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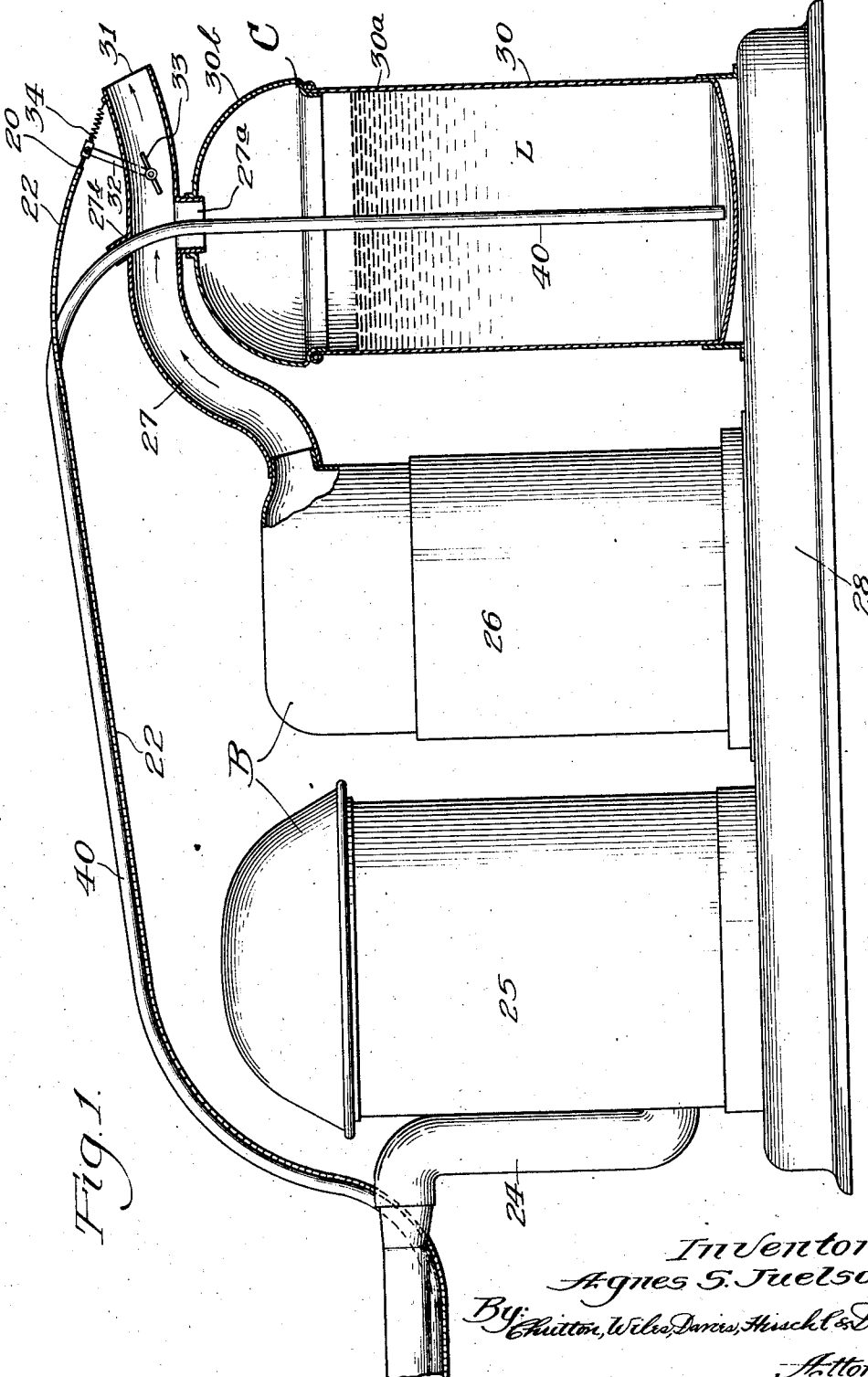
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2,200,026

