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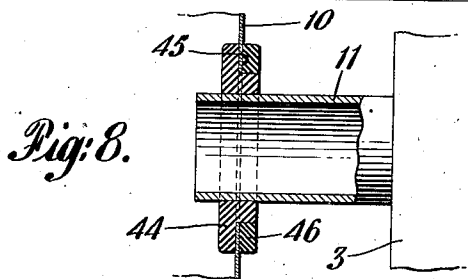
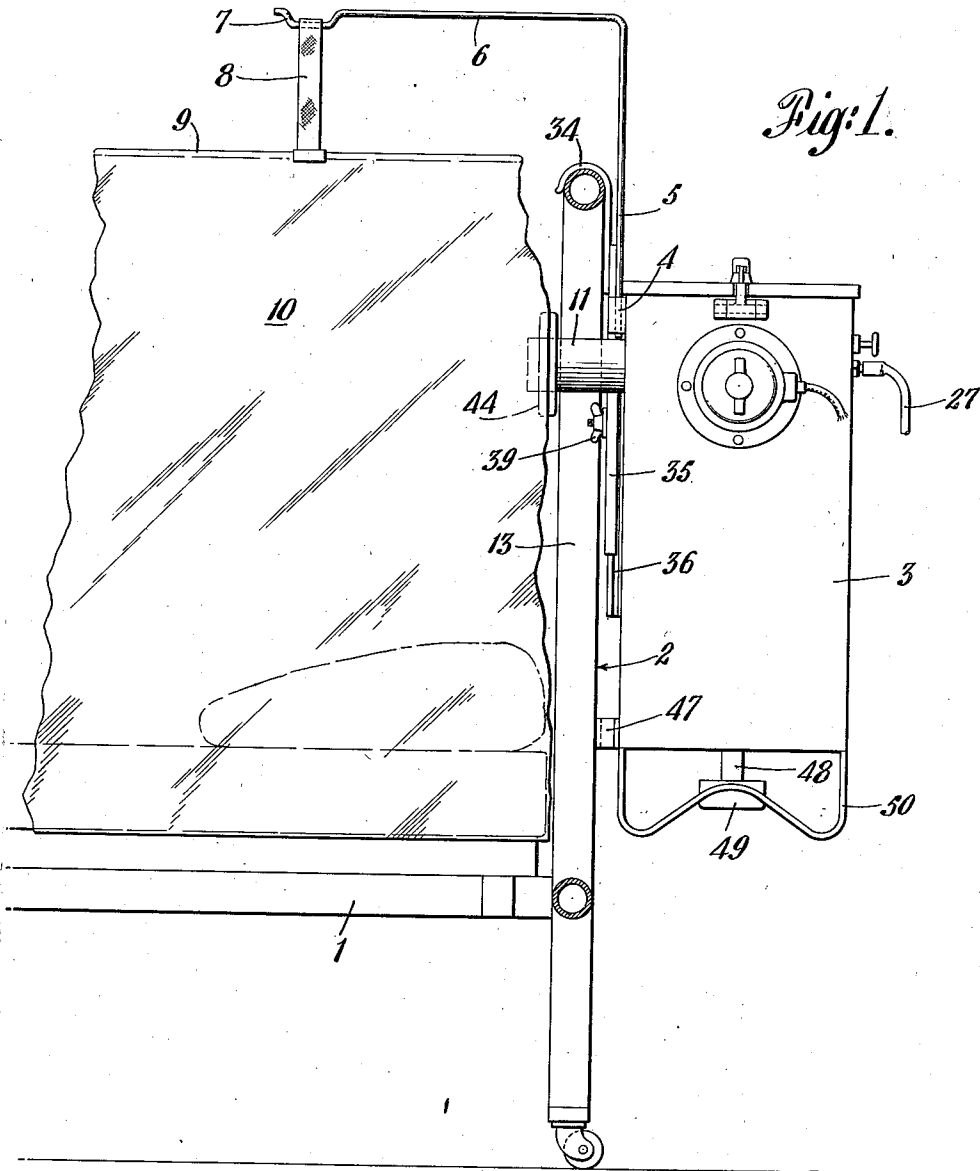
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GAS THERAPY APPARATUS

