G. CLARKE.

ANESTHETIZER.

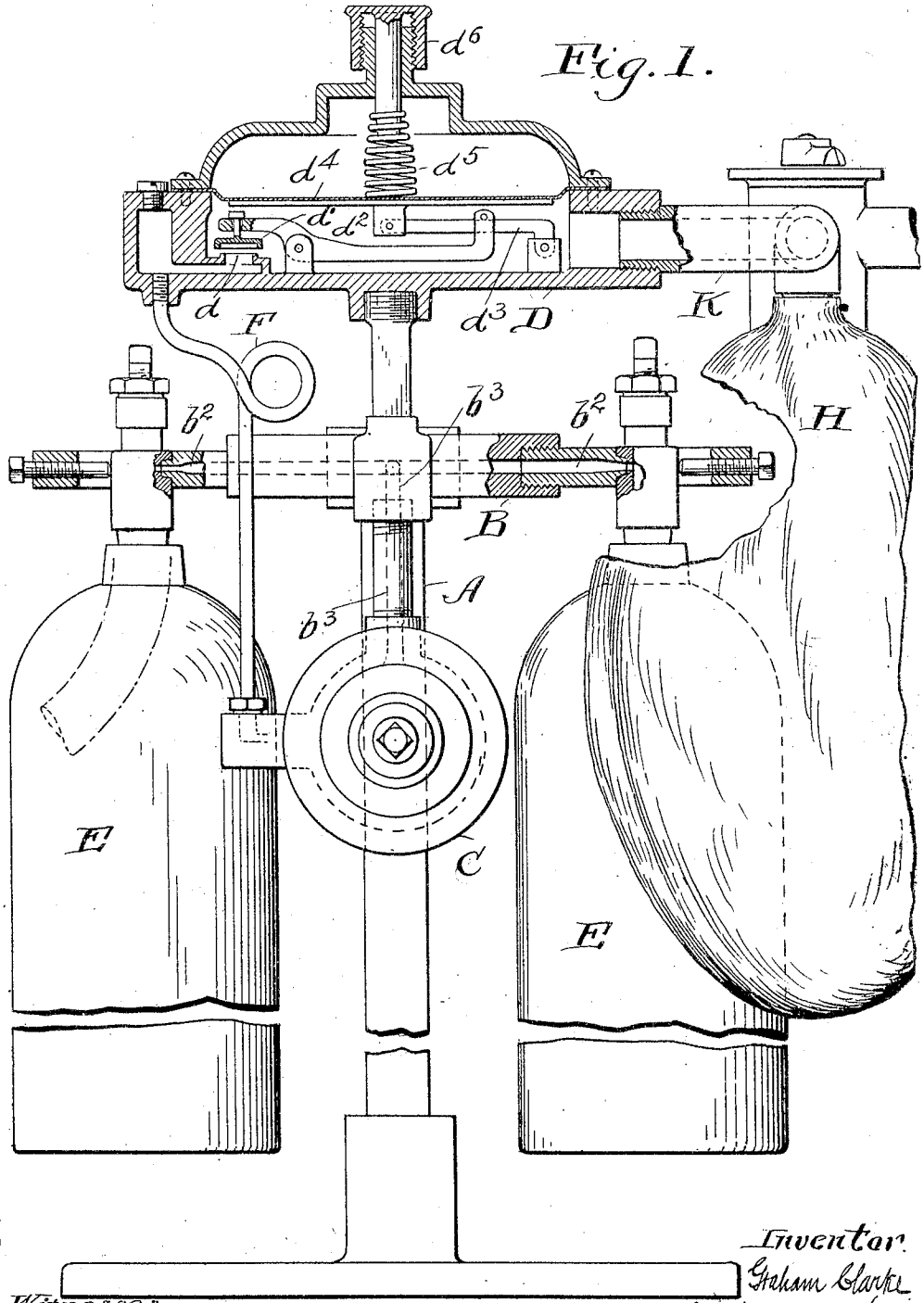
APPLICATION FILED DEC. 14, 1911.

1,093,975.

