Sept. 25, 1934. P. D. LYONS ET AL 1,974,964

MULTIPLE PUMP FOR EMBALMING AND OTHER PURPOSES

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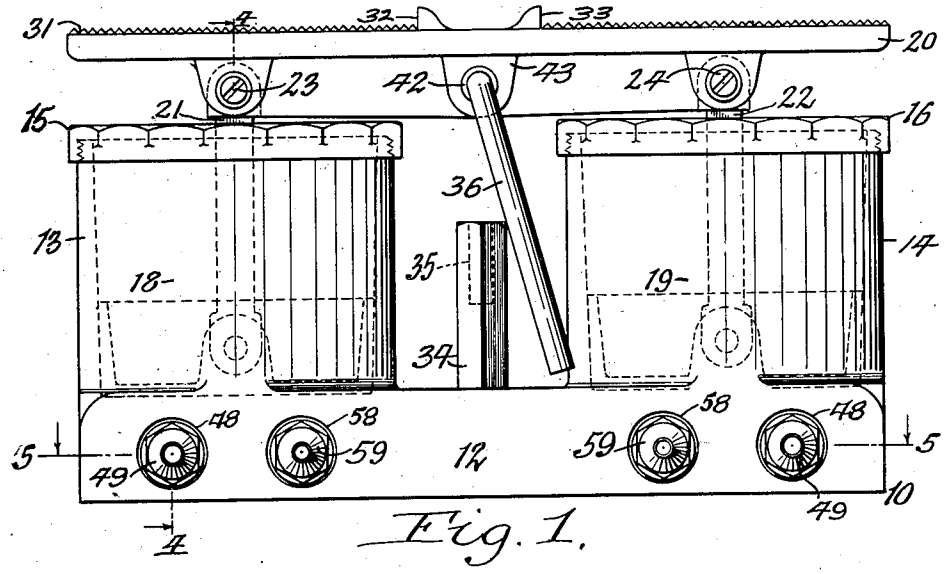


Fig. 1.

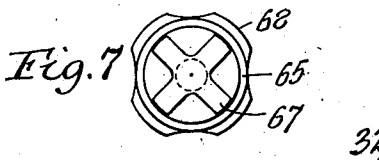


Fig. 7

Fig. 2.

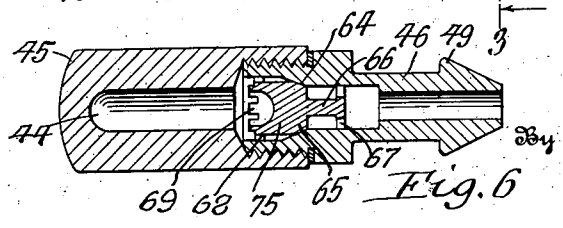


Fig. 6

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Fig. 3.

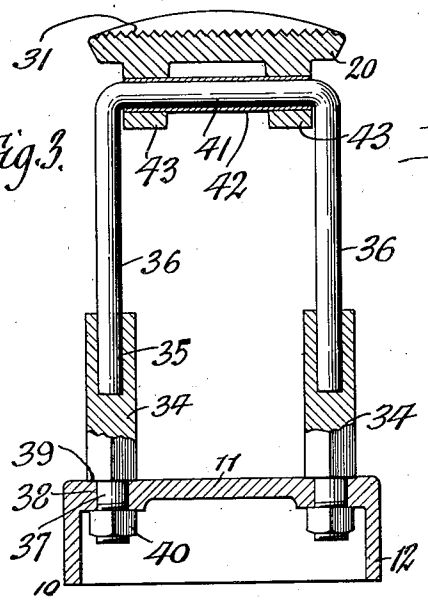


Fig. 4.

