

June 15, 1937.

L. O. BALINGER
SURFACE CLEANING DEVICE

2,083,551

Filed July 22, 1932

2 Sheets-Sheet 1

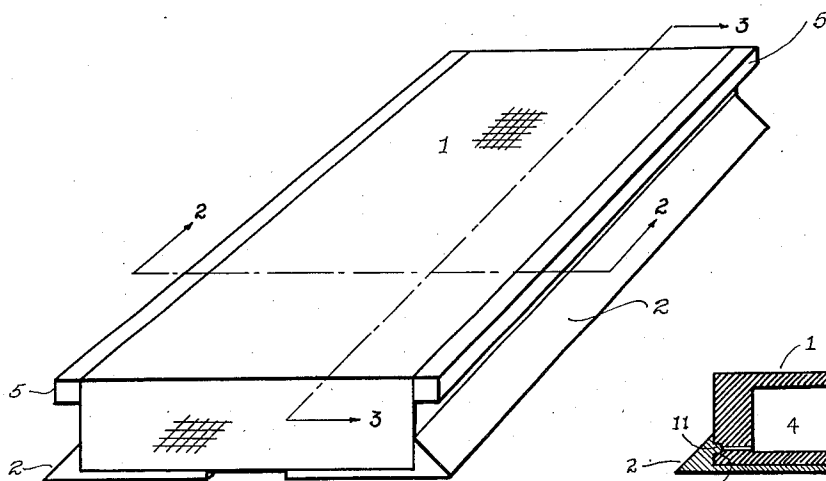


FIG. 1

FIG. 6

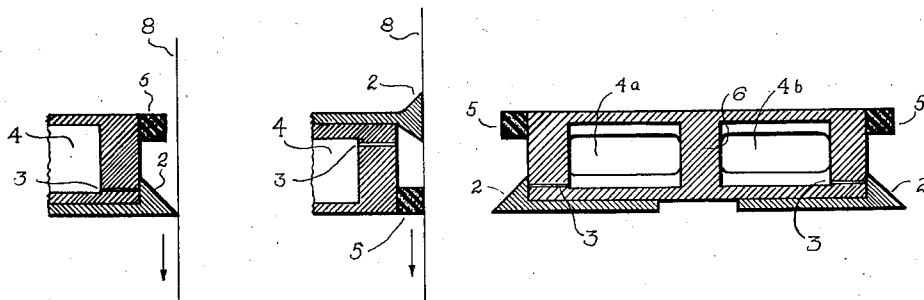


FIG. 5

FIG. 4

FIG. 2

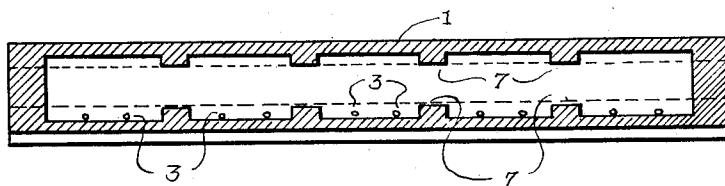


FIG. 3

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2 Sheets-Sheet 2

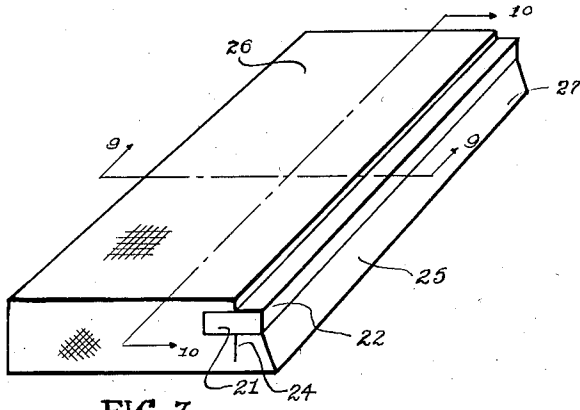


FIG. 7

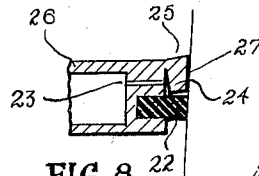


FIG. 8

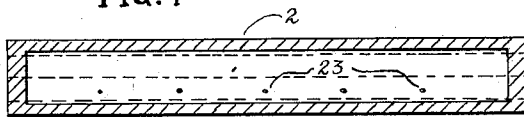


FIG. 10

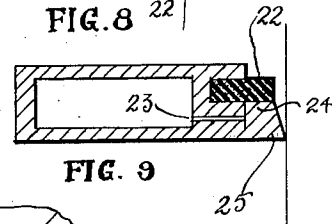


FIG. 9

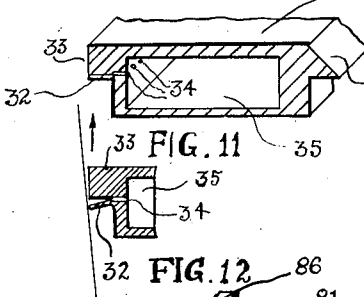


FIG. 11

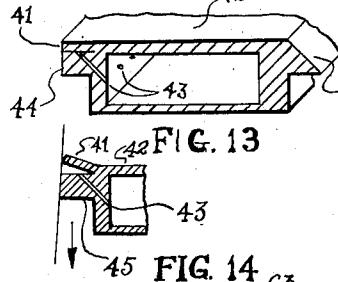


FIG. 13

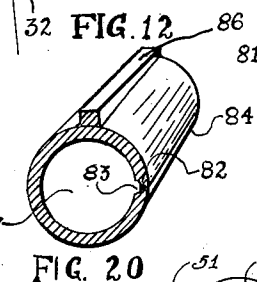


FIG. 12

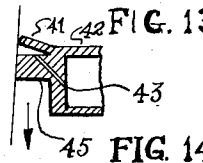


FIG. 14

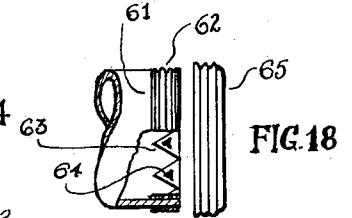


FIG. 18

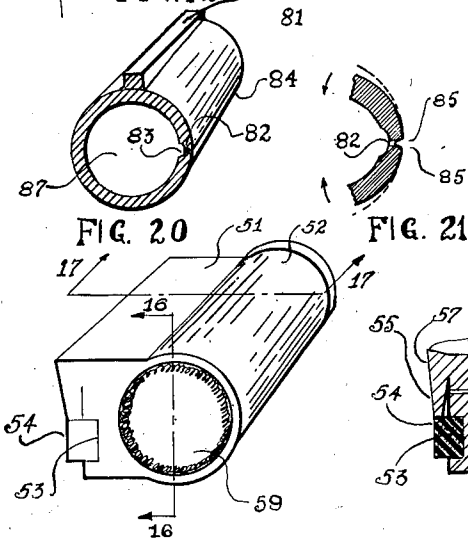


FIG. 15

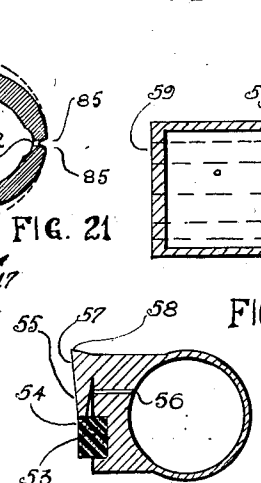


FIG. 17

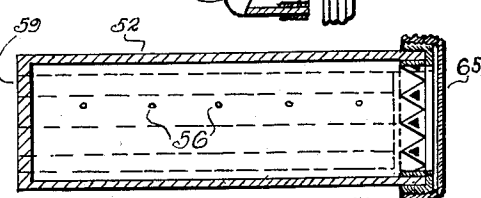


FIG. 16

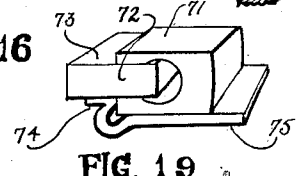


FIG. 19

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2,083,551

SURFACE CLEANING DEVICE

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Application July 22, 1932, Serial No. 624,033

11 Claims. (Cl. 15—126)

This invention, as indicated, relates to a surface cleaning device. More particularly, it comprises a unitary structure embodying means for applying a film of moisture to a surface and having a rubbing or squeegee device which may thereafter be utilized to distribute such liquid over the surface and to remove the dirt and excess moisture from such surface. It is not intended to limit the device to cleaning purposes, as it may be found of advantage in spreading liquid or coatings of various kinds over extended surfaces, and may be adaptable for distributing material in powdered form in an even layer, under special circumstances. However, the principal use for said device is for window cleaning purposes, both for household use and for automobiles and the like.

