June 13, 1950 W. RASKIN 2,511,375

AIR CONDITIONED ARTICLE DISPLAY STAND

Filed Dec. 4, 1946 5 Sheets-Sheet 1

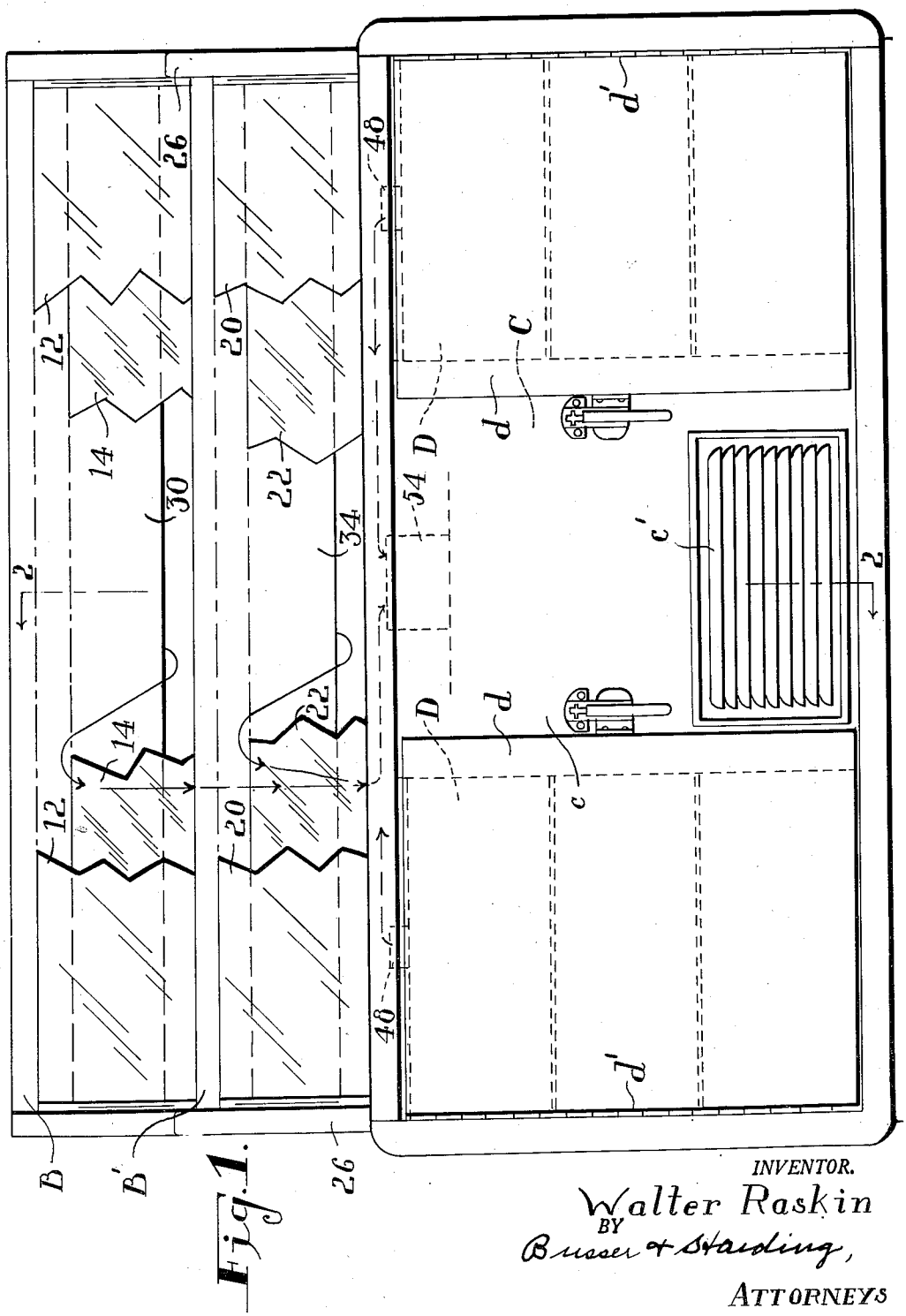


Fig. 1.

