May 11, 1948. N. ACHS 2,441,463

REFRIGERATED DISPLAY CASE

Filed Feb. 28, 1946 3 Sheets-Sheet 1

Fig. 1

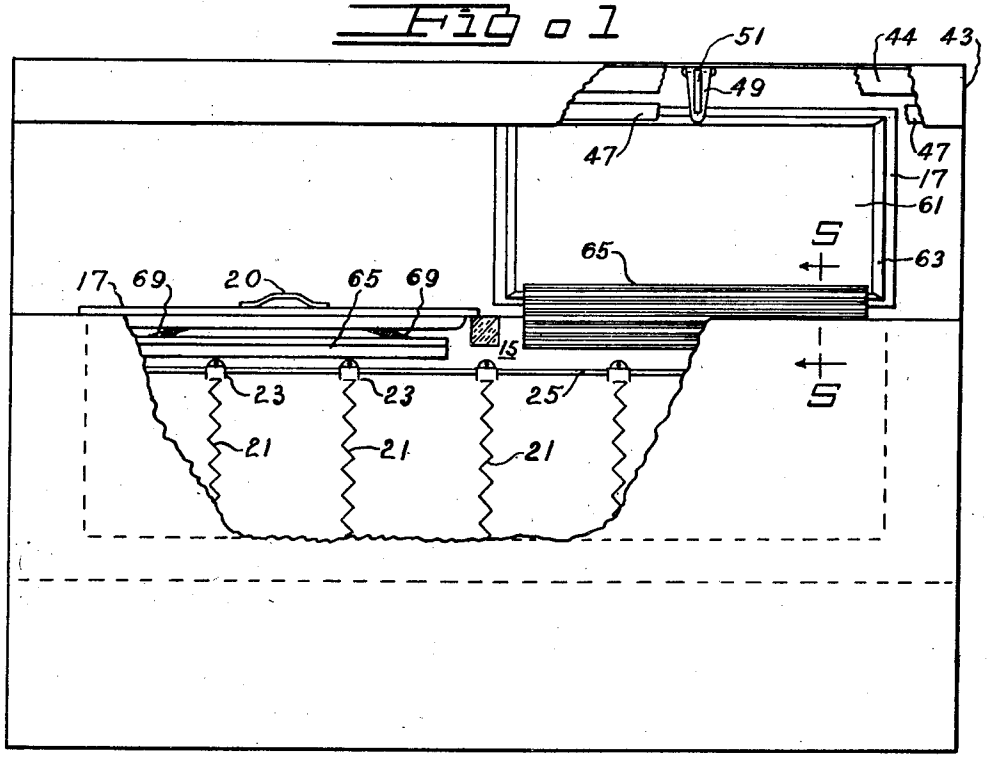


Fig. 2

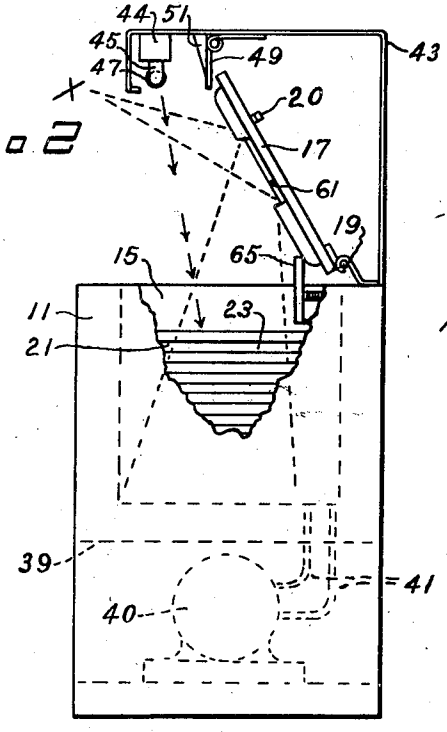
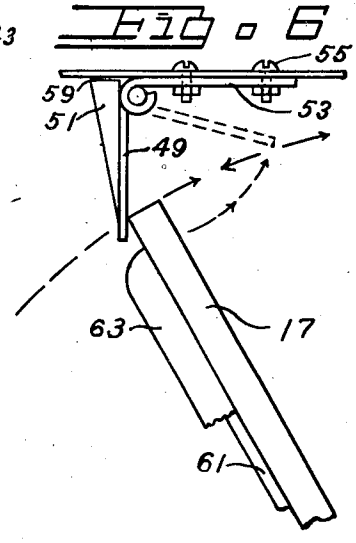


