Instructions for making and administering nitrous oxide : as an anesthetic in extracting teeth, and for minor surgical operations.

INSTRUCTIONS

FOR

MAKING AND ADMINISTERING

NITROUS OXIDE,

AS AN ANÆSTHETIC

IN

EXTRACTING TEETH,

AND

FOR MINOR SURGICAL OPERATIONS.

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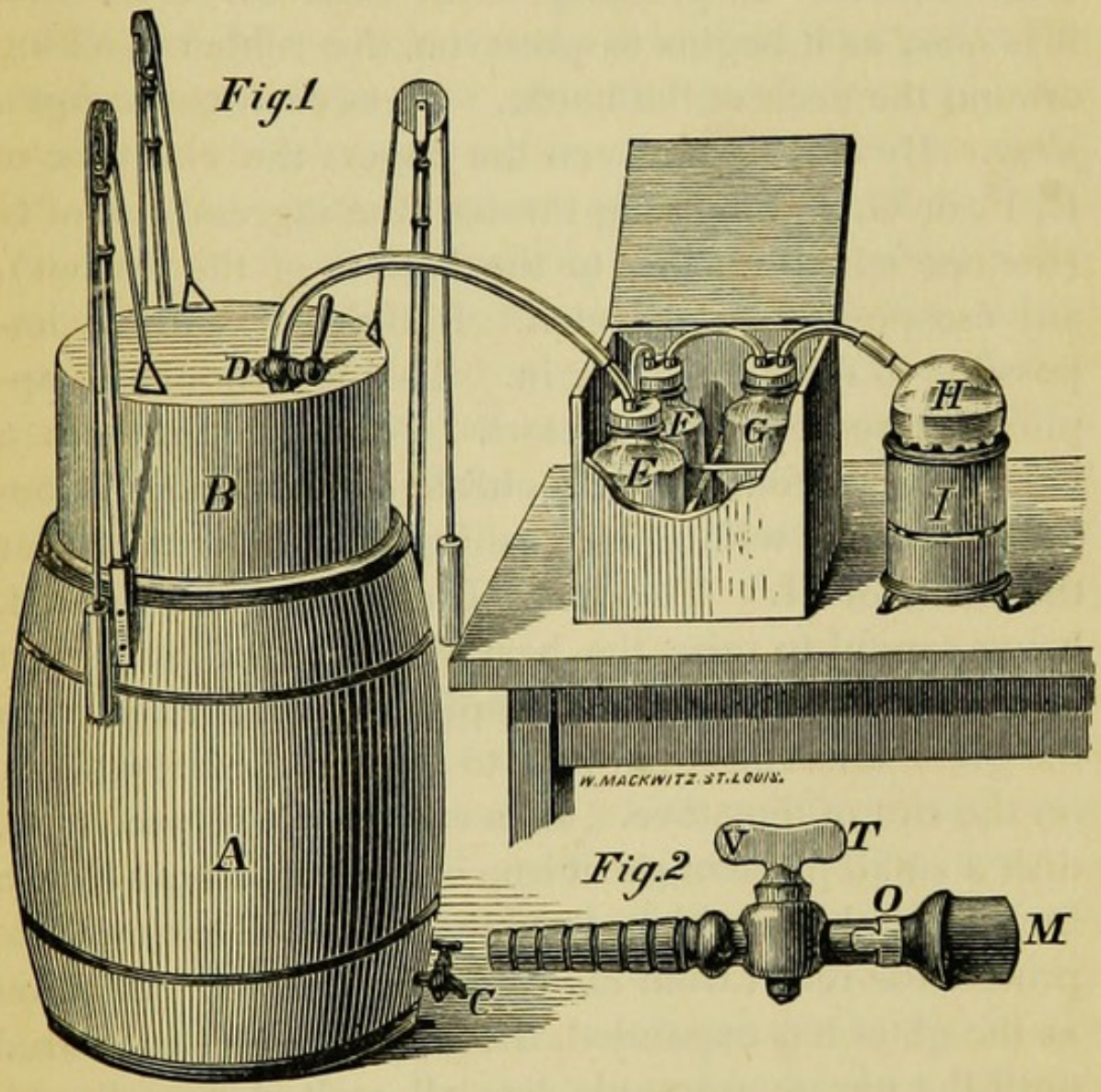
DIRECTIONS FOR USING A. M. LESLIE & CO'S COMPACT OFFICE APPARATUS, FOR THE PRODUCTION AND ADMINISTRATION OF NITROUS OXIDE OR LAUGHING GAS.



