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2,124,121

EMBALMING APPARATUS

Filed Sept. 23, 1936

2 Sheets-Sheet 1

Fig. 1.

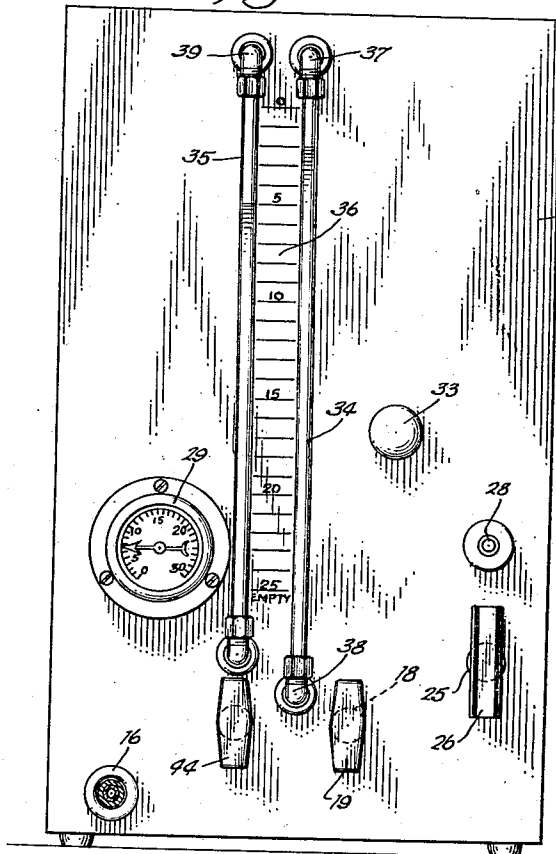


Fig. 2.

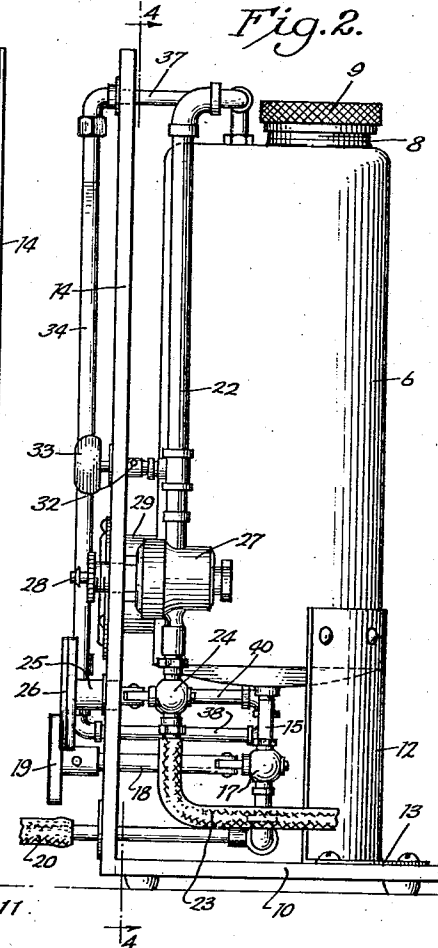
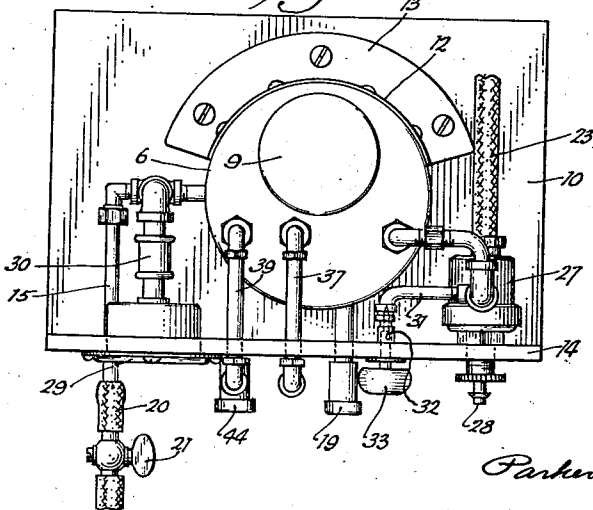


Fig. 3.



