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2,701,746

SELF-SERVICE COLD STORAGE LOCKER

Filed July 21, 1950

4 Sheets-Sheet 1

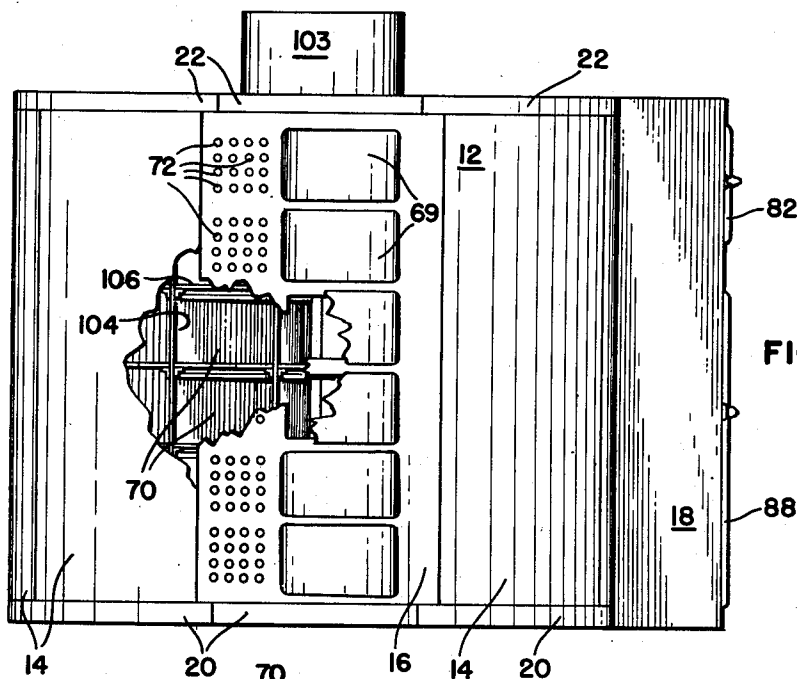


FIG. 1

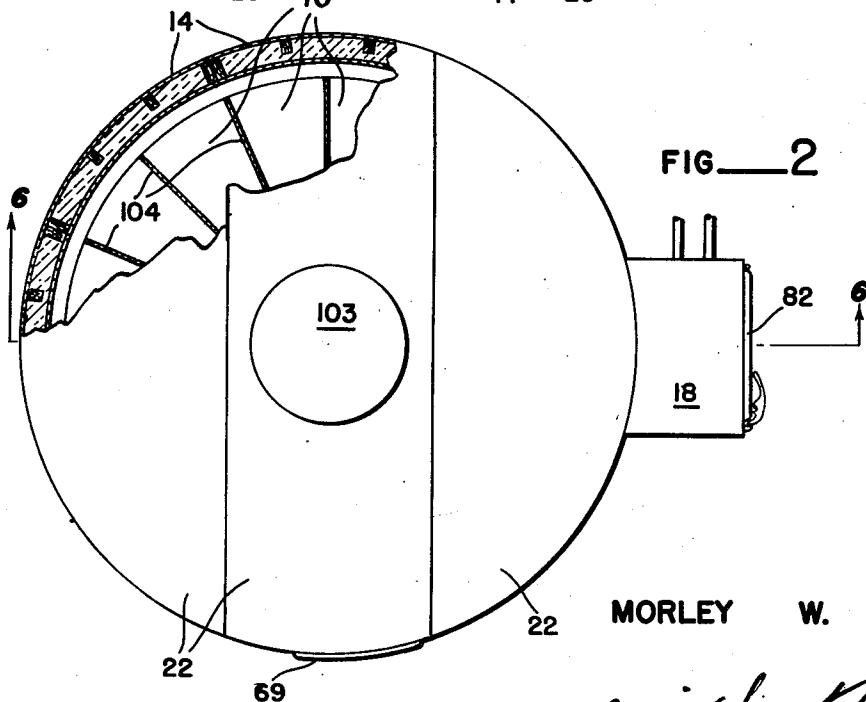


FIG. 2

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