G. H. HURD.
Inhaler.

No. 219,400. Patented Sept. 9, 1879.

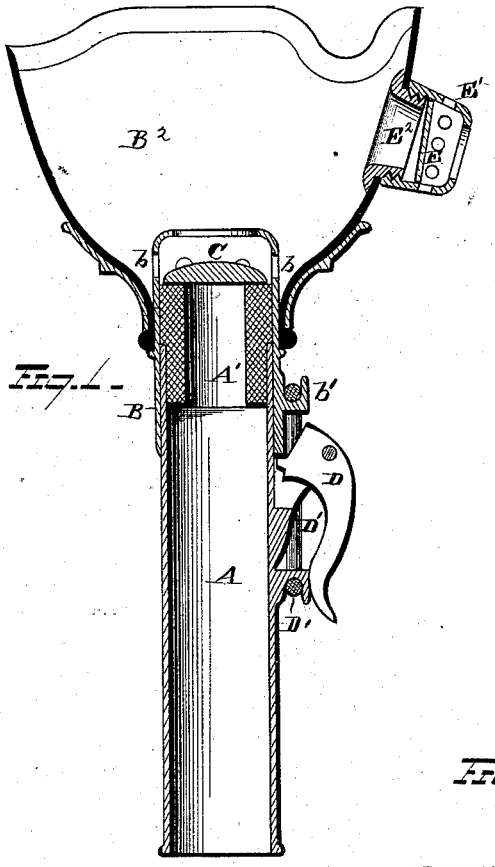


Fig. 1.

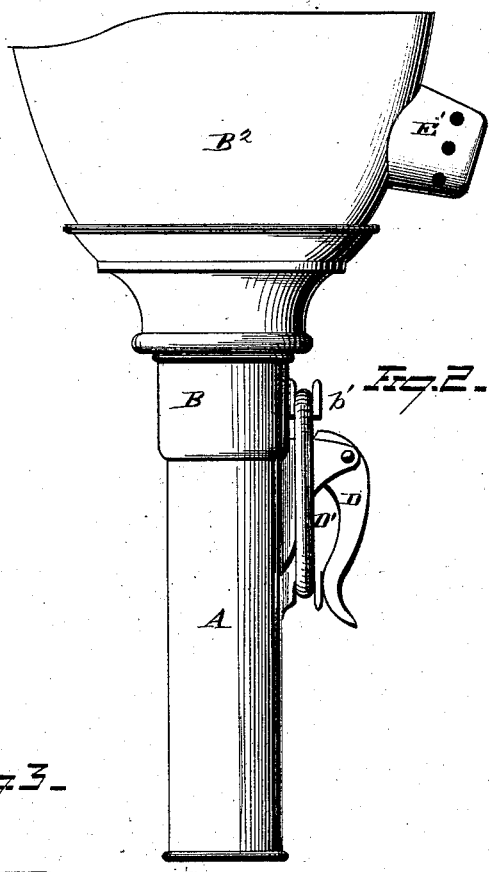
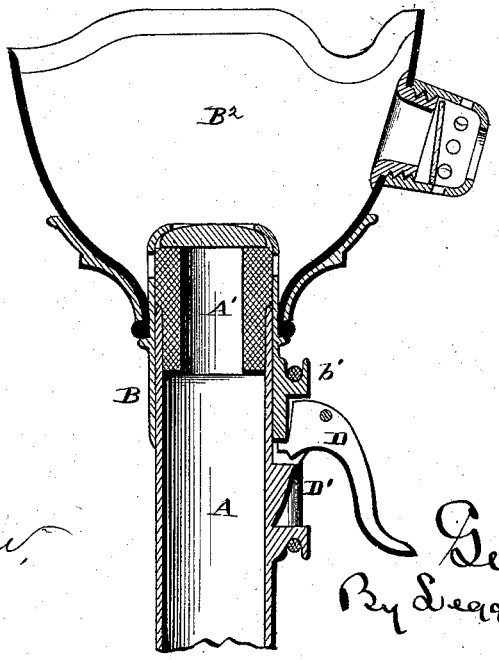


Fig. 2.

Fig. 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

GEORGE H. HURD, OF CLEVELAND, OHIO.

IMPROVEMENT IN INHALERS.

Specification forming part of Letters Patent No. **219,400**, dated September 9, 1879; application filed June 19, 1879.

To all whom it may concern:

Be it known that I, GEORGE H. HURD, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Inhaling Nitrous-Oxide Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to apparatus for inhaling nitrous-oxide gas, ether, and other like matter; and consists in the construction hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal central section of a device embodying my invention, representing the finger-lever as depressed and the tube open. Fig. 2 is an elevation of the same. Fig. 3 is a longitudinal central section, representing the finger-lever as free and the tube closed.