SCRUBBING DEVICE

Filed July 6, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

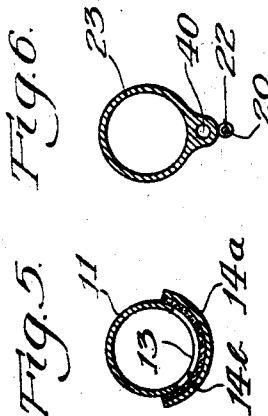
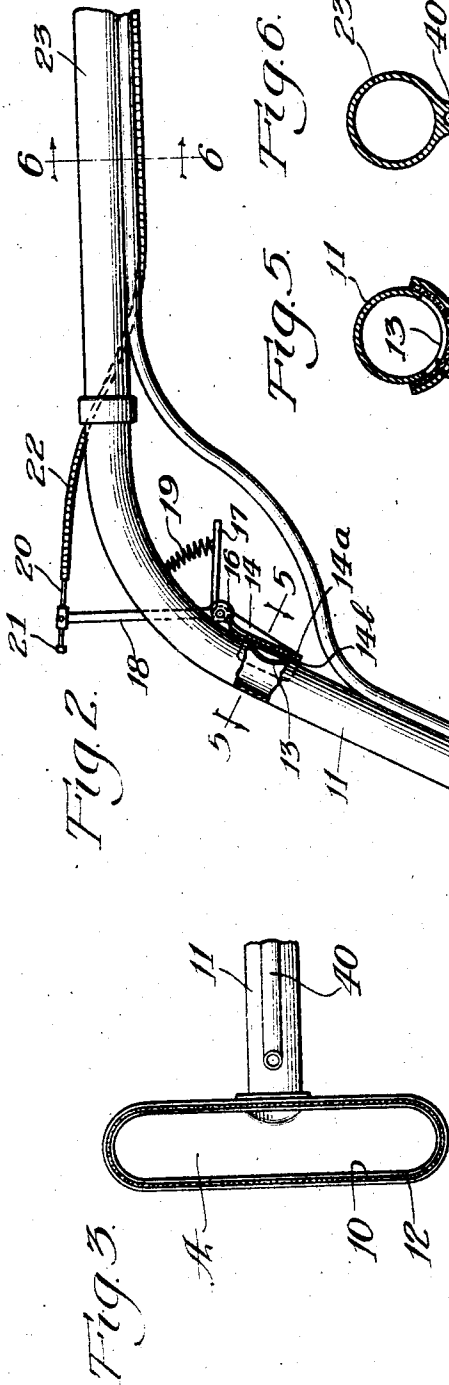
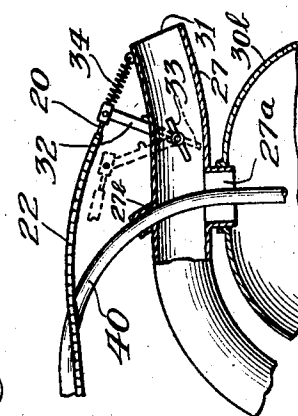
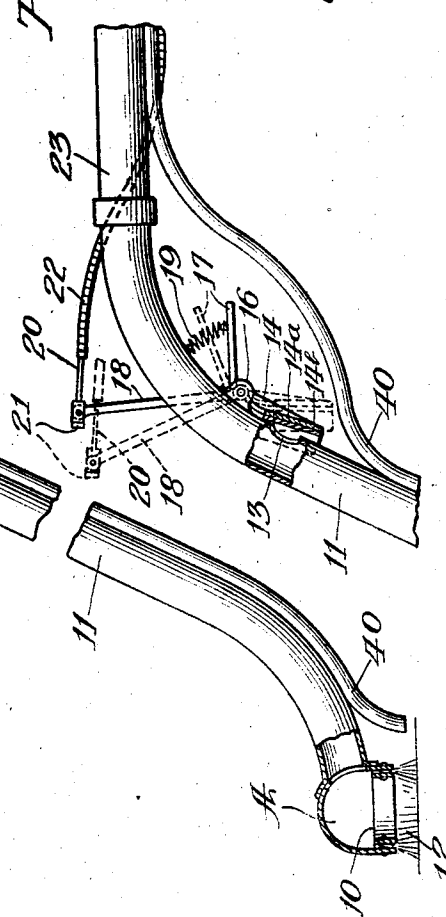


Fig. 4.