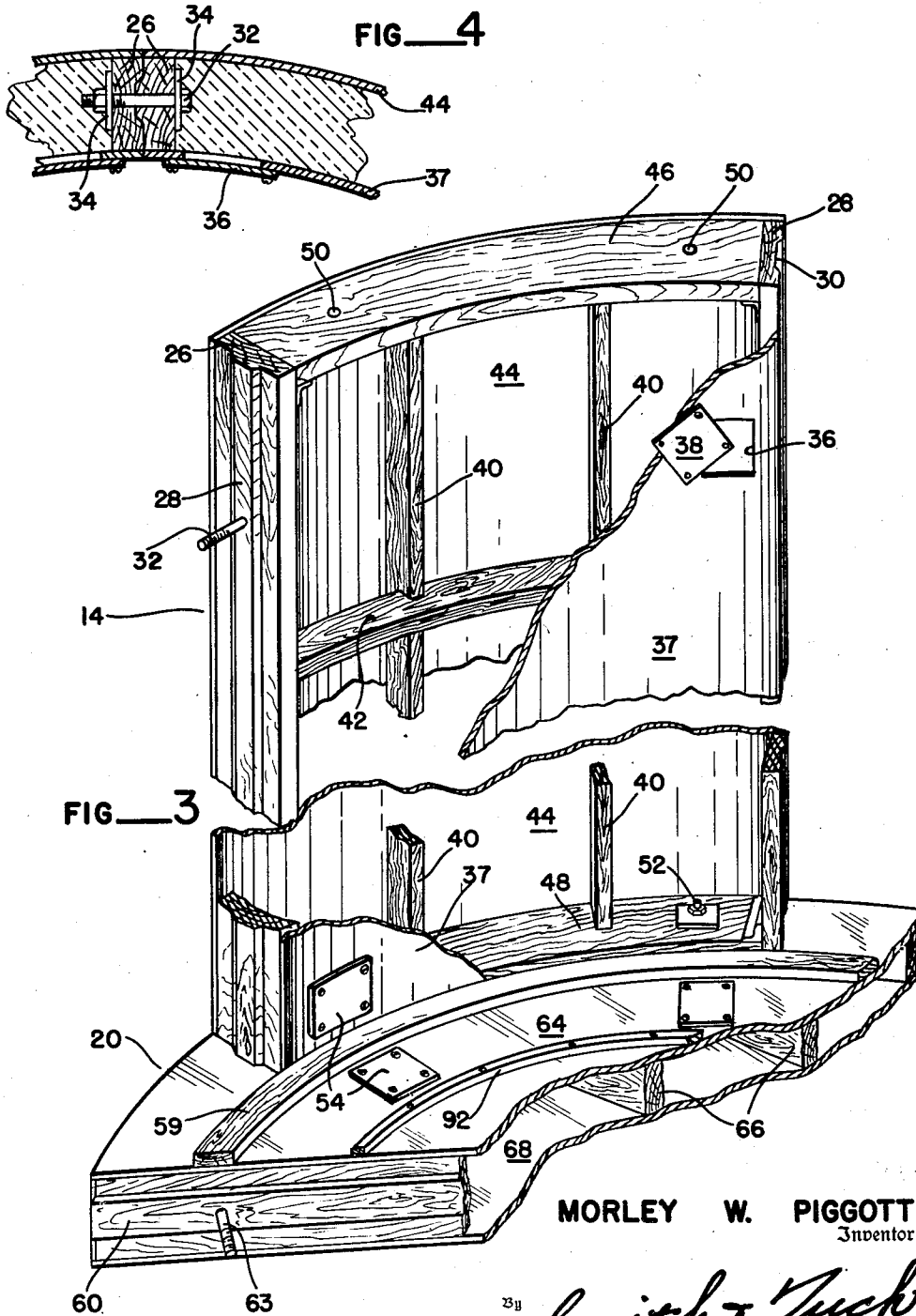
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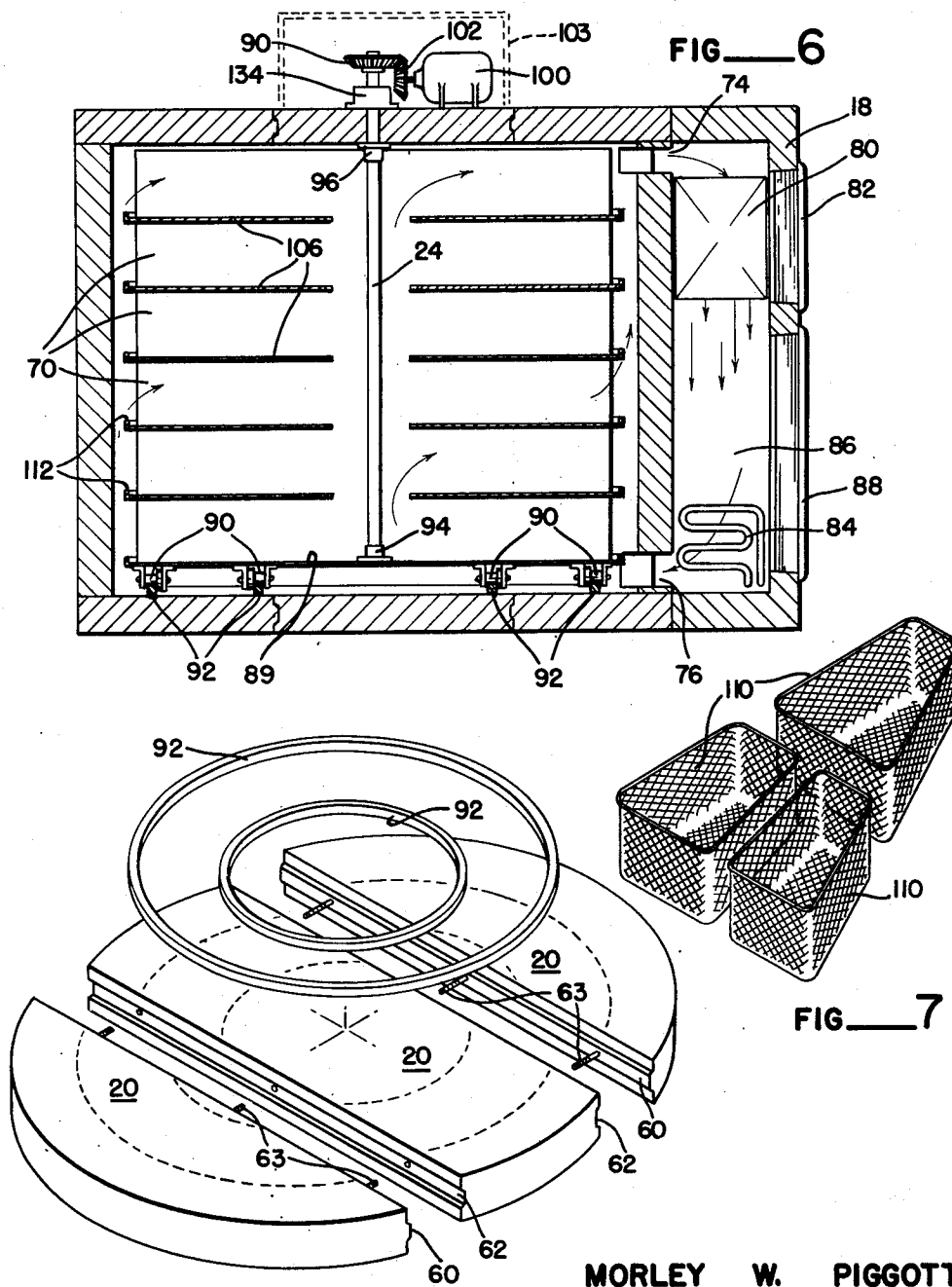


