Dec. 11, 1945. D. J. COHN 2,390,693

OXYGEN TENT UNIT

Filed March 20, 1942 3 Sheets-Sheet 1

Fig. 1

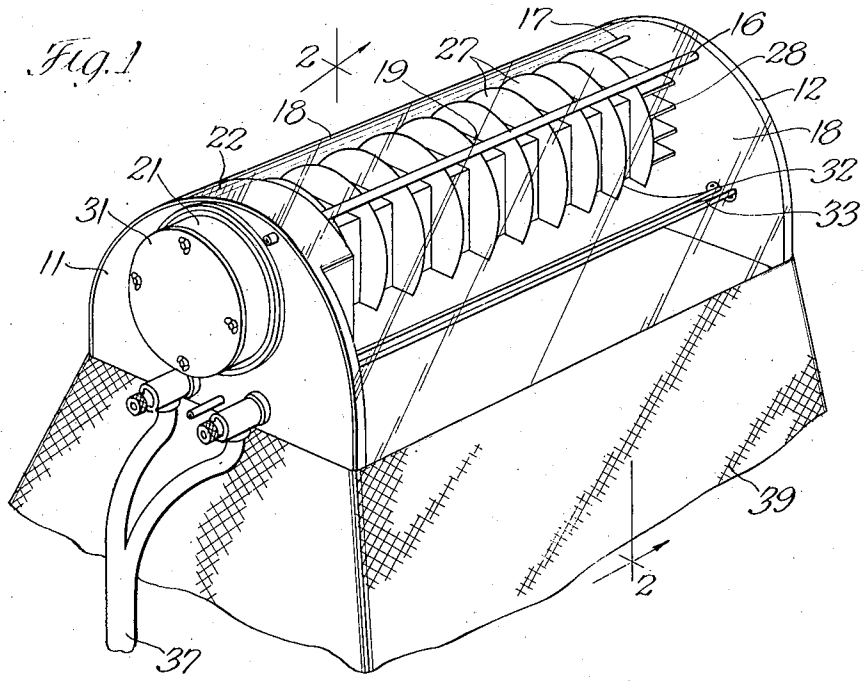
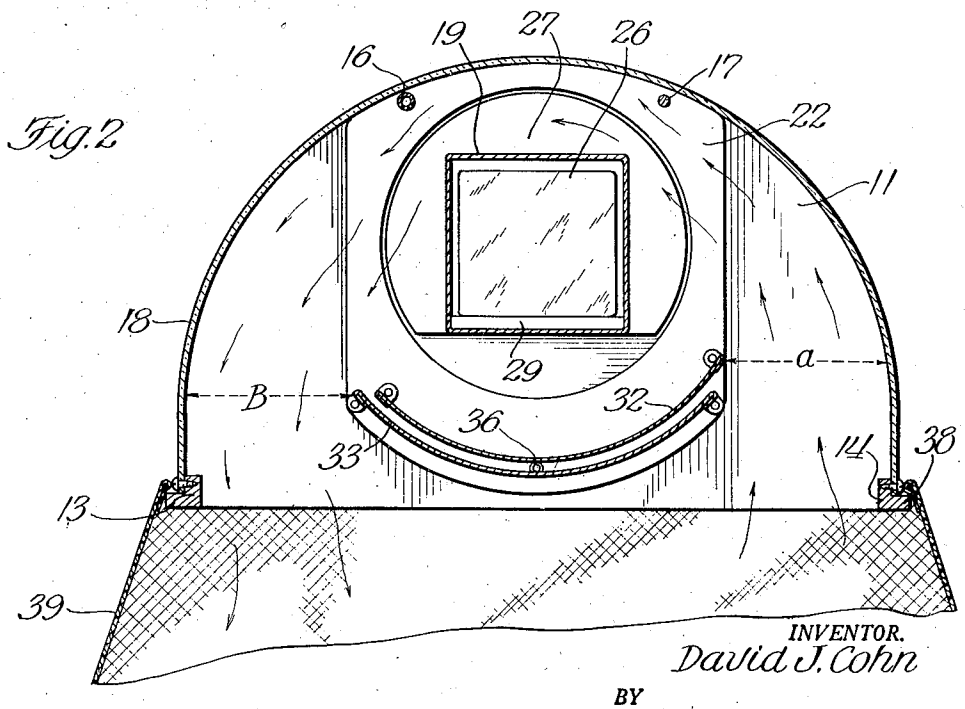


