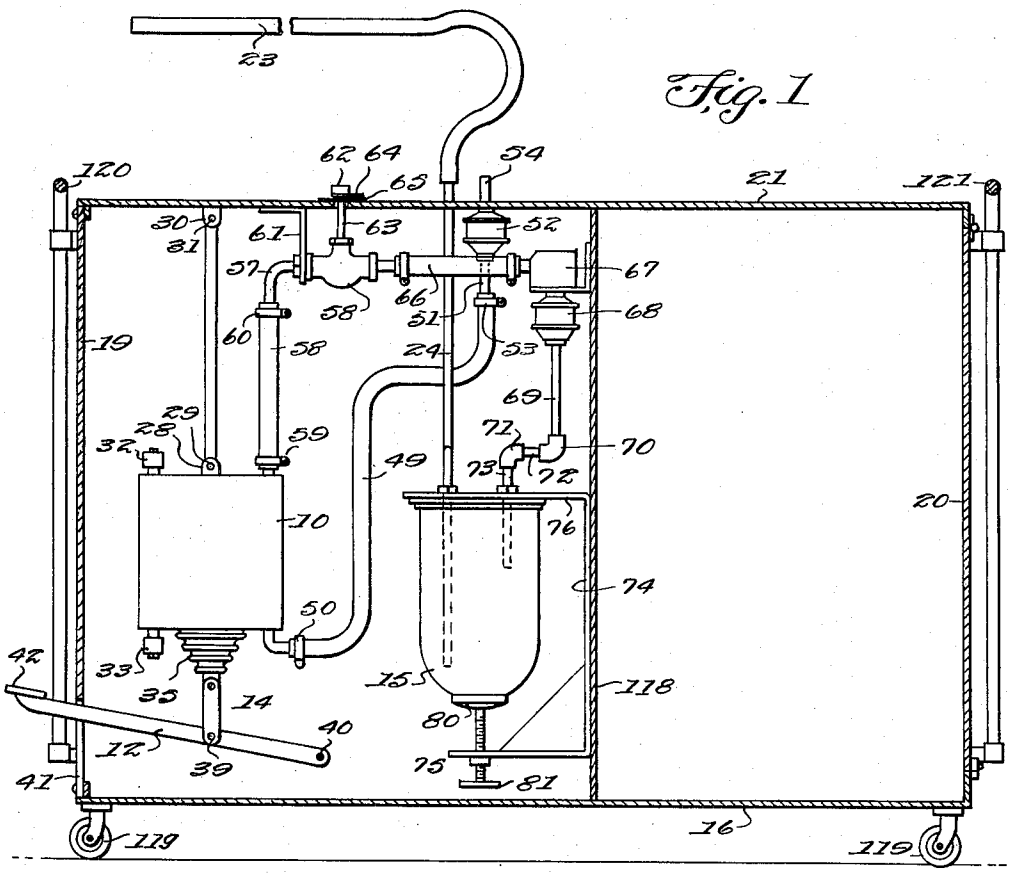
Aug. 18, 1953 V. C. VALENCIA 2,649,091

FOOT ACTUATED VACUUM APPLICATOR

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Fig. 1



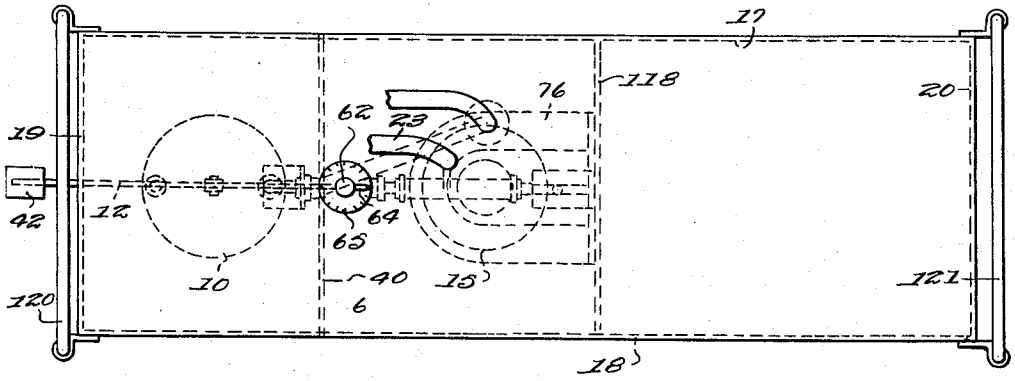


Fig. 2.

