Sept. 6, 1955 C. H. CALDWELL ET AL 2,716,770

WINDOW CLEANING APPLIANCE

Filed May 27, 1950 2 Sheets-Sheet 1

Fig. 1

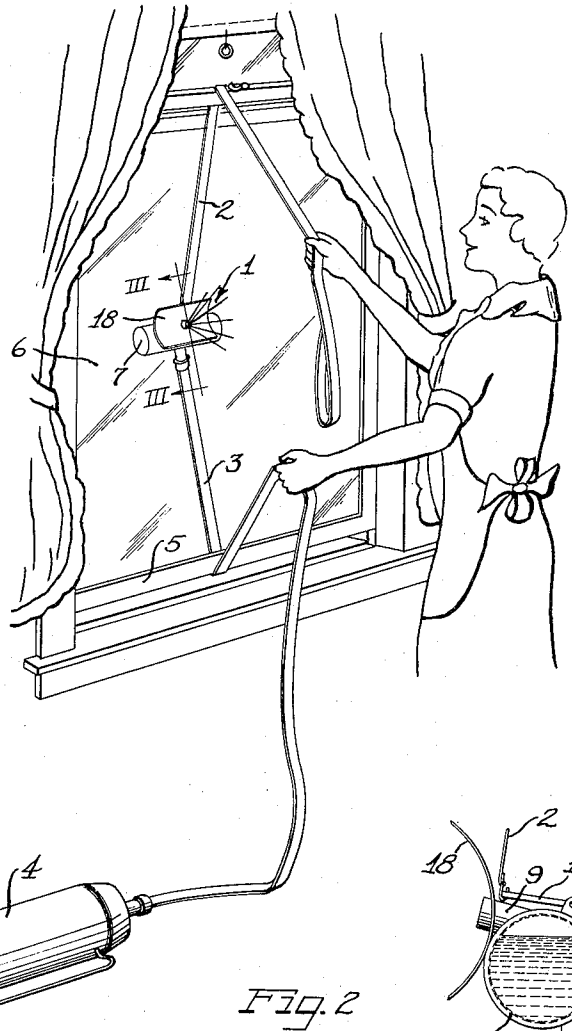
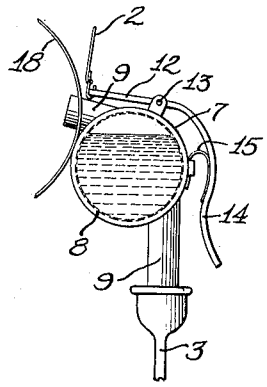


Fig. 2



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Filed May 27, 1950 2 Sheets-Sheet 2