Filed Feb. 19, 1938

3 Sheets-Sheet 1



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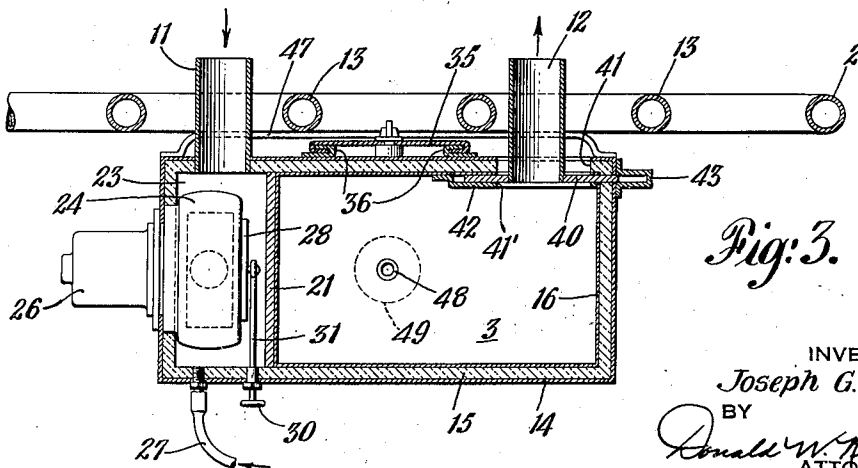
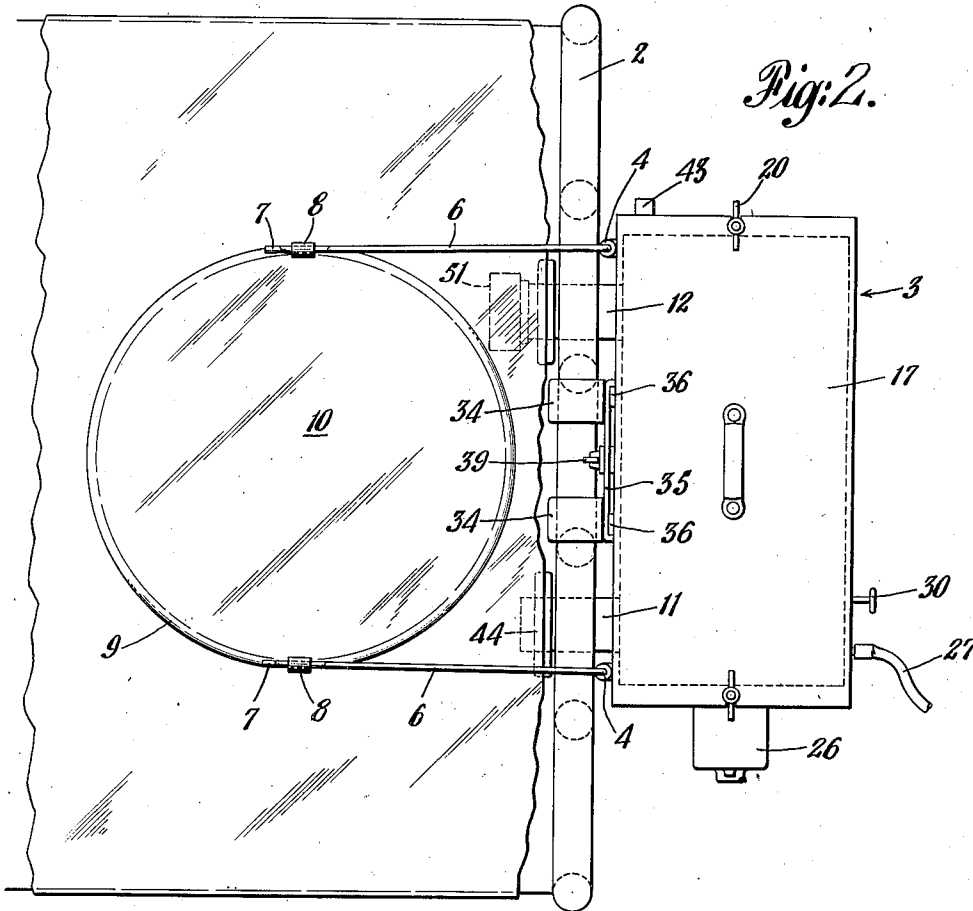
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3 Sheets-Sheet 2



