Nov. 8, 1932. L. O. BALINGER 1,887,447

CLEANING DEVICE

Filed Sept. 17, 1932 2 Sheets-Sheet 1

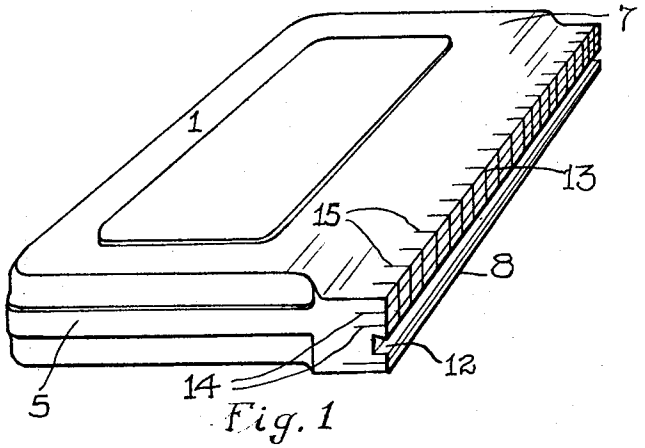

Fig. 1

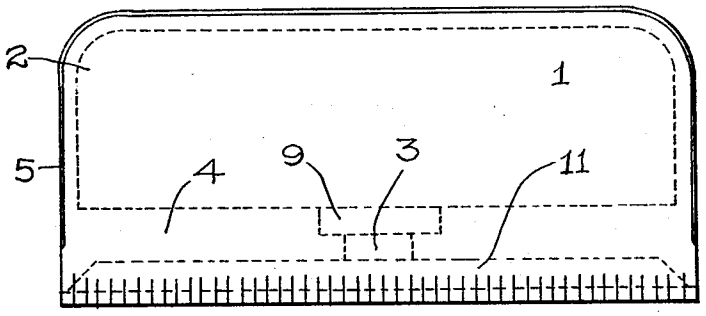

Fig. 2

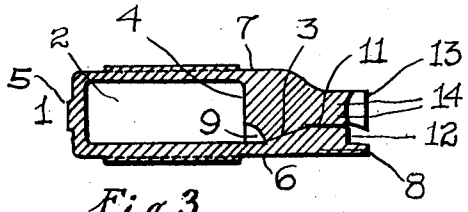

Fig. 3

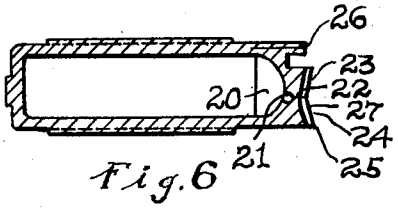

Fig. 6

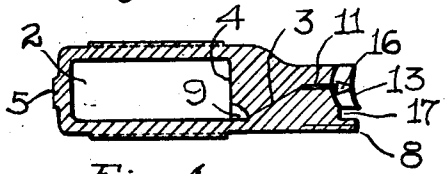

Fig. 4

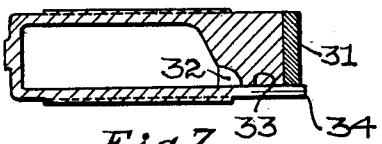

Fig. 7

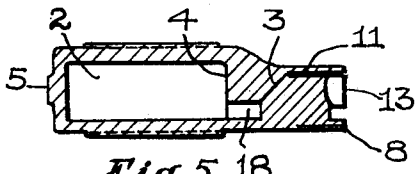

Fig. 5

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CLEANING DEVICE

Filed Sept. 17, 1932 2 Sheets-Sheet 2

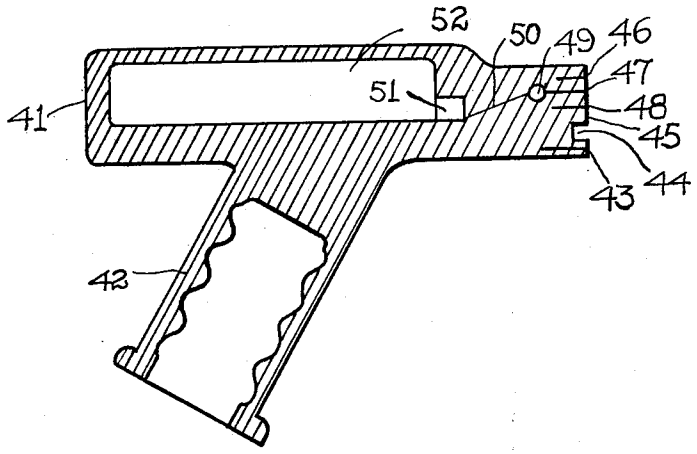

Fig. 8

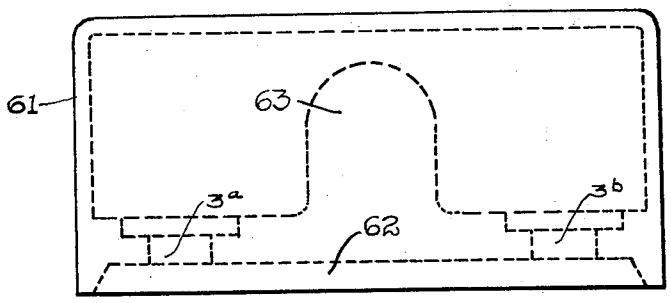

Fig. 9

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UNITED STATES PATENT OFFICE

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CLEANING DEVICE

Application filed September 17, 1932. Serial No. 633,635.

This application is a continuation in part of my application Serial No. 624,033, filed July 22, 1932.

This invention, as indicated, relates to a 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 other material 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 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 simple hand implement whereby the cleaning operation can be carried out by stroking the implement in one predetermined direction, or with a scrubbing motion back and forth to perform the moistening and scrubbing operation, and then without reversing the device, stroking it in a direction opposite the first-mentioned direction in a single stroke or in a plurality of successive strokes in said direction, to perform the squeegeeing or drying and polishing operation.

A further object of the invention is to provide a cleansing implement particularly adapted for window cleaning, and capable of manufacture in a variety of forms including a type permitting the wetting and scrubbing and wiping of the surface by merely changing the stroking of the surface and without reversing the implement end for end or changing from one side to the other with the consequent dripping of excess moisture.

Another object is to provide an implement capable of being made as an integral rubber or rubber composition structure with a minimum of finishing operations.

