May 15, 1928. 1,669,971

W. E. COLLINS

APPARATUS FOR OXYGEN THERAPY AND THE LIKE

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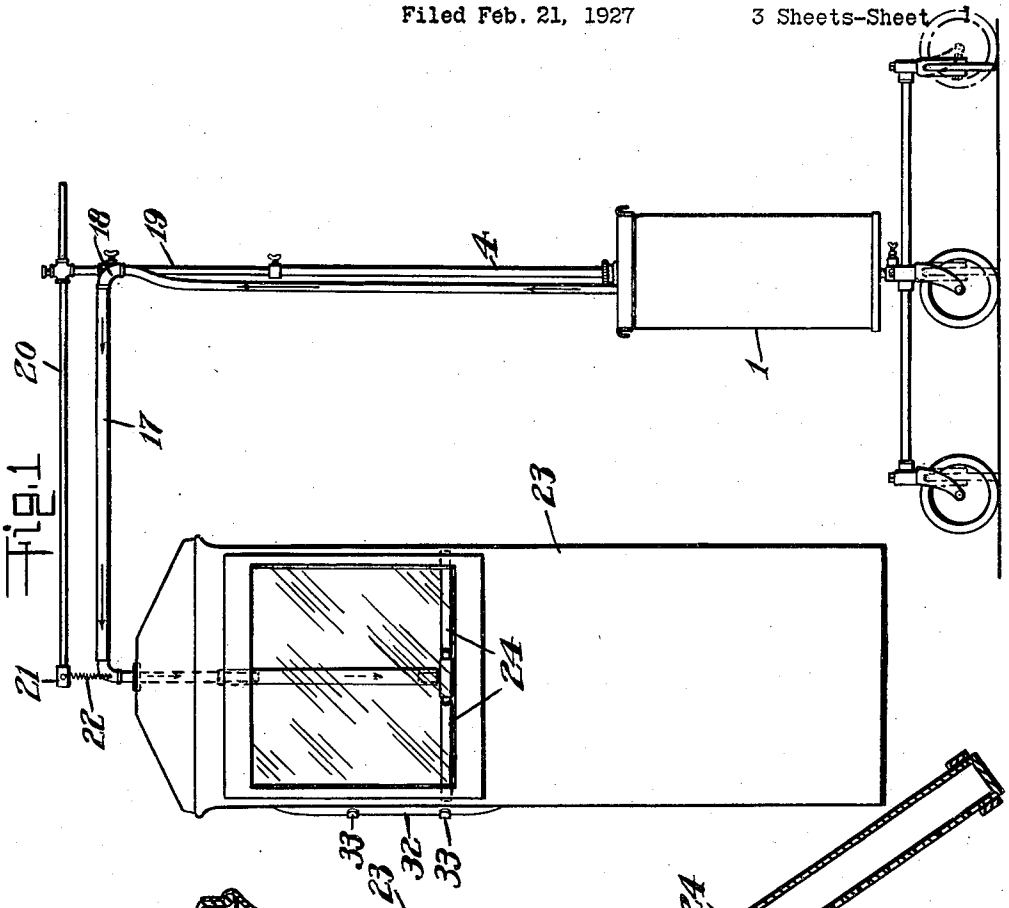


