May 6, 1941. A. WALY 2,240,819

APPARATUS FOR MEDICAL TREATMENT

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Fig. 1

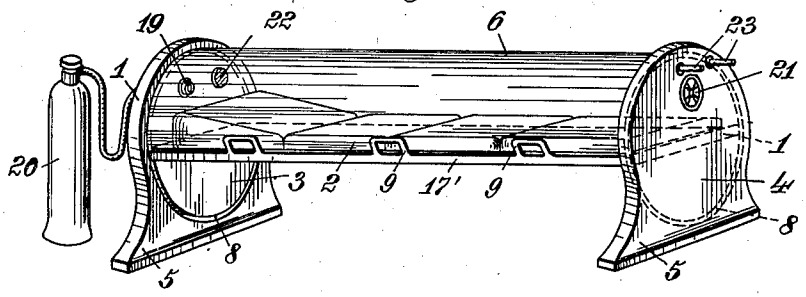


Fig. 2

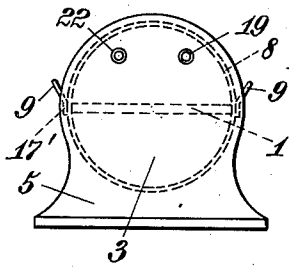


Fig. 3

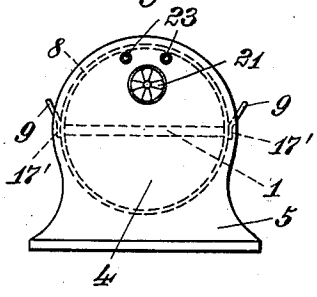
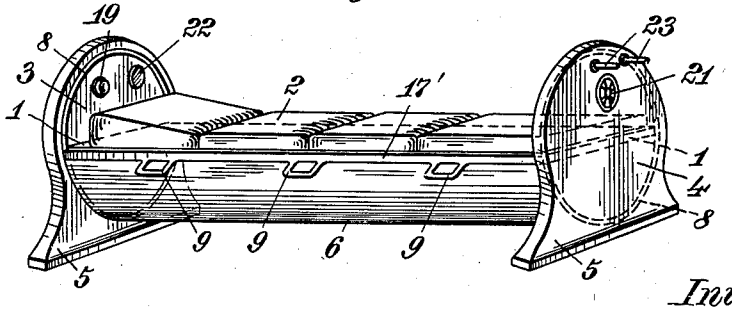


Fig. 4



Inventor:
Abdalla Waly
by:
Dr. Adolph Frumkin
Attorney

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APPARATUS FOR MEDICAL TREATMENT

