Jan. 24, 1950 G. E. SPANGLER 2,495,554

OPEN TOP REFRIGERATED DISPLAY CASE

Filed Dec. 14, 1948 5 Sheets-Sheet 1

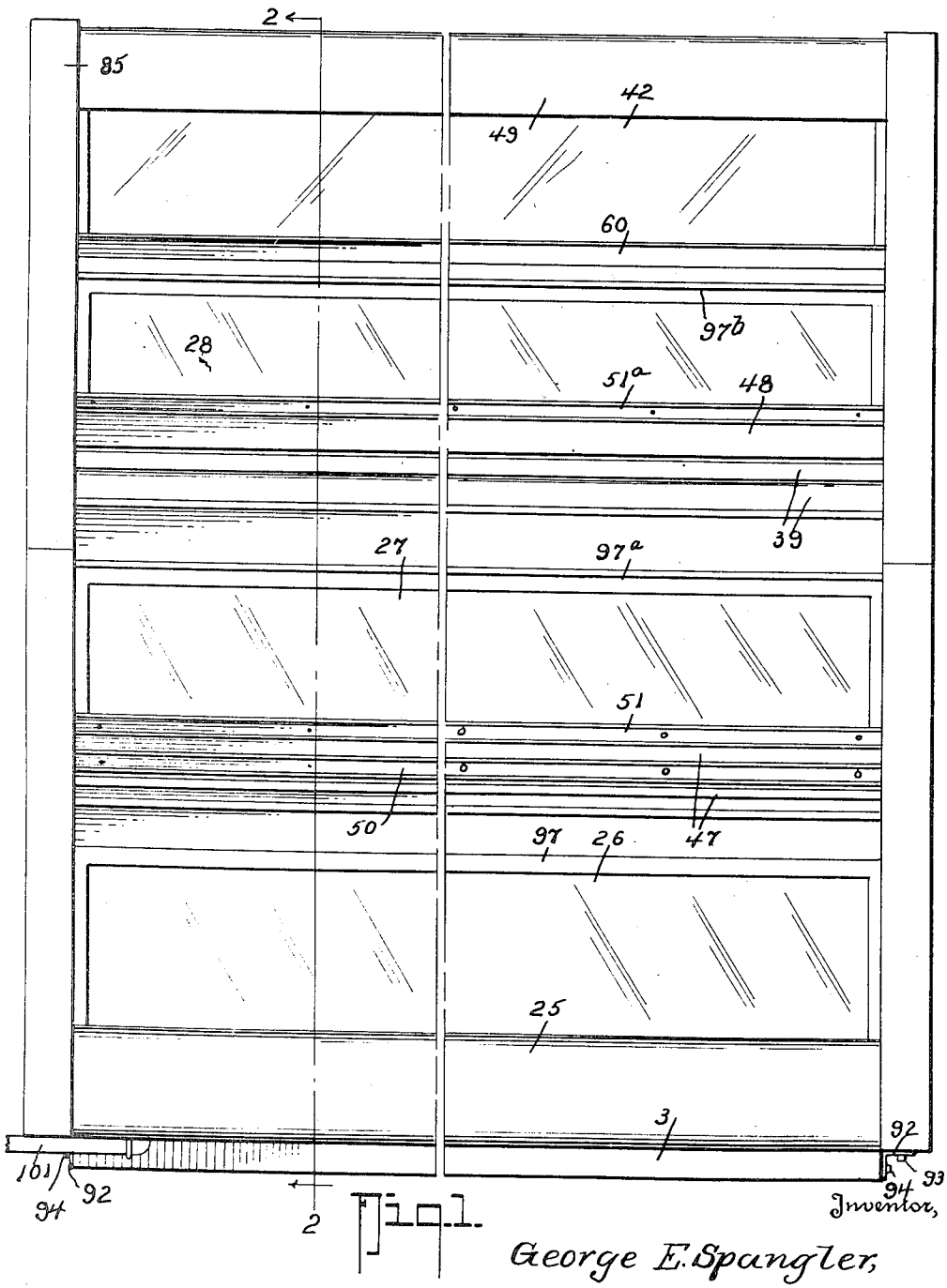


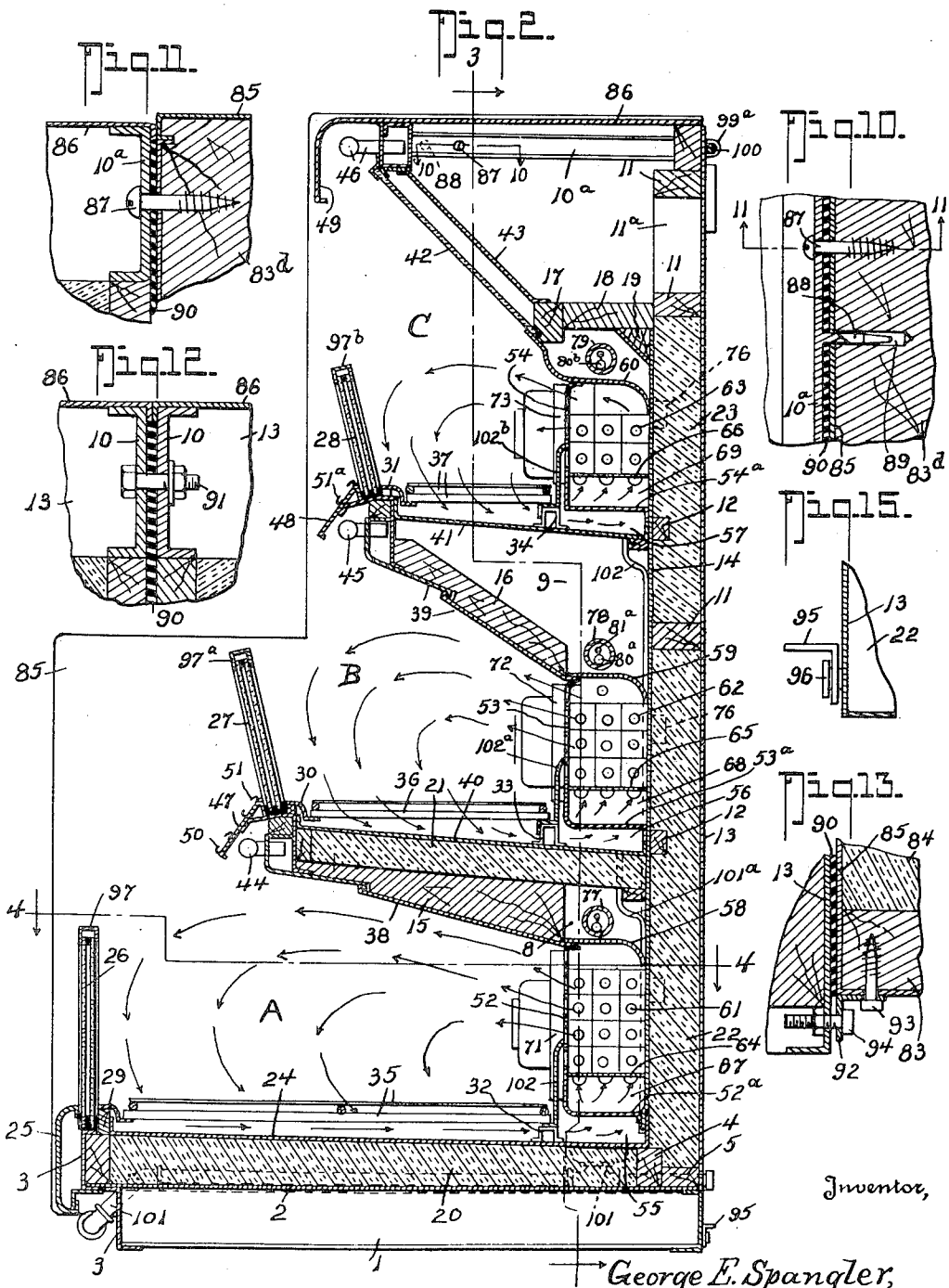
Fig. 1.

