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SIPHON APPARATUS

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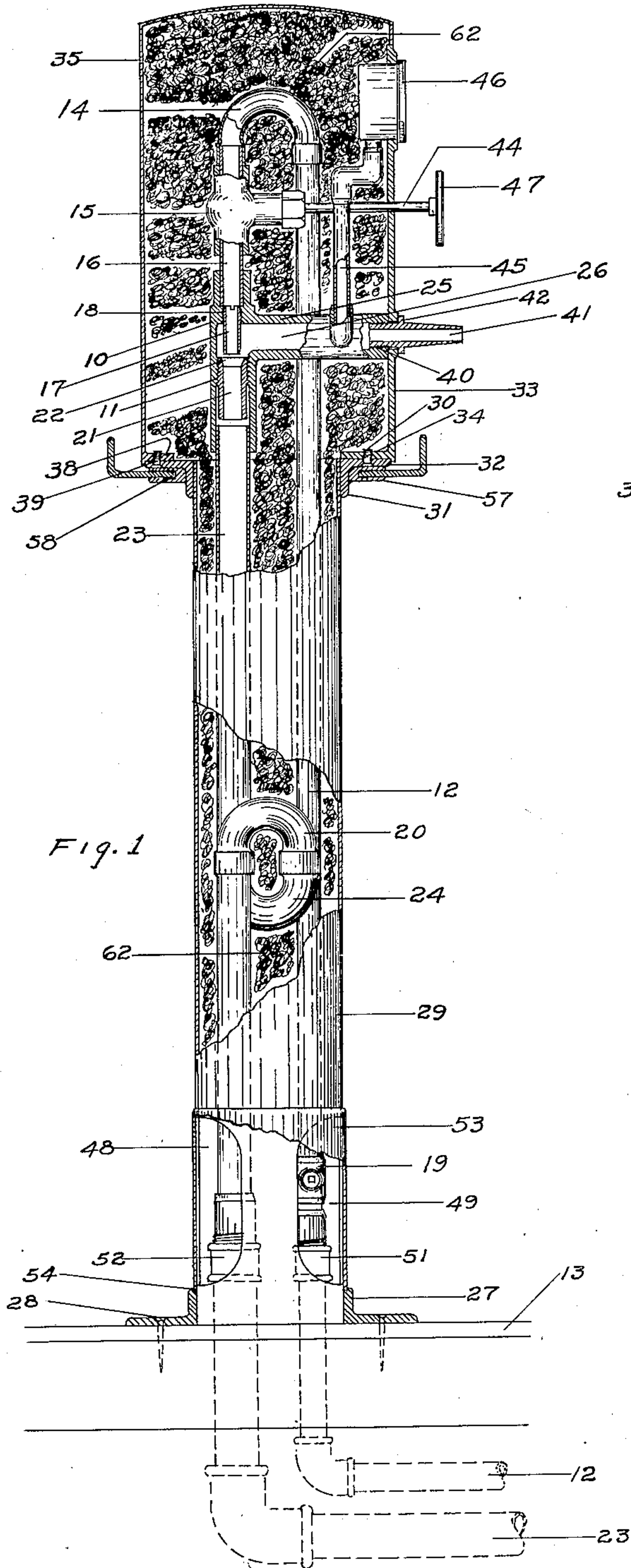


