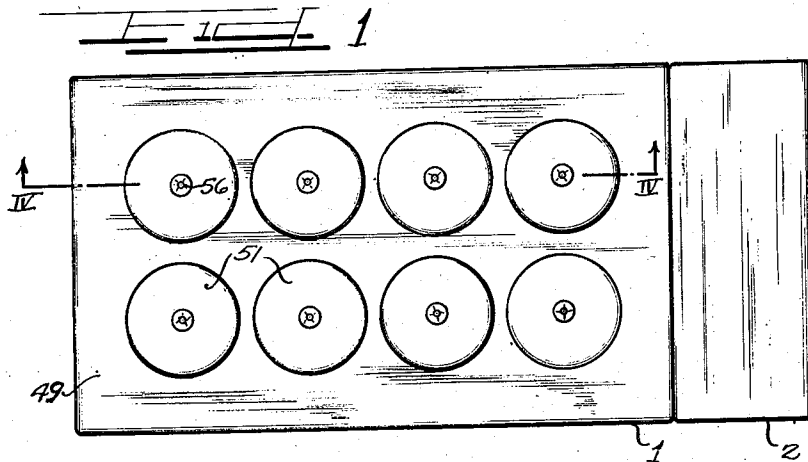
Jan. 20, 1931.

A. H. MORRELL
REFRIGERATOR CABINET

1,789,532

Filed June 13, 1925

3 Sheets-Sheet 1



INVENTOR
Albert H. Morrell

Charles H. Hill

BY

Attys

Jan. 20, 1931.