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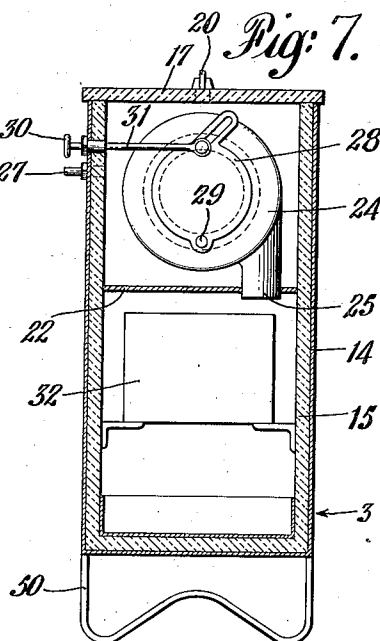
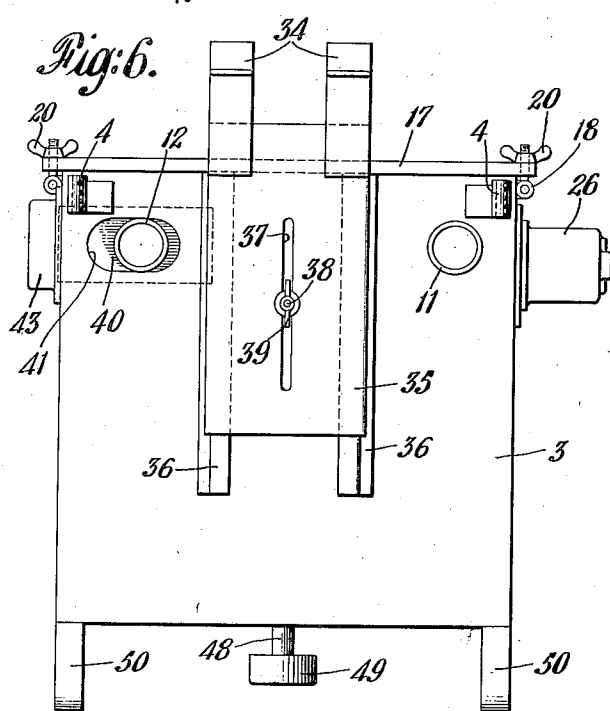
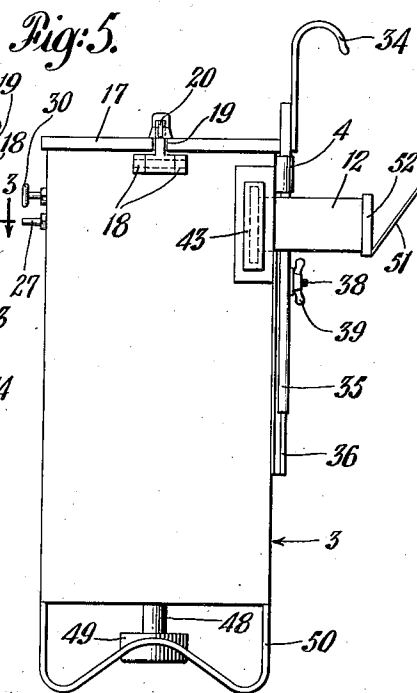
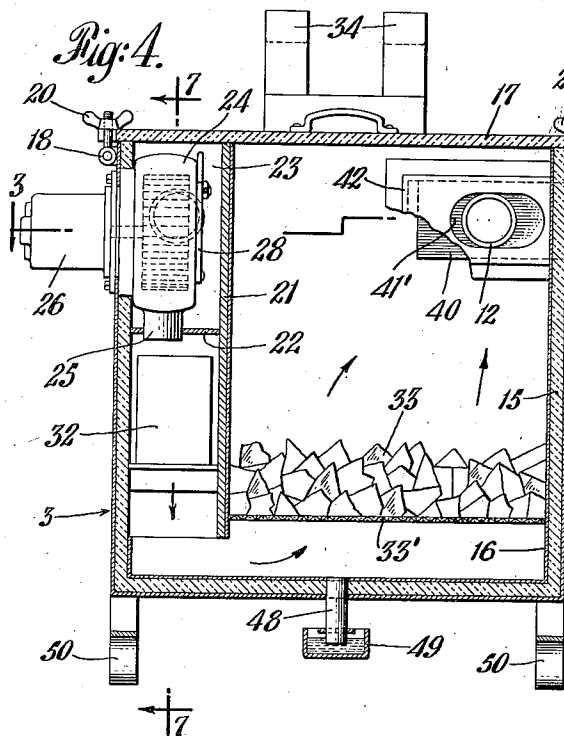
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GAS THERAPY APPARATUS

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3 Sheets-Sheet 3



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GAS THERAPY APPARATUS

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Application February 19, 1938, Serial No. 191,355

2 Claims. (Cl. 128—191)

The invention relates to apparatus for gas therapy, and more particularly to portable gas therapy apparatus comprising a mixing chamber and tent.

