

March 3, 1942.

S. M. SCHWELLER ET AL

2,275,323

REFRIGERATING APPARATUS

Filed May 29, 1940

2 Sheets-Sheet 1

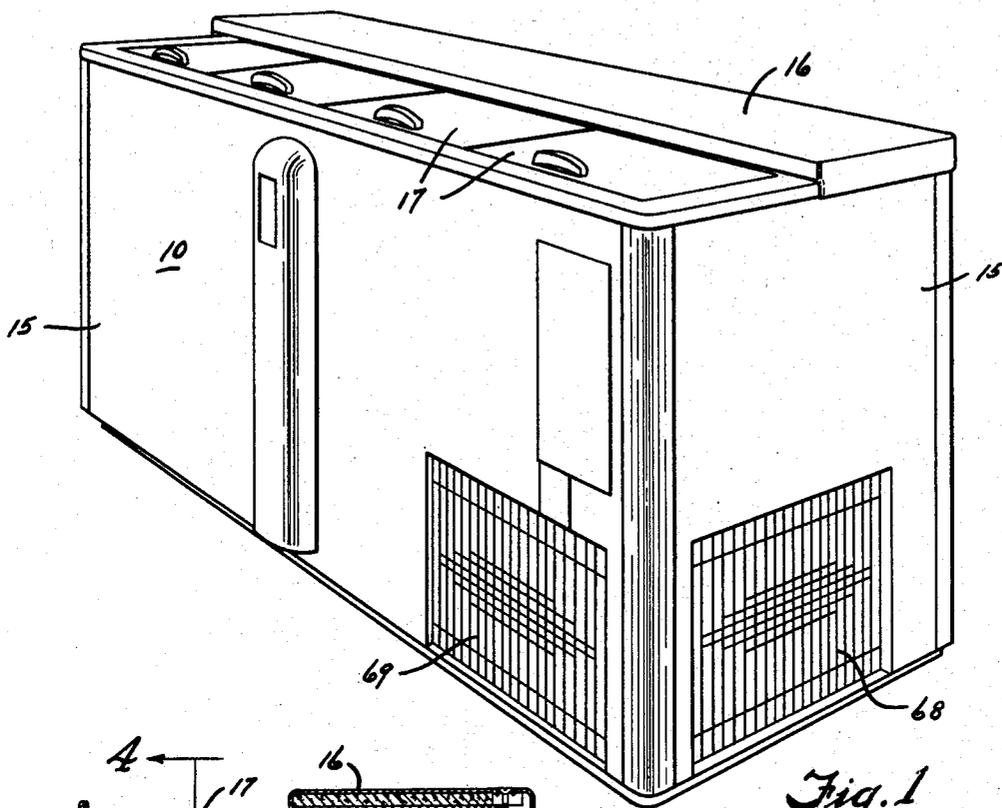


Fig. 1

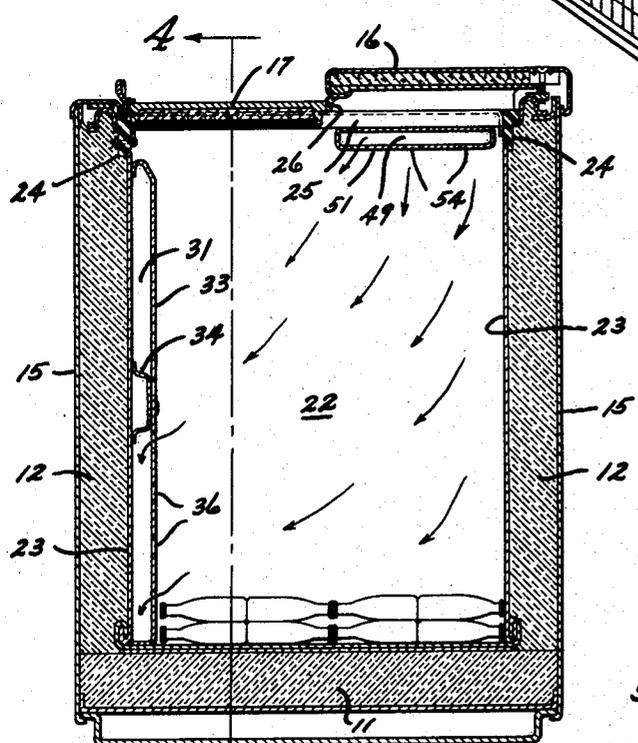


Fig. 2

SYLVESTER M. SCHWELLER, INVENTORS
HERMAN J. DICK AND
J. LOWELL GIBSON.
BY Spencer, Hardman and Tule,
THEIR ATTORNEYS.

March 3, 1942.