Fig. 2



INVENTOR.
David J. Cohn
BY
McLaughlin & Wallenstein

Dec. 11, 1945. D. J. COHN 2,390,693

OXYGEN TENT UNIT

Filed March 20, 1942 3 Sheets-Sheet 2

Fig. 3

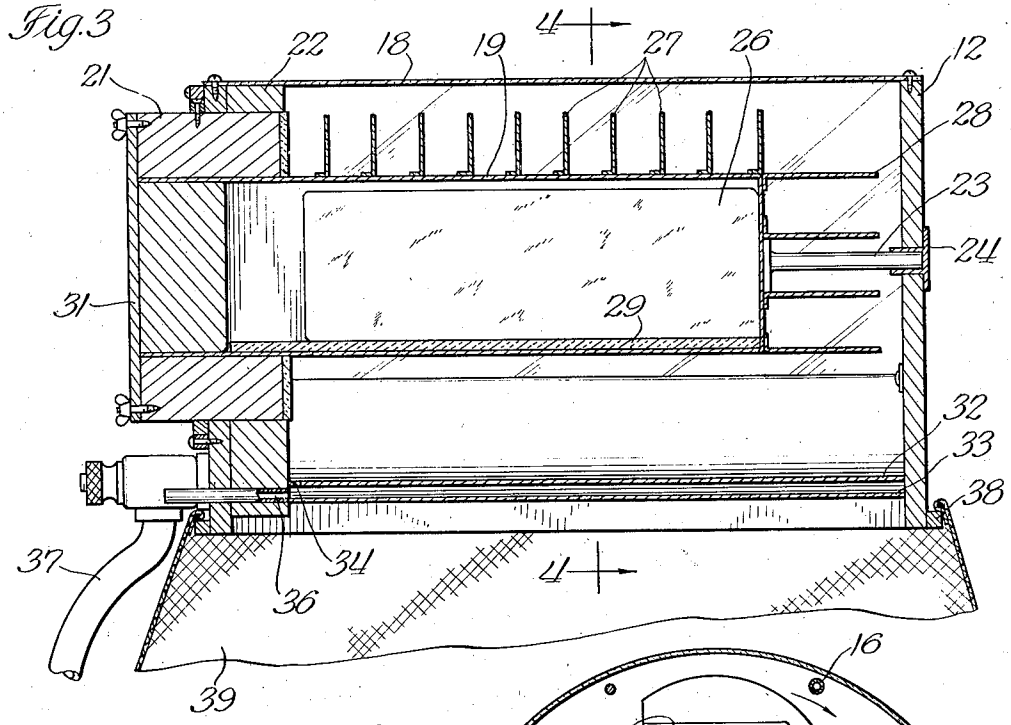


Fig. 4

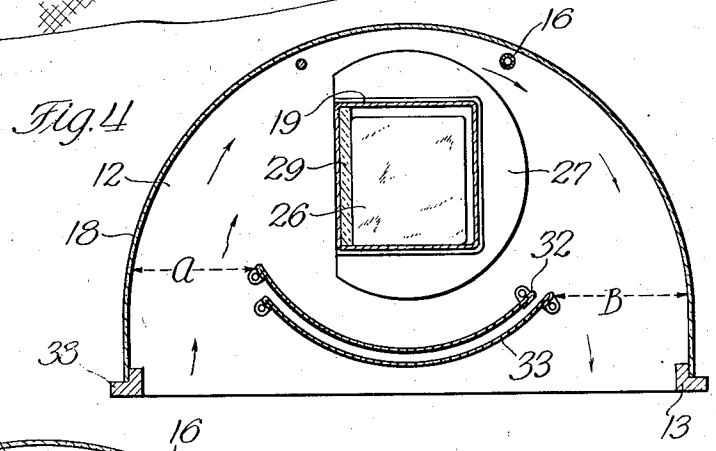
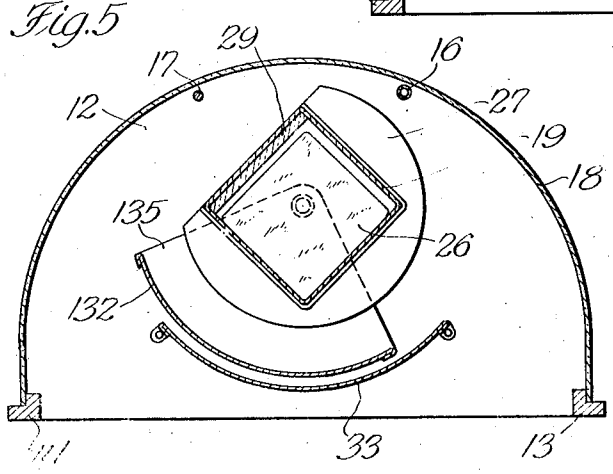