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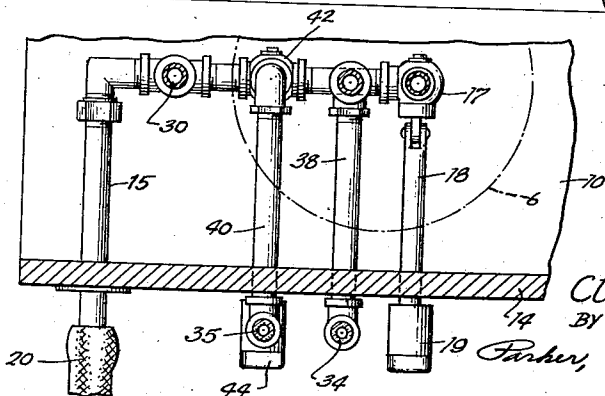
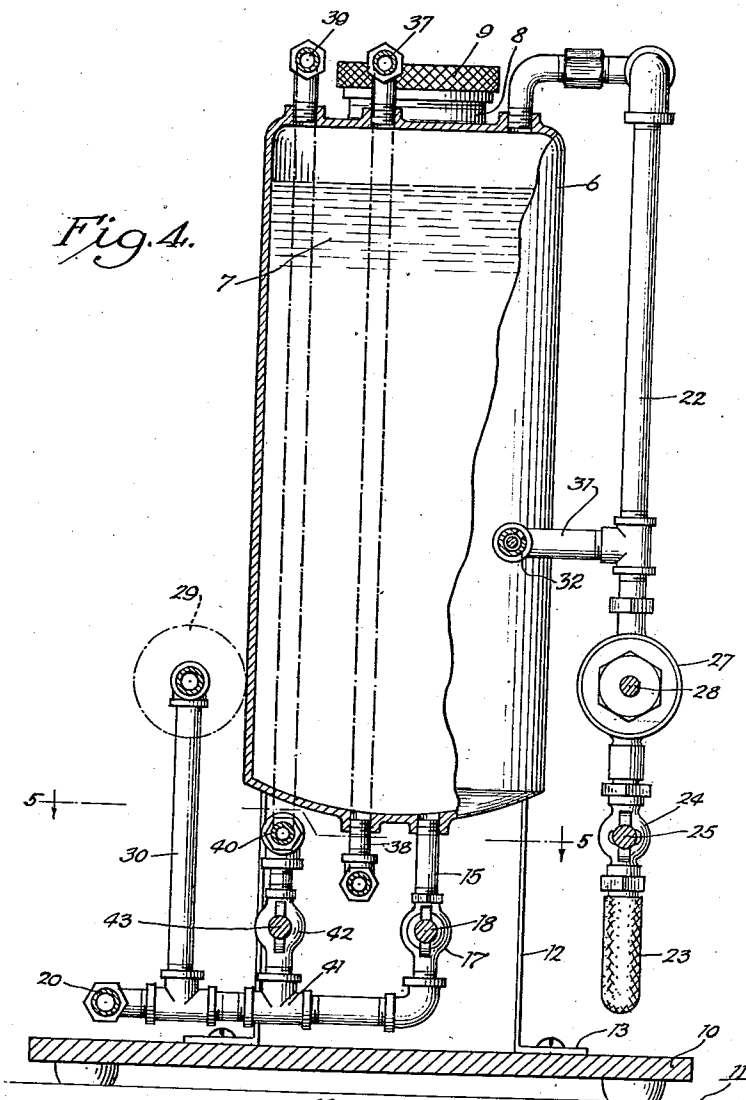
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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EMBALMING APPARATUS

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Application September 23, 1936, Serial No. 102,067

15 Claims. (Cl. 27—24)

The present invention relates to improvements in embalming apparatus, and has particular reference to a new and improved apparatus of a unitary character by the use of which the injection of the embalming fluid is subject to accurate determination and control.

One of the primary objects of the invention resides in the provision of a novel embalming apparatus in which the embalming fluid is injected under a constant adjustable predetermined pressure.

Another object is to provide a new and improved embalming apparatus in which the rate of flow of the embalming fluid into the body is measured and indicated.

A general object resides in the provision of an embalming apparatus of the foregoing character which is readily portable, which has its controls on a convenient panel, and which is simple, compact, sturdy and relatively inexpensive in construction. The present invention makes it possible to use mechanically compressed air instead of pressure produced and controlled by hand.

Further objects and advantages will become apparent as the description proceeds.

In the accompanying drawings,

Figure 1 is a front elevational view of an embalming apparatus embodying the features of my invention.

Fig. 2 is a side elevational view.

Fig. 3 is a plan view.

Fig. 4 is a vertical sectional view of the apparatus taken partially along line 4—4 of Fig. 2.

Fig. 5 is a fragmentary horizontal sectional view taken substantially along line 5—5 of Fig. 4.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more particularly to the drawings, the embalming apparatus, constituting the exemplary embodiment of the invention, comprises a suitable container 6 adapted to contain the embalming fluid indicated at 1. Preferably, the container 6 is in the form of a closed upright cylinder having a filling opening 8 in the top normally closed by a screw cap 9.

