

INHALING MASK.

Patented Oct. 8, 1912.

2 SHEETS--SHEET 1.

Fig. 2.

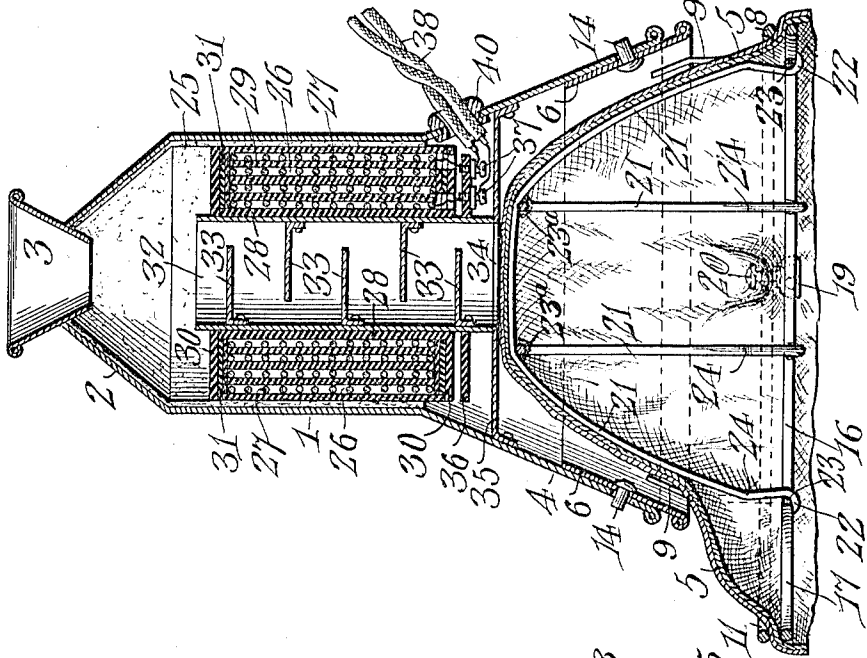
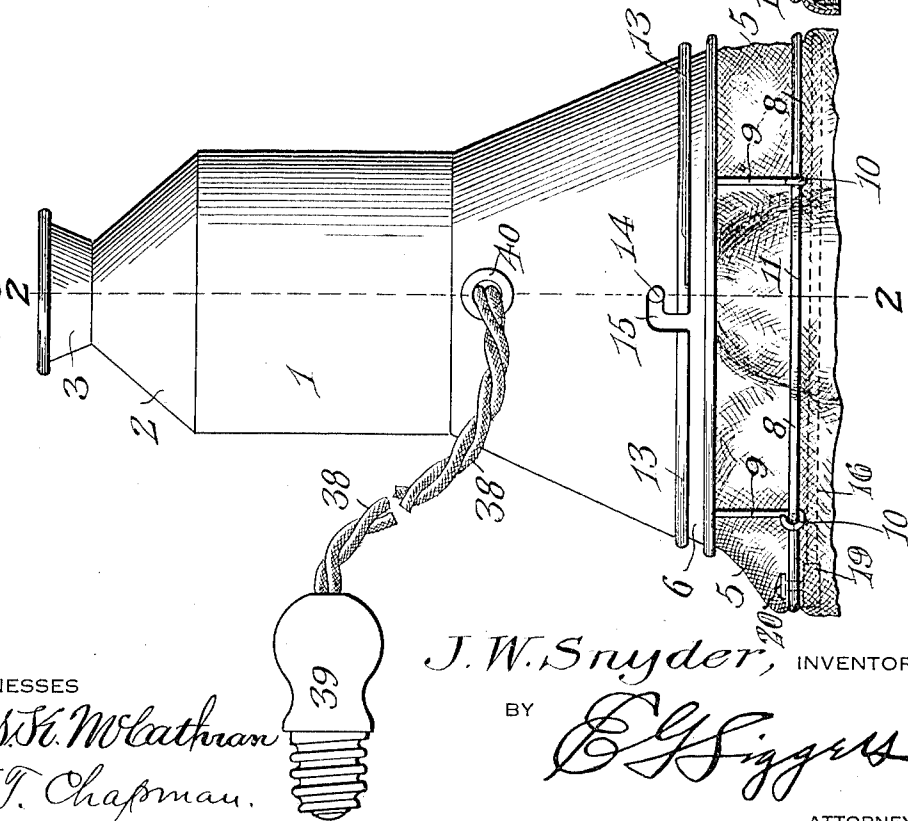


Fig. 1.