Fig. 1

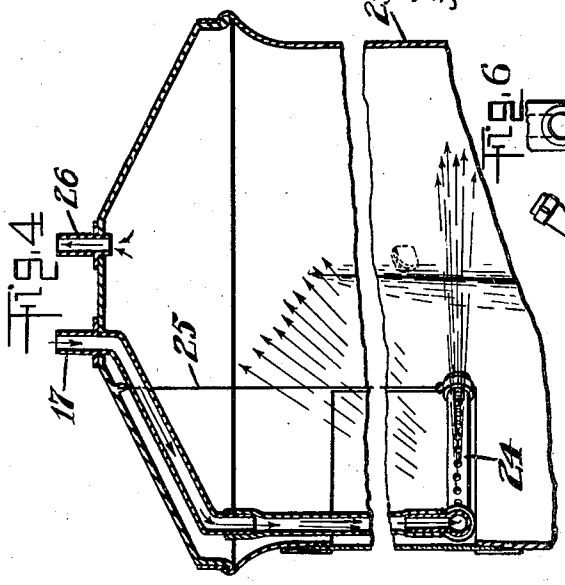


Fig. 4

Fig. 6

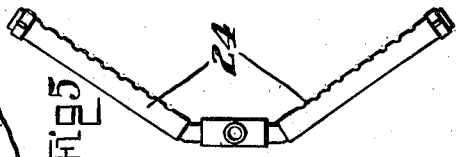


Fig. 5

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Fig. 2

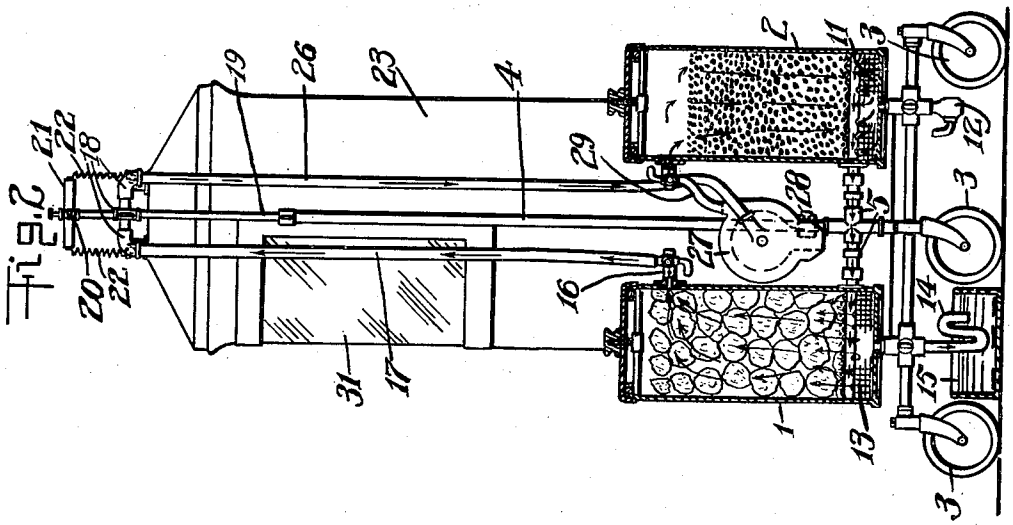
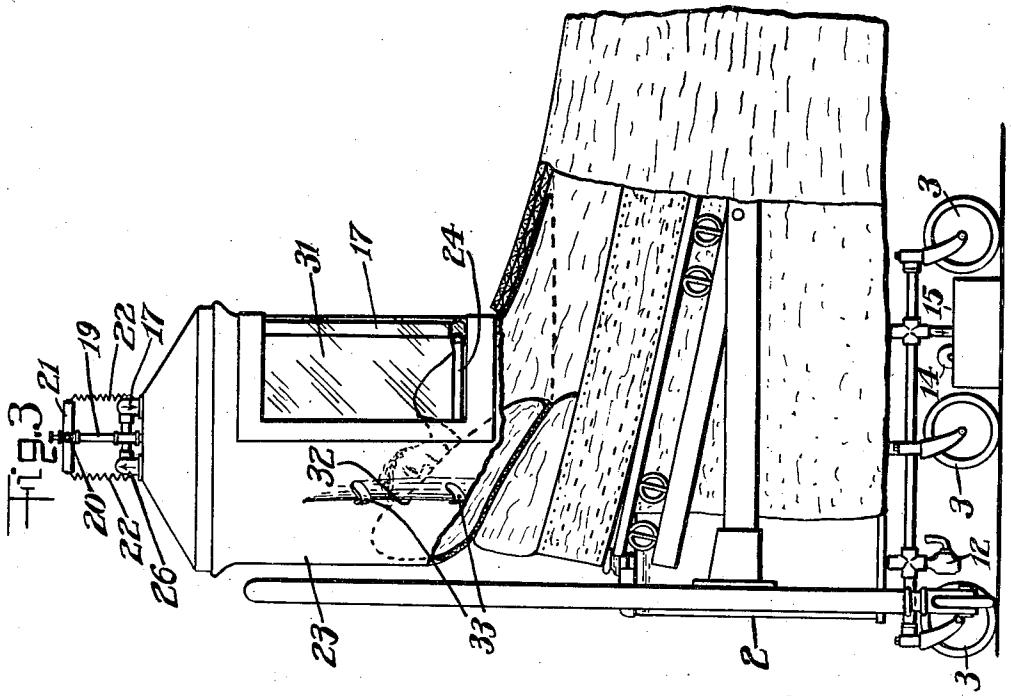


