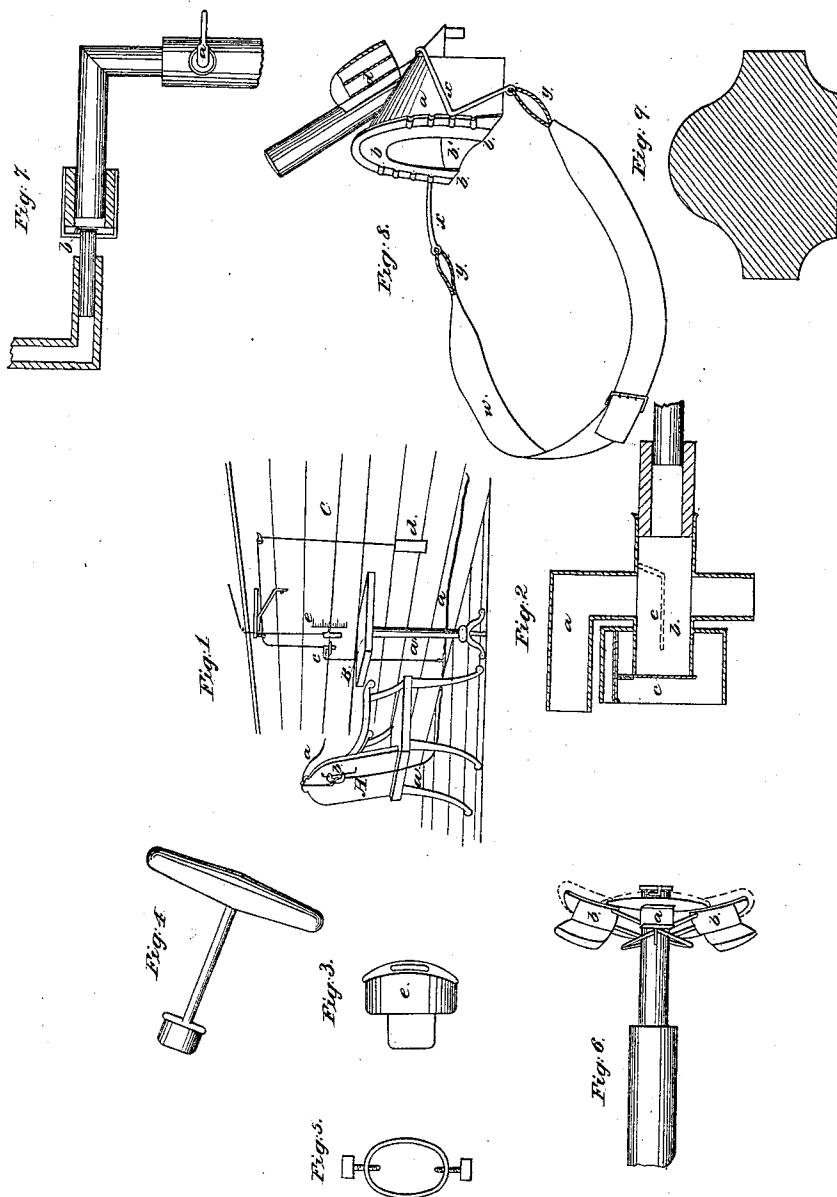


W. Z. W. Chapman,

Inhaler,

No 77,168,

Patented Apr. 28, 1868.



Witnesses:

J. H. Bennett
A. Clark

Inventors.

W. Z. W. Chapman

United States Patent Office.

WILLIAM Z. W. CHAPMAN, OF NEW YORK, N. Y.

Letters Patent No. 77,168, dated April 28, 1868.

IMPROVEMENT IN INHALING GASES.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, WILLIAM Z. W. CHAPMAN, of the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Inhaling Gases and Vapors, &c., for surgical and other purposes; and I do hereby declare and ascertain my said improvements, referring to the accompanying drawings illustrating the same.

My present improvements are in the details of construction and employment of apparatus for inhaling gases applicable to the practical and convenient use of the same, especially in dental and other like operations.