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OPEN TOP REFRIGERATED DISPLAY CASE

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5 Sheets-Sheet 3

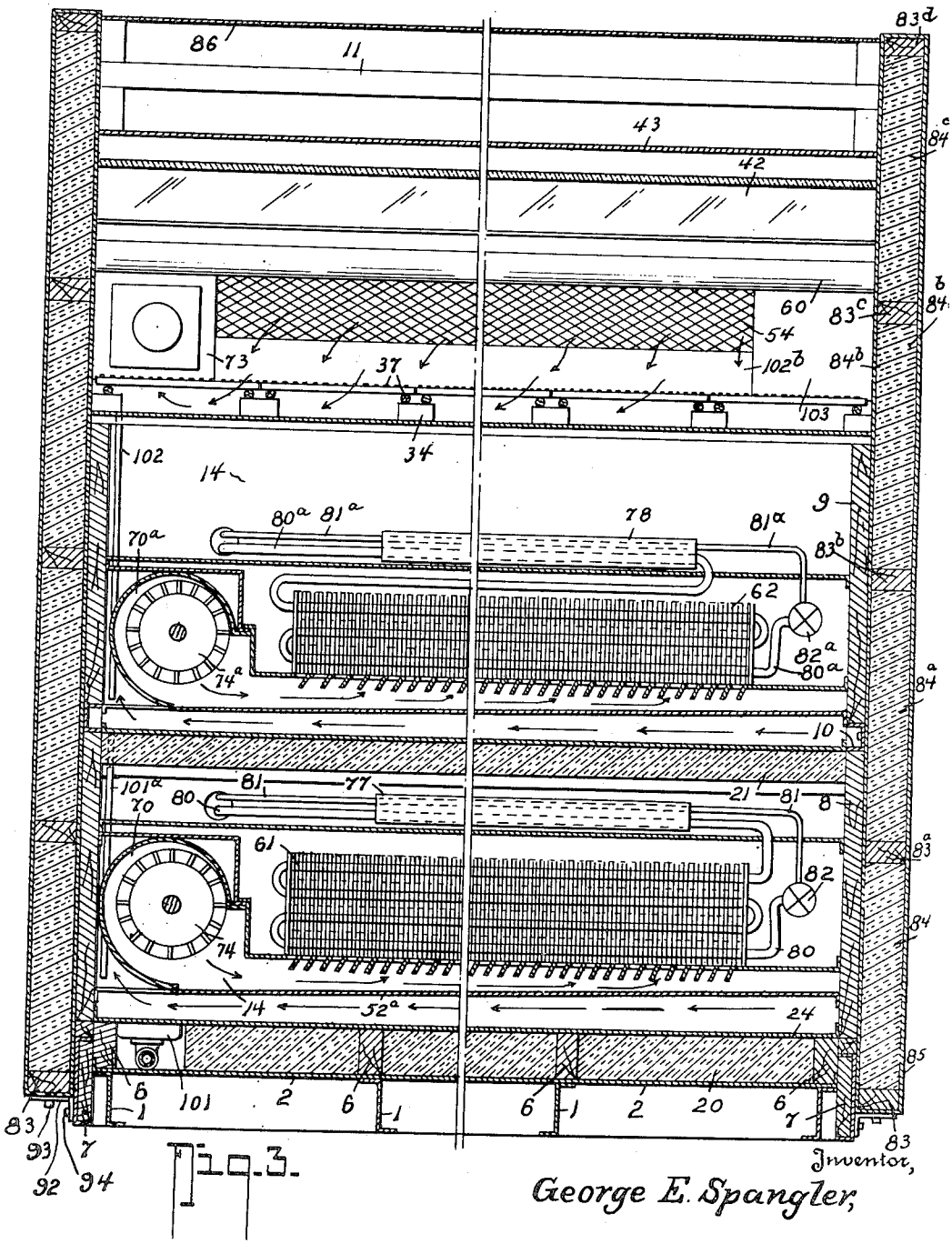


Fig. 3.