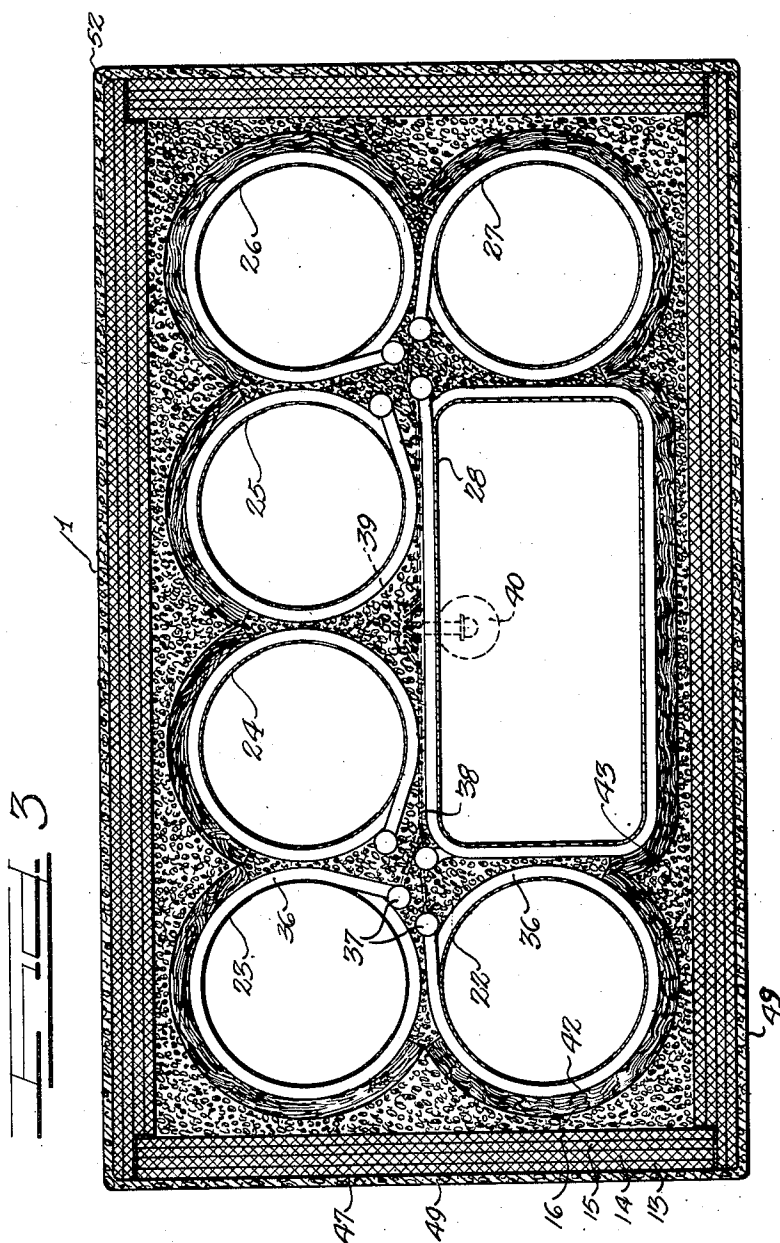
A. H. MORRELL

1,789,532

REFRIGERATOR CABINET

Filed June 13, 1925

3 Sheets-Sheet 2



INVENTOR
Albert H. Morrell

Charles J. Hill

BY

ALIVE

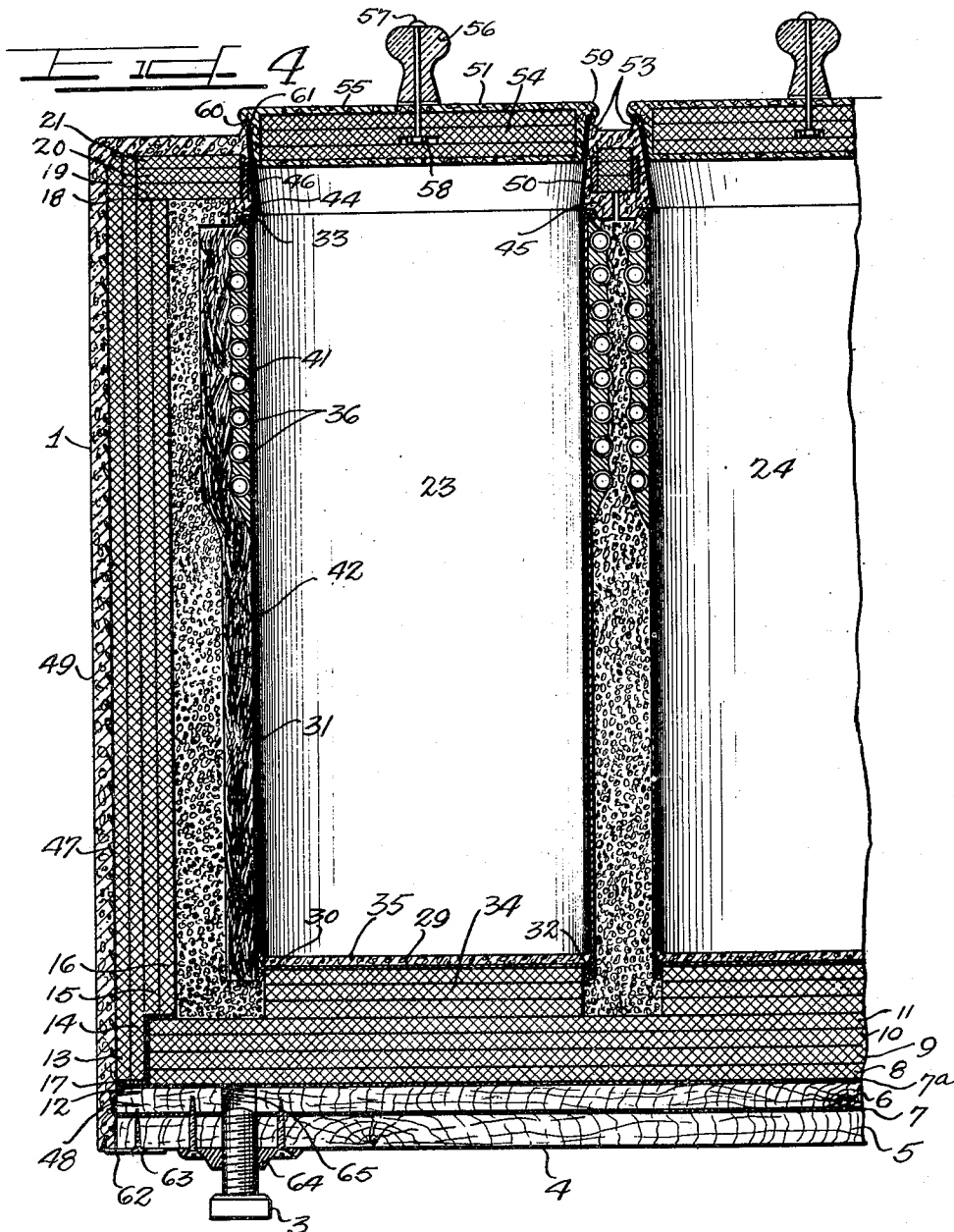
Jan. 20, 1931.

