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MORTICAN'S BODY CAVITY INJECTOR

Filed Sept. 21, 1961

2 Sheets-Sheet 1

FIG. 1

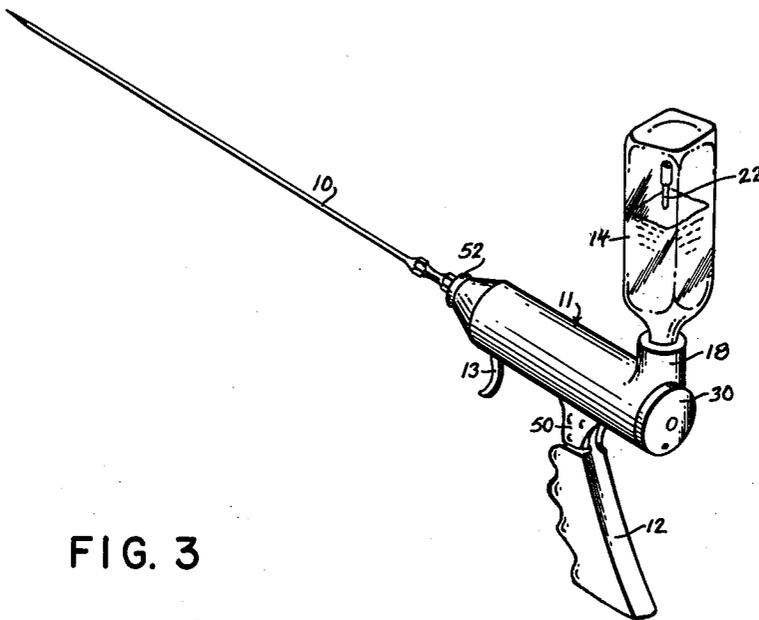
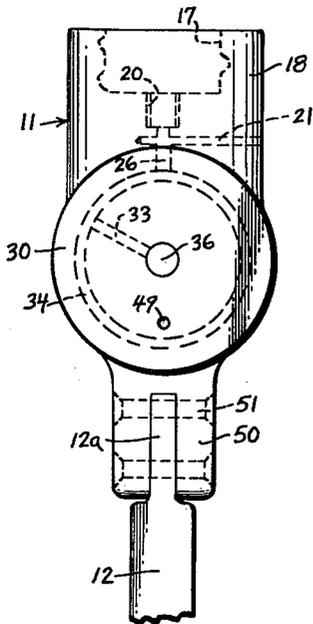


