July 2, 1940. L. F. CLERC 2,206,689

REFRIGERATED DISPLAY CABINET

Filed June 20, 1938 4 Sheets-Sheet 1

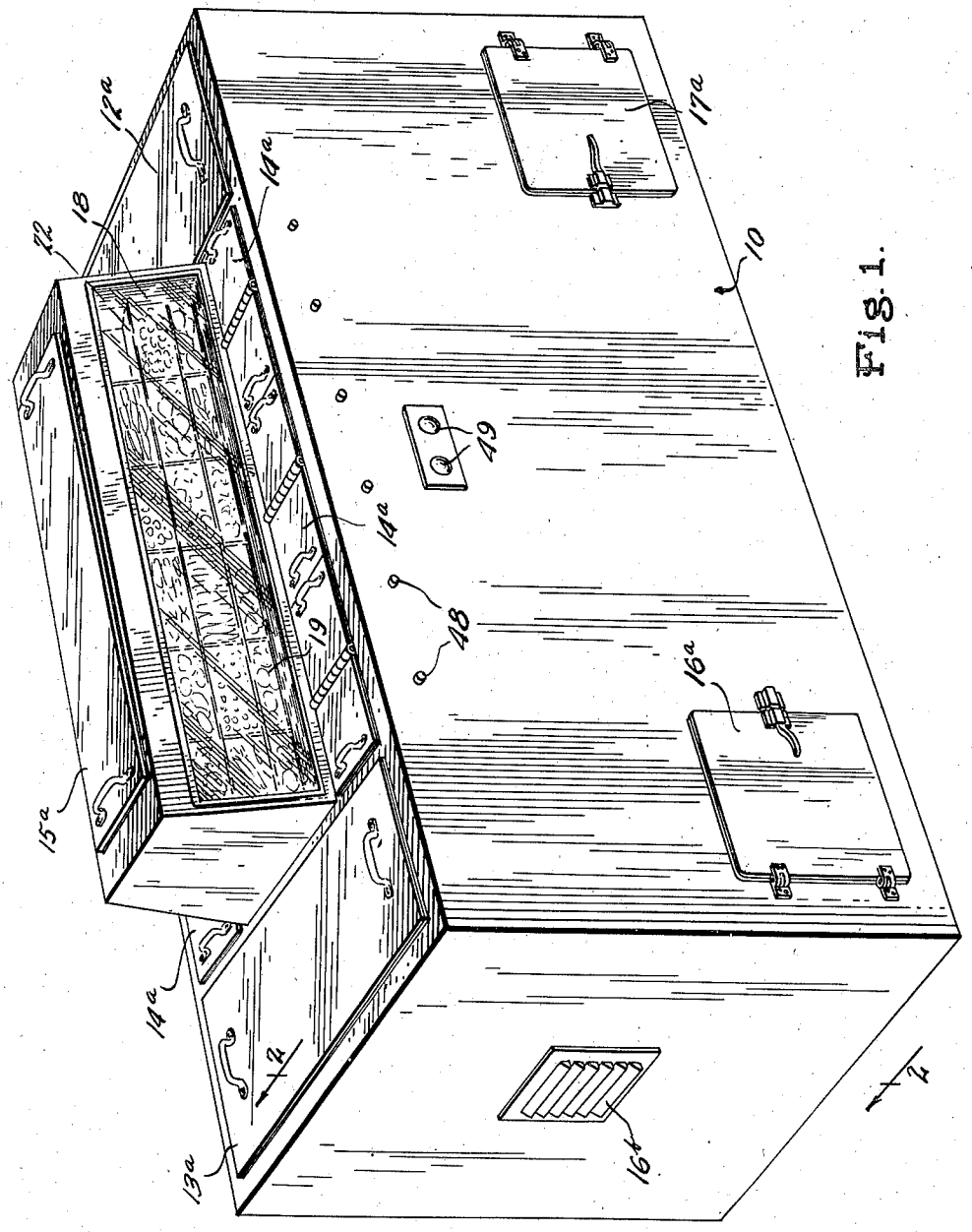

Fig. 1.

