July 30, 1940.

F. B. SEEBERGER

2,209,544

CLEANING DEVICE

Filed Aug. 4, 1938

Fig 1.

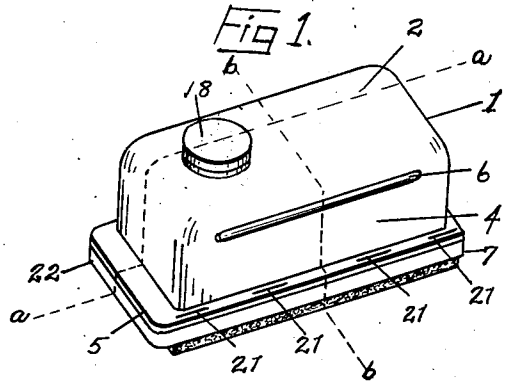


Fig 2.

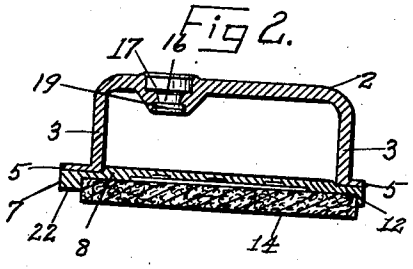


Fig 3.

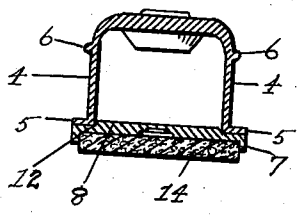


Fig 5.

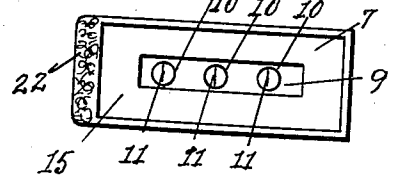


Fig 6.

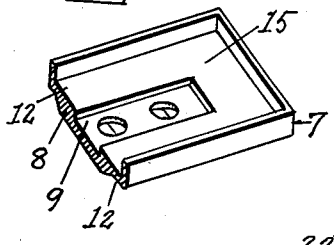


Fig 8.

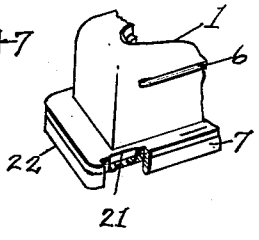


Fig 4.

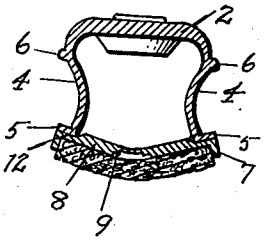


Fig 9.

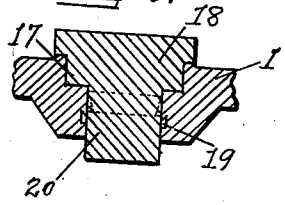
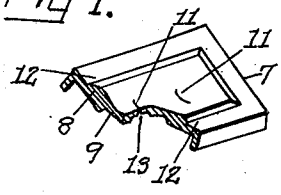


Fig 7.



Inventor

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pro se

Patented July 30, 1940 2,209,544

UNITED STATES PATENT OFFICE

2,209,544

CLEANING DEVICE

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Application August 4, 1938, Serial No. 222,998

1 Claim. (Cl. 15—133)

This invention relates to cleaning devices adapted to act as a receptacle for cleaning solutions, the dispensing of such solutions being controlled by the operator through automatic valve means.

The object of this invention is to provide a simple and efficient fluid dispensing means that will be operative under all conditions where its use is indicated, and that will not collapse, become distorted, or inoperative after little use.

Another object of this invention is to provide a cleaning device that has a substantially rigid reservoir for holding fluid, the sides of which are flexible, and that will yield only upon pressure being applied to said sides, and that may be placed in any position or carried in the pocket of the user without leaking and be ready for instant use.