Another object is to provide a reservoir and a valve or dispensing means in one wall thereof for supplying fluid adjacent the surface contacting member or members in regulated amount and of dependable supply.

A further object is to provide a reservoir having a heavy front wall formed with an effective liquid dispensing orifice or valve preferably in the form of a thin slit through said wall and normally closed, with the wall material in repose and unflexed, and which may be flexed to open said valve and communicate with the reservoir preferably through feeding and distributing channels or recesses which assist the valve action and modify and regulate the liquid flow.

Another object of the invention is to provide a capillary channel at the outer end of the fluid passageway from said reservoir, which channel will serve to modify and regulate the liquid flow and serve as a priming and excess liquid receptacle during the operation of the device.

A further object of the invention is to provide a recess at the inner face of the front wall of the device, at the position of the inner end of the valve slit, to prevent flexing action at such point, closing the inner end of the liquid passageway, while opening the remaining portion thereof.

Another object is to provide a structure adapted for use on a handle or rod, or formed with an internal structure which will be semi-rigid at its front edge when made in large units for hand operation.

Other and further objects 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 top plan view of the device shown in Figure 1;

Figure 3 is a central transverse sectional view of the device shown in Figures 1 and 2;

Figure 4 is a view similar to Figure 3 showing a modified form of liquid distributing elements;

Figure 5 is a view similar to Figure 3 showing another modified form of construction;

Figure 6 is a view similar to Figure 3 showing a modified form of liquid distributing elements;

Figure 7 is a view similar to Figure 3 showing a still further modified form of liquid-distributing elements with a sponge rubber facing adjacent the squeegee element;

Figure 8 is a central transverse sectional view showing a form of construction adapted for use upon a pole or handle; and

Figure 9 is a top plan view showing a form of construction adapted for large sized units and embodying internal reinforcement to provide a semi-rigid support for the front edge of the device.