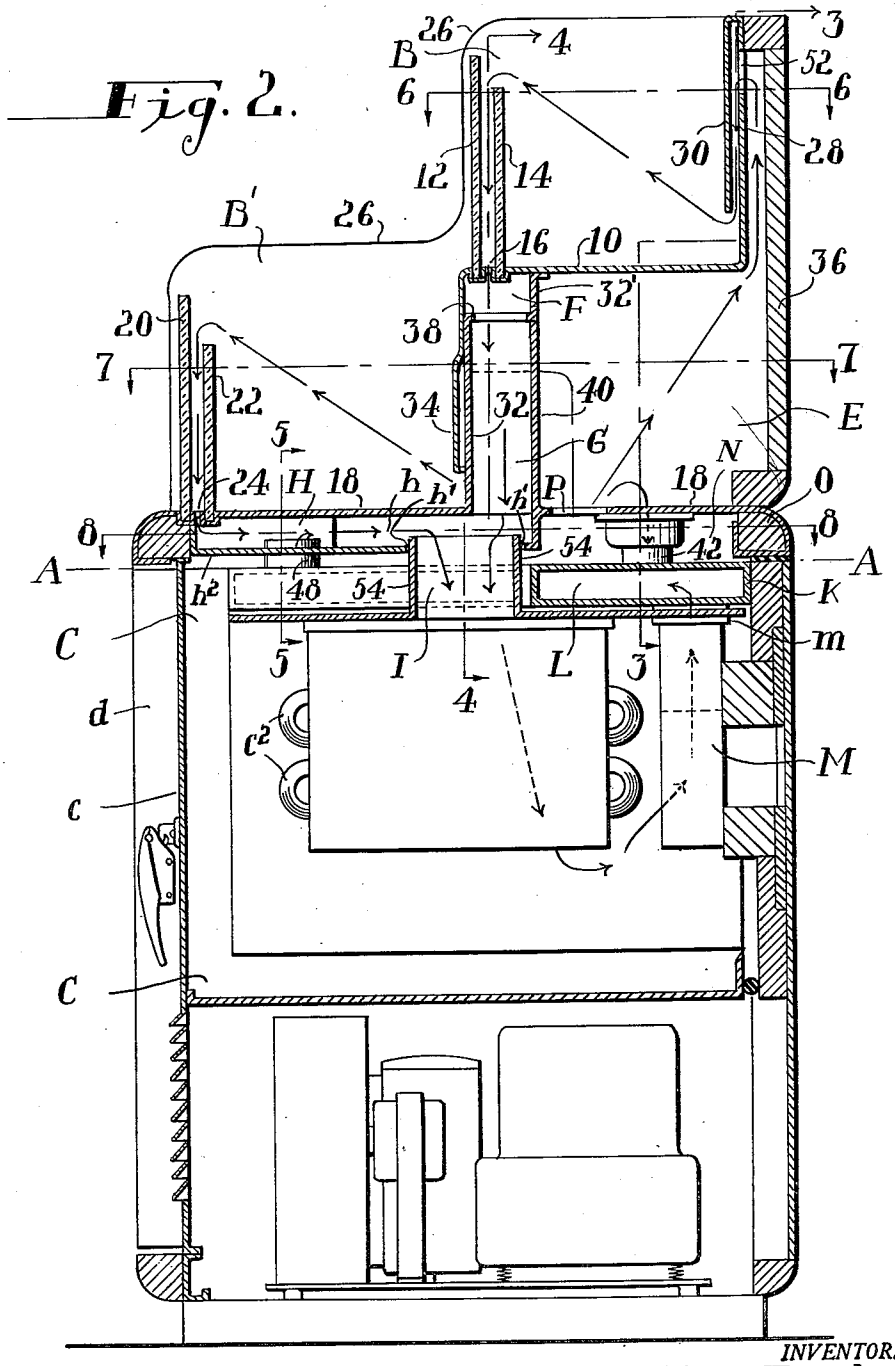
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June 13, 1950 W. RASKIN 2,511,375

AIR CONDITIONED ARTICLE DISPLAY STAND

Filed Dec. 4, 1946 5 Sheets-Sheet 2

Fig. 2.



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AIR CONDITIONED ARTICLE DISPLAY STAND

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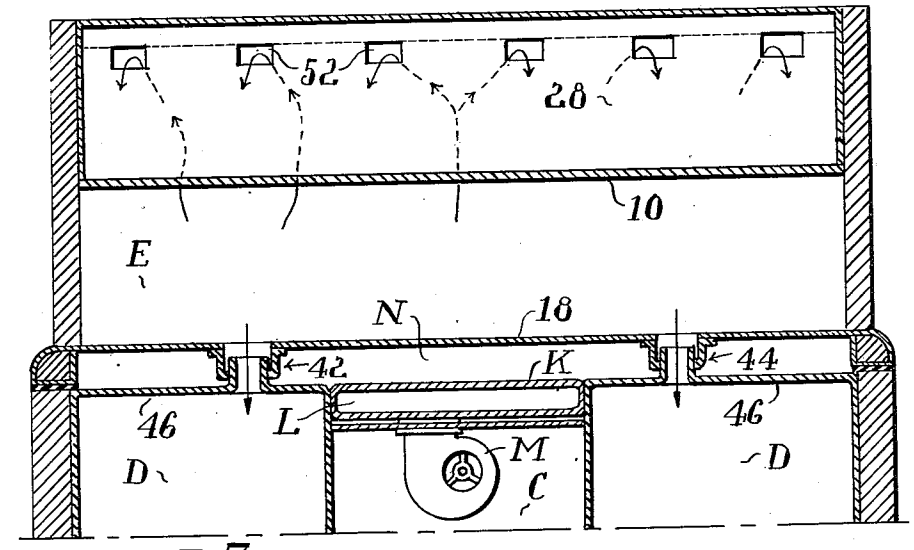


Fig. 3.

