Jan. 18, 1955 L. R. CAMETO 2,699,775

OXYGEN TENT FOR HOSPITAL BED PATIENTS

Filed June 6, 1950

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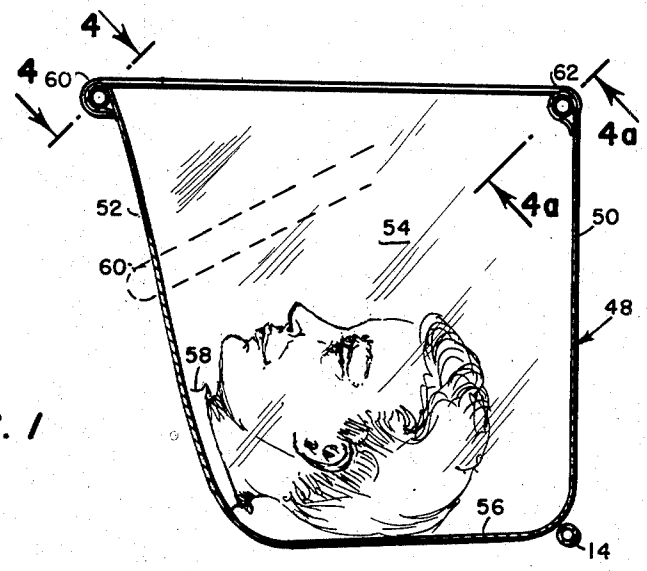



FIG. 1

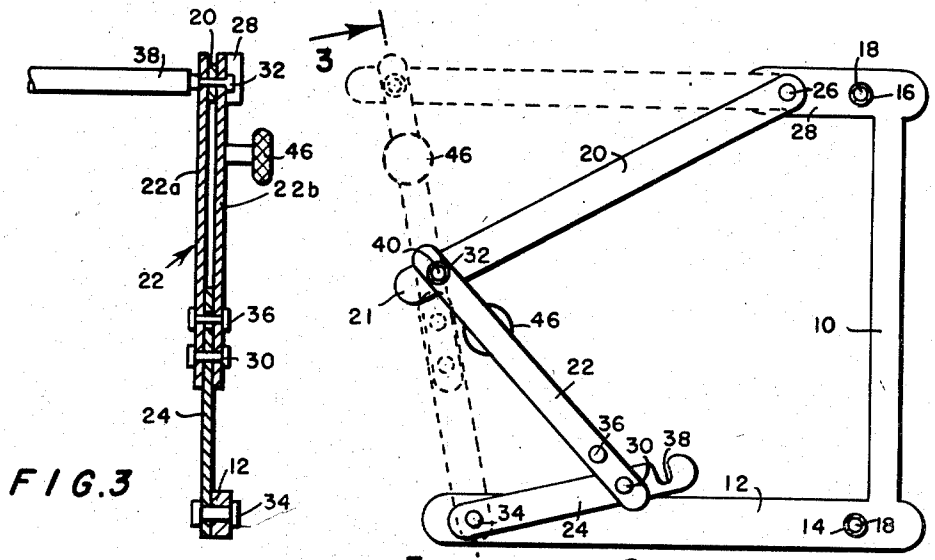



FIG. 3

FIG. 2

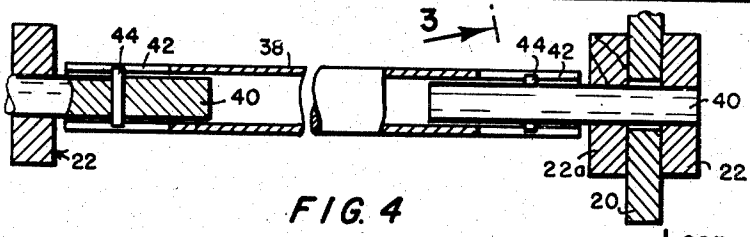



FIG. 4

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Jan. 18, 1955 L. R. CAMETO 2,699,775