WITNESSES

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1,040,801.

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INHALING MASK.
APPLICATION FILED DEC. 29, 1910.

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2 SHEETS—SHEET 2.

Fig. 3.

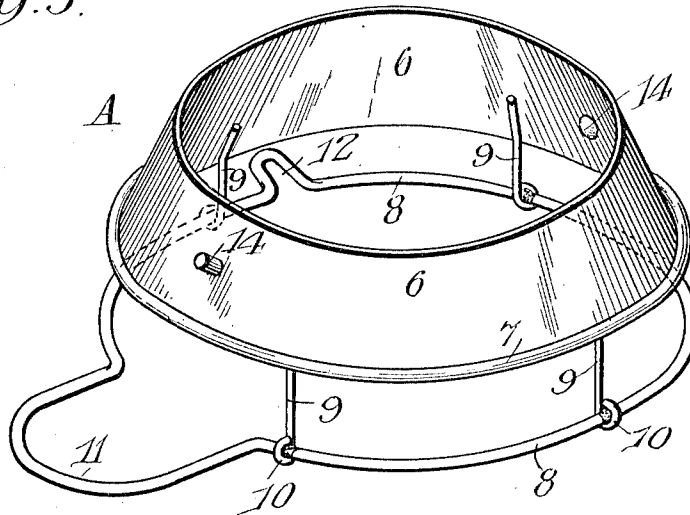
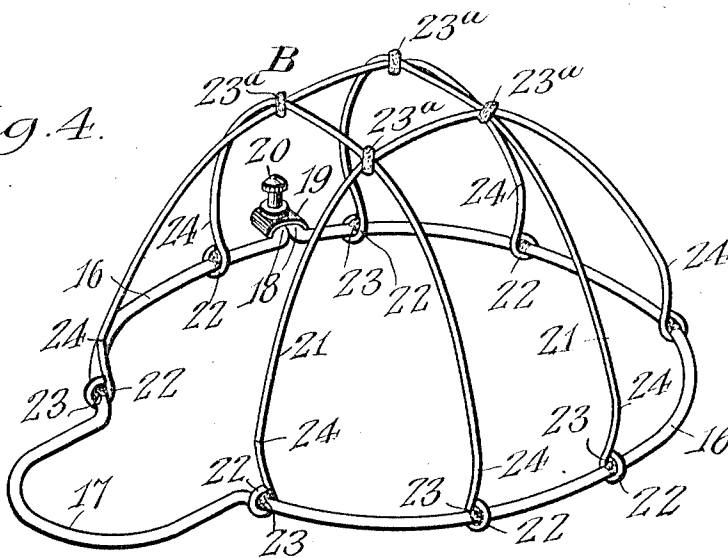


Fig. 4.



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UNITED STATES PATENT OFFICE.

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INHALING-MASK.

1,040,801.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed December 29, 1910. Serial No. 599,976.

To all whom it may concern:

Be it known that I, JOHN W. SNYDER, a citizen of the United States, residing at Michigan City, in the county of Laporte and State of Indiana, have invented a new and useful Inhaling-Mask, of which the following is a specification.

This invention has reference to improvements in inhaling masks, and its object is to provide a means for the administration of anesthetics, particularly ether or chloroform, or the like, whereby the liquid anesthetic is converted into a warm gas which has been proven by experience to be non-irritating to the patient and practically does away with the stage of excitement in anesthesia, the sensations of the patient being in no manner disagreeable and coughing or irritation of the throat being absent.

In accordance with the present invention there is provided a separable skeleton holder for a gauze or lightly woven cloth, such as cheese cloth, which holder is so shaped as to readily conform to the face of the patient, inclosing the mouth and nose, and in conjunction with the mask made up of the skeleton holder and cloth covering therefor there is provided a heater into which the liquid anesthetic is introduced, and through which it may find its way to the cloth covered mask by a sufficiently tortuous passage to insure the vaporization of the anesthetic and the heating of the vapor to a considerable degree.

The heater may be, and preferably is, an electric heater capable of producing a degree of heat which will convert the liquid anesthetic into a gas before it reaches the mask.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that while the drawing illustrates a practical form of the invention, the said invention is susceptible of other embodiments and consequently is not limited to the particular embodiment shown.

