

**Liquefied nitrous oxid and compressed oxygen and apparatus for their administration / The S.S. White Dental Mfg. Co.**

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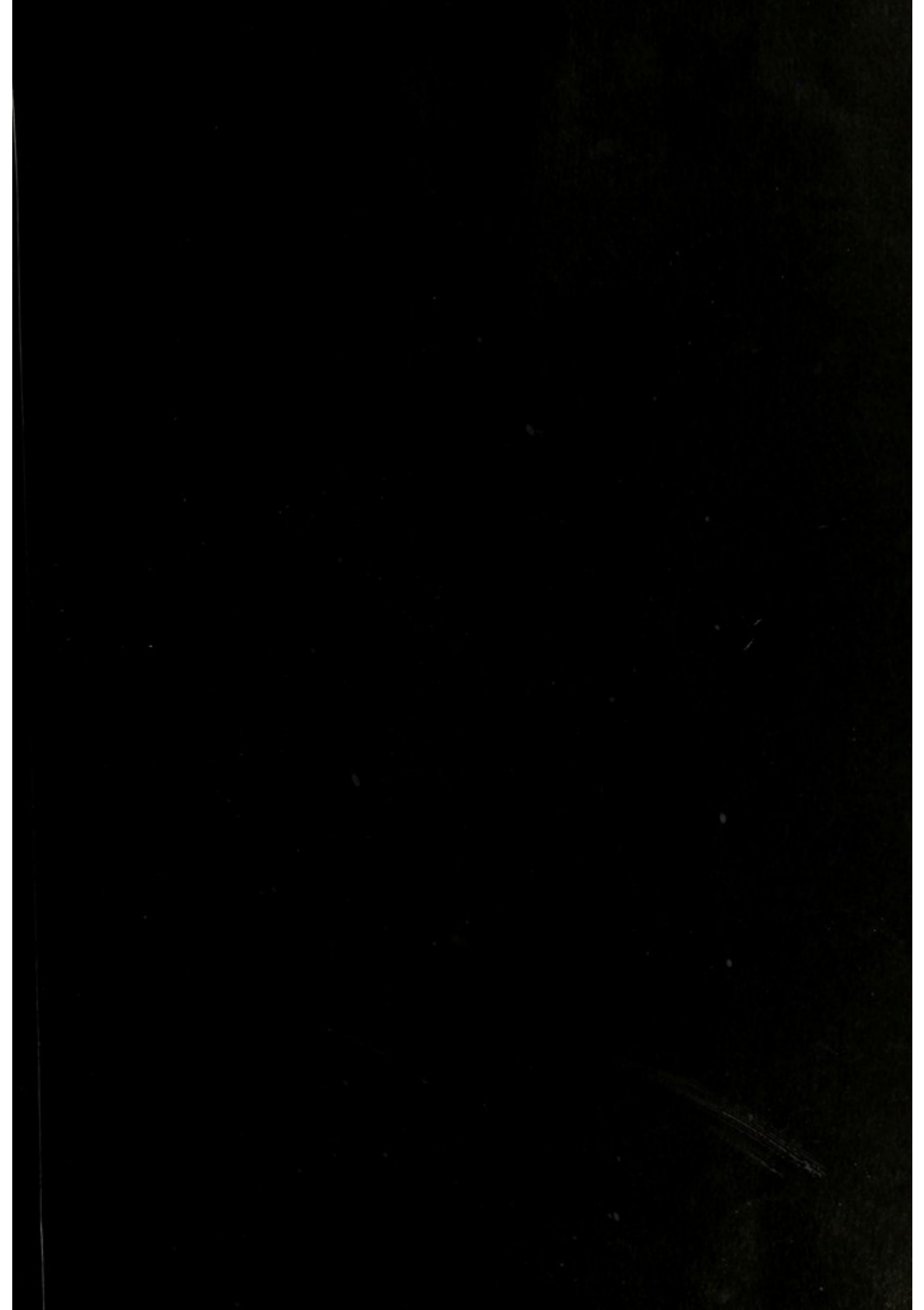
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# LIQUEFIED NITROUS OXID

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and

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## COMPRESSED OXYGEN

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and

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### APPARATUS FOR THEIR ADMINISTRATION

SEPTEMBER



1911

## The S.S. White Dental Mfg. Co.

CHESTNUT STREET, CORNER TWELFTH

PHILADELPHIA

### BRANCHES

NEW YORK: Spingler Building, 5, 7, and 9 Union Sq., W.; Charles Building, Madison Ave., cor. 43d St.

BOSTON: Walker Building, 120 Boylston Street.

CHICAGO: Atlas Building, Randolph St., cor. Wabash Avenue.

BROOKLYN: Nassau Building, 356 and 358 Fulton Street.

ATLANTA: Grant Building, North Broad and Walton Streets.

ROCHESTER: Chamber of Commerce, Main Street East, corner of South Avenue.

NEW ORLEANS: Maison Blanche, cor. Canal and Dauphine Streets.

CINCINNATI: First National Bank Building, Fourth and Walnut Streets.

SAN FRANCISCO: Butler Building, 135 Stockton Street.

LOS ANGELES: Mason Building, cor. Fourth and Broadway.

OAKLAND: Oakland Bank of Savings Building, cor. Twelfth and Broadway.

TORONTO (Can.): Confederation Life Building, 110 and 112 Victoria Street.

MONTREAL (Can.): Birk's Building, 14 Phillips Sq.

EUROPEAN BRANCH

BERLIN, W., Mauerstrasse 83-84

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



## *Special Notice*

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WE ARE occasionally asked to refill cylinders not of our manufacture, many of which are distinctly inferior in point of safety. We can only reply to such questions that the cylinders may be shipped to our factory where they will be examined by experts, and if need be, subjected to hydraulic test at the expense and risk of the owner.

We cannot accept for credit cylinders which are not of our manufacture. Neither will we refill cylinders which we have not ourselves tested and know to be safe.

Each of our seamless steel cylinders bears its number in large-sized figures on its upper end. This is much more satisfactory than the former practice of numbering the valve.



# NITROUS OXID (Liquefied)

## The Ideal Anesthetic for the Dentist

Nitrous Oxid ( $N_2O$ ) is almost universally recognized as the ideal anesthetic for such operations as the dentist is usually called upon to treat anesthetically.

A few inhalations induce profound general anesthesia, which lasts long enough to permit of the extraction of from one to a dozen teeth, the recovery is rapid, and the anesthesia may be induced repeatedly, if necessary, at the same sitting.

As to its relative safety, there are numerous offices in the larger cities where extraction is a specialty, which have records showing many thousands of administrations without a single fatality or even an alarming symptom. In the aggregate, millions of exhibitions have been recorded, with so few fatalities that they are commonly looked upon as coincidences of the administration, rather than as having been caused by it.

In order to get the best results the gas must be pure. If impure, its action is uncertain, and some impurities may cause serious complications.

For the Nitrous Oxid which we supply we claim absolute freedom from injurious admixture or ingredient. We will not knowingly refill cylinders which show any evidence of having contained any deleterious substance until they are freed from the taint.

**We guarantee every cylinder to contain the full quantity of Gas as stated on the label. Each customer can test this for himself by weighing the cylinder when full, and again when empty.**

Our rule with regard to leakage is printed on the tag which accompanies each cylinder, and is as follows: "Weigh this cylinder *as soon as received*. If the weight does not agree with that on the label, return the cylinder *at once*. Otherwise no allowance can be made for shortage." It will thus be seen that we guarantee the cylinder to contain the full quantity of gas charged, not only when it leaves us, but when it reaches the customer. If the valve is tight while the cylinder is in our possession and during its transit to the customer, it is satisfactory evidence that it is in good condition, and no allowances will be made for subsequent leakage. The valves which we now furnish are the best on the market, and complaints of loss by leakage have been reduced to the minimum.

**Any practitioner who desires to procure our Gas, and fails to obtain it of his local dealer, may order direct from any of our houses.**

### PRICES

#### SMALL (100 GALLONS) CYLINDER.

Cylinder, empty .....	net	\$6.00
Nitrous Oxid Gas, 100 gallons .....		2.00
		<hr/>
Cylinder with 100 gallons Nitrous Oxid Gas .....		\$8.00

#### MEDIUM (250 GALLONS) CYLINDER.

Cylinder, empty .....	net	\$10.00
Nitrous Oxid Gas, 250 gallons .....		5.00
		<hr/>
Cylinder with 250 gallons Nitrous Oxid Gas .....		\$15.00

#### LARGE (450 GALLONS) CYLINDER.

Cylinder, empty .....	net	\$12.00
Nitrous Oxid Gas, 450 gallons .....		9.00
		<hr/>
Cylinder with 450 gallons Nitrous Oxid Gas .....		\$21.00

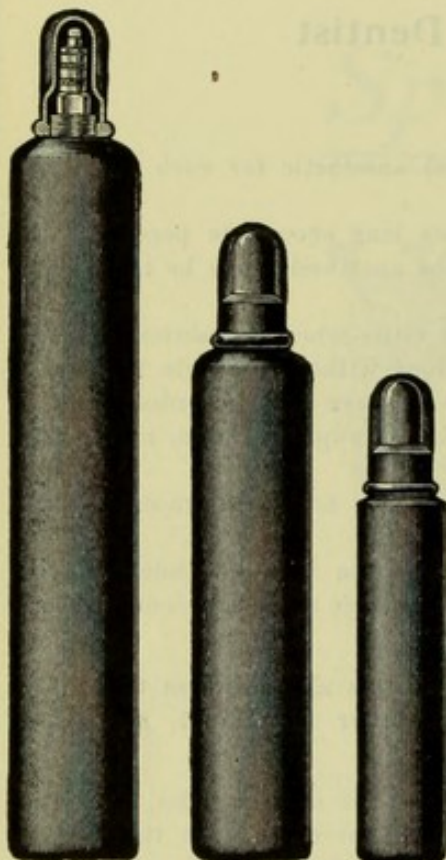
We list "empty" cylinders to show the prices at which they will be credited when returned for refilling. Unfilled cylinders will not be sold.