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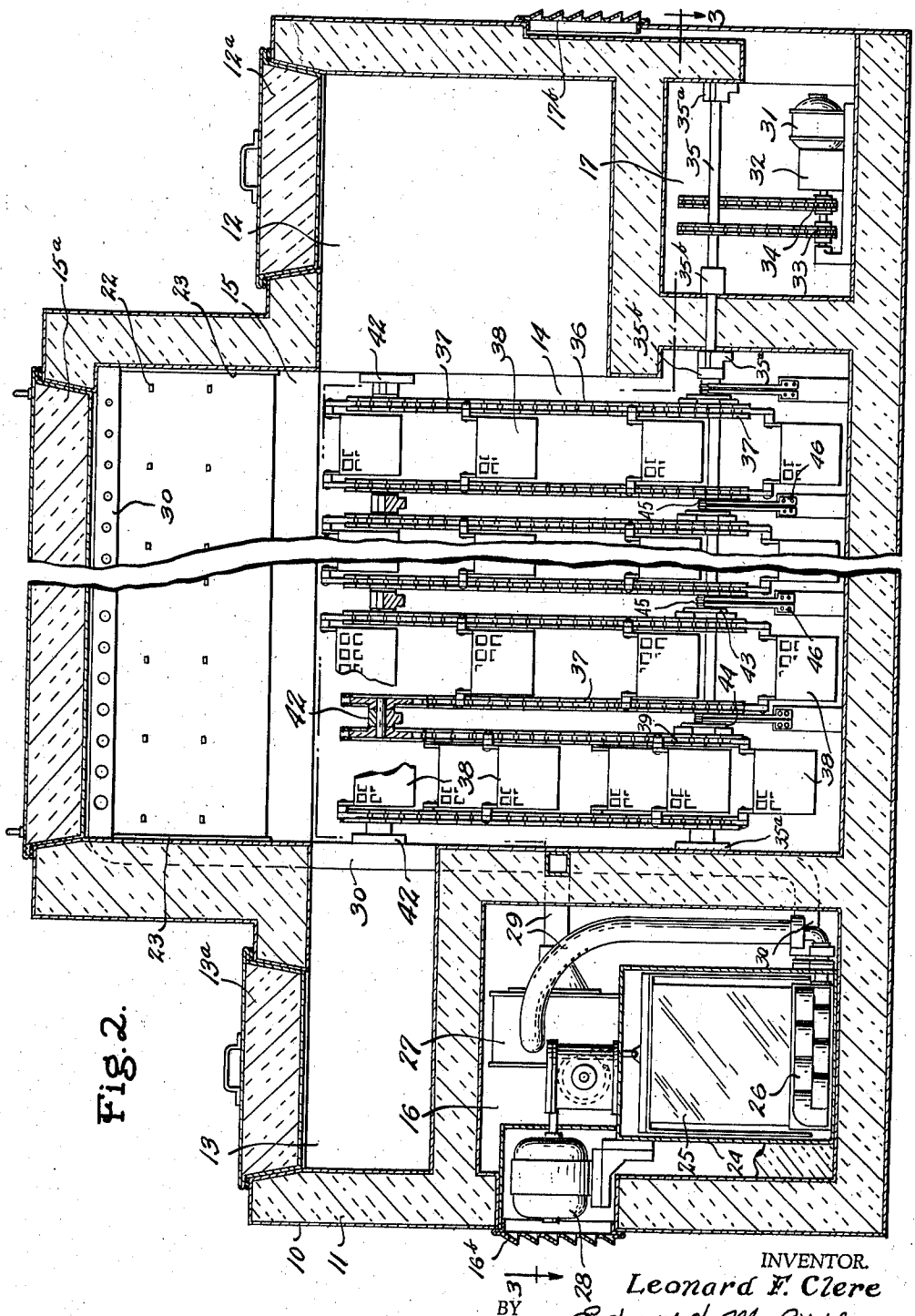

Fig. 2.