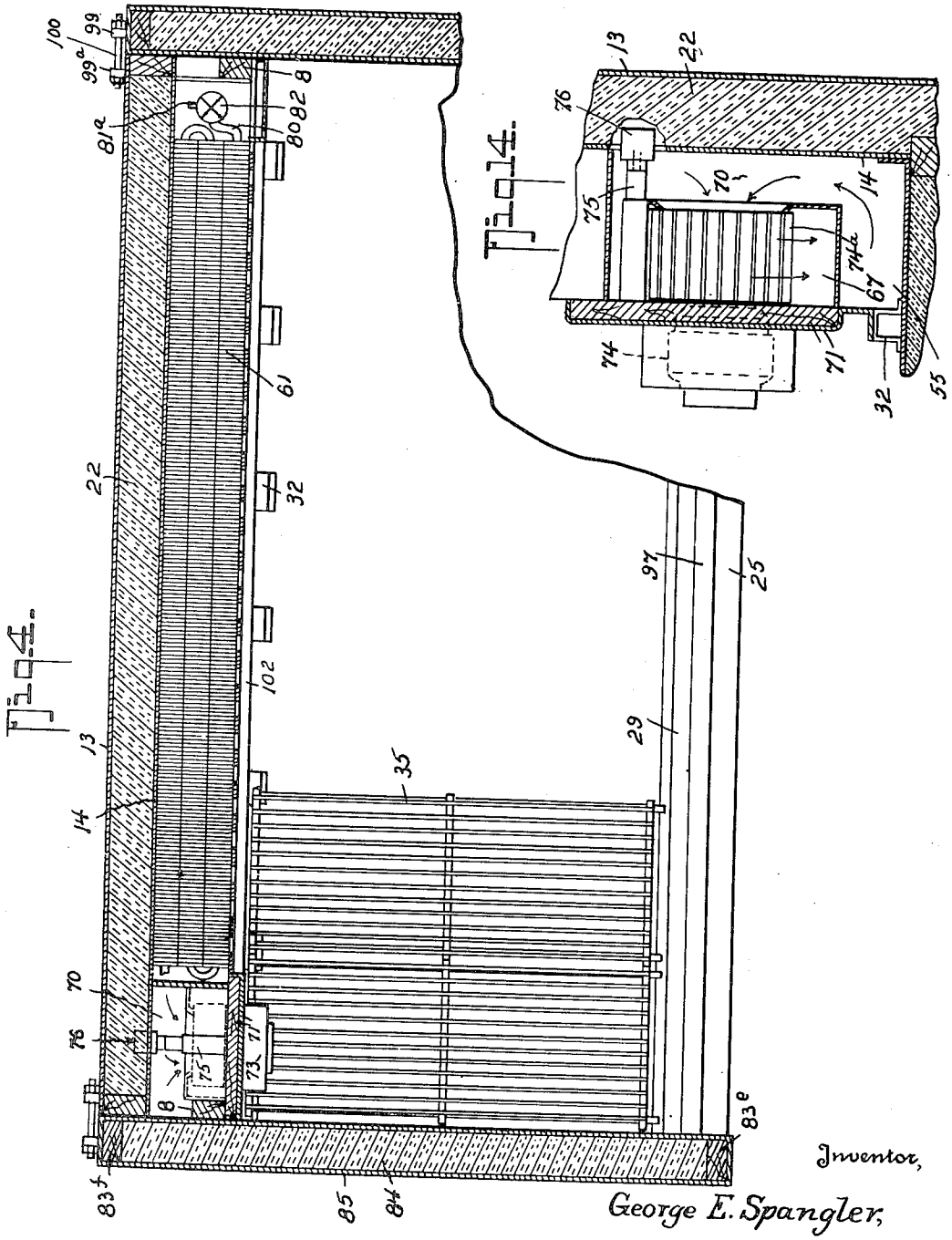
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OPEN TOP REFRIGERATED DISPLAY CASE

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Fig. 5.