Patented Apr. 21, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

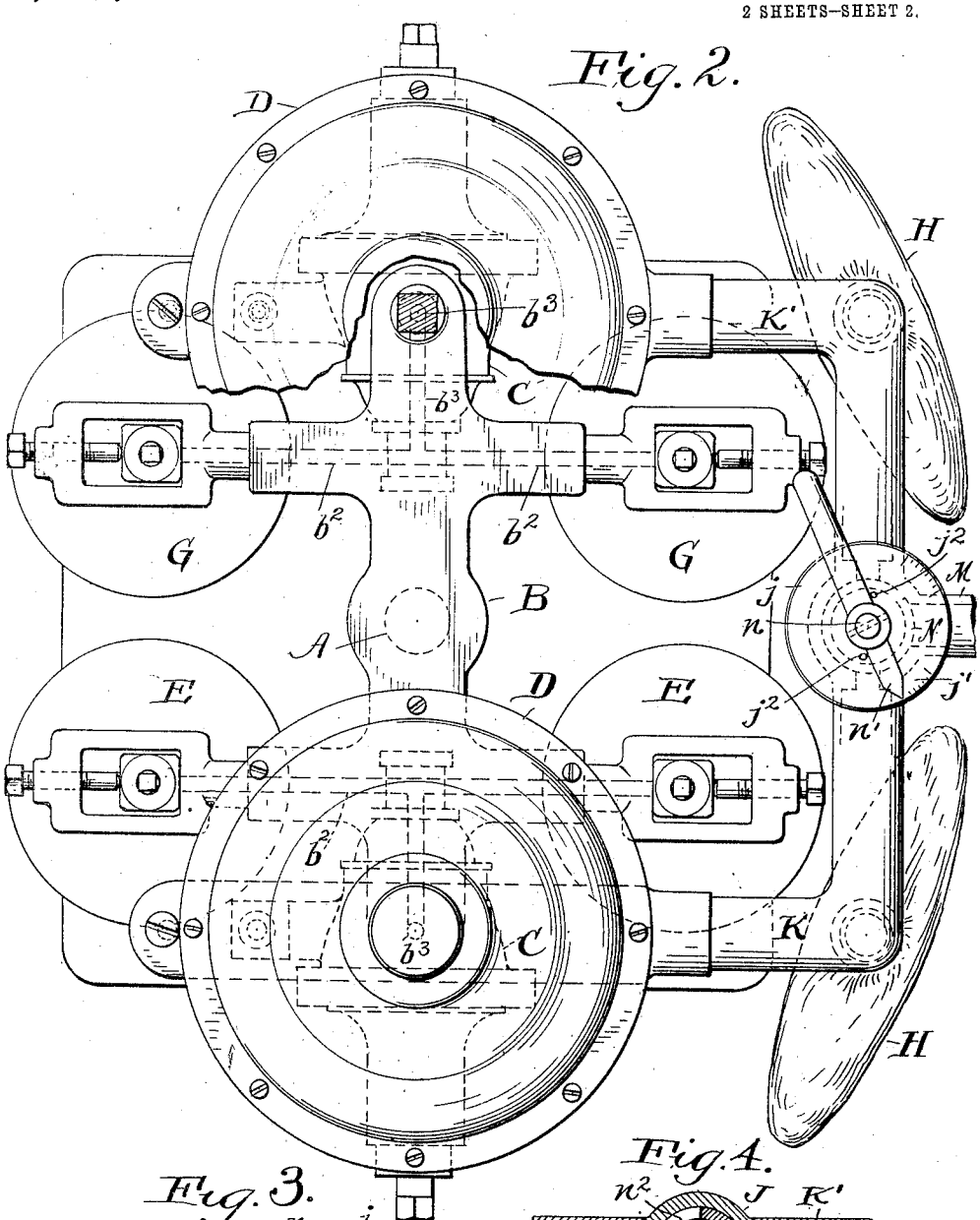


Fig. 3.

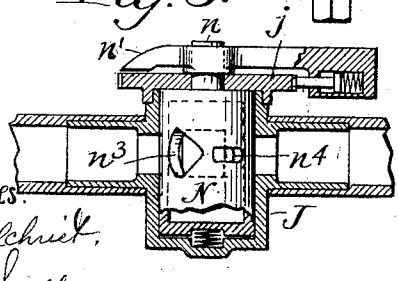
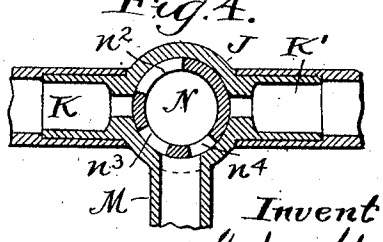


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ANESTHETIZER.

1,093,975. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed December 14, 1911. Serial No. 665,637.