OXYGEN TENT FOR HOSPITAL BED PATIENTS

Filed June 6, 1950

4 Sheets-Sheet 2

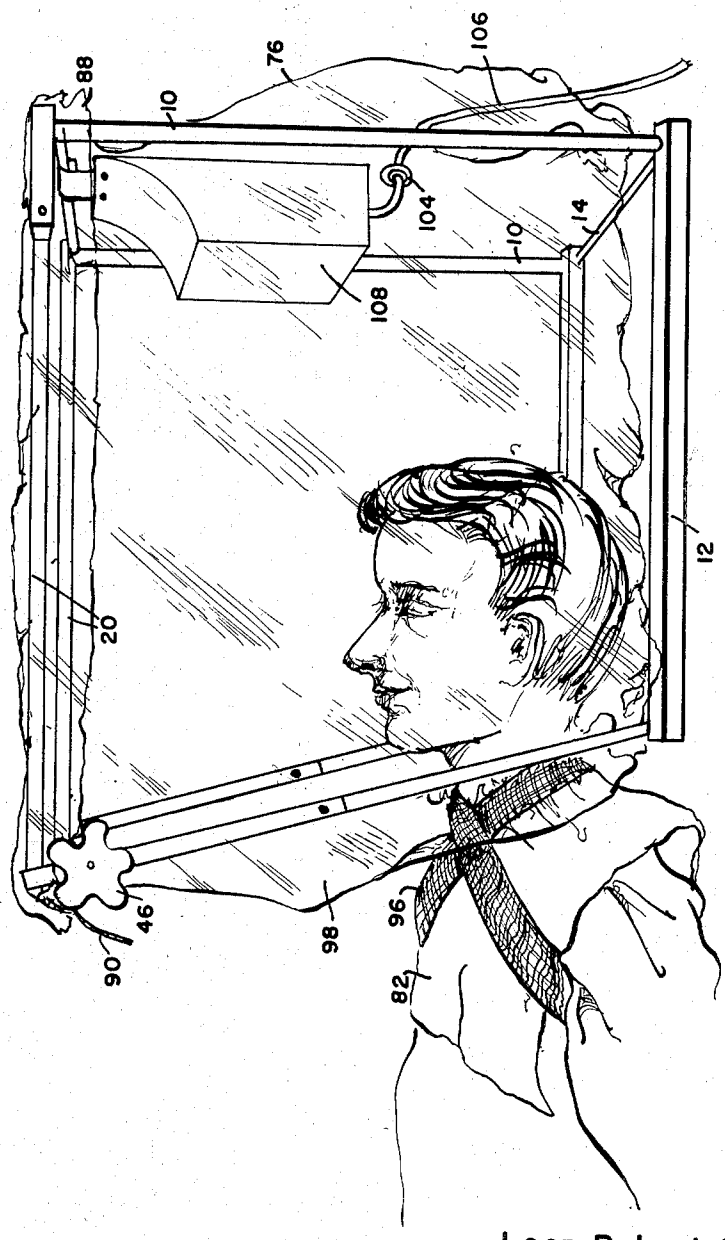



FIG. 5

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Jan. 18, 1955 L. R. CAMETO 2,699,775