The construction is as follows: The general view of an entire apparatus is shown in Figure 1, where A is an operating-chair, on which the patient is to be seated; B is the operator's table; C is a partition-wall, from which a portion of the apparatus is suspended. The gas-reservoir or gasometer is not shown, it being of ordinary construction, and is generally put in an adjoining room. *a* is a pipe leading from the reservoir of gas to the chair, and conveying gas to the patient. A portion of this pipe, *a'*, may be made flexible. It extends up behind the chair to a valve-apparatus, *b*, which is attached, either stationary or so as to slide in any direction, upon the chair or some other convenient fixture. From this valve-apparatus *b*, a pipe extends up over the chair, with proper supports to the apparatus, through which the patient breathes. Another branch, *a''*, of the gas-pipe *a* branches off from it, and connects with a mouth-respirator, *c*, which is sustained when not in use by a cord and counter-weight, *d*, spring, or other convenient device convenient to the hand of the operator for application to the patient, and, when freed from use, returning to its suspended position out of the way of the operator's instruments, and without his effort. I also connect, with the gas-reservoir, an index or register, in a position convenient for the operator to note, as at *e*, in fig. 1, which will at all times show the quantity of gas at the command of the operator, which is very important in practice.

The details that are new in this general apparatus are as follows, and may be considered as improvements upon the apparatus formerly patented by me.

Figure 2, of the drawing, shows an arrangement of inhaling and exhaling-pipes, that enables me to dispense with a valve in the inhaler, one valve, closing the exhaler, being alone necessary. In this device, *a* is the inhaling or gas-pipe connecting with the reservoir. It enters the breathing-tube or exhaler *b* at right angles thereto, this latter being a straight tube, having a valve, *c*, to close it, that opens outward, through which the breath of the patient is exhaled by the opening of said valve. When inhaling, the valve *c* closes, and the gas is drawn in through pipe *a* aforesaid, and it will be noticed that owing to the relative position of the two pipes, the tendency to force the exhaled breath into the gas-pipe is obviated without the necessity of a protecting-valve to close it.

I have herein described and shown the gas-pipe at right angles to the exhaler, where they unite, but other angles may be adopted; for instance, the gas may flow parallel with the exhaler, and thence through an opening into it. This is illustrated by the introduction of a partition, as shown by the dotted lines *e* in the figure. These are types, but the varieties of form are numerous, the device being a straight exhaling-tube, with an opening for the flow of gas into it on one side.

In my former patent I describe a tube, *e*, having a piece, *e'*, to cover the tongue, said piece *e'* being placed between the teeth.

Figure 3 represents a modified form of this device, which may, if the piece itself is not broad enough, have wings or projections on each side. I employ this for opening the jaws to a sufficient width, and to prop them open when necessary. To effect this, I can insert a key (see Figure 4) into the tube *e*, which it fits, and turn the tube, which is between the jaws, at right angles, so as to have its longest axis presented as the prop on which the teeth or gums rest, as the case may be, while the patient is insensible.

Figure 5 is a modification of this prop, where screws are used, to expand it; and it is obvious that various other mechanical equivalents can be used for the screw for expanding the prop, that will effect the same purpose of opening and expanding the opening of the jaws.

In my former patent, before referred to, I have a device for holding the lips, to prevent the admission of external air when they collapse under the influence of gas, &c. For this purpose I have since devised an

expanding mouth-piece, shown in Figure 6. This is an oval device, made in three parts, so grooved on its exterior edges as to allow the lips of the patient to rest therein. When this is inserted, the two wings or side pieces *b* can be expanded or made to slide outward, so as to stretch out the lips and make them fit the groove, securely excluding the air, as in the other case, while gas is being administered. This expansion can be effected by the hand of the operator or by any convenient and well-known mechanism. This device may also be employed in the nostrils should it be desired to administer gas through them by this means. I sometimes border the mouth-piece or plate with India rubber, as shown by red lines in the fig. 6, and it can be employed as a mouth-stopper when gas is administered through the nose alone, or an India-rubber cover may be substituted therefor.

When the external air is to be excluded from the lungs, and the mouth is required to be open for an operation within it, while gas is being inhaled through the nose, I employ a diaphragm or valve of thin rubber, as shown at Figure 9, inserted into the mouth, back of the teeth, but in front of the air-passage from the nostrils, thus cutting off the communication between the mouth and the lungs, and retaining that through the nose open. I can, if desired, pass a gas-tube through this diaphragm, and admit gas in that way to the lungs while operating in the mouth, or with the mouth open. A wet sponge or other diaphragm suitable for the purpose may be substituted for the India rubber above named.