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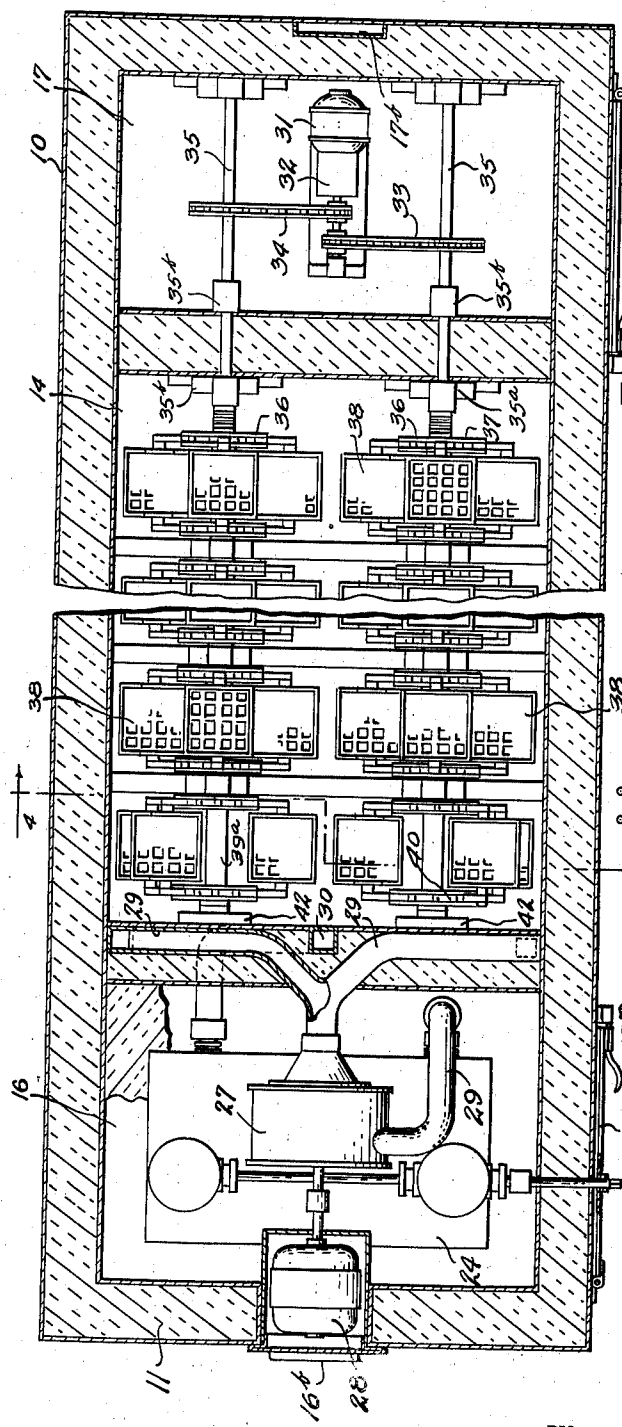

Fig. 3.

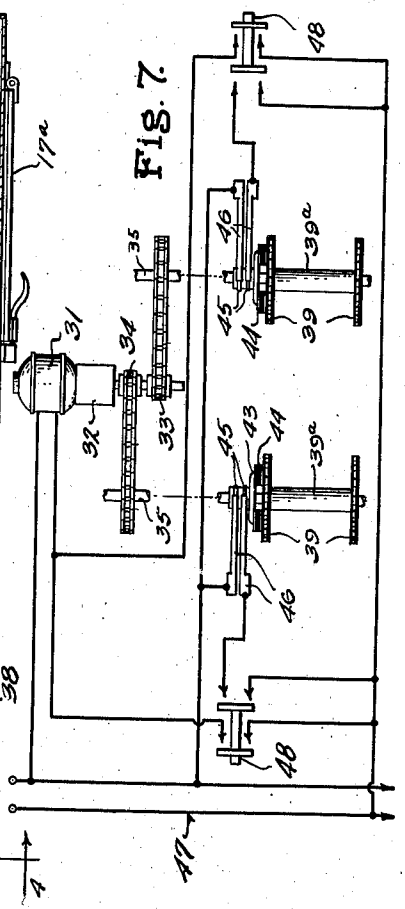

Fig. 7.

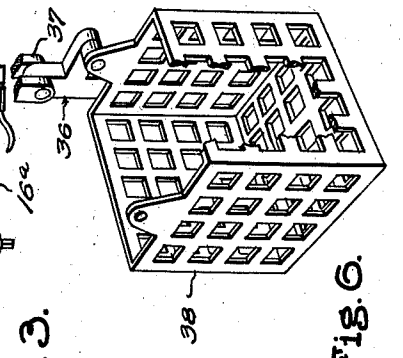

Fig. 6.