**FIG. 5**

FIG. 7

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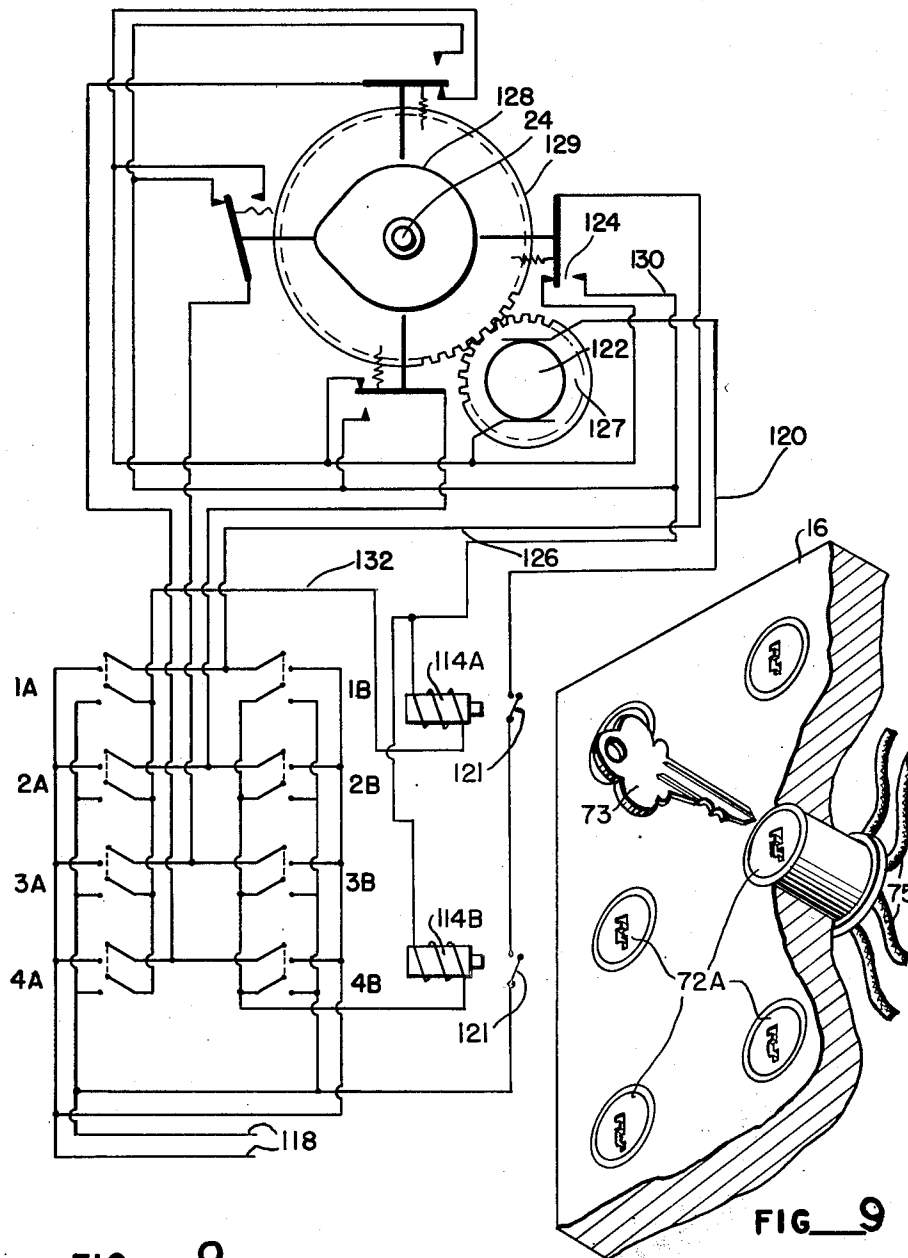


FIG. 8

FIG. 9

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## SELF-SERVICE COLD STORAGE LOCKER

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4 Claims. (Cl. 312—215)

This invention contemplates the provision of cold storage lockers that are normally used by the housewife for the storage of excess frozen foods. In lockers of this order this present invention contemplates a locker arrangement so made that it may be made in sections in the manufacturer's plant and then easily moved in parts through existing doorways, and the like, and to be assembled in the final place of use which normally will be either in, or closely associated with, a retail food establishment. Provision is made so that, with the minimum of expensive structural elements, lockers will be made available to the vendor on a self-servicing basis and at the same time the provision is made so that the renter can have access only to his own locker which will be key controlled.

In the past few years there has been a tremendous increase in the use of cold storage lockers by individual families. They find it convenient to freeze and thus store products of their own time or garden, and it is also found economical to buy whole animals, or of the larger of these to buy one-half, which is cut and wrapped in useable packages and then stored away for future use. A person, viewing the field of locker arrangements as employed today, will be impressed with the wide range of constructions that are at present in use. This is a definite indication that the best plan for general use has not yet been determined. In the past the most effective efficient system for cold storage lockers was to provide, in a single building, a large number of compartments, usually separated from each other by open-work framing, and to maintain the temperature of the entire large room at a necessarily very low freezing temperature. This provided great economy in over-all construction in that only the outer walls of the large room need be fully insulated and the various individual lockers were without insulation. They proved, however, to be objectionable from many points of view. First of all, the person putting goods in their locker, or taking material out from the same, were subjected to the very low freezing temperatures for considerable periods. Many persons cannot accept these low temperatures without being adequately and necessarily heavily clothed. Then too, the storage lockers normally being in a building by themselves, required either additional parking facilities with the attendant extra stock by the users of the establishment, or the users must carry the cold frozen products to their car or point of collection of other foods. A preferred solution appears to be that of combining the frozen food locker with a store having either general groceries or possibly just meats, or preferably a combination of them, such as is commonly referred to as a Super-Market, and under such conditions to have the lockers readily available to the patron without the necessity of getting into a low temperature room. This type of equipment is normally referred to as "warm room" storage lockers.