In the said drawings, A is a tube leading from the retort or gas-reservoir. The end of this pipe is provided with a piece of rubber tubing, A′, turned down true upon its end, so as to secure a snug bearing upon the valve. B is a tube connected with the mouth-piece. This tube is adapted to slip upon the tube A, but at its other end is perforated around its circumference at *b*, as shown, and its outer end is turned over, so as to inclose a wooden button or other suitable valve, C. D is a lever attached to the pipe A, and *b′* is a stud attached to the section of pipe B. D′ is a rubber band or other suitable spring, which operates to hold the stud *b′* snugly against the lever D, so that when the lever is free the stud and lever are held together, and in that position the end of the rubber tube A′ closes the openings *b* and presses firmly against the button C, so as to effectually prevent any escape of gas from the valve. When, however, the lever D is depressed with the thumb or finger, the section B is forced outward from the rubber tubing A′, and the perforations *b* are opened, so that the gas may escape therefrom into the mouth-piece B^2.

E is a loose button-valve inclosed in a suitable cage, E^1. This valve closes by a suction from within the mouth-piece.

The operation of this device is, briefly, as follows: The mouth-piece B^2, being formed of rubber or metal, or other suitable material, is placed over the mouth and nose of the patient, and by pressing with the finger or thumb upon the lever D the pipe A is opened, and the patient with every inspiration draws the gas from the pipe A through the orifices *b*. With every expiration the button C closes back upon the end of the rubber tubing A′, and at the same time the button E is forced out from its seat, so that in making an expiration the breath is forced out through the cage E^1 to the exterior, and then again, upon making an inspiration, the button E closes upon its seat, while the button C is freed from the end of the tube and the operation is repeated.

When the patient is sufficiently under the influence of the gas or ether, the operator releases the lever D, when the spring brings the section B down upon the tube A and closes the said tube.

This apparatus will be found very convenient, inasmuch as the supply-valve closes automatically by simply releasing the hold upon the pipe, whereby the operator, if he be a dentist, for instance, may hold his forceps in the same hand that holds the tube. With one finger he may open the valve by pressing upon the lever, and when the patient is sufficiently under the influence of the gas may simply drop the mouth-piece from his hand and not wait to turn a valve, as is necessary in the devices heretofore employed.

It is apparent that the inner end of the pipe B, adjacent to the orifices *b*, might be made in the form of a close cap, against which the rubber section A′ might close and stop the flow of gas; but I prefer to make it open and employ the button-valve C, so that in the process of expiration this valve will be forced against the end of the tube A′ and cut off the flow of gas without releasing the lever D.

The object in making the section A′ of rubber or flexible material is that it may more effectually close the orifices *b* and form a snug bearing upon the button. Moreover, it is not injuriously affected by the moisture of the breath.

The exhaling-valve E may be of any suitable form, so that it shall close certainly and quickly, thus preventing any inhalation of air

from the exterior. This is important, inasmuch as it is desirable that no air should be inhaled with the gas. I accomplish this by making a flexible valve with a solid seat, or a solid valve with a flexible seat. The device shown is believed to be very effectual for the purpose, in which the button E is of flexible rubber and the valve-seat of metal. So, also, the cage E^1 screws upon a plug, E^2, which is projected through the mouth-piece from the interior, so that the cap E^1 comes down flush against the material of the mouth-piece, and causes the latter to serve as a packing to prevent air from entering at the joint.

The portion B^2, which is termed the "mouth-piece," is adapted to embrace both the mouth and the nose, so as to cut off the possibility of inhaling air with the gas. This mouth-piece may with propriety, therefore, be termed a "face-piece."

What I claim is—

1. An inhaler consisting of the combination, with the supply-pipe A, of a telescope-section, B, and lever D, the said portions A and B constituting a valve, which may be opened by pressing upon the lever and closed by releasing it, substantially as and for the purposes described.

2. The pipe A, provided with a rubber or flexible section, A′, in combination with a telescoping section, B, provided with orifices *b* and valve C, substantially as and for the purposes described.

3. The combination, with pipe A and telescoping section B, of lever D and spring, whereby the valve is closed automatically by releasing the lever, substantially as and for the purposes described.

4. The combination, with the mouth-piece B^2 and telescopic section B, having inhaling-apertures, of the valve C, which is inclosed by the end of said section, being folded over the same, and the flexible section A′, substantially as set forth.

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

GEORGE H. HURD.

Witnesses:
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