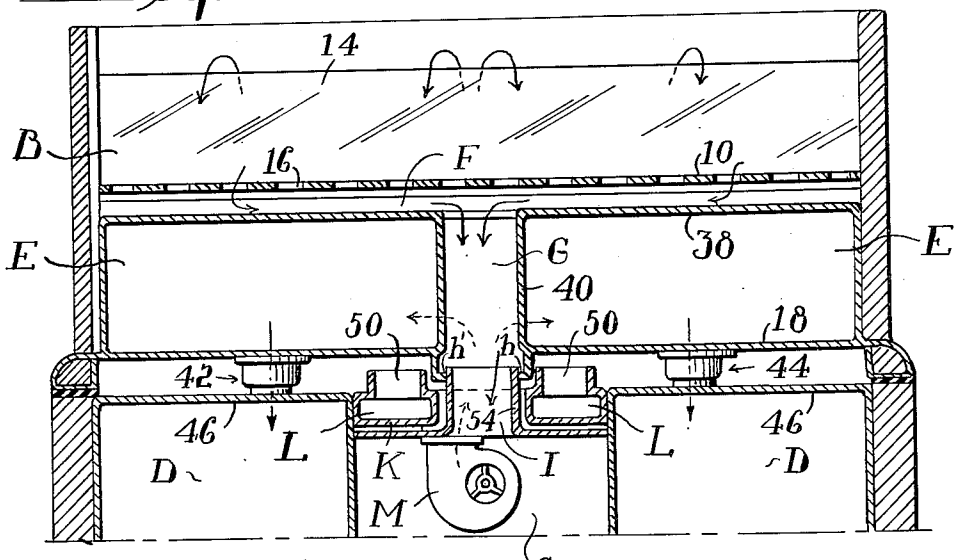


Fig. 4.

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June 13, 1950 W. RASKIN 2,511,375

AIR CONDITIONED ARTICLE DISPLAY STAND

Filed Dec. 4, 1946 5 Sheets-Sheet 4

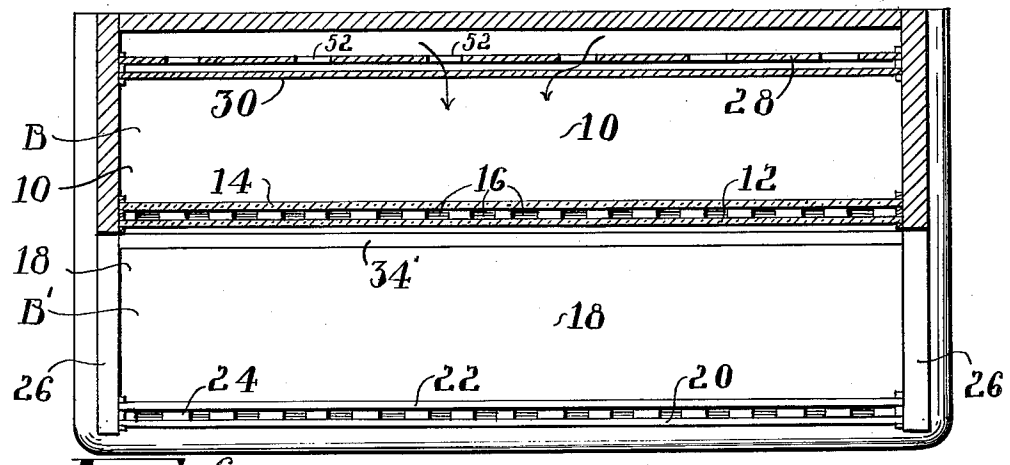


Fig. 6.

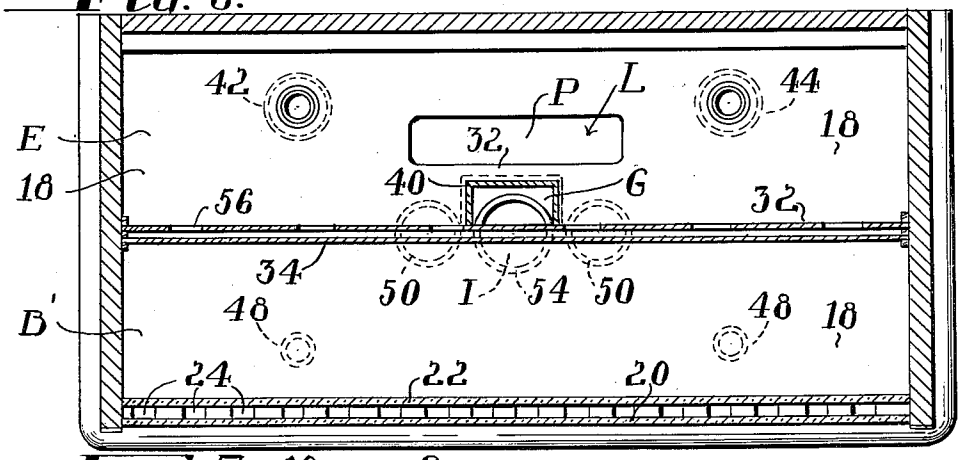


Fig. 7.