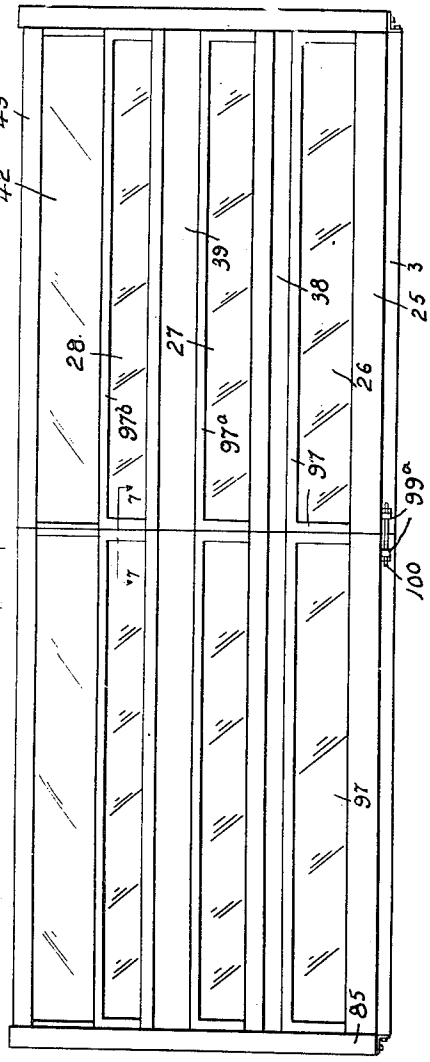


Fig. 6.

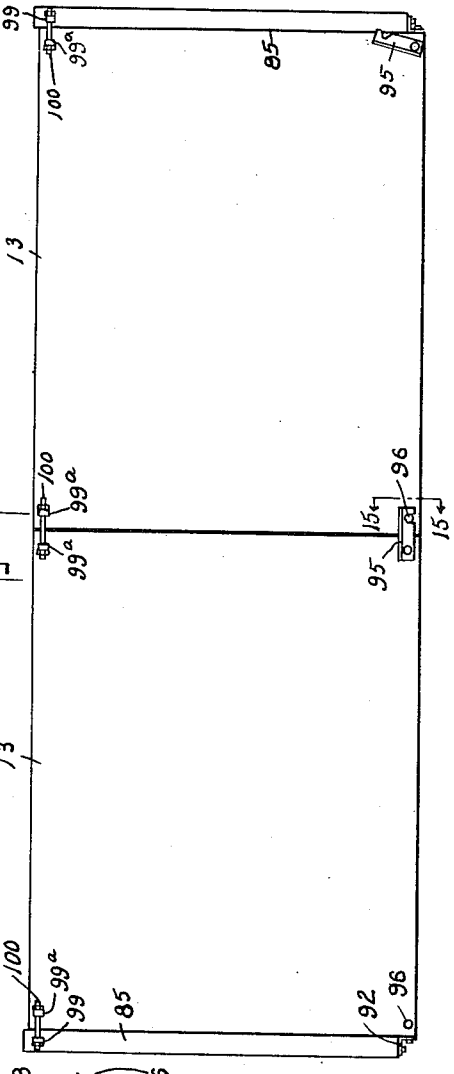


Fig. 8.

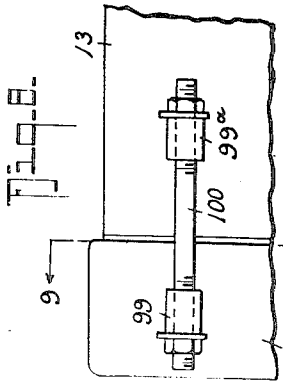


Fig. 9.

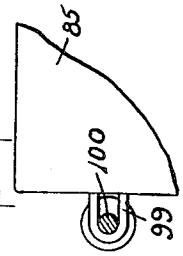
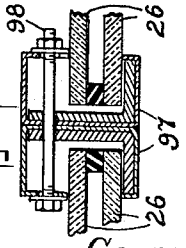


Fig. 7.