As is clearly shown in Figures 1, 2 and 3, the preferred form of construction comprises a substantially rectangular body 1 preferably formed entirely of rubber or rubber composition as one integral unit, and having a hollow interior to provide a fluid reservoir 2 closed except for one or more valve-like openings 3 at the front portion 4 of the device.

The device in most instances is intended for use as a hand implement although it may be mounted on an extension handle or be part of a mechanically operated cleaning device. It therefore is preferably constructed of a size to easily be held within the hand of the operator with the thumb and fingers grasping the same adjacent the front edge. The rearward corners of the body are preferably rounded and a flat smooth central band 5 may be formed about the sides and back of the body. The bottom face 6 is preferably substantially flat and the top surface 7 of the body adjacent the front edge may curve downwardly to provide a somewhat less thick front edge than the thickness of the body or of the rearward edge thereof.

The body member may be formed of stiff material with heavy walls throughout so as to yield to filling or ejecting pressure only upon very forceful manipulation of the device or may be provided with relatively thin rearward and top, bottom and side walls with a relatively heavy front wall. This front wall as shown in Figures 3 to 8, more particularly, is of sufficient rigidity to maintain a straight edge for the squeegee when used for polishing the surface.

The front portion of the device need merely comprise the essential elements, of the squeegee strip or edge 8 and the valve-like slit or opening 3 through the front wall, but preferably as is shown in Figure 3, is so formed that there will be no excess of moisture applied to the surface operated upon and thus may incorporate fluid controlling means, such as a recess 9 on the inside of the receptacle, a channel-like capillary groove 11 formed in the outside face, and terminating short of the ends of the structure, and a slit connecting the recess with the groove through the solid body of the relatively heavy front wall of the structure, and forming the valve-like opening 3.

The squeegee strip 8 as shown in Figures 1 and 3 comprises the lower front edge slitted horizontally so as to provide a pair of parallel strips or flaps flexing to provide a double surface contact with the surface operated on. Above these strips a groove or channel 12 is formed which is shallow and separates the squeegee strip or strips from the upper rubbing member 13, which is positioned at the upper edge of the structure parallel to the squeegee strip. The material of the front edge above the groove is preferably slitted longitudinally with a pair of parallel slits 14 and transversely with a plurality of parallel slits 15 giving something of a checker board appearance to said area. This subdivided surface immediately above the channel provides a series of capillary grooves and channels acting most effectively as a moisture-applying means. It operates with less moisture content than a sponge and is far more even and dependable in its action and serves as a liquid film distributing and grime and dirt dislodging element far better than a solid rubbing element or an applicator which is too soft and too moist, such as a sponge.

The slit connecting the channel with the receptacle may comprise a single slit 3 through the heavy front wall, as shown in Figure 3, or may comprise a plurality of such slits 3*a*, 3*b* as shown in Figure 9. A single slit suffices in most cases, as the degree of moisture thus obtained is sufficient to clean a surface without dripping liquid, and by economizing cleansing liquid, the device is not only more cleanly to handle, but also has a larger range of action without refilling.

The position and shape of the channel and slit and inner recess may be varied in accordance with the use and size of the device and

the severity of the work to be imposed upon it.

When moderate scrubbing action of a relatively light film of dirt or grime is all that is required the shape shown in Figure 3 will operate very satisfactorily. The heavy front wall of the receptacle is preferably formed with a longitudinal channel 12 of greater dimension at its rearward than at its forward end, the top wall being inclined downwardly and outwardly. The recess 9 at the inner wall face is adjacent the lower wall of the receptacle or reservoir and the slit 3 through the body of the front wall connecting the capillary channel 11 with the recess 9 extends in a downwardly inclined direction.