Fig. 6



INVENTOR

Nicholas Achs

BY

ATTORNEY

May 11, 1948. N. ACHS 2,441,463

REFRIGERATED DISPLAY CASE

Filed Feb. 28, 1946 3 Sheets-Sheet 2

Fig. 3

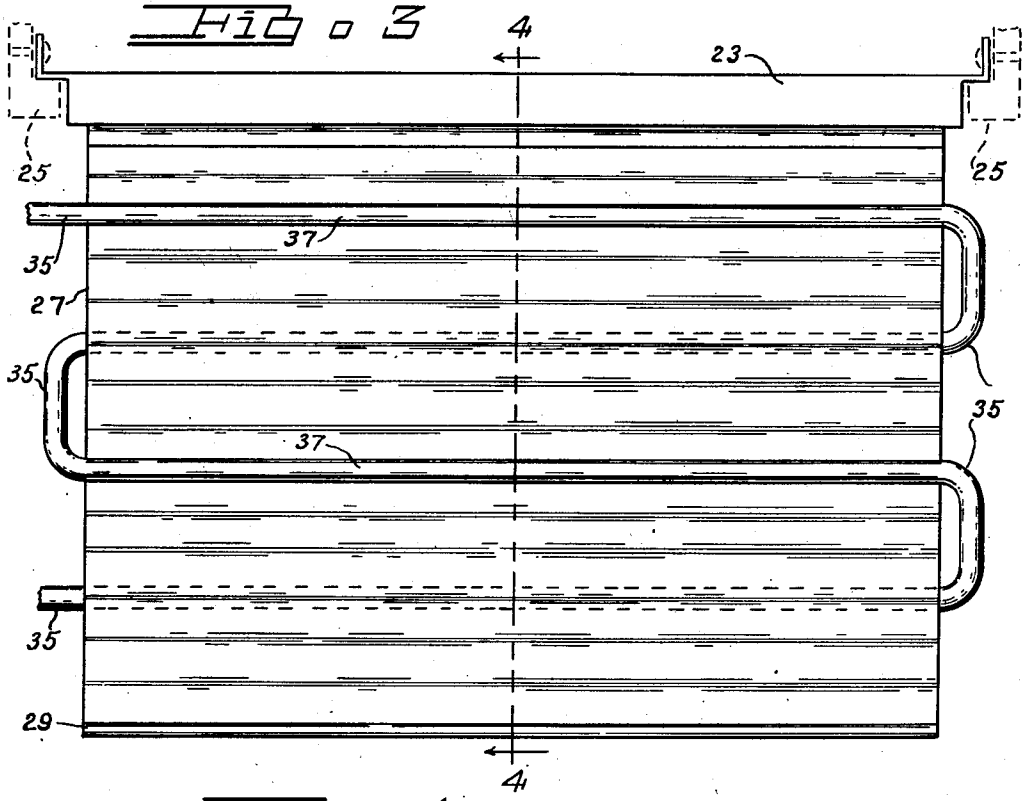
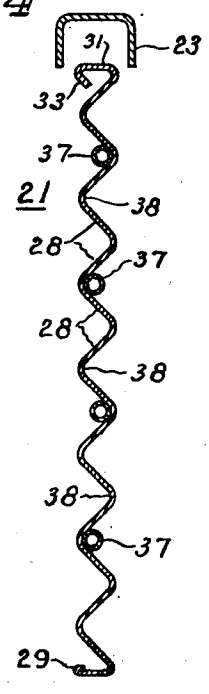