In the drawings:—Figure 1 is an elevation of the inhaler. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of one member of the cloth or gauze holder. Fig. 4 is a perspective view of the other member of the cloth or gauze holder.

Referring to the drawings, there is shown a cylindrical casing 1 which, however, may be otherwise shaped, since it is designed to serve simply as a body structure. One end 2 of this casing is shown as of general conical shape and receives and has made fast thereto a funnel 3 with the wide end outward and the narrow end opening into the interior of the conical portion 2, which latter may be termed a neck. The end of the body member 1 remote from the neck 2 is in the form of a frusto cone 4 constituting a receptacle or housing for a portion of the structure constituting the mask proper and designed to fit the face of the patient. This mask is made up of two members which may be designated generally as A and B, respectively, the member A being shaped to receive the member B and lock thereto so as to inclose sheets 5 of cloth, such as cheese cloth, or other gauze or gauze-like material tending to cause an anesthetic reaching the material to spread over the same and which may then readily pass through the interstices of the material. Ordinarily the sheet or sheets 5 are made of cheese cloth which is not only cheap, but is well adapted for the purpose.

The member A, best shown in Fig. 3, comprises a frusto-conical ring 6, preferably of sheet metal, with the basic edge formed into an annular bead 7 for stiffening the ring 6, and in spaced relation to this ring there is a ring 8, preferably of wire connected to the ring 6 by spacing and carrying members 9 also preferably formed of wire, each connected at one end to the inner wall of the ring 7, and at the other end formed into a loop 10 surrounding the wire ring 8 and soldered or otherwise united thereto, so that the rings 6 and 8 are firmly joined. The ring 8 has at one point in its circumference an offset 11, designed to override the nose of a patient when the ring 8 is over the face in a manner to inclose the nose and mouth of the patient. This ring 8 also has at another point in its circumference a small offset 12 for a purpose to be described, the offset 12 being shown as at a point substantially ninety degrees from the offset 11, but may be at any other point. The ring 6 is of a size to fit snugly within the conical end 4 of the body member 1, the wide end of this conical portion 4 being formed with a bead 13 for purposes of strength. The ring 6 is also provided on

opposite sides with projecting pins 14 adapted to bayonet slots 15 in the wide end of the cone 4, so that the ring 6 may be introduced into the cone 4 with the pins 14 entering the open ends of the slots 15, and then by a rotative movement of the ring 6 in the cone 4 the pins 14 may be carried into the closed angle ends of the slots 15 to thereby lock the member A to the body member 1 through the intermediary of the cone portion 4.

The convex member B of the mask proper comprises a basic ring 16 usually of wire with an offset 17 at one point matching the offset 11 and designed to receive the nose of the patient when the ring 16 is in proper position on the face of the patient. The ring 16 has another offset 18 similarly positioned with relation to the offset 17, as is the offset 12 with relation to the offset 11 of the ring 8. Surrounding the offset 18 is a clip 19 carrying a headed pin 20 in position to be engaged by the offset 12 of the ring 8, as will presently appear.

The ring 16 carries a skeleton dome formed of crossed pairs of wire yokes 21 rising from the ring where the ends of the yokes are bent into loops 22 embracing the ring 16 at spaced points therearound, and which may be united to the ring by soldering or otherwise. These yokes 21 where crossing may be bound and soldered, as indicated at 23^a, to unite them firmly together into a skeleton dome, and the legs of the yokes 21 close to where they are formed into loops 22 embracing the ring 16 are bent inwardly toward the center of the loop 16 as indicated at 23, so as to form a hump 24 in each leg of each yoke 21 between the main body of the respective yoke and the end 23 thereof. The yokes 21 and ring 16 are moderately elastic, so that on applying the ring 8, the offset 12 may be caused to embrace the pin 20, and then the ring 8 is moved toward the ring 16 on the pin 20 as a pivot, so that the ring 8 will snap over the humps 24 and seat against the inbent portions 23 of the legs of the yokes 21, thereby locking the mask members A and B together. By placing the sheets 5 over the skeleton dome of the member B and then applying the member A in the manner just described, the sheet or sheets 5 are confined to the member B by the member A in such manner as to override the portion of the face of the patient covered by the mask member B. In order to remove the sheet or sheets 5 the mask member A is pulled away from the mask member B until the humps 24 are passed by the ring 8, and the mask member A is then readily removed to release the sheets 5 which may be replaced by clean or fresh sheets for another patient, assuming that the device has already been used.