This present invention comprehends an improved form of the "warm room" storage locker. Of the various "warm room" lockers observed in the past, they have generally been characterized by constructions that made it mandatory that they be largely assembled in the producing factory, and then transportation to the point of installation and the physical moving of the same into the point of use normally occasioned the removal of portions of the walls, or the like, so that the bulky units could be installed. In this present invention it is believed that this fault of many of the forms of existing equipment has been

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overcome, and a unit having a large number of lockers can be transported in small sections and readily fitted into a store room through the normal doors provided in the same.

A great many of the "warm room" lockers available at present may be likened to the home refrigerator, in that for a given cubical content a large amount of surrounding insulation material is required, and to give adequate access expensive insulated doors are required for a relatively small storage capacity. This general plan is a wide departure from the cold storage locker room where each individual storage space did not require its own insulation. The majority of the "warm room" lockers observed have made it necessary to employ such a large amount of enclosing insulation and structure as to bring the cost per cubic foot of the "warm room" locker up to a level that prices the same out of general use. In this present invention it is believed that means are provided for overcoming the excessive expense per cubic foot of "warm room" storage lockers.

The principal object of this present invention, therefore, is to provide a "warm room" storage locker so constructed that the unit price per square foot of storage space can be greatly reduced so that it can compare favorably and economically with the large locker rooms wherein the uninsulated lockers are disposed in a cold room.

A further object of this invention is to provide means whereby the expensive access doors with their attendant fittings can be reduced to a minimum so that pricing or rentals of the finished units can be kept well within the range acceptable to the average family budget.

A further object of this invention is to provide a built-up bank of "warm room" storage lockers each piece of which is relatively small so that it can be easily handled, easily transported and easily entered in through the ordinary access doors in the building.

A further object of this invention is to provide that a single access door can be made to serve a large number of storage compartments to the end that the over-all cost will be kept to a minimum.

A further object of this invention is to provide means whereby, with a minimum of expense in structure, the individual locker renter will at all times have access to his locker but will be effectively denied access to any other lockers.

A further object of this invention is to provide a battery of food storage lockers which can be enclosed with the minimum of insulating material so that the over-all cost of the unit can, in many cases, be reduced below the cost of similar storage space in the "warm room" plan.

A further object of this invention provides a battery of frozen food lockers so arranged that the great bulk of the locker assembly can be placed in a room, such as a storage room adjoining a place of business, and have the access doors located within the grocery store or butcher shop and in this way use a very minimum of the organized existing floor space of the store yet give the customers and renters the convenience of selecting their frozen foods from their own locker at the same time they are purchasing the balance of food required for a periodic food supply.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is an elevational view of an embodiment of my self-service cold storage locker, with a portion of the cabinet broken away revealing compartments formed in the interior;

Figure 2 is a plan view as taken from above in Figure 1, a portion of the cabinet being broken away;

Figure 3 is a fragmentary perspective view of a sidewall unit positioned on a base unit, enlarged, with portions broken away revealing the inner construction of said units;

Figure 4 is a fragmentary view, enlarged and partly in section, showing the means of joining together two adjoining sidewall units;

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Figure 5 is a perspective view of members forming the base and track in my locker, in exploded form;

Figure 6 is a view taken on line 6-6 of Figure 2, partly in section;

Figure 7 is a perspective view of food containers to be used in my locker;

Figure 8 is a schematic diagram of an electrical circuit and associated parts, which, upon selection of a locker compartment, rotates the shelving unit until said compartment is in line with the appropriate door and release said door; and

Figure 9 is an enlarged perspective view of a portion of the locker selection panel, cut to show details of one key-operated selector.

Referring to Figures 1 and 2, cabinet 12 has the general form of an upright cylinder. The sides of cabinet 12, in this embodiment of my invention, are made in eight units, six sidewall units 14 being identical and door unit 16 and an outwardly extending cooling unit 18 being of the same width so that each unit covers one-eighth of the side surface of cabinet 12. Three base units 20 form the bottom of cabinet 12 and three cover units 22 form the top of cabinet 12. The outer base units and outer cover units are identical and the center base unit and center cover unit are identical except that the center cover unit has a passageway for shaft 24.

The interchangeability of the units of cabinet 12 is desirable to simplify the manufacture of the cabinet, this making a greater number of identical parts for mass production of the same and making fewer kinds of units to assemble. Throughout the design of my locker I have employed relatively small units so that they may be handled with ease and moved through even small doorways to a location at which they are to be used, the units being adapted to rapid assembly at the location where they are to be used.

