

No. 859,778.

PATENTED JULY 9, 1907.

G. POE.

MACHINE FOR INDUCING ARTIFICIAL RESPIRATION.

APPLICATION FILED OCT. 11, 1906.

2 SHEETS—SHEET 2.

Fig. 2.

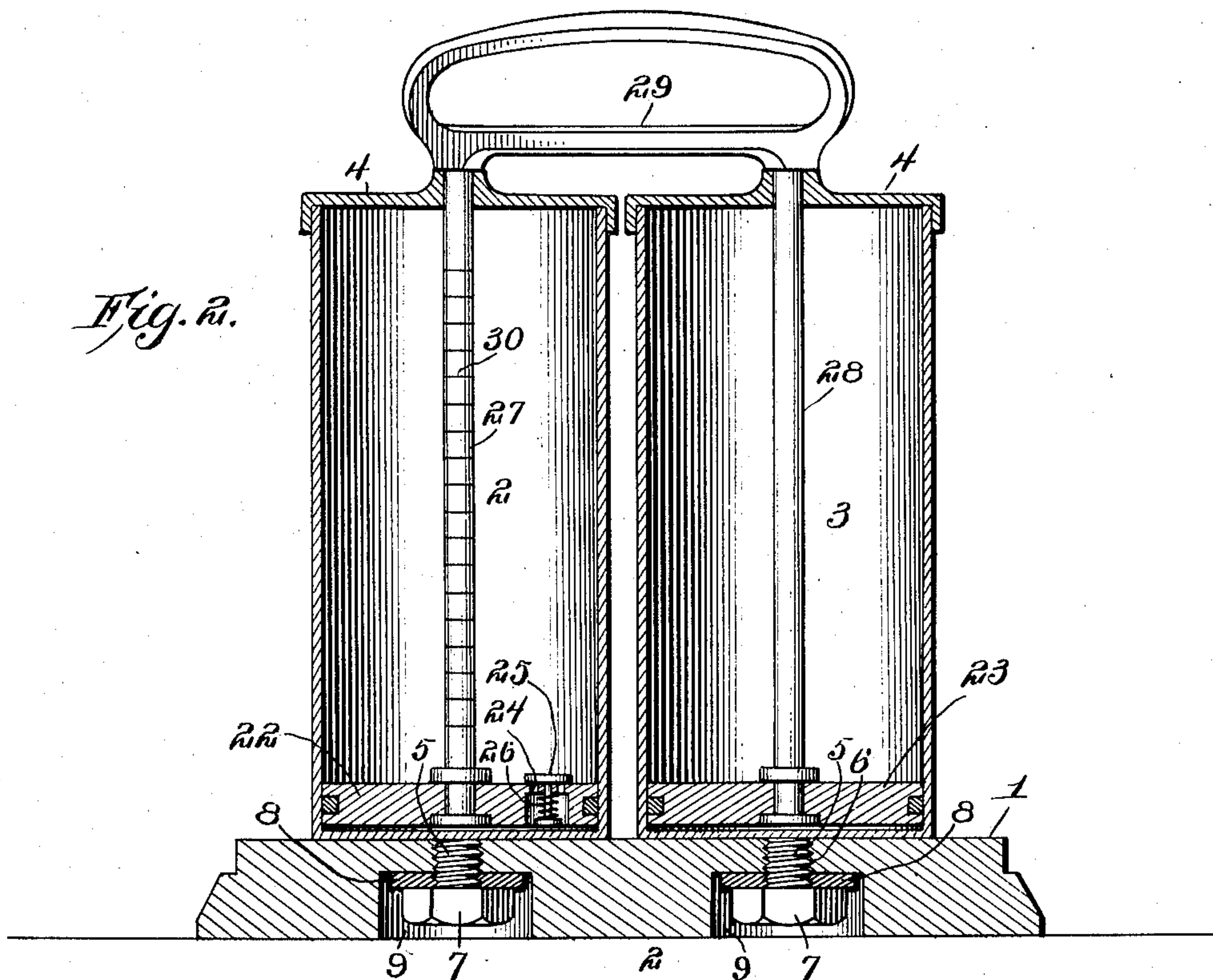
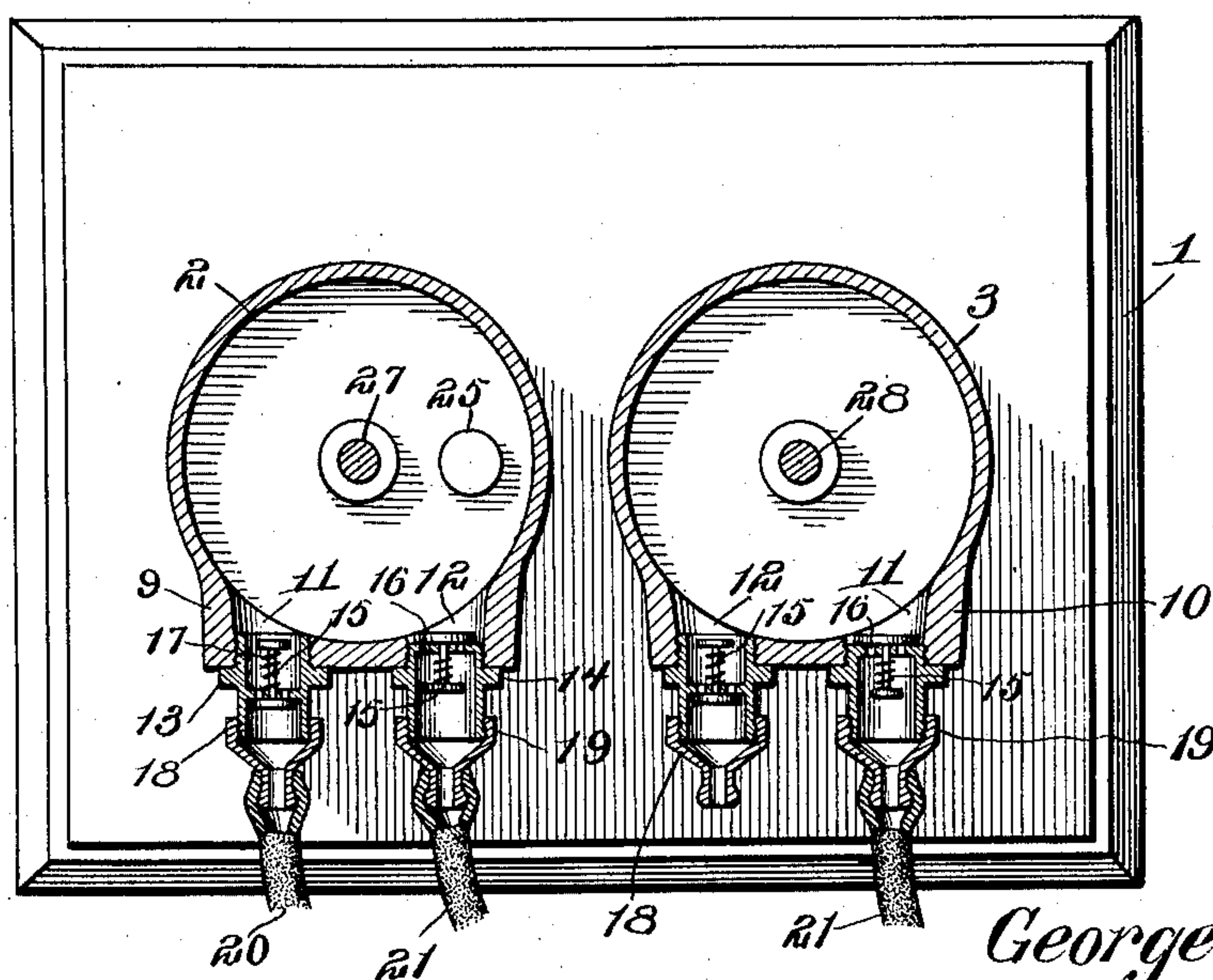


Fig. 3.