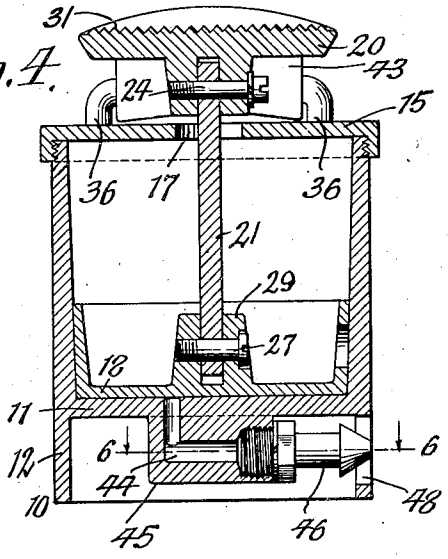
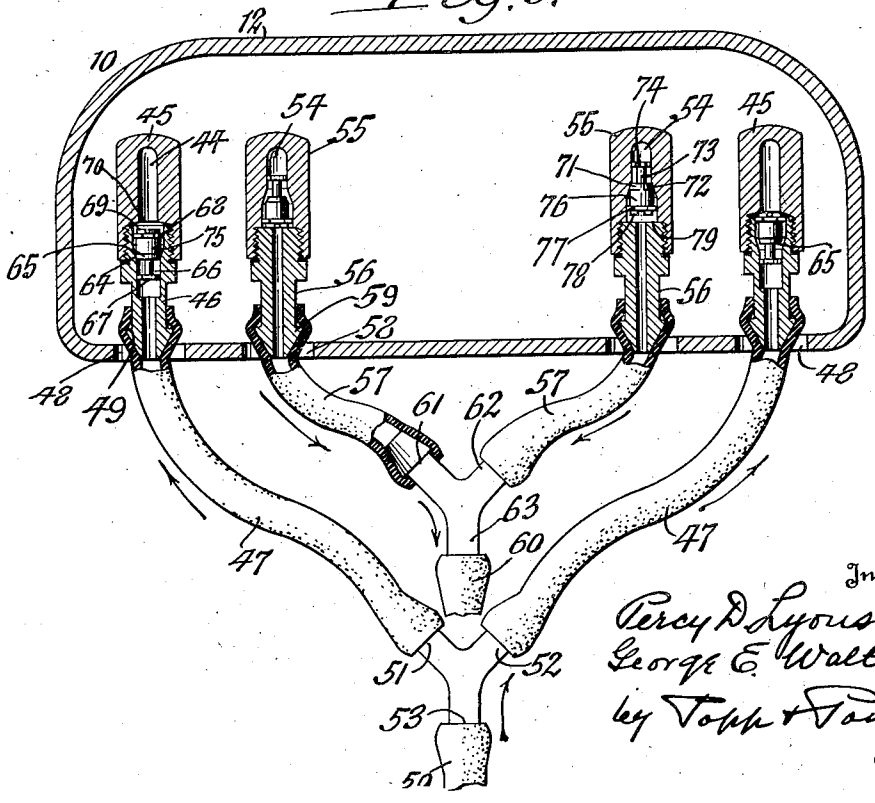


Fig. 5.



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MULTIPLE PUMP FOR EMBALMING AND OTHER PURPOSES

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3 Claims. (Cl. 230—184)

This invention relates to a pump, and more particularly to a multiple cylinder air pump which is to be used for sucking air and also delivering air in the operation of embalming bodies wherein air suction is utilized for withdrawing fluids from the body and delivering the same into a receptacle, and air pressure is utilized for forcing an embalming fluid into the arteries, veins and tissues of the body for preserving the latter.

Pumps of this character must be transported by the embalmer from place to place, and it is therefore very desirable to make such pumps as light and compact as possible for convenience in transportation. The pumps heretofore in use have not only been comparatively large and cumbersome but they also require the use of at least one hand for operating the same, thus leaving only one hand of the embalmer free for manipulating the body while embalming the same.