S. M. SCHWELLER ET AL

2,275,323

REFRIGERATING APPARATUS

Filed May 29, 1940

2 Sheets-Sheet 2

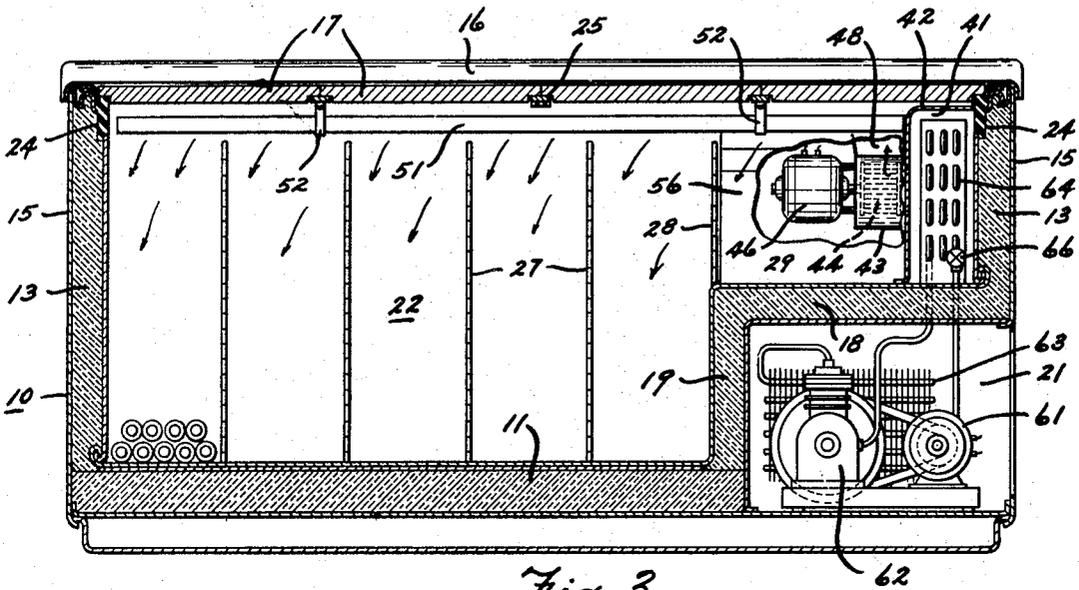


Fig. 3

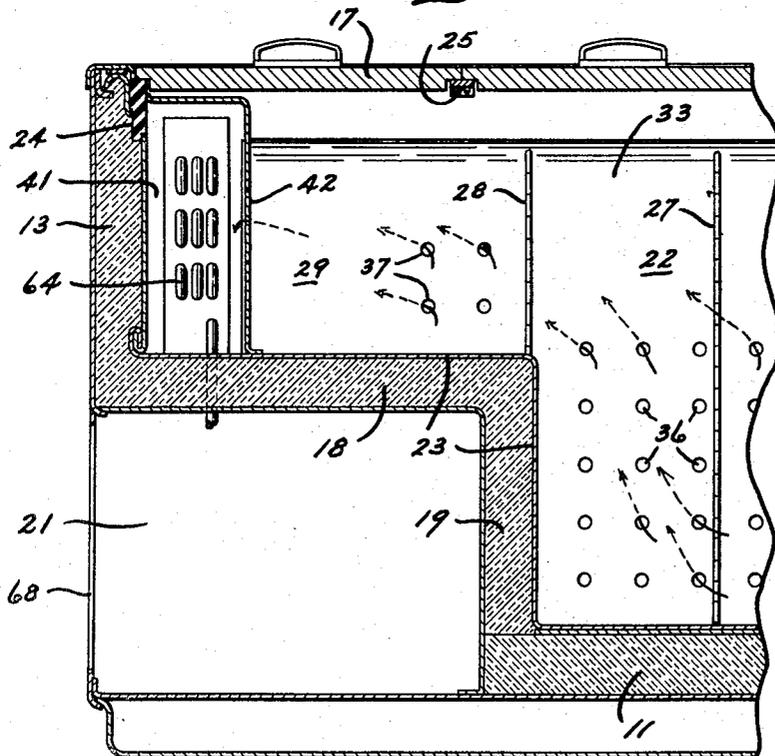


Fig. 4

SYLVESTER M. SCHWELLER, INVENTORS
HERMAN J. DICK AND
J. LOWELL GIBSON.
BY
Spencer, Hardman & Felt.
THEIR ATTORNEYS.

UNITED STATES PATENT OFFICE

2,275,323

REFRIGERATING APPARATUS

Sylvester M. Schweller, Herman J. Dick, and
J Lowell Gibson, Dayton, Ohio, assignors to
General Motors Corporation, Dayton, Ohio, a
corporation of Delaware

Application May 29, 1940, Serial No. 337,884

6 Claims. (Cl. 62-102)

This invention relates to refrigeration and particularly to bottled beverage storage and refrigerating apparatuses.

Since bottled beverage storage and cooling apparatuses of the wet type, wherein the bottled beverages are stored in a liquid bath, have several disadvantages, namely, that of dispensing a wet bottle therefrom, from which bottle liquid is likely to flow or drip onto the consumer of the contents of the bottle and that of soaking labels off the bottles before they are dispensed; attention has been focused on the provision of dry bottled beverage storing and cooling apparatuses. Dry bottled beverage storage and cooling apparatuses have not, in general, been entirely satisfactory because proper or ample cold air circulation over the bottled goods has not been provided rapidly and uniformly enough in cabinets containing the bottled beverages. The present invention is, therefore, directed to the provision of a dry bottled beverage storage and cooling apparatus of improved characteristics and novel design.