A. H. MORRELL
REFRIGERATOR CABINET

1,789,532

Filed June 13, 1925

3 Sheets-Sheet 3



INVENTOR
Albert H. Morrell
Charles H. Miller
BY
Atty

UNITED STATES PATENT OFFICE

ALBERT H. MORRELL, OF CLINTON, IOWA

REFRIGERATOR CABINET

Application filed June 13, 1925. Serial No. 36,797.

This invention relates to a refrigerator cabinet for maintaining ice cream and the like at a uniformly low temperature preparatory to serving the same. The usual type of cabinet used heretofore consists of a rectangular tank filled with brine or other low temperature freezing liquid and provided with submerged refrigerating coils, the brine tank being enclosed in a wood or metal case and insulated therefrom. Metallic receptacles or wells in the brine tank provide means for holding ice cream and the like. Such a cabinet is subject to a number of defects and disadvantages. In the first place, even though the brine be circulated somewhat by convection, the coldest area of the brine will always be at the bottom. That is precisely the point where the least cooling effect is required, since the heat enters the cabinet largely at the top while the cover is removed. Consequently, in order to maintain the ice cream at the top in a proper state of hardness, it is necessary to keep the brine so cold that the lower portion of ice cream gets too hard to serve.

Secondly, since it is necessary to maintain the brine at a lower temperature than good efficiency would require, there is a greater temperature difference between the brine and the outside air than necessary. This results in loss of cooling effect due to more rapid transfer of heat.

Thirdly, since the brine tank, as usually constructed, has a large surface area, the transfer of heat, or loss of cooling effect, is much greater than where individual refrigerating units are employed, as is the case of my invention. The thickness of insulation must also be less for the same size cabinet where a brine tank is used.

Fourthly, in the brine tank type all of the wells or receptacles are maintained at the same temperature, whereas with my unit type system, the wells may be maintained at different temperatures in accordance with their needs. For instance, brick ice cream should be kept at a lower temperature than ice cream to be served.

Fifthly, in the brine tank type of cabinet it is practically impossible to keep the insulation in good condition. The weight of the

brine causes the sheet metal tank to buckle and draw away from the insulation and to separate at seams and corners. Air and moisture get into the cabinet and lower the efficiency of the insulation.

Sixthly, the supporting structure of the usual refrigerator cabinet is of metal, which is a good conductor of heat, thus increasing the loss of refrigerating effect by conductance and radiation.

The present invention, has for its object to provide a refrigerator cabinet that is free from the disadvantages and defects of the usual brine type of cabinet.

It has for one of its objects to eliminate the use of brine altogether.

It has for a further important object to provide a cabinet in which the main structural element is of heat insulating material and in which the walls of the cabinet are hermetically sealed with the ice cream containers, so that no moisture may enter the inside of the cabinet to destroy the insulation.

