No. 848,579. PATENTED MAR. 26, 1907.

G. A. THIEDE.

INHALER.

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Fig. 1.

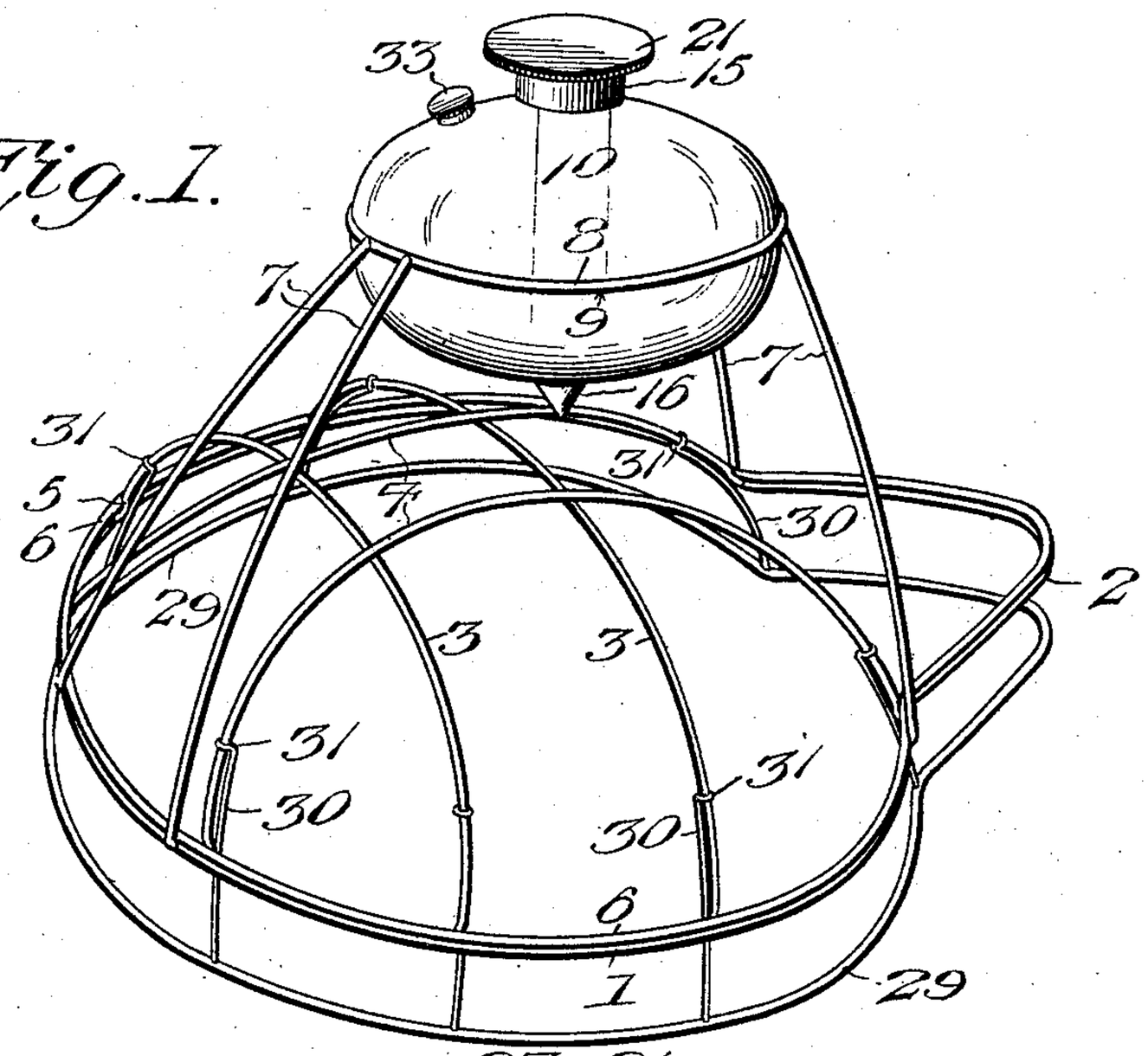
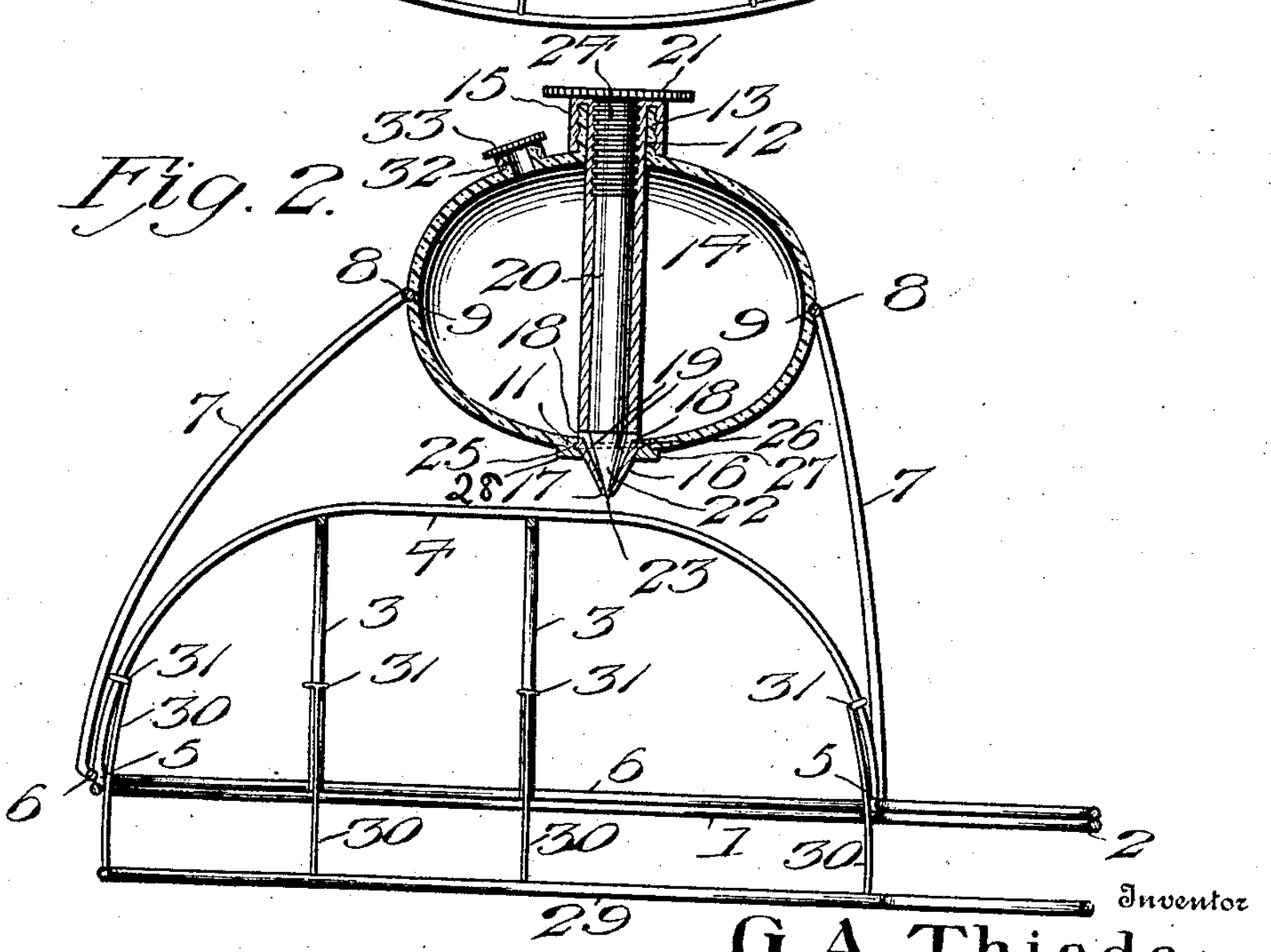


