Sept. 4, 1928. 1,683,144

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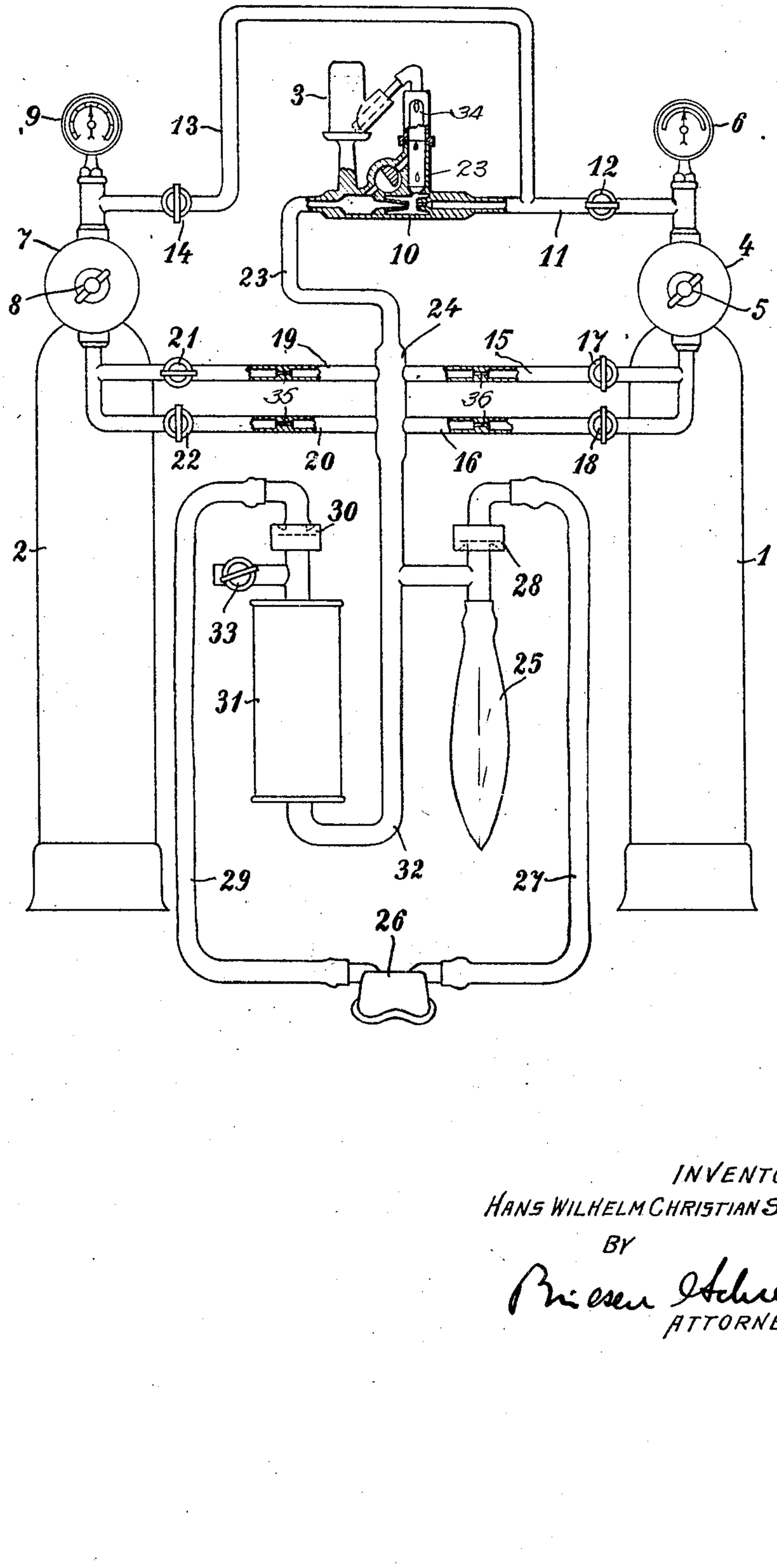
INHALING APPARATUS FOR NARCOTICS

Filed March 26, 1927



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Patented Sept. 4, 1928. 1,683,144

UNITED STATES PATENT OFFICE.