The container 6 is rigidly supported on a base plate 10 which may be removably positioned on

any desired surface, such as the top of a table, indicated by the line 11. In its preferred form, the means for mounting the container 6 on the plate 10 consists of an upright arcuate plate or bracket 12 which at the lower end is formed with a peripheral flange 13 attached to the plate 10, and which at the upper end conforms to the curvature of and is attached to the lower end portion of the rear of the container 6.

A flat upright panel 14 is rigid with the front edge of the base plate 6, and extends upwardly therefrom in front of the container 6. Various fittings, hereinafter described and connecting the container 6 and the panel 14, constitute supplemental supporting means for the container.

The embalming fluid is adapted to be discharged from the bottom of the container 6 through an outlet pipe 15 which extends first downwardly, then at right angles across the rear of the panel 14 and then at right angles forwardly through the panel wherein it may be anchored by a suitable fitting 16. Interposed in the vertical section of the pipe 15 is a rotary cut-off valve 17 having an operating stem 18 extending forwardly through the panel 14 and provided at the front thereof with a hand knob 19. A flexible conduit 20, having a stop valve 21, is adapted to be removably connected to the forward end of the outlet pipe 15, and may be provided with the customary arterial injection tube (not shown).

In the present instance, the embalming fluid is injected under an applied pressure subject to accurate control throughout the operation. To this end, any suitable gas, such as air, inert with respect to the embalming fluid, is supplied under pressure through a pipe 22 to the top of the container 6. The pipe 22 is adapted to be connected through a flexible conduit 23 to a suitable source of compressed air (not shown), such, for example, as a compressor or a pressure reservoir. Interposed in the pipe 22 is a rotary cut-off valve 24 having an operating stem 25 extending through the panel 14 and provided at the front thereof with a hand knob 26.

One of the important features of the present invention resides in controlling and regulating the pressure of injection. Thus, I have interposed in the line 22, between the container 6 and the valve 24, an automatic governor valve 27, preferably of the diaphragm type, for maintaining a substantially constant predetermined pressure in the top of the container 6 regardless of pressure impulses and fluctuations at the pressure source. The valve 27 has an adjusting stem 28 which projects through and to the front of the panel

14 for manual actuation to vary at will the pressure that is to be maintained.

The pressure of the embalming fluid is measured by a suitable gauge 29 which is mounted in the panel 14 and which is connected by a branch pipe 30 to the outlet pipe 15. Preferably, the gauge 29 is calibrated in feet of water height since this is the scale with which most embalmers are familiar.

Connected to the pipe 22 between the container 6 and the pressure control valve 27 is a branch pipe 31. A normally closed bleed valve 32, mounted in the panel 14 and having a needle stem operating knob 33, is connected to the free end of the pipe 31. The valve 32 affords means for reducing or relieving the gas pressure in the top of the container 6.

Another important feature of the invention resides in indicating and gauging the flow of embalming fluid into the body. I have provided a novel flow meter which in its preferred form comprises two parallel vertical glass tubes 34 and 35 which are mounted on the front of the panel 14, and which extend along a suitable scale 36. The tube 34 is connected at the top and bottom respectively through pipes 37 and 38, anchored in the panel 14, to the upper and lower ends of the container 6. Hence, the liquid in the tube 34 will always indicate the level of the liquid in the container 6.

The tube 35 is connected at the upper end by a pipe 39, anchored in the panel 14, to the top of the container 6. Hence, the upper ends of both tubes, as well as the container 6, are under the same gas pressure. The lower end of the tube 35, instead of being connected directly to the bottom of the container 6, is connected by a pipe 40, anchored in the panel 14, to the outlet pipe 15 at a point 41 beyond the valve 17. A rotary cut-off valve 42 is interposed in the pipe 40, and has an operating stem 43 extending through and to the front of the panel 14 and there provided with a hand knob 44. When the valves 17 and 42 are open and fluid is passing through the pipe 15, the liquid level in the tube 35 will be lower than that in the tube 34. The differential between these levels is directly proportional to the rate of fluid flow, and the scale 36 may be calibrated thereto.

In operation, first the valve 21 is closed, and air under pressure is supplied to the container 6 until the desired predetermined pressure is reached. As long as the valve 24 is open, this pressure will be substantially and automatically maintained by the valve 27. The valve 21 is now opened to discharge fluid through the pipe 15 for injection into the body. The pressure on the arteries in feet of water height is indicated by the gauge 29, and hence is always known and under control. The gauge is connected to the line 15 in order to indicate as nearly as possible the actual pressure of the fluid entering the body. Excessive pressures, which would tend to break down the tissues or cause swelling at conspicuous places such as the neck, therefore are not inadvertently possible.