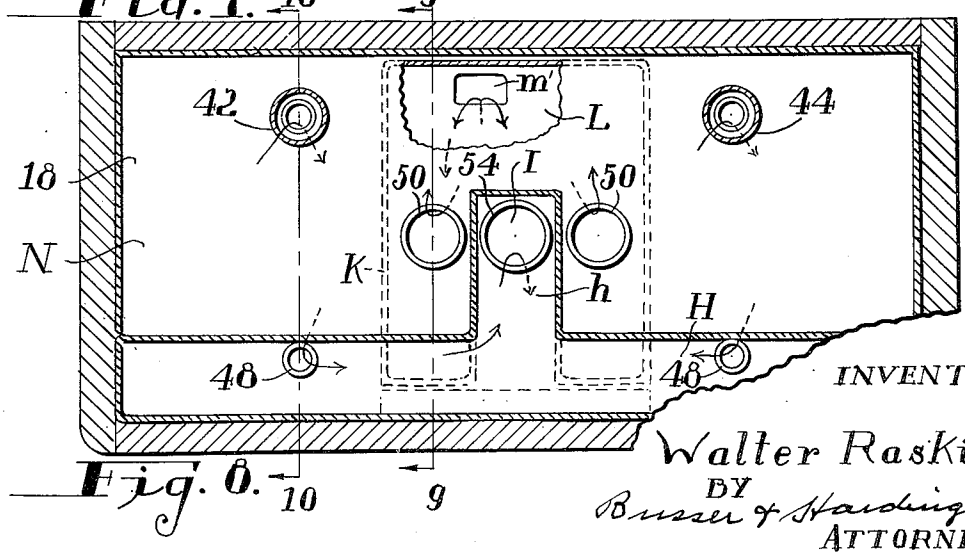


Fig. 8.

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AIR CONDITIONED ARTICLE DISPLAY STAND

Filed Dec. 4, 1946 5 Sheets-Sheet 5

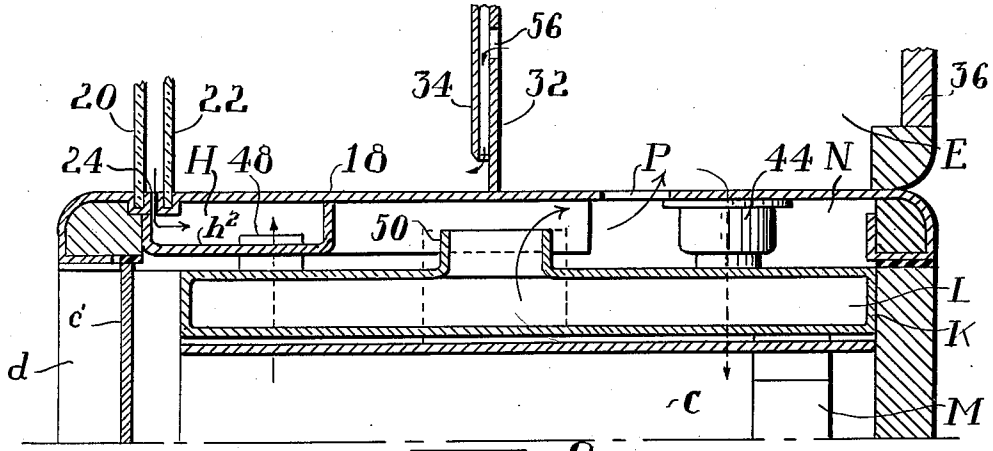


Fig. 9.

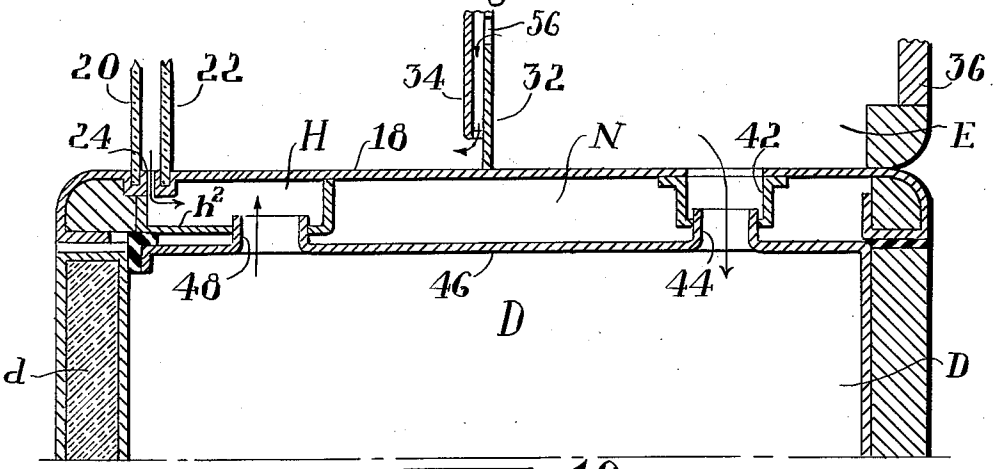


Fig. 10.