Fig. 3



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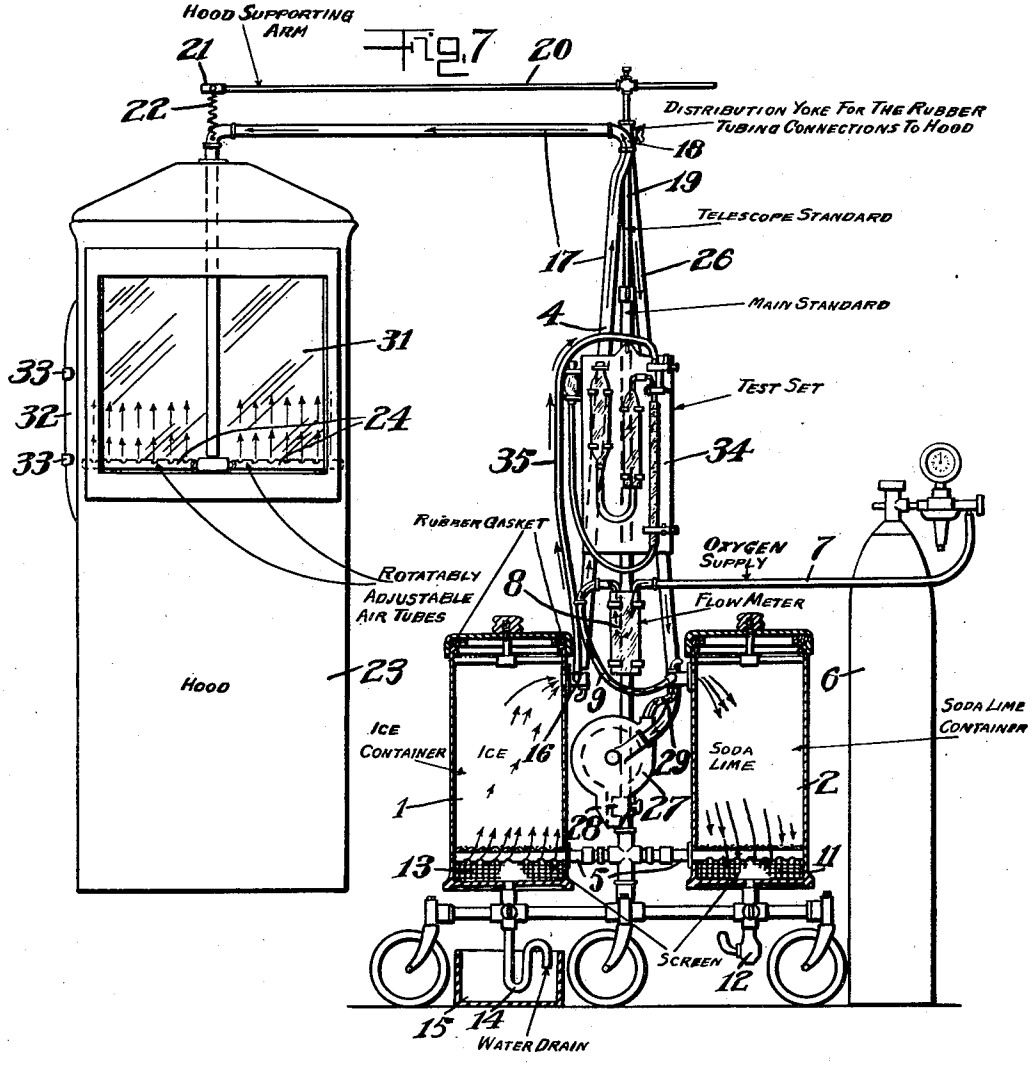
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Fig. 7



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UNITED STATES PATENT OFFICE.

WARREN E. COLLINS, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR OXYGEN THERAPY AND THE LIKE.

Application filed February 21, 1927. Serial No. 169,804.

In the treatment of certain pulmonary cases, oxygen or other gas is frequently administered, and various forms of apparatus have been devised for the purpose of maintaining an atmospheric current of predetermined character about the patient. The experiments of Dr. Paul Roth, Battle Creek, Michigan, and Alvin L. Barach of New York city, along these lines have shown that it is possible to establish about the patient an oxygen envelope or chamber of predetermined concentration, and I have collaborated with these gentlemen in the development of commercial apparatus for accomplishing this result.