For description of Cylinders, see page 2.



## SEAMLESS STEEL GAS CYLINDERS

Patented Feb. 25, 1896



If you have an internal pressure of 750 to 1200 pounds to the square inch in a gas cylinder which has a resistance of 3000 pounds to the square inch, you will feel that you have a pretty wide margin of safety.

That is what you have in our Seamless Steel Cylinders, which are the only kind we use for the shipment of Nitrous Oxid.

We make and test them ourselves. We know the quality of the steel, we know how faithfully they are made; their uniformity of caliber and of wall thickness. In few words, they are the "acme of present-day knowledge and cumulative experience" in the making of gas cylinders.

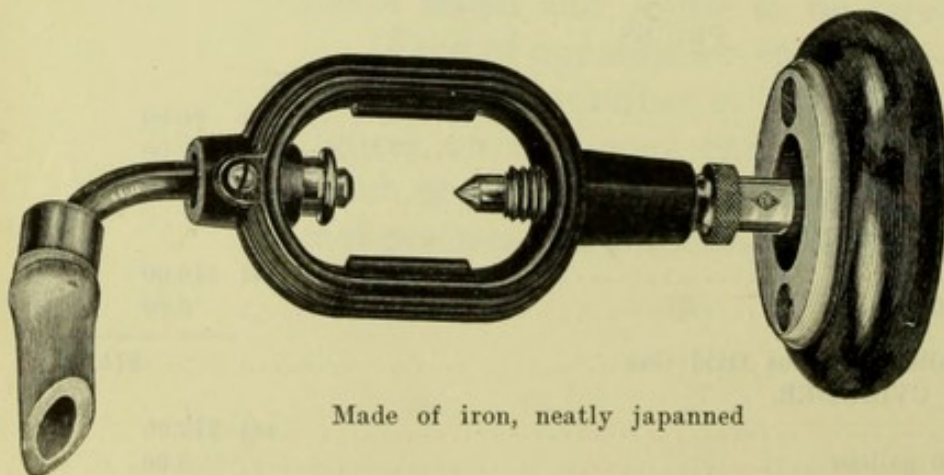
The improved valve we use is proof against leakage, and the cylinder cap covers the valve from possible injury in transportation.

They are economical in other ways,—are light and therefore more easily handled, besides saving freight in transportation.

Three sizes—Large (450-gallon); Medium (250-gallon); Small (100-gallon).

Sold only filled. (For prices see preceding page.)

## GAS CYLINDER YOKE CONNECTION



Made of iron, neatly japanned

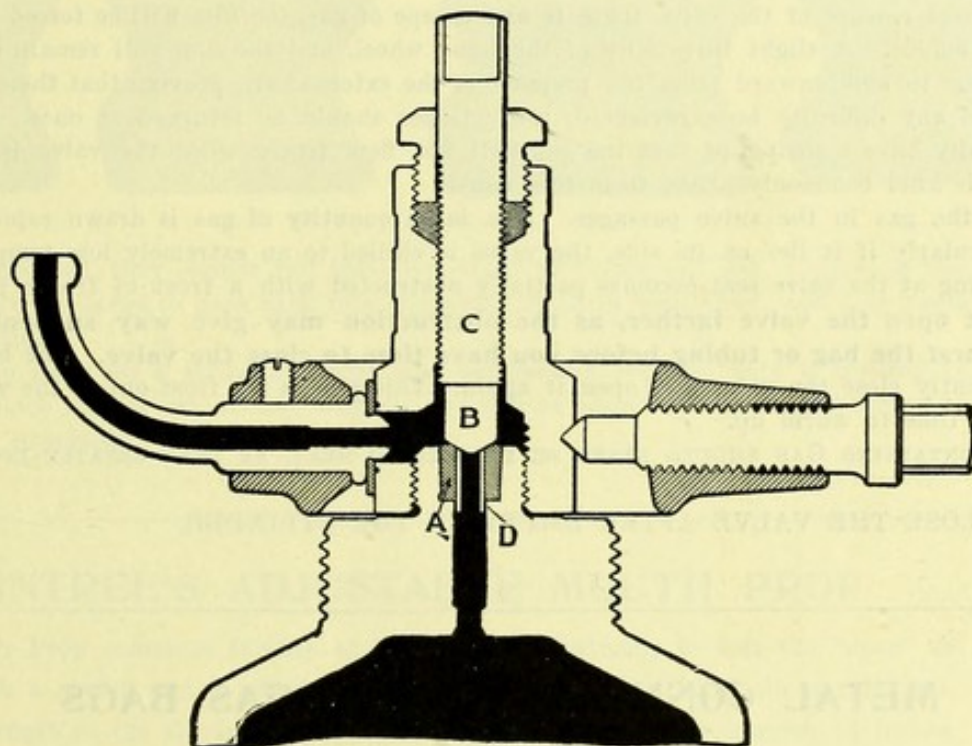
This convenient Connection is applicable to any cylinder, although intended more especially for use with our Surgeon's Cases. It makes a safe, tight attachment between the cylinder and the gas-bag. The metal tube for the hose leading to the gas bag can be turned as desired and fixed securely with the set screw seen at the left. The Connection is operated by the same wheel key which opens the cylinder.

### PRICE

Yoke Connection, including Wheel Key and Thimble ..... \$1.75



## JOHNSTON GAS VALVE No. 2



We have modified the Johnston Gas Valve, introducing a vulcanite seat (A), in place of the soft metal heretofore used. A coned threaded valve screw (C), operated by a removable wheel key, closes the opening in the vulcanite seat. In order to preserve the full size of this opening so as not to restrict the free flow of gas when the valve is open, it is lined with a metal bushing (D) which is pushed down by the valve as the seat becomes compressed or worn away under repeated operations.

The new valve is more simple and operates more easily and effectively than the old one, requiring very little pressure in closing. We have shipped many thousands of these cylinders having the new valve, and our records show that complaints of all kinds average about six in ten thousand, only one-third of which have any justifiable foundation. One error in five thousand, one-fiftieth of one per cent.,—and not always *our* error—comes very close to 100 per cent. of first quality.

The valves on our steel cylinders are protected by metal screw caps which add much to safety in transportation.



## DIRECTIONS

Before attaching a gas cylinder to the inhaling apparatus it is advisable to **open the valve partially and then gently close it again.** In opening a valve the first time one is liable to open it too far, occasioning a rush of gas and the possible disarrangement of the apparatus.

Use a single leather washer on the coupling joint of the yoke attachment.

The Valve is the only proper and sufficient means of retaining the gas; neither the bag nor the inhaler will prevent its escape if the valve is left open.

After detaching the bag from the cylinder, test the valve to be sure that it is closed. This may readily be ascertained in a very simple way, as follows: Take a little saliva from the mouth on the finger and gently pass it over the outlet of the valve, so as to form a film over the opening. If because of imperfect closure of the valve there is any escape of gas, the film will be forced outward into the form of a bubble. A slight turn more of the hand wheel, and the film will remain stationary or show a tendency to sink inward from the pressure of the external air, proving that there is no escape of gas. Should any difficulty be experienced, the cylinder should be returned at once.

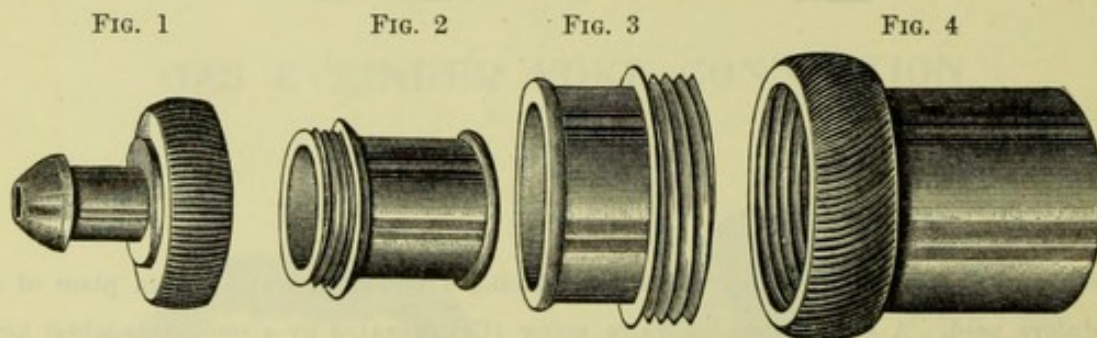
We occasionally have a complaint that the gas will not flow freely when the valve is open. Any difficulty of this kind commonly arises from this cause:

Freezing of the gas in the valve passages. If a large quantity of gas is drawn rapidly from the cylinder, particularly if it lies on its side, the valve is chilled to an extremely low temperature, and the small opening at the valve seat becomes partially obstructed with a frost of frozen gas. **If this occurs, do not open the valve farther, as the obstruction may give way suddenly, and the rush of gas burst the bag or tubing before you have time to close the valve.** The best course to pursue is to gently close the valve and open it again. This pushes the frost out of the way, and also gives the valve time to warm up.

CYLINDERS CONTAINING GAS SHOULD NEVER BE EXPOSED TO HEAT, AS THAT GREATLY INCREASES THE PRESSURE.

ALWAYS CLOSE THE VALVE AFTER EMPTYING THE CYLINDER.

## METAL CONNECTIONS FOR GAS BAGS



The tubing and bag are joined by metallic screw connections, as shown above. By their use anyone can attach either tubing or bag when necessary.

## DIRECTIONS

Figs. 1 and 2 connect the small end of the bag to the rubber tubing.

Figs. 3 and 4 connect the large end of the bag to the covered tubing.

Insert Fig. 1 in the rubber tubing, and screw Fig. 4 over the covered tubing.

In inserting Figs. 2 and 3, bind with copper wire or good strong twine, which may be neatly covered with material corresponding in appearance to that of the bag.

The parts must be screwed together until firmly seated on the leather washers.

