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(11)

EP 0 931 535 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.07.1999 Bulletin 1999/30

(51) Int Cl.⁶: **A61G 11/00**

(21) Application number: **99300534.7**

(22) Date of filing: **26.01.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **26.01.1998 US 13507**

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(54) Handhole for infant incubator

(57) A handhole (12) for an infant incubator is formed in an infant compartment for gaining access to an infant contained within the infant compartment. The handhole is of a particular configuration that is basically an isosceles triangle having a base edge generally par-

allel to the base of the infant compartment on which the infant is located. The triangular shape of the hand hole allows sufficient access to the infant yet minimizes the disruption to the controlled environment within the infant compartment when the attending personnel use the handhole to gain access to the infant.

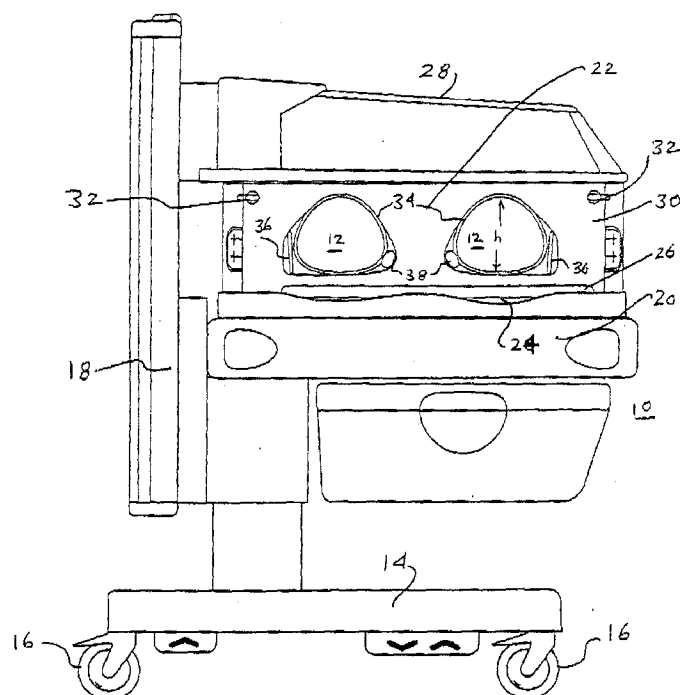


FIG. 1

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Description

Background

[0001] This invention relates to infant incubators and, more particularly, to handholes for gaining access to an infant positioned within the incubator.

[0002] Handholes are conventionally used with infant incubators and are basically openings in the side wall of an incubator and which are normally covered by a door that can be opened by hospital personnel so that the personnel can insert their hands into the incubator to attend to the needs of the infant. In general, there are various shapes of handholes currently used on incubators and many are of an oval configuration or similar thereto for gaining access to the infant. Since the environment within the infant compartment of the incubator is closely controlled with respect to temperature and humidity, the use of handholes allows personnel to attend to the infant with a minimum of disruption to the internal environment as opposed to the complete opening of the incubator hood.

[0003] As such, one of the requirements for the incubator handhole is that it be of a minimum area, that is, when the door is opened, it is desirable that the handhole area that is opened for access to the infant be as small as possible since that would result in the minimum effect on maintaining the controlled environment within the infant compartment. On the other hand, it is necessary for the handhole to be of sufficient size to allow the caregiver to carry out the necessary functions on the infant, such as changing the infant, moving the infant to various positions and the like.

[0004] One example of certain configurations of handholes is shown and described in U.S. Patent 4,788,965 where the access openings are elongated and where the various longitudinal axes of the openings form an upwardly facing obtuse angle.

Summary of the Invention

[0005] The handhole of the present invention thus provides a unique construction in which the configuration of the handhole is such that a minimum amount of area is opened in the incubator hood when the handhole door is opened and yet which affords ease of accessibility to the infant to carry out the needed functions on the infant. In particular, the handhole opening is of a triangular or gumdrop configuration and has a base edge that is approximately parallel to the base of the incubator on which the infant is positioned. The dimension of the base edge is such that there is sufficient lateral movement possible for the caregiver to move the arms horizontally to carry out the various operations on the infant when the infant is lying prone on the infant platform. Thus, for normal operations with the infant lying supine, there is a large dimension of the lower or base edge of the triangular opening that allows such movement in the

lateral direction.