Witnesses

Louis R. Heinichs
Geo. Ackerman Jr

By

Victor J. Evans

Attorney

Inventor
George Poe

No. 859,778.

PATENTED JULY 9, 1907.

G. POE.

MACHINE FOR INDUCING ARTIFICIAL RESPIRATION.

APPLICATION FILED OCT. 11, 1906.

2 SHEETS—SHEET 1.

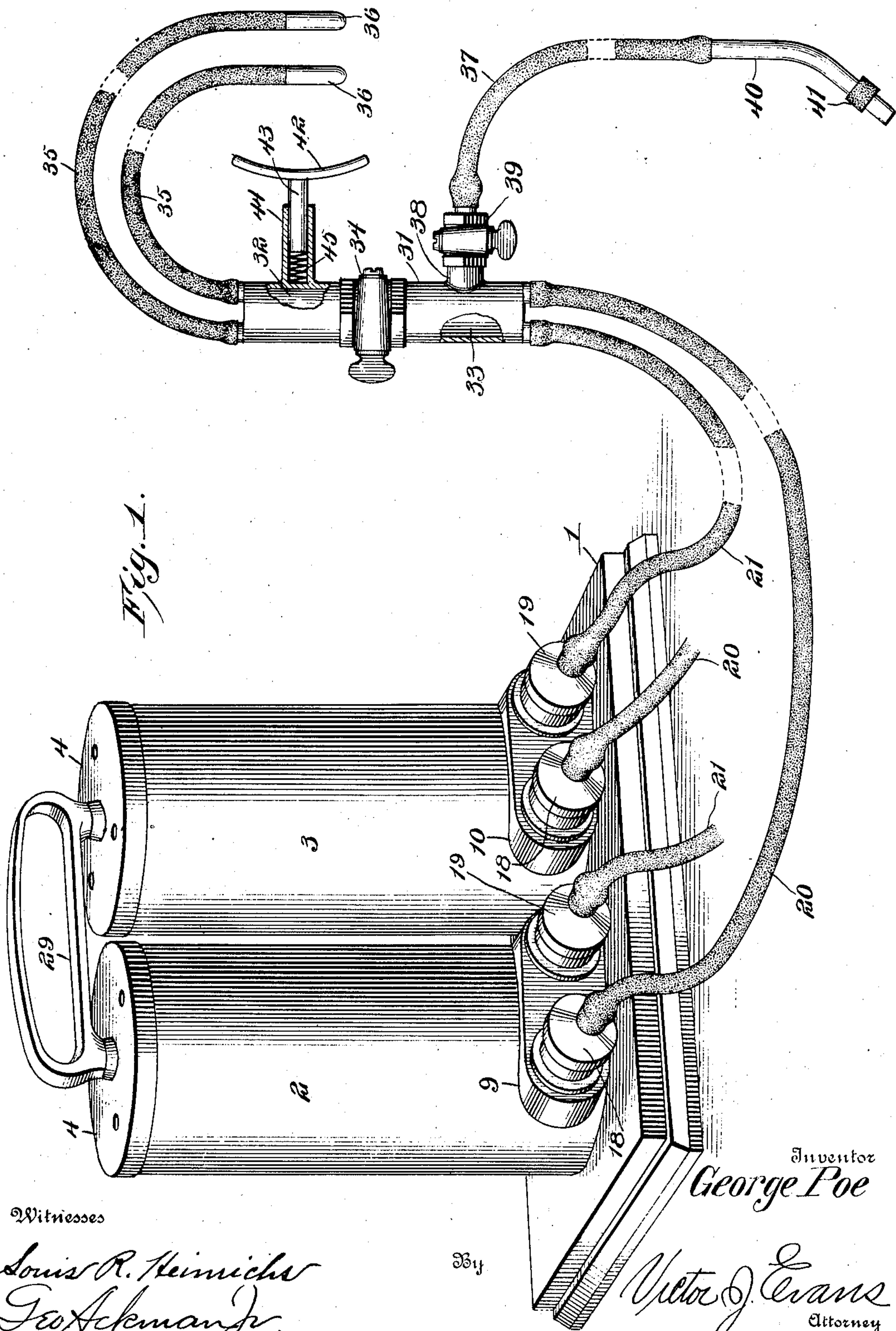


Fig. 1.