Price .....	per set	\$0.60
" parts separately, Figs. 1 and 2, each \$0.10; Figs. 3 and 4 .....	each	.20

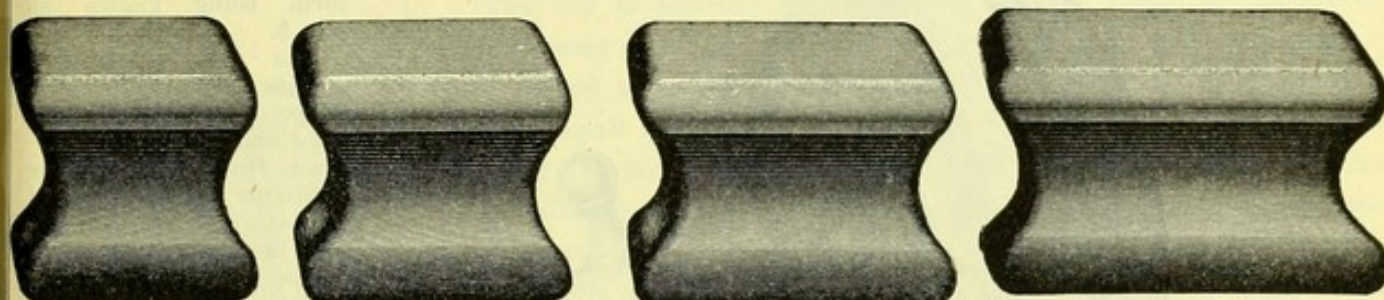


## SOFT-RUBBER BITE-BLOCKS

Patterns supplied by DR. S. H. GUILFORD

The four Soft-rubber Bite-Blocks illustrated herewith, besides affording a variety of sizes sufficient to cover all requirements, have the following advantages:

1. Being elastic, they cannot injure the frailest tooth by being bitten upon.
2. Their resilience will open the jaws if partially closed, as soon as muscular relaxation takes place.



1

2

3

4

3. Being grooved, they cannot fall into the mouth or be pressed out of place by the tongue.
4. They are too large to pass back into the pharynx or be swallowed, and they cannot be broken or injured by biting.
5. They do not need a string attached, and are readily removed with a crooked finger.
6. Each block can be set at two heights, and can be placed at any point between the jaws without likelihood of slipping.

Price .....each \$0.35

## DAINTREE'S ADJUSTABLE MOUTH PROP

This Mouth Prop combines facility of lengthwise adjustment to suit the "open" of the jaws with a spring which affords the necessary elasticity. With the spring compressed the length at the shortest adjustment is  $1\frac{3}{8}$  inches; at the longest,  $1\frac{1}{2}$  inches. One head screws into the body, around which the other swivels, an elastic spring being confined between the swiveling head and the body. The heads are cushioned with cork, and there is a ring for the attachment of the retaining cord. All metal parts are nickel plated.

Price ..... \$0.50



## RUBBER APRONS FOR DENTISTS

Our Rubber Aprons can be put on and taken off almost instantaneously. They are large enough to afford ample protection to the clothing, not big enough to interfere with freedom of movement. The dimensions are 43 inches long and 34 inches wide at the middle line.

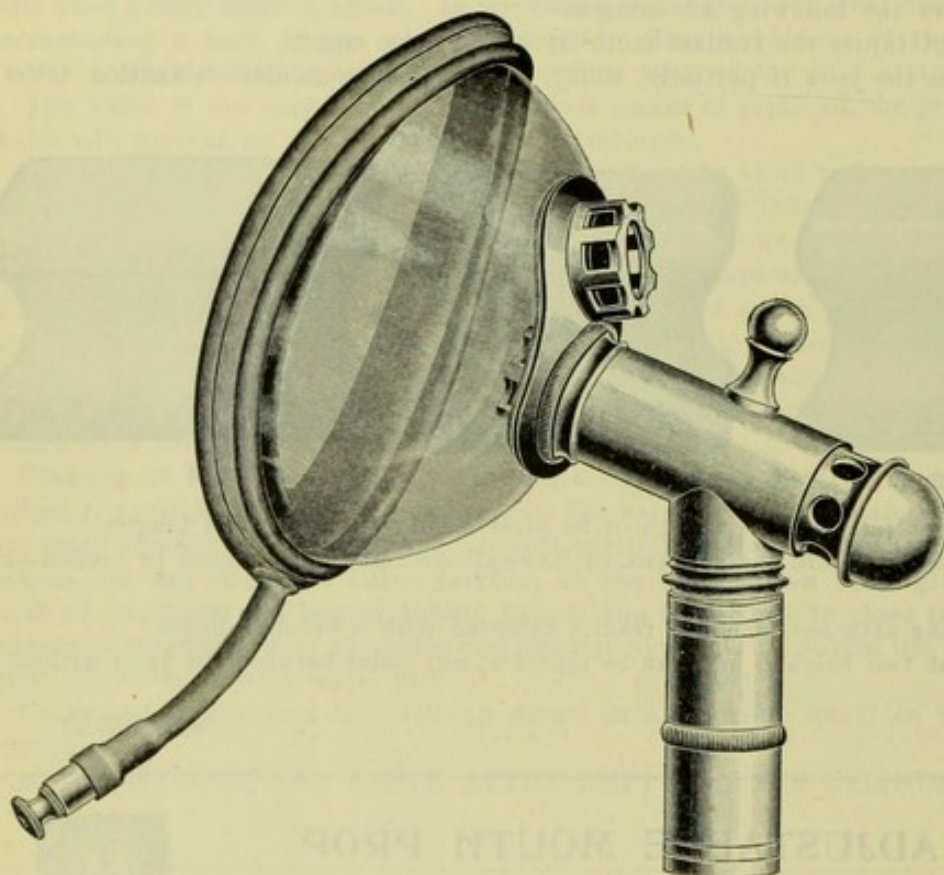
Made of rubber cloth, and nicely finished, with the edges bound.

Price .....each \$1.00



## S. S. WHITE INHALER No. 5

### Stop Valve—Transparent Celluloid Hood



Without changing its general outward appearance, we have made two very important practical improvements in our Gas Inhaler, the improved form being known as No. 5.

The first comprises modifications in the shape of the celluloid hood and the rubber face-piece, through which the appliance adjusts itself almost instantly to fit any face.

The second is the application of a bayonet lock in the telescoping gas inlet valve, whereby it may be caught and held open automatically.

These improvements greatly facilitate the convenience of the operator, and assure the efficiency of the administration, while affording every advantage gained in the old form.

The inhaling and exhaling valves are thin disks of mica working loosely in open-work

chambers—inhaling closes the latter and opens the former, exhaling closes the former and opens the latter; the patient cannot rebreathe the same atmosphere. The gas inlet valve, which telescopes in the body of the Inhaler, is controlled by a spring and is operated by pressure upon its external end with the thumb. The patient begins by breathing air only (through the perforations in the telescoping valve). After a few inhalations, a slight pressure on the projecting valve partially opens the inlet from the gas bag, and admits some gas with the air. Increasing the pressure gradually shuts off the air until only nitrous oxid reaches the patient. If the operator desires to free the hand manipulating the valve, a slight twist of the thumb will now bring the lock into play, holding the gas inlet open until released, which can be done instantly.

Throughout the entire administration the celluloid hood gives the operator a full view of the patient's lips, the most reliable indicator of the blood changes caused by the gas.

S. S. White Gas Inhaler No. 5 ..... \$8.00

## HORTON'S DENTAL APRON OR BIB

Designed by R. HORTON, D.D.S.

Where there is a copious flow of saliva this Bib becomes a necessity. It is so shaped as to catch and retain all overflow. The Bib is readily attached by passing the tape over the head and tying. Made of checkered rubber cloth, mounted on a wire frame.

Price ..... \$0.50





## THE S. S. WHITE GASOMETER

The strong points of the S. S. White Gasometer are its simplicity, its cleanliness, its convenience, its durability.

The bell is perfectly balanced; the slightest inhalation affects it. An annular air chamber at the bottom of the bell forms the "float," the perfect balance being maintained by means of ordinary gun shot in two small compartments covered with screw caps on the inner surface of the float. The bell, which holds eight gallons of gas, works on a nickel-plated guide rod, without unsightly "gallows." The guide rod is graduated to show the quantity of gas in the bell.

All parts exposed to the water are brass, insuring cleanliness and durability; zinc becomes slimy, unfit for gas to circulate through. The bell is nickel plated all over, the top burnished. The water tank is finished on the outside in a blue-black bronze, oxidized, with the beads and edges rubbed through to the polished brass, the whole lacquered. The stand is of cast iron, japanned black and ornamented. Will hold

either 450-gallon, 250-gallon, or 100-gallon cylinder, and is on rollers for convenience in handling.

The socket (A) of the stand is for large cylinders. The reversible clamp (B) fits the large cylinders on one side, and on the other the small cylinders. The side which fits small cylinders has a flange (C) on which sits the cylinder. A set screw (D) holds the cylinder firmly in position. The reservoir (E) is filled with water to the bead (K).

At the bottom of the reservoir, where the inhaler tubing is attached, is a piston valve (G), placed there for absolute security against waste when operations are suspended with the receiver full of gas. At the opposite side (not seen in illustrations) is a pipe to which the cylinder yoke is connected by means of rubber tubing (L). Near the top of the reservoir is a wooden fork (H), to support the inhaler when not in use. The bell (F) works on the guide rod (I).