OXYGEN TENT FOR HOSPITAL BED PATIENTS

Filed June 6, 1950

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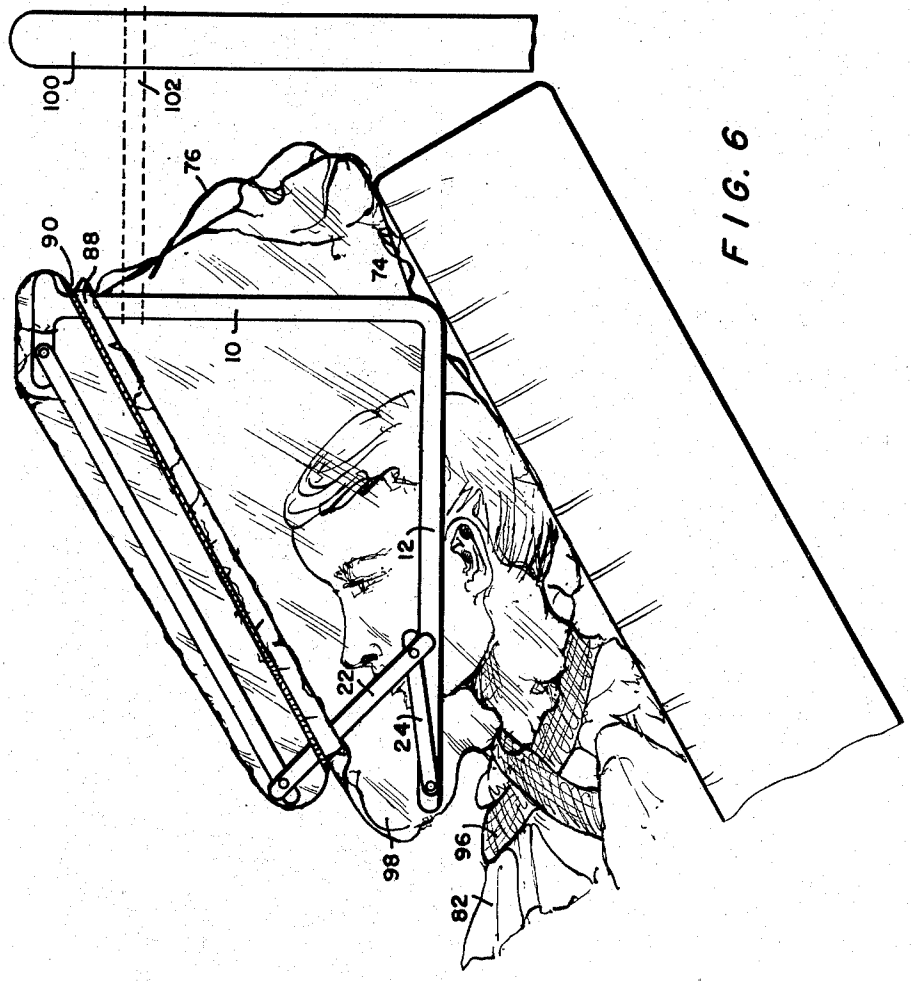



FIG. 6

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Jan. 18, 1955 L. R. CAMETO 2,699,775

OXYGEN TENT FOR HOSPITAL BED PATIENTS

Filed June 6, 1950

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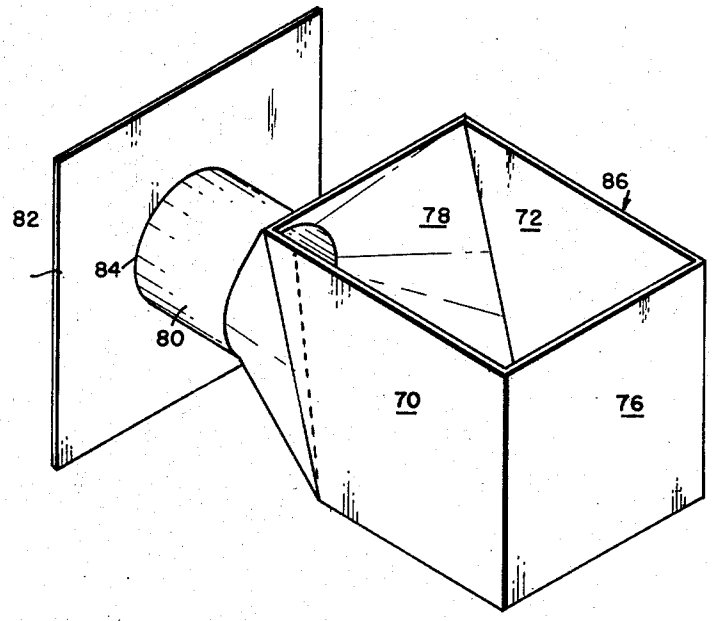