The interior of the body 1, and preferably

of the neck 2, is covered by a lining 25 of some insulating, and preferably refractory material, such as asbestos. Fitted within the body member 1 is a heating coil 26 which may comprise separate turns 27 of a suitable resistance conductor, such as German silver, wound upon an insulating core 28 with the successive layers separated by sheets 29 of suitable insulating, and preferably refractory material, such as asbestos, and the exterior of the heating coil may be covered with asbestos. The ends of the heating coil are provided with heads 30 of insulating material with interposed sheets 31 of insulating refractory material, such as asbestos or mica, or both.

The sleeve 28 has lodged within it a tube 32 in turn carrying within it a suitable number of spaced ledges or plates 33, the spacing being in the direction of the length of the tube, and these plates are each carried at one edge by the inner wall of the tube and project therefrom a distance greater than half the diameter of the tube. The plates are arranged preferably in staggered relation one to the other, overlapping at their free edges so as to form a tortuous passage through the tube 32, and this tube is in line with the funnel 3 and axial to the body 1.

When the device is in use upon the face of a patient, the body member 1 is upright and the tube 32 is also upright with the funnel above the same, so that any liquid anesthetic introduced into the device through the funnel 3 will fall upon the then uppermost ledge 33, pass from the edge of the ledge to the next ledge in order, and so on to the lowermost ledge, whence the material will ultimately reach the cloth layer or layers 5.

The tube 32 extends beyond what may be termed the lower end of the heating coil and into the funnel 4, and ultimately passes to an opening 34 in a wall 35 fast to the inner wall of the funnel 4 intermediate of the length thereof, but so positioned as to be closed to that portion of the cloth layer or layers 5 at the crown of the dome formed by the skeleton frame made up of the yokes 21, the wider end of the cone 4 and of the conical ring 6 forming a housing for the greater portion of the mask proper. Between the wall 35 and the corresponding end of the heating coil there is interposed a ring 36 of insulating material designed to carry binding posts 37 connected to the terminals of the heating coil and to these binding posts there may be coupled the terminals of flexible conductors 38 leading to a plug 39 designed to fit an appropriate socket coupled up to a power circuit, such as the ordinary street power circuit of a town or city. Where the conductors 38 are passed through the cone 4 an insulating bushing 40 may be provided.

When it is desired to apply an anesthetic

and the several parts of the device are assembled, the mask proper is placed over the face of a patient, who is assumed to be in the recumbent position, and the plug 39 is assumed to be already inserted in a suitable socket. The device is heated by the coil 26 through which current is caused to pass, the coil being properly proportioned for the purpose, and the ledges 33 and tube 32 become sufficiently heated, so that when a liquid anesthetic, such as ether or chloroform is introduced into the device through the funnel 3 it will fall on the hot ledges and be converted thereby into a gas which is further heated by absorption from the ledges and walls of the tube 32 as it passes toward the distributing sheets 5, and is ultimately drawn into the lungs of the patient by the ordinary action of breathing. The fumes may be intensified by covering the entire device with a cloth; such as a towel, to exclude to as great an extent as desirable the entrance of air to the interior of the mask proper through the portions exposed below the lower edge of the ring 6. If it be desirable that a proportion of air be mixed with the ether or chloroform gas it will find its way through the cloth 5 where exposed beyond the edge of the ring 6, the covering cloth or towel being then omitted.

In the ordinary administration of an anesthetic by means of a cloth cone, the evaporation of the liquid chills the gas, and the vaporization of the liquid is often imperfect, so that some of the anesthetic may reach the lungs of the patient in the form of a vapor instead of a gas. This has been found to produce coughing or irritation of the throat, and the administration of the anesthetic is often disagreeable to the patient.

By the preliminary heating of the anesthetic to the point of gasification before reaching the patient's nose and mouth, the irritation is entirely eliminated and the stage of excitement prevalent in the administration of anesthetics is done away with.

It is found in practice that the heating coil may be raised to a temperature approximating one hundred and fifty degrees centigrade to thereby produce a hot gas from the liquid anesthetic without, however, making the gas unduly hot, but only agreeably warm, while the effect of the warm gas is that already described.

What is claimed is:—

1. An inhaler for the administration of anesthetics provided with a mask for inclosing the respiratory orifices of a patient, and a heater having a continuous tube therein provided with a free passage therethrough for both air and anesthetic and open at the ends only, one end of the passage communicating directly with the atmosphere and the other end of the passage opening directly into the mask, said tube being provided with

a plurality of oppositely directed plates impervious to the anesthetic and rendering the passage tortuous.

