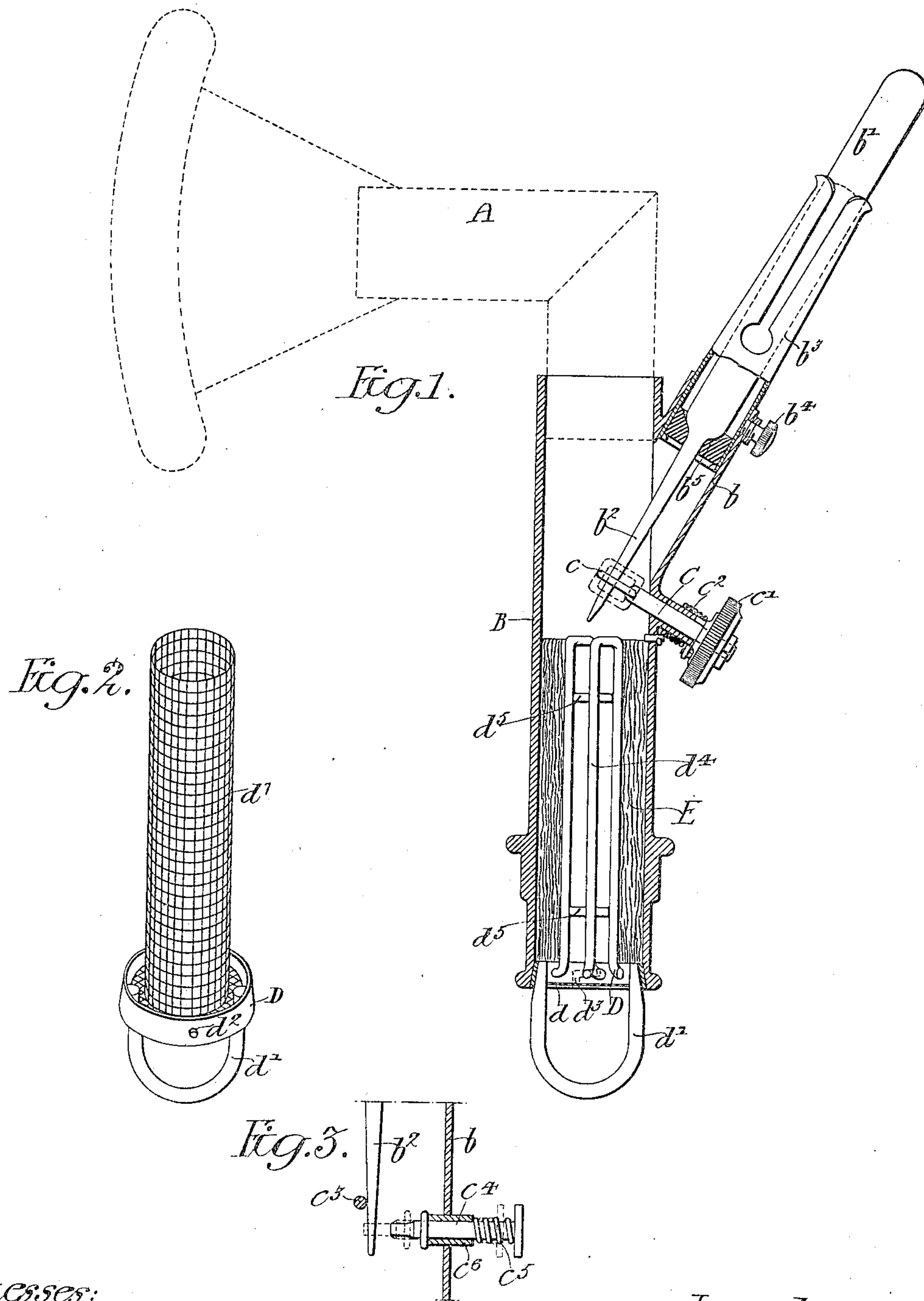


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C. S. BIRT.
INHALER.

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Witnesses:

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UNITED STATES PATENT OFFICE.

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INHALER.

No. 813,344.

Specification of Letters Patent.

Patented Feb. 20, 1906.

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To all whom it may concern:

Be it known that I, CHARLES STUART BIRT, a subject of the King of Great Britain, residing in Birmingham, England, have invented certain Improvements in Inhalers, of which the following is a specification.