I have experienced some difficulty in keeping the various joints of my apparatus tight until I devised an India-rubber joint, or other suitable elastic material, composed of a layer of India rubber or tubing, compressed between two rigid tubes, conical or otherwise; and this I have found efficient, enabling me to turn the parts at the joint, or take them apart and replace them without injury to the air-tight integrity of said joints. I represent this at Figure 7, in section.

I have found in some protracted cases that it was necessary to continue the supply of gas for breathing while the mouth was free for operations. I have therefore devised for this purpose an independent nose-respirator, in some particulars analogous to that used in my former patent, in conjunction with my mouth-respirator.

On the back of the operating-chair, as has been hereinbefore indicated, there is a valve-apparatus, shown in detail at fig. 7, in which there is a stop-cock at *a*, and a self-operating valve *b*, which rests against a raised valve-seat, as seen in the figure, which insures a perfect closing of the valve without adhesion. This device I adopt for all my self-acting valves. From this apparatus, a flexible pipe leads to the nose-piece.

The nose-piece is represented at Figure 8, *a*, of metal or other suitable material, to cover the nose, having on its edge next to the face a margin of elastic or flexible material, *b*, projecting inward, and fitting around the nose, so as to exclude the air therefrom. This flexible margin *b* may be single or double, and may be affixed in any convenient way. It may be so jointed as to embrace the nose like a pair of tongs, or in any convenient way applied that secures the result of surrounding the nose air-tight, without closing the nostrils, which would prevent the entrance of the gas. That portion of the elastic margin *b'* under the nose may be separate from the rest, or otherwise, and can be made to slide in or out to suit the formation of the features; and there can be a small mucus-receiver connected with the cap, if found necessary, and the cap is supplied with a self-acting exhaling-valve, *d*, in any convenient position.

To properly connect this device with the patient, a strap or band, *W*, (see fig. 8,) may be used to surround the head, and connected by proper attachment to the nose-piece, that shown in the drawing being a curved metal bar, *x*, attached to the band *w* by elastic bands *y*, metal bar resting in the notches in the flanch on the nose-cover, so as to be readily raised or lowered to bring the pressure on the proper point.

I sometimes omit the induction-valve at *b*, fig. 7, and connect the pipe for gas with this apparatus, as in the mouth-apparatus. With this apparatus I propose using any anæsthetic that may be found advisable.

Having thus fully described my improved apparatus for anæsthetic and other purposes, what I claim, and desire to secure by Letters Patent, is—

1. Placing the gas-pipe *a* in said apparatus at an angle with the pipe *b*, for inhaling through, to obviate the necessity of a valve to prevent the return of the exhaled gases into the gas-pipe, substantially as herein described.
2. I also claim the expanding mouth-piece, constructed and arranged substantially as and for the purposes set forth.
3. I also claim a suspending-device, employed in combination with the breathing-apparatus, by which the same is drawn out of the way, and supported when released by the operator, substantially as and for the purposes set forth.
4. I also claim the formation of the joints of the apparatus by compressing the elastic tube between the surfaces of two rigid tubes, as above specified.
5. I also claim the construction and operation of the breathing-apparatus, substantially as herein described, so as to administer the gas, if required, during an operation, or while the mouth is open and free therefor, as well as before the patient is rendered insensible, substantially as above specified.
6. I also claim affixing a gas-inhaler to the nose of a patient by the employment of an apparatus, substantially as herein described, in combination with said inhaler, so as to administer gas while the operator is free to operate upon the patient without the aid of an assistant, as would otherwise be required.
7. I also claim affixing the apparatus either to the operating-chair or other suitable permanent fixture, so as to relieve the operator or patient of the weight and annoyance of the apparatus, while it is at all times ready for use without other aid, substantially as herein described.
8. I also claim the devices illustrated in figs. 3 and 5, adjustable or otherwise, substantially as there represented, for opening the jaws of the patient, as herein set forth.

9. I also claim the employment of an indicator in combination with a respirator and gas-receptacle, presenting to the eye of the operator at all times the state of the apparatus and the supply and quantity of gas taken, substantially as and for the purposes set forth.

10. I also claim the diaphragm, substantially as described, to be placed in the mouth, to cut off communication between the lungs and the external air through the mouth when the mouth is open.

WM. Z. W. CHAPMAN.

Witnesses:

J. J. GREENOUGH,
STEPHEN G. CLARKE.