Reservoir sponges have been used with indifferent success. The cheaper grades of composition rubber from which articles of this character must be molded, will not retain the molded shape to a sufficient degree to remain operative for any definite period of time. Frequently they become distorted in stock before being sold. To overcome this tendency to distortion a certain degree of rigidity is necessary to the supporting structure. Rigidity that yields only to a predetermined amount of pressure is essential to a reasonable period of useful operativeness. This rigidity must be properly determined and distributed in the respective walls of the structure so that the valving action upon exertion of pressure thereto is controlled, and the reaction upon release of the pressure applied is such that the structure will return to its normal shape even when made from a poor grade composition.

The bath brush of the McCarthy Patent No. 792,278, is an example of such a device, and while not adapted to the purpose of the present invention, embodies in part the general principle of such a device as is herein disclosed.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawing, Figure 1 is a perspective view of the invention.

Fig. 2 is a sectional elevation taken on line *a*—*a* in Figure 1.

Fig. 3 is a sectional elevation taken on line *b*—*b* in Figure 1.

Fig. 4 is a sectional elevation similar to Fig. 3, showing the side walls depressed to operate the valves in the base member.

Fig. 5 is a bottom plan view of the base member.

Fig. 6 is a fragmentary perspective view of the base member.

Fig. 7 is a fragmentary perspective view of the base member showing the valve operation when same is distorted by pressure.

Fig. 8 is a fragmentary perspective view of the device showing a staple re-enforcing the seam.

Fig. 9 is a fragmentary sectional elevation of the reservoir closure.

The reference characters indicate the same parts in the drawing.

In the practice of the invention, the hollow body portion 1 of the device is molded from suitable resilient material such as composition rubber of the proper density to resist distortion during the ordinary handling of the device while being used. The top wall 2 and the end walls 3 are substantially the same thickness and form a substantially rigid foundation for the reservoir, while the side walls 4, Fig. 3, are approximately one-half the thickness of the top and end walls. These walls are easily flexed due to the rigidity of the top and end walls with which they are integral. For a specific density of composition this would make the top and end walls one-quarter inch thick and the side walls one-eighth inch thick. These measurements are not absolutely fixed but it has been found in actual practice that the relative proportions produce uniformly operative results, and the collapse of the body portion is thereby prevented and the useful life of the reservoir is indefinitely extended.

A flange member 5, of substantially the thickness of the side walls 4, extends around the periphery of the body portion 1, the lateral extension being approximately three-sixteenths of an inch to provide adequate surface for a seam between the respective parts. A grip rail 6 provides means for gripping the body portion to prevent same from slipping from the hands while using the device, and also acts as a retaining means to hold the device in a rack when not in use.

A substantially rigid base member 7, having a cross section area 8, immediately adjacent the point where it joins the body portion flange member 5, of approximately seventy-five per cent of the thickness of the top and end walls of the body portion 1, furnishes a closure for the hollow body of sufficient resistance to permanent distortion or set to return the structure to its original size and shape. This heavy portion 8 which is uniform in thickness within the hollow area of the body portion 1, has a rectangular

centrally disposed recess 9 reducing the thickness of this portion of the base member to one-half of the surrounding composition. This rectangular recess countersunk portion permits flexing of the base portion at a predetermined point in said base member. A series of round depressions 10, which form the valve members, reduce the thickness of the material within their area to approximately forty one-thousandths of one inch, thereby providing integral diaphragm valves, the said diaphragms being slitted or perforated to a predetermined length 11 which is governed by the density and resilient quality of the composition used to manufacture the part.

The plane edge 12, of the base portion 7, is substantially the same thickness as the laterally extending flange portion 5 on the body portion 1. These parts when cemented together are of equal strength and flex uniformly without tendency to rupture or separate at the joint when pressure is applied to the sides of the body portion to flex the base portion when operating the valves to dispense cleaning fluids, and are of sufficient strength to control the base member 7 as shown in Fig. 4. The rigidity of the base member forces the sides of the body to return to a parallel position thereby compelling the structure to regain its normal shape and keep the reservoir in its neutral or non-dispensing condition.