Fig. 5



INVENTOR.
David J. Cohn
BY
McLaughlin & Wallenstein

Dec. 11, 1945. D. J. COHN 2,390,693

OXYGEN TENT UNIT

Filed March 20, 1942 3 Sheets-Sheet 3

Fig. 6

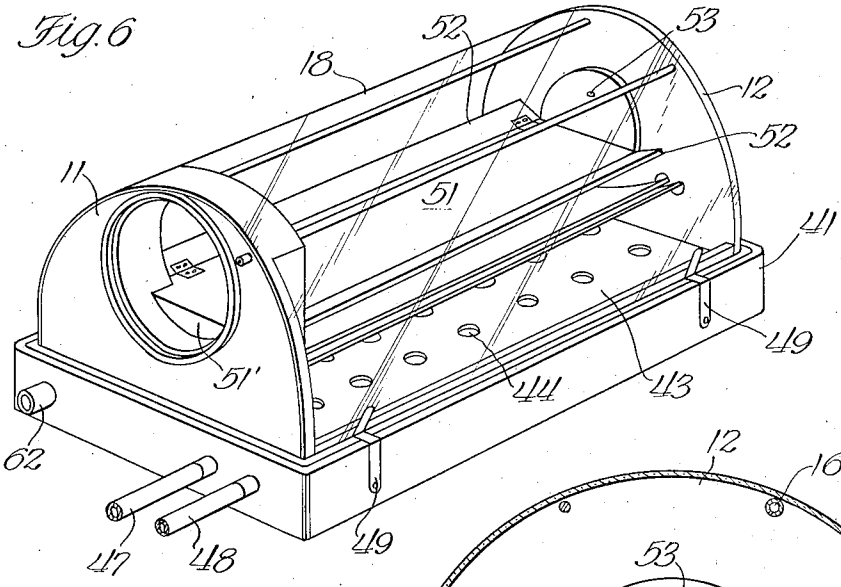


Fig. 9

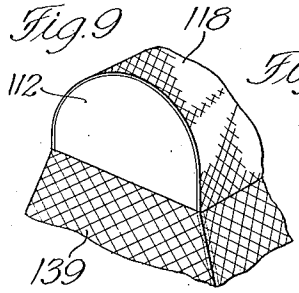


Fig. 7

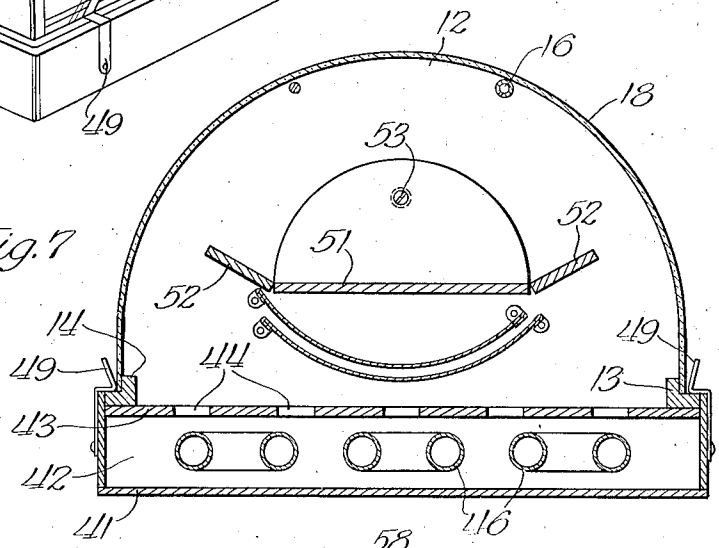
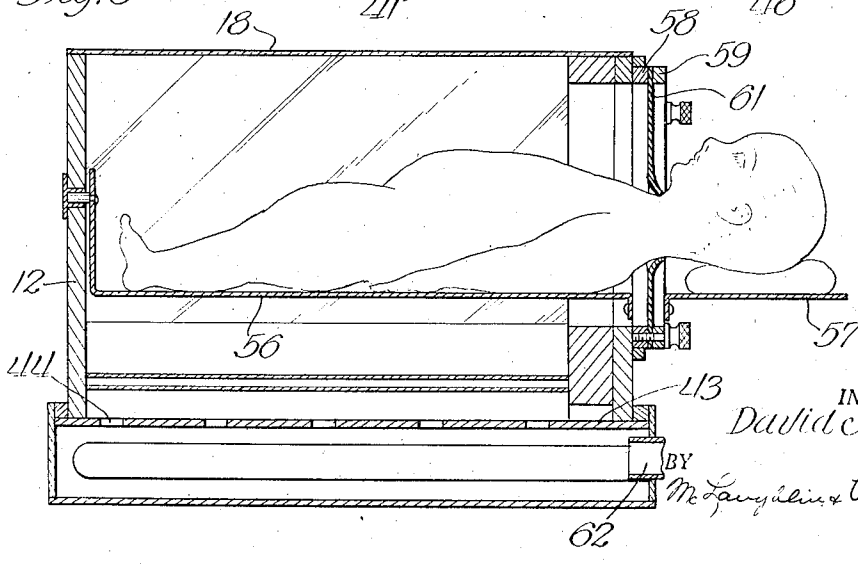