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Fig. 5

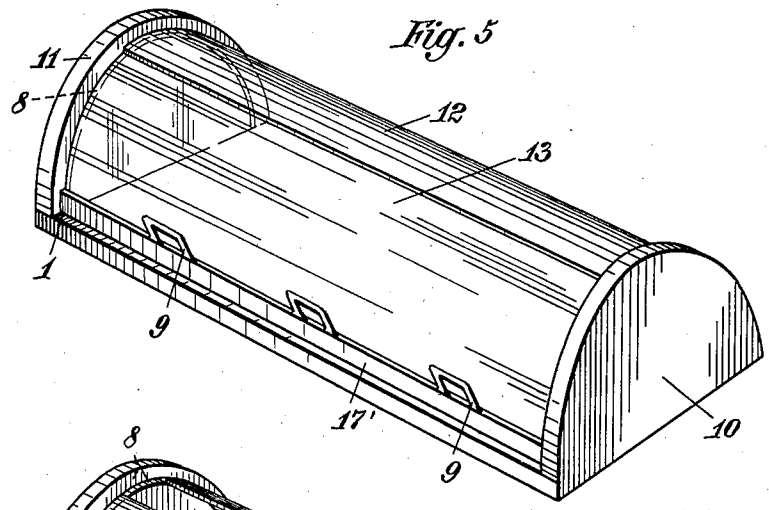


Fig. 6

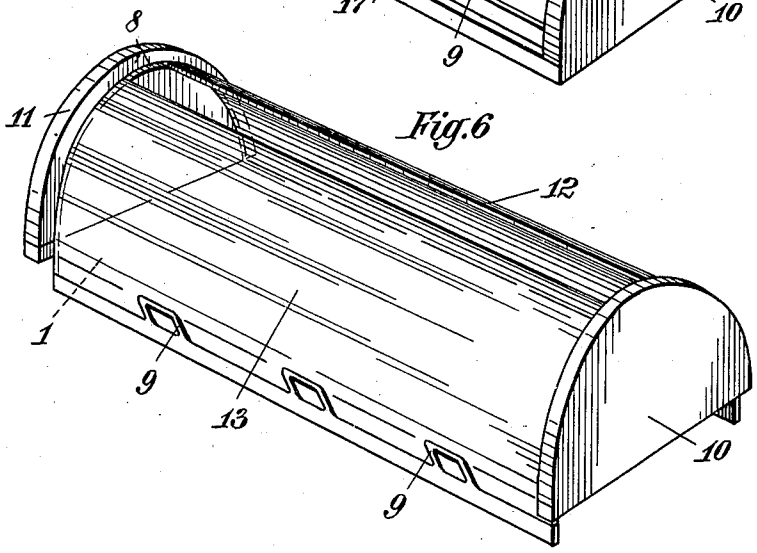


Fig. 7

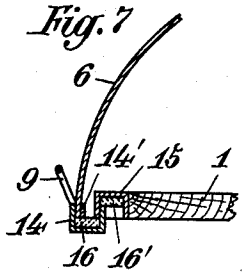
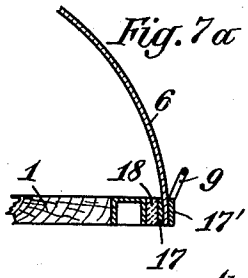


Fig. 7a



Inventor:
Abdalla Waly
by
Dr. Adolph Zimmermann
Attorney

Patented May 6, 1941 2,240,819

UNITED STATES PATENT OFFICE

2,240,819

APPARATUS FOR MEDICAL TREATMENT

Abdalla Waly, Berlin-Waidmannslust, Germany; Hugo Banneitz, Berlin, Germany, administrator of said Abdalla Waly, deceased

Application September 8, 1934, Serial No. 743,198
In Germany February 10, 1934

2 Claims. (Cl. 128—145)

My invention relates to apparatus for medical treatment, and more particularly to apparatus of the type in which some sort of shutter is used for partitioning a space from the ambient air, and a patient is subjected to the healing influence of a fluid, such as a gas, in this space.

In apparatus of this type, as designed heretofore, and particularly for the treatament of pulmonary diseases, the patient is placed on a bed or the like on which a tent-like structure, normally of canvas or similar material, is erected. The tent is neither gastight nor transparent. Its permeability reduces the efficiency of the treatment, and the patient is in the dark which is trying to the nerves, interferes with the observation of the patient's condition by the doctor, and, obviously, absolutely prevents treatment by irradiation, for instance, with ultra-violet rays, while the patient is subjected to the gas treatment.

It is an object of my invention to provide apparatus of the kind referred to in which the aforesaid drawbacks are eliminated.

To this end, I provide a gastight plate for supporting the patient, a movable shutter which is operatively connected to the plate and is gastight as well as transparent, for excluding the ambient air from, and keeping the gas in the vicinity of, the patient, and means for supplying gas, or other fluid, to the space from which the ambient air has been excluded by the shutter.

By way of example, the gastight plate may form part of a bed, couch, stretcher, etc., on which the patient is placed, and which has one end plate at the head, and another end plate at the foot. The shutter has the form of a semicylinder, of glass, "cellophane," or some other transparent material, and its ends are mounted to slide in suitable grooves in the end plates, so that the shutter turns about its own axis with respect to the gastight plate and, when above the plate, partitions a gas space about the patient. Novel packing means are provided for making a tight connection of the shutter with the gastight plate and the two end plates in whose grooves the shutter slides.