With these and other objects in view, which will become more apparent in the following description and disclosure, this invention comprises the novel structure and combinations hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings, which illustrate a preferred embodiment of this invention and in which similar reference numerals refer to similar features in the different views:

Figure 1 is a top plan view of a device embodying the principles of this invention;

Figure 2 is a front elevational view;

Figure 3 is an enlarged sectional view taken substantially on line III—III of Figure 2, and

Figure 4 is an enlarged fragmentary sectional view taken on line IV—IV of Figure 1, showing parts in elevation.

Referring now to the drawings, there is shown a refrigerator comprising a cabinet 1 of rectangular dimensions having an extension compartment 2 detachably secured thereto. The extension 2, which houses the refrigerating apparatus, may be detached if

desired, and the refrigerating apparatus set up at a remote place. The refrigerating apparatus consists of the usual compressor for compressing, condensing and circulating a refrigerant fluid, such as ammonia, together with the necessary piping and valves. Both the cabinet and extension are supported in a sanitary position from the floor by adjustable threaded legs 3.

The cabinet 1 has a rectangular bottom wall 4 formed of two layers 5 and 6 of heavy strips of lumber tongued and grooved to fit into each other. Between the layers 5 and 6 is a sheet of insulating paper 7 and resting on layer 6 is a sheet of three-ply rubber roofing 7^a to render the bottom moisture proof and also to afford insulation against the transfer of heat. The bottom is further built up by laminations of water proof and heat insulating fiber board. The fiber board is preferably a board having considerable structural strength, yet light in weight. As here shown, there are four layers of board 8, 9, 10 and 11, each layer being securely cemented to the adjacent one. The ends of these boards terminate inside of the ends of lumber strips 5 and 6 to form a shoulder 12 extending around all four sides. The side walls are similarly formed of four layers 13, 14, 15 and 16 of laminated fiber board, with the ends of the two outside boards 13 and 14 resting on the shoulder 12 and the ends of the two inside boards 15 and 16 resting on the board 11. The joints thus formed between the side walls and bottom wall are made rigid by cementing the abutting surfaces together with a casine cement 17. The side walls are similarly jointed and cemented together. The boards 15 and 16 of the side walls terminate below the upper ends of the boards 13 and 14 to form a shoulder 18, upon which the top wall rests.

Before the top wall is joined on, receptacles or wells are placed in the cabinet. These wells are for holding ice cream or other article required to be kept cold. As shown in Figure 3, there are six cylindrical wells 22, 23, 24, 25, 26 and 27 and one well 28 of rectangular cross section. The cylindrical wells are adapted to receive cans of ice cream and the rectangular well 28 is especially for brick ice cream. Obviously, the number and shape of these wells is immaterial to this invention, and the cabinets may be made in various sizes. The cylindrical wells being all alike, it is only necessary here to describe one of them. The rectangular or other shaped wells are constructed similar to the cylindrical wells. Each cylindrical well is made of galvanized ingot iron, and comprises a circular bottom 29 having a depending flanged edge 30, and a cylindrical wall 31 with its lower edge turned in and crimped around the flange 30 to form a water-tight beaded edge 32. The upper edge

of the cylindrical wall 31 is also beaded as at 33. Each well rests on a base 34 formed of laminated fiber board cemented to the board 11 and constructed so that its top fits inside of the beaded edge 32. A disk 35 of magnesite, or other similar material, rests on the bottom of each well inside the same to protect the well bottom against the shocks of ice cream cans as they are dropped in.