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Fig. 3.

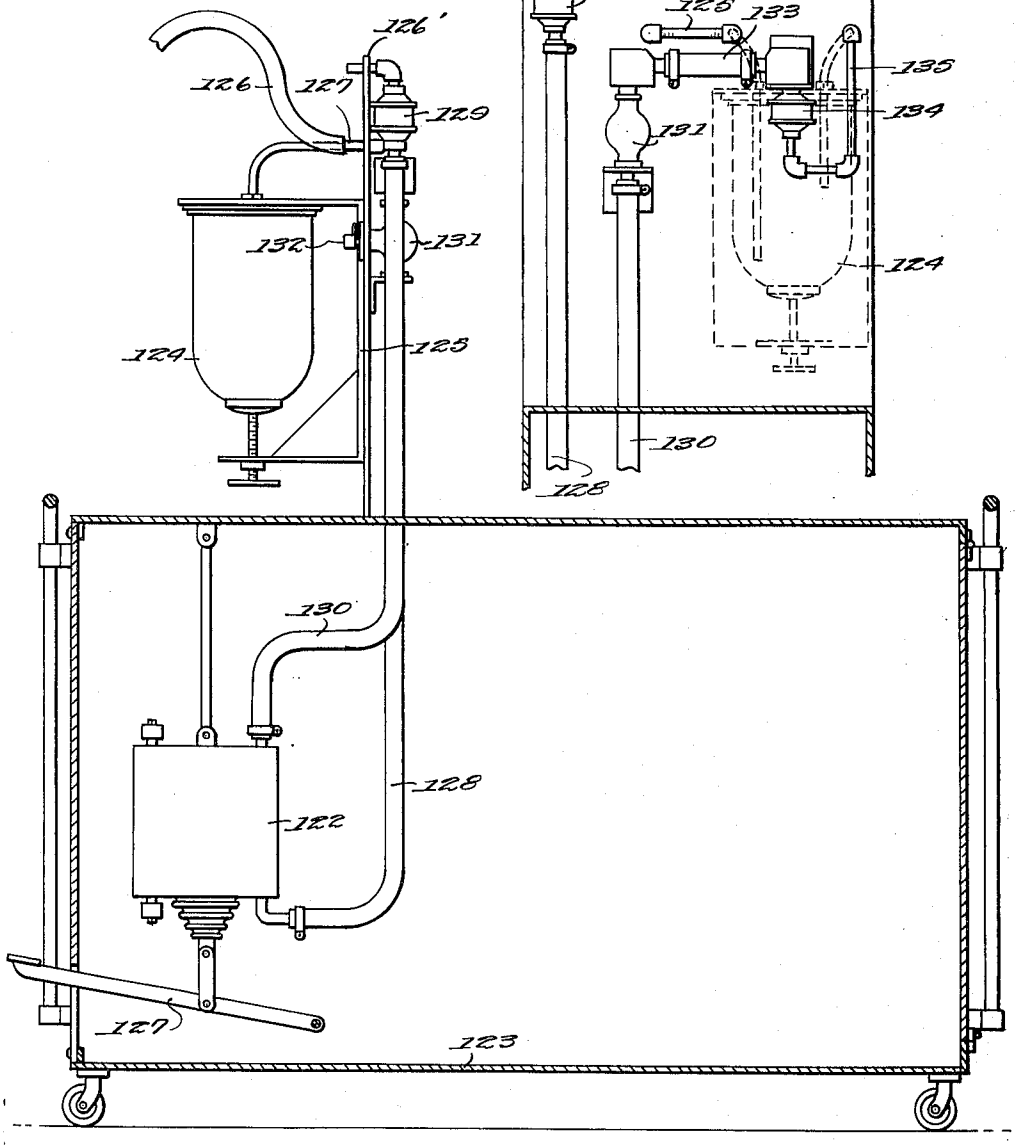


Fig. 4.