Typical construction of the units of cabinet 12 is shown in Figure 3. Sidewall unit 14 has side members 26, one having tongue 28 and the other having groove 30. Tongue 28 and groove 30 of adjacent side members 26 are held together as by bolts 32, having washers 34 on either side, as is shown in Figure 4. Access to bolts 32 is obtained by openings 36 in inner wall 37, there being cover plates 38 for said openings. Uprights 40 are spaced between side members 26 and stringers 42 tie the vertical members together. Inner wall 37 and outer wall 44 are preferably made of water-resistant plywood and secured to the adjacent members. Member 46 forms the top of sidewall unit 14 and member 48 forms the bottom. Insulating material and impervious vapor seals are placed in the hollow interior, and form a barrier to transfer of heat and moisture in sidewall unit 14, except at the extreme margin of the unit and at the crossing of uprights 40 and stringers 42 where the low conductivity of wood must be depended upon. The tongue and groove jointer of adjacent sidewall units 14 serves to hinder transfer of heat, it being preferable to have sealing material such as caulking at this point.

Holes, as at 50, are uniformly spaced on members 46 and 48 to secure sidewall unit 14 to cover units 22 and base units 20 as by bolts 52, access to bolts 52 being obtained through openings in sidewall unit 14 and base unit 20. Said openings are covered by cover plates 54 secured as by screws. Base units 20 and cover units 22 have holes uniformly spaced corresponding to holes 50 in sidewall units 14 so that said units may be combined in any manner, there being similar holes in door unit 16 and cooling unit 18-18. Battens 59 at the jointer of sidewall units 14 to cover units 22 and base units 20 serve to cover the joint and assists in positioning the units.

Base units 20 have tongues 60 and grooves 62 in adjacent walls and are connected together as by bolts 63. Joists 66 space inner wall 64 and outer wall 68 apart and the cavity is filled with insulating material and vapor barriers are provided.

Door unit 16 has a plurality of doors 69, one door for each level of compartments 70. A plurality of compartment selectors 72, one for each compartment, are set in door unit 16, operation of said selectors 72 being described in more detail later. Doors 69 are hingedly connected to door unit 56 and have locking means on the other side operable remotely by compartment selectors 72.

Figure 9 shows a section of the door panel 16 having

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a series of key operated selectors 72A, each to be operated by a separate key, as 73. The selectors 72A may have essentially the same mechanisms as the ordinary automobile ignition switch and each has a plurality of electrical leads for connection to the remainder of the electrical control system.

A most desirable feature of my self-service cold storage locker is having only one bank of doors 69. Compartments 70 are serviced by rotation to a position in line with said doors. In any "warm room" locker much heat is lost around doors, yet many lockers previously constructed have had a door for each compartment. Also, a door is a relatively expensive item and involves complex insulations and sealing means. Little air can pass to other compartments when one door is open to its associated compartment, the walls of the compartment being quite close to doors 69, as can be seen from Figure 2. Suitable rubber flanges on the inside of the door openings further seal the selected compartment.

Being of the same width as sidewall units 14, door unit 16 may be positioned at any place around the circumference of cabinet 12. It may be considered desirable in certain stores that all of cabinet 12, except door unit 16, be concealed behind a wall. Again, it may be considered desirable only that door unit 16 and cooling unit 18 be open to view in which case they may be positioned side by side and the rest of cabinet 12 covered.

Cooling unit 18, forming a cold air supply, has openings at the inner top at 74 and at the inner bottom at 76 for passage of air to and from inside cabinet 12. A blower 80 is positioned in the upper portion of cooling unit 18 and may be of any conventional type and powered by electricity. Door 82 affords access to blower 80. Refrigerant coils 84 are positioned below blower 80 and connected to a source of refrigerant not depicted. Space is provided for a quick freeze area either above or below refrigerant coils 84, as at 86, there being a door 88 affording access to this area. Cooling unit 18 may be positioned at any point around the circumference of cabinet 12.

A rotatable shelving unit, having a generally upright cylindrical outline, with a plurality of storage compartments 70, is formed by the following means. A circular base 89 is mounted on rollers 90 which are set on circular tracks 92. Circular tracks 92 are positioned on base units 20, there being two such tracks depicted in Figures 5 and 6, one near the outer edge of compartments 70 and one spaced inward therefrom. In this position the weight of food in compartments 70 is directly supported to facilitate rotation of base 89.