Fig. 1

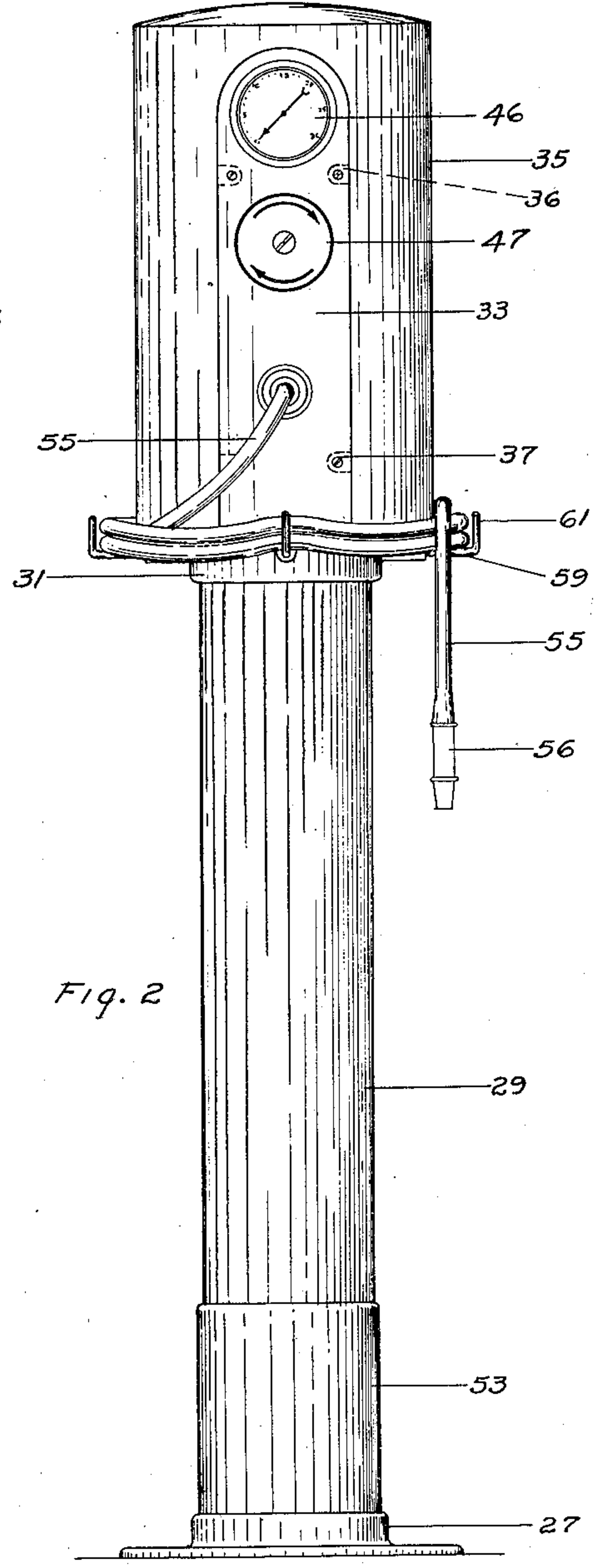


Fig. 2

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SIPHON APPARATUS

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7 Claims. (Cl. 128—278)

This invention relates generally to a vacuum siphon apparatus and more particularly to a device of this character for installation in hospital operating rooms, doctors' offices, and similar places for use in connection with major surgical operations to remove blood and other waste matter while the operation is being performed.

Rather crude water siphons have heretofore been employed by surgeons in connection with minor operations about the nose, throat and ears, and similar devices have also been employed for draining sinus canals and for like purposes, but as far as I am aware a siphon of this character has never been designed which is suitable for installation in operating rooms where cleanliness and sterility are of prime importance.

Suction devices employing an electric motor to create the vacuum have heretofore been employed in connection with major operations but such devices are extremely noisy, and are otherwise objectionable due to the danger of explosion and fire which may result from the ignition of ether or other anaesthetic vapors employed during the operation.

Fluid siphon apparatus which have heretofore been in use comprise generally a rough irregular casting containing the parts comprising the siphon per se, and the plumbing fixtures, gauge, valves, conduits and other connections are secured to this casting, forming an exposed assembly including many sharp angles and irregular surfaces. Constructions of this character collect dirt and germs and it is practically impossible to clean and sterilize them properly. They are therefore unsuitable for hospital purposes.

It is, therefore, an object of the present invention to provide a fluid operated, vacuum siphon apparatus which is suitable for installation in hospital operating rooms for use in connection with surgical operations to remove blood or other waste matter and which will overcome disadvantages present in siphon devices heretofore in use.

Another object of the present invention is to provide an outer casing containing and supporting the entire siphon apparatus including the plumbing fixtures, conduits and gauge.

Further, it is an object of the invention to provide an outer casing of novel construction and an association of the parts of the siphon therewith making the entire apparatus and associated plumbing fixtures accessible or readily removable for repair and cleaning thereof.

Another object of the invention is to provide means within the outer casing and associated with the apparatus for partially preventing and

completely absorbing moisture of condensation.