An object of our invention is to provide an improved bottled beverage storage and cooling apparatus.

Another object of our invention is to provide an improved dry bottled beverage storage and cooling apparatus wherein the apparatus forms a dispensing device and serving counter.

A further object of our invention is to provide a bottled beverage storage and dispensing apparatus wherein cold dry air is utilized for cooling the bottled goods to thereby prevent labels from being soaked off the bottles and to permit the cooled bottled beverages to be dispensed in a dry condition.

A still further and more specific object of our invention is to provide a dry bottled beverage storage and cooling apparatus having a horizontally elongated storage compartment provided with a novel and efficient duct arrangement for circulating relatively warm air from the compartment over a cooling element of a refrigerating system and for distributing the cooled air in a plurality of streams uniformly throughout the length of the compartment, preferably in a direction downwardly over and around the bottled goods stored therein.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of a refrigerating apparatus constructed in accordance with our invention;

Fig. 2 is a transverse vertical sectional view of the apparatus shown in Fig. 1;

Fig. 3 is a vertical sectional view taken longitudinally of the apparatus shown in Fig. 1; and

Fig. 4 is an enlarged vertical fragmentary sectional view of the apparatus taken on the line 4-4 of Fig. 2 disclosing an air duct leading from the storage compartment of the apparatus to the cooling element chamber thereof.