It is the object of this invention to provide a pump having a very large capacity which can be operated easily and conveniently by foot power or pressure so that withdrawal of fluids from the body and the injection therein of embalming fluid can be effected while both hands of the operator are free to manipulate the body as much as required to facilitate the embalming process and effect the same in a most satisfactory manner.

A further object of this invention is to provide a pump of this character which can be readily unfolded for use and also capable of being very compactly folded or collapsed when not in use, so that the same can be closely assembled with the other parts of the embalming apparatus for greater convenience in storage or transportation, for example, the pump in its folded position can be placed within one of the jars or containers which is commonly utilized in connection with the embalming process for either receiving the fluids from the body or for holding the embalming fluid which is to be discharged into the body, thereby enabling the embalmer to transport the whole apparatus from place to place with convenience.

A still further object of this invention is to provide an improved valve mechanism in connection with the air suction and air delivery conduits of the pump for withdrawing the fluids from the body which is being embalmed, and injecting a preserving fluid into the same.

In the accompanying drawings:

Figure 1 is a side elevation of an approved form of pump embodying our invention and showing the same folded or collapsed into compact form, so that the same can be readily stowed and transported in a container such as commonly used by embalmers, or otherwise readily disposed of.

Figure 2 is a vertical longitudinal section, taken centrally through the pump, and showing the parts unfolded and in condition for operation.

Figures 3 and 4 are vertical transverse sections taken on the correspondingly numbered lines in Fig. 2 and Fig. 1 respectively.

Figure 5 is a horizontal section taken on line 5—5 Fig. 1.

Figure 6 is a fragmentary horizontal section, on an enlarged scale, taken on line 6—6 Fig. 4.

Figure 7 is an end view of one of the check valves for controlling the flow of the fluid through the conduits of the apparatus.

In the following description similar characters of reference indicate like parts in the several views of the drawings.

The numeral 10 represents the base of the pump which may be of any suitable construction but preferably comprises a flat horizontal top plate 11 which is provided with a marginal downwardly projecting flange 12 whereby this base may rest upon the floor or other suitable support while in use.

On opposite ends of this base are arranged two pump cylinders or barrels 13, 14, each of which has its axis arranged vertically and is preferably formed integrally with the base so that the top plate 11 thereof forms the bottom or lower head of each of these cylinders. At its upper end each of these cylinders is provided with a cover or head 15 which is preferably detachably connected therewith by means of a screw joint 16 and provided with a central opening 17 for a purpose which will presently appear.

Within the cylinders are respectively arranged two pistons or plungers 18, 19, each of which is adapted to reciprocate vertically therein and to withdraw air into the cylinder during its upward stroke and to expel air therefrom during the downward stroke of the piston. These two pistons or plungers are adapted to be reciprocated alternately in opposite directions so that when a fluid is being withdrawn into one of these cylinders then fluid will be discharged from the other cylinder and vice versa.

This alternating reciprocating movement is imparted to these pistons by means of foot pressure or power so as to leave the hands of the person operating the pump free to be used for other purposes, such for example as manipulating a corpse which is being embalmed. For this purpose a pedal or treadle 20 is arranged lengthwise above both of the cylinders and their upper

heads, and pivotally mounted on the base so as to be capable of a rocking motion about a fulcrum arranged midway between the ends of this pedal, which motion is transmitted to the two pistons 18, 19 by means of links 21, 22 which are pivotally connected at their upper ends by means of horizontal pins 23, 24 with lugs 25, 26 on the underside of the pedal adjacent to opposite ends thereof, while the lower ends of these links are pivotally connected by means of pins 27, 28 with lugs 29, 30 on the upper sides of the respective pistons, as shown in Figs. 1, 2 and 4. The intermediate parts of these links pass through the openings 17 of the covers or upper heads of the cylinders.

By the use of these covers any fluid which may be present within these cylinders, such for example as the oil utilized for lubricating the pistons, is prevented from splashing to the exterior of the pump, and a finished appearance is produced on the upper ends of the cylinders, and these covers also serve as a guard to prevent or at least reduce to a minimum the chances of foreign matter getting into the pump cylinders and interfering with the operation of the pistons therein.