The level of the liquid in the container 6 is indicated at all times by the tube 34. Assuming both valves 17 and 42 to be open, the rate of flow into the body will be determined by the differential in level of the liquid in the tubes 34 and 35. Thus, if the body is taking the embalming fluid rapidly, the differential will be relatively large. If the body is taking the fluid slowly, the differential will be relatively small.

If the flow should be so abnormally fast that no liquid is present in the tube 35, or the level in the latter is very low, the valve 42 may be closed and then the rate of flow may be determined by inspection of the fluid drop in the tube 34 alone. The tube 35 also affords a convenient means for preserving an initial reading of the liquid level in the container 6 at any time. Thus, when the tube 34 is to be used alone, the flow through the pipe 15 is stopped temporarily as by closing the valve 21. The level in the tube 35 thereupon rises to that in the container. Then, the valve 42 is closed, and the valve 21 is opened to continue injection. The progressively increasing differential in level in the tubes then indicates the volume of injection from the time that the valve 42 was closed.

Should the rate of injection become very slow so that the differential reading, with both valves 17 and 42 open, is negligible, the tube 35 may be used alone. In this event, the valve 17 is closed to cut off the tube 34 and the container 6. Thereupon, only fluid from the tube 35 will be injected, and the fall in level will be more rapid and hence more susceptible of accurate determination. Here again the difference in the liquid level in the tubes will represent the quantity injected.

It will be evident that I have provided a new and improved embalming apparatus which permits of an improved technique of arterial injection. The apparatus is unitary in character and can be moved from place to place as desired. It eliminates injection by gravity, hand pumping or hand pressure. It affords a range of pressures suitable for all purposes and conditions. By accurately measuring the pressure and rate of injection at all times, guessing is eliminated, and the operator is advised as to the condition of the body and progress of the operation. If desired, the line 23 may be connected to a compressor mounted directly on the base 10, or to a pressure reservoir supplied from a compressor, both the reservoir and compressor being mounted on the base 10. Such construction would constitute a complete self-contained unit.

I claim as my invention:

1. An embalming apparatus comprising, in combination, a base, a pressure container mounted on said base and adapted to contain an embalming fluid, means for maintaining the fluid in said container under pressure, an outlet line for discharging said fluid from said container for injection, and a flow meter connected in said line for indicating the rate of fluid discharge.

2. An embalming apparatus comprising, in combination, a base having an upright panel, a pressure container mounted on said base and adapted to contain an embalming fluid, an outlet line opening from the bottom of said container, a vertical glass tube on said panel and connected at opposite ends respectively to the top and bottom of said container for indicating the liquid level in said container, a second vertical glass tube parallel and juxtaposed to said first mentioned glass tube on said panel and connected at its upper end to the top of said container and at the lower end to said outlet line, and a scale on said panel between said tubes.

3. An embalming apparatus comprising, in combination, a base having an upright panel, a pressure container mounted on said base and adapted to contain an embalming fluid, a discharge line opening from the bottom of said container, means for indicating the liquid level in

said container, a vertical glass tube connected at its upper end to the top of said container and at the lower end to said outlet line, and a scale on said panel for indicating the differential between the levels in said container and tube.

4. An embalming apparatus comprising, in combination, a base, a pressure container mounted on said base, a line for supplying a gas under pressure to said container, an automatic pressure regulating valve interposed in said line, an outlet line opening from said container for discharging liquid therefrom, means for indicating the liquid level in said container, and a vertical glass tube connected at its upper end to the top of said container and at its lower end to said outlet line.

5. An embalming apparatus comprising, in combination, a base, an upright pressure container mounted on said base, a line including a cut-off valve for supplying a gas under pressure to the top of said container, a pressure control valve interposed in said line between said container and said cut-off valve for maintaining a constant predetermined pressure in said container, an outlet line opening from the bottom of said container and including a cut-off valve, a liquid level gauge including a vertical glass tube connected at opposite ends respectively to the top and bottom of said container, a second vertical glass tube connected at its upper end to the top of said container and at its lower end to said outlet line at the outlet side of the cut-off valve therein, and a cut-off valve in the connection between said last mentioned tube and said outlet line.