Fig. 7 shows the curvature of the valve member slit 11 as it would appear when in operation. The diaphragm forms a concave depression which causes the slit 11 to open as shown at point 13 toward the lower side of the base member. Upon application of pressure to the sides of the body portion, the built up pressure within the reservoir, and the flexing action exerted upon the base portion forces the liquid contents through the valve slits 11. Upon release of the exerted pressure on the reservoir the yielding rigidity of the base portion forces the reservoir to return to normal position and to suck in sufficient air to replace the dispensed liquid. The structure is so designed as to permit vigorous operation of the device without leaking or involuntary dispensation of its fluid contents during the cleaning or dispersing operation.

A cellular member 14 is cemented into the receptacle portion 15 of the base member 7, to provide means for dispersing the fluid contents of the device. This cellular member may be composed of what is generally known as sponge rubber, or it may be felt, natural sponge, synthetic sponge, or other material specifically adapted to act as an absorbent and detergent dispersion means suitable for cleaning certain surfaces.

An opening 16, shown in Fig. 22, is provided to permit the device to be filled with such cleaning materials as may be found desirable to use, said opening being recessed at the entrance 17 to allow easy filling and also provide space for the top of the cork or plug closing member 18. The bore of the opening 16, immediately below the recessed portion 17, is gradually constricted for about one-half the length of said opening, and immediately below the extreme point of constriction there is provided a recess or undercut portion 19 which is somewhat larger than the diameter of the plug portion 20 entering the opening, the balance of the opening 16 is exactly the diameter of the plug or closure portion 20 of the plug 18.

In practice, this type of closure effectively seals the reservoir of the device and insures leakproof operation. The plug portion 20 entering the constricted area forces the constricted surplus downward and outward into the recessed portion 19, thereby securely sealing the closure against pressure from within the reservoir when the valves are operated by flexing the body member. A twisting pull is required to remove the plug for the refilling of the reservoir. The dotted lines in Fig. 9 indicate the normal position of the constricted area before the plug portion 20 enters the opening.

In assembling the body portion 1, and the base member 7, it has been found desirable for certain applications of the device, because of the rough usage to which it is subjected, to re-inforce the joint between said members with stitches or staples 21 as shown in Fig. 8. These stitches or staples are not essential to operativeness and are merely used where need for additional strength is indicated by the type of work to be done.

The conventional type plug or cork has been found to be the most efficient means for closure when used in conjunction with the specific type of constricted opening as is disclosed in the present invention. The constricted opening being molded does not increase the cost of production over that of the usual straight hole and incidently provides a closure that does not easily get out of order because of wear, it is easy to operate, and its general efficiency is equal, if not superior to the usual screw cap closure the cost of which in the present instance is prohibitive.

While controlled dispensation and dispersion of cleaning fluids is the prime object of this invention, there is frequent necessity for removing obstinate dirt particles, insects, etc., from glass surfaces, particularly automobile wind shields. For this purpose a soft metallic wool is impregnated with the composition used in the molding of the base portion 7 at what is nominally the front edge of the device 22, bronze wool being preferred. Metallic wool impregnation is restricted specifically to the front edge area 22, and does not come into contact with the surfaces being cleaned unless the operator tilts the sponge reservoir to bring this front portion 22 into action. This metallic impregnated area is adjacent to, but independent from the cellular detergent dispersion member 14. However, for specific cleaning solutions it may be found desirable to use stainless steel or other types of metallic wool that resist corrosive action. Devices of this character are not suitable for scrubbing or the removal of obstinate dirt particles, such dirt must be removed by collateral means, preferably a soft metallic wool impregnated in a definite part of the structure where it may readily be employed when required.

What is claimed as the invention and desired to be secured by Letters Patent, is:

A cleaning device comprising a semi-rigid hollow body portion having oppositely disposed flexible side walls, a substantially rigid base member having a countersunk centrally disposed slitted valve portion, a cellular member disposed in said base member, metallic wool impregnated in the lower face of the base member at one end thereof and adjacent to the cellular member, a constricted opening in the body portion, and a plug closure therefor.

FRED B. SEEBERGER.