Various types of front wall surfaces and contours may be provided to effect the purpose in hand and the connection of the narrow longitudinal capillary channel with the internal recess of the reservoir may be variously disposed.

As is clearly shown in Figure 4, the squeegee strips 8 are in substantially the same position at the lower edge of the device as in the construction shown in Figure 3. The capillary longitudinal groove 11 however is positioned slightly above the central horizontal plane of the device and communicates with a channel 16 formed centrally of the vertically subdivided rubbing area of the forward edge. This channel 16 preferably has top and bottom walls inclined outwardly toward each other so as to provide a moisture retaining recess when in inoperative position, but which will serve as a primary film applying means when said area is placed against the surface to be cleaned. This rubbing edge of the forward edge is separated from the squeegee strips by means of a shallow groove 17 having parallel top and bottom walls. The capillary groove 11 extends approximately half way through the thickened front wall of the device and is connected at its rearward end with the recess 9 formed at the base of the reservoir on the inner face of the front wall by means of a slit 3 acting as a self-sealing valve in a manner hereinbefore described.

The construction shown in Figure 5 is substantially like that shown in Figure 4 with the exception that the second channel on the front face is omitted and the capillary groove 11 is formed closely adjacent the upper part of the front portion of the device and at its inner end at preferably a central point is connected by means of a short downwardly-extending slit 3 with an elongated recess 18 formed in the lower portion of the front inner wall of the reservoir. Thus the front edge of this device presents at its lower portion a squeegee strip 8 comprising parallel members above which is a shallow longitudinal groove separating the squeegee strip from the rubbing section of the front edge. The rubbing section 13 is preferably subdivided by means of a series of vertical parallel slits providing a series of rubber lugs or fingers extending parallelly substantially the length thereof.

The form of construction shown in Figure 6 illustrates another type of construction, wherein the front wall 4 is formed without a capillary groove and wherein the liquid reservoir 2 has a large recess 20 formed centrally of its front wall, within the curved front wall of which recess, a smaller recess 21 is formed, which communicates with a valve-like slit 22 centrally of the rubbing area of the front face of the device. The rubbing area of the front wall is preferably formed with faces 23, 24 inclined inwardly toward said slit so as to permit frictional engagement with the surface operated upon to open the slit to permit the flow of cleansing fluid therethrough. The lower front edge 25 of the device may be used as a polishing or squeegee element by suitably inclining the device or as shown in said Figure 6, a squeegee strip 26 may be provided at the upper edge of the structure spaced from the lower wall portion by means of a shallow groove, said squeegee strip preferably being in the form of two overlying parallel strips. The inwardly beveled front face may be separated by shallow vertical slits 27 so as to present a dentated effect along its forward edge, particularly where a separate squeegee element is to be used at the other edge of the device. Obviously the device shown in Figure 6 may be reversed and used with the squeegee member at its lower edge and such reversed use of the device may also be made of the structures shown in Figures 3, 4 and 5, should the operator so desire.

The device shown in Figure 7 incorporates at the forward face of the structure a rubbing element 31 preferably formed of sponge rubber, which may be integrally formed therewith. The thickened front wall 4 of the device is provided with a recess 32 adjacent its lower inner portion and a slit 33 parallel to the bottom wall of the structure is formed through the front wall at a central point, the forward portion of the bottom wall serving as a squeegee strip 34 which may be subdivided to provide a pair of parallel strip members. The device just described will serve to deliver moisture to the forward face of the structure upon the contact of the squeegee strip with a surface when moved in an upward direction so as to turn the strip portion outwardly. To effect this purpose the squeegee strip is made slightly longer than the front face of the device and projects slightly beyond the surface of the sponge element so that the opening of the valve-like element may be readily brought about. Obviously the downward movement of the squeegee strip serves to tightly seal the valve element and prevent the flow of liquid therethrough.

