

Jan. 3, 1939.

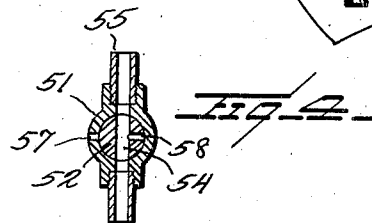
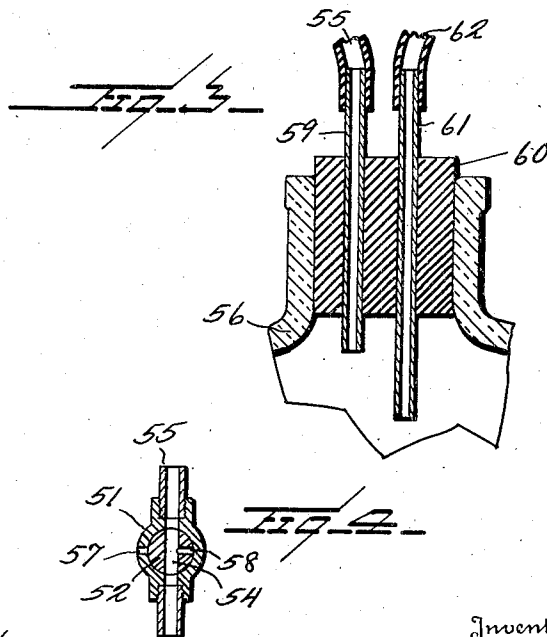
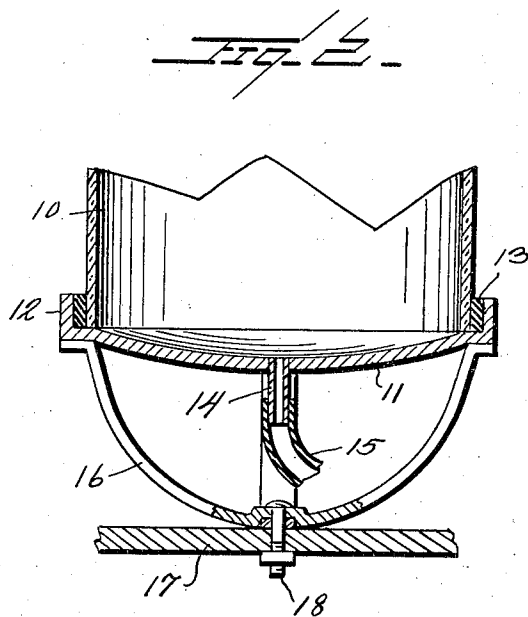
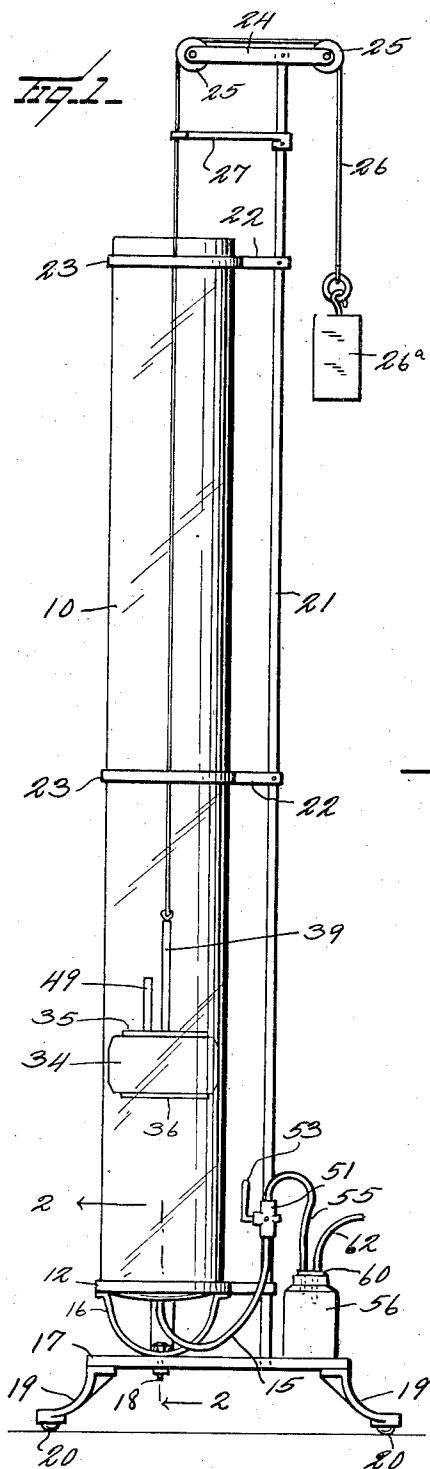
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2,142,624