The principal object of the present invention is to provide a simple self-contained surface cleaning device which may be made of rubber throughout, and which will serve to supply the liquid necessary for the removal of grit and dirt from the surface and in the same device provide a squeegee or similar means for removing such softened grit and dirt and excess moisture from the surface.

Another object of the invention is to provide an article having a reservoir for cleaning material, preferably in liquid form, with a means carried by the same device for spreading such liquid and removing the excess thereof, together with the accumulated grit and dirt from such surface.

Another object of the invention is to provide a receptacle, preferably formed of rubber, having one or more compartments within the interior thereof which may contain a soapy liquid mixture and clear water, respectively, in separate compartments, with means for selectively discharging either of said mixtures upon a surface and distributing the same over the surface and thereafter squeegeeing such surface to free the same from the mixture so applied and any accumulation of grit and dirt on such surface.

Another object of the invention is to provide an article, preferably constructed entirely of rubber, having one or more compartments therein for the reception of cleansing and rinsing fluid, embodying a self-filling construction and special discharging features, including a valve control responsive to the position of the device in connection with the surface operated on.

A further feature of the invention comprises the provision of a holder for a sponge rubber element, such holder being provided with a squee-

gee attachment, and also having means for automatically forcing the liquid from the sponge rubber, together with resilient means for supporting such sponge rubber and assisting in the discharge of liquid therefrom.

Other and further features of the invention will appear in the course of the following description.

The annexed drawings and the following description set forth in detail certain means embodying my invention, such means constituting, however, but several of the various forms in which the principle of the invention may be illustrated.

In said annexed drawings:

Figure 1 is a perspective view showing a preferred form of construction embodying the features of the invention;

Figure 2 is a transverse sectional view of the structure shown in Figure 1, taken along the line 2—2, shown in Figure 1, looking in the direction of the arrows;

Figure 3 is a longitudinal sectional view taken along the line 3—3, Figure 1, looking in the direction of the arrows;

Figure 4 is a sectional detail view showing the device in moisture-applying relation to a surface to be operated on, with the valve open;

Figure 5 is a sectional detail view showing the device in position to squeegee a surface operated on;

Figure 6 is a sectional detail view showing a modified form of valve structure;

Figure 7 is a perspective view showing a modified form of construction wherein the squeegee is formed integrally with the receptacle and wherein a sponge rubber insert is provided adjacent to which liquid may be supplied;

Figure 8 is a sectional detail view showing the device shown in Figure 7 in moisture-applying relation to a surface;

Figure 9 is a sectional view showing the device illustrated in Figure 7 in squeegee relation to a surface;

Figure 10 is a longitudinal sectional view taken along the line 10—10, shown in Figure 7, looking in the direction of the arrows;

Figure 11 is a fragmentary perspective view, partly in section, illustrating a modified form of device embodying the features of the invention;

Figure 12 is a sectional detail view showing the device in moisture-applying relation to a surface being operated on when moved in the direction indicated by the arrows;

Figure 13 is a perspective view, partly in sec-

tion, showing a still further modified form of device embodying the principles of the invention;

Figure 14 is a sectional detail view illustrating the device shown in Figure 13 in moisture-applying relation to a surface being operated on when moved in the direction indicated by the arrows;

Figure 15 is a perspective view showing a still further modified form of construction embodying the principles of the invention;

Figure 16 is a longitudinal sectional view, taken along the line 16—16, Figure 15, looking in the direction of the arrows;

Figure 17 is a transverse sectional view of the structure shown in Figure 15, taken along the line 17—17, shown in Figure 15, looking in the direction of the arrows;

Figure 18 is a fragmentary elevation, partly in section, showing the terminal ferrule and closure cap for the type of structure shown in Figure 15;

Figure 19 is a fragmentary perspective view, partly in section, illustrating a still further modified form of construction;

Figure 20 is a perspective view, partly in section, showing a still further modified form of device embodying the principles of the invention; and

Figure 21 is an enlarged detail sectional view showing the operation of the valve ports of the device shown in Figure 20.