Refrigerating coils 36, wound helically, surround the upper portion of each well, the ends of each set of coils being connected to a header 37. It will be understood that in place of coils, jackets or annular chambers might be used. The upper end of each header is connected by smaller piping 38 through a suction manifold 39 to an accumulator 40, which is preferably located within the rectangular well 28, and to a refrigerating unit, either in the section 2 or at a separate point. The lower end of each header is similarly connected to a liquid manifold and to the refrigerating plant. The liquid refrigerant is circulated by the compressor through the liquid manifold and thence by individual piping to the coils 36 and the headers 37. There the liquid refrigerant expands and vaporizes, absorbing heat from the well walls. The refrigerant gas returns through the piping 38, suction manifold 39 and accumulator 40 to the suction side of the compressor. If a lower temperature is desired in certain wells, this may be accomplished by increasing the number of turns of the coils 36. The coils 36 are secured to the wall 31 of each well by means of a layer 41 of metallic cement, or other suitable substance of high heat conductivity, substantially the thickness of the piping. This provides metallic contact between practically the entire surface of the coils and wells, and affords excellent heat conducting means therebetween.

A thick layer 42 of hair felt insulation surrounds a portion of the circumference of each well wall its entire height, including the refrigerating coils, with the adjacent end of each layer joined to form a continuous wall of insulating material around the outside of the wells taken as a group. The space between the wells and between the hair felt 42 and the side walls is tightly packed with ground cork 43, or other suitable heat insulating material.

A top wall comprising laminated fiber boards 19, 20 and 21 provided with openings corresponding with the well openings is adapted to fit into the rectangular space defined by the boards 14, with the board 19 resting on the shoulder 18. The abutting surfaces of the side and top walls are cemented together, as were the side and bottom walls, to form a rigid joint. This construction, it will be noted, forms a rigid box, or enclosing cabinet, the walls of which are each built up of several thicknesses of insulating

fiber boards solidly cemented together with water proof cement. This novel construction utilizes the main structural element as the principal insulating member, or in other words the insulation is used structurally. No metal frame is required, as is the case in the usual cabinet. The periphery of each of the openings in the top wall is faced with a band of linoleum 46 to effectually seal the ends of the fiber boards 19, 20 and 21 and to increase the insulation at this point.

Strips of metal fabric, or expanded steel lath 47, are secured by staples 48 to the outer side walls and top wall of the cabinet. The steel lath covers the entire outside surface of the fiber board, tightly binding and strengthening the entire structure. The metal lath also serves to anchor an outside coating 49 of magnesite cement, or other water proof cement. This magnesite covering, which is wrought to a smooth, hard, glass-like surface, is laid continuous without joint or crack, thereby hermetically sealing the cabinet against all air leaks. Since moisture cannot penetrate it, the insulating qualities of the cabinet are maintained at their maximum efficiency indefinitely. There being nothing within the cabinet to deteriorate, replace, or get out of order, no necessity arises for dismantling the cabinet. Consequently, the magnesite covering 49 can be laid continuously over the top and down to the edge of each well to form a collar 44, said collar making a permanent joint 45 with the well. In this way the wells are held rigidly at their upper edges against displacement. Moreover, since magnesite cement is a fair heat insulator, there is no such loss of refrigerating effect by conduction as is usual with metal cabinets. The facing of magnesite over the strips of linoleum 46 is tapered as at 50 to receive a cover 51. The edges and corners of the cabinet are rounded as at 52 to improve the appearance. The upper edges of the well openings are raised to form rims 53, which prevent liquids slopped on the top of the cabinet from running into the wells.

The covers 51 each comprise a circular disk body of laminated fiber boards 54, entirely enclosed in a coating of magnesite 55. A glass handle 56 is secured to each cover by means of a bolt 57 extending into the boards 54 and there anchored by a nut 58. Each cover is provided with an overhanging rounded edge 59, having on its under side an annular semi-circular groove 60. A rubber ring, or gasket 61, fits in this groove to afford an air tight and moisture proof seal when the cover is in place. The peripheral face of the cover is also tapering to fit snugly against the tapered facing 50 of the well opening.

The lower edge of the cabinet is strengthened by a metal flanged strip 62 anchored by screws 63 to the bottom boards 5 and

running around all four sides. The adjustable legs 3 are adapted to be threaded into places 64 secured over sockets 65 in the bottom boards 5 and 6.