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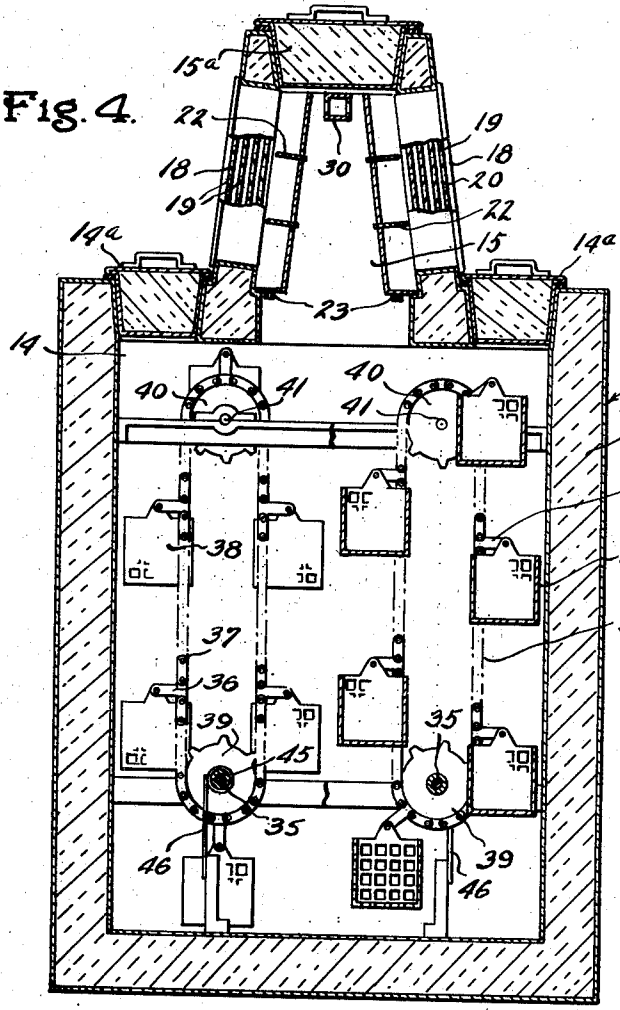
REFRIGERATED DISPLAY CABINET

Filed June 20, 1938 4 Sheets-Sheet 4

Fig. 4.



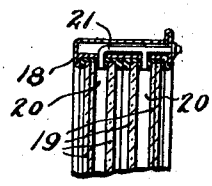


Fig. 8.

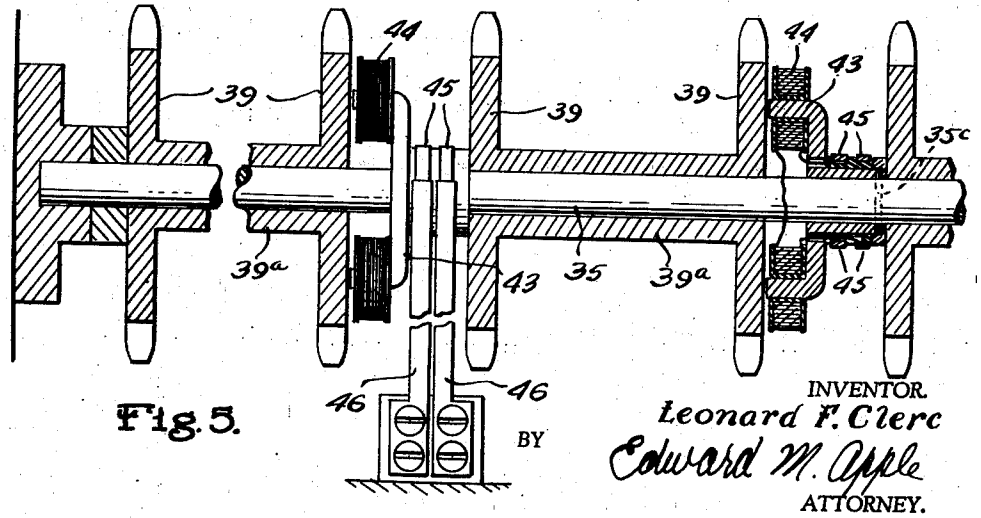


Fig. 5.

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Patented July 2, 1940 2,206,689

UNITED STATES PATENT OFFICE

2,206,689

REFRIGERATED DISPLAY CABINET

Leonard Frank Clerc, Chicago, Ill.

Application June 20, 1938, Serial No. 214,665

5 Claims. (Cl. 62—89.5)

This invention relates to refrigerating apparatus, and has particular reference to a device for refrigerating, displaying and dispensing frozen food products.