The patient is within a transparent and gastight structure, the aforesaid shutter, which does not interfere with his movements on the bed or couch, and with the observation of his body by the doctor. The shutter and the gastight plate together make up a unit which is readily portable with and without the patient.

In the accompanying drawings, various types of apparatus embodying my invention are illustrated by way of example.

In the drawings

Figs. 1 to 4 illustrate the first type in which the shutter is a semicylinder, as described.

Fig. 1 is a perspective illustration of the bed with the shutter above the gastight plate, ready for operation,

Fig. 2 is an end elevation of the head, and

Fig. 3 is an end elevation of the foot of the bed,

Fig. 4 is a perspective illustration of the bed with the shutter below the gastight plate,

Fig. 5 illustrates the second type, in perspective, in which the shutter is a semicylinder as described with reference to Figs. 1 to 4, but is divided longitudinally, and one of its parts is fixed to the gastight plate while the other part is movable,

Fig. 6 illustrates the third type in which both parts are movable,

Figs. 7 and 7*a* illustrate, in cross-section through the gastight plate, two kinds of packings for movable shutters on the gastight plate.

Referring now to the drawings, and first to Figs. 1 to 4 which illustrate the first type, the gastight plate 1 is equipped with suitable cushions 2, or a mattress. An end plate 3 is arranged at the head, and an end plate 4 is arranged at the foot, of the bed. Both end plates are substantially circular, but equipped with feet 5, 5. The shutter 6 is a semicylinder of suitable transparent material, whose ends are inserted in circular grooves 8 in the end plates 3 and 4, in such manner that the shutter, in sliding in the grooves 8 with its ends, turns about its own axis from the position illustrated in Fig. 1 in which the bed is ready for operation, into the position illustrated in Fig. 4 in which the shutter is below the gastight plate 1, and out of the way.

Obviously, suitable packing means must be provided for the shutter 6. The grooves 8 are equipped with packing strips of rubber or other suitable material, not shown, which may be similar to the packing means used for vehicle windows. The two edges of the cylinder are equipped with strips 17 and 17', as will be described with reference to Fig. 7*a*, for reinforcing purposes, and for making a tight fit at the sides of the gastight plate 1. Handles 9 may be provided on the strip 17', for turning the semicylinder 6 about its axis.

In one of the end plates, and preferably in the end plate 3 at the head of the bed, at least one inlet valve 19 is provided for admitting gas or other fluid from a pressure reservoir 20. A fan 21, or an outlet valve, not shown, is provided in the opposite end plate, 4, for removing the gas from the space within the shutter 6. Preferably, the gas is admitted through the head end plate 3, and discharged through the foot end plate 4, as shown. A telephone and microphone are arranged in the head end plate at 22, for communication with the patient, and apparatus generally indicated at 23 in the foot end plate 4, such as thermometers, pressure gauges, etc., may be arranged at this or any other point.

It is not necessary that the semicylinder or shutter 6 should be rigid but it may be of flexible material and the means for guiding its ends in the plates 3, 4 may be of other kind than the circular grooves 8 which have been illustrated. When the flexible shutter is turned down, as illustrated for the comparatively rigid shutter 6 in Fig. 4, it will not necessarily extend down almost as far as the floor but may be concealed in a box below the gastight plate 1. An apparatus having a flexible shutter has not been illustrated.

Referring now to Fig. 5, this apparatus, with its gastight plate 1 and semicircular end plates 10 and 11, is so designed that it can be placed in a normal bedstead instead of the mattress. The mattress itself is placed on top of the gastight plate 1. The semicylinder is subdivided into two parts 12 and 13. The part 12 is fixed and the part 13 is mounted to slide in semicircular grooves 8 of the end plates 10, 11, as described for the circular grooves in Figs. 1 to 4. The movable part 13 is equipped with the strip 17' and the handles 9, as described and, in its closed position, is overlapped at its upper end by the fixed part 12.