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FOOT ACTUATED VACUUM APPLICATOR

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Fig. 5.

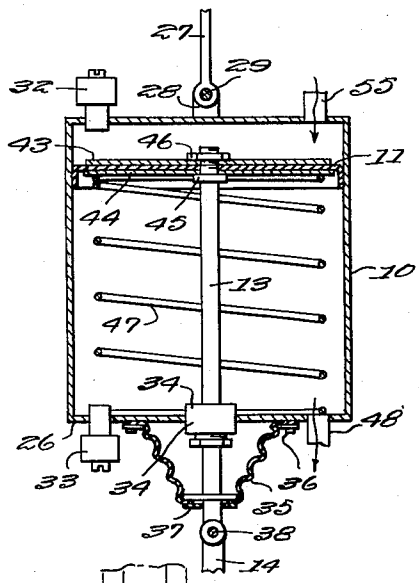


Fig. 6.

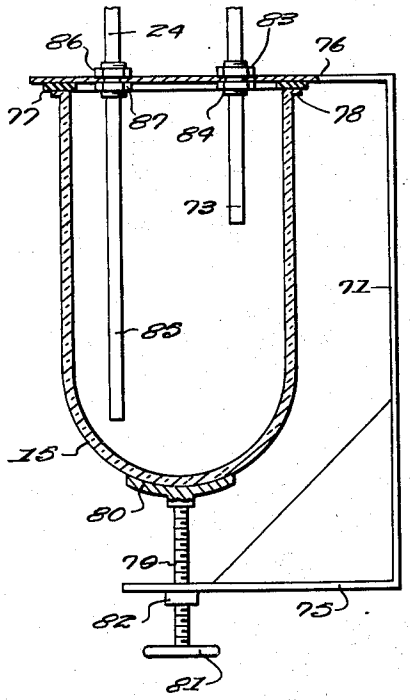


Fig. 7.

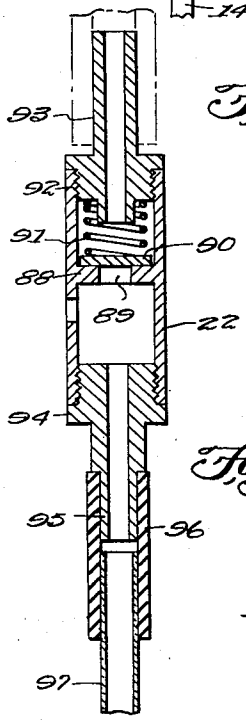


Fig. 8.

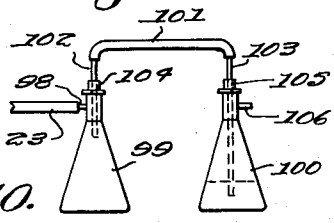


Fig. 9.

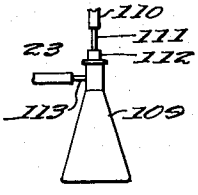
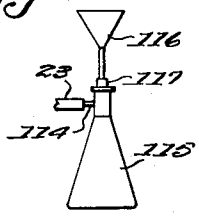


Fig. 10.



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FOOT ACTUATED VACUUM APPLICATOR

Victor Cornelio Valencia, Lima, Peru

Application March 8, 1951, Serial No. 214,470

2 Claims. (Cl. 128—276)

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This invention relates to surgical appliances for vacuum actuated testing devices for use in hospitals, laboratories and the like, and in particular a foot actuated vacuum pump in combination with a precipitator and suitable vacuum connections from the precipitator to apply vacuum or suction to different devices for different uses.