In my prior application, Serial No. 7700, filed February 7, 1925, I disclosed a form of apparatus which while satisfactory as a relatively stationary apparatus for use in hospitals lacked, however, that portability and compactness which would adapt it for emergency transportation and use. In the development of this phase of the subject I devised the form of apparatus illustrated at page 1214 of the issue of October 9, 1926, of the Journal of the American Medical Association, and my present invention is in part inclusive of the apparatus shown in said publication and in part presents improvements upon and refinements over all heretofore known forms of apparatus.

In the drawings accompanying this application I have therefore shown the apparatus in its entirety but only claim so much thereof as I believe to be my own invention.

Fig. 1 is an end view of the apparatus.

Fig. 2 is a side view thereof, partly in section.

Fig. 3 is a somewhat diagrammatic view illustrating the apparatus in use.

Fig. 4 is a detail section through the canopy or hood.

Figs. 5 and 6 are detail views of the rotatably adjustable discharge tubes, and

Fig. 7 is a general view showing the apparatus with flow meter and test set attachments.

As in my prior application, I provide a container 1 for the cooling medium and a container 2 for the purifying medium. These containers are mounted upon a wheeled carriage 3 at opposite sides of a vertically disposed main standard 4 and are connected to each other adjacent their lower ends for the circulation of the oxygen or other gas therethrough, as indicated at 5.

The oxygen is supplied from a suitable container 6 through a supply pipe 7 which preferably discharges into a flow meter 8 of standard type. The flow meter indicates the flow of the oxygen therethrough in terms of liters per minute.

From the flow meter, the oxygen passes through a discharge pipe 9 into the upper end of the purification container 2. This container is usually filled with soda lime and is screened at its bottom, as indicated at 11, and is preferably provided with a drain cock 12 to permit drainage thereof when necessary.

After purification in the soda lime chamber 2, the oxygen passes through the connecting pipe 5 into the cooling chamber 1. This chamber is preferably filled with cracked ice and the oxygen circulates through the ice in direct contact therewith so as to be cooled thereby. The ice container is also screened at its bottom, as indicated at 13, and is provided with a drain trap 14 which not only permits drainage of the water resulting from the melting of the ice into the catch receptacle 15 but also holds back the slight pressure under which the apparatus operates.

The purified and cooled oxygen discharges from the upper end of the ice container, as indicated at 16, into a vertically disposed delivery tube 17 which is carried by a yoke 18 at the upper end of an extension standard 19 telescopically mounted in the main standard for limited vertical adjustment relative thereto. The extension 19 carries a horizontally disposed hood supporting arm 20. At the free end of this arm is a cross-piece 21 from which is yieldably hung by springs 12 a hood 23 into which the delivery tube 17 enters from above, as shown in Fig. 4, and within which it discharges through the rotatably adjustable discharge tubes 24, detailed in Figs. 5 and 6. These tubes 24 permit the oxygen to be directed at various angles within the hood according to the position of the patient's body within the hood. The free ends of the adjustable discharge tubes 24 may be conveniently suspended from the top of the hood, as by means of the cords 25.

The oxygen discharged within the hood is withdrawn therefrom through a return tube 26 which is also carried by the hood-supporting arm 20 and yoke 18 and extends downwardly along the main standard 4 to a motor driven blower 27 bracketed at 28 to the main

standard and disposed between the containers 1 and 2. The blower 27 connects as at 29 with the upper end of the lime container 2 so as to maintain a continuous circulation of the purified and cooled oxygen through the hood. By mounting the blower and its motor adjacent the bottom of the apparatus, the vibration is better absorbed and the patient is relieved to a greater extent of the annoyance of the running motor.

The hood itself is arranged as a fabric curtain of generally tubular form adapted to enclose the head and shoulders of the patient with its free edges tucked beneath the bed clothing so as to maintain a substantially air-tight enclosure about the patient. This curtain is provided with a transparent window 31 and with an inlet opening in the form of a slitted flap 32 by means of which various articles may be introduced into the hood without the necessity of disturbing the hood itself. This slitted flap opening is adapted to be tightly sealed at all other times by being overfolded upon itself and fastened as by means of the clips 33. The springs 22 which yieldably suspend the hood from the supporting arm 20 permit a limited come and go of the hood when the patient moves in such a way as to tend to stretch the fabric of the hood.