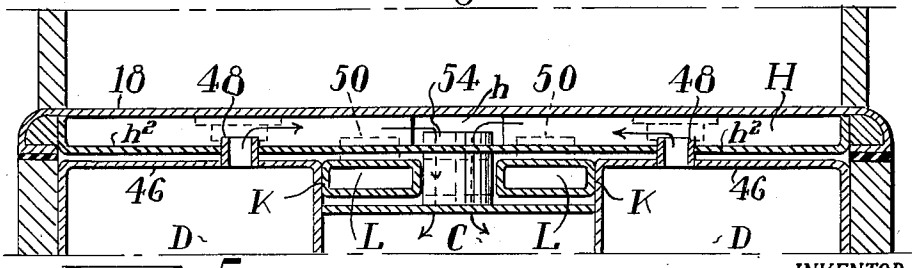


Fig. 5.

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Patented June 13, 1950 2,511,375

UNITED STATES PATENT OFFICE

2,511,375

AIR-CONDITIONED ARTICLE DISPLAY STAND

Walter Raskin, Orange, N. J., assignor, by mesne assignments, to Noma Electric Corporation, New York, N. Y., a corporation of New York

Application December 4, 1946, Serial No. 714,064

9 Claims. (Cl. 62—89.5)

1

This invention relates to an improvement in open top article display and self-help stands, in which the articles are maintained in conditioned air at the required temperature and humidity for maintaining the articles exhibited therein in a fresh condition.

The device is adapted for various uses, such as exhibiting candies, cigars, chewing gum displayed in stores where a purchaser selects the articles desired, or in grocery stores where various types of foods such as vegetables, frozen foods and dairy products can be displayed in open top bins and maintained in an atmosphere at the proper temperature and moisture content, regardless of the atmosphere surrounding the device.

One of the objects of my invention is the provision of means for providing a continuous circulation of conditioned air about and over the tops of articles below the upper edges of the bin forming partitions or walls.

Another object of my invention is the provision of means to maintain the walls surrounding the bins at substantially the same temperature as the air passing through the bins.

Another object of my invention is the provision of means whereby an upward current of conditioned air is maintained in the bins, while providing means for withdrawing the air from the upper portion of the bins, and returning the air withdrawn from the bins to the air conditioning means for reconditioning, without drawing any appreciable amount of air from the atmosphere surrounding the display device.

Another object of my invention, is the provision of a supporting base structure, for the display bins, having a chamber containing the air conditioning apparatus and a stock storage chamber at one or both sides of the chamber containing the air conditioning apparatus.

Another object of my invention is the provision of a structure having a main air supply chamber to which the conditioned air is supplied by the air conditioning apparatus, and from which the air is conducted to each of the display bins, as well as to each of the storage chambers.

Another object of my invention is the provision of a common return for the air to the air condition apparatus, to which return passages from each of the display bins and the stock storage chambers extend.

Another object of my invention is the provision of a stand of this character, having separable units in which the passages for the air to and from the bins and storage chambers are carried by the upper or display bin unit, there being telescopic connections between the air conditioning apparatus in the supporting unit and the chambers for the conditioned air as well as the air being returned to the conditioning apparatus, which will permit the removal of the upper unit from the lower unit whereby ready access to the air conditioning apparatus is provided.

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Having now described in a general way the nature and purpose of this invention, I will proceed, for illustrative purposes, to a detailed description of a preferred embodiment thereof, with reference to the accompanying drawings, in which:

Figure 1 is a face view of the entire cabinet;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1;

Figure 3 is a vertical sectional view on the line 3—3 of Figure 2;

Figure 4 is also a vertical sectional view on the line 4—4 of Figure 2;

Figure 5 is a view similar to Figures 3 and 4 on the line 5—5 of Figure 2;

Figures 6, 7 and 8 are horizontal sections on lines 6—6, 7—7, and 8—8, respectively, of Figure 2; and

Figures 9 and 10 are vertical sections on lines 9—9, and 10—10 of Figure 8.

The display stand illustrated in the drawings comprises upper and lower units separable at the line A—A, see Figure 2, the upper unit being provided with stepped display bins B and B' which extend the full length of the stand, while the lower unit is provided with a central chamber C in which an air conditioning apparatus of known make is located, and at each side of the chamber C is a stock storage chamber D.

The front of each storage chamber is closed by a door D, hinged at d', while the front of the chamber C is provided with a removable front c to permit access to the air conditioning apparatus therein. The front c is also provided with louvers c' opening into the lower compartment of chamber C containing the refrigerating unit, comprising a compressor for the refrigerant coupled to an electric motor for operating the compressor for delivering the refrigerant to the condenser in the usual manner, the upper portion of chamber C contains a coil C^2 in which the refrigerant is expanded after passing through an expansion valve, whereby the air passing over the coil C^2 is reconditioned.