The outfit includes yoke and plain rubber tubing (1 ft.), Inhaler No. 5, silk-covered Inhaler tubing

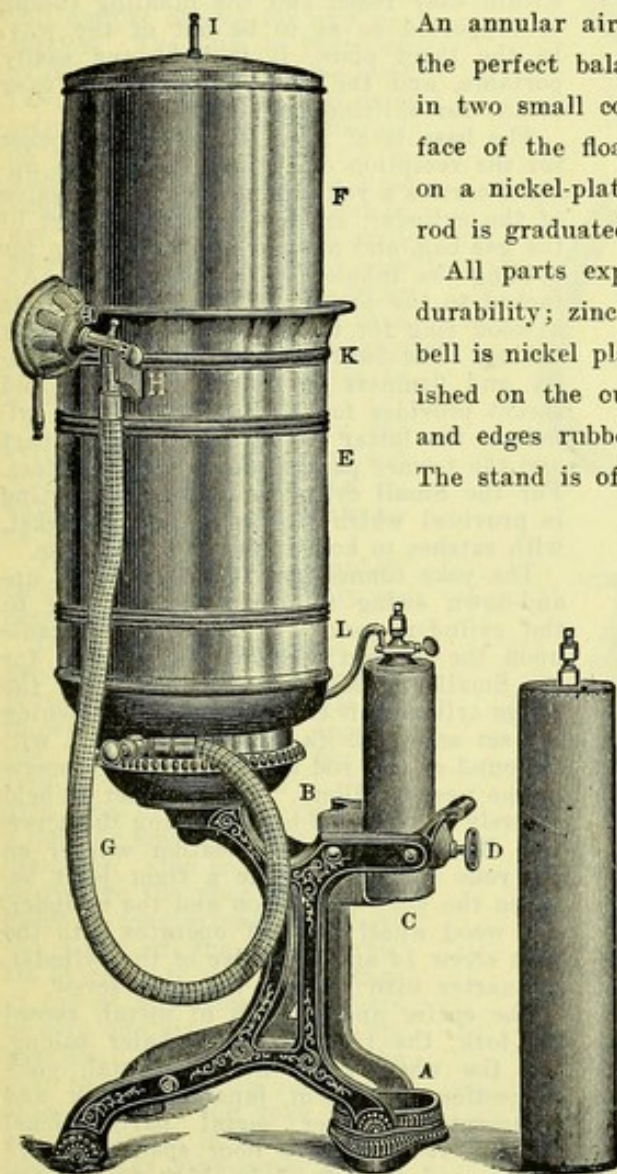
(4 ft.), and metal connection, wheel key and Russia-iron Jackets for the large and small cylinders, everything complete, ready to attach a gas cylinder.

Directions for setting up and operating accompany each Gasometer.

### PRICE

The S. S. White Gasometer, without Gas Cylinder and Gas ..... \$75.00

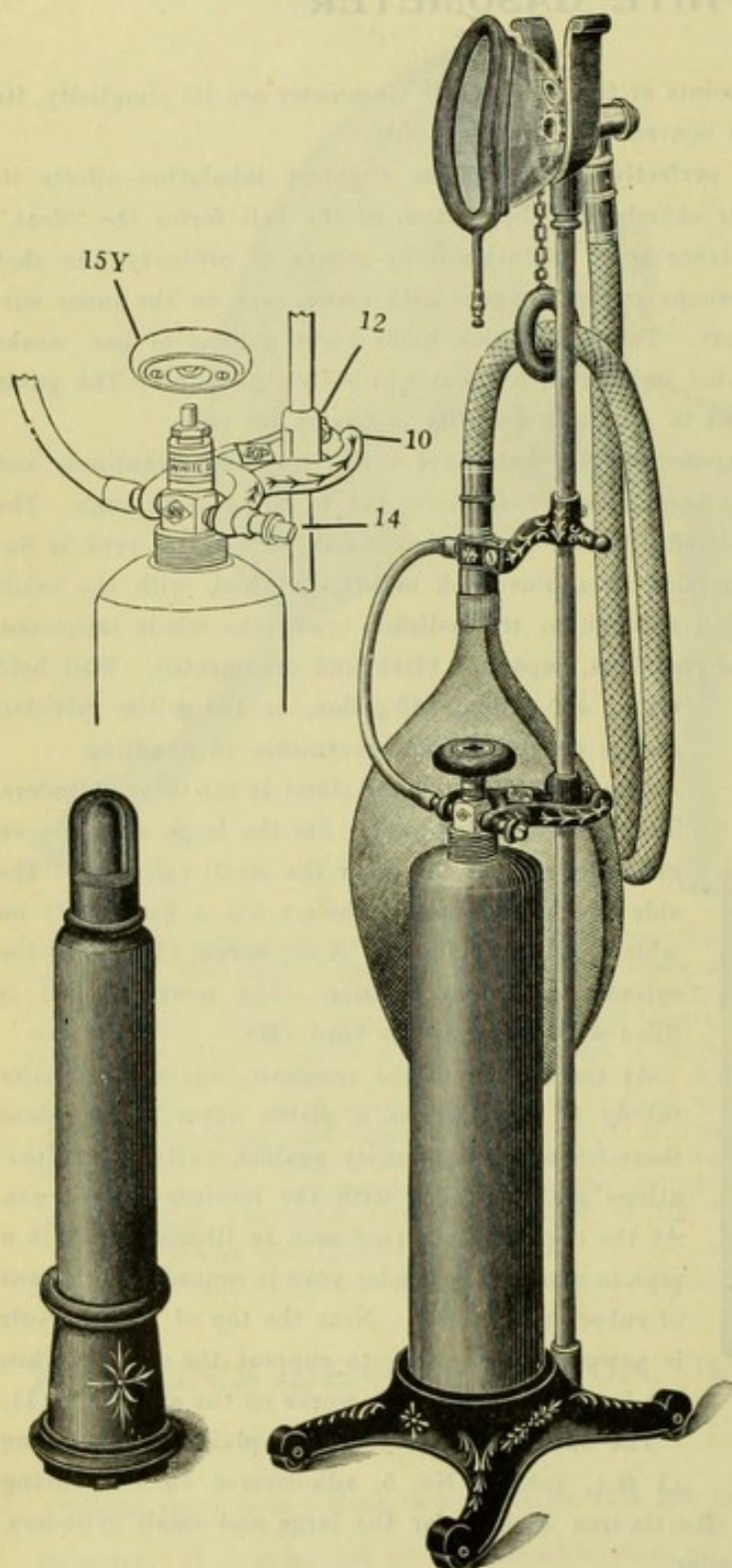
For prices of cylinders and gas, see page 1.





## UNIVERSAL GAS STAND No. 1, FOR NITROUS OXID

Patented March 22, 1898; May 15, 1900



The Universal Gas Stand is convenient, because, in the first place, it permits the operator to use any of the three sizes of cylinders, namely, Small or 100-gallon, Medium or 250-gallon, Large or 450-gallon. In the next place, it holds the Inhaler within easy reach and the inhaling tubing is supported so as to be out of the way. In the third place, it is light and easily portable, and the casters provide an easy means for shifting its position.

The base is of iron, with a coned socket for the reception of the cylinders. The upright carries a yoke connection for the valve of the cylinder, an arm for the support of the gas bag, and a wood fork at the top for holding the inhaler when not in use. Attached to the fork by means of a chain is a wood ring for the support of the inhaler tubing. The base is heavy to assure solidity and firmness on the floor. The coned socket provides for Medium and Large cylinders, the latter sitting in the upper part and the former passing down to the bottom. For the Small cylinders a pedestal casting is provided which sits in the coned socket, with catches to hold it firmly to the base.

The yoke connection, 10, has a short up-and-down swing to accommodate itself to the cylinder neck. It is also adjustable upon the upright. Shown in position for the Small and Medium cylinders. For the Large cylinders it can be raised by loosening the set screw 12 (a countersunk spot will be found on the rod to receive the set screw in the new position). The cylinder is held securely in the yoke by tightening the screw 14. Be sure there is a leather washer on the yoke nipple, to make a tight joint between the yoke connection and the cylinder. The wood wheel key 15Y operates both the yoke screw 14 and the valve of the cylinder. A quarter turn releases the yoke screw.

The entire appliance is of metal, except the fork, the ring for the inhaler tubing, and the wheel key. Base, pedestal, yoke connection, and arm japanned black and ornamented. Other metal parts nickel plated. It occupies a floor space 10 x 13 inches, and is 3 ft. 7 in. high to the top of the fork, and weighs, without the cylinder, 21 lbs.

The complete apparatus includes gas bag (either 4½ gallons or 7 gallons), with silk-covered inhaling and plain supply tubing, and a No. 5 Inhaler.

Prices vary with the size of the gas bag ordered, and do not include gas or cylinder.

## PRICES

Universal Gas Stand No. 1, with 4½-gallon Bag .....	\$27.25
The same, with 7-gallon Bag .....	28.00
Stand only, i.e., less Inhaler, Bag, and Tubing .....	16.00

For prices of Gas and Cylinder, see page 1.



## UNIVERSAL GAS STAND No. 2, FOR NITROUS OXID

Patented March 22, 1898; May 15, 1900

The principal advantage of the No. 2 apparatus is that it places two cylinders of gas at the service of the operator, so that having the contents of both to draw upon there need never be any question about a full supply of gas for any operation. The idea is that one cylinder should always be kept full, as a reserve; as soon as a cylinder is emptied it should be replaced with one which is filled. Then, if during a prolonged operation the cylinder in use should happen to become emptied, it is the work of only a moment to throw the other into operation, and there need be no halt or inconvenience from what might otherwise be a serious mishap.