Arrange the apparatus as shown in the above diagram, Fig. 1. Observe, in unpacking, that the barrel A, (which forms a tank,) should be opened at the end marked O. Having removed the contents, place the zinc reservoir B, mouth down in A. Insert faucet C, (used in emptying the tank) in place. Screw on the

columns which support the weights. Attach the weights to the cords. Open faucet D, that the air may escape from B. Fill the tank A with water until B is covered. Slip the end of the half inch rubber tube over the end of faucet D. Fill the washing bottles E, F, G, with water to within about two and a half inches of the covers. In pressing down each cover see that it is *level* as it begins to press on the rubber packing around the neck of the bottle. Press each cover down *firm*. By closing between the fingers the exit tube of E, F, or G, and blowing through the ingress one of G (the one which reaches to the bottom of the washer), any escape will be detected. If tight, it will be impossible to force much air in. This test should be applied before heating the retort. Fill the retort from a half to three-fourths with nitrate of ammonia. Connect the retort with G by pushing the rubber tube over the neck of H. The stove I may now be lighted, being careful to raise the heat very gradually the first few minutes. We usually apply the heat directly to the glass, allowing the retort to rest on the triangle or on the rim of the stove. If a sand bath is preferred, dish a small piece of sheet iron and place in it an eighth inch of sand, on which place the retort. Be careful to protect the retort from *currents* of cold air. As soon as the glass has expanded, the heat may be increased until the nitrate ammonia has all melted to a liquid. This requires a heat of over 400 deg. F. In a short time, as the heat approaches to 500 deg., ebullition will arise, caused by the formation of the gas. This ebullition will continue until the complete evaporation of the liquid. After sufficient gas has passed through the washers to displace the air in them, the connection

should be made with the reservoir B. To do this, slip the end of the exit tube (the short one) of E into the end of the tube which connects with faucet D. As the gas is generated it will pass into the reservoir, causing it to ascend. The production of the gas should be stopped when the lower rim of B is within an inch of the surface of the water.

The *chief care* required in making the gas is the *regulating of the heat* after the gas begins to come over. If white vapors are seen in either of the washers, or a dense vapor is observed in the retort, the heat must be diminished gradually until the cloudiness disappears. When the heat is kept too high the nitrate ammonia is wasted, and a gas, unfit for respiration, is produced. The operator must be satisfied with a steady, gentle flow of gas, filling the reservoir in about ninety minutes. Gas thus made, passed through water only, may be inspired immediately if made from good nitrate ammonia.

In reducing the heat care must be observed, not to entirely arrest the production of gas in the retort, as thereby a vacuum is formed, which will be immediately filled by water from G, resulting often in the destruction of the retort. To guard against a similar result, when it is desirable to stop generating the gas, the ingress tube of G should be compressed tightly in the fingers before the lamp is extinguished. In a few moments the pressure in the washers is reduced, and the water will not be expelled. The retort should now be withdrawn from the rubber tube.

THE ADMINISTRATION OF NITROUS OXIDE.

The oldest mode, and the one still pursued by some, is to place from five to eight gallons of the gas in a rubber bag having a faucet in it. [See Fig. 2.] The end of the faucet is inserted into the patient's mouth, the lips closed around it, the nostrils closed by pressure of the thumb and finger of the operator or an assistant, or in some instances the patient can be trusted to do this. The patient is then instructed to breath from, and into the bag, until anæsthesia is produced.

By this process the carbonic acid gas exhaled is mixed with nitrous oxide, and consequently, is partially, at least, returned to the lungs.

This is very justly objected to by most operators on account of the known poisonous effect of carbonic acid gas when inhaled.

It is thought by many better in nearly every case to use an inhaler arranged with valves so that the exhalations pass into the atmosphere.

There have been several such introduced. The latest improvement (which is of our own devising), is the one we issue with our apparatus. It possesses the advantages of *simplicity*, *efficiency*, and *cheapness*. It also is convertible in a few moments to inhalation on the old mode by a slight change of position of the valves.

By the use of a valved inhaler, the gas may be drawn from the gasometer through a good-sized rubber tube without the intervention of an inhaling bag. This can be neatly arranged if the apparatus can be placed in an adjoining room, carrying the tube through the partition near the chair. If the bag is preferred, one

holding six to eight gallons will be large enough for general use for adults. A smaller quantity for children will suffice.

To secure anæsthesia it is *indispensable* that the nostrils be closed, and the lips close perfectly on the mouth-piece. When the patient fails to do this, the operator or his assistant should pinch up the angles of the mouth. If the atmosphere is allowed to mix with the gas when inhaled, the power of the gas is neutralized, and anæsthesia is not secured.