2. An inhaler comprising a mask portion for application to the face of a patient, and a heating portion having a centrally located free passage therethrough for air and anesthetic, said passage being open at the ends only with one end communicating directly with the atmosphere and the other directly with the mask and containing a series of oppositely directed overlapping plates or ledges impervious to an anesthetic traversing the passage and defining a tortuous path for air and an anesthetic moving through the passage, and a heater surrounding the passage in direct heat conducting relation to the plates to cause vaporization of an anesthetic and the heating of the same and air traversing the passage before reaching the mask.

3. An inhaler comprising a mask portion for application to the face of a patient, and a heating portion having a centrally located free passage therethrough for air and anesthetic and open at the ends only, one end communicating directly with the air and the other end directly with the mask, and said passage being provided with a series of oppositely directed plates impervious to an anesthetic and spaced apart in the direction of the length of the passage, the plates being supported at one end by the walls of the passage and having their free ends in overlapping relation one to the other to define a tortuous path for the air and anesthetic moving through the passage, and a heating element surrounding the passage in direct heat conducting relation to the walls thereof and to the plates to cause the vaporization of anesthetic and the heating of the same and air moving through the passage before heating the mask, the heater including a member responsive to the passage of an electric current to convert the electric energy into heat.

4. An inhaler comprising a suitable casing having a neck at one end with a funnel entering the neck, and at the other end provided with a portion extending away from the body of the casing, an electric heating coil housed in the casing, a conduit in line with the funnel and extending through the heating coil and provided with means for the retardation of a fluid passing there-through, and a mask structure adapted to the expanded extension of the casing.

5. An inhaler comprising a suitable casing having a neck at one end with a funnel entering the neck and at the other end provided with a portion extending away from the body of the casing, an electric heating coil housed in the casing, a conduit in line with the funnel and extending through the heating coil and provided with means for

the retardation of a fluid passing there-
through, and a mask structure adapted to
the expanded extension of the casing, said
mask structure comprising separable frames
5 for the securing of a distributing sheet
thereto.

6. In an inhaler, a mask structure com-
prising two skeleton frames one provided
with a basic ring carrying a skeleton dome
10 of connected yokes with portions adjacent
the ring of greater lateral extent than at
the point of connection of the yokes with
the basic ring, and the other frame compris-
ing a basic ring conforming to the first
15 named ring and of a size to seat against the
yokes between the points of greatest lateral
extension thereof and the basic ring carry-
ing them, the second named frame having a
conical ring fast to the basic ring in spaced
20 relation thereto.

7. In an inhaler, a mask structure com-
prising two skeleton frames one provided
with a basic ring carrying a skeleton dome
25 of connected yokes with portions adjacent
the ring of greater lateral extent than at
the point of connection of the yokes with the
basic ring, and the other frame comprising
a basic ring conforming to the first named
ring and of a size to seat against the yokes
30 between the points of greatest lateral ex-
tension thereof and the basic ring carrying
them, the second named frame having a
conical ring fast to the basic ring in spaced
relation thereto, and a heater structure hav-
35 ing a conical receptacle for the conical ring

on the second frame, the conical ring and
conical receptacle therefor being provided
with coacting locking means for holding the
mask structure to the conical receptacle.

8. In an inhaler, a mask structure com- 40
prising two skeleton frames one provided
with a basic ring carrying a skeleton dome
of connected yokes with portions adjacent
the ring of greater lateral extent than at the
point of connection of the yokes with the 45
basic ring, and the other frame comprising
a basic ring conforming to the first named
ring and of a size to seat against the yokes
between the points of greatest lateral ex-
tension thereof and the basic ring carrying 50
them, the second named frame having a
conical ring fast to the basic ring in spaced
relation thereto, and a heater structure hav-
ing a conical receptacle for the conical ring
on the second frame, the conical ring and 55
conical receptacle therefor being provided
with coacting locking means for holding the
mask structure to the conical receptacle, and
an electric heater housed in the heater struc-
ture and provided with a passageway 60
through the same leading to the mask struc-
ture and designed to transmit an anesthetic
to said mask structure.

In testimony, that I claim the foregoing
as my own, I have hereto affixed my signa- 65
ture in the presence of two witnesses.

JOHN W. SNYDER.

Witnesses:

MATTHEW J. KENEFICK,
ELMER C. HICKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."