Referring to the drawings, for illustrating our invention, we have shown in Fig. 1 thereof a dry bottled beverage storage and refrigerating apparatus comprising an elongated, generally rectangularly-shaped cabinet 10. Cabinet 10 includes a bottom 11, side 12 and end insulated walls 13 and 14 (see Figs. 2 and 3) all faced with a suitable outer finished metal panel or the like 15. The top of the cabinet includes a stationary rear part or serving ledge 16 and a plurality of doors 17 normally closing and opening or openings which provide access to the interior of the cabinet. At one end of cabinet 10 wall 13 has a horizontally disposed extension 18 joining a vertical extension 19 of the cabinet bottom wall 11 (see Figs. 3 and 4) to form in the lower portion of one end of the cabinet a machine compartment 21 for the reception of a motor-compressor unit of a refrigerating system. Thus, the insulated walls 11, 12, 13, 14, 18 and 19 together with the cabinet top part or ledge 16 and doors 17 form a horizontally elongated storage compartment 22 within cabinet 10 adapted to receive bottled beverages or the like. All the walls of the cabinet are provided with a metal inner facing member 23 disposed over the insulation thereof and forming a liner for the compartment 22. The metal liner 23 is spaced from the metal top portion of cabinet 10 by an insulating breaker or molding strip 24 as is conventional and well known to those familiar with the refrigerator cabinet construction art. In the structure disclosed the doors 17 which normally close the access opening or openings in the top of cabinet 10 are slidably mounted on suitable tracks or supports 25 extending from the front to the rear of the cabinet. It is to be noted that the cabinet top part or serving ledge 16 is disposed above the tracks or supports 25 to provide a space therebetween to permit the doors 17 to be slid from the front of the cabinet to the rear thereof for uncovering the access opening or openings. Doors 17 are provided with a flexible

and preferably rubber gasket 26 at the top of their back edge which gasket engages the lower front portion of ledge 16, when the doors are in closed position, to seal the space between the doors and the ledge or cabinet part 16 (see Fig. 2). A plurality of vertically disposed reticulated or cross-wire partitions 27 are supported in any suitable or desirable manner within compartment 22 and divide the compartment into a plurality of smaller compartments for the segregation of different varieties of bottled beverages. Another reticulated or cross-wire partition 28 extends upwardly from the wall 18 to partition the shallow end part 29 of compartment 22 from the compartment 22 proper (see Figs. 3 and 4).

The means for cooling and circulating air within cabinet 10, in order to chill bottled beverages stored within the compartment 22 thereof, includes means forming a narrow vertically disposed air duct 31 along the inside of the front wall 12 which means is in the form of a plate or baffle 33. Plate or baffle 33 has its top and bottom edges bent or rolled to engage or abut the liner 23 so as to space the main part of plate 33 from the liner. A plurality of substantially U-shaped brackets 34 welded or otherwise suitably secured in spaced apart relation along the cabinet front wall maintains the plate 33 in spaced relation to the liner 23. Screws or the like pass through and engage the plate 33 and are threaded into each of the spaced apart brackets 34 to hold the plate 33 in position. It will be noted that plate 33 is provided, preferably in its lower portion, with a plurality of spaced apart openings or holes 36 providing communication between the air duct 31 and the compartment 22 and with a plurality of holes 37 providing communication of the air duct with the shallow end compartment portion 29 (see Fig. 4). The plate 33 extends throughout the length of compartment 22 and has its one end, adjacent the compartment 29, opening into a normally closed transverse chamber 41 formed by a baffle 42 which is secured to the cabinet walls in any suitable or conventional manner. A shroud or housing 43 connected to baffle 42 communicates with the interior of the transverse chamber 41 and contains a fan or blower 44 (see Fig. 3). An electric motor 46 is connected to the fan or blower 44 for operating same. A metal conduit forming member 48 has its one end connected with the shroud or housing 43 and has its other end connected with a means disposed beneath the cabinet part or ledge 16 which means forms another relatively flat wide horizontally disposed air duct 49 extending substantially throughout the length of compartment 22. This means forming air duct 49 comprises a hollow metal member 51 having closed ends and supported in any suitable manner within compartment 22, such as by straps or the like 52 secured to the door tracks 25 (see Fig. 3). Member 51 has a plurality of apertures 54 in its bottom (see Fig. 2) to provide communication between the duct 49 and the storage compartment 22. These apertures 54 are spaced apart along the length of the air duct forming member 51 for a purpose to be hereinafter described. An L-shaped metal partition 56 cooperates with the baffle 42 and with the rear wall of compartment 22 to enclose the motor 46 and shroud or housing 43 to thereby render the shallow end part 29 of compartment 22 suitable for the storage of various packaged articles to be refrigerated.