The bin B is provided with a bottom 10 having at the front thereof two spaced depressions in each of which is seated a sheet of glass which extends from one side of the bin to the other, the front glass 12 being higher than the rear glass

14 while the bottom 10 between the glass sheets is provided with openings 16, see Figure 2. The glass 14 forms a baffle causing the air to flow upwardly along the outer face before passing to the openings 16 between plates 12 and 14.

The bin B' is also provided with a bottom 18 having depressions therein in which sheets of glass 20 and 22 are seated, while the bottom between the glass sheets is also provided with openings 24, see Figure 2.

These openings 16 and 24 between the glass sheets which form the fronts of display bins B and B' are for the return of air from the bins back to the air conditioning apparatus, after having passed over and about articles displayed in the bins.

The ends of the bins B and B' are formed by stepped end members 26, the back of bin B is formed of a member 28 and a baffle member 30 which extends from the top of the bin to a point adjacent to the bottom 10 of the bin.

The back of bin B' is also formed of a member 32 and a baffle 34 which also extends to a point adjacent to the bottom 18 of the bin B'.

36 designates the back member of the upper unit, and formed between said back member 36, the back 32 of bin B', bottom 10 of bin B and an extension of bottom 18 of bin B' is a chamber E, to which the conditioned air is delivered, and from which the air is directly delivered to each of the bins B and B' and each of the storage chambers D.

In the form shown, the back forming member 32 of the bin B' (see Figure 2), is secured to the bottom 18 of the bin B', extends upwardly and is bent transversely at 38, then again upwardly at 32' and is secured to the bottom 10 of bin B, forming the bottom of rear wall of a channel F the full length of the unit between the stepped end members 26.

Formed by a U-shaped member 40, the vertical edges of which are secured to the back 32 of bin B' (see Figure 7), the lower edges of which member 40 are secured to the bottom 18 of chamber E, which is an extension of the bottom of bin B' while the upper edges are secured to the bottom of the transversely extending portion 38 of the back member 32, forming a passage G, communicating with the channel F through an opening in the transverse portion 38 at its upper end, which channel F communicates with a chamber for the air being returned to the chamber C containing the reconditioning apparatus, as hereinafter described.

H designates a passage below the bottom 18 which extends the full length of the unit to which the air returned to chamber C is delivered directly from both chambers D as well as from bin B', and extending laterally from chamber H is a channel *h* which communicates with the lower end of passage G and with air inlet passage I in a tubular member 54 which opens into chamber C and extends through an opening *h* in the bottom h^2 of channels H and *h*. The passage G to which the air from bin B is delivered communicates directly with the laterally extending channel *h*, see Figure 4.

Located within the lower unit in the chamber C between the air conditioning unit therein and the various members carried by the upper unit is a shell-like structure K, forming a chamber L to which the reconditioned air is delivered from the reconditioning apparatus, by means of a fan M, having telescopic connection with a tube *m* extending downwardly from the bottom of chamber L through which reconditioned air is delivered to the chamber L through the opening *m'* shown in Figure 8. The top plate of shell K is broken away to show the opening *m'*.

Reconditioned air is delivered from chamber L to a space N within the frame O connected to the lower end of the upper unit through tubular outlets 50, the shell K' rests on upper face of the lower unit, there being suitable packing between the adjacent faces of the units to prevent passage of air between the units.

The conditioned air passing from the space N to the chamber E through an opening P in the bottom 18 of chamber E, passes to the bins B and B' and the storage chambers D, D as hereinafter described.

The means for conducting air to the storage chambers D, D from the chamber E through the space N between the upper and lower units comprises tubular slip connections 42 and 44 attached to the bottom 18 of chamber E and the top portions 46 of the lining of the storage chambers D. Connected to top portions of the liners of each of the chambers D is a tubular member 48 which passes through openings in the bottom wall h^2 of air return passage H.

As previously described, the air is conditioned in chamber C by the apparatus located therein and is delivered to chamber L by the pump or fan M. The air is then delivered to the chamber E from chamber L through two tubular outlets 50 from chamber L to space N and from there to the chamber E through opening P in the bottom 18 of the conditioned air supply chamber E for the bins B and B', as well as the two storage chambers D, D.

The air supply for the bin B passes from the air supply chamber E upwardly between the back plate 28 of the bin and the back 36 of the upper unit. The air then passes through openings 52 in the back plate 28 of the bin, downwardly between the back plate 28 and baffle 30, outward below the baffle plate 28, across and upwardly about and over the articles displayed therein, then downwardly between the glass plates 12 and 14, and out through openings 16 in the bottom 10 into the air return passage F extending substantially the length of the bin below the bottom 10 which communicates with the downwardly extending passage G and the channel *h* extending from the air return passage H. The air is returned from the channel *h* through a tubular extension 54 to the air conditioning apparatus.