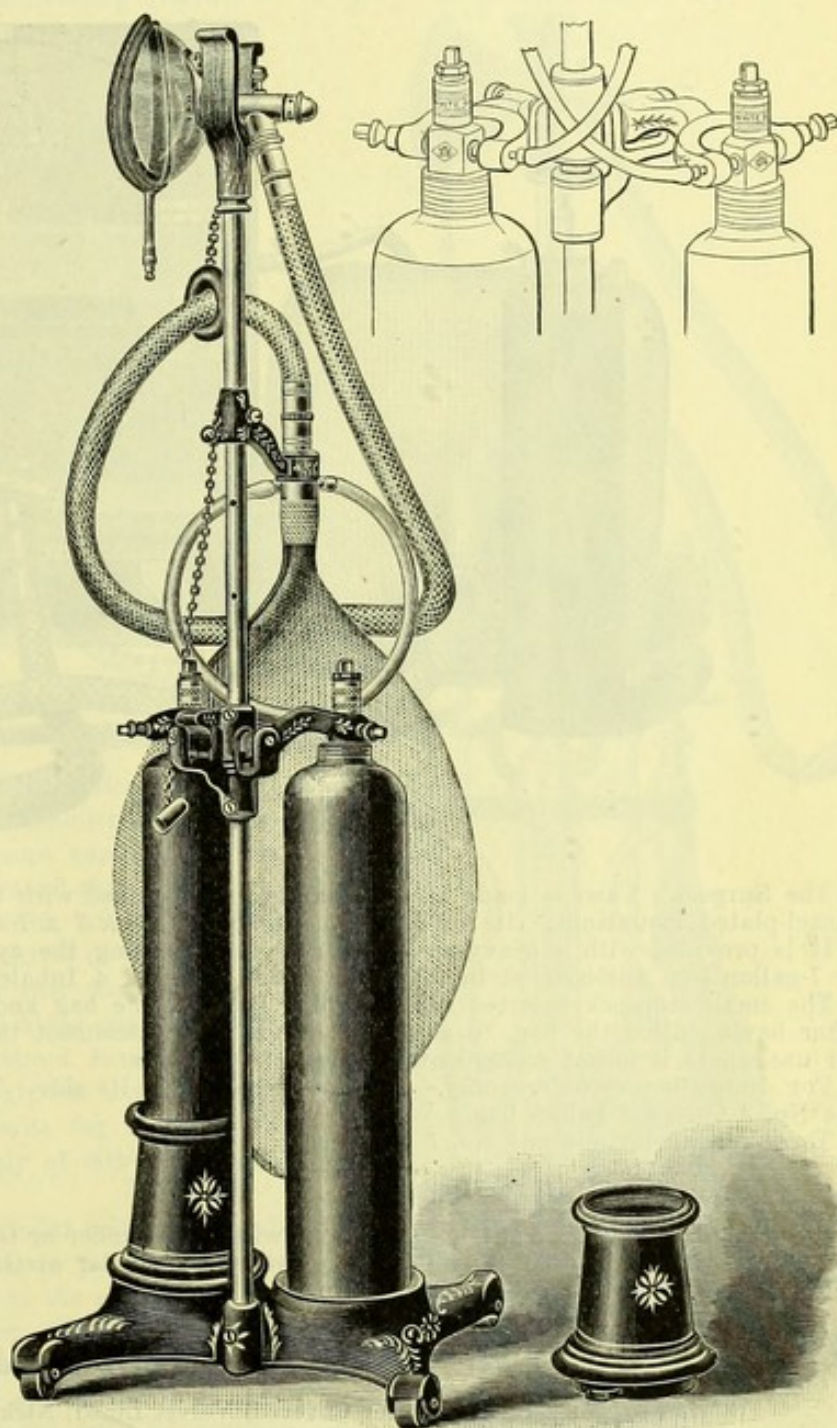
The sockets for holding the cylinders, the supporting rod with its supports for the inhaler and gas bags are the same as in Stand No. 1.

There are two yoke connections as seen, each entirely independent of the other.

Hung by a chain from the bracket of the arm which supports the gas bag is a small but important part of the apparatus, namely, the yoke connection stopper. This is a cylindric piece of metal an inch and a quarter long by a half inch in diameter. One end is socketed to receive the yoke nipple, the other is countersunk to receive the point of the yoke screw. Its object is to save the leakage of gas at any time when there is only one cylinder in the apparatus. It is placed in the yoke the same as the valve head of a cylinder, the yoke nipple being entered in the socketed end and the yoke screw turned up to make a tight joint at the nipple.

The complete apparatus includes gas bag (either 4½-gallon or 7-gallon), with silk covered inhaling and plain supply tubing and No. 5 Inhaler.

Universal Gas stand No. 2 occupies a floor space of 12 x 13 inches and weighs, without cylinders, 29 lbs.



Height to top of fork, 3 feet 7 inches

### PRICES

Universal Gas Stand No. 2, including 4½-gallon Bag .....	\$33.25
The same, with 7-gallon Bag .....	34.00
Stand only, i.e., without Inhaler, Bag, and Tubing .....	22.00

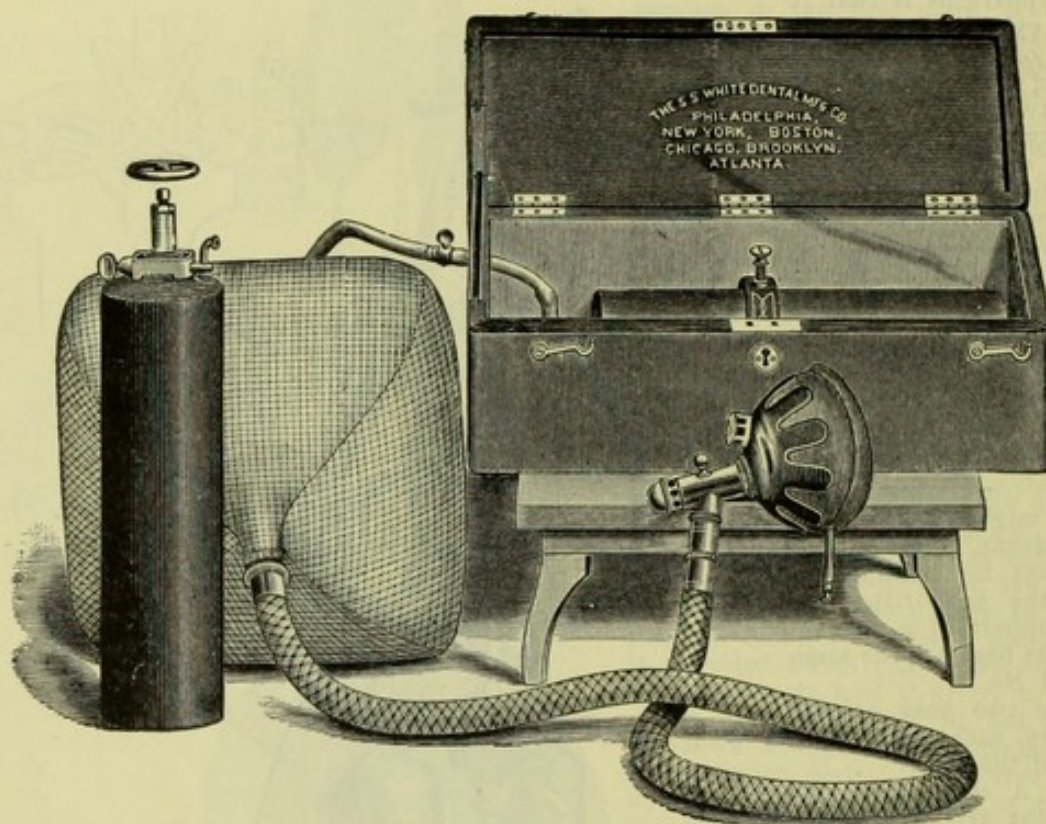
For prices of Gas and Cylinders, see page 1.



## SURGEON'S CASES

Our Surgeon's Case Nitrous Oxid Outfits were devised to permit the convenient administration of the gas at a distance from the office

Nos. 1 and 2



The Surgeon's Case is made of well-seasoned wood, lined with velvet and covered with leather, with nickel-plated mountings. Its outside dimensions are 18 x 7 x 7 inches.

It is provided with a heavy cast-steel ring for clamping the cylinder, rubber tubing, stop cock, 4½ or 7-gallon bag, silk-covered Inhaler tubing, and our No. 4 Inhaler.

The small stopcock inserted in the tubing between the bag and the cylinder enables the operator, after having filled the bag, to shut off the gas and disconnect the bag from the cylinder, if desired for use where it is not convenient to carry the cylinder.

For 100-gallon cylinders only. The cylinder lies on its side. The No. 1 Case has a 4½-gallon bag; the No. 2 Case a 7-gallon bag.

These outfits include our No. 5 Inhaler.

### PRICES

Surgeon's Case No. 1 (4½-gallon Bag), without Cylinder or Gas .....	\$23.75
Surgeon's Case No. 2 (7-gallon Bag), without Cylinder or Gas .....	24.50
For prices of Cylinders and Gas, see page 1.	

### Prices of Various Parts of Outfits

	Surgeon's Case, Leather Covered, Velvet Lined, Nickel-plated Mountings . . . . .								\$10.00	
For Uni- versal Gas Stands and N <sub>2</sub> O Apparatus	{	Gas bag for Nitrous Oxid 4½ gallons capacity, single end, less connections . . . . .								2.25
		" " " " 4½ " " " " with connections . . . . .								2.75
		" " " " 7 " " " " less connections . . . . .								3.00
		" " " " 7 " " " " with connections . . . . .								3.50
For Sur- geon's Case	{	" " " " 4½ " " " " double end, less connections . . . . .								2.25
		" " " " 4½ " " " " " " with connections . . . . .								2.85
		" " " " 7 " " " " " " less connections . . . . .								3.00
		" " " " 7 " " " " " " with connections . . . . .								3.60
		" " " " Oxygen, 1 gallon capacity, less connections . . . . .								1.00
		" " " " N <sub>2</sub> O and O Apparatus, 2 gallons capacity, less connections . . . . .								1.50
		Stopcock, for insertion in Small Rubber Tubing . . . . .								1.00
		Tubing, Inhaler, Silk Covered . . . . . per foot								.70



## ANESTHESIA BY NITROUS OXID AND OXYGEN COMBINED

Patented March 22, 1898

The non-asphyxial method of administering nitrous oxid, that is, in combination with pure oxygen, presents many advantages. By so combining the gases all fear of asphyxia is eliminated, the anesthesia can be prolonged sufficiently for many major surgical operations without danger to the patient, and the return of consciousness is not accompanied by the disagreeable symptoms which sometimes follow the administration of nitrous oxid. Further, the feeling of suffocation which the patient experiences when nitrous oxid is administered alone is completely eliminated when a proper proportion of pure oxygen is combined with the gas.

It is to be remembered that the anesthesia is produced by the Nitrous Oxid, the office of the Oxygen being merely that of a modifier of the effects of the Nitrous Oxid. Should the Nitrous Oxid be used alone with this apparatus there is always at hand the Oxygen, which the opening of a valve will admit at once, to overcome any tendency to asphyxiation which may develop.

