July 21, 1925. 1,547,091

D. K. BAXTER

REFRIGERATING APPARATUS

Filed Sept. 26, 1923 2 Sheets-Sheet 1

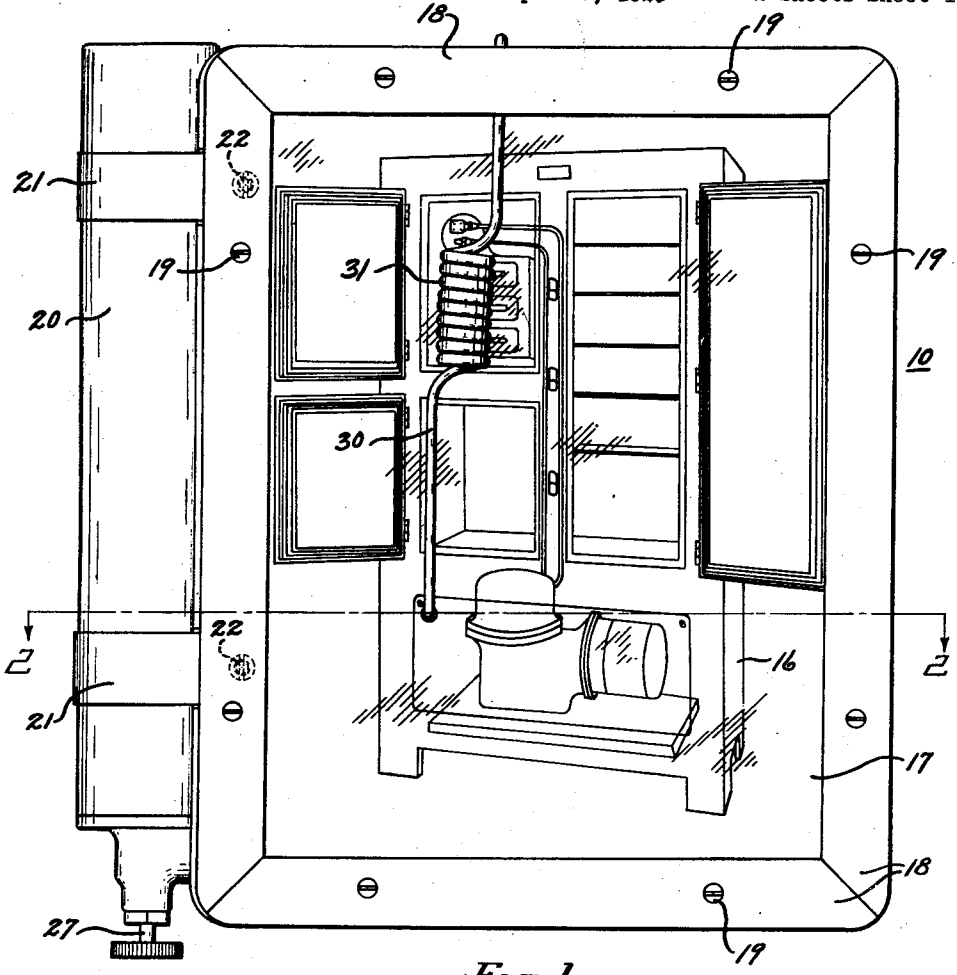


Fig. 1

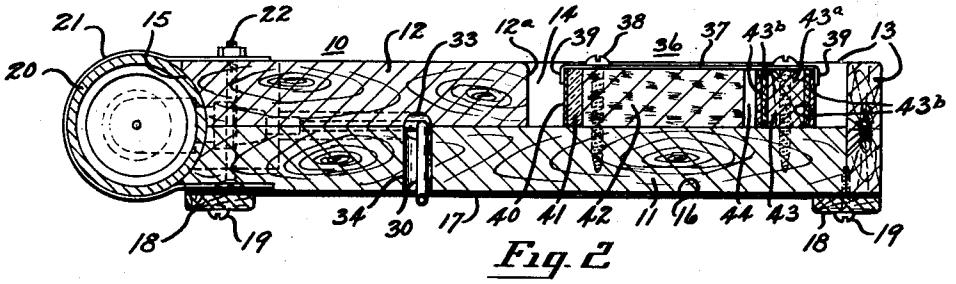


Fig. 2

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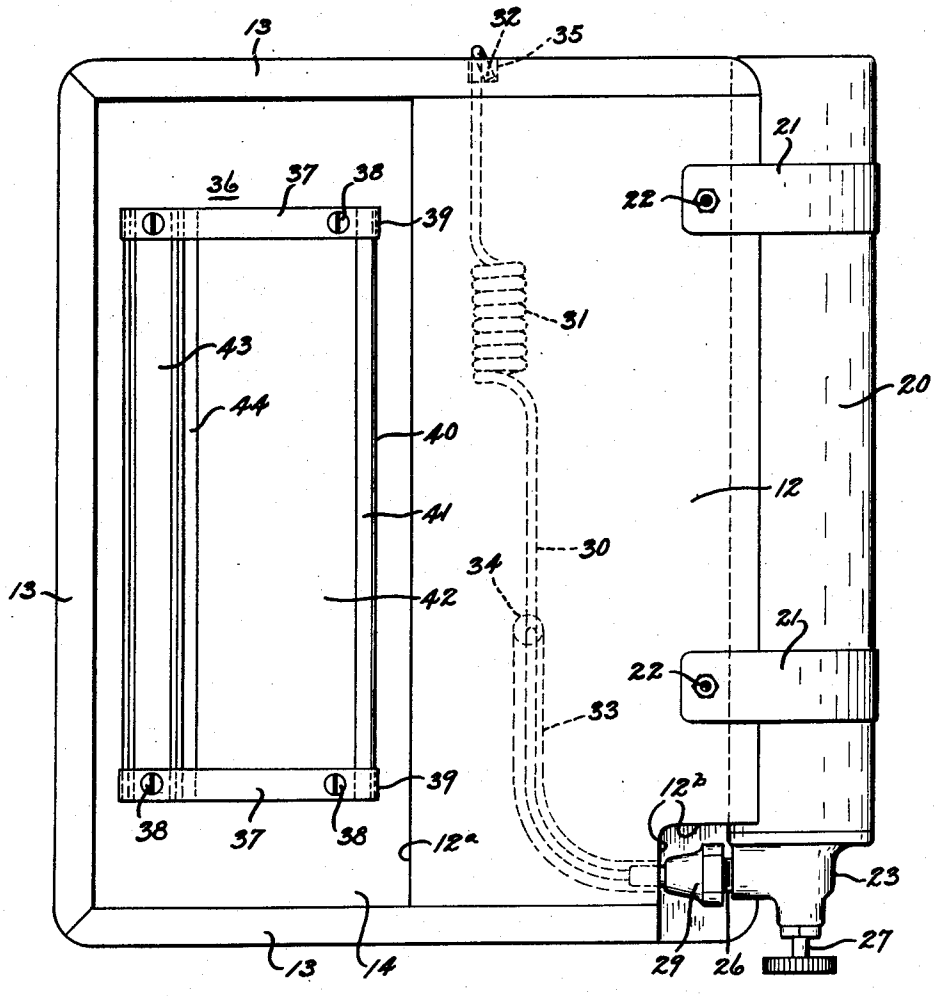


Fig. 3

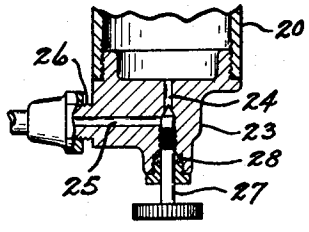


Fig. 4

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Patented July 21, 1925. 1,547,091

UNITED STATES PATENT OFFICE.

DONALD K. BAXTER, OF DAYTON, OHIO, ASSIGNOR TO DELCO-LIGHT COMPANY, OF DAYTON, OHIO, A CORPORATION OF DELAWARE.

REFRIGERATING APPARATUS.

Application filed September 26, 1923. Serial No. 664,816.

To all whom it may concern:

Be it known that I, DONALD K. BAXTER, a citizen of the United States of America, residing at Dayton, county of Montgomery, State of Ohio, have invented certain new and useful Improvements in Refrigerating Apparatus, of which the following is a full, clear, and exact description.

This invention relates to devices for demonstrating the principles of refrigerating machines and cabinets.

Objects of the invention are to aid persons, such as teachers and salesmen, in their efforts to impart to pupils, prospective purchasers, or others, information respecting the art of refrigeration involving the extraction of heat by expanding a fluid within a coil or other chamber, and the prevention of heat transference through walls.

The invention comprises among other things, a base bearing a representation of a refrigerating apparatus, a container adapted to confine a fluid refrigerant, an expansion chamber, and a valved fluid conductor connecting the refrigerant container and the expansion chamber; and it consists in the combinations and elements hereinafter described, illustrated in the drawings and defined in the appended claims.