6. An embalming apparatus comprising, in combination, a base, a panel on said base, a pressure container mounted on said base, a line for supplying a gas under pressure to the top of said container, a pressure control valve interposed in said line for maintaining a predetermined pressure in said container, an outlet line opening from the bottom of said container and including a cut-off valve, a liquid level gauge including a vertical glass tube connected at opposite ends respectively to the top and bottom of said container, and a second vertical glass tube connected at its upper end to the top of said container and at its lower end to said outlet line, said tubes being mounted on said panel and said valves having hand operators on said panel.

7. An embalming apparatus comprising, in combination, a base, a pressure container mounted on said base, a line for supplying a gas under pressure to the top of said container, a pressure regulating valve interposed in said line for maintaining a predetermined pressure in said container, an outlet line opening from the bottom of said container, a liquid level gauge including a vertical glass tube connected at opposite ends respectively to the top and bottom of said container, and a second vertical glass tube connected at its upper end to the top of said container and at its lower end to said outlet line.

8. An embalming apparatus comprising, in combination, a base, an upright panel on said base, an upright pressure container mounted on said base rearwardly of said panel, a line including a cut-off valve for supplying a gas under pressure to the top of said container, a pressure control valve interposed in said line between said container and said cut-off valve for maintaining a constant predetermined pressure in said container, a bleed line branching from said first mentioned line between said container and said pres-

sure control valve and including a normally closed valve adapted to be opened to the atmosphere, an outlet line opening from the bottom of said container and including a cut-off valve, a pressure gauge connected to said outlet line at the outlet side of said last mentioned cut-off valve, a liquid level gauge including a vertical glass tube connected at opposite ends respectively to the top and bottom of said container, a second vertical glass tube connected at its upper end to the top of said container and at its lower end to said outlet line intermediate the cut-off valve therein and said pressure gauge, and a cut-off valve in the connection between said last mentioned tube and said outlet line, said pressure gauge and said tubes being mounted on said panel and all of said valves having hand operators on said panel.

9. An embalming apparatus comprising, in combination, a base having an upright panel, a pressure container mounted on said base and adapted to contain an embalming fluid, an outlet line opening from the bottom of said container, a vertical glass tube on said panel and connected at opposite ends respectively to the top and bottom of said container for indicating the liquid level in said container, and a second vertical glass tube parallel and juxtaposed to said first mentioned glass tube on said panel and connected at its upper end to the top of said container and at the lower end to said outlet line.

10. An embalming apparatus comprising, in combination, a container adapted to contain fluid, an outlet line opening from said container, a generally vertical glass tube connected at opposite ends respectively to the top of said container and said outlet line, a cut-off valve interposed between said tube and said outlet line, and a second generally vertical glass tube connected at opposite ends respectively to the top and bottom of said container.

11. An embalming apparatus comprising, in combination, a container adapted to contain fluid, an outlet line opening from said container, a generally vertical glass tube connected at opposite ends respectively to the top of said container and said outlet line, a second generally vertical glass tube connected at opposite ends respectively to the top and bottom of said container, and a cut-off valve interposed in said outlet line between said container and said first mentioned glass tube.

12. An embalming apparatus comprising, in combination, a container adapted to contain fluid, an outlet line opening from said container, a generally vertical glass tube connected at opposite ends respectively to the top of said container and said outlet line, a cut-off valve interposed in the connection between said glass tube and said outlet line, a second generally vertical glass tube connected at opposite ends respectively to the top and bottom of said container, and a cut-off valve interposed in said outlet line between said container and the connection of said outlet line with said first mentioned glass tube.

13. In combination in embalming apparatus of the character described, a pressure tank for a supply of embalming fluid under pressure, an outlet line communicating with the bottom of said tank and leading to a discharge point, and means operable by the pressure differential between said tank and a spaced point in said outlet line during discharge from said line to indicate the rate of flow through said line.

14. In combination in apparatus of the character described, a pressure tank for embalming fluid, a continuous-pressure supply line communi-

cating with said tank, a governor valve in said line for maintaining a constant pressure, an outlet line leading from the bottom of said tank to a discharge point, a pressure gauge in said line, and
5 means operable in response to the drop in pressure along a predetermined extent of said outlet line resulting from the flow of fluid to indicate the rate of discharge.

15. Pressure embalming apparatus of the character described comprising, in combination, a

pressure tank for embalming fluid, means for maintaining the fluid continuously under regulated pressure, an outlet line leading from said tank to a point of discharge, a gauge for indicating the pressure at one point in said outlet line, 5 and means operable in response to the pressure differential between said tank and a given length of said outlet line during discharge for indicating the rate of fluid flow through said line.

CLIFFORD G. POSTLEWAIT. 10