STOMACH PUMP

Filed Dec. 17, 1936

2 Sheets-Sheet 1



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Fig. 5

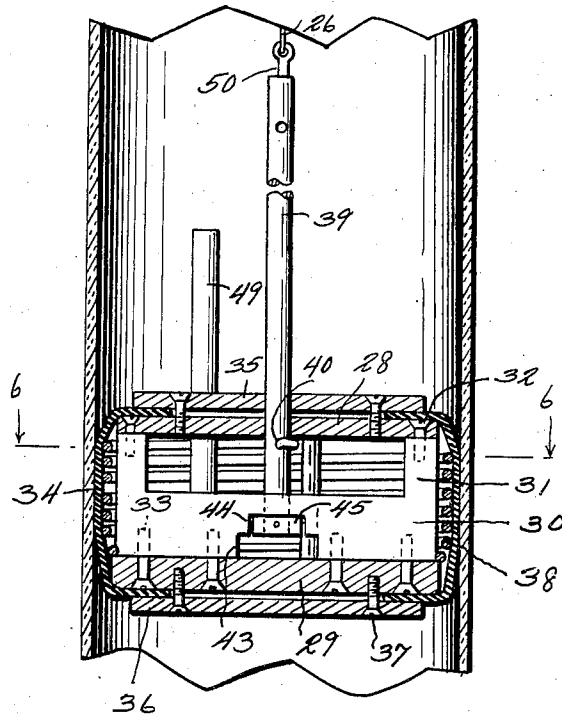


Fig. 6

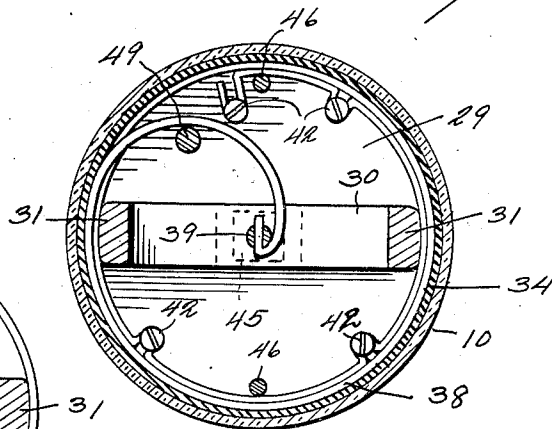
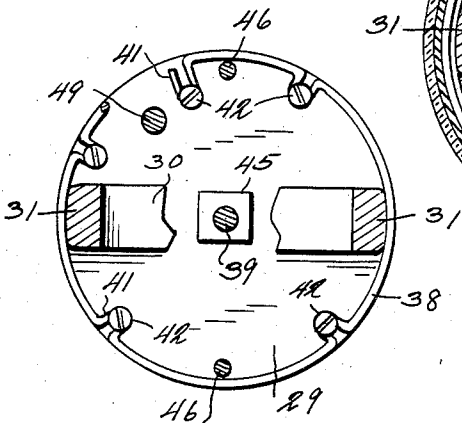


Fig. 7



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UNITED STATES PATENT OFFICE

2,142,624

STOMACH PUMP

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11 Claims. (Cl. 128—276)

This invention relates to stomach pumps, and the general object of the invention is to provide an apparatus for the evacuation of the stomach which is simpler and more easily handled than the usual Weigstein apparatus. The Weigstein method and apparatus consist in the use of a jug suspended in an inverted position, nearly filled with water, there being two rubber tubes leading from the stopper of the jug, one tube leading to a secretion receiving bottle or jug while the other tube is for the discharge of water. The flowing of the water out of the first named jug causes a withdrawal of the contents of the stomach from the patient, the secretions being discharged into the secretion receiving jug. On an average, the flow of water takes about an hour and at the end of this time, the first jug has to be replaced by another full jug, and quite a lot of attention has to be given to this device. Inasmuch as nurses in a hospital are often very busy elsewhere and oftentimes the condition of the water in the jug is not noted, the jug may be out of operation for hours before the matter is attended to.