An object of the invention is the provision of an improved display cabinet, adapted to employ refrigerating apparatus, such as disclosed in my copending application S. N. 214,291, filed June 17, 1938.

Another object of the invention, is the provision of a refrigerating device, of the character mentioned, which is simple in construction, portable, and readily set up and installed in an ordinary store or the like.

A further object of the invention is the provision of a device of the character referred to, which is constructed with movable containers, arranged to display a variety of perishable food stuffs.

A further object of the invention, is the provision of a refrigerating cabinet, having a plurality of display containers with means for moving certain of the display containers into position, so that their contents may be readily removed.

Other objects and advantages of the invention will appear as the description proceeds, reference being made from time to time to the accompanying drawings in which:

Fig. 1 is a perspective view of a refrigerated cabinet embodying my invention.

Fig. 2 is a vertical section, taken on line 2—2 of Fig. 1.

Fig. 3 is a horizontal section, taken on line 3—3 of Fig. 2.

Fig. 4 is a vertical section, taken on line 4—4 of Fig. 3.

Fig. 5 is an enlarged fragmentary detail, showing the arrangement of the sprockets and clutch mechanism for driving the movable containers.

Fig. 6 is a perspective view with parts broken away, illustrating the type of container used.

Fig. 7 is a diagrammatic view illustrating the circuits employed in driving the several trains of portable containers.

Fig. 8 is an enlarged fragmentary detail illustrating the construction of the display windows.

Referring now more particularly to the drawings, it will be understood that my invention resides in the particular combination and arrangement of the elements in the embodiment herein disclosed. The reference character 10 indicates the cabinet, in which is housed the various elements comprising my invention. The cabinet 10 is preferably made of metal and is heat insulated as at 11 with any desirable form of insulating material. The cabinet 10 is divided into storage compartments 12, 13, 14 and 15, and the mechanical compartments 16 and 17. Each of these compartments is provided with an insulated door, each door being designated by the same reference character as the compartment, with the addition of a letter such as 13a, etc. The compartment 15 is provided with windows 18, the construction of which is detailed in Fig. 8, in which it will be noted that I employ four panes of glass in each window as indicated by the character 19. The panes of glass are in spaced relation, so as to form dead air spaces between the several panes as at 20. I also provide means as at 21 for drawing the air from the spaces 20, so as to provide a partial vacuum, all of which prevents the frosting of the glass in the window. The compartment 15 is also provided with a plurality of shelves 22, which are arranged to slide vertically on tracks 23, so that the shelves 22 may be removed from the compartment 15 for loading.

The compartment 16, houses the refrigerating apparatus, which consists of the solid refrigerant container 24, the solid refrigerant 25, the heat exchange unit 26, a blower 27, a motor 28, air intake lines 29, and exhaust line 30, all of which are specifically described and claimed in my copending application, S. N. 214,291, filed June 17, 1938.

The compartment 17 contains a motor 31, gear reduction 32, chains and sprockets 33 and 34, which are arranged to drive the shafts 35, which said shafts are adapted to drive the trains 36 of movable containers, which are mounted in the compartment 14, as is more particularly described hereinafter. The shafts 35 are provided with suitable bearings, 35a and packing glands 35b, the latter being intended to prevent the passage of air between compartments 14 and 17.

The compartments 16 and 17 communicate with the atmosphere through the louvres 16b and 17b, for the purpose of cooling the motors 28 and 31.

The trains 36 consist of link belts 37, to which are secured a plurality of containers 38, such as illustrated in Fig. 6. These containers are perforated so that refrigerated air may circulate freely through them. The link belts 37, are adapted to pass over sprockets 39 and 40. The sprockets 39 and 40 are integrally formed at the ends of drums 39a (Fig. 5), which are freely mounted on the shafts 35 and 41. The shaft 41 is positioned

above the shaft 35, and is provided with suitable bearings 42.

As illustrated in Figs. 3 and 4, it will be seen that there are two groups of container trains in the compartment 14, each group being driven by a common drive shaft 35. It will be noted further, that each group consists of several individual trains 37, and that each train 37 may be connected to the drive shaft 35 separately. This is accomplished as follows: The sprockets 39 (Fig. 5), and the drums 39a, which comprise the spools, are made of magnetic material and are freely mounted on the shafts 35, and are adapted to contact the cores 43 of the electromagnets 44, which are secured to the shafts 35 by pins 35c. An electric circuit is completed through the electromagnets 44, by means of the rings 45, and the contact strips 46 (Figs. 5 and 7), so that when the electromagnets 44 are energized the sprockets 39 are gripped solidly, causing the container train secured thereto, to be moved.