One object of my invention is to provide an inhaler so constructed as to receive a capsule or tube containing fluid anesthetic to be administered and which shall include within it a device for breaking or opening the capsule or a portion of the tube in such manner that there shall be no waste or loss of said fluid.

A further object of my invention is to provide an inhaler with means for holding an absorbent, such as cotton, for the reception of an anesthetic, which means shall make it practically impossible to cut off the air-supply to the inhaler either by the absorbent becoming packed or by the freezing of the anesthetic thereon.

These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of my improved inhaler, showing the relative arrangement of its various parts. Fig. 2 is a slightly-modified form of the absorbent-holding device; and Fig. 3 is a modified form of the device for breaking a tube or capsule, so as to permit the anesthetic therein to be delivered to the inhaler.

In view of the fact that many of the anesthetics at present employed in connection with minor surgical operations are of an extremely-volatile nature a very great proportion of the anesthetic is necessarily lost in pouring it upon the gauze or cotton preparatory to the insertion of said gauze in an inhaler of the well-known form. In addition, owing to the rapid evaporation of the anesthetic from the absorbent upon which it is customarily placed, a deposit of solid material is frequently formed which, if said absorbent be held, as is customary, directly in the passage through which is drawn the air supplied to the inhaler, the flow of such air is apt to be seriously interfered with. In order to prevent waste or loss of the volatile anesthetic, I so construct my inhaler that the tube or capsule containing the same is not opened until after its introduction into the inhaler, and, further, I so support the absorbent upon

which the anesthetic fluid is delivered that there is no possibility of the free flow of air being interfered with.

In the above drawings, A indicates a face-piece of any desired construction, to which is connected one end of a tubular structure B, which has a branched portion *b* for the reception of a tube *b'*, containing liquid anesthetic. Tubes, such as those shown, are at present manufactured with a thin forwardly-projecting portion *b²*, which is designed to be broken in order to permit of the delivery of liquid from the tube.

b³ is a removable tubular holder fitting into the branched portion *b* of the tube B and held in position by means of a thumb-screw *b⁴*. Said holder is open at both ends, though partially closed at its inner end by a plug *b⁵*, of rubber or other packing material, which has through it an opening for the passage for the pointed end of the tube *b'*. The opposite end of the holder is provided with a number of longitudinal slots, which permit its parts to yield in order to permit of the entrance of a tube and retain said tube in engagement with the packing *b⁵* after it has been once inserted. In line with the opening in said packing, I provide a revoluble eyelet *c*, carried upon a spindle C, projecting through a suitable bearing in the side of the tubular structure C. This spindle is provided with a head *c'* and has a spring *c²*, tending to retain it in such a position that the eyelet *c* is in a plane at right angles to the line of the anesthetic-tube *b'*.

The lower open end of the tubular structure B is provided with a ring D, having wire-gauze *d* stretched across it and a handle *d'*, whereby it may be manipulated. A pin *d²* on the outside surface of this ring is designed to enter an angle-groove *d³*, (shown in dotted lines in Fig. 1,) so as to retain the ring D in position. Suitably fixed to the said ring, usually by soldering, is a framework *d⁴*, formed, in the present instance, of two elongated U-shaped pieces of wire spaced by two rings *d⁵*. The diameter of this frame is considerably less than the internal diameter of the tubular structure B and under operative conditions is designed to carry upon its outside surface the body of cotton or other absorbent E.

In placing the tube *b'* within its spring-holder *b³* its pointed end is allowed to project through and beyond the packing *b⁵*, and

when said holder is inserted in the branch portion *b* of the tubular structure the pointed end of the tube passes through the eyelet *c*.

If it be desired to use the apparatus, the revolution of the milled head *c'* causes the spindle *C*, and hence the eyelet *c*, to be turned, thereby breaking the thin end *b²* of the tube *b'* and permitting the flow of the liquid therein upon the body of absorbent material carried by the frame *d⁴*. It will be seen that by no possibility can this absorbent interfere with the free flow of air through the gauze-covered ring *D* and said frame into the inhaler, while at the same time the volatile anesthetic is delivered in the most advantageous manner.