The general object of my invention, therefore, is the provision of means whereby the stomach may be evacuated, which will operate over a relatively long period of time and which is relatively simple, which is easily set up and which will not require the attention necessary for the Weigstein method.

A further object is to provide a structure of this character which is portable and readily moved from place to place, and which may be readily cleaned and sterilized whenever necessary.

A still further object is the provision of a piston operating within a cylinder, preferably of glass, the piston being so constructed that while it may be readily removed for cleaning or repair and readily re-inserted, it will expand tightly within the cylinder so as to secure a close and air-tight engagement with the wall of the cylinder.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is an elevation of my stomach pump.

Figure 2 is a sectional view of the lower end of the cylinder, its closure plate and its support.

Figure 3 is an enlarged sectional view through the mouth of the secretion retaining vessel and the tubes entering the same.

Figure 4 is a sectional view through the valve

which controls communication between the cylinder and the secretion retaining vessel.

Figure 5 is a fragmentary longitudinal section through the cylinder and through the piston therein.

Figure 6 is a section on the line 6—6 of Figure 5.

Figure 7 is a top view of the bottom plate of the piston, the cross bar and the screws being shown in section.

Referring particularly to Figure 1, 10 designates a cylinder, preferably of glass having an amber color. This cylinder is entirely open at its upper end. At its lower end, the cylinder is closed by a dished plate 11 having upwardly extending flanges 12. Between these flanges 12 and the cylinder wall there is disposed packing 13 so as to make an air and water-tight joint between the cylinder and the plate 11. The plate 11 has at its middle a nipple 14, and extending from this nipple is a tube 15, preferably of rubber.

While I do not wish to be limited to the particular construction shown, the cylinder is illustrated as being supported by two semi-circular curved straps or irons 16, which are welded, brazed or otherwise attached to the rim of the plate 11, these straps intersecting each other at the middle of each strap and the intersecting portions of the straps being held to the base plate 17 by means of a bolt 18. The base plate 17 is provided with legs 19 having castor wheels 20 to permit the mechanism to be readily rolled from place to place and put in proper position.

Extending upward from the base 17 is a rod 21 which is parallel to the cylinder and which supports the cylinder by arms 22 which extend from bands 23 encircling the cylinder. The lower arm 22 may be connected directly to the upwardly turned flange 12 of the member 11. Mounted upon the upper end of the rod 21 is a transverse arm 24 having pulleys 25, one of these pulleys being disposed immediately over the axial center of the cylinder. Extending over these pulleys is a cable 26 preferably metallic, this cable at its outer end supporting a weight 26^a and at its other end extending into the cylinder 10 and being connected to a piston therein, as will be later described in detail.

Mounted upon the rod 21 is a limiting stop 27, whose function will be later described, and this limiting stop may be, if desired, adjustable upon the rod 21, or may be fixed at one definite position upon this rod 21. Operating within the cylinder is a piston shown in detail in Figure 5. The piston consists of two circular disks of metal

designated 28 and 29, vertically spaced from each other. Disposed between these disks is a transverse bar 30 also of metal, and having any desired weight, this bar at its ends being extended upwardly, as at 31. The disk 28 is held to this bar by screws 32, extending into these upwardly extending portions 31, while the metal disk 29 is held to the bar by the screws or pins 33. I do not wish to be limited to any particular means for holding these metallic disks 28 and 29 to the metallic cross bar 30, though I have shown screws for this purpose which permit the ready removal or detachment of these parts.