Referring to Fig. 6, both parts 12 and 13 are movable and equipped with handles 9. Otherwise, this type is similar to the one illustrated in Fig. 5, and is also adapted to be placed in a normal bedstead. By providing handles, not shown, on the plate 1, the apparatus may be changed into a stretcher.

Packing means for the sides of the gastight plate 1 and the ends of the shutter 6, or the shutter parts 12 or 13, will now be described with reference to Figs. 7 and 7*a*.

Referring first to Fig. 7, the sides of the shutter 6 are equipped with channel-section packing strips 14 whose outer flanges are secured to the outer face of the shutter, and may be equipped with the handles 9. Reinforcing strips 14' are placed on the inner side of the shutter opposite the flanges, and a strip 16 of rubber or the like, is placed on the flange of the channel-section 14. A similar section 15, which is inverted with respect to the section 14, is placed on the edge of the gastight plate 1, with its outer flange overlapping the inner flange of the section 14, and a strip 16' of packing material on the web of the section 15.

Referring now to Fig. 7*a*, the shutter 6 has the plain reinforcing strip 17' on its outer face, and another plain strip 17 opposite the strip 17' on its inner face. A packing strip 18, of rubber or the like, is secured to the outer flange of the channel-section 15.

It will be understood that existing normal bedsteads are readily transformed into an apparatus according to my invention by the equipment described, and that there is no difficulty about the gastight packing.

It is understood that the shutter which may be a single member, or may be subdivided into two members, as shown in Figs. 5 and 6, may be modified as desired or required, and may have any suitable cross-section, without departing from my invention. In particular, the shutter may be designed for high pressures, as required for certain scientific experiments. In this case, the shutter is reinforced, for instance, by metal bracing members, or it may be of metal throughout, with the exception of an inspection opening lined with transparent material.

The shutter may have an opening, with a suitable packing, through which the patient extends an arm, for taking blood samples. The packing means may be a cuff of rubber or the like, or it may be of sticking plaster, etc.

Signalling means for the patient may be arranged within the shutter, and means may also be provided by which the patient can open the shutter from within without assistance.

In operation, the patient is placed on the mattress or cushions 2 and the shutter 6 or 7 is closed. Gas, as prescribed by the doctor, is now admitted through valve 19, and discharged through valve or fan 21. The patient is now in an atmosphere which is quite different from that of the sick-room and in which he is treated as required. For instance, he may be relieved of asthma by the apparatus, or tuberculous patients may be kept for a long time in an atmosphere which corresponds to that of high-altitude health resorts. Instead of a single gas, mixtures of any desired gases may be introduced. The apparatus is very useful for treating gas poisoning with pure oxygen. Diseases such as bronchitis, inflammation of the lungs, the Basedow disease, and others, are also very successfully treated by my apparatus. It may also be used for training the lungs of sportsmen by admitting to the space within the shutter greater or lesser quantities of carbon dioxide so as to vary the effort of the lungs.

Tent-like structures, as referred to, or appliances such as gas masks as required heretofore for certain tests, are dispensed with altogether. The transparency of the shutter permits irradiation of the patient from the outside and the shutter may be made of special glass for a given kind of rays.

I claim:

1. In a medical treating enclosure the combination with a gastight supporting structure for a reclining patient, of a substantially channel-shaped, axially extending, substantially rigid axially turnable cover surrounding the supporting structure, additional supporting plates near the ends of the supporting structure, substantially channel-shaped guide-grooves on said plates for the reception of the ends of the turnable cover, and cooperable resilient packing strips mounted on the respectively engaging parts of the cover and of said supporting structure.

2. In an enclosure for medical treatment, a support for a reclining and prostrate patient, plate-like upright supporting means at opposite ends of said support and connected with said ends, an axially rotatable longitudinally extending semicylindrical casing adapted to cover the patient and extending the full length thereof, said supporting means having circular grooves therein engaged by the ends of said casing and affording axial rotation of said casing with respect to said support, and sealing means disposed on said supporting means adjacent said circular grooves, and on the sides of said support and of said casing in cooperable relation for establishing an air tight enclosure with said casing in closed position.

ABDALLA WALY.