The air for bin B' is also supplied directly from chamber E through openings 56 through the back 32 of the bin on opposite sides of the passage G to the space between the baffle 34 and the back 32 (see Figure 7), through which it flows and then outwardly below baffle 34, then upwardly about articles exposed in the bin, then down between glass plates 20 and 22 and through openings 24 into passage H and from there to extension *h* thereof to tubular extension 54, back to the air conditioning unit.

The conditioned air from air supply chamber E is delivered to each of the storage chambers D through tubular connections 42 and 44, and is returned for recondition to the air return passage H through the tubular connection 48 and from there to the air conditioning unit, as previously described.

By the provision of tubular connections between passages or chambers between the passages or chambers in the upper and lower units, the upper unit can readily be removed from the

lower unit, to permit access to the reconditioning unit by merely removing the shell K and as slip connections are provided the units can readily be reassembled.

Another advantage of my invention is the provision of means for conducting the conditioned air downwardly over the back of the bins whereby it flows to the lower portions of the bins and then downwardly between two glass sheets, through which the articles can be viewed. By passing the air over the back of the baffle and over the outer face of the inner glass sheet, both the back and front walls of the bins are maintained substantially at the temperature of the air delivered to the bins from the air supply chamber.

Another advantage of my invention results from the provision of means whereby the air is passed upwardly over the articles in the bins during its passage from the inlet for the air to the return for reconditioning, and as the outer glass extends above the inner sheet substantially no air from the atmosphere surrounding the cabinet will be drawn into the air being returned from the bins for reconditioning.

What I desire to secure by Letters Patent is:

1. An open top bin for articles to be displayed in conditioned air, having a bottom, end walls, front and rear walls, the front wall having a narrow air passage substantially the full length of the bin communicating with the bin slightly below the top of the front and end walls and extends to the bottom of the bin, there being an air inlet to the back of the bin adjacent to the bottom of the bin for delivering air over the bottom of the bin from the back wall to the front wall, an air conditioning device, an air passage connecting the air conditioning device with the inlet to the bin, there being an air outlet from the bottom of the passage in the front wall, an air passage connecting said outlet with the air conditioning device, and a fan for circulating the air through said passages from the air conditioning device over the bottom of the bin, up over the major portion of the front wall and down through the passage in the front wall of the bin through the outlet to the passage connecting the outlet to the air conditioning device.

2. An open top bin for articles to be displayed in conditioned air, having a bottom, end walls, front and rear walls, the front wall having a narrow air passage substantially the full length of the bin communicating with the bin slightly below the top of the front and end walls and extends to the bottom of the bin, the rear wall having a narrow air passage substantially the full length of the bin opening into the bin slightly above the bottom of the bin, there being an air inlet to the passage in the rear wall adjacent to the top of the bin for delivering air to said passage for delivering air over the bottom of the bin from the back wall to the front wall, an air conditioning device, an air passage connecting the air conditioning device with the inlet to the said passageway in the back wall, there being an air outlet from the bottom of the passage in the front wall, an air passage connecting said outlet with the air conditioning device, and a fan for circulating the air through said passages from the air conditioning device over the bottom of the bin, up over the major portion of the front wall and down through the passage in the front wall of the bin through the outlet to the passage connecting the outlet to the air conditioning device.

3. An article display device of the character described, comprising a plurality of open top bins in stepped relation to each other in which articles are displayed in conditioned air, each having a bottom, end walls, front and rear walls, the front wall having a narrow air passage substantially the full length of the bin communicating with the bin slightly below the top of the front and end walls and extends to the bottom of the bin, there being an air inlet to the back of the bin adjacent to the bottom of the bin for delivering air over the bottom of the bin from the back wall to the front wall, an air conditioning device, an air passage connecting the air conditioning device with the inlet to each bin, there being an air outlet from the bottom of the passage in the front wall of each bin, an air passage connecting said outlets with the air conditioning device, and a fan for circulating the air through said passages from the air conditioning device over the bottoms of the bins, up over the major portion of the front wall of each bin and down through the passage in the front wall of each bin through the outlet to the passage connecting the outlet to the air conditioning device.

4. An article display device of the character described, comprising a plurality of open top bins in stepped relation to each other in which articles are displayed in conditioned air, each having a bottom, end walls, front and rear walls, the front wall having a narrow air passage substantially the full length of the bin communicating with the bin slightly below the top of the front and end walls and extends to the bottom of the bin, the rear wall of each bin having a narrow air passage substantially the full length of the bin opening into the bin slightly above the bottom of the bin, there being an air inlet to the passage in the rear wall of each bin adjacent to the top of the bin for delivering air to said passage for delivering air over the bottom of the bin from the back wall to the front wall, an air conditioning device, an air passage connecting the air conditioning device with the inlet to the passageway in the back wall of each bin, there being an air outlet from the bottom of the passage in the front wall of each bin, an air passage connecting said outlets with the air conditioning device, and a fan for circulating the air through said passages from the air conditioning device over the bottoms of the bins, up over the major portion of the front wall of each bin and down through the passages in the front wall of each bin through the outlet to the passage connecting the outlet to the air conditioning device.