FIG. 10

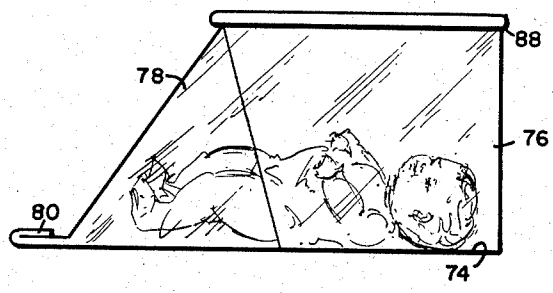



FIG. 7

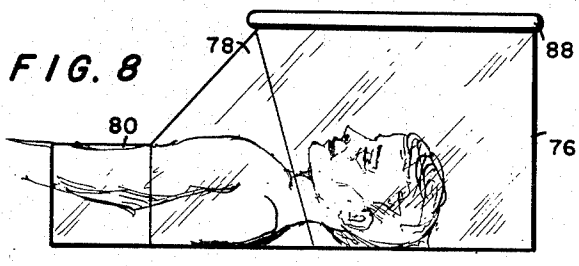



FIG. 8

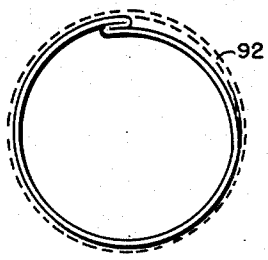



FIG. 8a

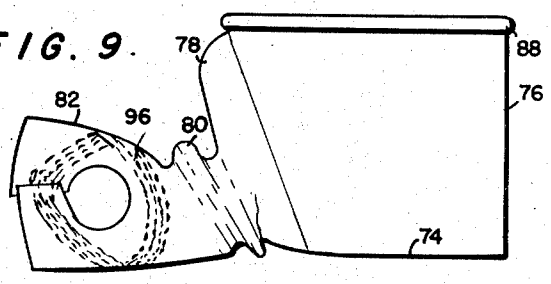



FIG. 9.

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United States Patent Office 2,699,775 Patented Jan. 18, 1955



2,699,775

# OXYGEN TENT FOR HOSPITAL BED PATIENTS

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Application June 6, 1950, Serial No. 166,361

15 Claims. (Cl. 128—191.1)

This invention relates to so-called oxygen tents used in hospitals and, more particularly to what may be termed the open type of tent which receives only the head, or the head and shoulders or more of the body less than the entire body in the present invention, in the oxygen confining space of the tent. Tents of this type are commonly secured to the head frame of the bed or to a suitable telescopic stand and the resultant position of the rim of the opening is at such a height above the floor upon which the bed is placed that attendants, including nurses, cannot readily reach the patient's head, for the purpose of attending to the needs of the patient for food, medicine, temperature taking, and the like.

It is one of the main objects of my invention to provide a tent of this character which can be partially collapsed so as to yield ready access to its interior, yet permit the maintenance of an adequate supply of oxygenized atmosphere for the patient for an indefinite period when collapsed or extended.

Tents of this general nature as heretofore used have been particularly awkward for the patient and attendant when the patient was placed with head, shoulders, and chest elevated in an inclined position. It is another of the objects of my invention to provide a tent which may be partially collapsed in such manner that the tent accommodates itself to the needs of the patient when so elevated.

The tent bags of this general nature as heretofore used for adults provide an opening for the passage of the head through the forward wall of the fabric bag and include a collar which closes about the throat of the patient to form a seal or a partial seal to prevent the escape of oxygen or excessive amounts of oxygen, through this opening. This type of seal produces discomfort to many patients, and often cannot be used with advantage.

It is another of the main objects of my invention to provide a tent which closes about the chest and shoulders of an adult patient, leaving a large free space for the throat within the throat passage and allowing for comfort of the patient whether inclined or horizontal, and allowing the patient to lie on his side without injury to the tent or discomfort to himself.

It is another object of my invention to provide a tent which can be readily accommodated to the varying sizes of patients, including infants, children, and adults, and which, in all cases occupies a minimum of space consistent with the need for effective treatment.