Fig. 2.



Witnesses.

W. J. Roberts

R. Allen.

Inventor

G. A. Thiede,

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

GUSTAV A. THIEDE, OF BALTIMORE, MARYLAND.

INHALER.

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To all whom it may concern:

Be it known that I, GUSTAV A. THIEDE, a citizen of the United States of America, residing at Baltimore city and State of Maryland, have invented new and useful Improvements in Inhalers, of which the following is a specification.

The invention relates generally to an improvement in inhalers, particularly to an inhaler designed primarily for use in the administration of the hypervolatile anesthetics, as ether and chloroform.

The main object of the present invention is the production of means for regulating the supply of the anesthetic to the absorbent material of the inhaler proper, whereby the services of the usual assistants for this purpose in the administration of the anesthetic may be dispensed with and the anesthetic delivered regularly and in just the right proportion to maintain the desired condition of the patient.

Another object is the production of means whereby the inhaler may be adjusted to provide for the inspiration by the patient of that determinate quantity of air known to be necessary in the proper administration of each of said anesthetics, whereby the necessary anesthesia narcosis may be produced without danger of suffocation.

The preferred details of construction of the invention will be clearly described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of an inhaler constructed in accordance with my invention. Fig. 2 is a longitudinal central section of the same.

Referring particularly to the drawings, it will be seen that the improved inhaler comprises a main frame, which includes a base-frame 1, constructed, preferably, of a single length of material, as wire, and of approximately oval shape in plan, being formed at one end with an offset portion 2 to embrace the nose of the patient. While preferably of the shape shown, whereby provision is made for covering the mouth and nose of the patient, it is obvious that said base-frame may be of any other shape desired, as such forms no material part of the present invention.

Braces 3 and 4 extend longitudinally and transversely of the base-frame, said braces being of arcuate shape and permanently secured at their terminals to the base-frame 1. A comparatively rigid structure is thus provided, it being understood that said braces are designed to support the usual gauze or other absorbent material and by virtue of the arcuate shape described provide within the plane of the base-frame a cup-shaped chamber arranged to cover the mouth and nose of the patient.

Immediately adjacent the connection of the braces 3 and 4 with the base-frame 1 each of said braces is formed with a depression 5, designed to receive a clamping ring or frame 6, corresponding in size and contour to that of the base-frame and serving as a clamping medium for securing the gauze in place.

A supporting-frame is rigidly secured to the main frame and projects above the same, said supporting-frame comprising rods 7, preferably four in number, secured at their lower terminals to the base-frame and projecting upwardly therefrom in relatively converging relation, being secured at their upper ends to a ring 8, designed to seat in a groove 9, formed in the outer surface of a vial or other receptacle 10, designed to receive the anesthetic in quantity.

The receptacle 10 is formed with an opening 11, disposed at its lowermost point, and with an entrance or mouth 12, surrounded by a vertically-extending neck 13. Within the receptacle is disposed a tube 14, formed at the upper end with an integral spaced concentric wall 15, between which and the main wall of the tube the neck 13 is received when the tube is in place. The inner surface of the wall 15 and the outer surface of the neck 13 are preferably formed for threaded engagement, as shown, whereby the tube may be held in relatively fixed relation to the receptacle.

The lower end of the tube is formed with a converging or conical-shaped extension 16, the apex of which is open to provide an outlet for the liquid, as at 17. At the juncture of the wall of the tube proper with the conical extension are formed diametrically-arranged openings 18, which when the tube is in place form a means of communication between the receptacle and interior of the tube. At diametrically opposite points in the wall of the conical extension and extending longitudinally thereof are arranged channels 19, communicating at their upper ends with the openings 18 and at their lower ends with the outlet 17, these channels being preferably of gradually-reducing transverse area toward their discharge end—that is, said channels

converge from the openings 18 to the outlet 17. Within the tube is arranged a valve 20, comprising an elongated cylindrical body provided at the upper end with a cap-plate 21 for convenient manipulation of the valve and at the lower end with a conical valve proper, 22, formed with a needle-point 23, designed when the valve is suitably positioned to close the outlet 17 in the tube. The body of the valve is arranged for threaded connection with the interior of the tube, as at 24, whereby revolution of the valve-body will move the valve proper to open or close the outlet 17 to the desired extent.

At the junction with the conical extension the tube 14 is formed with a spirally-arranged lug 25, designed to be engaged by a similarly-shaped recess 26, formed in a cap 27, the body of which is provided with a concentric extension 28, designed to bear against the lower surface of the receptacle. The construction described provides for securing the tube within the receptacle in a manner to guard against leakage therefrom, it being understood that revolution of the cap 27 will, through the medium of the connection described, effectively seal the lower opening in the receptacle and at the same time secure the tube in fixed relation to the receptacle.

It is well known that in the administration of certain anesthetics, such as chloroform, a largely-increased percentage of air as compared with the administration of ether is necessary to avoid suffocation. This increased admission of air has been heretofore gained by the temporary removal of the cone from the mouth and nose of the patient, the regulation of such admission depending entirely upon the skill of the operator.

It is one of the objects of the present invention to render the admission of a necessary quantity of air automatically, thereby insuring the proper proportion of air relative to the nature of the anesthetic used wholly independent of the operator. To this end I secure an auxiliary frame 29 to the main frame of the inhaler, said auxiliary frame corresponding in contour and size to the brace-frame 1 and being adjustably connected to the main frame by connectors 30, rigidly connected at their lower terminals to the auxiliary frame and formed at their upper terminals with eyes 31 to slidably embrace the rods 3 and 4 of the main frame. The connectors 30 are preferably disposed within the plane of the base-frame 1 so that the connectors 30 lie beneath the braces 3 and 4 to avoid interference in securing the gauze in place.