Fig. 4



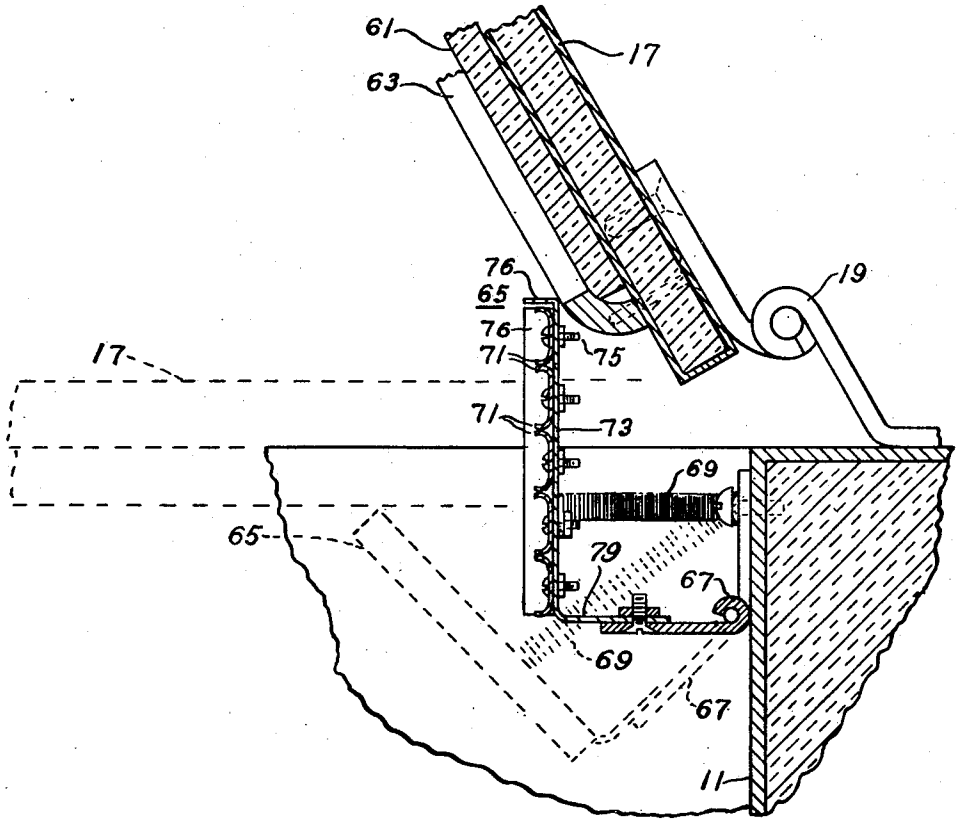
INVENTOR
Nicholas Achs
BY F. D. Hicks
ATTORNEY

May 11, 1948. N. ACHS 2,441,463

REFRIGERATED DISPLAY CASE

Filed Feb. 28, 1946 3 Sheets-Sheet 3

Fig. 5



INVENTOR
Nicholas Achs
BY F. D. Hicks
ATTORNEY

Patented May 11, 1948 2,441,463

UNITED STATES PATENT OFFICE

2,441,463

REFRIGERATED DISPLAY CASE

Nicholas Achs, Detroit, Mich.

Application February 28, 1946, Serial No. 650,837

6 Claims. (Cl. 62—89.5)

1

My invention pertains to a refrigerated display case for the refrigeration, storage and dispensing of goods, and which is especially advantageous for handling packaged merchandise.

It is an object of my invention to provide a refrigerated display case which is more effective, convenient and/or economical for refrigerating and storing merchandise.

It is also an object of my invention to provide an improved top opening refrigerator which more effectively and uniformly refrigerates packaged goods and merchandise stored therein.