A closed refrigerating system is associated with 75

the apparatus and comprises a motor 61, operatively connected with a compressor 62, a condenser 63 and a finned-type evaporator 64. The motor, compressor and condenser constitute a unit located within the machine compartment 21 of cabinet 10 and the evaporator 64 is disposed within the transverse chamber 41. Suitable pipe or refrigerant conveying conduits extend from the compressor 62 to the condenser 63, from the condenser 63 to the evaporator 64 and from the evaporator 64 to the compressor 62 to form the closed refrigerant circuit as is conventional in the art (see Fig. 3). An expansion valve 66 is interposed in the conduit leading from the condenser 63 to the evaporator 64 for controlling the flow of refrigerant cooled and liquefied in condenser 63 into the evaporator. A control switch (not shown) for the refrigerating system may be employed to start and stop motor 61 and, consequently, compressor 62, and this switch may be responsive either to the temperature of evaporator 64 or to the air within compartment 22. The electric motor 46 may operate the blower or fan 44 intermittently, if desired, but is preferably continuously operated during use of the apparatus. Condenser 63 may be cooled in any suitable or conventional manner and is preferably cooled by a fan (not shown) which draws air into the compartment 21, through a grilled opening 68 in a wall thereof, and circulates the air over the condenser and thence outwardly of compartment 21 through a grilled opening in another wall thereof (see Fig. 1).

In the use of the apparatus to cool or chill bottled beverages stored within the compartment 22 the refrigerating system is operated to cause evaporator 64 to produce a refrigerating effect within chamber 41. Operation of fan or blower 44, by motor 46, causes air to be drawn from along the length of compartment 22 through the plurality of spaced apart holes 36 in plate 33 and from compartment 29 through the holes 37 into the vertical relatively flat air duct 31 from one end of which the air flows into the cooling element chamber 41. The air upon entering chamber 41 is drawn between the fins of evaporator 64 and over the coils thereof to reduce its temperature and is then circulated from the chamber 41, through a suitable opening in baffle 42, into the shroud or housing 43 by the fan or blower 44. Fan or blower 44 then forces the cooled air from the housing 43 into the connecting conduit member 48 and into the one end of the flat horizontal air duct 49. The cold air flows along the length of duct 49 and is discharged therefrom along the length of compartment 22 through the spaced apart openings 54 in the bottom of the cold air duct forming means 51. The cold air from duct 49 flows downwardly and transversely in a plurality of divided streams along the length of compartment 22 over and around bottled beverages stored therein to cool the contents of the bottles. Heat extracted from the bottled beverages is carried by the air drawn into the relatively warm or return duct 31 back to the cooling chamber 41 where the heat is given up to the cooling element or evaporator 64 of the refrigerating system and dissipated to the air outside of the refrigerator cabinet. If desired, the openings 36 in plate 33 and the openings 54 in member 51 may be of increased size relative to one another or they may be irregularly spaced apart to enhance a uniform flow of air along the length of compartment 22.