Fig. 3

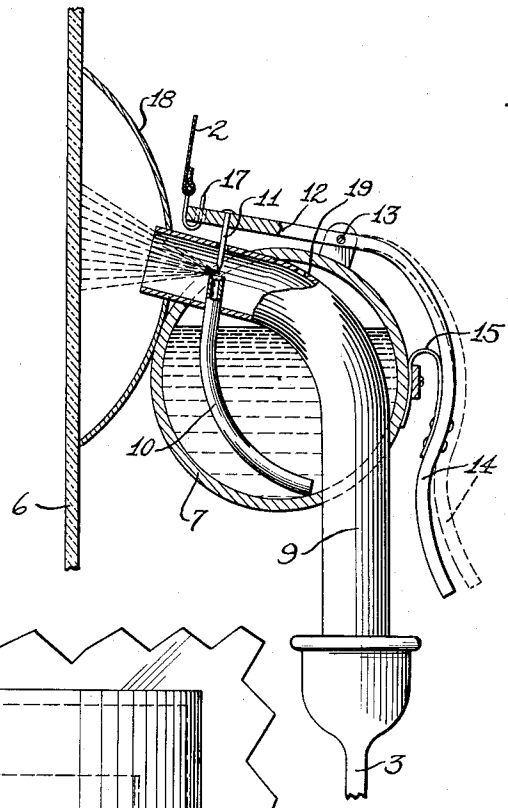
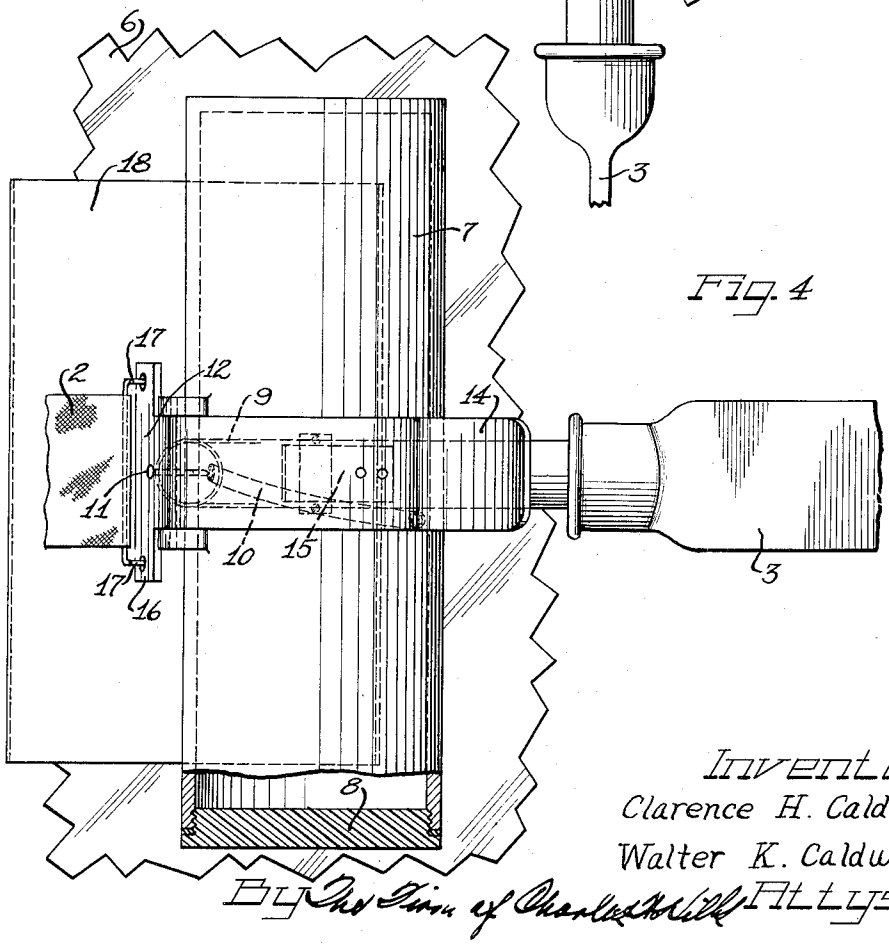


Fig. 4



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WINDOW CLEANING APPLIANCE

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5 Claims. (Cl. 15—126)

This invention relates to improvements in a window cleaning appliance, highly desirable for use in association with a vacuum cleaner, air compressor, or other source of a forced air blast to cause an atomized spray of cleaning liquid to be propelled against the window pane, although the device will have other uses and purposes as will be apparent to one skilled in the art.

The present invention is an improvement upon that set forth, described and claimed in Clarence H. Caldwell Letters Patent No. 2,285,412, issued June 9, 1942.

In the past, several devices have been developed for the purpose of washing windows on the outside from the inside, but these formerly known devices were in many cases almost prohibitively expensive to manufacture, not desirably efficient in their action, did not provide a positive pressure for the spraying of cleansing fluid on the glass, and in many cases required the operator to manipulate the mechanism causing the spray as well as control the movement of the entire device over the outside of the window. Further, many of these formerly known devices were not connectable to a source of compressed air such as a vacuum cleaner, air compressor, or the equivalent. In addition, many of these formerly known devices were difficult to manipulate if utilized on the inside of a window.