5 Many forms of apparatus have been devised for the utilization of the therapeutic value of oxygen and other gases. In some cases the patient is placed in a separate room provided with gas conditioning apparatus. A type of gas therapy equipment which has found considerable favor comprises a portable tent or canopy which is adapted to be supported over a hospital bed or cot and in connection with which there is employed a mixing chamber arranged in communication with 10 a source of gas supply. The gas supply commonly is drawn from high pressure containers, such as the well known oxygen cylinders. Equipment of this type, which is rolled into the room on a carriage and placed beside the bed, takes up considerable room and, being in constant view, is rather objectionable, particularly in the treatment of children, who are sometimes frightened by the formidable appearance of the equipment with which they are surrounded. Equipment of this 20 sort is, moreover, expensive to manufacture and maintain. It is an object of my invention to provide improved gas therapy apparatus which is more readily portable than previously known apparatus, and which is arranged to be supported by the head frame of a bed in such a position to take up very little room and so that the mixing chamber will be entirely out of view of the patient as well as out of the way of the nurse.

A further object of my invention is to provide 35 apparatus of this character comprising a mixing chamber which is adapted to be supported beyond the head of a bed and by the head frame of the bed, together with means for supporting a tent over the bed and for delivering the gas mixture to the tent at a point beyond the angle of vision of the patient.

A more specific object is to provide an apparatus of this character comprising a mixing chamber and tent adapted to be supported directly 45 upon the head frame of a bed together with means for uniting the tent and mixing chamber in a closed system for the circulation of gas mixtures.

A further specific object is to provide a portable gas mixing apparatus with which are associated conduits arranged to project through the head frame of a bed below the top of the frame.

A further object of my invention is to provide gas therapy apparatus which is simpler in construction than those heretofore known, and which 55

is particularly adapted to be transported for use in private dwellings. Other objects and advantages will appear as the description proceeds.

In the drawings, which illustrate a preferred embodiment of the invention:

Fig. 1 is a side elevational view showing my improved mixing chamber and tent supported in operative relationship from the head of a conventional type of bed.

Fig. 2 is a top plan view of the apparatus shown in Fig. 1.

Fig. 3 is a horizontal sectional view through the mixing chamber taken as indicated at 3—3 in Fig. 4, and includes also a portion of the head frame structure of the bed in horizontal section.

Fig. 4 is a vertical sectional view of the mixing chamber; Fig. 5 is a side elevational view of the mixing chamber (opposite to Fig. 1); Fig. 6 is a rear elevational view of the mixing chamber; and Fig. 7 a vertical sectional view on the line 7—7 of Fig. 4.

Fig. 8 is a longitudinal sectional view showing the detachable connection between the tent and one of the conduits associated with the mixing chamber.

Referring to Figs. 1 and 2, there is shown a bed 1 having a head end frame 2. Supported on the end frame, in a manner to be described later, is a gas mixing chamber 3. Secured to the mixing chamber 3, in some convenient manner as by means of sockets 4, are a pair of tent-supporting brackets 5 which have horizontally extending arms 6 projecting over the top of the head frame 2. The ends of the horizontal arms 6 may conveniently terminate in hook portions 7 adapted to receive hanger straps 8 to the lower ends of which is secured a canopy hoop 9. The canopy or tent 10 is supported on the hoop 9 and preferably is made of transparent material, such as "Pliofilm." The material of the tent 10 extends across the top of the hoop 9 and downwardly on all sides thereof, and is arranged so that its lower ends may be tucked in under the mattress or bed coverings to prevent the escape of conditioned air.

A pair of conduits 11, 12 of tubular form are arranged to extend between the mixing chamber 3 and tent 10 to provide a closed system for the circulation of air and gas mixtures. As will be seen in Fig. 3, the conduits 11 and 12 project through openings in the end frame 2 such as provided between the rungs 13 in the type of bed illustrated. The manner of adjusting the conduit 12 in order to accommodate the apparatus 55

to end frames having variously spaced openings will subsequently be described more in detail.