In the drawings in which like reference characters indicate like parts throughout the several views:

Fig. 1 is a front elevation of a demonstrator embodying this invention;

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

Fig. 3 is a rear elevation, and

Fig. 4 is a section exposing a valve controlled duct or passage leading from a refrigerant container to an expansion chamber.

The invention is illustrated as embodied in a small demonstrating device, adapted to be carried by a salesman, for example, and to be held in the hands and manipulated so as to illustrate the principle of refrigeration utilized in a refrigerating apparatus which is portrayed on the device.

The device illustrated comprises a base and display member indicated as a whole by 10; a refrigerant container 20, and an expansion chamber comprising a coil 30 with suitable pipe connection to the refrigerant container, and a fragment of an insulated cabinet wall 36.

The base member 10 may be of wood and may consist of a front layer 11 and a back layer 12 secured together back to back by any suitable means. In the constructions illustrated the base member is substantially rectangular in front elevation. Three of the four edges are covered by strips 13, preferably of wood. The back layer 12 is of less width than front layer 11, whereby a pocket 14 is formed on the rear side of the base member bounded by the edge 12^a of layer 12 and the edge-covering strips 13. This pocket 14 is for the purpose of holding and displaying a section of heat insulated wall of a refrigerator cabinet as will be presently described. That edge of the base member not covered by strips 13 may be grooved as at 15 to form a seat for a container 20 to be described.

Upon the front of the base member 10 is depicted a refrigerating cabinet inclosing a refrigerating apparatus. This may be a photograph or drawing 16 upon thin sheet material preferably covered and protected by a transparent sheet 17, such as a sheet of celluloid suitably secured upon the face of the base member, as by frame moldings 18 secured by screws 19.

The container 20, which should be fluid tight, is secured to one edge of the base 10 as by straps 21 embracing the container, said straps having their ends secured to the base member as by bolts 22. The container 20 fits in the groove 15 as shown in Figs. 1 and 2. In the illustrated embodiment one end is closed by a fitting 23 having a longitudinal duct 24 communicating with a lateral duct 25 extending therefrom through a threaded nipple 26. A needle valve 27, suitably packed at 28, controls the passage of fluid through the duct 24 to or from the container 20.

Coupled to the nipple 26 at the outlet side of the valve by means of any suitable coupling, as 29, is a pipe or fluid conductor 30 having between its ends an expansion chamber or coil 31 of relatively large heat exchanging capacity. The extremity 32 of the conductor 30 is open to the atmosphere. In the embodiment shown in the drawings the pipe or conductor 30 leads from the coupling 29 in an arc of about 90° and lies in a correspondingly curved tunnel 33 formed by mating grooves fashioned in the inner faces of the plates 11 and 12. The extremity of

the tunnel 33 nearest the coupling member 29 emerges into a recess 12b formed in the member 12 for the purpose of accommodating and permitting access to the coupling 29. From the other extremity of the tunnel 33 a hole 34 extends to the surface of the front plate 11. The pipe or conductor 30 lies in this tunnel 33 and hole 34, following the curves and angles thereof, and emerges from the front of plate 11, extends through the sheet 16 bearing the representation of a refrigerator, through the transparent covering sheet 17, then extends over the face of the picture, then between one of the frame mouldings 18, (as illustrated in Fig. 1) and said plate 11, the free extremity of the pipe or conduit being bent at an angle into a cavity 35 as indicated in Fig. 3.

The expansion chamber or coil 31 is intended to be disposed over that portion of the representation of the refrigerator which illustrates the chamber that, in actual practice, contains the expansion coil and constitutes the refrigerating chamber and the conductor leading thereto emerges from the representation of the compressor-containing chamber thereof.

In practice the container 20 may be filled with a suitable volatile refrigerant, such as methyl chloride. In the embodiment shown coupling 29 may be disconnected, the straps 21 released and the container detached from the base. A pipe leading from a supply of refrigerant may then be connected to the nipple 26. Valve 27 may then be opened, container 20 charged with refrigerant and valve 27 thereafter closed, confining the refrigerant in container 20. The container may again be secured to the base and conductor 30 connected again to the container.

