May 22, 1928. 1,670,301

R. EISENMENGER

APPARATUS FOR PRODUCING OR PROMOTING ARTIFICIAL BREATHING OR RESPIRATION

Filed July 7, 1926

Fig. 1.

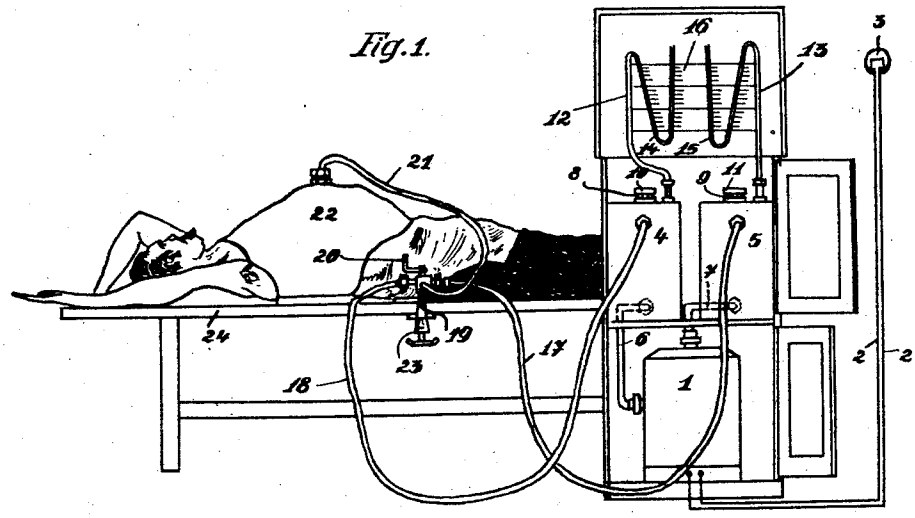



Fig. 2.

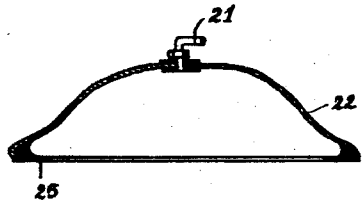
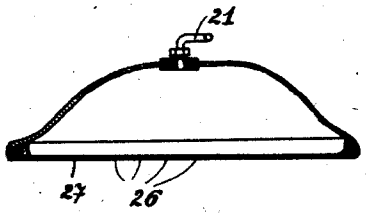



Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR PRODUCING OR PROMOTING ARTIFICIAL BREATHING OR RESPIRATION.

Application filed July 7, 1926, Serial No. 120,953, and in Austria August 12, 1925.

I have filed application in Austria on the 12th August, 1925, and in Germany on 7th May, 1926.

This invention relates to an apparatus for producing or promoting artificial breathing or respiration, which essentially consists of a bell-shaped, arched or curved member provided with a packing passing right round the rim of the said member, the latter being secured to the patient in such a manner, that between the breast and belly of the patient and the said curved member is formed an air-tight space, in which the pressure of the air can be reduced and raised.

The essential feature of the present invention consists in that a pressure air-vessel and a suction air-vessel are interposed in the pipes which lead from the device producing the pressure- and suction-effect to the interior of the curved member, the said vessels being provided with adjusting valves and devices for measuring the pressure, which are independent of one another, in order to adjust according to requirement and separately the intensity of the employed pressure and suction.

One mode of carrying out the present invention is illustrated by way of example on the accompanying sheet of drawings in which—

Fig. 1 shows the device in elevation, and Figs. 2 and 3 two constructions of the curved member in sectional elevation.

In Fig. 1, the reference character 1 designates an electrically operated diaphragm air pump, which by means of wires 2, 2 can be connected to the plug 3 of the lighting mains. 4 designates a suction air-vessel, 5 a pressure air-vessel, and 6 and 7 are pipes, which establish communication between the two vessels and the diaphragm pump. In the illustrated embodiment on the lid of each air-vessel is provided a valve (cock, slide or the like) 8 and 9 respectively, in order to establish communication between the interior of the vessels and the atmosphere. The discharge opening of the valve or slide can be adjusted according to requirement by operating a rotatable knob or button 10 and 11 respectively. In order to continuously regulate the pressure below the atmospheric pressure in the suction air-vessel or the pressure above the atmospheric pressure in the pressure air-vessel, each vessel is connected to a mercury gauge 14 and 15 respectively by means of pipes 12, 13, the position of the gauges being indicated on suitable dials arranged on a single dial-board 16.

Pipes 17 and 18 establish communication between the two air-vessels 5 and 4 respectively and a three-way cock 19, which according to the position of its operating handle 20 and by means of the pipe 21 establishes communication between the interior of the curved member 22, resting closely upon the breast and belly of the patient and the pressure air-vessel or the suction air-vessel.

The essential feature of the apparatus according to the present invention consists in that by means of the two adjustable valves 8 and 9 the intensity of the effect of the employed pressure and suction can be regulated separately and according to requirement, while uninfluenced by this regulation the duration of the pressure or suction action on the patient can be varied by the three-way cock within any desired limits and in the required succession. Thereby it is of advantage to secure the three-way cock not on the curved member but, by means of suitable clamping screws 23, on the edge 24 of the couch or table on which the patient lies.

During the suction period the curved member is firmly pressed against the body of the patient by means of the pressure of the outside air. However if the space underneath the arched or curved member 22 is filled with compressed air, difficulties arose with respect to the tight fit of the edge of the arched member against the body. According to the present invention these difficulties have been removed by arranging an inwardly extending broad strip 25 right round the the edge of the member 22 (Fig. 2). This strip preferably consists of soft rubber or of any other soft material, which readily adapts itself to the shape of the body of the patient. This inwardly extending strip 25 is pressed against the body of the patient by the pressure within the arched member 22.

In the modified construction of the arched member shown in Fig. 3, the bottom of the member 22 is closed by a rubber-diaphragm 27, which in its central part is provided with a number of perforations 26 and is closely pressed against the body of the patient during the pressure-period. The perforations 26 prevent that air is enclosed between the

diaphragm and the body of the patient during the suction-period, which during the increasing pressure below the atmospheric pressure in the space underneath the arched member would cause the diaphragm to be blown up and choke the opening of the arched member from the inside, thus rendering impossible any further suction-action.

I claim—

1. An apparatus for effecting artificial respiration comprising a suction air-vessel, a pressure air-vessel, a hollow arched rigid member communicating with said air vessels and adapted to be placed on that portion of the body of the patient below the chest, the hollow rigid member being open on that portion thereof which is placed on the body, a soft flexible member secured at its edge to the opening in said member and extending inwardly in the plane of the open end of the member, and having at least one opening therein, to prevent communication between the surrounding atmosphere and the member when the latter is communicating with either the suction air-vessel or the pressure air-vessel, and means for permitting and regulating as desired the communication between either of the said vessels and the said rigid member.

2. An apparatus according to claim 1 wherein the soft flexible member has a plurality of openings therein.

In testimony whereof I affix my signature.

RUDOLF EISENMENGER.