Fig. 8



INVENTOR.
David J. Cohn
BY
McLaughlin & Wallenstein

Patented Dec. 11, 1945 2,390,693

UNITED STATES PATENT OFFICE

2,390,693

OXYGEN TENT UNIT

David J. Cohn, Chicago, Ill.

Application March 20, 1942, Serial No. 435,443

2 Claims. (Cl. 128—191)

My invention relates to oxygen tents. It relates more in particular to an improved oxygen tent unit having many advantages over oxygen tent units heretofore known, but which, nevertheless, is adapted to be utilized as a device for infant therapy.

In my copending application, Serial No. 211,540, filed June 3, 1938, (Patent No. 2,270,072, issued March 24, 1942), I disclosed an improved oxygen tent combination, including a novel unit from which a canopy is adapted to be supported to form a so-called oxygen tent. While the oxygen tent of my copending application in actual use in hospitals and homes has been found to possess many marked advantages over oxygen tents known before its invention, continued day by day use has enabled me to improve certain of its features.

My present invention, therefore, may be considered as representing an improvement over the oxygen tent shown in my copending application, particularly in that many of the parts are simplified, the relative costs of manufacture are reduced and many structurally relatively minor but functionally very important features have been introduced. In general, the improvements in my present oxygen tent will be made apparent as the description progresses. I wish to point out, at this time, however, that in accordance with one aspect of my present invention, I provide an oxygen tent unit suitable for the treatment of adults, the unit being of a type to support a canopy to enclose the patient, and so constructed that by the use of simple associated apparatus it may be converted into a unit for treating infants, all as will be more particularly pointed out.

Details, objects and features of the invention will be apparent from a consideration of the following description, taken with the accompanying drawings wherein:

Fig. 1 is a perspective view showing one embodiment of an oxygen tent constructed in accordance with my invention, the canopy being broken away to conserve space;

Fig. 2 is a transverse sectional view taken along the line 2—2 of Fig. 1 looking in the direction of the arrows (the section may also be thought of as being taken along the line 2—2 of Fig. 3);

Fig. 3 is a longitudinal sectional view;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 4 but showing the parts in a modified position, the construction of one of the parts also being modified in this particular figure;

Fig. 6 shows the unit of Fig. 1 associated with a base to provide an infant therapy unit;

Fig. 7 is a transverse sectional view through the entire device shown in Fig. 6,

Fig. 8 is a longitudinal sectional view showing still another arrangement for the treatment of infants, and

Fig. 9 is a fragmentary perspective view showing a modified structure of Fig. 1.

I shall first refer to Figs. 1 to 5, inclusive, disclosing an embodiment of the invention comprising a unit adapted for the treatment of adults, it being understood, however, that the size of the unit may vary without departing from the spirit and scope of the invention in any way.