In order to prevent the underside of a shoe on the foot of the operator from slipping while oscillating the pedal 20, this side of the latter is roughened or provided with suitable serrations or scorings 31, and on its central part the upper side of this pedal is provided with two outwardly facing shoulders or stops 32, 33 against which the inner side of the heel of the shoe may engage upon moving the foot in either direction lengthwise of the pedal and thus prevent the shoe from slipping off the pedal while rocking the same.

Means are provided for arranging the fulcrum of the pedal about which the same rocks in a vertical plane either in an elevated position relative to the base so that the pump may be operated normally and alternately raise and lower the pistons in the cylinders, or this fulcrum may be lowered toward the base so that both pistons may be simultaneously in their lowermost position for the purpose of rendering the pump as a whole more compact and permit of storing and transporting the same more conveniently in the manner heretofore described.

Although the means whereby this fulcrum may be thus adjusted or shifted vertically with reference to the base may be variously constructed, it is preferable to organize the same as shown in the drawings, wherein the construction is as follows:

From the central part of the base between the cylinders thereof an upright supporting structure is arranged consisting of two standards arranged transversely side by side and each standard comprising a lower upright post or section 34 which is secured at its lower end to the adjacent part of the base top 11 and provided in its upper end with a vertical socket or recess 35, and an upper leg, rod or section 36 adapted to be removably engaged at its lower end with a socket 35 of the companion post, while its upper end is pivotally connected with the pedal of the pump so that the latter can turn about a horizontal axis arranged transversely to the base. Each of the posts may be mounted on the base in any suitable manner but preferably this mounting is effected by providing the lower end of the respective post with a lower reduced portion or neck 37 which passes through an opening in the top plate of the base and forms a downwardly facing shoulder 39 on this post which engages the upper side of the base plate 11, while the lower end of the neck 37 is provided with a screw nut 40 engaging with the underside of this base plate, as shown in Figs. 2 and 3.

The pivotal connection between the upper ends of the two rods or legs 36 forming the upper sections of the standards and the pedal may be accomplished in various ways but this is preferably effected by means of a horizontal axle or wrist 41 which connects the upper ends of the rods 36 and is formed integrally therewith, and journaled in a bearing sleeve 42 which is supported at its opposite ends in bearing lugs 43 arranged on the underside of the central part of the pedal adjacent to opposite longitudinal edges thereof, as best shown in Figs. 1, 2 and 3.

In the normal operative position of the several parts of the pump the lower ends of the rods or legs 36 are elevated into an upright position and rest with their lower ends in the sockets 35 of the post 34 so as to engage with the bottoms of these sockets, as shown in Fig. 3, whereby the fulcrum or axis which is formed by the axle or wrist 41 and about which the pedal turns is elevated into its highest position, as shown in Fig. 2, so that upon rocking this pedal alternately in opposite directions, the pistons 18 and 19 connected therewith will be raised and lowered alternately and thereby cause fluid such as air to be alternately drawn into the cylinders and expelled therefrom.

When it is desired to collapse the pump and render the same more compact for convenience in storage and transportation the pedal is raised high enough to disengage the lower ends of the rods or legs 36 from the sockets of the posts 34, then these legs are turned so that the lower ends thereof are arranged on one side of the posts and the pedal is lowered until both pistons are arranged in their lowermost position within the cylinders, as shown by dotted lines in Fig. 1, at which time the upper sections, rods or legs of the standards assume an inclined position on one side of their respective posts and the pedal is in a horizontal position parallel with the base of the pump, as shown in Fig. 1.

In this position of the parts, the pump as a whole is substantially reduced in over all dimensions and produces a much smaller cubical mass which enables the same to be readily carried with greater ease and convenience either in a bottle such as usually forms part of an embalmer's equipment, or the same may be otherwise stowed more compactly in a grip with other articles or tools which are required for any particular kind of work.