Other objects and advantages will be apparent from the following specification wherein reference is made to the accompanying drawing, in which:

Fig. 1 is a section through a tent;

Fig. 2 is a side elevation of a tent frame;

Fig. 3 is a fragmentary section at plane 3—3 of Fig. 2;

Fig. 4 shows, on a corresponding plane of Fig. 1, a detail, and a similar detail taken at plane 4*a*—4*a* of Fig. 1;

Figs. 5 and 6 illustrate the use of the tent by and for an adult patient, in the horizontal and inclined positions;

Fig. 7 illustrates the use of the tent by and for an infant patient;

Fig. 8 illustrates the use of the tent by and for a junior patient;

Fig. 8*a* illustrates a method of closure employed in Fig. 8;

Fig. 9 illustrates in more detail the shape of the tent proper as employed in Fig. 5; and

Fig. 10 illustrates the manner, and construction, of the fabric portion of the tent.



The tent frame comprises two side assemblies as shown in Fig. 2. Each side assembly includes a rigid frame part formed by a rigid column **10**, which is placed upright adjacent the head of a bed frame, and including a sill member **12** rigidly secured to column **10** at approximately right angles thereto for resting on the bed in a position projecting from the head toward the foot of the bed.

The two rigid frame parts are secured together in parallel spaced relation, so as to provide a space for the patient between them, by two hollow tubes **14** and **16** which snugly receive in the ends thereof pins **18** which project perpendicularly from the rigid frame parts in the manner of the illustration in Fig. 4, the pins **18** in Fig. 2 corresponding to the pins **40** in Fig. 4, and extending into the tubes **14** and **16** in the same manner as the pins **40** extend into tube **38** in Fig. 4.

The balance of each of the frame side assemblies is formed by three articulated links **20**, **22**, and **24**. The link **20** forms an arm pivoted to the upper end of the rigid frame part as at **26** upon a forwardly projecting beam **28** in a manner to provide for its movement in a single vertical plane. The links **22** and **24** form a leg having a pivotal knee joint at **30** and are respectively pivoted at their other ends to the free end of the arm **20** at **32** and to the free end of sill **12** at **34**. The lower leg forming link **24** is constrained to rotate in a vertical plane by its pivot **34** and pivots **30** and **32** provide for maintaining movements of link **22** in approximately a vertical plane.

The link **22** may be formed of two parallel pieces **22***a* and **22***b* which receive the link **24** therebetween, and the three are held together at the knee pivot **30** by a suitable rivet or bolt. A stop pin **36** is secured to the upper leg link **22** in the path of the portion **38** extending from lower leg link **24**.

Upon straightening the leg, the parts take an erect approximately straight line position as shown dotted in Fig. 2, being so supported by the pin **36** engaging stop **38** with the arm **20** in approximately horizontal position. In the fully bent position of the knee, the knee is disposed toward the head of the bed; that is, between pivot **34** and the column **10**. The forward end of arm **20** is positioned at a point about mid-way between the fully erect tent rim and the bottom of the tent by the stoppage of the knee on the sill **12**. Thus the forward end **21** of arm **20** is clear above the patient.

The forward ends of the arms **20** of the two side assemblies are separably joined together, and to enforce their joint simultaneous movement, by a tube **38** about equal in length to tubes **14** and **16**. Pins **40** are rigidly secured to arms **22** in alignment with each other. The ends of tube **38** are provided with slots **42** in which pins **44** secured in pins **40** slide and prevent relative rotation of arms **20** about coaxial pivots **26**. As shown, pins **40** also form the pivot at **32**.

Each leg **22** has a crank handle in the form of a knob **46** rigidly secured thereto with its axis parallel to the leg pivots. By grasping this knob firmly and exerting a torsional force on it, the necessary movement of the two sets of linkages is effected. Since the tube **38** transmits the motion of either link **22** to the other link **22**, both arms **20** move down simultaneously whichever knob **46** is twisted upon.