Witnesses

Louis R. Heinichs
Geo Ackman Jr.

By

Inventor
George Poe

Victor J. Evans
Attorney

UNITED STATES PATENT OFFICE.

GEORGE POE, OF SOUTH NORFOLK, VIRGINIA, ASSIGNOR OF ONE-FOURTH TO HARRIET LOUISE OSTRANDER, ONE-FOURTH TO THOMAS BLACK, OF SOUTH NORFOLK, VIRGINIA, AND ONE-FOURTH TO FRANCIS M. MORGAN, OF BERKLEY, VIRGINIA.

MACHINE FOR INDUCING ARTIFICIAL RESPIRATION.

No. 859,778.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed October 11, 1906. Serial No. 338,392.

To all whom it may concern:

Be it known that I, GEORGE POE, a citizen of the United States, residing at South Norfolk, in the county of Norfolk and State of Virginia, have invented new and useful Improvements in Machines for Inducing Artificial Respiration, of which the following is a specification.

The invention relates to an apparatus for inducing artificial respiration, in the use of which carbonic acid gas is withdrawn from the lungs of the patient, and oxygen forced into the lungs with the effect to induce as nearly as possible a simulation of natural respiration.

The main object of the present invention is the production of an apparatus designed primarily for manual operation and constructed to provide independent cylinders into which carbonic acid gas and oxygen is simultaneously drawn, the former from the lungs of the patient and the latter from any suitable source of supply, the subsequent actuation of the apparatus clearing the cylinders by forcing the carbonic acid gas into the atmosphere and the oxygen into the lungs of the patient.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a perspective view of the apparatus constructed in accordance with my invention, Fig. 2 is a vertical central section through the cylinders, parts being in elevation, Fig. 3 is a transverse section through the cylinders taken on the line of the valve connection.

Referring particularly to the drawings, wherein like reference numerals indicate like parts throughout the several views, my invention comprises essentially a base 1 of substantial character and of such size as to properly support the working parts of the apparatus without interfering with the portability of the device.

Cylinders 2 and 3, hereinafter termed respectively the charging and discharging cylinders, are secured upon the base about centrally thereof, the former being the cylinder for the distribution of oxygen, and the latter the cylinder for the withdrawal of carbonic acid gas. The cylinders are preferably identical in size and construction each including a cylindrical wall open at the upper end and having an integral bottom, the open upper end being closed by a cap 4 hermetically fitting the cylinder wall and formed with a series of perforations to permit the free ingress and egress of air to avoid the formation of a vacuum in the operation of the apparatus.

While I contemplate securing the cylinders to the base in any usual or desired manner, I prefer to provide the bottom or base of each cylinder with a centrally arranged threaded stud 5, which depends from said

bottom and is adapted to pass through a threaded opening 6 in the base 1 of the apparatus, nuts 7 and washers 8 cooperating with the stud to secure the cylinders to the base. The relatively lower or under surface of the base is recessed at 9 to receive the securing nuts 7, thereby housing said nuts and avoiding projection on the bearing surface of the base.

Each cylinder 2 and 3 is formed near the bottom with a laterally offset valve chamber, 9 and 10 respectively, said chambers being in open communication with the interior of the cylinder and each formed with two openings 11 and 12, the encircling walls of which are threaded. Valve casings 13 and 14 are arranged for threaded connection with the respective outlets, each casing containing a valve 15 cooperating with openings 16 formed in a transversely disposed partition arranged within the casing, the valves being normally maintained in closing position through the medium of coil springs 17, all as clearly shown in Fig. 3.

The valves of the respective valve casings 13 and 14 are reversely disposed, so that the former constitutes an outlet valve from the cylinder, and the latter an inlet valve thereto. The relatively free ends of the valve casings 13 and 14 are threaded for the reception of nipples 18 and 19 respectively to permit the connection of flexible pipes 20 and 21 thereto, said pipes being preferably of a character to permit their complete flexibility while preventing their collapse in the operation of the apparatus.