From the foregoing it will be apparent that

we have provided an improved bottled beverage storage and cooling apparatus which forms a combined dispensing device and serving counter in that the bottled beverages may be readily dispensed from their cooling compartment and placed upon the back part or ledge of the top of the cabinet for serving. The improved apparatus provides efficient circulation and even distribution of cold air within the storage compartment for rapidly cooling bottled goods stored therein and at the same time enables the storing and serving of many different types or varieties of bottled beverages. Bottled goods are dispensed in a cool dry condition and labels on the bottles remain intact to indicate to the consumer that the type of drink ordered is being served. The built-in forced air distribution or circulation of our apparatus insures a constant stream or streams of cold air over the top bottles in the storage compartment which are to be dispensed first, and thereafter over and around the lower bottles in its passage to the return air duct.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A dry bottled beverage storage and refrigerating apparatus comprising in combination, a cabinet including a bottom, side and end insulated walls and a top forming a horizontally elongated compartment therein, said cabinet top having an opening therein providing access to said compartment, a door or doors normally closing said compartment access opening, a closed chamber extending transversely across said horizontally elongated compartment, a cooling element of a refrigerating system disposed in said chamber, means forming an air duct having a connection with said chamber and extending outwardly therefrom along said elongated compartment, said air duct being provided with a plurality of spaced apart openings affording communication thereof with the lower portion of said elongated compartment, means beneath said cabinet top forming another air duct having a connection with said chamber and extending outwardly therefrom along said elongated compartment, said another air duct being provided with a plurality of spaced apart openings affording communication thereof with the upper portion of said elongated compartment, a fan adapted to circulate air through said duct forming means and said chamber, means for operating said fan to cause same to circulate air from said compartment through the openings in said first named duct forming means into said chamber and over the cooling element therein to cool the air, and said fan forcing the air cooled by said element out of said chamber into said another duct forming means and outwardly of the openings therein into the upper part of said elongated compartment whereby the cooled air flows downwardly in a plurality of streams along the length thereof.

2. A dry bottled beverage storage and refrigerating apparatus comprising in combination, a cabinet including a bottom, side and end insulated walls and a top forming a horizontally elongated compartment therein, said cabinet top having an opening therein providing access to said compartment, a door or doors normally closing said compartment access opening, a closed chamber extending transversely across said hori-

zontally elongated compartment at one end thereof, a cooling element of a refrigerating system disposed in said chamber, means forming an air duct having a connection with said chamber and extending outwardly therefrom along said elongated compartment substantially to the other end thereof, said air duct being provided with a plurality of spaced apart openings affording communication thereof with the lower portion of said elongated compartment, means beneath said cabinet top forming another air duct having a connection with said chamber and extending outwardly therefrom along said elongated compartment substantially to said other end thereof, said another air duct being provided with a plurality of spaced apart openings affording communication thereof with the upper portion of said elongated compartment, a fan adapted to circulate air through said duct forming means and said chamber, means for operating said fan to cause same to circulate air from said compartment through the openings in said first named duct forming means into said chamber and over the cooling element therein to cool the air, and said fan forcing the air cooled by said element out of said chamber into said another duct forming means and outwardly of the openings therein into the upper part of said elongated compartment whereby the cooled air flows downwardly in a plurality of streams along the length thereof.

3. A dry bottled beverage storage and refrigerating apparatus comprising in combination, a cabinet including a bottom, side and end insulated walls and a top forming a horizontally elongated compartment therein, said cabinet top having an opening therein providing access to said compartment, a door or doors normally closing said compartment access opening, a relatively long narrow closed chamber extending transversely across said horizontally elongated compartment, a cooling element of a refrigerating system disposed in said chamber, means forming an air duct having a connection with one end of said chamber and extending outwardly therefrom along a side wall of said elongated compartment, said air duct being provided in its bottom portion with a plurality of spaced apart openings affording communication thereof with the lower part of said elongated compartment, means beneath said cabinet top forming another air duct having a connection with the other end of said chamber and extending outwardly therefrom along said elongated compartment, said another air duct being provided in its bottom wall with a plurality of spaced apart openings affording communication thereof with the upper part of said elongated compartment, a fan interposed in one of said duct forming means adjacent its connection with said chamber adapted to circulate air through said duct forming means and said chamber, means for operating said fan to cause same to circulate air from said compartment through the openings in said first named duct forming means into said chamber and over the cooling element therein to cool the air, and said fan forcing the air cooled by said element out of said chamber into said another duct forming means and outwardly of the openings therein into the upper part of said elongated compartment whereby the cooled air flows downwardly and transversely in a plurality of streams along the length thereof.