The tent shown in Fig. 1 includes a bag portion **48** formed of suitable gas impervious fabric to provide a back wall **50**, front wall **52**, two side walls **54** and the bottom **56**. An opening and sealing collar are provided at **58** so that only the head of the patient is contained in the tent. The bag **48** may include suitable loops or tubular beads **60** at the rim of the front and back walls through which the respective tubes **38** and **16** may be threaded prior to the assembly of the frames thereto. By this construction the bags may be removed for sterilization, and storage or replacement.

The form of the bag portion of the tent illustrated in Fig. 1 represents that of previously known types as respects the neck opening at **58**. In such types the collar **58** is formed to close about the patient's throat and includes a tubular portion designed for this purpose. The purpose of this closure is to prevent the escape of the oxygenized atmosphere through the neck opening. To

this end the collar **58** is designed for close contact with the throat of the patient. Because this contact is oftentimes undesirable I have altered the tent bag in this respect and for other purposes to the general pattern shown in Fig. 10 for the uses illustrated in Figs. 5 through 9.

The tent bag of Figs. 5 through 10 has been successfully fabricated almost entirely from a transparent elastomeric compound in sheet form known as vinyl chloride-acetate copolymer. Transparency is desirable for visibility of the patient by attendance at a distance. This material is heat vulcanizable, or weldable by high frequency electrostatic fields, is tough, only slightly elastic and therefore readily deforms somewhat from any natural shape which it tends to resume after release of all distortional forces acting normal to the sheet planes. The design for fabrication is illustrated by the isometric view in Fig. 10 which shows the trapezoidal side walls **70** and **72** joined by a rectangular bottom panel **74** (Fig. 9) and back wall **76**. A front wall **78** is formed by a convergent funnel joined to the edges of walls **70**, **72**, and bottom **74**, and to a tubular, preferably cylindrical, portion **80**. The bottom element of the portion **80**, if a cylinder, is preferably positioned in the plane of the bottom **74**, with the corresponding elements of the funnel are also so placed, as seen in Fig. 8. The cylindrical portion **80** is found to be satisfactory when made about thirty-two inches in circumference or about ten inches in diameter and about eight inches long.

The tent bag, being designed for use for adults, as well as for infants and youths, has attached to the other end of cylinder **80** a cape forming panel **82** shown rectangular. The central portion of the panel **82**, within the circular bond of it with cylinder **80** at **84**, is omitted to provide the opening through which the head and neck of an adult may pass.

In order to quickly and easily attach the bag, somewhat adjustably, to the four members forming the top rim of the frame the upper rim **86** of the bag is hemmed to form an encircling tube **88** for the threading therethrough of a suitable closed elastic band or drawstring **90**. The bag rim **86** is inserted within the frame from below bar **38** and upwardly inside the top frame members and the bag rim, with the adjoining part of the bag, is drawn outwardly over the top of and downwardly on the outside of the frame members thus forming of the bag and rim an open channel entirely covering the frame parts above the bag rim with the fabric of the bag as is most clearly illustrated in Fig. 6. This leaves the bag entirely open at the top through the loop formed by the frame.

As shown in Fig. 7, the tent bag portion is folded upon itself and clamped at **80**, as by ordinary clothes pins, thus forming a bag open only at the top, for receiving the entire body of an infant within it.

As shown in Fig. 8, the tubular portion **80** is received about the abdomen of a youth, being folded longitudinally, as shown by the radial section of Fig. 8*a*, to form a seal with the body, retained by a suitable wrapper **92**. It will be understood that the effectiveness of the seal is largely due to the length of the portion **80**, since there is ample opportunity for a continuous contact with the body around this portion in the length of about eight inches. A film of body moisture accumulates here to complete the seal. From the patient's point of view, the sealing at the abdomen is usually an advantage since the respiration is affected in no substantial degree and irritation is minimized. The panel **82** is not employed in either of the Fig. 7 and Fig. 8 uses, though it will usually be present and forms no means of substantial discomfort to the patient.

In Fig. 9 the bag of Fig. 10 is shown as reformed to accommodate itself to an adult patient. The two portions of cape **82** drape the chest and back and are tucked in overlapping relationship against the body beneath the arms. A suitable strap **96** is drawn over the shoulders across the chest and back and over the folds. This forms an effective seal with the body over the shoulders and at the high portion of the chest and below the throat, where no substantial restriction of respiration can occur. The portion **80** of the bag forms a very loose collar about the neck, folding to accommodate itself to the patient's neck without substantial resistance.