Still another object is the provision, in a siphon apparatus having a suction hose, of a casing surrounding the apparatus and means exteriorly thereof forming a support for the hose when not in use.

Other objects and advantages of the invention will become apparent from a reading of the following description taken in connection with the accompanying drawing, in which

Fig. 1 is a vertical sectional side view of the apparatus, shown partially in elevation and with certain parts broken away;

Fig. 2 is a front elevational view showing the front panel assembly and the manner in which it is secured to the remainder of the outer casing.

Referring now to the drawing, the siphon apparatus comprises a suitable casting 10 having inlet and outlet openings formed therein and a connecting passageway 11 therebetween. A fluid inlet conduit 12, provided with a cut-off valve 19 of well known construction, extends from beneath a floor or other surface 13 upwardly to the casting 10 and is provided with a suitable elbow 14 which connects with a valve casing 15 containing a gate valve or other suitable valve member (not shown). A conduit member 16 extends between the valve casing 15 and the inlet side of the siphon casting 10. A jet or nozzle member 17 is adjustably secured interiorly of the casting 10 as by threads 18 in the passageway 11 and in open communication with the inlet conduit 16, and an outlet jet member 21 is also adjustably threaded in the outlet side of the casting 10 in suitable spaced relation to the jet 17. As shown, this outlet jet 21 is slightly larger in diameter than the jet 17 and is provided with a flared mouth portion 22. The casting 10 may be provided with a conduit extension 25 having a passageway 26 formed therein, extending from the casting 10 at right angles to the jets 17 and 21 and adjacent the point of separation thereof.

It will be noted that the flared mouth portion 22 of the outlet jet 21 lies in a plane slightly below that of the lower floor of the vacuum passageway 26. This feature insures complete drainage of any waste matter remaining in the passageway 26 after the device has ceased to operate.

A waste conduit 23 is connected to the outlet side of the casting 10 and extends downwardly through the floor 13. A suitable waste trap 24 of well known construction may be interposed in the conduit 23 and provided with a removable portion 20 to facilitate cleaning thereof.

It will now be understood that water or other

fluid passing through the inlet conduits 12 and 16 and the jets 17 and 21 to the waste conduit 23 will create a vacuum at the point where the jets 17 and 21 are separated. The conduit 25 being in communication with the interior of the casting 10 at this point, a vacuum will be created therein which may be employed to remove blood and waste matter during the operation.

As previously stated, it is an important object of this invention to provide a suitable casing for the siphon apparatus which will make the device adaptable for hospital purposes. To this end, a cylindrical base portion 27 is provided which surrounds both the inlet and outlet conduits 12 and 23 and which may be suitably secured as at 28 to the floor or other surface 13. A vertically extending, cylindrical pedestal portion 29 may be formed integrally with the base 27 or otherwise secured thereto and is provided at its upper end with an annular ring member 31 which is flanged outwardly as at 32 forming a base or supporting surface to which a vertically extending panel member 33, flanged inwardly as at 34, is suitably secured as at 30.

To complete the enclosure for the siphon apparatus, a cylindrical casing member, indicated generally at 35, is provided, having an opening therein in registration with the panel portion 33. The casing 35 may be provided with suitable bosses 36 secured thereto and extending into the opening, forming means for securing the panel thereto. Suitable means such as threaded bolts 37 may be provided to secure the panel to these bosses. As shown, the bottom portion of the casing 35 is flanged inwardly as at 38 whereby it may be secured as at 39 to the flanged portion 32 of the ring member 31.

The panel 33 is provided with a suitable opening to receive an extended nipple member 41 which extends therethrough and which in turn is provided with screw threads to engage corresponding threads formed in the extended vacuum conduit 25, as at 40. It will be noted that the nipple 41 is provided with a flange 42 adapted to bear against the panel exteriorly thereof so that when the nipple 41 is securely screwed into the vacuum conduit 25, the siphon apparatus will be entirely supported by the panel.

A valve control handle 47 is provided exteriorly of the outer casing and has a shaft portion 44 which extends through the panel 33 and into the valve casing 15 to operatively connect with the valve therein in any suitable manner (not shown).