In demonstrating the principles of refrigeration the instrument may be held in the hand with the needle valve downward and exhibited to the view of the person to whom the demonstration is to be made. By gradually opening the valve 27 it can be shown that volatile liquid refrigerant escapes into the conduit 30, expands into a gaseous or vaporous condition and extracts heat from the surroundings. This fact may be perceived by the sense of touch, by the formation of visible frost on the coil 31 and adjacent portions of the conductor, and by the hissing of vapor or gas escaping into the cavity 35 from the open end of the conduit. As the coil or expansion chamber 31 is disposed at the refrigerating chamber and emerges from the compressor-containing chamber depicted on the base, the exhibition helps the pupil or sales prospect to grasp the simple principles of mechanical refrigeration and the mode of operation of household or other refrigerating machines. As soon as the demonstration has been completed the needle valve should be closed to conserve the refrigerant. In demonstrating the valve should not be opened wide enough to permit refrigerant to escape from the conductor in liquid form. The cavity 35 receiving the cold vapor prevents the stream from directly impinging accidentally against a person.

On the back of the base 10, disposed within the pocket 14, is a fragment 36 of the wall of a refrigerator cabinet, exposing to view a cross section thereof so that the wall structure and means for excluding the outside heat from the contents of a cabinet may be made apparent. This fragment 36 may be secured to the back of the front plate 11 by the strips 37 and screws 38, said strips crossing the ends of the fragment and having turned or flanged extremities 39 embracing its sides. The inside surface of the wall is that which faces the container in the illustration. This inside surface is formed by a lining layer of enameled sheet metal 40 or equivalent, next to which is a layer of insulating cement 41, known as hydrolene, and which serves to fasten the thick insulating layer of cork 42 to the lining. The outside of the wall is composed of a layer of multiply wood 43, separated from the cork insulation by an air space 44. The outside layer of wood may comprise a relatively thick middle layer 43a and two sheets of veneer 43b on each of the inner and outer faces as shown in Fig. 2.

It will be perceived that with this device in his hand a salesman or teacher may arouse the interest of a prospective buyer or pupil and by its aid demonstrate the principles of refrigeration and heat insulation.

Although for the purpose of explaining the invention and the best mode known to me of applying the principle thereof I have described it in connection with a preferred embodiment, it is to be understood that it may be embodied in other forms of apparatus within the scope of the appended claims without departing from the principles thereof.

What I claim and desire to secure by Letters Patent is:

1. In a demonstrating device, a comparatively thin portable base having a representation of a refrigerator upon one of its sides, a fluid tight container detachably secured to one side edge of said base, said container having a duct communicating with its interior, a valve for controlling said duct, a conductor extending from said duct over the representation aforesaid, and means for detachably connecting said conductor with said duct.

2. In a demonstrating device, a comparatively thin portable base having a representation of a refrigerating apparatus upon one of its sides, a fluid tight container mounted on one edge of said base, said base having

a tunnel therein opening in the surface thereof having the representation aforesaid and within a space representing the compressor containing chamber of the refrigerating apparatus, a conductor in said tunnel one end of which is in communication with said container, said conductor emerging from said tunnel and extending over the representation hereinbefore mentioned, said conductor including an expansion chamber disposed adjacent the portion of said representation showing the refrigerating chamber of the refrigerating apparatus.

3. In a demonstrating device, a portable base having a representation of a refrigerating apparatus, a fluid tight container mounted on one edge thereof, said base having a tunnel therein opening in the surface thereof within the space on which is represented the compressor containing chamber of the refrigerating apparatus, a conductor in said tunnel one end of which is in communication with said container, said conductor emerging from said tunnel and extending over the surface of said base and including an expansion chamber disposed adjacent the representation of the refrigerating chamber of the refrigerating apparatus, said base being composed of two layers, and the tunnel therein being formed by meeting grooves in the respective layers.

4. A device such as is defined in claim 3 in which one layer is provided with a recess, and a detachable connection between the conduit and the fluid tight container is disposed within said recess.

5. In a demonstrator, a base, a fluid tight container, a fluid conductor having an open end directed against said base and an expansion chamber between its ends, said conductor having its other end in communication with said container.

6. A device such as is defined in claim 5 in which the base has a cavity, and the end of the fluid conductor is directed into said cavity.

7. In a demonstrator, a comparatively thin base having a representation of a refrigerating apparatus upon one of its faces, and a recess or pocket in its other face, a fragment of the wall of a refrigerator cabinet arranged within said recess, a fluid tight container secured to one side edge of said base, and a fluid conductor leading from said container through said base and emerging from the representation of the compressor containing chamber, and having an expansion chamber disposed in front of the representation of the refrigerating chamber thereof.

In testimony whereof I hereto affix my signature.

DONALD K. BAXTER.