It is a further object of my invention to provide an improved refrigerated partition for use in separating a refrigerated space into smaller divided compartments, while providing heat absorbing surfaces for more effective refrigeration.

Another object of my invention is to provide an open top refrigerator embodying an improved arrangement for the illumination and viewing of the interior and contents to facilitate the storage and dispensing of merchandise.

Also it is an object of my invention to provide an improved latch and arrangement for holding top opening door of a cabinet in elevated position.

Further objects and advantages are within the scope of my invention, such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification in conjunction with the drawings disclosing specific embodiments of the invention, in which:

Fig. 1 is a front elevational view showing the improved refrigerator, with one top opening door elevated, and parts broken away to show the internal arrangement therein, with partitions diagrammatically represented;

Fig. 2 is an end elevational view of the refrigerator, partially broken away and with dotted lines showing the viewing and illuminating arrangements diagrammatically;

Fig. 3 is an enlarged side elevational view of one of the refrigerated partitions;

Fig. 4 is a sectional view on line 4—4 in Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view on line 5—5 in Fig. 1 showing the arrangement of a swinging price list board shown in upstanding position in full lines, and showing how it is pushed down by the door closing to a dotted line position; and

Fig. 6 is a fragmentary enlarged end view showing the latch holding the edge of a door in elevated position, with dotted lines diagrammatically representing its operation.

2

Referring more specifically to the drawings, I have in Figs. 1 and 2 shown a top opening refrigerator embodying the improved features and arrangements in accordance with my invention. As usual, such a refrigerator comprises thermal insulating walls 11, which may be of any conventional construction, for forming a cabinet enclosing and insulating a refrigerated storage space 15 which is open at the top. Doors 17 rest upon the cabinet suitably closing the open top and hinges 19 pivotally secure the rear edges of the doors to the cabinet so that access to the interior of the storage space is conveniently had by lifting the front edges of the doors, in a well known manner, as by means of handles 20.

Although I have shown a two door embodiment, it will be understood that the principles of my invention may be utilized in refrigerators of various sizes having one, two, three or more doors.

In accordance with my invention, I provide a plurality of refrigerated partitions 21 for dividing the storage space into a plurality of smaller compartments while also providing an ample extent of prime refrigerating surface distributed and widely dispersed about the space to be chilled. These refrigerated partitions 21 are preferably mounted vertically and they are spaced suitably so that the packages of goods to be stored will be piled up against one or another of the partitions. This causes the goods to be uniformly and quickly chilled. For storage of frozen packaged foods, a space of twelve inches between such refrigerated partitions has proven to be quite effective. But it will be understood that this distance may be varied to suit any particular kinds of packaged goods to be stored and dispensed. Extending over the upper edge of each partition, in spaced relation thereabove, a guard member 23 of a U or channel cross-section is mounted in an inverted position. The spaced guard 23 also serves to utilize the air space enclosed over the upper edge of the partition as thermal insulation between the small compartments. The ends of the guards 23 extend to the walls of the cabinet where attachment is made to the strips 25 of "Bakelite" or other material, which extend down on the side walls from the top of the cabinet. It will be understood that the partitions 21 may extend from side-to-side, if preferred, to suit the shape of a cabinet, instead of extending from front-to-back as shown.