It will be appreciated that the patient, in Figs. 5, 8 and 9 may be moved toward the back **76** of the tent bag so as to leave the face relatively free of immediate contact with, or in proximity to, the portion **78**. However, the panels are made substantially larger in area than the corresponding frame areas so that the bag will be full, allow considerable movement, and also permit a substantial bulge to remain as at **98** in Figs. 5 and 6.

In Figs. 1, 5, and 6, it will be seen that the frame columns **10** are rigidly secured, as to the bed frame **100**, by a suitable bracket **102**.

It will be evident from Fig. 6 that, although the patient's head has dropped below the frame sills **12**, the bottom **74** of the bag has been allowed to follow the bedding by allowing partial collapse of the frame edge. This same adjustment has permitted bulging of the bag in front of the patient's face.

As shown in Fig. 5, the panel **76** has been provided with a small hole **104** with a reenforced edge, through which a drainage tube **106** from an ice cooler **108** is passed. Usually an oxygen delivery device, such as that described in my copending application filed of even date herewith, is placed with the patient in the tent.

I claim:

1. A tent for administering respiratory treatment to a patient comprising a bag having a bottom and side walls, a back wall, an open top, and a front wall, said front wall having a funnel portion part of which is disposed for extension of the bottom, a tubular portion, said funnel portion terminating in jointure with the tubular portion, a cape portion fixed to the tubular portion, a frame providing a generally rectangular rim for the reception of the bag top therewithin to be surrounded thereby, said bag including means for engaging the frame rim to hold the bag in open condition, said frame further including a rigid portion for fixedly positioning the rim of the back wall of the bag and further including means for causing the front and side walls of the bag to be lowered and elevated with respect to the back wall of the bag.

2. In a tent for receiving at least the head portion of the body of a patient in medical treatment, a bag having a bottom and side walls and a rim portion surrounding a top opening of the bag, and means for supporting said bag in either of two positions including a fully suspended position with the bag rim about horizontal and in a partially collapsed position with a portion of the bag rim gravitally below the remaining portions of the rim.

3. A tent for receiving at least the head portion of the body of a patient undergoing medical treatment, said tent comprising a bag like member of sheet material which is impervious to gas and which member provides an open top, said tent being collapsible at the top and including frame means engaging the member at the top and adapted for lowering part of the top of the member at the opening, and means for positioning the lowered portion of the member in the lowered position.

4. A tent for receiving a patient in medical treatment comprising a frame and a bag portion, said frame portion including a hinged section having a bag rim engaging portion adapted for supporting the rim of the bag in a generally horizontal and bag open position or for supporting the bag with a portion of the bag rim lowered below the remainder of the rim with the bag open and with bag walls gravitally suspended from the bag rim, to form an opening surrounded by the bag rim; said bag portion being formed of continuously flexible sheet material of gas impervious quality.

5. A tent for receiving a patient in medical treatment comprising, in combination: a frame portion and a bag portion, said frame portion including a loop secured to said bag at the bag rim of the open end of the bag and being arranged to support the bag walls in positions gravitally suspended from the bag rim to form a top opening in the bag corresponding to the loop surrounded by the bag rim; said frame further including means for dropping a portion of the loop and the bag rim to, and to support them in, a position gravitally below the remainder of the rim between the bottom of the bag and the remainder of the rim.

6. A tent, for administering medication to a patient, forming a bag, said bag having a main portion with an open top and side walls and with a tubular portion joined at one end to one of the side walls and having a cape portion joined to the other end of the tubular portion.

7. A tent for administering respiratory treatment to

a patient comprising a bag having an opening and formed of gas impervious flexible sheet material having a bottom and continuous side walls including a funnel portion terminating in a tubular portion terminating in a cape portion, a frame having hinged arms for engaging the bag at the open end thereof, said frame including pairs of links joined to said arms for supporting the arms in either one of two positions.