A conduit 45 is provided interiorly of the casing 35 which communicates with the vacuum conduit 25 and the passageway 26 therein and extends upwardly to a point adjacent the interior surface of the panel where a vacuum gauge 46 of any suitable well known construction is operatively secured thereto. The panel 33 may be provided with an opening to receive the face of the gauge 46 so that it may be readily read from the exterior of the casing.

It is desirable that the inlet and outlet conduits be readily accessible so that they may be easily connected to standard plumbing fittings. To this end the pedestal portion 29 of the casing is cut away as at 48 and 49 adjacent the base 27. The inlet and outlet conduits 12 and 23 may terminate within the casing adjacent these cut-out portions, and standard fluid inlet and waste outlet connections may be made at this point as at 51 and 52.

In order that the plumbing fixtures may be completely enclosed at all times, a suitable sleeve

member 53 is telescopically associated with the pedestal casing 29 and is adapted to normally rest in an annular groove formed in the base 27 as at 54. When access to the plumbing connections 51 and 52 is desired, this sleeve 53 may be moved upwardly from the base 27 to a position in telescopic relation to the pedestal portion 29 and access to the plumbing connections may be had through the cut-out portions 48 and 49 of the pedestal.

A suitable flexible hose 55 may be secured to the vacuum nipple 41 and may be provided on the opposite end thereof with a suitable glass tip 56 to which may be attached a short length of hose and a suitable suction tip (not shown) to be placed in direct contact with the blood or other waste matter to be removed.

It is desirable that means be provided to support the hose 55 when not in use, and to this end the flanged portion 32 of the ring member 31 is provided with a plurality of downwardly extending bosses 57 spaced from each other around the ring member 31 and having drilled and threaded openings therein to receive the threaded portions 58 of outwardly extending bracket members which may be provided with upwardly extending portions 61 adjacent the outer ends thereof. As shown, the hose 55 may be coiled around the casing 35 upon these bracket members 59 when not in use.

It will now be apparent that the extent of the vacuum created in the vacuum conduit portion 25—26 will be registered on the vacuum gauge 46 which is connected thereto and may be controlled by regulating the quantity of fluid admitted to the apparatus by means of the control wheel 47 which is connected to the fluid inlet valve contained within the casing 15. Blood or other waste matter coming in contact with the glass suction tip 56 will be drawn by suction through the hose 55, conduit 25—26, jet 21, to the waste conduit 23.

Operating rooms and places of similar character are usually maintained at a relatively high, humid temperature. Due to this fact moisture of condensation would be formed upon the apparatus unless means were provided for its prevention. I have found that mineral wool or other similar non-deteriorating, moisture absorbing and heat insulating substance is suitable for this purpose.

As shown in Fig. 1 of the drawing, the interiors of the pedestal portion 29 and the casing 35 are completely packed with this insulating, moisture absorbing wool 62 and the parts of the apparatus positioned within the casing are completely and closely surrounded thereby. If the mineral wool is packed closely around the parts of the siphon apparatus, the room heat and humid air will be absorbed thereby and moisture will not be formed. If, however, some moisture does form, the mineral wool will completely and effectively absorb it, so that the exterior of the apparatus is at all times dry. The mineral wool insulation 62 also performs the additional function of deadening any noise incident to the operation of the device.

It will be noted that I prefer to form the pedestal 29 and the casing portion 35 cylindrically and that all other exterior parts are also substantially curved or cylindrical and free from cracks or crevices so that a smooth, unbroken surface is presented from the floor or other supporting surface upwardly. Due to this construction the entire apparatus may be quickly washed with a hose and sterilized when the operating room is

being cleaned, and the fact that no cracks or crevices are presented eliminates the possibility of dirt and germs collecting upon the apparatus.

It will also be noted that the entire siphon apparatus and the gauge are entirely supported on the panel 35. Therefore, to gain access to the apparatus for the purposes of removal or repair, it is only necessary to remove the outer casing 35, and should it be necessary or desirable to remove the entire apparatus from the casing, the plumbing connections 51 and 52 may be uncoupled, as previously stated, and the entire assembly removed with the panel 33.

It will be apparent to those skilled in the art that various modifications may be made in the construction and arrangement of parts shown without departing from the spirit or scope of the invention, which is to be limited only by the appended claims.