Shaft 24 is centered on base 89 and is fixedly secured thereto by suitable means as by having a flanged sleeve 94 set on the end of shaft 24 and having bolts or screws passing through the flange and base 89. A second flanged sleeve 96 is rotatably mounted on shaft 24 and secured to the inner side of the central cover unit 22. Shaft 24 carries a bevel gear 98 at its upper end; and an electric motor 100 is positioned on cover unit 22, at one side, there being a bevel gear 102 on the motor shaft connecting with bevel gear 98. Shaft 24 should either be made of material having a low conductivity factor or suitable couplings should be provided to prevent the conducting of heat in the shaft. Upon activation of electric motor 100, shaft 24 rotates and compartments 70 are moved. A cover 103 may be used to protect these parts and conceal them from view.

Vertical partitions 104 are positioned on base 89. Shelves 106 are mounted on brackets 108 of a general V-shape horizontally between partitions 104, forming compartments 70. Shelves 106 are cut off at their apex to permit circulation of air at the center of compartments 70. It is desirable to have some form of container for material to be stored in compartments 70. In Figure 7 is depicted a set of three wire baskets 110 of a size and shape together to fit in compartments 70. The baskets 110 afford means of segregating material in compartments 70 and each will not be very heavy. A lip 112 on the outer edge of shelves 106 provides means to prevent baskets 110 from coming out of compartments 70 during rotation and wedging against sidewall units 14.

It can be seen that the compartments 70 are arranged in vertical and horizontal rows, there being a door 69 for each horizontal row and the compartments being rotatably mounted permitting any vertical row to be positioned in line with said doors 69.

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Now will be described the means whereby a customer may select his compartment, this being the self-service feature of my invention. The customer's compartment may be at any location and means must be provided by which the compartments 70 are rotated until the customer's compartment is lined up with doors 69 and the door 69 corresponding to said compartment released. At the same time, the customer must not be able to obtain access to any other compartment.

There is a compartment selector 72 for each compartment, as recited before. These selectors 72 should be in the form of locks with separate keys for each, as it is desirable that a customer only be able to operate one selector. Simple push-button selectors could be utilized if the storage locker is to be operated by an employee.

Referring to Figure 8, a schematic diagram of an electrical circuit and associated parts to be activated by said selectors 72 is depicted. This is a simplified example in that only eight compartments, with corresponding switches 1A; 1B; 1C; 1D; 2A; 2B; 2C; and 2D, are involved, four being compartments on a level with door and solenoid 114A and four on a level with door and solenoid 114B.

A solenoid 114A, 114B is associated with each door to release the associated door upon selection of a compartment on that level. A double-pole, single-pull switch is associated with each compartment selector 72, to be closed upon operation of the associated selector 72.

Taking the example that the compartment corresponding to switch 1A is selected, as by inserting a key in the associated selector, this double-pole switch 1A is closed. Current from the source of electricity at 118, 110 or 220 volt A. C., is free to pass through line 120, past switches 121 which are only open when the doors are open, through motor 122, through the cam-operated switch 124 associated with the vertical tier of compartments in which the selected compartment is located, through line 126, through double-pole switch 1A, back to the source at 118.

In passing through motor 122, the same is activated and rotates. Motor 122 carries a gear 127 engaged with a gear 129 fixedly positioned on shaft 24, and said shaft is rotated moving compartments 70. Also fixedly mounted on shaft 24 is cam 128 which operates cam-operated switches 124 as it passes.

As shaft 24 is rotated, cam 128 reaches the cam-operated switch 124 associated with the tier of compartments in which the selected compartment is located. Switch 124 is normally held in an inward position by spring means; but, upon cam 128 moving the same outward, switch 124 makes contact with line 130. Current is no longer free to pass through motor 122; and cam 128 maintains its position, the motor having an automatic electric brake which acts when power to the motor is cut off.

Current now passes from the source at 118, past the double-pole switch 1A, through line 132, past solenoid 114A, through line 130, past cam-operated switch 124, through line 126, past double-pole switch 1A, back to the source at 118. The associated door is released when the current passes through solenoid 114A and solenoid 114A also opens one of the switches 121. The purpose of the switch at 121 is to prevent the selection mechanism being activated by the insertion of another key in a compartment selector 72 while one of the doors is open, and perhaps injuring a customer who has his arm in his compartment. The selected compartment being in line with the doors and solenoid 114A releasing the door on the correct level, the customer now has access to his compartment.