If desired, the device shown in Fig. 3 may be employed to break the thin pointed end of the tube *b'*, there being in such case a pin *c³*, extending through the structure *B* to one side of the line of the end *b²* of the tube and a longitudinally-movable spindle *c⁴*, extending through the side of the branch tube *b*. This spindle is normally retained in its outermost position by means of a spring *c⁵*, placed between its head, and a suitable bushing *c⁶* inside of the tube, and in operation is pressed inwardly against the action of said spring, so as to engage the end *b²* of the anesthetic-tube beyond the pin *c³* to break said end.

If desired, the frame *d⁴* may be replaced by a cylindrical structure *d⁷* of wire-gauze, as shown in Fig. 2, carried upon the gauze *d*, or it may be attached to the ring *D* in any desired manner. As before, the body of absorbent for the reception of an anesthetic is wrapped around said cylinder, which is open at both ends to permit of the free flow of air.

I claim as my invention—

1. The combination in an inhaler having a tubular branch portion, of an anesthetic-containing tube, means for gripping and removably holding said tube in said branch portion, and means carried by the inhaler for opening said tube to permit liquid to be delivered to the inhaler from said tube, substantially as described.

2. The combination with an inhaler of a device having resilient portions for holding a tube, means for removably retaining said device in position to permit the tube to communicate with the inhaler, and means for opening the tube to permit flow of liquid therefrom into the inhaler, substantially as described.

3. The combination with an inhaler including a main tubular portion having an opening, of means for retaining an anesthetic-containing vessel in a portion projecting adjacent to said opening, and a device rotatable on an axis substantially at right angles to the line of said latter portion of the inhaler for engaging and breaking a portion of the said anesthetic-containing vessel at will, substantially as described.

4. The combination of an inhaler including a tubular structure constructed to receive and hold an anesthetic-containing tube and a spindle having a device constructed to engage the pointed portion of an anesthetic-containing tube and be rotatable on an axis substantially at right angles to the line of said tubular structure, said spindle extending outside of the tubular structure and being provided with a head, substantially as described.

5. The combination of an inhaler including a tubular structure having a branch portion, means for holding an anesthetic-containing tube in said branch portion, a spindle having an eyelet projecting into the branch portion in line with such tube, means for turning the spindle and a spring for holding the spindle in a definite position, substantially as described.

6. The combination in an inhaler of a tubular section having a branch portion, a tubular holding device in said branch portion a device for breaking an anesthetic-tube carried in the holding device and packing in said holding device for making a tight joint between the same and the anesthetic-containing tube, substantially as described.

7. A tube having in one end a series of longitudinal slots and a body of packing in the opposite end, portions of the slotted end of the tube being resilient and serving to hold a liquid-containing tube against said packing, in combination with an inhaler, substantially as described.

8. An inhaler including a tubular portion, with a removable frame and absorbent material supported on said frame in such manner as to leave a free passage for air, substantially as described.

9. An inhaler including a tubular portion open at one end, an elongated frame removably held in said end, and a body of absorbent material on the frame so disposed as to permit an unobstructed flow of air into the inhaler, with an anesthetic-containing vessel and means within the inhaler for opening said vessel to permit the delivery of an anesthetic to said absorbent material, substantially as described.

10. The combination in an inhaler of a casing having an opening, a ring having a frame removably held in said opening, with a body of absorbent material on said frame, an anesthetic-containing tube, and a device within the casing for opening the tube to permit flow of liquid therefrom to said body of absorbent material, substantially as described.

11. The combination in an inhaler of a tubular structure having an opening, a ring carrying a substantially cylindrical frame and movably held in said opening, and a body of absorbent material upon the cylindrical surface of said frame, an anesthetic-containing tube and a device within the structure and operative from without the same for opening

the tube to permit liquid to flow therefrom to said absorbent material, substantially as described.

12. The combination with an inhaler of a casing having an opening, a gauze-covered frame removably held in said opening, an elongated frame carried by said first frame, a body of absorbent material on said frame, an anesthetic-containing vessel, and a device within the casing for opening said vessel to permit of flow of liquid therefrom to said absorbent material, substantially as described.

13. The combination in an inhaler of a casing having an opening for air, a frame adjacent to said opening, and a body of absorb-

ent material upon said frame so disposed as to permit the free flow of air into the inhaler, an anesthetic-containing vessel, and a device within the casing and operative from without the same for breaking said tube to permit flow of liquid therefrom to the absorbent material, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES STUART BIRT.

Witnesses:

K. THEODORE BAKER,
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