What is claimed and desired to be secured by Letters Patent is:

1. In a vacuum siphon apparatus, an inner casing having a fluid inlet, fluid outlet, and vacuum openings, spaced inlet and outlet jets positioned within said inlet and outlet openings respectively, adjusting means associated with said jets for varying the spaces between the adjacent ends thereof to vary the amount of vacuum produced, a fluid supply conduit connected to said casing in communication with said inlet opening, a waste conduit connected to said casing and in communication with said outlet opening, a valve in said inlet conduit, and an outer casing enclosing and entirely supporting said inner casing and said inlet and outlet conduits.

2. In a vacuum siphon apparatus, an inner casing having a fluid inlet, fluid outlet and vacuum openings, spaced inlet and outlet jets positioned within said inlet and outlet openings, adjusting means associated with said jets for varying the spaces between the adjacent ends thereof to vary the amount of vacuum produced, a fluid supply conduit connected to said casing in communication with said inlet jet, a waste conduit connected to said casing in communication with said outlet jet, a valve in said inlet conduit, an outer casing enclosing and entirely supporting said inner casing and said inlet and outlet conduits, conduit means extending from said vacuum opening in said inner casing to the exterior of the outer casing through a wall thereof, and control means for said valve extending therefrom also to the exterior of said outer casing through a wall thereof.

3. In a siphon apparatus, a hollow cylindrical pedestal, a hollow cylindrical casing supported by said pedestal, a vacuum siphon apparatus secured to said casing, a fluid control valve associated with said apparatus, a valve control handle exteriorly of said casing, connecting means between said handle and said valve, a vacuum connection communicating with said siphon apparatus, and a vacuum gauge connected to said vacuum connection and extending exteriorly of said casing.

4. In a siphon apparatus, fluid inlet and outlet conduits, vacuum producing means interposed between said inlet and outlet conduits, a conduit se-

cured to said vacuum producing means, a panel, an outer casing having an opening registering with said panel, said casing being secured to said panel and entirely enclosing said vacuum producing means and said conduit, and a hose connection extending through said panel and secured to said conduit whereby said vacuum producing means is supported by said panel.

5. In a vacuum siphon apparatus, spaced inlet and outlet jets, a casing surrounding said jets provided with inlet and outlet openings registering with said jets and a vacuum opening in communication with said space between the inlet and outlet jets, a fluid supply conduit communicating with the inlet opening in said casing, a cut-off valve interposed in said supply line, a waste return line communicating with the outlet opening in said casing, a vacuum gauge associated with said vacuum opening, a second casing enclosing said first casing, said fluid supply line, said cut-off valve, and said waste return line, means interiorly of said second casing for supporting said first casing and said gauge, said second casing being provided with an opening adjacent said gauge and an opening in registration with the vacuum opening in said first casing, a control handle extending through said second casing and connected to said cut-off valve, means for supplying fluid to said apparatus, and waste means associated therewith.

6. In a vacuum siphon apparatus, spaced fluid inlet and outlet jets, a casing surrounding said jets provided with inlet and outlet openings registering with said jets and a vacuum opening communicating with the interior of said casing, a fluid supply conduit communicating with said inlet opening, a fluid control valve interposed in said supply conduit, a waste conduit communicating with said outlet opening, a second casing enclosing said first casing, said fluid supply conduit, said control valve and said waste conduit, means interiorly of said second casing for supporting said first casing, conduit means extending through said second casing and connected to said vacuum opening, and valve control means extending through said second casing and connected to said valve.

7. In a vacuum siphon apparatus, an inner casing having a fluid inlet, fluid outlet, and vacuum openings, spaced inlet and outlet jets adj- justably positioned within said inlet and outlet openings, a fluid supply conduit connected to said casing in communication with said inlet jet, a waste conduit connected to said casing in communication with said outlet jet, a valve in said inlet conduit, an outer casing enclosing and entirely supporting said inner casing and said inlet and outlet conduits, conduit means extending from said vacuum opening in said inner casing to the exterior of the outer casing through a wall thereof, control means for said valve extending therefrom also to the exterior of said outer casing through a wall thereof, a vacuum gauge mounted on a wall of said outer casing, and a conduit extending from said gauge interiorly of said outer casing and connected to said vacuum conduit.

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