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UNITED STATES PATENT OFFICE

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SCRUBBING DEVICE

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5 Claims. (Cl. 15—2)

This invention relates to a scrubbing device for use in cleaning rugs, upholstery, etc., and deals particularly with the type of device which employs a vacuum for removing the dirt, dust, etc. from the surface being cleaned.

An object of the invention is to provide a scrubbing device which will deliver liquid to the surface to be cleaned and which will effectively remove the liquid and entrained dirt particles from the surface. A further object is to provide such a scrubbing device which has improved means for delivering liquid to the surface to be cleaned, and in which the operation of the suction producing means can be made effective in causing liquid to be supplied.

Another object is to provide a scrubbing device having novel means of control by which suction at the nozzle may be relieved while liquid is being supplied and while the nozzle is used as a scrub brush to agitate and clean the surface. Other objects will appear as the specification proceeds.

An embodiment of the invention is illustrated by the accompanying drawings in which—

Fig. 1 is a part sectional view in side elevation showing the blower and separator apparatus and the liquid supply container employed in this embodiment; Fig. 2, a broken elevational view of the cleaning nozzle and handle; Fig. 3, a detail view showing the underside of the nozzle; Fig. 4, a broken view illustrating the valves and valve control means here employed; Fig. 5, a sectional view of the tubular handle, the section being taken as indicated at line 5—5 of Fig. 2; and Fig. 6, a sectional view of the tube taken as indicated at line 6—6 of Fig. 2.

As illustrated, A designates a cleaning nozzle; B, a blower and separator apparatus; and C, means for supplying liquid to the surface being cleaned.

The nozzle A may be of any suitable construction. As here shown, it has an elongated opening 10 through which the air enters the nozzle. It connects with a tube 11 made of metal or other stiff material which also serves as a handle convenient for moving the nozzle across the floor. Adjacent the edge of opening 10 is one or more rows of bristles 12 which serve as a brush for scrubbing the surface being cleaned.

At the upper portion of the tubular handle is an opening 13 in the side of the handle, and this opening is normally closed by a valve member 14 which is pivotally mounted on a lug 16 and has attached to it the hand lever 17 and the cable lever 18. A spring 19 presses the hand lever 17

downwardly and so maintains the valve member 14 in position to tightly close the opening 13 in the side of the handle. To provide an effective seal the member 14 has at its end portion the semi-cylindrical piece 14^a which may be lined with some resilient material 14^b to more tightly engage the edges of opening 13. The forward end of a cable 20 is received through the end of lever 18 and is equipped with a head 21 at its extreme end. This cable may be made of wire or other suitable flexible material, and may be encased in a covering 22.

A flexible tube or hose 23 is connected at its one end to the handle 11 and has its other end connected with the inlet pipe 24 of the separating unit 25 which forms a part of the blower and separator apparatus B.

The apparatus B may be any suitable device for producing a suction to draw air and dirt-laden liquid in through nozzle A and for separating out the dirt-laden liquid from the air. The device illustrated includes an air cleaning unit 25 and a blower unit 26 which I have described fully in my pending application Serial No. 145,871, filed June 1, 1937, and which will not be described in detail here. It is sufficient to say that mixed air and liquid entering through inlet pipe 24 is given a rapid circulating motion within unit 25, and the dirt-laden liquid is retained in this unit while the clean air is discharged from the unit. The blower unit 26 includes fan mechanism which produces a suction effective in drawing air through the nozzle and through the cleaner and causes the clean air to be discharged through the outlet conduit 27. If desired, the blower unit 26 might be placed on the other side of the separator unit 25 so as to force the dirt-laden air through separator unit 25 and out through an outlet conduit such as conduit 27. However, the arrangement illustrated is preferred because here no dirt or liquid comes in contact with the fan mechanism.