The electromagnets 44 are connected in the circuit 47, to which is also connected the motor 31. The circuit 47 is closed by any one of the push button switches 48 (Fig. 1). Each electromagnet 45 is operated by a separate push button switch 48, so that any container train may be operated individually.

The lights 49, are in the same circuit which operates the refrigerating mechanism, which is contained in compartment 16 and forms no part of this invention, and are fully described in my copending application S. N. 214,291, filed June 17, 1938.

It will be noted that the shelves 22 in the compartment 15, are divided into tiers, corresponding to the number of container trains contained in the compartment 14. This arrangement being intended to permit the display on the shelves 22, of the type or types of perishable merchandise carried in the movable containers 38.

The operation of the device is simple. As stated above, the containers 38, are provided with the same kind of perishable merchandise, displayed on the shelves 22, immediately above. A prospective purchaser simply has to press the push button switch 48 in front of the container train, carrying the type of merchandise desired to be selected. The door 14a is held open until the container carrying the desired merchandise is in view, whereupon the push button is released and the container train stops, so that the prospective purchaser may remove the desired merchandise from the container.

A display cabinet constructed as hereinabove described has a number of advantages over present known cabinets. First, a cabinet constructed in the manner herein disclosed permits the display of a small quantity of merchandise in a compartment, positioned above the main storage compartment. This reduces to the minimum, the possibility of any warm air reaching the display compartment, when the doors 14a are opened to remove merchandise from the main storage compartment. Secondly, the great bulk of the merchandise stored is not subjected to the damaging effects of light rays. Further, a cabinet constructed in the manner taught by the applicant enables a dealer to carry as little merchandise as he desires, without the necessity of filling the storage section, in order to make it attractive. In other words, a small quantity of merchandise may be attractively displayed in the display compartment, without the necessity of having the storage compartment completely filled. This cabinet has the further advantage of having satisfactory display space, without the necessity of having a great amount of glass exposed, which creates a refrigeration problem with its attendant expense and inefficiency.

A cabinet constructed in the manner taught by applicant, has all the advantages of "blind storage," without any of its disadvantages. With this device, a prospective customer may readily select any desired commodity, and may remove it from the cabinet without the necessity of having a clerk mauling all of the merchandise to find a particularly desirable item.

A cabinet constructed in this manner also obviates the necessity of removing a basket of merchandise from the cabinet, and exposing it to the warmer temperature of the room, in order to make a selection of a particular item, as is the practice in the use of present devices of this kind.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a cabinet of the character described, the combination of a storage compartment, having a plurality of trains of movable containers mounted therein, means for moving each train separately, a display compartment communicating with said storage compartment, removable shelves in said display compartment, each shelf having a division corresponding to one of said trains, and means to circulate refrigerated air through and about said trains and said shelves.

2. A combination as defined in claim 1, there being a common means for driving all trains, and manually controlled means for connecting any one train to said common means.

3. A device as defined in claim 1, wherein the means to circulate refrigerated air comprise a gas tight compartment in which may be sublimated a solid refrigerant, a heat exchange unit in said gas tight compartment, said heat exchange unit comprising a substantially square tube arranged in a tortuous path, air intake and exhaust means communicating with said heat exchange unit and the storage and display compartments of said cabinet.

4. The combination as defined in claim 1, in which the means to circulate the refrigerated air comprise a compartment suitable for the sublimation of a solid refrigerant, a heat transfer unit comprising a tube arranged in a tortuous path, air intake and exhaust means connected to said tube, a blower connected to said air intake line, and thermostatically controlled means for operating said blower.

5. The combination with a machine using a solid refrigerant, of a cabinet having a compartment adapted to house said machine, a storage compartment, a plurality of doors entering said storage compartment, an endless train, comprising link belts carrying perforated containers, arranged to travel past each door in said storage compartment, there being means associated with said trains for moving said trains collectively and individually, a display compartment, comprising an auxiliary section secured to said cabinet, said display compartment having shelves arranged in fixed relation to said doors, and means for circulating air, cooled by said solid refrigerant, through and around said trains and said shelves.

LEONARD FRANK CLERC.