Jan. 19, 1943. E. L. ROY 2,308,630

DUPLEX RESPIRATOR

Filed May 23, 1941 2 Sheets--Sheet 1

Fig. 1.

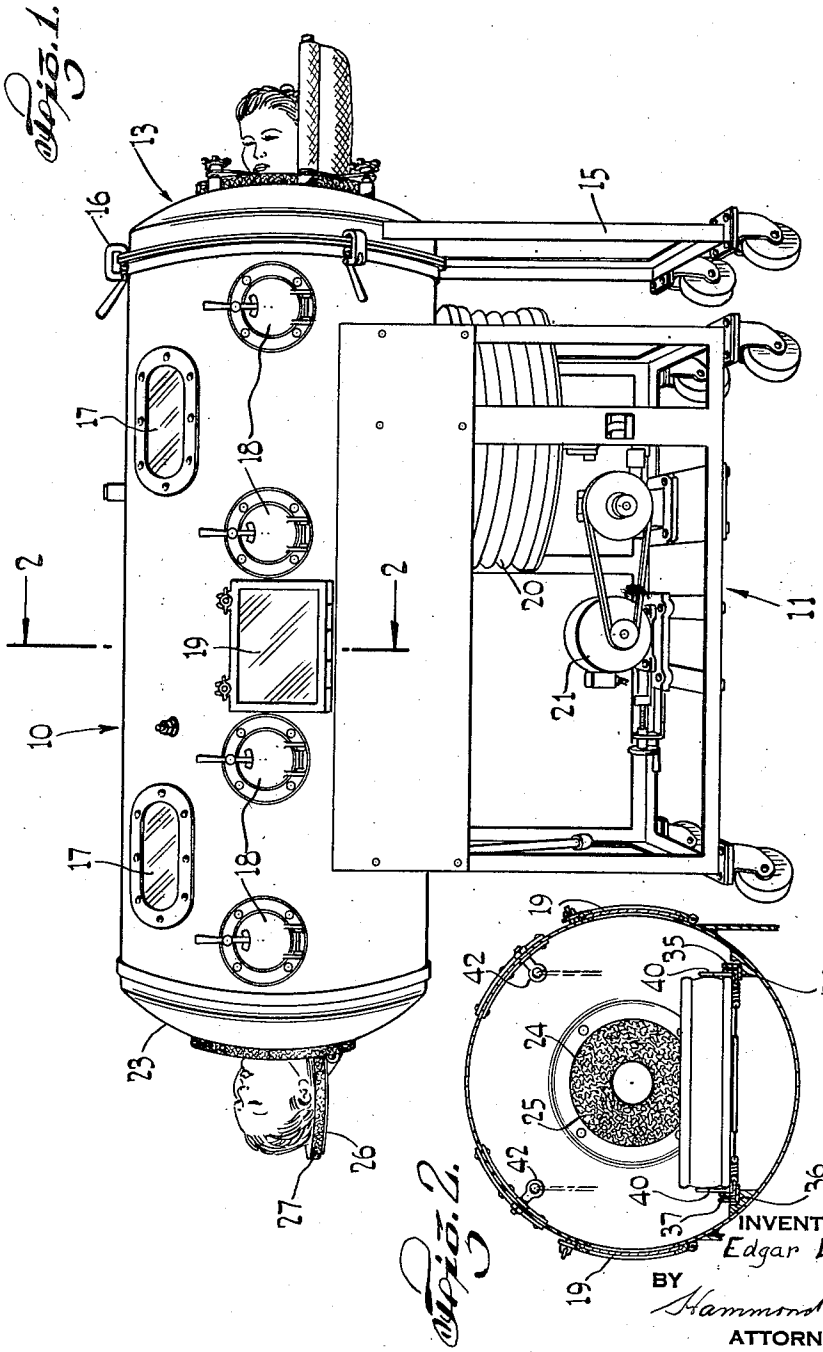


Fig. 2.