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Patented Jan. 24, 1950

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UNITED STATES PATENT OFFICE

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OPEN-TOP REFRIGERATED DISPLAY CASE

George E. Spangler, San Antonio, Tex., assignor to Ed. Friedrich, Inc., San Antonio, Tex., a corporation of Texas

Application December 14, 1948, Serial No. 65,227

6 Claims. (Cl. 62—89.5)

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My invention relates to self-serving or open top refrigerators for foods, etc., and it has for its objects:

1. To provide an improved three decker or three level case having removable ends to enable the case to be extended by the interposition of additional intermediate sections.

2. To provide a three level case wherein each level of each section has its own individual air circulation mechanism and chilling coil, which chilling coils of all sections may be connected in parallel to the condenser and compressor of a refrigeration system.

3. To provide a three level case of an improved construction in which improved means are provided for detachably coupling the ends to the intermediate section or sections and for coupling intermediate sections together.

4. To provide a three level case with improved motor-turbine units that can be removed and replaced from the food chamber without dismantling the case.

5. To provide a case in which the temperature in the several levels of the case can be independently controlled whereby the several levels can maintain different temperatures and different air-flow rates, if desired.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which:

Fig. 1 is a front elevation of my improved open top refrigerated display case.

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

Fig. 3 is a vertical section on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 2.

Fig. 5 is a front elevation on a reduced scale showing a case with one pair of ends and two intermediate sections.

Fig. 6 is a rear elevation of the same.

Fig. 7 is a detail section on a larger scale, taken on the line 7—7 of Fig. 5.

Fig. 8 is an enlarged elevation showing the means for securing the upper end of one end section to an intermediate section of the case.

Fig. 9 is a section on the line 9—9 of Fig. 8.

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Fig. 10 is a detail section on an enlarged scale on the line 10—10 of Fig. 2.

Fig. 11 is a section on the line 11—11 of Fig. 10.

Fig. 12 is a section similar to Fig. 11 showing the top front connection between two intermediate sections.

Fig. 3 is a detail vertical section showing the manner of connecting the bottom parts of an end section to an intemediate section.

Fig. 14 is an enlarged detail vertical section showing how the motor-turbine units are mounted in the motor-turbine chamber.

Fig. 15 is a detail section on an enlarged scale on the line 15—15 of Fig. 6.

In the drawing in which like numerals and letters of reference indicate like parts in all the figures, 1 represents transverse angle irons which support a base plate 2 on which is mounted wooden frame beams 6, a front longitudinal wooden beam 3 and rear longitudinal beam 4. The beams 3, 4 and 6 constitute the bottom frame in which heat and cold insulation blocks 20 are mounted and on which the floor pan 24 of the lower level is mounted (see Figs. 2 and 3).

7, 8 and 9 are wooden side wall plates against which the removable ends of the case fit as will later more fully appear. 10, 10a are channel irons extending transversely between the side wall plates 8 and 9 and at the top of the case (see Figs. 3 and 2 respectively). The back of the case (exclusive of the ends) is composed of a frame of wooden bars 5, 11, and 11a between which are heat and cold insulation blocks 22, 23, an inner metal lining 14 and a back metal cover 13. Nailing strips 12 are embedded in the insulation 22 and 23.

15 designates a wooden bracket or support for the floor of the second level, the lower face of which bracket is inclined from the front in a downwardly backward direction and is lined with a liner 38 which constitutes the ceiling of the lower level compartment. 16 designates a wooden bracket or support for the ceiling 39 of the second level compartment and the floor 41 of the third level compartment.

Wooden bars 17, 18 and 19 provide a support for the lower end of a mirror 42 and its protecting back plate 43.

Covering the insulation 21 that is supported on the bracket 15 is the floor pan 40 of the second level compartment.