The purpose of this invention is to provide means for obtaining vacuum without the use of mechanical power whereby vacuum may be used in a hospital or laboratory for transferring fluids from one container to another without subjecting the products to air, for measuring poisonous liquids, for filtering solutions of biological products, for absorbing liquids from the lungs and other parts of the body and also for drying bloods, such as on cuts or injuries, and also for drying pipettes and the like.

Vacuum is not used in numerous instances in hospitals, laboratories, and the like because it is difficult to sterilize conventional pumping equipment such as is required for obtaining vacuum and also as vacuum equipment of this type is comparatively costly. In numerous instances the use of vacuum would save time and reduce the possibility of infections. With this thought in mind this invention contemplates a comparatively small foot actuated vacuum pump positioned in a portable stand and connected to a precipitator from which nozzles or connecting tubes extend.

The object of this invention is, therefore, to provide means for forming a portable vacuum machine or applicator with which vacuum may be provided at different points in a hospital, laboratory or the like, and where use thereof is desired.

Another object of the invention is to provide a vacuum applicator that is adapted for universal use in a hospital, laboratory, or the like.

A further object of the invention is to provide a vacuum machine that is mounted in combination with a precipitator on a portable stand and in which the device is provided with a suction nozzle which provides a portable vacuum applicator of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a vacuum cylinder suspended by a link in a portable housing and having a piston in the cylinder attached to a foot lever, and a precipitator mounted in or on the housing and connected to the cylinder and also having a nozzle extended therefrom.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

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Figure 1 is a vertical longitudinal section through the vacuum applicator.

Figure 2 is a plan view of the device.

Figure 3 is a view similar to that shown in Figure 1 illustrating a modification wherein a precipitator is placed on the housing instead of being mounted in the housing.

Figure 4 is an elevational view looking toward the rear of a precipitator showing a supporting handle extended upwardly from the housing and with the lower part of the housing broken away.

Figure 5 is a detail showing a vertical section through the vacuum cylinder.

Figure 6 is a detail showing a vertical section through the precipitator.

Figure 7 is a detail illustrating a nozzle, having a check valve therein, that is adapted to be carried on the outer end of a tube extended from the precipitator.

Figure 8 is a detail illustrating an application of the device wherein the vacuum is used for transferring liquid from one container to another without subjecting the liquid to the atmosphere.

Figure 9 is a similar view showing the method of applying vacuum to a part of the human body for withdrawing liquids or the like and wherein the said liquids withdrawn from the body are collected in a small container.

Figure 10 is a similar view illustrating the use of the vacuum applicator for filtering materials through a funnel, or the like.

Referring now to the drawings wherein like reference characters denote corresponding parts the vacuum applicator of this invention includes a vacuum cylinder 10, having a piston 11 therein with a foot lever 12 that is connected to the piston rod 13 by a link 14, a precipitator 15, a housing having a base 16 with upwardly extended side walls 17 and 18, end walls 19 and 20 and a cover 21, and a nozzle 22 that may be attached to a hose 23 extended from a tube 24 which extends downwardly into the precipitator 15.

In the design shown the vacuum cylinder 10 is provided with heads 25 and 26 and, as illustrated in Figure 1 the cylinder is suspended by a bar 27 that is pivotally connected to lugs 28 in the head 25 by pin 29, and the upper end of which is attached to lugs 30 on the under surface of the cover 21 of the housing by a pin 31. The head 25 is provided with a valve 32 and a similar valve 33 is provided in the head 26. The head 26 is also provided with a packing gland 34 through which the piston rod 13 extends and a flexible sealing

element 35 is positioned over the packing gland with the peripheral edge thereof secured to the head 26 by bolts 36 and with a washer 37 in the lower end providing a seal around the lower end of the piston rod 13.

The link 14 is pivotally connected to the lower end of the piston rod 13 by a pin 38 and the lower end thereof is pivotally connected to the lever 12 by a pin 39. The lever 12 is pivotally mounted on a pin 40 in the housing and the outer end thereof which extends through a slot 41 in the front wall 19 of the housing is provided with a foot treadle 42.