The effect of the first few inspirations of the gas in most persons is a pleasant state of excitement, at which point, if the supply of gas is arrested, some will show a pugilistic, some a poetic, some an oratorical, and others a dramatic disposition, while many laugh immoderately. A few more free inspirations of the gas will carry most persons rapidly beyond this point into the full anæsthetic state. When they are nearing this point their breathing generally becomes loud and full, and in many cases the face becomes slightly purple. The change will be observed first on the lips. This change in color of the skin is, we believe, much more frequently observed in the old mode of inhalation from a bag and inhaler without valves.

The average time required to produce anæsthesia is said to be ninety seconds, and the average time of its duration thirty seconds. In this short time it is possible to extract six or more teeth or fangs, *provided* they are exposed enough to be seized readily.

In extracting fangs firmly embedded in the alveoli those forceps made to cut through the gum and alveolus, and embrace these and the fang at one operation, are much used.

The rapidity with which the influence of the gas passes away is the chief objection which can be made to it. This is felt, however, only in difficult cases.

It is customary, when necessary, to give the gas more than once at the same sitting. In giving a second dose care must be had that hemorrhage has ceased, and that the mouth and fauces are clear of blood and water, as in inhalation, these might produce suffocation.

It should not be given a second time at the same sitting if it has been difficult to obtain anæsthesia, or if it excites headache or the circulation unduly. It should not be given soon after eating a full meal. A patient liable to hemorrhage or tubercular destruction of the lungs, or heart disease, should not be given the gas to the extent of anæsthesia. As consciousness is recovered the patient should be brought forward and instructed to clear the throat of blood.

For the medicinal use of this gas in various abnormal states of the body the reader is referred for information to "ZEIGLER ON NITROUS OXIDE."

Should a patient show any serious spasmodic action during inhalation, the mouth-piece should immediately be removed, the patient made to lean forward that the glottis may be relieved of the pressure exerted on it when the head is thrown back. A few inspirations of air will generally restore proper action.

In using other anæsthetics there occurs a closure of the jaws in some patients. This also occurs with nitrous oxide. While it is possible frequently to compel the opening of the jaws by force, a more efficient mode is, before inhaling, to insert between the teeth a cork or piece of wood notched so as to retain its position on the teeth.

For the reason that, to most persons, the purple hue of the lips is alarming, and because some patients groan and exhibit other signs of great pain, some shrewd operators refuse admission to spectators.

The operator should test each lot of gas. If it is good it is void of all pungency, and is as pleasant to breathe as the atmosphere. If it is found to irritate the throat it must be allowed to stand in the reservoir over water until it becomes bland. To purify such gas when the rubber reservoir is used, three or four gallons of water should be poured into the reservoir. Shake the contents well and allow it to lay a few hours before using the gas.

The bag is filled from the reservoir by the aid of a short rubber tube (supplied with the apparatus,) which fits into the mouth-piece and into the tube attached to faucet D.

Some operators place in G a saturated solution of sulphate of iron, and in F a solution of caustic potash. These are *remedies* for carelessness, and it is much better to prepare the gas with care.

As water has the power of absorbing its bulk of this gas, loss is incurred by the frequent change of the water in the tank and washers. Our rule is, change it only when it becomes offensive or ceases to make good gas.

DESCRIPTION OF LESLIE'S VALVED INHALER—[FIG. 2.]

This is the ordinary rubber inhaler with two very simple modifications, which make a more efficient valved inhaler than those generally in use.

The end marked M is the mouth-piece, which, for description, we name the front. The opposite end, over which the bag (or large tube when inhalation is made from the reservoir) is slipped, we call the back. The part marked T we call the tap.

If the tap is removed it will be observed, that inside of it is placed the *ingress* valve on the side marked with a V on one arm of the tap. During inhalation (using it as a valved inhaler) this V arm should always be turned towards the back end of the inhaler. O is the *egress* or exhalation valve.

By turning this V arm forward a quarter of a circle and slipping the valve back a little, the patients may inhale atmospheric air until they understand how to keep the lips closed around the mouth-piece and the nostrils closed. This gives timid patients time to recover, and is economical in gas with dull ones.

This inhaler can be altered immediately and used without valves. To do so slip the soft rubber ring O back over the opening at O; this closes it. Remove the tap and press the free end of the inner valve back into the end of the chamber it lays in. If it does not readily remain there, retain it by a wad of paper or a piece of rubber pressed into the end of the chamber. Or remove the valve by withdrawing the piece of rubber which holds the valve in place.