The structure shown in Figure 8 illustrates a structure of the type heretofore described adapted for use upon an extension handle such as a short pole or rod whereby the device may be used on windows or other surfaces not readily accessible because of their height. This device provides a hollow body member 41 which carries the integral rubber socket 42 which may be corrugated on its interior, and within which the handle member (not shown) may be engaged. The socket is preferably given a slight inclination rearwardly so that the device may be used in a substantially horizontal position against the surface operated on. The thickening of the body structure of the device along its forward face and lower central area provides a supporting frame to insure the smooth operation of the device.

The squeegee strip 43 is positioned at the lower edge of the front face of the device and may comprise double overlying strips as shown in Figure 8. A shallow channel 44 separates the squeegee from the rubbing area 45 which preferably is formed with three longitudinal slits 46, 47, 48, the central slit 47 communicating with a longitudinally extending cylindrical passageway 49 formed in the body of the front wall. This passageway communicates by means of a downwardly extending slit 50 with a recess 51 in the front wall of the reservoir 52.

The device shown in Figure 9 is intended for large units for hand operation. It includes a hollow body 61 with a capillary groove 62 in its front edge. In place of a single slit communicating between the capillary groove of the front edge and the recess in the inner wall of the reservoir, a plurality of such slits 3*a* and 3*b* may be made, two being shown in Figure 9, whereby in the larger units made to carry out the principle of the invention an adequate supply of cleansing fluid may be obtained at all times.

The reinforcing of the device, so that it may be used in large size units of greater length or depth than will conveniently fit within the hand of the user is provided in the structure shown in Figure 9 by a thickened central area 63, which may be firmly pressed by the user without pressing upon the reservoir so as to eject cleansing fluid therefrom. This thickened central area may subdivide the reservoir into two independent compartments which must be independently manipulated to fill fluid into or eject fluid from the same, or may have a reservoir of saddle-bag shape, as shown in Figure 9. Units of extended width or depth or both may be constructed in this manner so as to give unusual reservoir capacity to a single unit permitting the cleansing of large areas of surface with a single filling of the device.

The method of operating the device has already been indicated in connection with the description of its construction but will be briefly summarized in view of the fact that a number of different forms of the construction have been illustrated. The device may be filled by pressing upon the resilient sides of the reservoir and placing the device under water and allowing the reservoir to expand. It likewise may be filled by repeatedly pressing and releasing the body of the same with the front edge held beneath a stream of running water preferably in an up-turned position. It likewise may be filled by holding the valve-like element open by pulling the squeegee strip away from the remaining portion of the front wall or by mechanically spreading the slit into the interior of the reservoir in any desired manner. The first-mentioned operation, however, would be the usual manner of filling the device by dipping it into a pail or basin of water and permitting the reservoir to suck up the cleansing fluid.

When wholly or partially filled, the device is ready to be applied to the surface to be cleaned and this may be accomplished by stroking a device such as is shown in Figures 1 to 3 upwardly on the surface so as to permit the discharge of a thin film of water and thereafter stroking the device downwardly to wipe or squeegee the same. By turning the device in the hand through a slight arc of movement about a plane inclined slightly downwardly, an up and down scrubbing motion may be made, this serving to apply moisture and spread the same rather than to wipe the moisture free of the surface during such short up and down strokes. When a suitable area of the surface has been thus moistened, the wiping or squeegee action of the device may be applied to the surface by firmly gripping the device adjacent its forward edge with the finger extending over the body of the structure and firmly drawing the device downwardly over the surface with the squeegee edge in contact with the surface and the body member inclined in a slightly downward direction from said surface. Repetition of this series of steps will enable the operator to quickly cover the entire extent of the surface to be cleansed and produce a clean highly-polished surface within a very short period of time.