Extending around the periphery of the piston is a packing band 34 preferably of rubber, leather or equivalent material, the margins of this band being turned inward over the upper face of the disk 28 and the lower face of the disk 29. These inwardly turned margins are clamped upon the body of the piston by means of the disks or plates 35 and 36, which are held to the disks 28 and 29 by the screws 37. Disposed immediately within the band 34 and extending around the ends of the cross bar 30 is a coiled expansion spring 38. The upper coil of this spring is connected to a spindle or piston rod 39, the upper extremity of the spring being illustrated as being angularly bent, as at 40, and inserted through this rod 39. The spring is coiled any desired plurality of times around the piston and at its lower portion, the last coil of the series, as shown in Figure 7, is held flat against the upper face of the disk 29. This lower coil, to this end, is formed with a plurality of loops, or eyes 41, through which screws 42 pass in order to hold this lowest coil securely to the disk 29.

In Figure 5, the bar or weight 30 is shown as formed on its lower face with a recess 43 and above this recess with a smaller recess 44, the walls of this recess 44 being parallel to each other. The rod or spindle 39 is vertically shiftable through the bar 30 and at its lower end carries a many-sided head 45. When the spindle or rod 39 is drawn upward with reference to the piston, this head 45 is disposed within the recess 44 and no relative rotation can be had between the rod 39 and the piston, but when the rod 39 is forced downward into the enlarged recess 43, the cross bar 30 and the body of the piston may rotate with reference to this rod 39. Extending upward from the piston is a rod 47 which acts as a handle or crank whereby the body of the piston may be rotated with relation to the spindle or rod 39 when it is desired to wind up or contract the spring 38, as before stated. By this means, it is possible, when the rod 39 is lowered, to give a relative rotation to the piston and the rod in reverse directions to contract or wind up the spring 38 to thus reduce its diameter and the consequent exterior diameter of the piston, thus permitting the piston to be readily inserted within the cylinder. Lifting the rod locks the spring contracted and then, when the piston is inserted, the rod may be forced downward into the relatively large recess 43 and the spring will expand, forcing the packing band or strip 34 tightly against the inner face of the cylinder. Thus it will be seen that it is a very easy matter to remove and re-insert the piston, and a very easy matter to remove an old packing 34 and replace it with new packing or to renew any parts that may become worn or need replacement. Furthermore, this construction permits the piston, after it has been drawn upward within the cylinder 10, to be contracted and then easily lowered into the lower end of the cylinder without ma-

terial effort whereas if the piston is not contractible, it would require considerable effort to push the piston downward into the lower end of the cylinder.

The disks 28 and 29 are held apart not only by the cross-piece or bar 30, but by vertically disposed spacing members 46 shown in section in Figures 6 and 7. It will be noted that the upper end of the rod 39 carries an eye 50 to which the cable 26 is attached. This eye may be held in place by a set screw or in any other suitable manner, or the cable may be swiveled into the upper end of the rod 39. The stop 27 acts by engagement with the eye 50, to prevent the entire removal of the piston from the cylinder under ordinary circumstances, but obviously the arm 27 may be readily shifted out of position, as for instance, raised so as to permit the entire removal of the piston from the cylinder.

The pipe 15, as before stated, is preferably of rubber and, though not necessarily so, extends into a valve casing 51 having therein a rotatable valve 52 provided with a handle 53. The valve has a diametrical bore 54 which, in one position of the valve, is adapted to register with the extremity of the pipe 15 and with the extremity of a pipe 55, preferably of rubber which leads into the receptacle 56. The valve casing 51 is also formed with a vent 57 and a vent opening 58 extends transversely through the valve at right angles to the bore 54 and thus the valve may be turned to connect the bore with the vent 57 or to cut off this vent and connect the two pipes 15 and 55 directly with each other. The flexible pipe 55, as shown in Figure 3, is connected at its end to a glass tube 59 extending down through a stopper 60 in the neck of the vessel 56. Through this stopper 60 extends a glass tube 61 which is connected to a flexible pipe 62 which in turn has its end inserted in the patient's stomach in the usual manner.