At the front of each food compartment is a window composed of a frame 97, 97a, 97b respectively and double glasses 26, 27, 28 respectively.

25 is a finish moulding at the bottom of the case.

Adjacent each window is a shelf supporting strip 29, 30, 31 respectively. Rear shelf supports 32, 33, 34 are also provided in the respective compartments for supporting removable wire-rod shelves 35, 36, 37 respectively.

Each compartment is separately illuminated by suitable luminaires 44, 45, and 46 respectively, suitably shielded by platees 47, 48 and 49, the plate 47 having two grooved strips 50 and 51 for price tags related respectively to the first and second level compartments while the plate 48 has but one grooved strip 51^a for price tags related to the upper or third level compartment.

At the back of each food compartment is a perforated wall 52, 53, 54 respectively. Each of said walls is spaced from the back liner 14 and has a backwardly bent partition 52^a, 53^a, 54^a respectively, spaced from the respective bottom pans to provide return ducts 55, 56, 57 respectively to the air circulating turbines hereinafter again referred to. To the rear of the walls 52, 53, 54 respectively are refrigerating coils 61, 62, 63 respectively. The coils are supported on horizontal foraminous finned partitions 64, 65, and 66 respectively and over the coils and spaced therefrom are other horizontal partitions or top shields 58, 59 and 60 respectively. The partitions 64, 65, 66 are spaced above the respective partitions 52^a, 53^a, 54^a to provide pressure air ducts 67, 68 and 69 respectively. The ducts 55 and 67 communicate at one end with a motor-turbine chamber 70, the ducts 55 and 67 communicate with a motor-turbine chamber 70^a, while the ducts 57 and 69 communicate with the motor-turbine chamber of the top or third level.

The motor-turbine units consist of a support 71, 72, 73 respectively for the motor 74 and turbine 74^a of the respective units (Fig. 14) and a male electric terminal coupling 75 that plugs into a female socket handy box 76 to which feed wires (not shown) lead in a well known way. The unit as shown in Fig. 14 may readily be removed and replaced from the chamber 70 for repairs when necessary.

77, 78, 79 respectively indicate the usual heat exchangers used in similar types of refrigerators and 82, 82^a, 82^b indicate the usual expansion valves (one for each level), while 80, 80^a, 80^b and 81, 81^a, 81^b indicate the refrigerant lines which connect with the outside lines to the usual condenser and compressor of a refrigerating system. The refrigerant lines 80, 81, 80^a, 81^a, etc. may be separately connected to the condenser and compressor or they may be connected in multiple to a single condenser and compressor as may be found most desirable and each motor 74 may be provided with a separate speed control and each cooling coil 61, 62, 63 may have a separate temperature regulator if desired whereby each individual unit (air circulator and cooler) may be separately set for proper performance in the complete assembly.

Each case unit includes at least one intermediate sub-unit as described and a single pair of ends. Each end section or unit comprises a frame composed of wooden bars 83, 83^a, 83^b, 83^c, 83^d, 83^e, 83^f with suitable heat and cold insulation 84, 84^a, 84^b all enclosed in a metal covering 85 (Figs. 3 and 4).

For securing the ends to the adjacent intermediate section, I provide the intermediate section adjacent the front of the top portion with aligning pins 88 that enter recesses 89 in the frame bars 83^d (Figs. 10 and 11) and fasten the two parts together with wood screws 87. At the bottom I use angles 92, screws 93 and bolt and nut connection 94 (see Fig. 13). Suitable gaskets 90 are interposed between the end and intermediate sections. At the back the end and adjacent intermediate section are held together at the top by draw bolts and nuts 100 passing through U-shaped members 99, 99^a, welded respectively to the metal plates 95 and 13 (Figs. 6, 8 and 9). The channels 10, 10^a between adjacent portions of two abutting intermediate sections are secured by bolts and nuts 9 (Fig. 12).

When two or more intermediate sections or units are used they are secured end to end as shown in Figs. 5 and 6, pivoted latches 95 and latch pins 96 being used at the bottom of adjacent intermediate sections. When two intermediate sections are used the abutting window frames are connected together by bolts and nuts 98 passed through the frames, as best shown in Fig. 7.