Units 25 and 26, just described, may be supported on any convenient base 28 which may also serve for supporting the liquid container 30 of the liquid supply means C. The container 30 carries in its body portion 30^a a liquid L which may be water or any desired cleaning fluid. The top portion 30^b is removable for adding liquid to the container and contains an opening through which is received the neck 27^a of the outlet conduit. Thus the interior of conduit 27 is in communication with the interior of container 30 above the level of liquid L.

A tube 40 of comparatively small cross section

extends through opening 27^b in the wall of outlet conduit 27 and downwardly through neck 27^a into the liquid in container 30, the extreme end extending to the bottom portion of the container. The middle portion of this tube is preferably held within the covering on the vacuum tube 23 as more clearly shown in Fig. 6, and its other end portion extends downwardly adjacent handle 11, the extreme end having its outlet opening adjacent nozzle A.

At the end of outlet conduit 27 is the normal air outlet opening 31. Controlling the air emitted through this opening is a valve member 33 pivotally mounted within conduit 27 and adapted to be moved to a position in which it obstructs the passage of air outwardly through opening 31. A lever 32 is attached to valve member 33 and extends on the exterior of the outlet conduit, its upper end being attached to the rearward end of cable 20. A spring 34, extending between lever 33 and outlet conduit 27, serves to maintain the valve member normally in position to permit free passage of air outwardly through outlet opening 31.

In the use of my improved scrubber, the base 28, supporting the units 25 and 26 and the container 30, may be placed at any convenient location adjacent the rug or other surface to be cleaned, and the operator may grasp the handle 11 for manipulating the nozzle.

The operation of the device may be more clearly understood by particular reference to Figs. 2 and 4 of the drawings, which illustrate different positions of the valves.

The device may be used as an ordinary vacuum cleaner without the use of cleaning fluid by simply leaving the valves remain in their normal positions as shown by Figs. 1 and 2 of the drawings. It will be observed that the valve member 14 is urged by spring 19 to close opening 13 in the handle, and that valve member 33 is maintained in open position by the spring 34. With the valves in these positions, operation of the blower mechanism causes air adjacent the surface being cleaned to enter through opening 10 of the nozzle, pass upwardly through handle 11, through tube 23, and through separating unit 25. Within the unit 25, the air is relieved of its dust particles through centrifugal action, and only clean air enters the blower unit 26 and is passed outwardly through outlet conduit 27. Since valve member 33 is in open position, all of the air discharged is emitted through the outlet opening 31, and none is caused to pass into the container 30.

When it is desired to discharge a quantity of cleaning liquid on the rug or other surface, the operator has merely to raise the hand lever 17. After the lever has been raised to the position shown in solid lines in Fig. 4, the valve member 14 will have been moved so as to allow air to enter into the handle through the opening 13. This movement of the hand lever also causes the cable lever 18 to move forwardly toward the end of the cable and engage the head 21. It will be seen that with the hand lever in this middle position, air is allowed to enter through the opening 13 to relieve the suction at nozzle A and, since the position of the valve member 33 has not been changed, the air will be discharged through the outlet opening 31. Thus the blower means may remain in continuous operation while its effect is temporarily nullified.

When the operator raises the hand lever 17

still farther to the position shown in dotted lines in Fig. 4, the cable lever 18 operates to pull the cable 20 forwardly against the tension in spring 34 so as to move the valve member 33 to closed position. This added movement has no effect so far as the opening 13 is concerned, for the valve member 14 is merely moved farther from the opening and air still enters the opening to destroy the vacuum at the nozzle just as before explained. By causing the valve member 33 to move to closed position, the discharge of air through outlet opening 31 is shut off and the air is caused to enter the upper portion of the container through the neck 27^a, causing the air within the container to be compressed. The increased pressure against the surface of the liquid within the container causes liquid to be forced upwardly in tube 40 and discharged at the other end of the tube adjacent the nozzle.

When sufficient liquid has been discharged the operator may release the hand lever to the position shown in solid lines in Fig. 4. This allows the cable 20 to be drawn rearwardly by the spring 34, and the valve member 33 is moved to open position, permitting the discharge of air through outlet opening 31 and relieving the air pressure within the container to stop the flow of liquid through tube 40.