The unit comprises an outer shell including end members 11 and 12 connected together by side rods 13 and 14 and tie rods 16 and 17, at least one of which comprises a pipe extending to the outside of the shell and adapted to be provided with suitable apertures for the introduction of oxygen. Extending around in the general form of a semicircular arc is a side member 18 which is preferably made of a single walled insulating material such as "Lucite" or other transparent plastic. A refrigerant container 19, preferably of polygonal (in a broad sense to mean more than two sided) cross section, and in the preferred embodiment of square cross section, is supported by a block 21 having a circular exterior and adapted to fit within the end member 11, the end member 11 including a relatively thick block or panel 22 which assists in affording a bearing surface for the supporting block 21. The construction and arrangement of parts is such that the supporting block 21, as well as the refrigerant container 19, may be rotated about a longitudinal axis. An axial supporting rod 23 projecting from the end of the container 19 engages in a journal 24 carried by the end member 12.

The container 19 preferably utilizes a solid refrigerant such as dry ice 26 which may be furnished to have a length substantially equal to that portion of the container effective to cause a reduction in the temperature of the tent atmosphere, and a cross section so as initially substantially to correspond to the cross sectional inner dimensions of the container. Radial fins 27 extend around three sides of the container 19 and end fins 28 are also provided substantially parallel with the unfinned side of the container. The unfinned side of the container preferably, also, is

provided with a layer of insulation 29, although the oxygen tent of my invention may be employed to advantage without this layer of insulation. A removable cover 31 is provided whereby to permit introduction of the refrigerant into the container 19. Below the container 19 I provide a drip pan member 32 below which is disposed a second pan member 33 in generally parallel relation thereto. The members 32 and 33 are secured to the end members 11 and 12 and comprise in effect a single drip pan, the space between them having the function, as will be pointed out, of preventing the possibility of moisture accumulating and dripping onto the patient. The pan 32 has at least one opening 34 to permit drainage to the upper concaved surface of the pan 33, and a pipe 36 extending through the end member 11 serves as a drain for the pan 33. It will be noted from an inspection of Figs. 2 and 4 that while the drip pan 33 is symmetrical in its position, the drip pan 32 is slightly higher on one side than the other. This provides an effect whereby the passageway indicated by the dotted line (*a*) is higher than the passageway indicated by the dotted line (*b*) with the result that intake and outlet positions are established and circulation of tent atmosphere will be in the direction indicated by the arrows in Fig. 2 through the generally annular space between the outer shell and refrigerant container.

The unit is adapted to be held by a support 37 in the manner indicated, this support preferably being arranged in such a way that the unit is carried directly over the head of a patient in the manner indicated in my copending application. A ridge 38 is formed entirely around the lower portion of the unit so that a canopy 39, preferably formed of a transparent material such as "Cellophane," "Pliofilm" or the like, may readily be supported from the unit. While the canopy 39 and transparent side member 18 are shown as comprising separate members, I have found that I may shape the canopy so as to entirely cover the top of the unit in which case a separate side member 18 is not necessarily employed. This manner of construction is referred to more fully later.

In Fig. 5, I show a modification wherein a drip pan 132, corresponding in shape and function to the drip pan 32, is supported by a pair of end members 135 (only one appearing in the drawing) said members 135 being pivoted to the end members 11 and 12 of the shell in the manner indicated in the drawing. Thus, the structure, as it involves the relation between the outer shell and the drip pan, may be controlled, and the movement of tent atmosphere over the dry ice container may, in part, be controlled.

The operation of the unit as hereinabove described is as follows:

The oxygen tent, including the unit and canopy, being properly assembled and placed over a patient, the container 19 is rotated to a position to cause the desired amount of circulation of tent atmosphere. When the container 19 is in the position shown in Figs. 1, 2 and 3, the minimum cooling effect is obtained because the dry ice 26 is resting upon the unfinned side of the container. The presence of the insulation 29 still further decreases the cooling effect, but it will be seen that even without the insulation 29, there is less cooling due to the fact that the side supporting the dry ice is not provided with fins. Figs. 4 and 5 indicate other positions of the container, in each of which the cooling action is greater than when the parts are in the position shown in Fig. 1. Generally speaking, I have found the maximum cooling action to occur when the container is in approximately the position shown in Fig. 5. Oxygen may, of course, be introduced from a suitable oxygen tank, using the structure provided for the purpose.

Continued use of the oxygen tent for a period of time causes a frosting of the container, particularly of the fins 27 and 28. Since the entire cooling unit may be removed, I have found that, in general, it is neither necessary nor desirable to defrost while the unit is in position over a patient. In the event any accumulated frost should melt, while the unit is over a patient, it is obvious that the liquid resulting from such melting will drain off through the drip pan assembly in an obvious manner and be discharged at the outer exposed end of the pipe 36. Due to the fact that the double spaced drip pan arrangement is employed, there will be no accumulation of moisture such as would cause dripping onto the patient whether because of defrosting or due to the accumulation of moisture which occurs as surfaces are cooled when the unit is first placed in operation.