I shall now describe my preferred mixing chamber construction with reference to Figs. 3 to 7 inclusive. This embodiment is particularly well adapted for use in oxygen therapy, although it should be understood that the principal features of my invention are applicable for use in treatment with other gases. The chamber may be of box-like form as shown, having an outer metal shell 14 with a heat insulating lining 15 of composition board. If desired, a metal lining 16 may be provided on the inside of the body of the chamber. It will be understood that other forms of insulated construction may be employed as may be desired. A cover 17 is secured in place at the top of the chamber or in any convenient manner. For this purpose I have shown bolts pivotally mounted in lugs 18 at the upper ends of the walls of the chamber so as to be adapted to swing into slots 19 (Fig. 5) in the ends of the cover 17. Wing nuts 20 cooperate with these pivotally mounted bolts for fastening the cover 17 in position. If desired, a sealing gasket may be employed to insure a gas-tight connection between the cover and chamber. In the arrangement shown, the conduit 11 provides an intake port for conducting gas from the tent 10 into the chamber 3, and the conduit 12 provides an outlet port for conducting oxygen-rich gas from the chamber 3 to the tent.

A baffle 21 extends across the chamber 3 adjacent the inlet conduit 11 but terminates short of the bottom of the chamber to permit passage of gas underneath the baffle. A partition 22 closes off the upper end of the passage formed by the baffle 21 to form a mixing chamber 23. A blower 24, which may be of the squirrel cage type, is mounted on the chamber 23 with its discharge nozzle 25 extending through an aperture in the partition 22. The blower 24 is driven by a motor 26 which may conveniently be located outside of the chamber. An inlet tube 27 is arranged in communication with mixing chamber 23 for the introduction of oxygen, helium or other gas or gas mixtures possessing therapeutic properties. The inlet to the blower 24 is controlled by a damper 28, or other equivalent means may be provided to control the rate of flow of the gas mixture into blower 24. The damper 28 provides a convenient means for effecting this control, and may consist of a disc pivoted to the housing of the blower 24, as at 29. A control button 30 on the outside of the chamber is connected to a push rod 31 pivotally and slidably secured to the damper 28.

The blower 24 draws the gas mixture containing oxygen or helium and carbon dioxide or other gas mixture resulting from the mixing of the gaseous components drawn in through the conduit 11 and tube 27, and discharges this mixture through the nozzle 25. A soda lime container 32 may be provided in the passage below the nozzle 25 for the purpose of removing excess carbon dioxide. The gas supply is controlled in any convenient manner, as by the reducing valves usually employed in connection with oxygen cylinders and the like. After the gas mixture passes beyond the soda lime container 32, and underneath the baffle 21, it passes through a compartment which may contain cubed ice or other refrigerant 33 to cool and humidify the mixture. In the arrangement I have illustrated, the refrigerant is carried on a foraminous shelf 33' extending between the baffle 21 and the side walls of

the chamber 3. This shelf may conveniently consist of a metal screen or perforated plate. The conditioned gas mixture passes upwardly and thence out of the cooling and humidifying compartment into conduit 12 through which it is discharged into the tent 10. It will be observed that by my arrangement in which the conduits 11 and 12 extend through openings in the head frame of the bed, just above the pillow, I have provided an arrangement which permits the mixing and conditioning chamber to be placed beyond the normal range of vision of the patient. This is particularly advantageous where children are concerned as they are not so likely to become frightened by the sight of the therapeutic equipment. My arrangement is also advantageous from the standpoint of conserving space and providing apparatus which is readily portable.

Associated with the mixing chamber 3 are supporting means which preferably comprise a pair of hooks 34 vertically adjustable with respect to the conditioning unit. The hooks 34 are secured to an adjustable plate 35, the vertical edges of which may be flanged inwardly and toward the center of the plate (Fig. 3) for engagement with the complementary flanges of members 36 secured to the back of the chamber 3. The plate 35 has a vertically extending slot 37 (Fig. 6) through which passes a bolt 38 secured to the back wall of the chamber. A wing nut 39 provides means for clamping the plate 35 in any desired vertical adjustment. With the arrangement shown, this simple adjustment of the supporting hooks 34 provides means for simultaneously adjusting the height of the inlet and outlet ports 11, 12 and of the tent supporting brackets 5. As is well known, different bed constructions have bed frames varying considerably in height; yet it is advantageous to be able always to mount the gas conduits and tent support at the desired height above the patient's head. Even with a very high or a very low end frame, my arrangement, in which the conduits extend through the frame, makes it possible to keep the air conduits at the desired height as well as to keep the apparatus well out of sight and out of the way.