As is clearly shown in Figures 1 to 5 of the drawings, the preferred form of construction comprises a receptacle 1, which may be formed of any suitable material, such as molded rubber, but which also may be formed, if desired, of light metal with elastic walls. The device, however, is preferably formed of rubber with a substantial degree of elasticity, and may have roughened outer wall surfaces to provide rubbing surfaces to remove material adhering to the surface operated on, and is provided adjacent one edge with a combined squeegee and valve element 2 which is of triangular cross section and is preferably a separate strip vulcanized or otherwise suitably fastened to one side of the receptacle adjacent the edge, with the angular portion of the squeegee engaging over the adjacent face of the receptacle and covering a series of apertures 3 passing through the wall thereof and entering a compartment 4 within which cleansing fluid may be received.

Adjacent the opposite longitudinal edge of the side of the receptacle, a strip of sponge rubber 5, or rubber of suitable consistency for removing compacted material from a surface, may be attached by vulcanizing or fastening in any other suitable manner, or may be formed integrally with the article itself. The interior of the receptacle may comprise one single compartment or the same may be divided into two separate receptacles 4a, 4b, as is more clearly indicated in Figure 2, wherein a heavy central web 6 extends substantially the length of the receptacle along a central longitudinal line. When such central division is provided, one receptacle may serve as a container for soapy liquid or other cleansing fluid, and the other compartment may serve as a receptacle for clear water for rinsing purposes. As indicated, the receptacle itself should have elastic walls so that the filling of the reservoirs or chambers within the same may be accomplished by compressing the chamber preliminary to inserting it in a basin of liquid with the valves held free, whereby

liquid may be drawn or sucked into the interior of the device.

As is more clearly shown in Figure 3 of the drawings, the discharge orifices 3 for the receptacle preferably comprise a series of very small ports arranged adjacent one marginal edge of the receptacle, over which one face of the triangular combined squeegee and valve member is adapted to closely seat. Internal ribs 7 may be provided within the compartment for stiffening the top and bottom walls thereof and to prevent adhesion of the interior surfaces in the event the liquid employed should be of a somewhat sticky consistency.

After filling the device in the manner explained, the use of the same against the surface 8 to be cleaned is shown in Figures 4 and 5. As is shown in Figure 4, the device is being moved downwardly over a window surface with a valve member 2 tilted to free the valve ports 3 so that pressure upon the top and bottom walls of the receptacle will force cleansing liquid from the interior of the device against the adjacent surface to be cleaned. The sponge rubber member 5 is shown as in contact with the surface in advance of the fluid discharge orifices and serves to distribute such fluid over said surface when lightly passed thereover.

The angular position of the device toward the surface to be cleaned may be changed so as to bring the sponge rubber member a little more forcibly against the surface after the same has been fully moistened so as to dislodge any firmly adhering particles from the surface. After the application of the fluid and the dislodging of firmly impacted material from the surface, the squeegeeing of the surface is brought about by reversing the device and applying the squeegee edge to the surface in the manner shown in Figure 5. It will be noted that in this position the squeegee is forced against the end of the receptacle having the orifices and such orifices are more firmly sealed when the device is thus moved downwardly in operative position.

When a two-compartment apparatus is used, the operation just described is performed first with the soapy mixture on one side of the device, and thereafter the other compartment is used by reversing the device and clean water is applied over the surface and the surface is again squeegeed to remove all excess moisture and to finally clean and polish the surface.

In place of having a flat face against which the combined valve closure and squeegee element bears to seal the discharge orifices, the discharge orifices may at their outer ends lie within a shallow groove 11, as is shown in Figure 6, on the exterior surface of the receptacle, and the adjacent face of the valve sealing element may have a rounded bead 12 to correspond with the curvature of said groove and thus provide a more secure closure of the discharge orifices owing to the compression of the rib 12 within such groove and the more firm adherence of the same against the adjacent wall of the container.

The forms of construction of the apparatus shown in Figures 7, 11, 13, and 15 may be formed in molds or may be extruded, if desired. In each of said structures the squeegee and valve elements are shown as integrally formed with the receptacle for the cleansing fluid. In the event the device is made by extrusion, the ends may be plugged and sealed in any suitable manner by vulcanizing end walls thereto.