[0006] At the upper portion of the triangular configuration of the opening, there is also a large height dimension generally vertically upward from the center of the base edge so that the user can make various movements in the front to back direction, or reaching forward into the incubator. Thus, the vertical height of the triangular configuration of the handhole opening allows a vertical reach into the incubator to attend to the infant in a near seated position within the infant compartment. The sides edges of are generally equal in length, thus making the overall opening configuration that of an isosceles triangle. The corners of the triangular opening are preferably rounded so as to give a gumdrop shaped configuration and to allow the arms of the attending personnel the full movement to each of the corners of the handhole opening configuration.

Brief Description of the Drawings

[0007]

FIG. 1 is a isometric view of an infant incubator having handhole openings configured in accordance with the present invention;

FIG 2 is an enlarged perspective view of the hood of an infant incubator showing the configuration of the opening of the handhole configured in accordance with the present invention.

Detailed Description of the Invention

[0008] Referring now to FIG. 1, there is shown an isometric view of an infant incubator 10 having handholes 12 constructed in accordance with the present invention. As used herein, the term handhole will mean the opening through which the user can gain access to the infant. In general, a door is present that covers the handhole when not in use and will normally be of the same configuration as the handhole itself. Basically the infant incubator 10 comprises a base 14 that may be mobile by means of wheels 16. The infant incubator 10 itself may be supported on a pedestal 18 that extends upwardly from the base 14 and the infant incubator 10 affixed to the pedestal 18 in a cantilever construction so that access to the infant incubator 10 can be readily gained from various locations. The infant incubator 10 includes an lower compartment 20 containing the various air conditioning apparatus needed to properly heat and humidify the air within the infant compartment 22 that overlies the lower compartment 20. A typical incubator that can be used with the present invention is shown and described in U.S. Patent 4,939,827 of Koch et al and the disclosure of which is incorporated by reference into the present specification.

[0009] As such, an infant is located within the infant compartment 22 and lies upon a generally planar sur-

face 24 that forms a plane underlying the infant. The planar surface forms the bottom of the infant compartment and 22 and may have a mattress 26 placed thereof for the comfort of the infant. The infant is thus contained within a controlled environment so as to properly enhance the survival and growth of the infant. A top hood 28 encloses the top of the infant compartment 22 and is movable with respect to the infant compartment 22, however, the infant compartment 22 may be of numerous configurations and may or may not have a top hood 28 that is movable. Access to the infant compartment 22 to insert and remove the infant may be afforded by a side door 30 held in the closed position in FIG. 1 by means of latches 32 that can be manipulated so as to open the side door 30 and which is hinged at the bottom of the side door 30 to allow opening and closing thereof.

[0010] As can be seen in FIG. 1, the handholes 12 are formed in the side door 30 and are covered by suitable handhole doors 34 that can be opened and closed to allow the attending personnel to insert his or her arms into the infant compartment 22 to attend to the infant. In many incubators, other sides may be fixed, that is, there is no openable door like the side door 30. As can be seen, the handhole 12 of the present invention may be located in any part of the infant incubator 10 where access is desired to the infant and may certainly be in surfaces at the front, back or sides, or even the top of the infant incubator.

[0011] The handhole doors 34 can be suitably hinged such as by the hinge 36 and may have latches 38 so that the door can be secured to close the handhole 12 or opened for access to the infant within the infant compartment 22.

[0012] Turning now to FIG. 2, there is shown an enlarged view of the opening configuration of a handhole 12 constructed in accordance with the present invention. As can be seen, the configuration of the handhole 12 is generally triangular having a lower or base edge 40 generally parallel to the planar surface 24 located within the infant compartment 22 on which the infant is positioned. Handhole 12 has two angled side edges 42 of equal length that meet at a vertical height h above the center of the base edge 40. In the preferred embodiment, the vertical height may be of about 6.0 inches (15cm) and the base edge 40 about 7.5 inches (19cm) in length.

[0013] As such, the overall configuration of the handhole 12 is described as an isosceles triangle having its base edge 40 generally parallel to the planar surface 24 on which the infant rests and with two equal side edges 42 forming the triangle.

[0014] As can further be seen in FIG. 2, in the preferred embodiment, the side edges 42 are slightly curved outwardly with respect to the triangle configuration and the corners, that is the meeting or apexes of the side edges 42 and the apexes with the side edges 42 and the base edge 40 are rounded so that the user can move an arm into such corners or apexes and move

the maximum distance without obstruction.