FIG. 3



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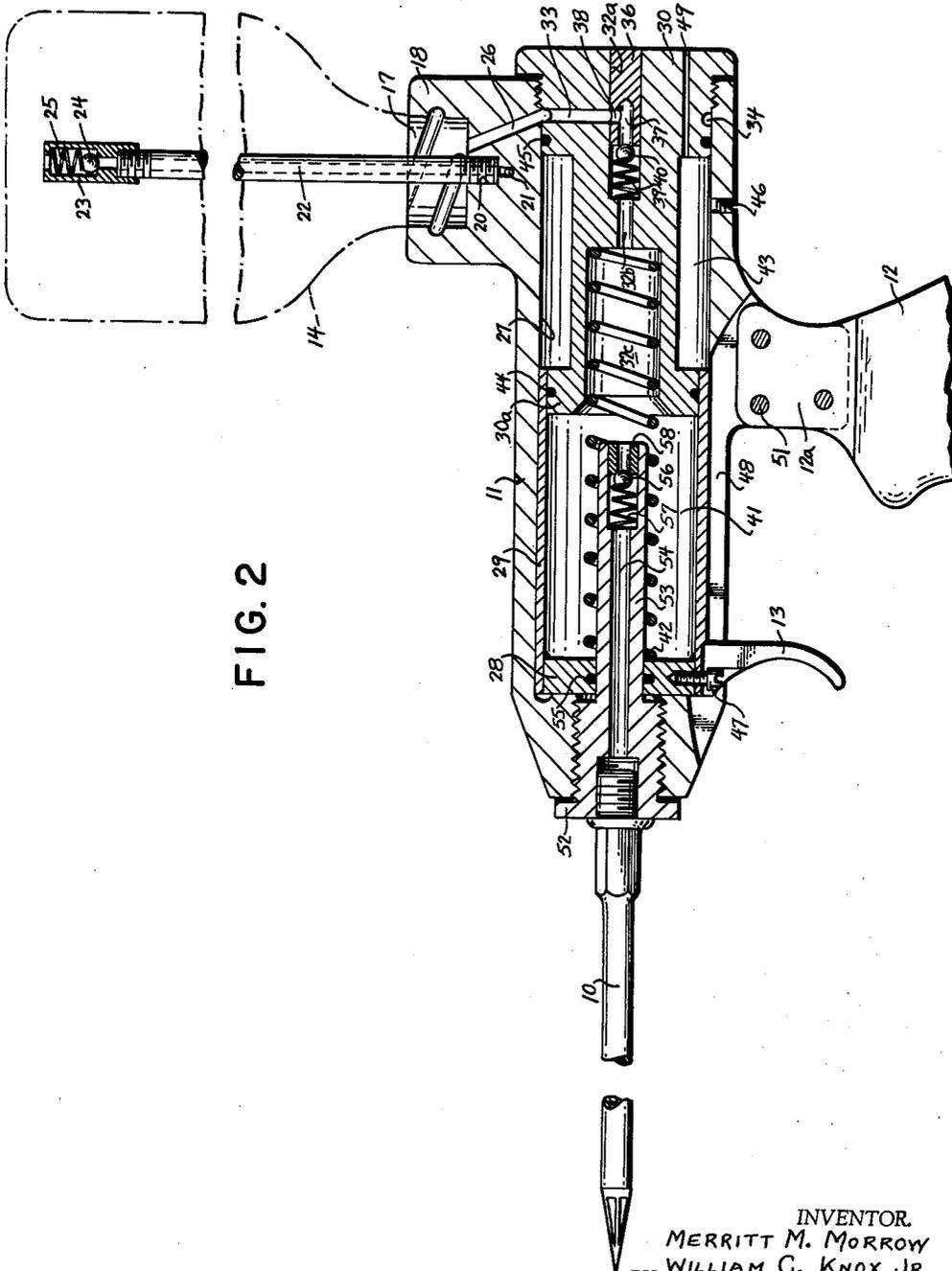


FIG. 2

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MORTICIAN'S BODY CAVITY INJECTOR

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This invention relates to mortician's embalming instruments, and more particularly to a body cavity injector.

In embalming practice, a preservative, commonly formaldehyde, is used to fill the various body cavities. In accordance with the prescribed manner in which this operation is performed, only one opening is made in the surface of the body, and the filling of all cavities is accomplished through this single opening by inserting a trocar about 18 or 20 inches in length therethrough at various angles and depths so that its point is brought into communication with each body cavity.

The formaldehyde is commonly shipped to the mortician in sealed pint containers. The prior art practice is to elevate this container and to insert a tube leading from the container to the trocar, thus depending on gravity feed to cause the embalming fluid to flow into the body cavities. The formaldehyde is highly toxic, and a person cannot endure any prolonged exposure to its fumes, so a certain amount of caution is required in manipulating the apparatus.

There is a further problem in that it is sometimes difficult to develop sufficient pressure to fill a body cavity. Also there is the necessity of ascertaining when a sufficient quantity of fluid has flowed into a body cavity. The container is usually graduated for this purpose, but it is still necessary to observe these graduations to determine the amount of fluid delivered.

It is therefore the general object of our invention to provide a cavity injector in which the operator is able to quickly and easily fill the various body cavities each with a predetermined quantity of embalming fluid injected at a proper pressure and in proper amounts and yet eliminate any substantial danger of exposing the operator to the fumes of the embalming fluid.

More particularly it is also an object of our invention to accomplish this convenience of operation by providing a pistol-like injector which can be easily handled and which is arranged to safely discharge under pressure a metered charge of embalming fluid with each retraction of a trigger on the injector.

Further, it is an object to so arrange the injector that it carries a standard container of embalming fluid and provides for the safe venting of the bottle and for the efficient injection of metered charges of this embalming fluid from the injector.

It is yet another object to arrange the injector with a minimum of economically manufactured and assembled parts, which operate reliably and safely to accomplish the aforementioned objects.