The method is in effect a scientific application of the principle on which most successful administrators of Nitrous Oxid work—namely, the prompt admission of air on the observance of the first untoward signs. This apparatus supplies pure Oxygen instead, with all its advantages, and under the absolute control of the operator. It meets all the requirements for this purpose, and it will be found as perfect for giving either gas separately.

The apparatus consists of a stand furnished with casters for carrying cylinders of nitrous oxid and oxygen with the necessary paraphernalia for their admixture and for controlling the supply of either gas independently.

There are two forms,—a two-cylinder and a three cylinder. In the first, provision is made for one cylinder each of nitrous oxid and oxygen; in the second, for two of nitrous oxid and one of oxygen. The letters in the description below refer to the illustration of the two-cylinder apparatus, but the parts are the same in both. Either apparatus is adapted to our small and medium cylinders.

Cylinder A contains Pure Oxygen.

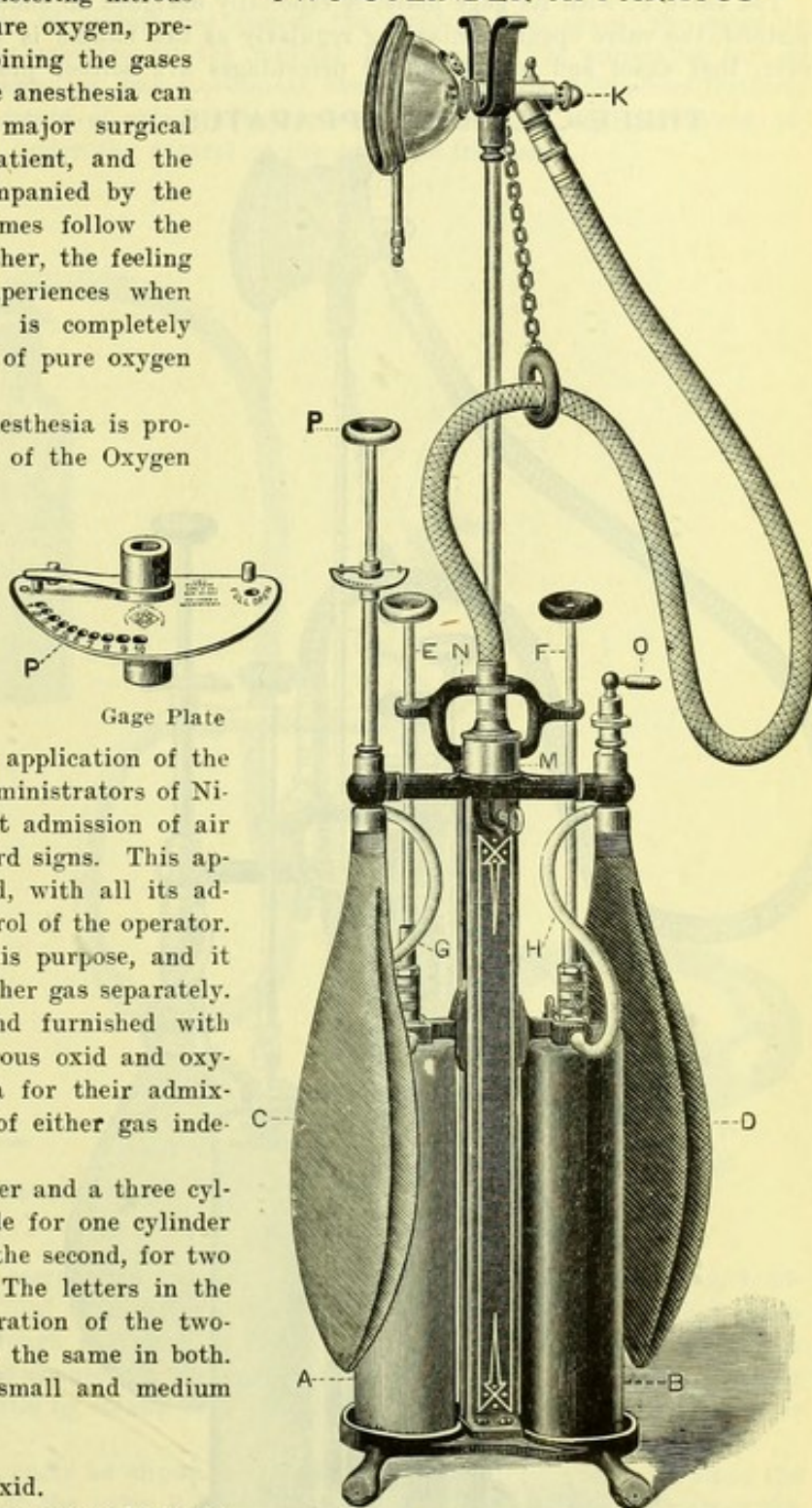
Cylinder B is filled with Nitrous Oxid.

C and D are rubber bags (2-gallon) into which the gas is drawn from the cylinders and from which it goes to the mixing chamber M. These bags are made of different colors to avoid confusion.

E and F are keys which open the valves of the cylinders and allow the gas to fill the bags through the tubes G and H.

The S. S. White Inhaler No. 5, with silk-covered Inhaler Tubing, is part of each apparatus.

## TWO-CYLINDER APPARATUS



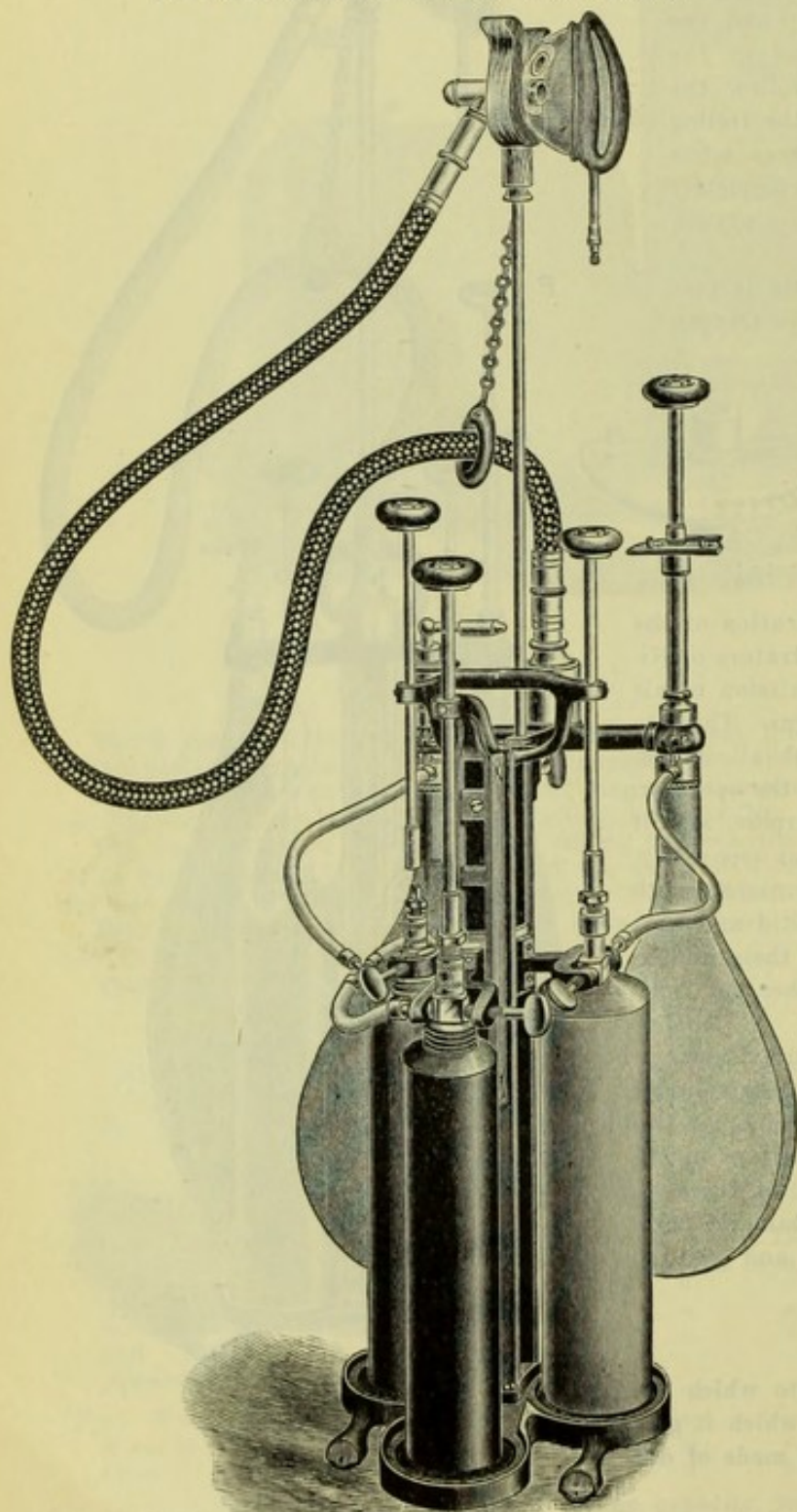
Height, 43 Inches  
Weight, 26 Pounds



O and P are the keys to the valves in the necks of the gas bags which admit Nitrous Oxid and Oxygen respectively to the mixing chamber M, whence the gas flows through the silk-covered rubber tubing to the inhaler. To administer either separately, only the valve controlling the gas desired is opened; to administer the Nitrous Oxid modified by the Oxygen, O is opened to its full extent, and P to admit so much Oxygen as is required, the amount being indicated by the gage plate.

The valve P, with its gage plate, is especially designed to enable the operator to follow Dr. Hewitt's method, the valve opening enlarging regularly as the handle is turned. It must be understood, however, that exact and predetermined percentages are neither practicable nor desirable.

### THREE-CYLINDER APPARATUS



Height, 43 inches  
Weight, 27 pounds

N is a convenient handle by which the apparatus, which balances nicely, may be carried.

For compactness in transportation the rod which supports the inhaler may be run down to the level of the mixing chamber.