By holding the hand lever in this position, the operator may use the nozzle simply as a scrub brush to spread the liquid and agitate the surface. If desired, a soapy liquid may be used and, by this scrubbing action, a foam may be worked up. Whatever the liquid used, the scrubbing action of the brush serves to more thoroughly bring the liquid into contact with the dust and dirt and to loosen the dirt, so that it together with the liquid may be drawn off from the surface by the use of the vacuum.

After scrubbing the surface thoroughly, the operator may further release the hand lever 17 to its normal or lowered position as shown in Fig. 2. This allows the valve member 14 to close opening 13 and so make the blower mechanism effective for maintaining a vacuum in the nozzle. Then by moving the nozzle over the surface which has been scrubbed, the dirt and liquid are together drawn through the nozzle, through tube 23, and drawn into the separating unit 25 where the dirt and liquid are retained and from which only the clean air is discharged.

It will be observed that the air discharged by the blower is here utilized for actuating the means for supplying liquid, and that no separate pump or other actuating means is necessary. Another very important feature of the invention is that the vacuum effective at the nozzle is relieved during the time liquid is discharged and during the scrubbing operation. In the use of the device, the nozzle may be moved vigorously across the surface during the time liquid is being supplied and the liquid worked well into the surface as it is applied; then the surface may be scrubbed after the flow of liquid is stopped, if so desired. The vacuum effective for drawing in the dirt and liquid is not applied to the nozzle until the hand lever 17 is allowed to move back to its lower normal position and the opening 13 is closed.

By moving hand lever 17 to its extreme upper position, the valve member 33 is caused to completely close the passage to outlet opening 31, and the liquid is forced through tube 40 at a rapid rate. However, if lever 17 is moved almost to this extreme position, the valve member 33 will re-

strict but not close the passage to outlet opening 31. By restricting this passage a lesser compression is built up in container 30 and the liquid may be forced through tube 40 at a slower rate. Thus the control means here employed is effective also in regulating the speed of flow or the rate at which liquid is supplied.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

1. Apparatus of the character set forth comprising: a cleaning nozzle adapted to be passed along the surface to be cleaned, an air cleaning unit, a tube connecting said nozzle and cleaning unit, blower means for passing air and liquid through said tube into said cleaning unit, a withdrawal conduit through which clean air is discharged to the atmosphere, a container adapted to contain a liquid therein, the interior of said container being in communication with the interior of said withdrawal conduit, a liquid tube having its inlet opening in said container below the level of said liquid and having its outlet opening adjacent said nozzle, and means for passing at least a part of the air discharged through said withdrawal conduit into said container to force the liquid through said liquid tube.

2. Apparatus of the character set forth comprising: a cleaning nozzle, conduit means connected with said nozzle, suction-producing means associated with said conduit means for drawing air through said nozzle, a container adapted to contain liquid therein, a tube having an inlet opening in said container and below the level of said liquid and having an outlet opening adjacent the surface being cleaned, said conduit

means including an outlet conduit in communication with the interior of said container and having an outlet opening through which air is normally discharged, an opening in the side of said conduit means between said nozzle and said suction-producing means, valve means normally closing said last-mentioned opening, valve means normally permitting free passage of air through said outlet opening, and control means for operating said valves to open said last-mentioned opening and to close said outlet opening.

3. Apparatus as set forth in claim 2 in which said control means is adapted to move said first-mentioned valve means to open position without affecting the position of said last-mentioned valve means.

4. Apparatus of the character set forth comprising: a cleaning nozzle equipped with a brush, tube means communicating with said nozzle, means for supplying liquid to the surface to be cleaned and including a container adapted to contain liquid therein, said means being adapted to supply liquid to said surface when air under pressure is delivered to said container, blower means for passing air through said nozzle and tube means and for delivering air under pressure to said container, a valve normally preventing the delivery of air under pressure to said container, an opening in said tube means between said nozzle and said blower means, a valve normally closing said opening, and control means for operating said valves to permit delivery of liquid to said surface without air being drawn through said nozzle.

5. Apparatus as set forth in claim 4 in which said control means is operative for moving said first-mentioned valve to normal position without moving said last-mentioned valve to closed position.

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