The top of the intermediate section is formed by a plate 86 which may be a continuation of the shield 49 (see Fig. 2).

Suitable provisions 101, 101^a, 102 are made for draining water of condensation from the several return ducts 55, 56, 57.

As best shown in Figs. 2 and 4 it will be seen that imperforate plates 102, 102^a, 102^b are provided which extend from the respective supports 32, 33, 34 up along side the perforated plates 52, 53, 54 respectively and serve as the front walls of the return air ducts 55, 56, 57 respectively. The plates 102, etc. extend up only a short distance above the shelves 35, etc. so as to leave uncovered the major areas of the perforated plates 52, etc.

It will further be observed from Fig. 2 that the ceilings 38, 39, 42 of the respective level compartments A, B, C are of progressively increasing angles to the horizontal and the compartments are of progressively decreasing depth from the bottom to the top of the case and the cooling coils of the respective levels are likewise progressively decreased in size and the heights of the windows also progressively decrease from that of the lowest to that of the highest level.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation and advantages of the invention will readily appear to those skilled in the art.

What I claim is:

1. A three level open top refrigerated display case, including at least one intermediate section and two ends, and means to secure the ends to the intermediate section, said intermediate section having a lower food compartment, a second level food compartment and a top compartment and a separate cooling coil and air circulating unit located at the back portion of each compartment.

2. A three level open top refrigerated display case, including at least one intermediate section and two ends, and means to secure the ends to the intermediate section, said intermediate section having a lower food compartment, a second level food compartment and a top compartment and a separate cooling coil and air circulating unit for each compartment, said intermediate section further including front windows and ceilings upwardly forwardly inclined from the back

of the compartment toward but short of the front windows of the respective compartments.

3. A three level open top refrigerated display case which includes three food chambers located at different levels, each chamber having a bottom, a front window, an inclined ceiling and a back, said back being composed of a back wall, a perforated wall spaced from the back wall, horizontal partitions between said back wall and said perforated wall and defining a pressure duct and a return duct and a cooling coil compartment, a cooling coil in said cooling coil compartment, a motor-turbine chamber with which said pressure and return ducts communicate, and a removable motor-turbine unit in said motor-turbine chamber, spaced shelf supports in each food chamber at the rear of the chamber, imperforate plates set on said shelf supports and extending part way up said perforated wall.

4. In a three level open top refrigerated display case, a pair of intermediate sections and a pair of ends, means securing said intermediate sections together end to end, said means comprising, on the back of the sections, draw bolts and eye members secured to the intermediate sections adjacent their tops through which eye members said bolts pass, and foot latches for securing said sections together at the bottom, and another draw bolt and eye member on the front of said sections at the bottom of the same and means for securing said ends to the intermediate sections.

5. In a three level open top refrigerated display case, a pair of intermediate sections and a pair of ends, means securing said intermediate sections together end to end, said means comprising, on the back of the sections, draw bolts and eye members secured to the intermediate sections adjacent their tops through which eye

members said bolts pass, and foot latches for securing said sections together at the bottom, and another draw bolt and eye member on the front of said sections at the bottom of the same and means for securing said ends to the intermediate sections, said intermediate sections having at their ends, channel irons and bolts and nuts securing the channel irons of adjacent section ends together.

6. In a three level open top refrigerated display case, a pair of intermediate sections and a pair of ends, means securing said intermediate sections together end to end, said means comprising, on the back of the sections, draw bolts and eye members secured to the intermediate sections adjacent their tops through which eye members said bolts pass, and foot latches for securing said sections together at the bottom, and another draw bolt and eye member on the front of said sections at the bottom of the same and means for securing said ends to the intermediate sections, said intermediate sections having at their ends, channel irons and bolts and nuts securing the channel irons of adjacent section ends together, the means for securing said ends to the intermediate sections comprising screws passing through the adjacent channel irons into said ends.

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