The structure shown in Figures 7 to 9 preferably is formed with a channel 21 extending along one surface thereof within which a strip of sponge rubber 22 is embedded, and adjacent which a series of valve ports 23 is provided adapted to be closed by the overhanging edge 24 of the squeegee element 25 which, as stated, is preferably formed integrally with the receptacle 26. It will be noted that the squeegee element has an angular forward face 27 and an extension flange 24 overhanging the forward edge of the receptacle, and bearing against the valve ports at a point closely adjacent the sponge rubber insert. When the device is to be used for applying moisture to a surface, the action of the construction is illustrated in Figure 8, wherein the integral overhanging valve closure is raised from valve-sealing position by contact with the adjacent surface to be operated on, and permits the free flow of liquid under the pressure upon the top and bottom walls of the receptacle outwardly against the surface to be cleaned. After the liquid so discharged against such surface has been distributed thereover and the surface is ready for the squeegee operation, the device is reversed and is rapidly moved over the surface to be cleaned, carrying with such film of liquid the grit and dirt which has been softened through the application of the liquid.

In Figure 11, the receptacle 31 may be formed of extruded material, as stated, but in place of using a large overhanging valve closing member, the valve closure comprises a thin lip 32 adapted to bear against an adjacent substantially rigid extension edge 33 and to seal the structure against discharge of liquid. Such sealing device is in direct line with the discharge ports 34 from the interior 35 of the receptacle and the liquid may be readily discharged by slight pressure upon the top and bottom walls of the receptacle.

When the device is moved upwardly against the surface, as shown in Figure 12, the ports will be unsealed and liquid may be forced through the discharge openings against such surface. The integrally formed squeegee 36 on the opposite end of the apparatus may be used for the final cleansing operation or the substantially rigid edge 33 adjacent the valve ports may be used for such squeegee operation.

When the squeegee on the opposite side of the receptacle is used, an opportunity is afforded to tightly grasp the members on the other side of the receptacle and thus manually hold the sealing elements together so as to prevent accidental discharge of liquid during the squeegee process.

The structure shown in Figures 13 and 14 may likewise be of extruded material and while in a measure such device is similar to the device shown in Figure 11, it illustrates a different type of valve and closure therefor, the closing flap for the valves being a relatively thin member 41 adjacent the top surface or in line with the top surface of the receptacle 42 and the valve ports 43 being formed through a substantially rigid member 44 extending longitudinally of the central portion of said side adjacent thereto. The valve sealing flap therefore completely covers the outer end of the discharge port and may be held firmly thereagainst by the grip of the operator in the usual course of using the squeegee element 45 on the other side of the receptacle.

In Figure 14 the action of the device in discharging fluid against the surface being cleaned is shown, it being understood, of course, that

suitable pressure is applied to the top and bottom walls of the container to bring about the discharge of such fluid.

The structure shown in Figure 15 may be extruded, and shows a relatively heavy body 51 of solid rubber having a suitable degree of elasticity with the rearward portion of such body being formed integrally so as to provide a cylindrical receptacle 52. The thickened body portion may be formed at one edge with a channel 53 within which is preferably embedded a sponge rubber moisture-applying element 54 against which bears the valve sealing element 55 formed integrally with the body and being in effect an overhanging depending flange of rubber bearing against a series of ports 56 parallelly arranged beneath the same and extending into the interior of the receptacle. The outer face 57 of the body portion is beveled so that when the device is moved downwardly against the surface, the valve closing flange will be lifted to permit the free discharge of the contents of the receptacle under the pressure of the hand of the operator upon the cylindrical portion of the device. When the device is bodily reversed, the edge formed by the meeting line of the outer surfaces at substantially right angles to each other provides the squeegee element 58 which when moved downwardly in reverse position is forced into valve sealing position and thus prevents any discharge of moisture during the squeegee strokes of the apparatus.

The device shown in Figures 15 to 17, when made of extruded material, is preferably sealed at one end by inserting a suitably shaped plug 59, preferably of rubber, and vulcanizing the same in such end and inserting in the slightly projecting end opposite thereto an annular ferule 61, having screw threads 62 on its exterior surface and having a series of folded prongs 63 shown as of substantially triangular shape at its inner side and adapted to be clampingly engaged upon the free edge of the cylindrical receptacle which projects beyond the body portion of the device. The ends of the triangular elements may be turned inwardly to form gripping points and struck-up tongues 64 may be formed at intermediate points on the triangular inner members shown to more securely attach the threaded ferule to the cylindrical receptacle. A suitably threaded cap member 65 carrying a sealing washer of suitable material (not shown) may be utilized to seal the receptacle against leakage of the cleansing fluid placed therein.