Other more particular objects and advantages will appear and be understood in the course of the following description and claims, the invention consisting in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

FIGURE 1 is a perspective view of our cavity injector with a container of embalming fluid ready for operation.

FIG. 2 is a longitudinal vertical sectional view of the injector; and

FIG. 3 is a fragmentary rear elevational view of the injector.

Referring to the drawings, our cavity injector generally resembles a pistol having as a barrel a standard trocar 10 pointed at one end and threaded at the other. The housing

2

11 of this pistol-like injector has depending therefrom a handle 12 adapted to be held in one hand, and a trigger 13 positioned forward of the handle in a location so as to be able to be conveniently retracted by the forefinger. Up- standing from the rear of the housing is an inverted bottle 14 which is or may be a standard pint container of embalming fluid and which serves as a reservoir.

In practice the trocar is inserted into the cadaver at the desired location and the trigger 13 is fully retracted to eject a metered charge of embalming fluid. Upon release of the trigger, a mechanism in the housing draws from the bottle 14 another charge of fluid which is to be ejected by a subsequent retraction of the trigger.

Proceeding now to a more detailed description of the injector, the bottle 14 has an externally threaded neck which threads into a mating socket 17 formed in a boss 18 at the upper rear portion of the housing. Opening to the floor of this socket 17 is a second smaller socket 20 which has an air vent passage 21 leading from its base laterally to one side of the housing. A vent tube 22 threads into this socket and projects to substantially the upper end of the bottle whereat it threadably receives a tubular housing 23 for a ball check valve 24. This ball is urged by a compression spring 25 to a closed position preventing the loss of fluid through the vent 22 and vent passage 21. Leading from the socket 17 is a fluid passageway 26 through which the bottle 14 communicates with the interior of the housing 11.

The injector has a center bore 27 which slidably receives a forward piston 28 with a rearwardly extending cylindrical skirt 29 and contains a complementing plug 30. This plug is threaded into the rear of the housing and has a piston-like head 30a on which the skirt 29 is sleeved. The plug also has an axial through-bore formed with a rear section 32a, a reduced intermediate section 32b, and an enlarged forward section 32c. The rear bore section has a radial passageway 33 leading therefrom to a circumferential groove 34 which is disposed to communicate with the passageway 26. This latter arrangement precludes any need of precise angular alignment between the two passageways 26 and 33.

A small plug 36 is press fitted into the rear of the rear bore section 32a and has a front axial passage 37 communicating by a side port 38 with the passage 33. The forward end of the plug 36 serves as a seat for a ball check valve 40 which is urged thereagainst by a compression spring 39 in turn seated at the forward end of the rear bore section. This valve 40 prevents reverse flow from the chamber 41 between the piston 28 and plug 30 to the reservoir 14. The front bore section 32c accommodates a compression spring 42 which acts against the rear face of the piston 28.

The center portion of the plug 30 is necked to provide an intermediate annular air chamber 43 to receive the piston skirt 29, and the air displaced thereby when the trigger 13 is retracted in opposition to the spring 42 vents at 49. O-rings 44-45 are provided at the front and rear end of the chamber 43 for sealing off the embalming fluid therefrom. Any leakage past these O-rings can be drained through the vent 49 or by removal of a drain plug 46. The trigger 13 is secured to the piston 28 by screws 47 and depends through a longitudinal slot 48 at the bottom of the housing 11. At the rear of this slot the side walls thereof are extended downwardly as cheeks 50-51 to receive the upper neck 12a of the handle which is secured therebetween by rivets 51.

The housing 11 has a threaded front opening to the bore 27 in which is screwed a hollow adapter 52 having a tubular stem 53 which continues rearwardly through a center opening in the piston 28 and receives the spring 42. The base of the trocar is threaded into the forward

end of this adapter so that the trocar is fed from the chamber 41 via the bore 54 of the adapter. An O-ring 55 seals between the stem 53 and the piston 23. It will be noted that the adapter has a counterbore at its rear end to accommodate a ball check valve 56 and related spring 57, the ball seating against a tubular insert 58. This valve allows fluid to pass from the chamber 41 into the trocar, but prohibits any reverse flow.