The general operation of this mechanism will be understood from what has gone before. When the operation of evacuating the stomach is started, the piston is at the lower end of the cylinder, it being either pushed down into this lower end as, for instance, by means of a rod inserted through the upper end of the cylinder or descending into the lower end by gravity due to the fact that all of the parts of the piston are of metal. With the valve turned to the position shown in Figure 4 and the tube 62 inserted in the patient's stomach, the weight 26a is allowed to very slowly draw the piston upward. As the piston moves upward, it will, of course, draw air and gases from the patient's stomach and the fluid contents of the stomach are discharged into the secretion retaining vessel 56 and retained therein. The cylinder 10 is of any desired length but will be of such length that it will take a relatively long period of time for the piston to move from the lower end of the cylinder to the upper under the action of the weight. The weights may be readily changed so as to secure any desired rapidity of action. It is obvious also that the cylinder may be graduated, if desired, so as to secure just the evacuation needed. When the weight has reached the upper end of the cylinder, if a further evacuation of the stomach is desired, the valve is turned so as to aline the vent opening 58 with the mouth of the pipe 15 and aline the bore 54 with the vent opening 57. This will permit the escape of air from the lower end of the cylinder and the piston will be carried down either by gravity or, as before remarked, by being forced down whereupon, after the valve

has been turned to the position shown in Figure 4, the operation may be readily repeated. After a full evacuation has been secured, the valve 51 may be turned to a position where the vent 58 is in alinement with the vent 57 and the pipes 55 and 62 disconnected from the bottle 56 so as to permit an examination of the contents of the bottle 56 and, of course, under these circumstances, the air will readily escape from the lower end of the cylinder and the piston will descend to its lowered position. Of course, when it is desired to have the piston descend, the weight 26a may be removed from the cable 26.

It will be seen that I have provided a mechanism for pumping out the stomach of a patient, which does not require the constant attention necessary where the Weigstein method and apparatus is used, which does not require that the water shall be withdrawn from an upper jug into a lower jug and then the upper jug removed, the stopper removed and the water poured from the lower jug into the upper jug and the upper jug again be inverted, etc. or the replacement of one jug by another with the necessary replacement of the suction hose and other parts.

The device is very compact, may be easily transported from place to place because of the castor wheels, may be readily cleaned and is ready for instant use. The container 56 will normally be a glass jar or bottle holding approximately a gallon.

While I have illustrated certain details of construction and arrangement of parts, I wish it distinctly understood that many changes might be made in the minor details without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:—

1. A stomach pump including a cylinder, a piston in the cylinder and movable through the length of the cylinder, a weight operatively connected to the piston to draw the piston outward in the cylinder, an air inlet pipe leading into the inner end of the cylinder inward of the piston, a secretion receptacle into which the inlet pipe extends, and an inlet pipe extending into the receptacle and adapted to be inserted in the stomach.

2. A stomach pump, including a cylinder open at its upper end, a piston in the cylinder, a support mounted above the cylinder and having pulleys, a flexible connection from the piston extending over said pulleys, a weight connected to the end of the flexible connection whereby to draw the piston outward in the cylinder, an air inlet pipe leading into the inner end of the cylinder inward of the piston, a secretion containing receptacle into which the inlet pipe extends, and a pipe leading from the receptacle and discharging thereinto, said pipe being adapted to be inserted in the stomach.

3. A stomach pump, including a wheel support, a glass cylinder mounted upon said wheel support and open at its upper end, a rod extending upward from the support parallel to the cylinder and operatively supporting the cylinder at a plurality of points, said rod at its upper end having an arm extending in opposite directions from the rod and carrying pulleys, a piston within the cylinder having a flexible connection extending upward over said pulleys and downward exteriorly of the cylinder, a weight attached to said flexible connection and urging the piston upward, an inlet tube connected to the lower end of the cylinder, a secretion container into the upper

end of which the inlet tube opens, and a stomach tube extending from the secretion container.

4. A stomach pump including a wheel support, a glass cylinder mounted upon said wheel support and open at its upper end, a rod extending upward from the support parallel to the cylinder and operatively supporting the cylinder at a plurality of points, said rod at its upper end having an arm extending in opposite directions from the rod and carrying pulleys, a piston within the cylinder having a flexible connection extending upward over said pulleys and downward exteriorly of the cylinder, a weight attached to said flexible connection and urging the piston upward, means carried by the rod for limiting the upward movement of the piston, an inlet tube connected to the lower end of the cylinder, a vent valve in said tube, a secretion container into the upper end of which the inlet tube opens, and a stomach tube extending from the secretion container.