With the foregoing in mind, it is an important object of the instant invention to provide a window cleaning appliance, which enables one to clean the outside of a window from the inside of the room, and which operates faster, more thoroughly, and may be constructed more economically than appliances of this character heretofore known.

Another object of the invention resides in the provision of a window cleaning appliance which may readily be connected to a vacuum cleaner or other source of air pressure to cause an atomized fluid to be sprayed against the window for cleaning purposes, thus adding to the functional attributes of a vacuum cleaner, especially if the device is used in the home.

A further features of this invention resides in the provision of a window cleaning appliance so arranged as to enable one to clean the outside of a window from inside the room, which appliance is also constructed to permit ready and easy cleaning of the inside of the window as well.

A further feature of the invention resides in the provision of a window cleaning device embodying a tank for cleansing liquid from which the liquid is atomized over the surface of a window, the device being manipulated by a pair of strap-like elements, one of which is tubular and through which a blast of air may be delivered for atomizing the cleansing liquid from a suitable source of air pressure, such as a vacuum cleaner, air compressor, or the equivalent.

It is also an object of this invention to provide a window cleaning device from which an atomized spray of cleansing liquid is directed over the surface of the glass from a tank forming a part of the device, and the construction is such that not only is liquid aspirated forcefully from the tank, but a greater than atmospheric pressure is created inside the tank in order to help expel the liquid forcibly against the window pane.

Another object of the invention is the provision of a window cleaning appliance connectable to a source of air pressure to selectively atomize and spray a cleaning fluid against the window and act as a quick drying medium when the fluid is cut off.

Still another object of the invention resides in the provision of a window cleaning appliance wherein an atomized spray of cleansing liquid is produced by the device, and the spray is controlled by the means utilized for moving the appliance over the surface of a window.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures taken in conjunction with the accompanying drawings, in which—

Figure 1 is a pictorial illustration of a window cleaning appliance embodying principles of the instant invention, shown in use during the cleansing of a window;

Figure 2 is a fragmentary side elevational view of the device itself, taken from the right hand side of Fig. 1;

Figure 3 is an enlarged fragmentary central vertical sectional view, with parts in elevation, taken substantially as indicated by the line III—III of Fig. 1, looking in the direction of the arrows; and

Figure 4 is a fragmentary elevational view taken from the right hand side of Fig. 3, and revolved 90° for purposes of convenience.

As shown on the drawings:

In Fig. 1, we have illustrated the present invention in the form of a window cleaning appliance, generally indicated by numeral **1**, showing the same on the outside of a window pane suspended from a strap **2**, made of any suitable material such as webbing, and also connected on its underside with a flattened tube **3** which may be connected to any suitable source of air pressure, such as a vacuum cleaner **4** with the hose or tube **3** connected on the rear end of the vacuum cleaner. The tube or hose **3** is obviously constructed so as to have thickened side seams, thus preventing the tube from being squeezed too flat to prevent the passage of forced air therethrough.

In positioning the device as seen in Fig. 1, the sash **5** is raised so that the then free end of the strap **2** may be threaded over the top rail of the sash frame and dropped down outside the window. This end may then be attached to the appliance **1** through the open bottom portion of the window; and the device elevated by pulling downward on the inside portion of the strap **2**, to the position seen in Fig. 1, bearing against the outside of the window pane **6**.

As seen best in Figs. 2, 3 and 4, the appliance itself embodies a tank **7** for cleansing liquid, which may be in the form of a horizontally disposed cylindrical structure, as illustrated, if so desired. One end of this tank is preferably provided with a removable cover **8**, and this cover may satisfactorily be made of a transparent material, such as a suitable plastic, so the contents of the tank may be visible at all times and replenishment of cleansing liquid may be made whenever necessary.