As may be seen in Figs. 3 and 4, each of the

refrigerated partitions 21 comprises a sheet of metal 27 having a plurality of reversely bent portions, areas, or folds 28 and being bent along the bottom to provide a flange 29 suitable for mounting. The upper edge of the partition sheet is bent to form a top flange 31 with a down-turned edge 33. A refrigerant conduit 35 of copper, or other suitable metal, is provided having a plurality of reverse bends forming a plurality of straight legs or elements 37 in a spaced apart parallel arrangement. The conduit is preferably so bent that the straight elements 37 are so spaced that these may be laid into the valleys 38 of the reversely bent portions 28 of the sheet. As shown, these straight elements 37 may be so disposed in the valleys of the partition sheet 27 as to pass alternately on opposite sides of the sheet, and may be in substantially spaced apart relation as the conductivity of the metal sheet transmits the absorbed heat to the conduit. In the preferred embodiment the valleys on either respective side are about two inches apart, and the legs of the conduit are about three inches apart. In this arrangement a much larger area of prime refrigeration surface is provided for a given height. For example, a partition of this kind may have about 20% more refrigeration surface. The partition sheet 27 and the straight legs or elements 37 of the refrigerant conduit are joined to provide good thermal conduction therebetween, as by soldering, brazing, welding or any suitable metal fusion process.

When installed, the refrigerant conduits 35 of the partitions are connected together to receive refrigerant, either vaporizible or a brine or other medium from a suitable source, local or distant. In accordance with the popular and convenient practice, the cabinet may be provided with a machine compartment 39, under the food storage compartment, for housing a conventional compressor and condenser unit 40 to which the two ends of the conduit line 41 may be connected, as represented by dotted lines for receiving a vaporizible refrigerant. Such a unit may be installed from the rear of the cabinet, which may be left open for this purpose, and conventional automatic controls may be utilized, in a well known manner.

A top structure 43 is provided rising from the back of the cabinet and disposed over the top above the orbit of the door as it is lifted. A fixture 44 and suitable sockets 45 are mounted in the top for holding fluorescent tubes 47, or other electric light sources, in a position suitable for effectively illuminating the interior of the storage compartment when the door is opened, as shown by the dotted line with arrows.

The top structure also mounts a latch 49 which is pivotally suspended in such a position that the lower end of the latch will swing back with the front edge of the door to pass it as it is lifted. As the door then comes forward, it engages the rear side of the latch 49 causing a front projection 51 of the latch to abut the top. This limits the forward swinging movement of the latch and holds the door open. Fig. 6 more clearly shows how the latch holds a door in a forwardly inclined position, for a purpose to be subsequently described. The latch may be made from a strap hinge, and is then one strap of the hinge, which hangs down, the other strap 53 of the hinge being attached to the top structure of the refrigerator, as by screws 55 passing therethrough. A triangular piece of metal 57 welded

to the front side of the latch provides an extended surface 59 which abuts the top and limits the forward swinging movement of the latch, thereby holding the door open. The door can be closed by manually turning the latch 49 back sufficiently, as shown by the dotted line position in Fig. 6, to pass the edge of the door. Normally the weight of metal piece 57 balances the latch to hang inclined backward so the door strikes it lightly.

For providing a convenient reflected view of all portions of the storage compartment, a large flat mirror 61 is mounted upon the under or inner side of the door, as by a molding or frame 63 secured to the door. The forwardly inclining position in which the latch holds the door is arranged to so position the mirror on the inside of the door as to present a clear reflected view of the inside of the storage compartment from the attendant's position at X, as represented by dotted lines in Fig. 2. Also any light entering from shop windows will come into the refrigerator horizontally, whereby it impinges upon the mirror of the opened door at such an angle as to be reflected down into the storage compartment. This still more brightly illuminates the compartment.

A price list board 65 is provided having its lower edge pivotally mounted by hinges 67 on the rear wall of the storage compartment just below the rear edge of the door, as may be seen in Figs. 1 and 5. A tension spring 69 continuously biases the price list board to rise so that it follows the door up as it is lifted. It is again closed down into the refrigerator by the door as it is closed. Fig. 5 shows structural details of the price list board which comprises a plurality of channel members 71 of sheet metal each having the edges turned in suitably for receiving and securing the edges of price cards. These card holding channels 71 are secured upon a back board or plate 73, which is preferably a sheet of metal, by screws 75, providing a rigid light weight structure. The end and upper edges 76 of this sheet of metal are preferably turned forward. The lower edge 77 is turned back providing a flange 79 to which the hinges are attached. One end of the tension spring 69 may be secured at the back of the price list board by the screws which hold the card channels, while the other end of the spring is anchored to the back wall of the storage compartment.