4. A dry bottled beverage storage and refrigerating apparatus comprising in combination, a

cabinet including a bottom, side and end insulated walls and a top forming a horizontally elongated compartment therein, said cabinet top having an opening therein providing access to said compartment, a door or doors normally closing said compartment access opening, a relatively long narrow closed chamber extending transversely across said horizontally elongated compartment at one end thereof, a cooling element of a refrigerating system disposed in said chamber, means forming an air duct having a connection with one end of said chamber and extending outwardly therefrom along a side wall of said elongated compartment substantially to the other end thereof, said air duct being provided in its bottom portion with a plurality of spaced apart openings affording communication thereof with the lower part of said elongated compartment, means beneath said cabinet top forming another air duct having a connection with the other end of said chamber and extending outwardly therefrom along said elongated compartment substantially to said other end thereof, said another air duct being provided in its bottom wall with a plurality of spaced apart openings affording communication thereof with the upper part of said elongated compartment, a fan interposed in said another air duct adjacent its connection with said chamber adapted to circulate air through said duct forming means and said chamber, means for operating said fan to cause same to circulate air from said compartment through the openings in said first named duct forming means into said chamber and over the cooling element therein to cool the air, and said fan forcing the air cooled by said element out of said chamber into said another duct forming means and outwardly of the openings therein into the upper part of said elongated compartment whereby the cooled air flows downwardly and transversely in a plurality of streams along the length thereof.

5. A dry bottled beverage storage and refrigerating apparatus comprising in combination, a cabinet including a bottom, side and end insulated walls and a top forming a horizontally elongated compartment therein, said cabinet top having an opening therein providing access to said compartment, a door or doors normally closing said compartment access opening, a closed chamber extending transversely across said horizontally elongated compartment at one end thereof, a cooling element of a refrigerating system disposed in said chamber, means forming a relatively narrow vertically disposed air duct along a side wall of said elongated compartment, said air duct having a connection with said chamber and being provided with a plurality of spaced apart openings in its bottom portion affording communication thereof with the lower part of said elongated compartment, means beneath said cabinet top forming a relatively flat horizontally disposed air duct extending along said elongated

compartment, said flat horizontally disposed air duct having a connection with said chamber and being provided with a plurality of spaced apart openings in its bottom wall affording communication thereof with the upper part of said elongated compartment, a fan interposed in said flat horizontally disposed air duct adjacent its connection with said chamber adapted to circulate air through said air ducts and said chamber, means for operating said fan to cause same to circulate air from said compartment through the openings in said vertically disposed air duct into said chamber and over the cooling element therein to cool the air, and said fan forcing the air cooled by said element out of said chamber into said flat horizontally disposed air duct and outwardly of the openings therein into the upper part of said elongated compartment whereby the cooled air flows downwardly and transversely in a plurality of streams along the length thereof.

6. A dry bottled beverage storage and refrigerating apparatus comprising in combination, a cabinet including a bottom, a top, a side and end walls forming a horizontally elongated compartment therein, said cabinet having an opening therein providing access to said compartment, a door or doors normally closing said compartment access opening, a chamber within said cabinet extending transversely of said horizontally elongated compartment, a cooling element of a refrigerating system disposed in said chamber, means forming an air duct having a connection with said chamber and extending outwardly therefrom in a direction along the length of said horizontally elongated compartment, said air duct being provided with a plurality of spaced apart openings therealong affording communication thereof with the compartment, means forming another air duct having a connection with said chamber and extending outwardly therefrom in a direction along the length of said horizontally elongated compartment, said another air duct being provided with a plurality of spaced apart openings therealong affording communication thereof with said compartment, means adapted to circulate air through said duct forming means and said chamber, means for operating said air circulating means to cause same to circulate air from said compartment through the openings in said first named duct forming means into said chamber and over the cooling element therein to cool the air, and said air circulating means forcing the air cooled by said element out of said chamber into said another duct forming means and outwardly of the openings therein into said compartment whereby the cooled air flows transversely across said horizontally elongated compartment in a plurality of streams along the length thereof.

SYLVESTER M. SCHWELLER.
HERMAN J. DICK.
J LOWELL GIBSON.