The Cylinder for Oxygen is always bronzed.

The Cylinder for Nitrous Oxid is black, and there need be no mistake in placing them in the apparatus.

### TWO-CYLINDER OUTFIT

N<sub>2</sub>O and O Apparatus with  
4 ft. silk-covered tubing,  
two (2) two-gallon Gas  
Bags, and No. 5 Inhaler... \$45.00

For prices of Cylinders and Gas,  
see page 1.

### THREE-CYLINDER OUTFIT

N<sub>2</sub>O and O Apparatus with  
4 ft. silk-covered tubing,  
two (2) two-gallon Gas  
Bags, and No. 5 Inhaler... \$50.00

For prices of Cylinders and Gas,  
see page 1.

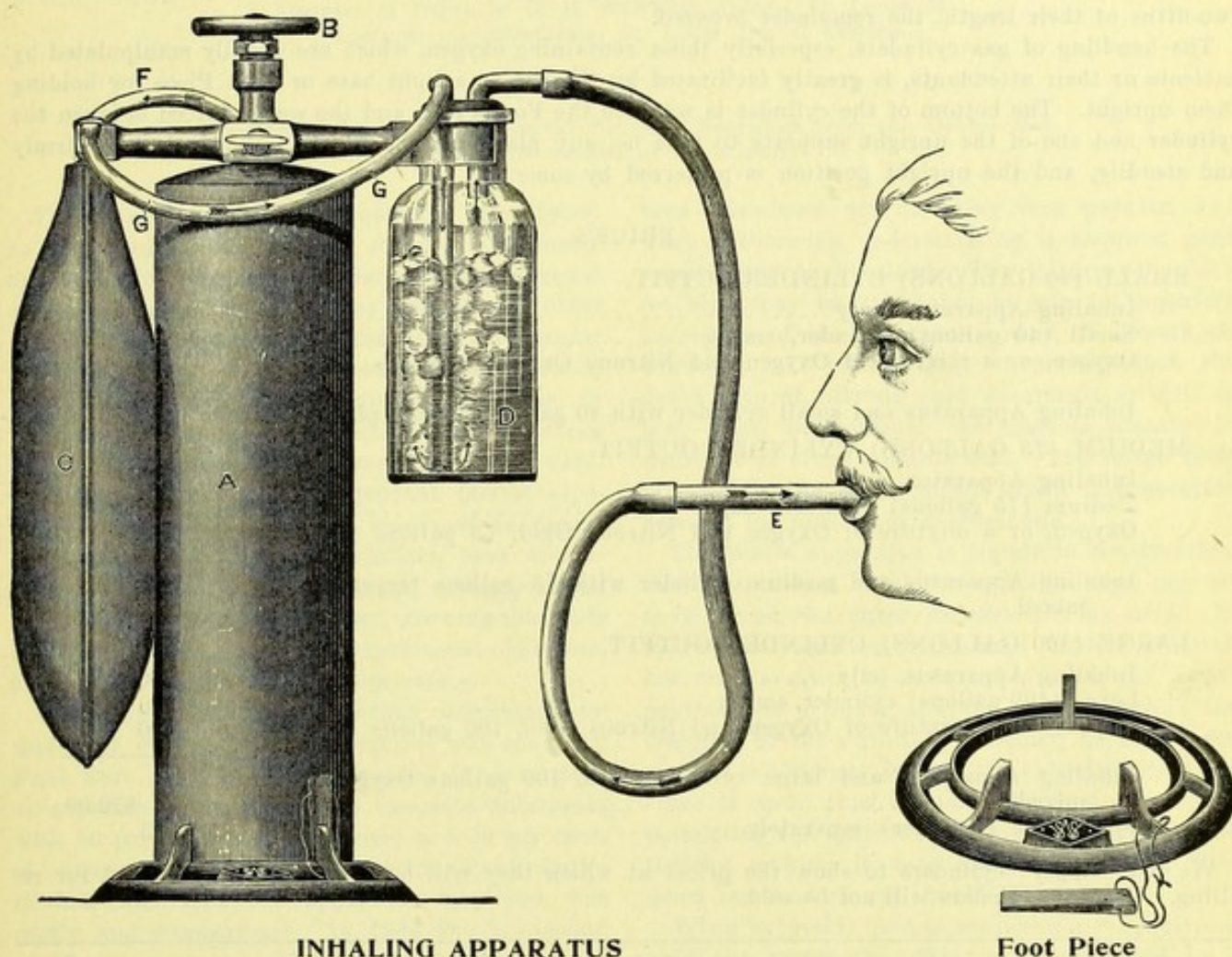
Either of these Outfits will be  
supplied with or without Cylinders  
as desired.

With the three-cylinder apparatus a full cylinder of nitrous oxid should always be kept in one of the holders, so that if the cylinder which is being drawn from should be exhausted during an administration, instant recourse could be had to the third cylinder.



## OXYGEN AND ITS APPARATUS FOR THERAPEUTIC ADMINISTRATION

The use of Oxygen in the treatment of disease has passed the experimental stage, its value in various conditions being now commonly accepted by the medical profession. The apparatus for its administration, herewith shown, is convenient and economical, overcoming all the difficulties formerly encountered. It meets all the requirements of safe transportation, easy keeping, and convenient administration, the last being absolutely under the control of the operator in charge.



A represents the cylinder filled with compressed oxygen; B, the gas valve; C, a rubber bag, holding one gallon; D, a wash bottle half filled with water;\* E, a mouthpiece attached by a rubber tube to a short glass tube which passes through the cover of the bottle, but does not extend down to the surface of the water; F, a rubber tube connecting the rubber bag to the valve B; and G, a rubber tube connecting the bag to the wash bottle by means of a glass tube which extends through the cover nearly to the bottom.

In using the apparatus, arrange the parts as shown in the illustration, being careful to place the leather washer properly at the outlet of the valve B, and half fill the bottle D with water. Open the valve B *very slowly and cautiously*; the oxygen will then flow through the tube F to the gas bag C. When the bag is filled, the valve B may be closed and the apparatus is ready for use. If the valve B is

\* The wash bottle serves several important purposes: indicates how fast the gas is flowing; calls attention if the valve of the cylinder be not closed tightly; arrests any dust that might be carried from the cylinder or from the interior of the tubing or bag; and moistens the gas, thus preventing its absorbing moisture from the throat and air passages.



opened too much, a portion of the gas may rush by the bag, and, forcing its way through the water, be lost; to correct this it is only necessary to partially close valve B. In administering oxygen the usual practice is to cause the patient to inhale very slowly from three to four gallons.

In certain conditions a modification of the pure oxygen by the admixture of definite proportions of nitrous oxid has been found advantageous.

We are prepared to supply pure Oxygen gas, or a mixture of Oxygen and Nitrous Oxid in definite proportions respectively of 20 per cent. and 40 per cent. of Nitrous Oxid.

Supplied in cylinders containing forty, seventy-five, or one hundred gallons.

Cylinders containing pure Nitrous Oxid ~~Gas are painted black~~; those containing pure Oxygen are *bronzed*. Oxygen cylinders containing 20 per cent. of Nitrous Oxid are painted *black* one-fifth of their length, the remainder *bronzed*; those containing 40 per cent. of Nitrous Oxid are painted *black* two-fifths of their length, the remainder *bronzed*.

The handling of gas cylinders, especially those containing oxygen, which are usually manipulated by patients or their attendants, is greatly facilitated by the use of a light base or Foot Piece for holding them upright. The bottom of the cylinder is set into the Foot Piece, and the wedge forced between the cylinder and one of the upright supports to take up any play. So placed the cylinder is held firmly and steadily, and the upright position is preferred by some.

### PRICES

#### SMALL (40 GALLONS) CYLINDER OUTFIT.

Inhaling Apparatus, only .....	\$5.00
Small (40 gallons) cylinder, empty .....	net 6.00
Oxygen, or a mixture of Oxygen and Nitrous Oxid, 40 gallons .....	2.00
Inhaling Apparatus and small cylinder with 40 gallons Oxygen, plain or mixed .....	\$13.00

#### MEDIUM (75 GALLONS) CYLINDER OUTFIT.

Inhaling Apparatus, only .....	\$5.00
Medium (75 gallons) cylinder, empty .....	net 10.00
Oxygen, or a mixture of Oxygen and Nitrous Oxid, 75 gallons .....	3.75
Inhaling Apparatus and medium cylinder with 75 gallons Oxygen, plain or mixed .....	\$18.75

#### LARGE (100 GALLONS) CYLINDER OUTFIT.

Inhaling Apparatus, only .....	\$5.00
Large (100 gallons) cylinder, empty .....	net 12.00
Oxygen, or a mixture of Oxygen and Nitrous Oxid, 100 gallons .....	5.00
Inhaling Apparatus and large cylinder, with 100 gallons Oxygen, plain or mixed .....	\$22.00
Foot Piece (cylinder) separately .....	\$0.35

We list "empty" cylinders to show the prices at which they will be credited when returned for refilling. Unfilled cylinders will not be sold.

## OF INTEREST TO THOSE WHO MAKE THEIR OWN NITROUS OXID

Dentists who for any reason prefer to generate the Nitrous Oxid which they use, will do well to take the following list of items and prices into account. The goods are all first-class.

### Retorts, Wash Bottles, Etc.

Retorts, Bohemian, with Rubber Stoppers .....	each \$1.25
Retorts, Bohemian, without Rubber Stoppers .....	" 1.15
Wash Bottles, capacity approximately 1½ gals. ....	" 1.00
Wash-bottle Tubes, Long .....	" .25
" " " Short .....	" .15
Rubber Stoppers for Bohemian Retorts .....	" .10
Rubber Stoppers for Wash Bottles, 2 holes .....	" .60
Rubber Stoppers for Florence Flasks, 1 hole .....	" .60



## THE ADMINISTRATION OF NITROUS OXID AND OXYGEN FOR ANESTHETIC PURPOSES

Abstract of Paper by G. B. WINTER, D.D.S., St. Louis, Mo.  
Lecturer on Anesthesia, St. Louis Dental College

(Read before the St. Louis Dental Society. Reprinted from the *Dental Era* with the consent of the author)

The ideal anesthetic has not yet been found as is shown by the various articles continually appearing in journals advancing some new agent or some improvement upon the innumerable older anesthetics. Approximately the death rate under chloroform is about one in two thousand; ether, one in fourteen thousand; nitrous oxid, one in five hundred thousand. We must take cognizance of this fact and give preference to nitrous oxid, since safety is the most important factor, especially when an anesthetic is employed in dental practice. Six extracting specialists, have administered it over **eight hundred and seventy thousand** times without an accident, showing that this anesthetic when employed by experienced operators, has given a record of maximum safety.