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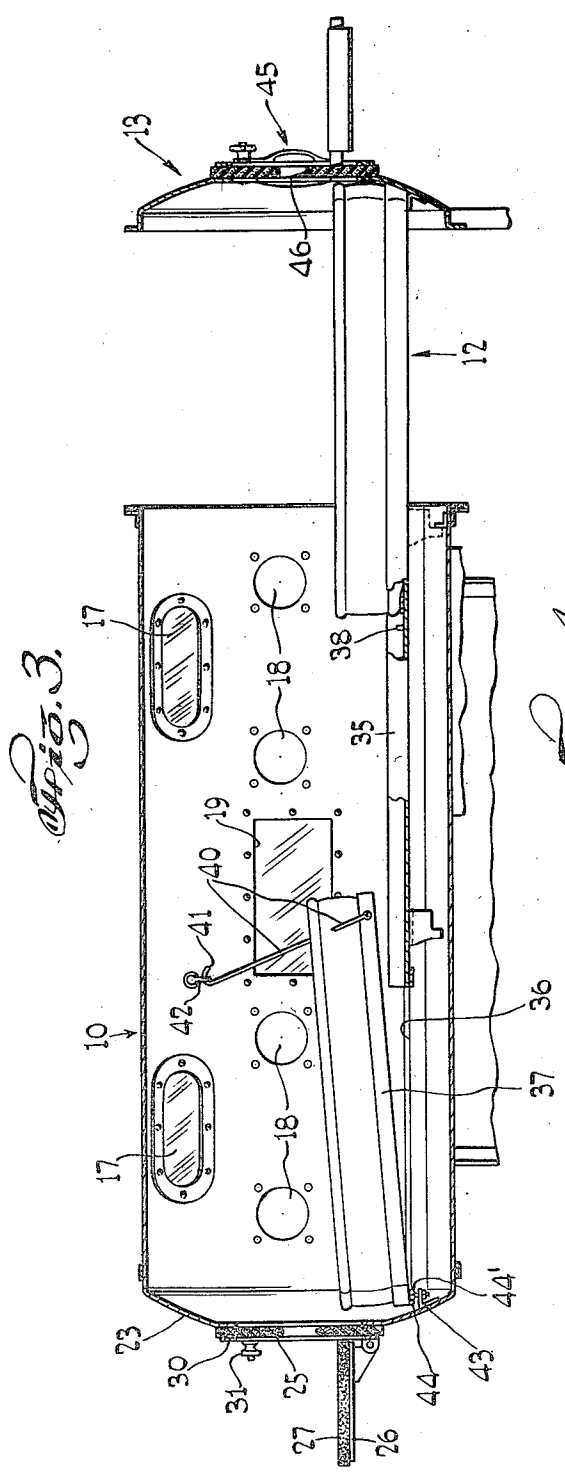


Fig. 3.

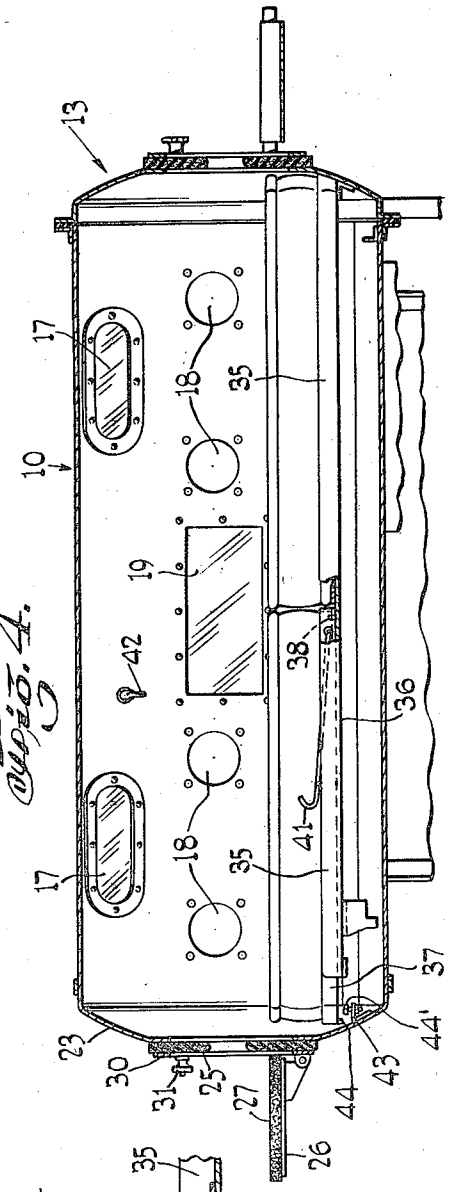


Fig. 4.