From the above description it is evident that a very durable, efficient and economical type of refrigerator cabinet has been provided. If used for ice cream, none of the difficulties attendant upon the former brine type of freezer are encountered. Furthermore, in my type of cabinet, I can provide for a lower temperature in certain of the wells if desired, as for instance in the brick ice cream compartment, whereas in the usual brine type cabinet this is impossible. If warm or melted cream be placed in any of the wells, it will be cooled to the predetermined temperature without affecting the contents of the other wells. This is due to the wells being insulated from each other. In the brine system, since the transfer of heat is from the ice cream through the walls of the ice cream can, intervening air space, well wall and brine to the refrigerating coil, and since the volume of the brine is considerable, the time necessary to lower the temperature in the well is much longer than in my improved system. Moreover, to maintain the top layer of ice cream at the proper temperature, it is necessary to keep the bottom portion of ice cream at a considerably lower temperature, due both to the fact of poor conductance of heat and to the fact that the brine is necessarily colder at the bottom. Consequently, the loss of refrigerating effect by absorption of heat through the bottom is unavoidable. In addition, a larger capacity refrigerating plant is required. Due to the efficient manner of insulating the wells in my improved refrigerator cabinet, the loss of refrigeration effect is less than that of the usual cabinet when new and at its maximum efficiency. Furthermore, the efficiency of my cabinet does not diminish with use or time because of the rugged construction and the air-tight, moisture proof seal provided by the magnesite covering.

I am aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not propose limiting the patent granted hereon, otherwise than necessitated by the prior art.

I claim as my invention:

1. A refrigerator cabinet comprising side walls made of cement reinforced by metal lath, laminated heat insulating material adjacent said metal lath, ground heat insulating material adjacent said laminated material, receptacles within said cabinet, and felt heat insulating material surrounding all of the receptacles as a group.

2. A refrigerator of the class described

comprising a cabinet, walls for said cabinet covered with a water proof cement, ice cream wells within said cabinet and means joining said walls and wells to hermetically seal the inside of the cabinet against moisture.

3. In a refrigerator of the class described having bottom, side and top walls formed of a heat insulating material, unit metallic wells, heat insulating material separating said wells and filling the space between said wells and the outside walls, and means joining said wells and top walls for hermetically sealing the cabinet.

4. In a refrigerator cabinet, bottom, side and top walls of laminated fiber board cemented together, metallic wells resting on said bottom wall, felt insulating material surrounding said wells, ground insulating material packed in the spaces around said wells, metal fabric secured to said fiber board, and a magnesite cement coating laid over said metal fabric.

5. A refrigerator of the class described comprising a cabinet, the outer coating of said cabinet being formed of a heat insulating, water proof cement, a well within said cabinet, and a collar of said cement joining said well and said outer coating to form a permanent air-tight joint.

6. A refrigerator of the class described comprising a cabinet, a wooden bottom to said cabinet, laminated fiber board adjacent said wooden bottom, laminated fiber board side walls cemented thereto, a laminated top wall cemented to said side walls, and provided with openings, metallic wells within said cabinet, insulating material packed between said wells and said fiber board walls, metal fabric secured to the outside of said fiber board walls, and a magnesite cement coating laid over said metal fabric to form an air-tight seal with said metallic wells.

7. A refrigerator cabinet, comprising an outer shell of cementitious material forming the walls and top thereof, containers within said shell, the top wall of said shell having openings registering with said containers and being continuous to the upper edge of said containers to form a sealed joint therewith.

8. In a refrigerator cabinet, a plurality of receptacles, fibrous insulating material surrounding all of said receptacles as a group, enclosing laminated structural walls formed of fibre board, granular insulating material between said fibrous insulating material and said walls and between said receptacles, and means for sealing the exterior of said walls and forming an airtight joint with said receptacles.

In testimony whereof, I have hereunto subscribed my name.

ALBERT H. MORRELL.