5. An open top bin for articles to be displayed in conditioned air having a bottom, end walls, a rear wall formed of spaced members forming an air passage between said members closed to the atmosphere at the top, there being an outlet from the passage to the bin adjacent to the bottom of the bin, a front wall formed of spaced members forming a passage between said members, there being an air inlet to the passageway from the bin adjacent to the top of the bin, there being an air inlet to the top of the passage between the spaced members of the rear wall, an air conditioning device, there being an air passage connecting the air conditioning device with said last mentioned inlet, there being an outlet from the lower end of the passage between the spaced front wall members, there being a return passage connecting said last mentioned outlet with the air conditioning device and a fan for circulating the air from the air condition device

to the bin and back to the air conditioning device whereby both faces of adjacent members of the front and rear walls are contacted by conditioned air.

6. An article display device of the character described, comprising a plurality of open top bins in stepped relation to each other in which articles are displayed in conditioned air, each bin having a bottom, end walls, a rear wall formed of spaced members forming an air passage between said members closed to the atmosphere at the top, there being an outlet from the passage to the bin adjacent to the bottom of the bin, a front wall formed of spaced members forming a passage between said members, there being an air inlet to the passageway from the bin adjacent to the top of the bin, there being an air inlet to the top of the passage between the spaced members of the rear wall, an air conditioning device, there being an air passage connecting the air conditioning device with said last mentioned inlet, there being an outlet from the lower end of the passage between the spaced front wall members, there being a return passage connecting last mentioned outlet with the air conditioning device and a fan for circulating the air from the air condition device to the bin and back to the air conditioning device whereby both faces of adjacent members of the front and rear walls are contacted by conditioned air.

7. An article display device of the character described, comprising a plurality of open top bins in stepped relation to each other in which articles are displayed in conditioned air, each bin having a bottom, end walls, a rear wall formed of spaced members forming an air passage between said members closed to the atmosphere at the top, there being an outlet from the passage to the bin adjacent to the bottom of the bin, a front wall formed of spaced members forming a passage between said members, there being an air inlet to the passageway from the bin adjacent to the top of the bin, there being an air inlet to the top of the passage between the spaced members of the rear wall, an air conditioning device, there being an air passage connecting the air conditioning device with said last mentioned inlet of each bin, there being an outlet from the lower end of the passage between the spaced front wall members of each bin, there being a return passage connecting said last mentioned outlets with the air conditioning device and a fan for circulating the air from the air condition device to each bin and back to the air conditioning device whereby both faces of adjacent members of the front and rear walls of each bin are contacted by conditioned air.

8. A display device having an open top bin in which articles are displayed in conditioned air, a cabinet on which the bin is removably supported having a storage compartment and a compartment containing an air conditioning device, the bin having a bottom, end walls, a rear wall formed of an inner and an outer member, there being an air passage between the members closed at its upper end but opening into the bin adjacent to the bottom, an air chamber under the bottom of the bin, there being an air conduit connecting the upper portion of the air passage with the air chamber, air supply connections between the air conditioning device and the air chamber including a fan, the front wall having inner and outer spaced plates extending upwardly from the bottom of the bin short of the rear and end walls forming an air passage between the plates, the outer plate extending above the inner plate forming an inlet to the last mentioned passage from the upper portion of the bin, there being an outlet from the bottom of said passage and air conducting channels from said outlet to the air conditioning device.

9. A display device having a plurality of open top bins in stepped relation in which articles are displayed in conditioned air, the bins being removably supported on a cabinet having end storage compartments and an intermediate compartment containing an air conditioning device, each bin having a bottom and end walls, each bin having a rear wall having inner and outer members forming an air passage extending substantially from one end wall to the other, said passages being closed at the top, the front member of each wall stopping short of the bottom of the bin forming an outlet from the passage to the lower portion of the bin, an air chamber below the bottom of one bin and at the back of the other, each air passage having an inlet opening into the upper portion thereof in communication with the air chamber, air conducting connections between the air conditioning device and the air chamber containing a fan for delivering conditioned air to the air chamber, the front wall of each bin having spaced sheets of glass extending upwardly from the bottom of the bin, the inner sheet stopping short of the outer sheet forming an air passage between the sheets of less height than the outer sheet, the portion of the outer sheet above the inner sheet directing the air from the bin into the air passage, there being an air return passage below th bottom of the lower bin, outlet ports connecting the lower end of the air passage between the glass sheets and said air return passage, there being an air return passage below the bottom of the upper bin, outlet ports connecting the lower end of the passage between the glass sheets and the second air return passage, a conduit connecting the last mentioned air return passage with the first mentioned air return passage and a tubular member connecting the first air return passage below the lower bin with the air conditioning device.

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

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