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INHALING APPARATUS FOR NARCOTICS.

Application filed March 26, 1927, Serial No. 178,748, and in Germany March 11, 1926.

The invention refers to an apparatus for inhaling two fluids which act narcotically and therapeutically of which one is gaseous (laughing gas) and the other liquid (ether) as well as a nourishing gas (oxygen).

Narcotic apparatus have been suggested heretofore in which the oxygen serves as carrier for the narcotic fluid, and moreover narcotic apparatus are known which are adapted to produce an oxygen-laughinggas-ether-narcosis. Such apparatus are frequently deficient and do not answer clinical requirements. The patients behave physiologically in a very different manner, so that a narcotic method, which the physician at first considers the right thing frequently must be speedily changed during the narcosis to uphold a sufficient depth of the narcosis and not to endanger the heart- and breathing-operations. The physician therefore must be enabled to either make use of a harmless pure gas-narcosis (oxygen-laughinggas), or to combine the same with an addition of ether, or finally a pure ether-narcosis (oxygen-ether).

One object of the present invention is an apparatus for administering anæsthetic gases in which the quantity of the gas mixture administered to the patient may easily be varied without altering the ratio of the constituents of the mixture at the same time.

In the drawing an elevation of the apparatus is shown diagrammatically constructed according to the present invention.

The steel cylinder or flask 1 is filled with laughing gas and the steel cylinder or flask 2 is filled with oxygen, while the glass 3 contains ether. The pressure reducing valve 4 for the laughing gas is adjusted by the adjusting screw 5 to a predetermined low pressure, for instance one atmosphere, which may be read off from the gauge 6, while the pressure reducing valve 7 for the oxygen may be controlled by the adjusting screw 8 to a variable low pressure, which can be read off from the gauge 9. By changing the pressure the amount of oxygen, which is to be added to a certain amount of laughing-gas, may be regulated in order to secure the desired ratio of mixture of the two gases, for instance 85% laughing gas and 15% oxygen.

By the aid of an injector nozzle 34 ether is sucked from the glass 3 into a known dripping apparatus 10 in which it is atomized and vaporized. The injector nozzle 34 is inserted in a conduit 23 which terminates in two branches 11 and 13 connected to the pressure reducing valves 4 and 7 respectively. The injector nozzle may be operated either by the stream of laughing gas from the pipe 11 having a cock 12, or by the stream of oxygen from the pipe 13 having a cock 14. Besides the pipes 10 and 13 there are two other sets of conduits, one set comprising the pipes 15 and 16 having cocks 17 and 18 for laughing gas, and the other set comprising pipes 19 and 20 having cocks 21 and 22 for oxygen. The four pipes 15, 16, 19, 20 as well as the pipe 23 for the ether vapors lead into the collecting pipe or mixing chamber 24 from which the gases are inhaled. Gas dosing constrictions 35 are provided in the pipes 15, 16, 19, 20 which are of the same size as the aforementioned injector nozzle. The constriction 35 throttle the current of gas flowing through the respective conduits, thereby determining the quantity of gas passing therethrough. As all the nozzles and constrictions have the same size, the same gas quantity will pass through each of the various conduits, provided that the same pressure prevails in both reducing valves. Instead of the constrictions 35 any desired sort of throttling elements may be used, of course, provided that their throttling effect equals that produced by the nozzle 34. Where it has been stated heretofore that the nozzles must have the same size, it is meant thereby that their throttling effect must be the same to insure equality of the passing gas currents. The constrictions are tuned together with the scales of the gauges 6 and 9. It will be clear from the foregoing description that the pipes 15, 16, 19 and 20 represent conduits which are shunted across the ether admixing device 10 to form direct communications between the mixing chamber 24 and the gas sources 4 and 7 respectively. The dosed amounts of gas may be very small when the inhaled gas is regenerated in known manner, that is to say when they are deprived of the carbonic acid and water vapors and are used again. In the drawing a device of this description is illustrated. The pipe 24 conducts the mixed gas into the breathing bag 25 from which the patient inhales the gas by the mask 26, the hose 27 and the non-return valve 28. The exhaled air is

conducted by the hose 29, the non-return valve 30, the carbonic acid and water absorption cartridge 31 and by the pipe 32 back into the breathing bag 25. A small surplus of gas necessary for upholding the ratio of mixture escapes by the cock 33, which may be adjusted more or less in width according to the filling degree of the bag 25.