When a receptacle of the character just described is utilized, it is possible to use the apparatus for distributing heavy mucilaginous material over a surface or for using material of heavy consistency, such as liquid wax. The receptacle also may be filled with a powdered material and obviously would be suitable for mothproofing operations whereby pulverized naphthalene could be ejected through the ports of the receptacle into upholstery fabrics by moving the same thereover in one direction with the valves open, and by moving the rubbing edge of the device over such a surface after such pulverized material has been ejected thereon, the material could be forced into the fibres of the fabric. In place of a rubbing edge, a brush attachment (not shown) may be provided to distribute the mothproofing powder through the fibres of the fabric.

A skeletonized form of apparatus is shown in Figure 19, a substantially rigid body member 71

being provided with a recess opening at one side thereof through a channel 72 of reduced cross section in which a strip of sponge rubber 73 is secured. The body portion which receives the sponge rubber may be formed of any suitable material, but preferably is formed of molded rubber having sufficient degree of elasticity to permit the compression of the sponge rubber by the fingers of the operator when firmly applied to the free edges thereof. It may be made substantially rigid, however, if desired, and an auxiliary plate-like member 74 formed of rubber or other suitable material may be provided to bear against the sponge rubber in slightly spaced relation to its outer edge, whereby pressure of the sponge rubber against such element or pressure brought by forcing said element against the surface in advance of the sponge rubber will serve to discharge liquid from the sponge rubber element. The device is preferably formed with a squeegee attachment 75 secured to one side of the body member and projecting beyond the rearward edge thereof. This element may be formed integrally with the plate-like member contacting with the sponge rubber strip.

If desired, fastening pins (not shown) may be used to secure the sponge rubber against accidental dislodgement from the recess and such fastening pins may also hold or assist in holding the squeegee element and the resilient moisture-discharging element in position against the side of the body member.

A still further modified form of construction is shown in Figures 20 and 21, wherein the liquid receptacle is in the form of a cylindrical member 81 and wherein the discharge orifices comprise a series of ports 82 extending only partially through the heavy wall of said receptacle. Said ports are preferably formed at spaced intervals at the bottom of a channel or recess 83 provided on the inner wall of the cylindrical receptacle to permit free flexing action of said wall at such point for a purpose presently to be disclosed. A slot 84 cut longitudinally in the outer wall of said receptacle in alignment with the series of shallow ports or passageways intersects the extreme ends of said ports and serves as a sealing means for such ports when the natural cylindrical contour of said receptacle is maintained. Upon inward deformation of the sides of said receptacle, as shown by the arrows in Figure 21, the lips 85 formed at either side of said slot which extends partially through the wall of said receptacle in alignment with said ports are drawn apart, as is shown in Figure 21, and thus open such ports and permit the pressure exerted upon the sides to eject the liquid contents through said ports and slot. Release of said pressure immediately seals said ports and the inherent resiliency of the structure maintains such ports closed under a high degree of elastic pressure, so that substantially no leakage will occur through the normal use of the squeegee member. Said squeegee member 86 is preferably integrally formed with the cylindrical member along one side thereof, and preferably spaced at a position ninety degrees from said discharge slot. The gripping action of the hand of the operator upon the cylindrical member at points on either side of the squeegee tends to more firmly hold the ports closed, and therefore this additional pressure will entirely prevent any leakage of moisture through the discharge ports during the squeegeeing operation. The ends of the cylindrical structure are preferably sealed by means of rubber plugs which may be inserted

as at 87 therein and vulcanized in position, such plugs being relatively thin-walled and of elastic composition which permits the compression of the cylindrical member.

While a number of forms of the apparatus have been described, the arrangement and combination of the various elements is by no means intended to be exhaustive, and the extent and position of the valve and squeegee elements with reference to each other, as well as the particular position and shape thereof, may be widely varied in accordance with the special purposes for which the device is intended to be used, as well as such considerations of cheapness of manufacture and the requirements of quantity production operation. The reservoir may be made as an attachment, and, as such, or as a complete device, may be used as part of a power operated windshield wiper.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the structure herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. An article of the character described, having in combination a body member providing a receptacle within the interior thereof, an orifice extending through the wall of said body member, a flexible surface-contacting means supported on said body member and covering over the outer end of said orifice, and through its movement controlling the opening and closing of said orifice, and sponge rubber means associated with said body member and positioned adjacent the outer end of said orifice for assisting in dispensing the contents of said receptacle.