The piston 11, which is cup-shaped is secured between washers 43 and 44 and the washers and pistons are secured against a collar 45 by a lock nut 46. The piston is resiliently urged upwardly by a spring 47 that is positioned between the piston and lower end or head 26 of the cylinder.

The head 26 in the lower end of the cylinder is provided with an outlet nipple 48 in which a tube 49 is connected by a clamp 50 and the opposite end of the tube is attached to a stem 51 of a check valve 52 by a similar clamp 53. The valve 52 is provided with an inlet connection 54 that extends through the cover 21 of the housing providing an outlet connection to the atmosphere.

The head 25 of the cylinder is provided with an inlet nipple 55 and the nipple 55 is connected by a tube 56 to a nipple 57 extended from a control valve 58. The tube 56 is connected to the nipple 55 by a clamp 59 and the opposite end is connected to the nipple 57 by a clamp 60. The control valve 58 is suspended from the cover 21 by a hanger 61 and a knob 62 in the upper end of a stem 63, which extends from the valve 58 through the cover 21 is provided with a pointer 64 that is positioned to coact with a graduated valve 65 on the upper surface of the cover.

The control valve 58 is connected by a tube 66 with a fitting 67 and a check valve 68 on the fitting 67 is connected to the precipitator 15 through a tube 69 which extends through fittings 70 and 71 and nipples 72 and 73 through the interior of the precipitator.

The precipitator 15 is carried in a bracket having a base 74 with a lower arm 75 and an upper arm 76 and, as illustrated in Figure 6 a cover plate 77 is clamped between a rim 78 on the upper edge of the precipitator and the upper arm 76 of the bracket by an adjusting screw 79 that is threaded through the lower arm 75 of the bracket and that is provided with an arcuate washer 80 which is positioned to receive the lower end of the precipitator. The adjusting screw 79 is provided with a handle 81 with a lock nut 82 thereon which secures the screw in the desired adjusted positions.

The nipple 73 extends through the arm 76 and plates 77 and is secured in position, providing a sealed connection, by lock nuts 83 and 84.

The precipitator is also provided with an inlet tube 85 that also extends through the plate 77 and arm 76 and the tube 85 is secured in position by lock nuts 86 and 87. The tube 85 is connected to the vacuum tube or pipe 24 on the outer end of which the tube 23 is positioned.

The device is provided with a nozzle or connector 22 which is formed with a tubular casing having a partition 88 that is provided with an opening 89 and that is positioned to coact with the disc 90 to provide a check valve in the nozzle. The disc 90 is resiliently held against the valve seat or partition by a spring 91 and the spring is held by a bushing 92 that is threaded in the end of the tube and that is provided with an extended nipple 93 over which the hose or tube 23 is placed. The tube 22 is also provided with a bushing 94 that is threaded in the opposite end of the casing and the bushing 94 is provided with a nipple 95 on which a coupling sleeve 96 which is formed of rubber or other suitable material is positioned. A pipette or the like may be held in the bushing 96, as indicated by the numeral 97 and it will be understood that a connector or attaching device may be provided for connecting the vacuum or suction hose or tube to a pipette, surgical needle, or other device or the coupling member or tube may be used as illustrated in Figures 8, 9 and 10 by placing the tube over a nipple 98 of a container or bottle, as indicated by the numeral 99. In the application illustrated in Figure 8 the container 99 is connected to a container 100 by a tube 101 and nipples 102 and 103 extended from the end of the tube extended through corks or the like as indicated by the numerals 104 and 105 whereby with the lower end of the nipple 103 extends into the solution in the container 100 the solution is drawn by vacuum through the tube 23 into the container 99. The container 100 is provided with an inlet connection or nipple 106.

A similar container 107, as illustrated in Figure 9 may be provided with a tube 110 that extended from the end of the nipple 111 which extends through a cork 112, and with the tube 23 positioned on a nipple 113 the tube 110 may be used to draw plasma and the like into the container 109, or with the parts arranged in this manner the device may be used for drawing liquid from the lungs, abdomen, or other parts, or may be used to clean an operation area or withdraw gynecological secretion.