Within the cylinders 2 and 3 are arranged pistons 22—23, each provided with an edge packing to prevent leakage. The piston 22 within the oxygen or charging cylinder is formed with relief port or ports 24, with which a valve 25 cooperates, the valve being disposed to close the ports in the movement of the piston in an upward direction, and being normally maintained in said closed position through the medium of a coil spring 26 encircling the stem of the valve and bearing between a disk head on the valve stem and the wall of the piston recess, it being understood that the piston is recessed to provide for the reception of the valve stem and spring, as clearly shown in Fig. 2.

Each piston is fixedly secured to a rod, 27—28 respectively, which rods extend through centrally disposed openings in the cap plates of the cylinders and are connected beyond the cylinders by a handle 29, preferably of loop form for convenience in operation. By this construction the pistons are simultaneously and similarly operated through the medium of the handle 29, the piston rod 27 of the oxygen or charging cylinder being preferably graduated, as at 30, to indicate the cubical contents of said cylinder remaining beneath the piston in any particular projected position of the

piston rod. The operator is thus enabled to determine and control the amount of oxygen delivered to the patient at any one stroke of the piston.

In conjunction with the cylinders and parts described, the apparatus includes a hand piece 31, comprising in effect a cylindrical body having an upper chamber 32 and a lower chamber 33 communicating through a reduced passage controlled by an ordinary barrel valve 34. The tube 20, or outlet tube leading from the oxygen or charging cylinder, and the tube 21 or inlet tube leading to the carbonic acid gas or discharging cylinder are in open communication with the lower chamber 33 of the hand piece by any desired form of pipe connection. The upper chamber 32 is also in open communication with service tubes 35, two in number, which are each provided at their free ends with plug sections 36, formed to permit free passage of the gases to and from the tubes 35 and adapted for insertion in the nostrils of the patient, the plugs being, of course, of a size to close the nasal passages except through the plug passages.

An additional service tube 37 is in communication with the lower chamber 33 of the hand piece through the medium of an outlet 38 from said chamber controlled by a valve 39. The free end of the service tube 37 connects with an inflexible tube 40 shaped to correspond to the shape of the larynx, and provided near one end with an encircling plug section 41 designed in the use of the service tube 37 to close the upper opening of the glottis in the throat of the patient.

The hand piece is provided with a pressure plate or pad 42 shaped to fit the "Pomum Adami" of the larynx and adapted for manual operation to exert a backward pressure upon the thyroid cartilage to close the asophagus during the operation of the apparatus and prevent the oxygen or air from going into the stomach of the patient. The pad is preferably connected to a stem 43 slidably disposed in a sleeve extension 44 projecting laterally from the wall of the upper chamber of the handle, a coil spring 45 being arranged within the sleeve to bear against the stem, and thereby exert a yielding pressure upon the cartilage.

With the parts constructed and arranged as described, assuming the service pipes 35 to be in use, the operation of the invention is as follows. The valve 34 is turned to provide free communication between the respective chambers of the hand piece, the plugs 36 are inserted in the nasal passages of the patient, and the pad 42 placed against the thyroid cartilage projection or Adam's apple, the weight of the hand piece serving to cause the desired pressure of the pad. The pistons 22 and 23 are now operated by means of the handle 29. The upward movement of the piston 22 serves to draw into the oxygen or charging cylinder 2 a supply of oxygen, ozone, or air, from any suitable source (not shown) through the medium of the pipe 21; the similar movement of the piston 23 serving to draw into the carbonic acid gas or discharging cylinder 3 a portion of the gas in the lungs of the patient, it being noted that the pipe 21 of the discharging cylinder is in direct communication with the service pipes 35. On the downward movement of the pistons the action of the piston 22 serves to force the oxygen accumulated in the cylinder 2 through the outlet pipe 20, hand piece 31, and service pipes 35 into the lungs of the patient; the simi-

lar movement of piston 23 serving to force the entrapped carbonic acid gas in said cylinder through the discharge pipe 20 to the atmosphere. Operation of the handle 29 thereby alternately forces oxygen into the lungs of the patient and withdraws the carbonic acid gas therefrom, thereby artificially inducing respiration in practically exact simulation of the natural function.