2. An article of the character described, having in combination a hollow body formed wholly of rubber and provided adjacent one side with a series of orifices permitting the filling into and discharge from the interior of said body, of liquid to be applied to a surface by said structure, means selectively under the control of the operator for closing over the outer ends of said orifices to seal the liquid within said body member, and a squeegee element associated with said body member adjacent said orifices for distributing the liquid supply therefrom and cleansing the surface to be operated on.

3. An article of the character described, having in combination a receptacle, formed wholly of rubber, of substantially rectangular outline, a squeegee element mounted adjacent one longitudinal edge of said receptacle, a series of orifices closely adjacent said squeegee element extending through an end wall of said receptacle into the hollow interior thereof and providing discharge ports for the liquid contents of the receptacle and means for filling the same, and means associated with said squeegee element for closing over the outer ends of said orifices to prevent discharge of liquid therefrom, said closure means being selectively operable to open or close said orifices upon movement of said squeegee element in a direction at right angles to its longitudinal extent.

4. A window-cleaning device made wholly of hollow rubber having a substantial degree of elasticity, and being formed adjacent one side with an orifice, and with a squeegee element having a portion closing over the outer end of said

orifice adapted to be used as a liquid distributing and liquid cut-off device.

5 5. A window-cleaning device made wholly of rubber having a substantial degree of elasticity, and being formed with a hollow interior providing a reservoir adapted to receive a cleansing fluid, a series of orifices extending through an outer wall of said device into said reservoir for the filling and discharge thereof, a longitudinally
10 extending rubber squeegee element formed integrally with said member, pressure on the walls of said body member effecting filling and discharge of liquid into and from said reservoir through said orifices, and means associated with
15 said squeegee element for covering and uncovering the outer ends of said orifices and responsive to the direction of motion of said squeegee element.

20 6. An article of the character described, formed wholly of rubber of a substantial degree of elasticity, and providing a substantially rectangular receptacle subdivided into a plurality of independent liquid chambers within the same by a common wall providing reinforcing means,
25 a squeegee element supported adjacent one corner edge of said receptacle adjacent each liquid chamber, a series of ports from each liquid chamber disposed adjacent said support for said squeegee element, and means on each squeegee element
30 for covering said ports when said squeegee element is moved in one direction and for uncovering said ports when said element is moved in the opposite direction.

35 7. A window-cleaning device formed wholly of elastic rubber composition, providing a reservoir for cleansing liquid within the same, an orifice through the outer wall of said reservoir for discharge of said liquid, means normally closing over the outer end of said orifice, and means carried by said device for opening and
40 closing said orifice and distributing the liquid contents over a surface and cleaning such surface.

8. A window-cleaning apparatus formed wholly

of rubber, having in combination a hollow rubber body member providing a recess along one side thereof, a sponge rubber cleansing strip adapted to be engaged within said recess and secured therein, a squeegee element mounted on said
5 body member adjacent said sponge rubber strip, and a fluid passageway intermediate said squeegee element and said sponge rubber strip, and communicating with said hollow body member.

9. An article of the character described,
10 formed as a substantially integral structure providing a hollow interior with elastic wall areas and having a plurality of independent liquid receptacles within the same formed in part by a common dividing and reinforcing wall, a squeegee element supported adjacent one edge of said
15 structure adjacent each liquid receptacle, and a normally closed orifice communicating with each respective liquid chamber disposed adjacent its squeegee element, each said squeegee element
20 serving to open its adjacent orifice when said squeegee element is moved in one direction over a surface.

10. A hollow rubber article formed wholly of rubber elements united as an integral fluid-tight
25 structure and having a central body portion providing a hollow interior with elastic wall areas, and having end wall closures at each of the ends of said hollow central body united with said body and providing the fluid-tight structure, and
30 formed with a squeegee element integrally united therewith, said structure having a normally closed orifice adjacent the squeegee element for filling and discharging fluid therethrough.

11. A hollow rubber article formed wholly of
35 interfitted rubber parts united to each other to form an integral fluid-tight structure providing a hollow liquid receptacle, a squeegee element provided along one wall of said receptacle, said
40 wall of said receptacle having an orifice adjacent said squeegee element adapted to be opened through the flexing of said squeegee element.

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