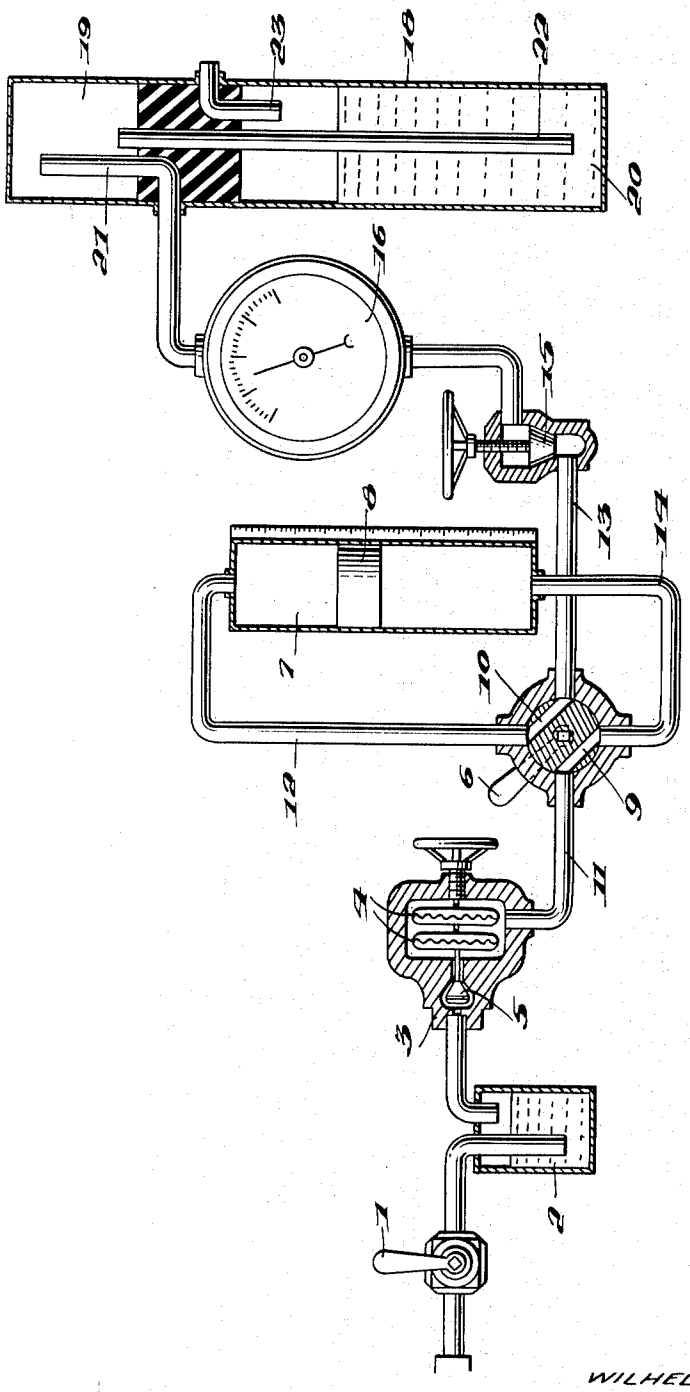
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INSUFFLATION APPARATUS

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INSUFFLATION APPARATUS

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The invention relates to insufflation apparatus, and more particularly to apparatus for introducing oxygen intra-arterially in the case of disturbances in the circulation of the blood. It is also useful for producing arteriopneumographs, and for gaseous medication of any sort by insufflation.

In the past, insufflation has ordinarily been avoided whenever possible for a number of reasons. One of these has been the difficulty of keeping the pressure of the gas properly adjusted with respect to the pressure of the blood stream into which it is introduced. It has also been difficult to prevent the admixture of air with the gaseous medicament. Another problem has arisen in that it is hard to control the amount of gaseous medium introduced into the blood.

The primary object of the present invention is to provide an insufflation apparatus which is more efficient and satisfactory than those heretofore available.

Another object of the invention is to provide such an apparatus which indicates the pressure of the blood stream and which can be therefore quickly adjusted to compensate for variations in such pressure.

A further object of the invention is to provide an apparatus which completely excludes the possibility of the admixture of air with the gaseous medium.

A further object of the invention is to provide a device which allows accurate dosage of various amounts of the gaseous medicament.

Further objects and advantages of the invention will appear more fully from the following description, especially when taken in conjunction with the accompanying drawing which forms a part thereof.

In the drawing, a gas such as oxygen from any suitable source, such as a pressure tank, flows to pressure reduction valve 1 into a dry scrubber 2. The gas then flows to a precision pressure control device 3 having a valve 5 controlled by adjustable diaphragms 4. From this the gas flows to a four-way valve 6 having two parallel passages 9 and 10. Valve 6 has inlet pipe 11 leading from control member 3. Pipe 12 leads from the valve to the top of a dosing device including cylinder 7 in which a piston 8 is slidably mounted. Pipe 14 leads from valve 6 to the bottom of cylinder 7, while pipe 13 runs from the valve to an adjustable throttle valve 15.

From this throttle valve, a line runs to pressure gauge 16, and then to a liquid scrubber composed of a tank

18 divided to form an upper chamber 19 and a lower chamber 20. The intake pipe 21 from gauge 16 leads into upper chamber 19. A tube 22 connects the bottom of chamber 19 with the bottom of chamber 20, and an outlet 23, to which the injection needle may be connected, leads out from the top of chamber 20.

With such an arrangement, when the valve 6 is in the position shown, gas from pressure control 3 will be flowing through passage 9 and pipe 14 to the bottom of cylinder 7, pushing piston 8 upwards and forcing the gas above it through pipe 7, passage 10 and pipe 13 to the outlet 23 for use. The amount of gas fed in this way is limited by the volume of cylinder 7, and, if this cylinder is made transparent and provided with a scale, the quantity fed can be determined by the movement of piston 8.

When piston 8 reaches the top of cylinder 7, valve 6 is turned by 90°, connecting pipe 11 to pipe 7 and pipe 14 to pipe 13, so that the piston is now pushed down and another volume of gas is fed to outlet 23.

By allowing a measured quantity to flow to one side of piston 8 and then reversing valve 6, doses smaller than the full volume of cylinder 7 can be readily administered.

From pipe 13 the gas flows through valve 15, gauge 23, pipe 21 to chamber 19, then through pipe 22 into chamber 20 and to outlet 23, being scrubbed by the liquid in the chamber 20. This chamber also helps in maintaining the desired pressure more nearly constant, since any change in the back pressure will cause a detectable variation in the level of the liquid in chamber 20. By observing this level, corrections can be made to the valves as needed.

Such an arrangement therefore allows the insufflation of measured doses of gas at an accurately maintained pressure. It ensures the purity of the gas and avoids any danger of the mixture of air therewith.

While I have described herein one embodiment of my invention I wish it to be understood that I do not intend to limit myself thereby except within the scope of the claims hereto or hereinafter appended.

I claim:

1. Insufflation apparatus comprising a precision pressure reducing device adapted to be connected to a source of supply, a dosing device, a four-way cock connecting said dosing device to said pressure reducing device, a throttle valve connected to said dosing device, and a scrubber connected to said throttle valve and having an outlet adapted to be connected to an insufflation tube, said dosing device comprising a chamber and a piston freely slidable therein, said cock being arranged to connect said pressure reducing device and said throttle valve alternately to opposite sides of said piston.

2. Apparatus as claimed in claim 1 in which the scrubber further includes means to indicate the volume and pressure of the gas flowing therethrough.

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