With regard to the operation of our injector, as previously indicated, the operator grasps the handle 12 with one hand and fully retracts the trigger 13 in a manner similar to the firing of a pistol, the trocar having previously been properly inserted into the cadaver. The retraction of the trigger draws the piston 23 rearwardly along the adapter stem 53 against the resisting force of the spring 42 so that the skirt 29 sleeves further onto the head of the plug 30. This stroke of the piston reduces the volume of the chamber 41 and hence forces open the check valve 56 and ejects the fluid from the chamber out the pointed open end of the trocar 10. At the end of this stroke the valve 56 is closed by the spring 57 to prevent back flow.

Upon release of the trigger 13, the spring 42 returns the piston 23 to expand the chamber 41 and the resulting suction opens the rear check valve 40. As a result fluid is drawn from the bottle 14 successively through passages 26, 34, 33, 38, and 37 by the valve 40, and axially through the plug 30 into the chamber 41. When the piston 23 has returned to its forward position a full charge of fluid has been drawn into the chamber 41 to be ejected by the next retraction of the trigger. As the liquid level in the bottle 14 drops, the check valve 24 opens to allow air to flow through the vent passage 21 and vent 22 into the bottle to equalize pressure within the bottle with the ambient atmosphere. Thus it can be seen that a metered charge of liquid is discharged through the trocar with each retraction of the trigger. It is to be noted that if a smaller charge is desired spacing washers can be placed at the rear of the chamber 43 to be engaged by the rear end of the sleeve 29 and thereby shorten the stroke of the piston 23.

To initially load the injector with fluid, a full bottle of fluid is threaded into its mating socket 17, the bottle being held upright and the injector being held in inverted position to prevent spilling or leaking of the fluid. After the bottle is firmly secured a full retraction and release of the trigger 13 will charge the chamber 41, and a second retraction will eject a charge of fluid.

It should be noted that the term trocar as used herein refers broadly to any type of injection needle. It will be appreciated that in order to substitute a smaller needle for that illustrated, it might be necessary to thread into the adapter 52 a second adapter which is suitably arranged to hold the smaller needle.

It is believed that the invention will have been clearly understood from the foregoing description of our now preferred illustrated embodiments. Changes in the details of construction may be resorted to without departing from the spirit of the invention, wherefore it is our intention that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation to which the employed language fairly admits.

What we claim is:

1. A cavity injector having a pistol-like configuration and comprising a housing with a depending handle and a trigger, a trocar secured to said housing and extending forwardly therefrom, an embalming fluid container carried by said housing, said container being inverted and mounted above said housing so that fluid from said container will tend to flow into said housing, a vent tube upstanding from said housing and extending into said container, said tube venting to the ambient atmosphere through said housing, a forwardly facing stationary piston mounted in said housing, a movable piston with a rearwardly extending cylindrical skirt mounted in said housing forward of said stationary piston with said skirt sleeved on the latter, a tubular stem extending from said trocar through said movable piston and forming a seal therewith, said pistons defining a chamber therebetween, an injector passageway leading from said chamber through said stem and trocar, a check valve to block reverse flow in said ejector passageway, a charging passageway leading from said container into said chamber to bring fluid from said container thereto, a check valve to prevent reverse flow in said charging passageway, and spring means to urge said movable piston away from said stationary piston so as to draw a charge from said container, said trigger being secured to said movable piston and depending through a longitudinal slot in said housing whereby retraction of said trigger in opposition to said spring means ejects a charge of fluid from said chamber through said stem and trocar and release of said trigger allows said spring means to move said cylinder forward so as to draw in a charge of fluid from said container.

2. The injector as recited in claim 1, wherein a plug extends into the rear of said housing and provides said stationary piston, said plug having at least a portion of said charging passageway running therethrough and having a circumferential groove communicating with said plug passageway portion, a passageway portion in said housing leading from said container to said circumferential groove whereby fluid is able to pass from said container through said housing passageway portion, through said groove, and through said plug passageway portion.

3. The injector as recited in claim 1 wherein said stationary piston has a forwardly exposed pocket and said spring means comprises a compression spring seated in said pocket and sleeved on said stem to work against the rear face of said movable piston.

4. The injector as recited in claim 1, wherein said housing has a socket to receive said container, a second socket leading to said first named socket with said vent tube upstanding from said second socket, and a vent passageway leading from said second socket through said housing to the ambient atmosphere.

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