The cam 128, gear 129, motor and cam-operated switches are enclosed in a housing positioned on cover unit 22, indicated at 134 in Figure 6.

As can be seen, I have provided a thoroughly automatic self-servicing selector system, whereby the operator may have access to only the compartment to which he has the key. A minimum of expensive door construction is involved in my locker and the cabinet is very well insulated except in the door area. The temperature of other compartments is little affected by the servicing of one compartment. This has been provided in a "warm room" locker fabricated from easily portable small units. The locker is suitable for use in various commercial establishments without providing additional facilities to house cold storage lockers and does not require employee supervision. The locker is relatively economical of construc-

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tion and maintenance and presents an attractive appearance. A minimum of floor area is occupied by the locker.

Having thus described my self-service cold storage locker, it will be apparent to those skilled in the art that various modifications may be made without departing from the scope of my invention, and it is my intention to claim all structures within the proper scope of my invention.

I claim:

1. In a self-service cold storage locker of the type having a cabinet and a shelving unit positioned in the cabinet to rotate about a vertical axis, the shelving unit being divided horizontally and vertically into rows of wedge-shaped storage compartments, the improvement, comprising: the sidewalls of said cabinet being formed by a series of separable sidewall units of equal width which join one another on vertical lines, several of said sidewall units being identical, one sidewall unit forming a door unit having a separate door for each layer of storage compartments, independent latching means on each door, an electric motor and means connecting said motor to said shelving unit to rotate the same, an electrical control system having a selector corresponding to each storage compartment, said control system being connected to said latching means and to said motor and being operative to rotate said shelving unit upon selection of a compartment by its selector until the selected compartment is aligned with its door and unlatching only the door of the layer in which the selected compartment is located, whereby access is afforded to but the single compartment selected by its associated selector, and a switch, operated by each door, in said control system operative to inactivate said motor when said doors are open.

2. In a self-service cold storage locker of the type having a cabinet and a shelving unit positioned in the cabinet to rotate about a vertical axis, the shelving unit being divided horizontally and vertically into rows of wedge-shaped storage compartments, the improvement, comprising: the sidewalls of said cabinet being formed by at least six separable sidewall units of equal width which join one another on vertical lines and extend from top to bottom of the cabinet, said sidewall units being identical except for one forming a door unit and one forming a cooling unit having an outer extension containing a source of cold air, said door unit having a separate door for each layer of storage compartments, independent latching means on each door, said cabinet having a floor formed by a series of separable chordal floor units, said cabinet having a ceiling formed by a series of separable chordal ceiling units, an electric motor and means connecting said motor to said shelving unit to rotate the same, an electrical control system having a key-operated selector corresponding to each storage compartment, said control system being connected to said latching means and to said motor and being operative to rotate said shelving unit upon selection of a compartment by its selector until the selected compartment is aligned with its door and unlatching only the door of the layer in which the selected compartment is located, whereby access is afforded to but the single compartment selected by its associated selector.

3. In a self-service cold storage locker of the type having a cabinet and a shelving unit positioned in the cabinet to rotate about a vertical axis, the shelving unit being divided horizontally and vertically into rows of wedge-shaped storage compartments, the improvement, comprising: the sidewalls of said cabinet including a vertical row of doors including a separate door for each layer of storage compartments, independent latching means on each door, an electric motor and means connecting said motor to said shelving unit to rotate the same, and an electrical control system for said locker having a selector corresponding to each storage compartment, said control system being connected to said latching means and to said motor and being operative to rotate said shelving unit upon selection of a compartment by its selector until the selected compartment is aligned with its door and unlatching only the door of the layer in which the selected compartment is located, whereby access is afforded to but the single compartment selected by its associated selector.

4. In a self-service cold storage locker of the type having a cabinet and a shelving unit positioned in the cabinet to rotate about a vertical axis, the shelving unit be-

ing divided horizontally and vertically into rows of wedge-shaped storage compartments, the improvement, comprising: the sidewalls of said cabinet including a separate door for each layer of storage compartments, independent latching means on each door, an electric motor and means connecting said motor to said shelving unit to rotate the same, and an electric control system for said locker having a key-operated selector corresponding to each storage compartment, said control system being connected to said latching means and to said motor and being operative to rotate said shelving unit upon selection of a compartment by its selector until the selected compartment is aligned with its door and unlatching only the door of the layer in which the selected compartment is located, whereby access is afforded to but the single compartment selected by its associated selector.

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