As seen best in Fig. 3, a curved tube **9** extends through the tank, and is sealed off at its points of junction with the tank. The lower end of this tube is connected by a suitable slip fit to the end of the flat hose **3**. The upper end of the tube projects forwardly through the top portion of the tank and is left open. Another and smaller tube **10** is disposed in the tank with one end adjacent the bottom of the tank, and the other end projecting through the underside of the tube **9**, adjacent the point where the forward end of this tube **9** passes through the tank. The upper end of the tube **10** terminates substantially centrally of the larger air tube **9**, and may be selectively

closed and opened by proper actuation of a needle valve **11** carried on the forward portion of a lever arm **12** intermediately pivoted as at **13** to the tank, and extending rearwardly of the tank in the form of a thumb lever **14**. This lever is normally pressed away from the tank at its rear portion by means of a suitable spring **15** thereby tending to maintain the upper end of the tube **10** plugged with the needle valve **11**. The normal position of the lever **12—14** is therefore the dotted line position as viewed in Fig. 3, the full line position showing the lever moved inwardly at its rear end against the action of a spring **15** to elevate the needle valve out of the tube **10**.

Such movement of the lever **12—14** may be caused in either of two dieffrent ways. When the device is used outside of the window, the opening of the needle valve may be caused by a pull on the hand controlled strap **2**. To this end, the outer end of the lever is expanded as indicated at **16** in Fig. 4, and suitably apertured to accommodate hooks **17—17** on the end of the strap **2** by means of which the strap is connected to the appliance. Consequently, with the flat hose **3** held in one hand, and the strap **2** held in the other hand, pressure may be applied such as to elevate the forward end of the lever **12—14** against the action of the spring **15**, and open the needle valve. On the other hand, if the device is used inside the window, the strap **2** may be removed from the appliance, and the appliance held by encircling the lower portion of the tube **9** with the hand or fingers thereof, and controlling the lever **12—14** by thumb pressure on the part **14**.

Secured to the front part of the tank **7** and also around the projecting end of the tube **9**, is a concavo-convex squeegee **18**. This squeegee may be made of metal, and rubber edged if so desired, or it may effectively be made of a somewhat resilient piece of thermoplastic or thermosetting plastic, so that the edge portions thereof will rub up and down the window as the device is moved over the window pane and squeegee the liquid from the glass.

One other feature of the invention should be especially noted, namely a vent hole **19** provided in the tube **9** inside the tank **7**, and preferably near an upper portion of the tank as seen in Fig. 3. Some of the air under pressure passing through this tube will therefore exit through the vent opening into the interior of the tank.

In operation, the present invention is extremely simple, positive, and efficient. The device is attached to the strap **2** by means of the hooks **17—17** after the strap has been threaded over the upper rail of the window sash frame. The device may then be put through the window at the bottom, and elevated to a desired position by pulling on the strap **2**. The operator, as illustrated in Fig. 1, may hold the flat hose **3** in one hand, and the strap **2** in the other hand and manipulate the device up and down over the outside surface of the window. Such manipulation will bring the device into substantially all corners of the window, and the device will effectively cover and cleanse a window regardless of the shape of the window.

During the operation of the device, the atomized spray of cleansing liquid may be selectively produced whenever desired. Any form of cleansing liquid desired may be placed in the tank **7**, with or without a detergent, and economical detergents may be utilized. When it is desired to wet the window pane, it is simply necessary for the operator to hold the flat hose **3**, and pull upon the strap **2**, thus actuating the lever **12—14** against the action of the spring **15** to open the needle valve. Compressed air is passing through the flat tube **3** and the tube **9** of the device at all times, and when the needle valve is opened liquid is aspirated through the small tube **10** and atomized or sprayed over the surface of the window as indicated in Fig. 3. This forcible spraying of the cleansing liquid is aided by the fact that the pressure inside the tank **7** above the liquid is normally above atmospheric pressure by virtue of the discharge of compressed air through the vent opening **19** in the tube **9** into the tank. Thus, a very positive spraying of cleansing liquid on the window is occurrent whenever desired.