For the purposes of this application, I have shown in connection with the apparatus a test set 34 of standard construction, which is adjustably mounted upon the main standard of the apparatus. The intake tube 35 of the test set connects with the ice container at the discharge 16 thereof so that the sample oxygen withdrawn for testing will be a sample which has been passed through the soda lime to relieve it of its carbon dioxide content.

From the foregoing, it will be seen that the apparatus is readily portable so as to allow its convenient movement from bed to bed or room to room and is capable of assembly and disassembly with the minimum of time and effort. Some degree of adjustment is provided for by means of the telescoping standards and swivel yoke connection for the hood-supporting arm and the direction of discharge of the oxygen into the hood may be varied at will by means of the rotatably adjustable branch tubes 24. The flapped inlet opening 32 of the hood permits certain articles to be passed to the patient without substantial loss of the oxygen within the hood and without the necessity of disarranging the hood or bed clothing, and in general the apparatus permits the circulation of a predetermined concentration of oxygen about the patient under conditions which can be made extremely exact and accurate.

Various modifications in the construction and operation of my device may obviously be resorted to without departing from the spirit of my invention if within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. A portable knock down circulation apparatus, comprising a hood adapted to be fitted about the patient, a source of oxygen supply, a wheeled base, a standard rising vertically therefrom, a pair of vertically disposed containers mounted on said base at either side of said standard and connected with each other, one of said containers containing a purifying medium and the other container containing a cooling medium, a motor-driven blower mounted on said standard intermediate of said containers, a connection from the oxygen supply to the purifying container, a connection from the cooling container to the hood, a hood-supporting arm mounted on said standard, a rotatably adjustable branch tube arranged within the hood at the discharge end of said tube, a return tube from said hood to the blower, and a connection from the blower to the purifying chamber whereby the spent air from within the hood is continuously drawn into said purifying and cooling chambers and when cooled and purified is recirculated through said hood.

2. A portable knock down circulation apparatus, comprising a hood adapted to be fitted about the patient, a source of oxygen supply, a wheeled base, a standard rising vertically therefrom, a pair of vertically disposed containers mounted on said base at either side of said standard and connected with each other, one of said containers containing a purifying medium and the other container containing a cooling medium, a motor-driven blower mounted on said standard intermediate of said containers, a connection from the oxygen supply to the purifying container, a connection from the cooling container, to the hood, a telescoping section mounted on said standard, an adjustable yoke carried by said telescoping section and carrying said discharge connection to the hood, a hood-supporting arm mounted on said extension standard, a rotatably adjustable branch tube arranged within the hood at the discharge end of said tube, a return tube from said hood to the blower carried by said hood-supporting arm and yoke, and a connection from the blower to the purifying chamber whereby the spent air from within the hood is continuously drawn into said purifying and cooling chambers and when cooled and purified is recirculated through said hood.

3. A portable knock down circulation apparatus, comprising a hood adapted to be fitted about the patient, a source of oxygen supply, a base, a standard rising vertically therefrom, a pair of vertically disposed containers mounted on said base at either side

of said standard and connected with each other, one of said containers containing a purifying medium and the other container containing a cooling medium, a motor-driven blower mounted on said standard intermediate of said containers, a connection from the oxygen supply to the purifying container, a connection from the cooling container to the hood, a rotatable adjustable branch tube arranged within the hood at the discharge end of said tube, a return tube from said hood to the blower, and a connection from the blower to the purifying chamber whereby the spent air from within the hood is continuously drawn into said purifying and cooling chambers and when cooled and purified is recirculated through said hood.

4. A portable knock down circulation apparatus, comprising a hood adapted to be fitted about the patient, a source of oxygen supply, a base, a standard rising vertically therefrom, a pair of containers mounted on said base and connected with each other, one of said containers containing a purifying medium and the other container containing a cooling medium, a motor-driven blower mounted on said standard, a connection from the oxygen supply to the purifying container, a connection from the cooling container to the hood, a pair of rotatable adjustable branch tubes arranged within the hood at the discharge end of said tube, a return tube from said hood to the blower, and a connection from the blower to the purifying chamber whereby the spent air from within the hood is continuously drawn into said purifying and cooling chambers and when cooled and purified is recirculated through said hood.

In testimony whereof I affix my signature.

WARREN E. COLLINS.