To all whom it may concern:

Be it known that I, GRAHAM CLARKE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Anesthetizers, of which the following is a full, clear, and exact description.

This invention is an improved apparatus for administering a gaseous anesthetic, such as nitrous oxid, or oxygen, or a variable mixture of both. The apparatuses which have heretofore been employed for this purpose have required for their successful use the constant watchful care of a skilful attendant. It is essential that the pressure at the delivery mouth piece shall remain substantially uniform. The attendant, in charge of apparatuses which have heretofore been used, has determined variation in pressure by the feel and appearance of the flexible gas bags to which the mouth piece of the tube is attached. As the pressure in that bag appears to vary the attendant has been obliged to turn in the opening or closing direction, as appears to him necessary, several valves which are between the gas supply tank and said flexible bearing.

The object of the present invention is to provide an apparatus by which certainty will be substituted for skilled guessing, and which will require very little attention from or manipulation by an attendant, who need not be skilful, to obtain the desired result.

The invention consists in the combination of parts shown in the drawing, and hereinafter described and claimed.

In the drawing, Figure 1 is a front view of the apparatus partly broken away. Fig. 2 is a plan view thereof. Fig. 3 is a vertical section through the only valve mechanism in the apparatus requiring any attention from the operator while the apparatus is in use. Fig. 4 is a horizontal sectional view of said valve mechanism.

A frame B is fixed to a standard A,—said frame having one arm which extends rearward and another which extends forward from said standard. These two arms are alike both in construction and in respect to the parts with which they are associated. Each arm supports a gas pressure reducer C and an automatic gas pressure regulator D. In each arm is a port b^2 which extends transversely across it; and a port b^3 which connects the port b^2 with the gas pressure reducer C. A pipe F connects the gas pressure reducer C with the gas pressure regulator D. One of these arms is associated with the anesthetizing gas, as nitrous oxid, and the other with the oxygen. The source of anesthetizing gas under pressure is connected with the port b^2 of the front arm, for example. This gas may be in two tanks E, E, which are respectively connected with the opposite ends of the ports b^2. If preferred, however, only one of these tanks may be used, in which event, the other end of the port b^2 would have to be closed by some suitable means; or, instead of taking the gas from a small tank which as shown is fixed to and supported by this arm, it may be taken from a large tank located at a distant point, in which event said tank could be connected with one end of the port b^2 by a flexible pipe. Similarly, two oxygen tanks G, G, are connected with the port b^2 in the rear arm, and are suspended from said arm. Two pipes K, K′ receive the gas from the two automatic gas pressure regulators D, D, and deliver it, at diametrically opposite points, into the casing J of the only valve in the apparatus which requires manipulation by the attendant while the apparatus is in use. To each of these pipes K, K′ between the gas pressure regulator and the valve casing referred to a flexible rubber bag H is connected, which bag will always contain an adequate supply of gas to be drawn from for administration to the patient. The tanks of oxygen, whether large or small, and the tanks of the nitrous oxid, whether large or small, are usually charged under a pressure of 800 pounds, more or less.

The gas pressure reducers C employed may be of any suitable construction which will receive gas at 800 pounds pressure, more or less, and will deliver it at a pressure of approximately five to ten pounds.

The automatic gas pressure regulators D may be of any suitable construction, such as will receive gas at from five to ten pounds pressure, and discharge it at any pressure desired from, say, four ounces to sixteen ounces. Of course, these pressures are not absolute, but they represent the variations which may occur, or be desired in practice.

There are on sale now several varieties of

gas pressure reducers, suitable for use as a part of this apparatus, and therefore no description of them is necessary here.

An automatic gas pressure regulator suitable for use as a part of this apparatus is shown in Fig. 1. The gas from pipe F is admitted through port d into a chamber having a horizontal flexible diaphragm d^4 for its upper wall. The valve d' for the port d is carried by a lever d^2, which is operatively connected with another lever d^3, and this latter lever is connected with the diaphragm d^4. When the gas within the chamber of this regulator increases above a determined maximum, this diaphragm is bent, and thereby, through the described levers, the valve is moved toward its seat. A spring d^5 bears on said diaphragm; and the tension of the spring is regulated by the screw cap d^6. By manipulating this cap this regulator may be so adjusted that the gas delivered therefrom may have any desired pressure.