5. In a structure of the character described, a cylinder and a piston operating therein, the piston including an outer elastic covering and a multi-coiled spring disposed within the elastic covering, manually operable means on the piston whereby the spring may be contracted to permit the insertion of the piston into the cylinder, said means being movable to permit the release of the spring and its radial expansion against the elastic covering of the piston.

6. In a structure of the character described, a cylinder and a piston operable therein, the piston including upper and lower plates, a centrally disposed piston rod, an elastic peripheral covering for the piston clamped upon the upper and lower plates, a multi-coiled spring disposed within the rubber covering and resiliently urged radially outward against the rubber covering, the inner end of the spring being attached to said piston rod, the piston rod being rotatable relative to the body of the piston to cause the contraction of the spring to permit the insertion of the piston within the cylinder, the release of the piston rod permitting the spring to expand to thereby force the flexible covering against the wall of the cylinder.

7. In a structure of the character described, a cylinder and a piston operating therein, the piston including upper and lower plates spaced from but connected to each other, a cross bar connected to both of said plates, a piston rod extending through the upper plate and through the cross bar and having a many-sided head at its lower end, the underface of the cross bar being formed with a recess larger than the head to permit the head and piston rod to rotate and with a continuation of the first named recess having a width equal to that of the head whereby when the piston rod is depressed, the piston may be rotated relative to the rod and when the piston rod is raised, the piston and piston rod will be held for unitary rotary movement, a multi-coiled spring attached at one end to the piston rod and at its other end attached to the lower plate, a covering of flexible material extending around the peripheries of said plates and having margins extending inward over the upper and lower surfaces of the upper and lower plates respectively and clamping plates detachably engaged with the upper and lower plates and engaging the intumed margin of the covering whereby the piston rod may be rotated relative to the body of the piston to contract said spring and the spring held in its contracted position while the piston is being inserted in the cylinder and whereby the spring may then be released to permit its ex-

pansion to force the flexible covering against the wall of the cylinder.

5 8. A stomach pump of the character described, including a carriage having castor wheels, a cylinder extending vertically upward from the carriage, a bottom member for the cylinder removable therefrom and detachably supported upon the carriage, a rod extending upward from the carriage to a point above the cylinder and having means for clamping the cylinder in position, 10 a radial arm carried by the upper end of the rod and having pulleys at its opposite ends, a piston disposed within the cylinder and having a piston rod, a flexible connection leading from the piston rod over said pulleys, a weight attached to the 15 outer end of the flexible connection and urging the piston upward, a stop carried by the rod and limiting the upward movement of the piston, a tube extending from the bottom member of the cylinder, a secretion receiving receptacle having a stopper and through which the tube extends, 20 the second tube leading from the secretion receptacle through the stopper thereof and adapted to be inserted in the stomach.

25 9. A stomach pump, including a cylinder, a piston in the cylinder movable through the length of the cylinder, a weight operatively connected to the piston to draw the piston outward in the cylinder, an air inlet pipe leading into the inner

end of the cylinder inward of the piston, a secretion receptacle, a conduit affording communication between the secretion receptacle and the inner end of the cylinder, and a drain tube extending into the receptacle.

5 10. A stomach pump, including a cylinder open at one end, a piston in the cylinder movable through the length thereof, a weight operatively connected to the piston to draw the piston outward in the cylinder, an air inlet conduit leading 10 into the inner end of the cylinder inward of the piston, a secretion receptacle into which the inlet conduit extends, and an inlet pipe extending into the receptacle and adapted to be inserted into the stomach, the piston being manually expansible 15 and contractible to thereby permit the piston to readily move into the inner end of the cylinder when the piston is contracted.

20 11. A draining device for internal organs, comprising an outer cylinder, an inner cylinder slidable in the outer cylinder, a weight for raising the inner cylinder to effect a sub-atmospheric pressure within the cylinders, a vessel, a drain tube extending into the vessel, a conduit to afford communication between the cylinders and the vessel, and valves for selectively opening and 25 closing the conduit and the tube.

WILLIAM L. WILLIAMS.