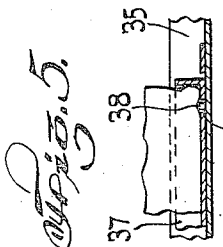


Fig. 5.

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UNITED STATES PATENT OFFICE

2,308,630

DUPLEX RESPIRATOR

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Application May 23, 1941, Serial No. 394,815

8 Claims. (Cl. 128—30)

The present invention relates to artificial respirators.

Emergency cases of drowning, gas poisoning, electric shock and the like, have long been treated by artificially producing respiration to ventilate the lungs until the patient recovers sufficiently to breathe naturally. Within the last ten years, the use of artificial respirators of the type known as the Drinker respirator, in which the body of the patient is supported within a substantially air-tight casing, has developed to such an extent that such respirators have become standard equipment in hospitals in which poliomyelitis patients are treated. Even in hospitals in which such cases are not ordinarily treated, frequently at least one respirator is maintained for emergency use. Many hospitals have a considerable number of respirators but always the number of patients that can be treated at one time is limited to the number of respirators.

The present invention provides an improved adult type respirator of such construction that, at least in case of emergency, two child patients may be treated therein at one time.

The invention aims further to provide a respirator of such construction that it is comfortable and effective for the treatment of one adult or alternatively for the treatment of two children. The invention aims further to provide a bed arrangement for such a respirator such that one patient can be removed from the respirator or placed therein with little or no inconvenience to the other patient.

Another object is to provide a closure for the neck opening, which may serve alternatively either as a closure or as a headrest for a patient in the respirator with his neck in the opening.

The nature and objects of the invention will be better understood from a description of an illustrative apparatus for the purposes of which description reference should be had to the accompanying drawings forming a part hereof and in which:

Figure 1 is a perspective view of a respirator embodying the invention;

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1 to show the bed supporting arrangement;

Fig. 3 is a central longitudinal sectional view of the open respirator showing one bed section supported in slightly lifted position temporarily to facilitate removal of the other bed section.

Fig. 4 is a sectional view similar to Fig. 3 but showing the respirator closed and the bed adjusted for comfort.

Fig. 5 is a sectional detail view showing the connection between the auxiliary bed section and the main bed section.

The respirator shown for the purposes of illustration is of the type commonly in use and known as the Drinker respirator. The respirator casing 10 is supported on a wheeled carriage 11, and contains a bed 12, movable into and out of the casing. The end wall or head 13 of the casing is rigidly connected to one end of the bed, and is, in turn, supported by castered legs 15 to facilitate sliding the bed in and out. Clamps 16 lock the head of the casing in closed position. Transparent ports 17 permit a view of the patient and hand ports 18 and a larger service port 19 are provided for access to the casing for treatment of the patient. A bellows 20, driven from a motor 21, on the frame of the machine, provides for causing fluctuation of pressure in the casing to induce respiration.

According to the present invention, the head 23 of the casing is provided with an opening 24 and a flexible collar 25 of sponge rubber, adapted to fit closely around the neck of the patient, serves as an air seal. The hinged cover 26, for this opening, alternatively closes the opening or is held in horizontal position where it serves as a head support for the patient. The closure member 26 has secured thereto a spong rubber pad 27 to provide a more comfortable headrest.

The collar 25 is held in place by a clamping ring 30 which, in turn, is secured in place by a suitable number of bolt and nut connectors 31. When the respirator is to be used for one patient only, the opening in the head 23 is closed.

The present invention provides a bed arrangement such that the whole bed may be used as one complete bed for an adult patient or the two parts can be separately supported to the extent that one patient may be left in the respirator and the other can be taken out by sliding his section of the bed as the casing is opened.