Although the means for conducting the air to and discharging the same from the lower end of each cylinder may be variously constructed, it is advantageous to organize these passages and the valve means for controlling the passage of fluid through the same as follows:

The numeral 44 represents the air inlet of each of the cylinders which is formed in the lug 45 arranged on the underside of the base plate 11 and has its inner end opening upwardly through the lower head of the respective cylinder, while its lower end extends horizontally toward one side of the base and communicates with a tubular nozzle 46 which is screwed into the respective end of the lug 45. To the outer end of the nozzle a branch fluid inlet tube 47 is connected, which tube is preferably passed through an opening 48 in the adjacent part of the flange of the base, and

sprung over an enlarged head or flange 49 on the nozzle 46, as shown in Fig. 5. The two branch inlet tubes of the two cylinders have their outer ends connected to a main fluid supply tube or conduit 50 by means of a triple nozzle coupling, two of which 51, 52 are connected with the outer ends of the branch tube sections 47, while the third one 53 is connected with the main inlet tube section 50, as shown in Fig. 5.

The numeral 54 represents a fluid outlet for each cylinder which is preferably formed in a lug 55 arranged on the underside of the base plate and has its inner end extending upwardly and opening through the base plate into the lower end of the respective cylinder, while its lower end extends horizontally to one side of the base and communicates with a tubular nozzle 56. Each of the last-mentioned nozzles communicates with a branch 57 of an outlet or delivery conduit by passing the inner end of this branch 57 through an opening 58 in the adjacent part of the flange 12 of the base, and springing this end over an enlarged head or flange 59 on the outer end of the respective nozzle 56, as shown in Fig. 5.

The two branch suction tubes 57 have their outer ends connected with the main suction tube 60 by means of a triple nozzle coupling having two of its members 61 and 62 connected respectively with the outer end of the branch tube 57, while the third member 63 of this triple coupling is connected with the main delivery tube 60, as shown in Fig. 5.

Within each of the branch conduits is arranged a check valve which permits the fluid to pass therethrough in one direction only and prevents the fluid from passing therethrough in the opposite direction. For this purpose the inner part of the bore of each of the nozzles 46 is provided with an inwardly facing valve seat 64 which is adapted to be engaged by an outwardly closing check valve 65, which latter is movable lengthwise in the bore of the nozzle for the purpose of either engaging with the seat 64 or disengaging therefrom.

In order to maintain this valve constantly in its central position means are provided for guiding the same at its opposite ends in the bore of the nozzle 46, for which purpose the outer end of the valve is provided with a reduced stem 66 having a star-shaped guide 67 engaging with the bore of the nozzle 46, while the enlarged rear end 75 of the stem of this valve is provided with a star-shaped guide 68 engaging with the large inner part of the bore of this nozzle.

Inward movement of this valve away from its seat is limited by a notched flange 69 which is adapted to engage with an internal shoulder 70 in the bore of the lug 45.

When the piston of the respective cylinder descends, this check valve will be moved outwardly into the position shown in Fig. 5 so as to engage the seat 64, and thereby prevent the escape of air or other fluid therethrough, while upon raising the piston this check valve will be drawn inwardly away from its seat and permit the passage of air around the star-shaped guides 67, 68 and the notched flange 69 and enter the lower end of the cylinder. During such movement the check valve is reliably guided in its conduit and constantly maintained in a central or axial position therein, so as to insure prompt seating of the valve at all times, and thereby increase the effectiveness of the pump.