[0015] While the present invention has been set forth in terms of a specific embodiment, it will be understood that the present handhole configuration herein disclosed may be modified or altered by those skilled in the art to other configurations. Accordingly, the invention is to be broadly construed and limited only by the scope and spirit of the claims appended hereto.

Claims

1. An infant incubator having at least one handhole, said incubator comprising generally planar surface on which an infant is adapted to be located, a hood overlying said planar surface and enclosing therein a controlled atmosphere, said handhole having a generally triangular configuration having a base edge and side edges, said base edge being generally parallel to the plane of the planar surface, and having said side edges of about equal length converging at a predetermined height above said base edge.
2. An infant incubator as defined in Claim 1 wherein said side edges are slightly curved outwardly.
3. An infant incubator as defined in Claim 1 wherein said side edges and said base edge meet at apexes that are curved to accommodate the arm of a user.
4. An infant incubator as claimed in any one of claims 1 to 3, wherein the base edge is approximately 7.5 inches (19 cm) in length.
5. An infant incubator as claimed in any one of claims 1 to 4, wherein the said side edges converge at a predetermined height of approximately 6 inches (15cm) above the base edge.
6. An infant incubator as defined in Claim 1 wherein said infant incubator further comprises a handhole door covering said at least one handhole, said door being openable and closable with respect to said at least one handhole.
7. A hood for mounting atop an infant incubator, said hood having a top and sides forming an enclosed area for enclosing an infant resting on a planar surface, said hood having a handhole formed in at least one of said sides or in said top, said handhole having a base edge formed in said hood and adapted to be generally parallel to the planar surface, said handhole further having two side edges of about equal length to form an isosceles triangular configuration,