As previously noted, the entire refrigerant container may be removed from the oxygen tent unit, and this arrangement is provided not only for the purpose of permitting defrosting exteriorly of the tent, but also to permit the utilization of the unit for infant therapy in the manner illustrated in Figures 6, 7 and 8.

As shown in Fig. 1, the oxygen tent unit is adapted to be placed on a base 41 comprising a compartment 42 with a cover 43 through which openings 44 are provided. A fluid carrying coil 46 is provided within the compartment 42 with inlet and outlet pipes 48 connected thereto. The base 41 is provided with spring clamps 49 so that the base may be releasably secured to the oxygen tent unit.

Within the unit itself, I place a cradle 51 having hinged side extensions 52, the cradle being provided with a supporting pin 53 insertable in the journal 24. An extension 51' of the cradle supports it at the opening which would normally receive the block 21, thus, the cradle may be supported in position by first folding the side extensions 52 inwardly, and after the cradle is in position lowering the side extensions to the positions indicated whereby to comprise parts of the cradle itself. The opening through which the cradle is introduced may be partially closed by any suitable means such as a curtain or sterile cloth.

Thus, I provide therapy apparatus for an infant which may comprise both an oxygen administering device as well as an incubator. The temperature may be controlled by any suitable instrument such as a thermostat of the bi-metallic strip type. Such instruments as are employed may be placed within the tent or exterior thereof, as desired. In general, since the device will be employed in a room where ordinary room temperatures will prevail, very desirable operating conditions are maintained if the temperature of the fluid entering the coil 46 is thermostatically controlled. The use of a transparent side wall 18 is obviously of very great advantage when the unit is employed for infant therapy in the manner described.

The oxygen tent unit may be converted to infant therapy apparatus of various types, depending upon what is wanted; and in Fig. 8, I indicate an arrangement wherein the unit comprises an infant respirator. The same base 41 may be em-

ployed as shown in Fig. 6. A cradle 56 is provided having an extension 57, the cradle and extension carrying ring members 58 and 59 between which a resilient apertured partition 61 is clamped. This permits the infant's body to be supported on the cradle 56 with its head on the extension 57 and the resilient partition 61 will substantially seal the compartment by extending around the infant's neck. A connection 62 is provided in the base to which a motor mechanism (not shown) may be connected for alternatively increasing and decreasing the pressure within the unit.

In Fig. 9 I show a construction wherein the side member of the shell comprises a portion 118 of the canopy itself. The structure otherwise may be the same as illustrated in Fig. 1, and I utilize in Fig. 9, the same numerals as employed in Fig. 1, with, however, the prefix one (1) before them.

My invention is subject to certain modifications within the scope of the claims as will be clear to those skilled in the art. The dry ice container is preferably square but it may take other shapes. There are two factors which determine the cooling effect, namely, the extent to which the dry ice or other refrigerant cools the portions of the container carrying the fins (relative contact with the unfinned portions, for example) and the extent to which the cooled fins are brought in contact with moving tent atmosphere. While I may construct the oxygen tent of my invention to utilize either or both principles, and, therefore, may employ various constructions, the simple arrangement of the drawings has been found in practice to be very satisfactory.

What I claim as new and desire to protect by Letters Patent of the United States is:

1. In an oxygen tent unit of the character described, an outer shell and a container for a solid refrigerant, said container having a cross section comprising a number of sides and being so supported within said shell as to be rotatable about its longitudinal axis, exterior fins on at least part of the sides of the container and at least one side being without fins, said shell and container being so constructed and arranged as to provide a generally annular circulation space with intake and outlet positions for tent atmosphere, the cooling effect of the refrigerant being controlled by the position of the said container.

2. In an oxygen tent unit of the character described, an outer shell, and a container for a solid refrigerant, said container being square in cross section, three sides having exteriorly projecting fins and one side being without fins, whereby the cooling effect of a solid refrigerant within the container is determined at least in part by the manner in which the same engages said sides, a heat insulator for said unfinned side, and means including an axial bearing for rotatably supporting said container to permit rotation of said container about its longitudinal axis.

DAVID J. COHN.