In like manner, the bore of the outlet of each cylinder is provided in the lug 55 thereof with an outwardly facing valve seat 72 which is adapted to be engaged by a check valve 71 for closing this conduit and this valve may be disengaged therefrom for opening this conduit and permitting the air to escape from the respective cylinder. At its inner end each of these last-mentioned check valves is provided with a reduced neck 73 which carries a star-shaped guide 74 engaging with the adjacent part of the bore 54 of this conduit, while the outer enlarged part 76 of the valve stem is provided with a star-shaped guide 77 which engages with the enlarged bore of the respective outlet conduit, and the outer end of this stem is provided with a notched flange 78 adapted to engage with a stop 79 formed by the inner end of the respective nozzle 56 for limiting the opening movement of the respective check valve.

When a piston moves upwardly in its cylinder the check valve 71 is engaged with its seat so as to prevent air from being drawn through the respective conduit, as shown at the right of Fig. 5, but when a piston descends the air or fluid pressure in the respective cylinder forces this check valve outwardly and away from its seat, as shown at the left of Fig. 5, during which movement each of these valves is guided and maintained in its central position, and when open permits the air to flow around its star-shaped guides and notched flanges to the main delivery tube 60.

A positive suction of air as well as a positive delivery of the same is thus insured during each upward and downward stroke of a piston in its cylinder, and as the pistons alternately move up and down in their cylinders a continuous suction of air as well a continuous pressure or delivery of air is maintained while the pump is in operation, thereby rendering the same particularly suitable for such work as embalming bodies in which it is desirable to maintain the discharge of body fluids from the corpse and the introduction of an embalming fluid into the same under a uniform air exhausting and pressure action.

As a whole this apparatus is very simple in construction, the same has no delicate parts which are liable to get out of order, and it can be produced at comparatively low cost, thereby rendering the same well-suited as an economical tool forming part of the equipment for embalming purposes as now practiced.

It will be noted that the several tube attaching nozzles 46 and 56 do not project beyond the outer side of the base flange 12 but instead are wholly within the external surface of this flange, thereby avoiding any projections on the exterior of the base, and permitting the pump to be handled freely after the tubes are removed from these nozzles without liability of injury, and also rendering the same very compact so that it can be stored in a comparatively small space such as the interior of a jar forming part of the usual equipment of an embalmer.

It will be noted that in this pump it is possible to operate the treadle by applying a foot to the upper side of the same in either direction of its length, thereby enabling the pump to be operated either with the left foot or the right foot, as may be most convenient.

Lubrication of the cooperating surfaces of the cylinder and piston can be readily effected by applying either liquid or grease lubrication to these surfaces after removing the upper heads or caps of the cylinders.

We claim as our invention:

1. A pump comprising a base, two cylinders mounted on said base, a piston reciprocating in

each of said cylinders, a rocking pedal connected at its opposite ends to said pistons, and fulcrum means for said pedal including two lower posts mounted on said base and each having a vertical socket in its upper end, and two upright rods pivoted concentrically at their upper ends to said pedal between its ends and each adapted to be seated at its lower end in the socket of one of said posts or to be folded in a lowered position against the outer side of the respective post, each of said posts having a reduced lower end passing through the base and forming a shoulder bearing against the top of said base and having a screw nut bearing against the underside of said base.

2. A pump comprising a base, two cylinders mounted on said base, pistons reciprocating respectively in said cylinders, a pedal operatively connected at its opposite ends with said pistons, and foldable means for pivotally mounting said pedal on said base including a bearing arranged on the pedal between its ends, a horizontal axle arranged in said bearing, upright supporting legs connected at their upper ends with opposite ends of said axle and projecting downwardly therefrom, and posts which are mounted on said base and are adapted to detachably receive the lower ends of said legs.

3. A pump comprising a base, two cylinders mounted on said base, pistons reciprocating respectively in said cylinders, a pedal operatively connected at its opposite ends with said pistons, and foldable means for pivotally mounting said pedal on said base including a bearing arranged on the pedal between its ends, a horizontal axle arranged in said bearing, upright supporting legs connected at their upper ends with opposite ends of said axle and projecting downwardly therefrom, and posts mounted at their lower ends on said base and each provided at its upper end with a socket in which the lower end of one of said legs is removably seated.

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