In carrying out a narcosis the physician at first will always try to do with the harmless pure gas narcosis (oxygen-laughing-gas) without addition to ether. Therefore the cocks 12 and 21 are opened accordingly, while the cocks 14, 17, 18 and 22 remain closed. Moreover the dripping apparatus 10 is adjusted to zero, so that the laughing-gas is fed by the injector nozzle without tearing any ether with it. The gas flows uniformly after adjusting the gauge 6, say about two litres in the minute, to the pipe 23, pipe 24, and so on to the breathing bag 25. The oxygen passes through the cock 21 and by the dosing constriction in the pipe 19 to the pipe 24 where the two gases mix with one another. When the mixture by way of example is supposed to contain 80% laughing gas and oxygen the amount of oxygen which is added in the minute will be 0, 5 litres. Here it may be remarked that it is not necessary to make a calculation for every adjustment, because the dial of the gauge 9 is provided with a percent-gauge.

If the amount of gas of 2, 5 litres is insufficient to uphold the bag 25 inflated to a moderate extent the cocks 18 and 22 in the pipes 16 and 20 are also opened. Since the constrictions in these pipes correspond in size with those in the dripping apparatus 10 and with that inserted in the pipe 19 it is only the amount that will be changed thereby but not the ratio.

Should it happen that owing to a too slight relaxation of the muscles of the patient an addition of ether will become necessary and the dripping apparatus will be set to operate in the usual manner. The ether will be carried away by the laughing gas in a vaporous state. Even in this instance the ratio of mixture will not be changed. Of course the dripping apparatus 10 will be adjusted for a fixed working pressure of the laughing gas reducing valve.

When it is necessary to administer a full ether marcosis (oxygen-ether) without laughing gas the cocks 12, 17 and 18 must be closed while the cock 14 is opened, and at the same time the working pressure according to the gauge 9 is to be adjusted to a value corresponding to the pressure of the laughing gas. Then the oxygen evaporates the ether in the dripping apparatus and will be inhaled together therewith more or less saturated. By deep breathing an addition of oxygen may be administered by opening the cocks 21 and 22.

I claim:—

1. Apparatus for administering anæsthetic gases comprising a source of anæsthetic gas of constant pressure, a source of nutrient gas of constant pressure, a mixing chamber, a conduit leading from said chamber and terminating in two branches, connected to said sources respectively, valve means adapted to shut off said branches selectively, a vapor admixing device including a throttling member inserted in said conduit and serving to admix anæsthetic vapors with the gas passing therethrough, a face piece communicating with said mixing chamber, two sets of conduits, each set forming a direct communication between one of said sources and said mixing chamber and valves adapted to shut off said conduits selectively, each conduit being provided with a throttling element equal in size to the aforementioned throttling member.

2. Apparatus for administering anæsthetic gases comprising a source of anæsthetic gas of constant pressure, a source of nutrient gas of constant pressure, a mixing chamber, a conduit leading from said chamber and terminating in two branches, connected to said sources respectively, valve means adapted to shut off said branches selectively, a vapor admixing device including a throttling member inserted in said conduit and serving to admix anæsthetic vapors with the gas passing therethrough, a face piece communicating with said mixing chamber, two sets of conduits, each set forming a direct communication between one of said sources and said mixing chamber and valves adapted to shut off said conduits selectively, at least one of said conduits being provided with a throttling element therein.

In testimony whereof I have signed my name to this specification.

HANS WILHELM CHRISTIAN SCHRÖDER.