The main bed section 35, which is rigidly secured to the movable head 14, slides in ways 36. A shorter bed section 37 may rest on and be carried by the main section 35, as shown in Fig. 4, and when so supported, this section will move with the main section as the bed is slid out. Means for definitely locking the bed section 37 to the main section 35 may be provided, if desired. A simple illustrative arrangement is shown in Fig. 5, wherein the main bed section 35 is provided with a pin 38, which fits in the recess 39 in the auxiliary bed section 37. When it is desired to leave one patient in the respirator while re-

moving the other, the bed section 37 is supported at one end by two rods 40, one on each side of the respirator. These rods are pivoted to the bed section 37 and are formed at their upper ends with hooks 41 engageable with the eyes 42, secured in the respirator casing. It is to be noted that when these rods are connected with the supporting eye-bolts 42, the forward end of the bed section 37 is lifted somewhat above its normal position and the opposite end is slightly lowered. This end, when so lowered, is supported by brackets 43 on the end wall 23. In order to hold the bed section 37 from sliding forward, a rib 44 depending from the bed section 37 is arranged to engage behind adjustable screws 44' positioned in the brackets 43. The screws 44' are adjusted at such a level that when the bed section 37 is in normal horizontal position resting on the main bed section, the rib 44 will lie above the level of the tops of the screws 44'.

When the bed is used for one patient, or if desired, when both patients are in the respirator, rods 40 are released from the eye-bolts 42 and swung down upon the frame 37. The two sections then form one complete even bed.

Upon the occasion of removal of one patient temporarily while leaving another patient on the auxiliary bed, it is necessary to close the principal neck opening in the movable head 14. For this purpose, a removable closure member is indicated at 45 in Fig. 3. This closure is shown as a simple plate with a retaining projection 46, extending through the opening in the sponge rubber collar and engaging the inner side of the collar.

When two children are to be placed into the respirator, the bed is pulled out as one unit. One child is put into the machine in the usual way, with his head through the rubber collar in the head wall. The second child is placed on the other end of the bed and, as the machine is closed, his head is guided through the collar at the closed end of the machine. This is not difficult because the nurse can work through the opening in the end, and also through the hand openings in the side of the machine. Working in this way, it is not difficult to move the child on the bed to such extent as may be necessary. When it is desired to remove one child from the respirator, the auxiliary bed section is lifted sufficiently to free it from the main bed section and the supporting hooks are connected to the supporting eye-bolts 42.

The foregoing particular description is illustrative merely and is not intended as defining the limits of the invention.

What is claimed is:

1. In an apparatus for producing artificial respiration, a casing constructed to receive the major portions of the bodies of two patients, oppositely disposed, with their heads extending through the opposite ends of said casing, a bed support means slidable as a unit to and from the interior of said casing, constructed to provide support for the bodies of said patients, said casing having, at one end, a fixed end wall section including an opening through which the head of one patient may extend and, at the opposite end, a movable end wall section including an opening through which the head of the other patient may extend, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, means associated with the fixed end of the casing for supporting the patient whose head extends through the fixed end wall section when the bed support means for the body of the patient whose head extends through the movable end wall section is moved out of the casing, and means for producing alternate variations of pressure within said casing.

2. In an apparatus for producing artificial respiration, a casing constructed to receive the major portions of the bodies of two patients oppositely disposed with their heads extending through the opposite ends of said casing, a two-part bed, slidable into and out of said casing, each part being constructed and arranged to provide support for the major portion of the body of one patient, means for supporting one part of said bed with a patient supported thereby within the casing while the other part of the bed with a patient thereon is slid out of said casing, said casing having, at one end, an end wall section including an opening through which the head of one patient may extend and, at the opposite end, a movable end wall section including an opening through which the head of the other patient may extend, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, and means for producing alternate variations of pressure within said casing.