In place of relying upon the slight pressure on the receptacle induced by the flexing of the body thereof with the upward movement of the device, liquid may be ejected from the reservoir by slight pressure upon the top and bottom walls of said reservoir. Should this pressure be abruptly made with the type of construction shown in Figure 6, liquid may be ejected from the orifice directly against the surface to be cleansed even though the device is not in contact with said surface but the operation heretofore described of gently flowing the liquid through the orifice and distributing the film of liquid running over the

front wall thereof over said surface by means of a series of rubbing elements or by means of such elements and the squeegee element is to be preferred, inasmuch as greater economy of liquid consumption is thus brought about with increased cleanliness of operation and also with more uniform and effective distribution of the liquid film and a more rapid and perfect cleansing of the surface operated on.

While the forms of construction illustrated and described have been found satisfactory in operation for the purposes outlined, it is not intended to limit the scope of the invention to any specific type as variations of construction may be freely made without departing from the essential principle of the invention, and may be embodied in operative devices varying widely in size and capacity as well as in outward appearance and accessory means for the moisture dispensing and the squeegeeing operation.

What I claim is:

1. An article of the character described, having in combination an elastic body member associated with a fluid supply and an elongated squeegee comprising a valve element supported thereon.

2. An article of the character described, having in combination an elastic body member providing a cleansing fluid receptacle within the interior thereof, and an elongated squeegee comprising a valve element supported thereon.

3. An article of the character described, having in combination a hollow body formed wholly of rubber having a heavy front wall portion, a squeegee element provided on said wall, and a valve-like pasageway through said wall into said hollow interior of said body for dispensing cleansing fluid therefrom, said squeegee being adapted to close said passageway.

4. An article of the character described, having in combination a unitary hollow body formed wholly of rubber having a heavy front wall portion, a heavy rearward extension connected with said front wall, a squeegee element integral with said wall, and at least one valve-like passageway through said wall into said hollow interior of said body for dispensing cleansing fluid therefrom.

5. An apparatus of the character described, having in combination a hollow body at least one wall of which is formed wholly of rubber composition, said wall having a capillary channel in the form of an elongated slit at one side thereof to dispense cleansing fluid to the surface operated on, a reservoir adjacent said capillary channel and a valve-like passageway connecting said channel with said reservoir.

6. An apparatus of the character described, having in combination a hollow body at least one wall of which is formed wholly of rubber composition, said wall having a plurality of intersecting capillary channels at one side thereof to dispense cleansing fluid to the surface operated on, said channels extending substantially vertically and horizontally, a reservoir adjacent said capillary channels and a valve-like passageway adjacent said channels for supplying liquid thereto from said reservoir.

7. An article of the character described, having in combination a hollow body formed of elastic material to provide a liquid reservoir and having a projecting rubber squeegee element rigidly mounted thereon, and an orifice extending through the wall of said body member to permit the filling and discharging of said reservoir, said orifice being positioned closely adjacent said squeegee element, and means associated with said squeegee element for closing said orifice against the discharge of the contents of said reservoir when said squeegee element is moved in surface-cleansing direction and for freeing said orifice from said closure element when said squeegee element is moved in the opposite direction.

8. An article of the character described, having in combination a hollow body formed of elastic material and provided adjacent one side with an elongated orifice adapted to be opened and closed and permitting the filling into and discharge from the interior of said body of liquid to be applied to a surface by said structure, and selective means for controlling said orifice.

9. An article of the character described, having in combination a hollow body formed of elastic material and provided adjacent one side with an elongated orifice adapted to be opened and closed, and permitting the filling into and discharge from the interior of said body of liquid to be applied to a surface by said structure, selective means for controlling said orifice, and a squeegee element associated with said body member for distributing the liquid supply therefrom and cleansing the surface to be operated on.

10. An article of the character described, having in combination a hollow body providing a normally closed reservoir formed of rubber composition and provided adjacent one side with an elongated orifice adapted to be opened and closed, and permitting the filling into and discharge from the interior of said body of liquid to be applied to a surface by said structure, and a queegee element associated with said body member for distributing the liquid supply therefrom and cleansing the surface to be operated on, such squeegee member being positioned adjacent said orifice to said hollow interior of the body and serving to control the opening and closing of said orifice.