With the parts arranged as illustrated in Figure 10 vacuum may be used for accelerating filtering solutions whereby with the tube 23 connected to a nipple 114 on the container 115 a funnel 116 may be positioned in a stopper or plug 117. With a filter paper disc positioned in the funnel 116 the products may be filtered with the vacuum drawing the solution through the filter element.

With the parts as illustrated in Figure 1, the pumps, precipitator and associated parts are located within the housing and the precipitator is mounted on a partition 118.

The housing is mounted on caster rollers 119 and the ends are provided with handles 120 and 121.

In the design illustrated in Figures 3 and 4 a vacuum pump 122, similar to the pump 10 is positioned in a housing 123 and a precipitator 124, similar to the precipitator 15 is positioned above the housing with the precipitator mounted in the bracket 125 and with the bracket supported on a panel 126.

In this design the cylinder 122 is actuated by a lever 127 and the discharge end is connected by a tube 128 to the upper part of the panel 126 through a check valve 129. The upper end of the cylinder 122 is connected by a tube 130 to a control valve 131 and the control valve is actuated by a head 132. The control valve is connected by a tube 133 to a check valve 134 and the check valve is connected by a tube 135 to the interior of the precipitator 124 as shown in Figure 4. A tube 125 extends from the precipitator and a hose 126 which is extended from the end 127 of the tube 125, extends to provide a connection through which the vacuum may be

applied to a container, such as illustrated in Figures 8, 9 and 10, or to other suitable devices.

With the parts arranged in this manner the nozzle is held in one hand and by holding the end of the nipple or a tube or pipette thereon over a cut or the like blood flowing therefrom is readily dried, or liquid may be absorbed from parts of the body or from instruments such as pipettes, test tubes, bottles and the like to facilitate drying. With the nozzle held in the hand a thumb or finger may be placed over an opening **136** therein whereby the vacuum may readily be controlled.

By this means a portable vacuum applicator is provided for hospital and laboratory use and by this means poisonous liquids that would injure an operator should the fumes be inhaled, may be measured or the vacuum may be used to dry pipettes, without the need of alcohol or the like. The vacuum may also be used to filter solutions for biological products with the vacuum drawing the solutions through the filter.

The vacuum of this device may also be used to dispense plasma and the like, in a vacuum whereby the parts remain sterilized, or the vacuum may be used to absorb liquid from the lungs, abdomen, or other parts of the body, or it may be used to clean the operation area or remove gynecological secretion.

The device is readily actuated by foot power by which the desired vacuum may be pumped and retained in the precipitator which will render the solids in the air or solution passing therethrough insoluble or separate such solids from the air or solution passing therethrough, and from the precipitator the vacuum may be applied to the above and other uses.

It will be understood that other modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. A portable vacuum applicator comprising a housing mounted on wheels, a vacuum cylinder mounted in said housing and having a piston rod extended therefrom, a foot actuated lever pivotally mounted in the housing and connected to the said piston rod, a precipitator, a bracket in which the precipitator is mounted, means mounting the bracket with the precipitator therein in the housing, a tube connecting the suction side of the cylinder to the outlet of the precipitator, a tube extended from the inlet of the precipitator through the housing, a control valve in the tube extended from the cylinder to the precipitator and check valves in the said tubes.

2. A portable vacuum applicator comprising a housing mounted on wheels, a vacuum cylinder mounted in said housing and having a piston rod extended therefrom, a foot actuated lever pivotally mounted in the housing and connected to the said piston rod, a precipitator, a bracket in which the precipitator is mounted, means mounting the bracket with the precipitator therein in the housing, a tube connecting the suction side of the cylinder to the outlet of the precipitator, a tube extended from the inlet of of the precipitator through the housing, a control valve in the tube extended from the cylinder to the precipitator, check valves in the said connections, and a nozzle having a check valve therein, in the tube extended from the housing.

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