Of course, the spring **15** is of sufficient strength that the entire device may be moved over the outer surface of the window to squeegee the same without opening the needle valve when the device is pulled upwardly, it being necessary to provide a slight extra pull over that necessary to merely move the appliance around, in order to open the needle valve and create the spray.

After washing the window with a detergent, the tank **7** may be emptied and filled with a rinsing liquid, if so desired.

When the device is used inside, it is a simple expedient to remove the strap **2**, grasp the lower portion of the tube **9**, and move the device up and down over the window pane with the hand, energizing the spray whenever needed by thumb pressure on the part **14** of the pivoted lever. While the device is highly desirable for use in the homes as above described, it should also be noted that the device may be used in larger sizes, and in association with an air compressor or the like, for the cleansing of larger windows and for the cleansing of windows in office buildings, factories, and other types of commercial buildings. The device may equally as well be utilized in gasoline filling stations and similar service stations wherein it is customary to cleanse the windshield and perhaps other windows of an automobile at the time some service is provided the driver.

From the foregoing, it is apparent that we have provided a novel window cleaning appliance that is equally as effective for outside cleaning as well as inside cleaning, with the user remaining inside at all times. Further, the device by simple manipulation of the operator provides a forceful atomized spray of cleansing liquid over the glass whenever needed, and this is accomplished without the operator manipulating any additional apparatus whatever, other than that required to merely move the appliance over the surface of the glass. It will be noted that the appliance is long lasting, highly effective in use, and may be economically manufactured.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

We claim as our invention:

1. In a window cleaning appliance, a tank for a cleansing liquid, atomizing means carried by said tank to spray liquid over a window, a flat tube connected at one end to said atomizing means and connectable at the other end to a source of forced air, valve means controlling said atomizing means, and a strap connected to the opposite side of the appliance from said tube and arranged to control said valve means.

2. In a window cleaning appliance, a tank for a cleansing liquid, atomizing means carried by said tank to spray liquid over a window, a flat tube connected at one end to said atomizing means and connectable at the other end to a source of forced air, valve means controlling said atomizing means, spring means normally urging said valve means to closed position, and a tension member connected to said appliance opposite said tube to selectively open said valve means against the action of said spring means by pulling in opposite directions on said tube and tension member.

3. In a window cleaning appliance, a tank for a cleansing liquid, atomizing means carried by said tank to spray liquid over a window, a flat tube connected at one end to said atomizing means and connectable at the other end to a source of forced air, valve means controlling said atomizing means, spring means normally urging said valve means to closed position, a strap connected to the opposite side of said appliance from said tube and which may be utilized with said tube to manipulate the appliance over a window, said strap being connected

to selectively actuate said valve means, and said spring means being of sufficient strength to maintain the valve means closed against the weight of the appliance.

4. In a window cleaning appliance, a tank for a cleansing liquid, atomizing means carried by said tank, a pair of opposed elongated flexible strap manipulators to move said appliace over a window, one of said manipulators being a flat tube for forced air and connected to said atomizing means, valve means controlling said atomizing means, and the other manipulator being connected to selectively open said valve means.

5. In a window cleaning device, a tank for a cleansing liquid, atomizing means carried by said tank, a pair of opposed elongated flexible strap manipulators to move said device over a window, one of said manipulators being a flat tube for forced air and connected to said atomizing means, valve means controlling said atomizing means, the other manipulator being connected to selectively open said valve means, a concavo-convex squeegee carried by said tank for contacting the window, said atomizing means discharging through said squeegee, and a resilient member urging said valve means closed so that said valve means may remain closed while said squeegee is moved over and against the window by pulling on said manipulators but said valve means may be opened and said squeegee pressed more strongly against the window by pulling more strongly on said manipulator.

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