3. In an apparatus for producing artificial respiration, a casing constructed to receive the major portions of the bodies of two patients oppositely disposed with their heads extending through the opposite ends of said casing, a two-part bed comprising a base section slidable into and out of said casing, an auxiliary section normally attachable to said base section and movable therewith into and out of said casing but detachable from said base section, and means for supporting the auxiliary section within the casing independently of the base section whereby the base section with the patient supported thereby can be removed independently of the auxiliary section and the patient supported thereby, said casing having at one end a fixed end wall section including an opening through which the head of one patient may extend, and, at the opposite end, a movable end wall section including an opening through which the head of the other patient may extend, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, and means for producing alternate variations of pressure within said casing.

4. In an apparatus for producing artificial respiration, a casing constructed to receive the major portion of the body of a patient or alternatively to receive the major portions of the bodies of two patients oppositely disposed, a bed support means slidable to and from the interior of said casing constructed to provide support for the body or bodies of said patient or patients, said casing having a movable wall section at one end connected to said bed support means and slidable therewith, and including an opening through which the head of one patient may extend, the opposite end of said casing including an opening through which the head of the other patient may pass as the bed is slid into position in the casing, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, means associated with the opposite end of the casing for supporting the patient whose

head extends through the opposite end wall when the bed support means for the body of the patient whose head extends through the movable end wall section is moved out of the casing, means for forming a seal between said movable wall section and the body of the casing, and means for producing alternate variations of pressure within said casing.

5. In an apparatus for producing artificial respiration, a casing constructed to receive the major portion of the body of a patient or alternatively to receive the major portions of the bodies of two patients oppositely disposed, a dual, divisible supporting means capable of independently supporting two patients, said means including a bed slidable to and from the interior of said casing, said casing having a movable wall section at one end rigidly connected to said bed and slidable therewith and including an opening through which the head of one patient may extend, a head rest supported on said movable wall section adjacent to the opening and movable therewith, the opposite end of said casing being fixed and including an opening through which the head of the other patient may extend, a second head rest supported on said casing, adjacent to said last mentioned opening, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, means for forming a seal between said movable wall section and the body of the casing and means for producing alternate variations of pressure within said casing.

6. In an apparatus for producing artificial respiration, a casing constructed to receive the major portion of the body of a patient or alternatively to receive the major portions of the bodies of two patients oppositely disposed, a bed slidable to and from the interior of said casing, constructed to provide support for the body or bodies of said patient or patients, said casing having, at one end, a movable wall section including an opening through which the head of one patient may extend, the opposite end of said casing including an opening through which the head of the other patient may extend, a head rest and closure member hingedly supported on the casing movable upwardly and inwardly to position to close the last mentioned opening and movable downwardly and outwardly to head supporting position, adjacent said opening, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, means for forming a seal between said movable wall section and the body of the casing, and means for producing alternate variations of pressure within said casing.

7. In an apparatus for producing artificial respiration, a hollow casing constructed to receive the major portion of the body of a patient, having, at one end, an end wall including an opening for the head of the patient, a head rest supported by said end wall adjacent to said opening, a sealing member positioned in said opening and formed with a restricted opening adapted to fit snugly around the neck of the patient, a bed slidable to and from the interior of said casing from the opposite end constructed to provide support for the body of the patient, means associated with the casing adjacent said end wall adapted to support the body of the patient when said bed is slid out of said casing, means to close said opposite end of said casing, and means for producing alternate variations of pressure within said casing.

8. In an apparatus for producing artificial respiration, a casing constructed to receive the bodies of two patients oppositely disposed with their heads extending through the opposite ends of said casing and the legs of one patient at one side of the legs of the other patient, a two-part bed in said casing, each part being constructed and arranged to provide support for the major portion of the body of one patient and the legs of the other patient, means for connecting the two parts to cause the whole bed to move as a unit, means for supporting one part of said bed with a patient supported thereby within the casing while the other part of the bed, with a patient thereon, is slid out of said casing, said casing having at one end an end wall section including an opening through which the head of one patient may extend, and at the opposite end a movable wall section including an opening through which the head of the other patient may extend, a sealing member positioned in each opening and formed with a restricted opening adapted to fit snugly around the neck of the patient and means for producing alternate variations of pressure within said casing.

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