Each time the door of the refrigerator is opened the price list board follows it up and is exposed in a well illuminated position for easy viewing by the attendant. When the door is closed, the price board is pushed down into the refrigerator, as represented by dotted lines, Fig. 5.

It is apparent that within the scope of my invention modifications and different arrangements may be made other than herein disclosed, and the present disclosure is illustrative merely, the invention comprehending variations thereof.

What is claimed is:

1. A refrigerated partition comprising, a sheet of metal having a plurality of reversely bent folds, a reversely bent refrigerant conduit having a plurality of straight elements in a spaced parallel relation, the straight elements of said conduit being spaced suitably and being disposed alternately on opposite sides of said sheet in the valleys of reversely bent folds of the sheet, and such straight elements of the conduit being joined to

the metal sheet by metal fusion to provide good thermal conducive connection therebetween.

2. A refrigerated partition in accordance with claim 1 and further characterized by the parallel straight elements of the refrigerant conduit being disposed in valleys of the reversely bent sheet which are further apart than the next adjacent valley in said sheet.

3. A top opening refrigerator comprising, thermal insulating wall means forming a cabinet enclosing a storage compartment having a top opening, a door closing said top opening, a large flat mirror mounted upon the inner or under side of the door, hinge means pivotally attaching the rear edge of the door to the cabinet, a top structure rising from said cabinet and disposed over said top opening above the orbit of the door as it is lifted and so that a light source may be mounted thereon suitably positioned for illuminating the compartment when the door is opened to a forwardly inclined position, latch means mounted on said top structure for holding the door in a forwardly inclined position suitable to permit light to pass from the source down into the compartment while the mirror reflects any horizontally received light down into the compartment and also reflects a clear view of the interior of the compartment to the attendant.

4. A top opening refrigerator in accordance with claim 3 and further characterized by having a price list board, hinge means pivotally securing the bottom edge of said board to the rear wall of said cabinet below the rear edge of the door, and resilient biasing means urging said board to rise against said door and to turn to upright position as the door is opened.

5. In combination in a top opening refrigerator, thermal insulating wall means forming a cabinet enclosing a storage space open at the top, a door for closing the open top, hinge means pivotally attaching said door along the rear edge to said wall means so that the front edge of the door may be conveniently lifted to provide access into said storage space, a top structure rising from the cabinet and disposed above the open top at a position above the orbit described by the front edge of the door as it is opened, a latch, means pivotally suspending said latch from said top structure in such a position that the lower end of the latch will swing back with the front edge of the door to pass the door as it is being opened, and cooperatively engageable surfaces so disposed as to limit the forward swinging movement of the latch so that the door can be released only by turning the latch back sufficiently to pass the front edge of the door.

6. A top opening refrigerator comprising, thermal insulating wall means enclosing a storage compartment having a top opening, a plurality of refrigerated partitions dividing said storage compartment and suitably spaced apart so that goods to be stored may be piled up against one or another of said partitions for effective refrigeration and for convenient accessibility for dispensing, a door closing said top opening, a large flat mirror mounted upon the inner side of the door, hinge means pivotally attaching the rear edge of the door to the cabinet, a top structure rising from said cabinet and disposed above the orbit of the door as it is lifted and means for mounting a light source in said top structure so that the interior of the storage compartment is illuminated when the door is opened, and latch means for holding the door inclined suitably for providing a reflected view of the interior of the compartment.

NICHOLAS ACHS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,093,728	King	Sept. 21, 1937
2,244,475	Raskin	Jan. 3, 1941
2,306,385	Herter	Dec. 29, 1942
2,428,243	Raskin	Sept. 30, 1947
2,430,329	Davis	Nov. 4, 1947