8. A medication tent frame comprising two rigid side assemblies; each side assembly comprising a straight column having a straight sill secured at a right angle to the column at one end of the column and a straight beam secured perpendicularly to the column at the other end of the column with the sill and beam extending in the same plane from the column; means secured to the side assemblies at the ends of the columns providing rigid straight rod members joining the side assemblies with their planes in rigid parallel relation perpendicular to a common plane including the axes of the columns and with the sills and beams in juxtaposed relation; the beams being shorter than the sills; two like arms pivoted at one end on the beams and positionable in extension of the beams to extend a free end of the arms a substantial distance from the columns so that the ends of the arms adjoin the ends of the sills as respects their distances from the plane of the columns; two legs, each leg comprising a pair of links having knee joints, each link of each leg being pivoted respectively to the free end of the arm and to the free end of the sill, and the legs being constructed to assume knees-bent positions adjacent to the sill between the sill ends.

9. A construction as in claim 8, and means joining the ends of the arms to pivot together as a unit about their beam ends.

10. A medication tent frame comprising two rigid side assemblies; each assembly comprising a column having a sill secured at a right angle to the column at one end of the column and a straight beam secured perpendicular to the column at the other end of the column with the sill and the beam extending in the same plane from the column; means secured to the side assemblies adjoining the columns joining the side assemblies with their planes in parallel relation about perpendicular to the common plane of the columns and with the sills and beams in juxtaposed relation; the beams being shorter than the sills; two like arms pivoted at one end on the beams and positionable in extension of the beam to extend a free end of the arm a substantial distance from the column so that the ends of the arms adjoin the ends of the sills as respects their distances from the plane of the columns; two legs, each leg comprising a pair of links having knee joints, each link of each leg being pivoted respectively to the free end of the arm and to the free end of the sill, and the legs being constructed to assume knees-bent positions adjacent to the sill between the sill ends.

11. A construction as in claim 10, and means including a handle secured to the legs for causing the legs to bend the knees toward the columns.

12. A medication tent comprising, in combination: a rigid frame member providing a loop to be disposed in a horizontal position; and having a hinged loop portion for shifting to a position below horizontal position; a highly flexible bag-like member having an open top end providing a highly flexible rim having a rim length substantially greater than the length of the loop formed by the frame member; the flexibility of the bag permitting the passage of the open end of the bag from beneath the loop through the loop and the folding of the bag rim over the outside of the loop for attachment thereto and support thereby.

13. A tent for a medical patient including a bag portion entirely of continuously flexible sheet material having an open top, and a portion extending from a wall at the bag bottom constructed and arranged to pass a portion of the patient's body therethrough, said portion being adapted to fold upon itself and to form a closure of such passage upon itself by such folding; and a frame having a rigid loop attached to the rim of the open top of the bag portion, said frame including a portion hinged to the remainder; and means for changing the position of said portion and the position of the bag top supported thereby.

14. A tent for a medical bed patient including a bag portion having an open top, and a flexible tubular portion extending from a wall of the bag and providing a passage from the outside to the inside of the bag for passing a portion of the body of a patient therethrough, the tubular portion being of continuously thin flexible sheet material for folding upon itself and to afford maximum opportunity for a continuous contacting relation with the body of the patient over a large area; a frame having a loop portion; and means for attaching the entire rim of the open end of said bag portion to the loop portion for support of the bag rim thereby; the frame including a hinged portion whereby the portion of the bag rim supported by the hinged portion may be shifted thereby.

15. A tent for a patient including a bag formed entirely of thin, tough, flexible, vulcanizable transparent material providing for expansion into a large cavity portion, and providing an open-ended sleeve-like portion extending from the large cavity portion for receiving the abdomen and/or chest of a patient therein and the sleeve-like portion being capable of being folded around the abdomen and/or chest to contacting relation of the material with the body entirely around the patient; a frame having a loop portion including a part hinged to the remainder of the loop, and means for attaching the rim of the open end of said bag portion to the loop portion.

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