I shall now describe the arrangement which I have provided for lateral adjustment of the conduits 11 and 12 with respect to each other. For this purpose the tubular conduit 12 is mounted in a slidable plate 40 and passes through an elongated aperture 41 in the back wall of the unit. A housing 42 surrounds the plate 40 and is secured to the inner side of the back wall of the unit. The housing 42 is provided with an elongated aperture 41' arranged opposite the aperture 41 in the back wall. A second housing 43 is secured to the outside of the unit, forming an extension permitting the plate 40 to slide to the right as viewed in Figs. 3 and 4. The housings 42 and 43 together serve to provide a gas-tight connection between the adjustable conduit 12 and the chamber 3. It will be appreciated that many variations in this construction are possible such as will provide for lateral adjustment of one of the conduits with respect to the other while maintaining a gas-tight connection with the body of the unit.

The wall of the tent 10 is provided with a pair of apertures to receive the conduits 11 and 12 and these apertures should be so constructed as to provide for a gas-tight engagement with the conduits while permitting ready insertion and removal thereof. I have shown in Fig. 8 a collar 44 preferably of rubber or other resilient

material. This collar may be provided with a shoulder 45 against which the edges of the aperture in the wall of the tent material may be pressed in sealing engagement by means of a ring 46 bearing against the outside of the tent material and having a threaded or frictional engagement with the projecting portion of the collar 45. This arrangement permits the conduits 11 and 12 to be inserted and withdrawn readily, and the flexibility of the tent material permits the desired lateral adjustment between the conduits 11 and 12 previously described. The material of the tent 10 may be cemented to the shoulder 45 of the collar.

15 If desired, a spacing bracket 47 may be secured to the back wall of the chamber 3 adjacent its lower edge to bear against the rungs 13 of the bed as shown in Figs. 1 and 3. I have shown also a drain pipe 48 to take care of the waste liquid from the melting refrigerant. This drain pipe should be provided with a suitable trap 49 permitting the water to run off, while sealing the gas mixture within the chamber. A waste bucket may be suspended beneath the unit in any convenient manner to catch the water.

25 Brackets 50 may be attached to the bottom of the unit, providing legs to support it when it is removed from the bed. A deflector 51 may be provided for attachment to the end of the conduit 12 to deflect the oxygen-rich gas away from the head of the patient as it enters the tent. This deflector may be of any convenient form such as the flat sheet 51 attached to a collar 52 (Fig. 5) adapted to slip over the end of the conduit 12. The deflector 51 preferably is formed of a light, fibrous or resilient material which will not injure the patient if he happens to hit it. In the construction shown, the collar 52 permits the deflector to be turned around into any desired position either to deflect the oxygen-rich gas upwardly toward the top of the tent or outwardly toward the side.

It will be understood that the various modifications may be made in the structure which I have specifically described with reference to a preferred embodiment of my invention, and I have no intention of excluding such modifications or equivalents of the construction described, or of portions thereof, as may fall within the scope of the claims.

I claim:

1. Apparatus for gas therapy comprising a mixing chamber and a tent, means for supporting said chamber from the end frame of a bed in a position beyond the end of the bed, a tent-supporting bracket and fluid conduits attached to said chamber, said bracket and conduit being so arranged as to permit said bracket to extend over the top of the end frame and said conduits to extend through openings in the end frame, said conduits being laterally adjustable with respect to one another at their points of attachment to said chamber to accommodate them to variously spaced openings in the end frame, means for attaching said tent to said bracket and means for attaching said conduits in communication with apertures in a wall of said tent.

2. Apparatus for gas therapy comprising a mixing chamber and a tent, means for supporting said chamber from the end frame of a bed in a position beyond the end of the bed, a tent-supporting bracket and fluid conduits attached to said chamber, said bracket and conduit being so arranged as to permit said bracket to extend over the top of the end frame and said conduits to extend through openings in the end frame, one of said conduits being mounted for slidable movement with respect to the other of said conduits to accommodate said conduits to variously spaced openings in end frames of varying designs.

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