In use with the parts constructed and assembled as described the clamping-frame 6 is removed from the depressions 5 in the braces and the sheet of gauze or other absorbent material placed in position to overlie said braces and the base-frame 1, being passed beneath the clamping-frame 6, as will be understood. Said clamping-frame is then moved downward until it enters the depressions 5 in the braces, and thereby secures the gauze in place on the main frame in an obvious manner. The inhaler being properly applied to the face of the patient, the valve 20 is operated to admit a suitable quantity of the anesthetic to escape through the outlet 17 and onto the gauze. After the initial coma is produced by the anesthetic the valve 20 may be regulated to deliver such determinate quantity of the anesthetic to the gauze as the condition of the patient may demand, thus continuing the administration of the anesthetic entirely automatic and dispensing wholly with the services of the usual assistants for this purpose. It is obvious, of course, that the operator may in his discretion increase or diminish the quantity of the anesthetic being delivered to the gauze by a simple operation of the valve 20, the delivery after such regulation being constant and automatic.

In the use of some anesthetics, as chloroform, it is well understood that a greater proportion of air must be admitted with the vapor of the anesthetic than would be the case with ether, for example. The inhaler of the present invention is particularly designed to provide for this contingency, as in the administration of ether the auxiliary frame is designed to be closed against the base-frame 1, as the quantity of air admitted to the gauze overlying the main frame is sufficient for the proper administration of such anesthetic. In the use of chloroform, however, a largely-increased proportion of air is necessary, and in the administration of this anesthetic with my improved inhaler the auxiliary frame 29 is drawn downward to space it from the base-frame 1, preferably to the full extent of the connectors 30. A space is thus provided between the face of the patient and the main frame which is opened to the free admission of the air, thus admitting to the vapor of the anesthetic the desired quantity of air necessary to the best results without danger in the administration of such anesthetic.

The auxiliary frame may of course be adjusted at varying distances from the main frame to admit an increased or decreased quantity of air, as varying conditions and circumstances may necessitate.

By preference the receptacle 10 is formed with a vent-opening 32, normally closed by a cap 33, serving to admit air to the receptacle to provide for the discharge therefrom of the anesthetic. The receptacle as a whole is designed for removal from its connection with the ring 8 to provide for convenient storage or packing of the inhaler.

The inhaler proper is preferably constructed of wire in order to afford desired lightness

and cleanliness; but it is to be understood that such is not essential and that it may be constructed of other materials, if desired.

It is to be understood that the primary features of the present invention are, first, the application to an inhaler of means whereby a definite quantity of an anesthetic may be constantly and automatically delivered to the absorbent material of the inhaler, the means being adjusted for manual regulation, and, second, the provision in an inhaler of means whereby said inhaler may be manually adjusted to provide for the admission of a determinate and definite quantity of air to the anesthetic vapor to insure the administration of such anesthetic in the manner best suited to the nature of the anesthetic and the condition of the patient.

Having thus described my invention, what is claimed as new is—

1. The combination with an inhaler including a main frame, of a holder comprising a ring, rods depending from said ring and secured to the main frame, of a receptacle formed with an annular groove to receive the ring, a tube arranged within the receptacle and in communication therewith, and a manually-operable valve for controlling the outlet from the tube.

2. An inhaler comprising a main frame designed to support an absorbent material, and an auxiliary frame conforming in contour to the shape of the main frame and movably connected to the main frame, said auxiliary frame being arranged to be moved to adjust the main frame with relation to the face of the patient.

3. The combination with an inhaler for use with anesthetics and designed in normal use to contact with the face of the patient, of means for adjustably spacing said inhaler from the face of the patient to increase or decrease the quantity of air admitted to the anesthetic vapor.

4. An inhaler comprising a main frame designed to support absorbent material, an auxiliary frame to be projected from said main frame to provide a free air-space beneath the main frame, and means for securing the auxiliary frame in projected relation to the main frame.

5. An inhaler comprising a frame designed to support absorbent material, and an auxiliary frame to be projected from said frame to provide a free air-space beneath the main frame; said auxiliary frame being slidably and frictionally connected to the main frame.

In testimony whereof I affix my signature in presence of two witnesses.

GUSTAV A. THIEDE.

Witnesses:
JOHN L. FLETCHER,
DAVID W. GOULD.