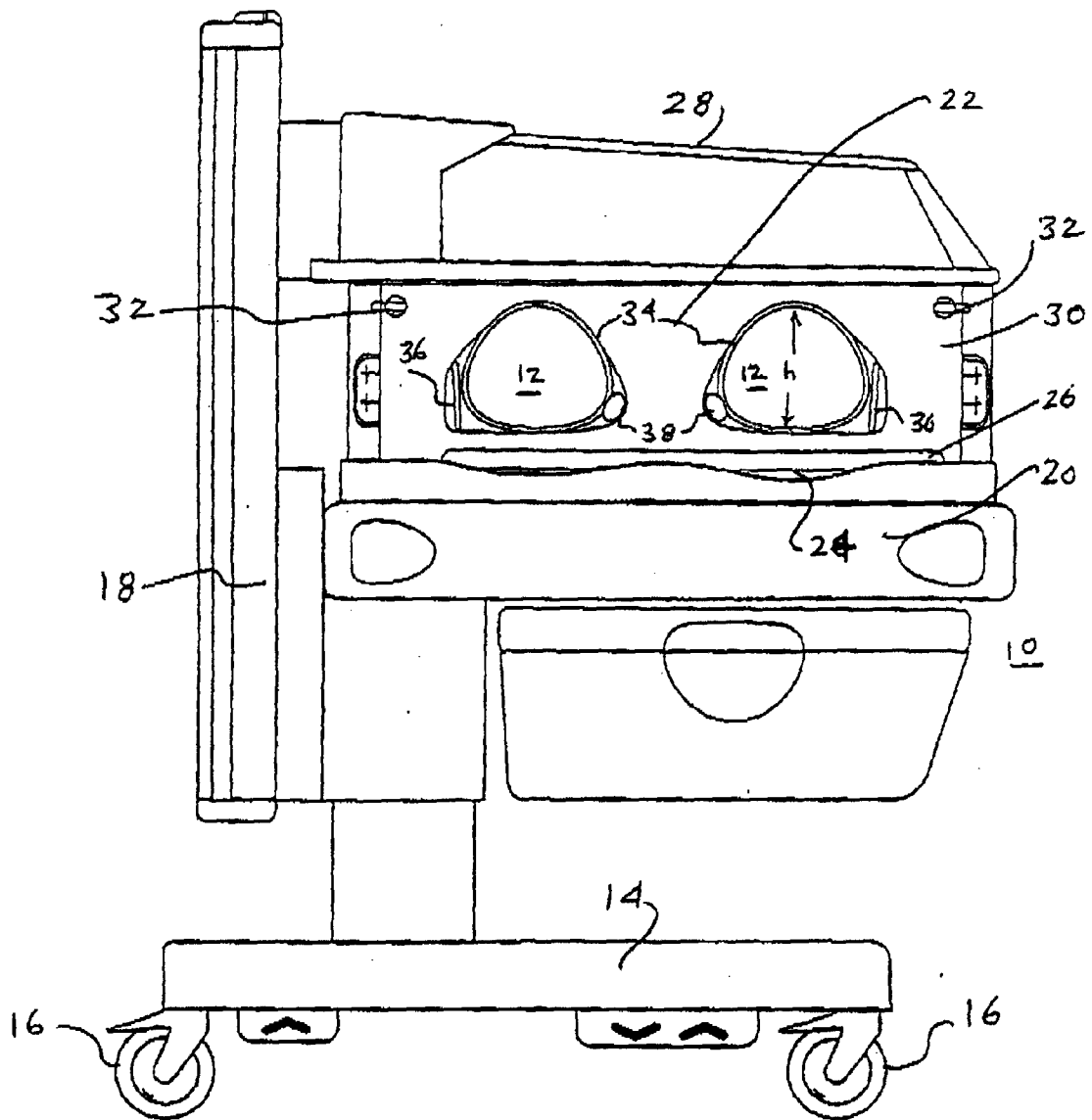


FIG. 1

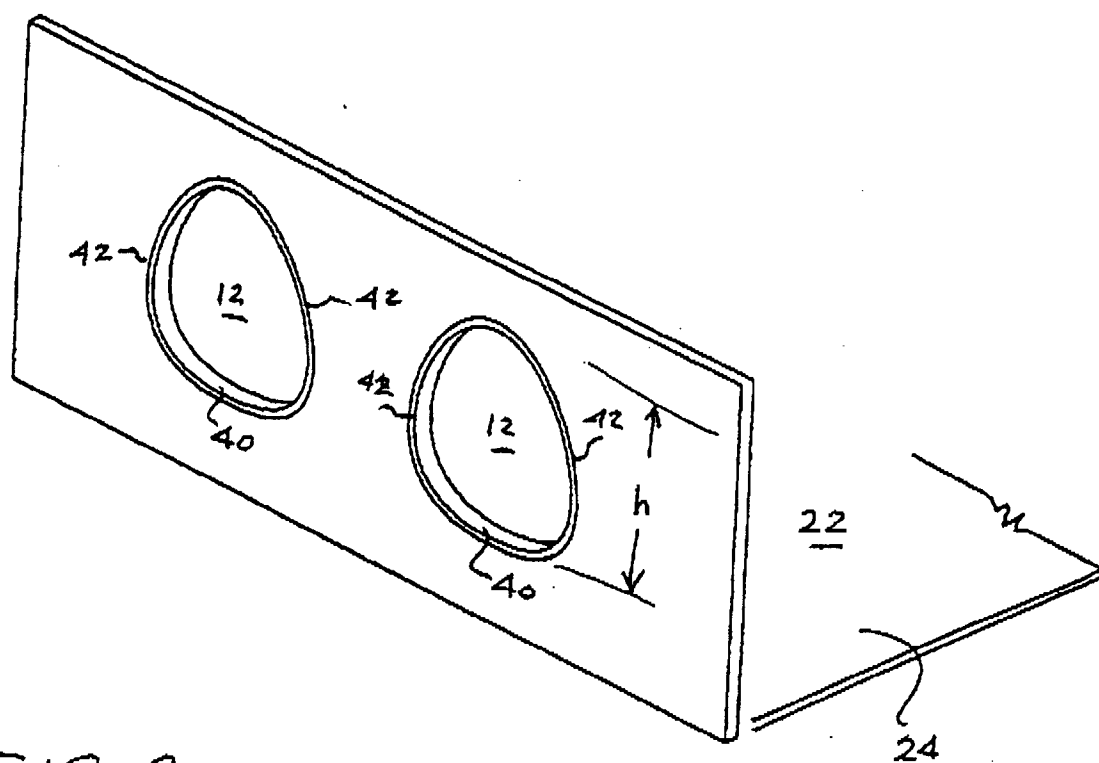


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 0534

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A,D	US 4 788 965 A (MILANI FRANCESCO ET AL) 6 December 1988 * abstract; figures 1,2 * -----	1,7	A61G11/00
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A61G B25J
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		9 April 1999	Godot, T
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 99 30 0534

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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09-04-1999

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US 4788965 A	06-12-1988	DE 3609147 C EP 0237941 A	23-04-1987 23-09-1987

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82