The introduction of prolonged anesthesia by means of nitrous oxid and oxygen was made by Paul Bert in 1876, who succeeded in a number of experiments in producing complete anesthesia with 80 per cent. of nitrous oxid and 20 per cent. of oxygen. The disadvantage of Paul Bert's method was that the apparatus employed was costly and cumbersome. In 1886 Dr. Hillischer, of Vienna, reported administering oxygen in connection with nitrous oxid in fifteen thousand cases, stating that the anesthetic effect was perfect, and he also introduced an apparatus whereby he could regulate the amount of oxygen. In his paper he states that he looked upon his gaseous mixture as without counter-indication, and that he administered it to every patient, irrespective of any morbid condition which might happen to be present.

Following these experiments were those of Dr. Hewitt of London, England. He introduced a perfect working apparatus, whereby the amount of oxygen could be regulated. His treatise upon the subject is very extensive and worthy of high praise.

The various apparatuses which have recently

been introduced are becoming very popular, and when a thorough understanding is acquired good results may be obtained. The failures of which we hear may be attributed largely to imperfect knowledge of the apparatus and of the anesthetic employed. It is certainly surprising that the death rate of nitrous oxid anesthesia is still so low, when we consider the careless manner in which it is often administered. The latter fault is probably the result of the small remuneration received for nitrous oxid anesthesia.

The White apparatus is simple in construction, having a correct regulator and two bags, one for oxygen and the other for the nitrous oxid. In operations requiring more than twenty minutes, hot towels must be wrapped around the upper part of the cylinder and the valve to avoid the clogging of the outlet by freezing, as the frozen gas has a tendency to lock the cylinder while the valve is open, thus stopping the flow of gas and permitting the patient to recover and struggle and thereby making it very disagreeable at a time when the flow of gas should be perfect.

When oxygen is used in conjunction with nitrous oxid the anesthetic effect is characterized by a normal color, quiet, sleep-like breathing, relaxed muscles, quiet pulse and normal pupils. The characteristic cyanosis and struggling of the simple nitrous oxid is eliminated. Jactitation, which is so commonly met with and which inconveniences the operator, is absent when oxygen is administered with nitrous oxid. The method which we formerly employed under such conditions, by pushing the gas to extremes, is no longer needed; better results are obtained at present in about the same time.

If prolonged anesthesia is required, varying from ten minutes to an hour, I find that by thoroughly anesthetizing the patient first with nitrous oxid and then admitting oxygen gradually, I have obtained better results than when oxygen was ad-



ministered from the beginning. Too much oxygen will result in the same objectionable symptoms as nitrous oxid alone; the patient will struggle and become mentally excited. The advantage of this anesthetic over all others is the short period required to obtain complete results. For minor operations about sixty seconds is required, while two minutes must be allowed for major operations. Full recovery requires about the same time. After-effects are practically nil.

In the general practice of dentistry this form of anesthesia can be employed in innumerable cases, relieving the patient of unbearable pain, and often permitting results impossible without it. This anesthetic can be given with a facepiece or a nasal inhaler. If the operation requires more than two or three minutes the nasal inhaler is employed. The nasal inhalers are of various designs so constructed that they do not interfere with the operator and are not disagreeable to the patient. However, the operator cannot administer the anesthetic and operate at the same time, as the patient requires constant attention and the flow of gas must be continuous in order to obtain good results. In nasal obstructions the facepiece must be employed, and by reapplying it about every thirty seconds the anesthetic can be continued up to the termination of the operation. If a large number of teeth are to be extracted the anesthesia can be carried on to the completion of the operation. The amount of hemorrhage will govern the length of time the patient can be kept under the anesthetic, as extreme care must be exercised to avoid the blood passing beyond the oral cavity. Impacted and broken-down teeth, which require time, and where the hemorrhage is not too great, can be extracted successfully. The removal of live pulps where medicinal agents or pressure anesthesia has failed, or excising the tooth to receive a crown, can be accomplished very easily by anesthetizing the patient. Quite a large number of pulps may be exposed and removed at one sitting without discomfort to the patient. Preparing sensitive cavities where it is impossible to secure a good undercut may be accomplished very quickly, thus relieving the patient of extreme pain, which would have to be endured if the cavity was prepared without a general anesthetic. In opening into the pulp chamber of abscessed teeth, or when the apical end of a tooth is to be removed, as in the treat-

ment of chronic abscesses opening into the antrum, or the removal of foreign growths about the mouth, and in any operation which will be painful, this anesthetic can be employed with satisfaction to both patient and operator.

For surgical operations the writer has administered nitrous oxid and oxygen in about one hundred cases, with good results. The advantages which this gas mixture possesses are its safety, the time required to produce anesthesia, the quick recovery, the absence of disagreeable after-effects, and the absence of shock. The only disadvantages—which, however, are trifling—are the size and weight of the apparatus and the expense of the gas. In cases where the patient has an idiosyncrasy against chloroform or ether it has been employed advantageously. General operations which require about the same time as is necessary for the extraction of a tooth—as the removal of tonsils or adenoids—are ideal cases for this form of anesthesia. The operator can secure a good operative position, and the short time required to produce anesthesia and the quick recovery are of essential value to the patient.

Two cases may be of general interest:

Case 1. Demonstrating complete anesthesia, as required for rectal operations. Patient, Mr. R., October 24, 1905, Rebekah Hospital, St. Louis. Diagnosis, syphilitic stricture of the rectum.

Treatment.—Mercury and iodides, with dilatation. Patient was anesthetized with nitrous oxid. Complete anesthesia in about fifty seconds. Rectum dilated by rectal bougie, the procedure occupying about twenty minutes. Anesthetic entirely satisfactory. Pulse and respiration not influenced to any appreciable degree. Patient felt no ill-effects beyond being light-headed, as he expressed it.

Case 2. Mrs. B., November 22, 1905, St. Anthony's Hospital, St. Louis. Diagnosis, pyosalpinx.

Treatment.—Operation November 1905. Med. laparotomy. Large friable uterus, with pus tube on left side, was found, size of a large orange. Did pan-hysterectomy; evacuated a quart of pus from abdomen; also removed both tubes.

Gas and oxygen were administered in this case during the operation, which required thirty minutes. Pulse and respiration were not influenced to any appreciable degree. About two minutes was required to secure complete anesthesia. Patient recovered in one minute from the effect of the gas.



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## THE ADMINISTRATION OF NITROUS OXIDE AND OXYGEN FOR DENTAL OPERATIONS

By **FREDERICK W. HEWITT, M.V.O., M.A., M.D., Cantab.**

Anæsthetist to his Majesty the King; Late Anæsthetist to his Majesty King Edward VII; Physician  
Anæsthetist to St. George's Hospital; Consulting Anæsthetist and Emeritus Lecturer on  
Anæsthetics at the London Hospital; Late Anæsthetist at the London Hospital,  
Charing Cross Hospital, and the Dental Hospital of London.

### FOURTH EDITION

Pp. i-ix, 1-104; illustrations 6; cloth 8vo, \$1.75

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This little volume, by the man to whom more than any other is due the practicalization of nitrous oxid and oxygen anesthesia, is a very complete manual of the subject. It makes no attempt to cover the entire ground of anesthetics and their administration, but sticks closely to its text. A bibliography of the subject and a full index add to its value. The book should be in the hands of all who contemplate the installation of apparatus for the induction of nitrous oxid anesthesia by the modern scientific method.

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PHILADELPHIA

**THE S. S. WHITE DENTAL MANUFACTURING CO.**

Chestnut Street, corner Twelfth



# "HOLD FAST THAT WHICH IS GOOD"



F all the agents used for the induction of anesthesia, not one even approaches Nitrous Oxid in safety; its nearest competitor in this regard is at least twenty times more dangerous.

The commonly accepted death rate of the four leading anesthetics is:

<i>Chloroform,</i>	<i>1 death to</i>	<i>2,500 administrations</i>	
<i>Ethyl Chlorid,</i>	<i>1 " "</i>	<i>10,000</i>	<i>"</i>
<i>Ether,</i>	<i>1 " "</i>	<i>15,000</i>	<i>"</i>
<i>Nitrous Oxid,</i>	<i>1 " "</i>	<i>300,000</i>	<i>"</i>

It is quite probable that the death rate of Nitrous Oxid is considerably overstated in this table, but, accepting the figures as given, a fatality of 1-3000 of 1 per cent. is practically negligible.

As showing the probable exaggeration of even the small fatality debited to the Nitrous Oxid, some statistics may be referred to.

In 1891, Dr. J. D. Thomas of Philadelphia, in a paper read before a joint meeting of the Pennsylvania and New Jersey State Dental Societies, stated that in twenty-eight years there had been but two deaths under Nitrous Oxid in the United States, although probably 10,500,000 persons had "taken the gas."

Dr. S. Straith of Detroit, before the Michigan State Dental Association in 1905, referred to records which he had of 500,000 administrations in three different offices without any serious results of any nature.

Dr. G. B. Winter of St. Louis, in a paper recently read before the St. Louis Dental Society, told of 870,000 cases recorded by six specialists without an accident.

Such figures emphasize the statement of Dr. J. McCardie, anæsthetist to the General, Dental, and Ear and Throat Hospitals of Birmingham, England, in a paper printed in the *Lancet*, October 7, 1905:

**"Nitrous Oxid, as regards safety, is still in a class by itself, and should be administered whenever possible."**