11. A window-cleaning device adapted to be made wholly of rubber having a substantial degree of elasticity with a substantially

rectangular body portion providing a hand gripping and operating element and being formed adjacent one longitudinal side with a squeegee element adapted to be used as a liquid-distributing and cleansing device.

12. A window-cleaning device adapted to be made wholly of rubber as an integral structure having a substantial degree of elasticity, and providing a body member formed with a hollow interior serving as a reservoir to receive a cleansing fluid, an orifice extending through an outer wall of said member into said reservoir for the filling and discharge thereof, and a longitudinally extending rubber squeegee element formed integrally on said member.

13. A window-cleaning device adapted to be made wholly of rubber having a substantial degree of elasticity, and providing a body member formed with a hollow interior serving as a reservoir to receive a cleansing fluid, an orifice in the form of a narrow slit extending through an outer wall of said member into said reservoir for the filling and discharge thereof, and a longitudinally extending rubber squeegee element formed integrally with said member.

14. A window-cleaning device adapted to be made wholly of rubber having a substantial degree of elasticity, and providing a body member formed with a hollow interior serving as a reservoir to receive a cleansing fluid, an orifice in the form of a narrow slit extending through an outer wall of said member into said reservoir for the filling and discharge thereof, a longitudinally extending rubber squeegee element formed integrally with said member, and means responsive to pressure on the walls of said body member for filling and discharging liquid from said reservoir through said orifice.

15. An integral elongated hollow body member formed wholly of rubber, an elongated squeegee strip supported thereon, an elongated normally closed discharge orifice adjacent said strip and operable through movement of said body member.

16. An elongated hollow body member formed with at least one wall of rubber, a normally closed discharge orifice formed through said wall and operable through movement of said body member, and a squeegee element supported adjacent said discharge orifice.

17. A surface cleaning implement of resilient material having in combination a hollow interior reservoir, and a capillary channel in the form of an elongated slit at one side thereof to dispense cleansing fluid to said surface.

18. A surface cleaning implement of resilient material having a hollow interior reservoir, a recess formed in an inner face of a wall of said reservoir, a capillary channel formed in the outer face of said wall and a valve-like slit connecting said recess and channel and operable to dispense fluid from said reservoir through the movement of said implement.

19. A window cleaning device in the form of a substantially rectangular hand-fitting block formed wholly of rubber composition and having in combination an elongated surface contacting face of substantial area a portion of which is formed of one or more capillary moisture retaining elements in the form of elongated slits, and another portion of which is formed of one or more squeegeeing elements and spaced from the elements of said first portion.

20. A window cleaning device in the form of a substantially rectangular hand-fitting block formed wholly of rubber composition and having in combination an elongated surface contacting face of substantial area a portion of which is formed of one or more capillary moisture retaining elements in the form of elongated slits, and another portion of which is formed of one or more squeegeeing elements, said moisture and squeegeeing elements being positioned in substantially parallel relation and separated from each other by a groove adapted to receive moisture and to provide a dry edge for the squeegee member.

21. A window cleaning device in the form of a substantially rectangular hand-fitting block formed wholly of rubber composition and providing a body portion presenting a hand grip portion and a longitudinal front face, a sponge rubber element along one edge and a squeegee element along another edge of said front face.

22. A window cleaning device in the form of a substantially rectangular hollow block formed wholly of rubber providing a reservoir, one face of which is adapted to serve as a surface moistening and squeegeeing device without reversing the same in the hand of the operator, said face having a sponge rubber area adjacent one longitudinal edge, means adjacent thereto communicating with said reservoir, and a squeegee element along the opposite longitudinal edge projecting slightly beyond said moisture applying element so as to preserve a dry edge.

23. A window cleaning device formed wholly of rubber having a hollow body portion providing a reservoir and a support, an integral handle socket beneath said support, an elongated moisture supplying and distributing member adjacent one edge of the forward face of said support, means adjacent thereto communicating with said reservoir, and an elongated squeegeeing member adjacent the other edge of the forward face of said support.

Signed by me this 9th day of September, 1932.

LEE O. BALINGER.