In the event it should be found impossible to introduce the oxygen into the lungs through the nasal passages, the identical effect is gained through the use of the service tube 37 which is introduced into the larynx through the mouth. In this use the valve 39, which is closed in the use of the service pipes 35, is to be opened, and the valve 34 open in the use of the service pipes 35, will be closed. The gases will then be introduced and withdrawn from the patient through the service pipe 37, as will be understood.

The pressure of the pad 42 is designed to be normally that induced by the weight of the hand piece, though it is at once apparent that such pressure may be increased or decreased at the will of the operator by lowering or raising the hand piece as desired.

The apparatus as a whole combines in a simple and convenient manner a means for simulating natural respiration and at the same time withdrawing the deleterious gases from the lungs of the patient and forcing oxygen or a similar gas thereto, it being understood that the charging cylinder may be utilized to force oxygen, ozone, air, or any other gas desired into the lungs of the patient.

The relief valve 25 is designed to prevent a sudden excess charge of oxygen through a too rapid operation of the piston. In this connection it is to be understood that the spring 26 of the relief valve is of slightly greater strength than the springs 17 of the outlet valve. Normally, therefore, the pressure of the piston will force the gas through the outlet valve, but in a sudden operation of the piston will cause the gas to seek an outlet through the relief valve, thereby avoiding excess pressure in the lungs of the patient and avoiding the liability of destroying the air cells therein.

While preferring the detailed construction shown and described, it is to be understood that I do not specifically limit myself thereto, comprehending as within the spirit of my invention all changes and variations of structure which may fall within the scope of the appended claims.

Having thus described the invention what is claimed as new, is:—

1. In an apparatus for producing artificial respiration, a charging cylinder for delivering oxygen, a discharging cylinder for withdrawing carbonic acid gas, an inlet and an outlet for each cylinder, a hand piece in communication with the inlet of one cylinder and the outlet of the other, and a pressure pad yieldingly carried by the hand piece.

2. In an apparatus for producing artificial respiration, a charging cylinder for delivering oxygen, a discharging cylinder for withdrawing carbonic acid gas, an inlet and an outlet for each cylinder, and a hand piece in communication with the inlet of one cylinder and the outlet of the other, and a spring-pressed pressure pad carried by the hand piece.

3. In an apparatus for producing artificial respiration, a charging cylinder for delivering oxygen, a discharging cylinder for withdrawing carbonic acid gas, an inlet and an outlet for each cylinder, and a hand piece in communication with the inlet of one cylinder and the outlet of the other, said hand piece including independent chambers

having valved communication, and service pipes leading from the respective chambers.

4. In an apparatus for producing artificial respiration, a charging cylinder for delivering oxygen, a discharging cylinder for withdrawing carbonic acid gas, an inlet and an outlet for each cylinder, and a hand piece in communication with the inlet of one cylinder and the outlet of the other, said hand piece including independent chambers having valved communication, and service pipes leading from the respective chambers, one of said pipes having a valved connection with the hand piece.

5. In an apparatus for producing artificial respiration, a hollow hand piece, service pipes in communication with the hollow hand-piece, and cylinders in communication with the hand piece, said cylinders being arranged for operation to alternately force material into and withdraw

material from the hand piece, said hand-piece being constructed to control the use of either of the service pipes at will.

6. In an apparatus for producing artificial respiration, a hand piece, service pipes connected therewith, a nasal plug carried by one of the pipes, a larynx tube carried by the other of said pipes, and cylinders in communication with the hand piece, said cylinders being arranged for operation to alternately force material into and withdraw material from the hand piece.

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

GEORGE POE.

Witnesses:

JOHN L. FLETCHER.

K. ALLEN.