Attention is now directed to the valve casing J, and the valve therein. As stated, the two gas pressure regulators D discharge into this casing at diametrically opposite points through the pipes K, K'. The discharge pipe M, to which may be attached the flexible tube with its mouth piece or nose piece for delivering the gas to the patient, is connected with this valve casing midway between the two pipes K and K'. The valve N within this casing is a tubular cylinder whose stem n passes out through a removable cap j, the upper surface of which is graduated so as to serve as a dial j', and the pointer n' is attached to this stem. Two pins j^2, j^3, fixed to this dial by engaging the pointer limit the movement of the valve. This valve contains three ports n^2, n^3, n^4, so placed that the valve may be turned to admit nitrous oxid only from pipe K to the delivery pipe M; or to admit oxygen only from pipe K' to the delivery pipe M, or to deliver any required mixture of those two gases to the delivery pipe. The dial j' may be graduated so as to indicate the required position of the pointer to get any of the results desired.

When this apparatus is to be used, the gas regulator D is adjusted in accordance with the desired pressure. When the mouth piece employed may cover the nose and mouth of the patient, it should be regulated to deliver gas at a pressure of about four ounces, if nitrous oxid is the anesthetic. If the anesthetic has to be administered through the nose only, as for throat and mouth operations, the pressure should be greater and the regulator should be adjusted accordingly. But when this adjustment has been effected, the attendant has only to open valve N to give a full flow of the anesthetic, or turn it to get any desired mixture thereof with oxygen, or to get a full flow of oxygen; as during the progress of the operation may be required.

Having described my invention, I claim:

1. In an anesthetizer, the combination of a gas conduit adapted for connection with a source of gas supply, a gas pressure reducer, and an automatic gas pressure regulator connected in series and forming a part of said gas conduit, and a manually controlled valve in said gas conduit between the gas pressure regulator and the final outlet of said conduit, capable in one position of entirely cutting off the escape of said gas.

2. In an anesthetizer, the combination of a gas conduit adapted for connection with a source of gas supply, a gas pressure reducer, and an automatic gas pressure regulator connected in series and forming a part of said gas conduit, a manually controlled valve in said gas conduit between the gas pressure regulator and the final outlet of said conduit capable in one position of entirely cutting off the escape of said gas, and a gas bag connected with the gas conduit between the gas pressure regulator and said valve.

3. In an anesthetizer, the combination of two gas conduits adapted respectively for connection with independent sources of gas supply, a gas pressure reducer and an automatic gas pressure regulator connected in series forming a part of each gas conduit, a valve casing which is connected with the delivery end of each gas conduit, and has a discharge port, and a manually controlled three way valve adapted to connect either or both gas conduits with said gas discharge port capable in one position of entirely cutting off the escape of said gases.

4. In an anesthetizer, the combination of two gas conduits adapted respectively for connection with independent sources of gas supply, a gas pressure reducer and an automatic gas pressure regulator connected in series forming a part of each gas conduit, a valve casing which is connected with the delivery end of each gas conduit, and has a discharge port and a manually controlled three-way valve adapted to connect either or both gas conduits with said gas discharge port and capable in one position of entirely cutting off the escape of said gases, a graduated dial, and a pointer fixed to said valve and moving in juxtaposition to said dial.

5. In an anesthetizer, the combination of a base having a standard, a frame fixed thereto and containing a gas port, one end of which may be connected with a source of gas, a gas pressure regulator connected with said gas port and secured to and supported by said frame, an automatic gas regulator also secured to and supported by said frame a pipe connecting the gas pressure reducer and the gas pressure regulator, an outlet pipe connected with the gas pressure regu-

lator, and a manually controlled valve in said outlet pipe capable in one position of entirely cutting off the escape of said gas.

6. In an anesthetizer, the combination of a base having a standard, a frame fixed thereto and having arms which project on opposite sides of said standard, each arm containing a gas port which is adapted to have one end connected with a source of gas supply, a gas pressure regulator secured to each arm of said frame and connected with the gas port therein, an automatic gas pressure regulator also supported by each arm of said frame, a pipe connecting the gas pressure reducer with the gas pressure regulator, two pipes connected respectively with the two gas pressure regulators, a valve casing with which both of said pipes are connected, said casing having a gas discharge port, and a manually controlled three-way valve in said casing adapted to connect either or both of said pipes with said outlet port and capable in one position of entirely cutting off the escape of said gases.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

GRAHAM CLARKE.

Witnesses:
H. R. SULLIVAN,
E. L. THURSTON.