

Dec. 10, 1940.

W. E. WILLIAMS

2,224,462

WRINGER MOP

Filed Sept. 7, 1937

3 Sheets-Sheet 1

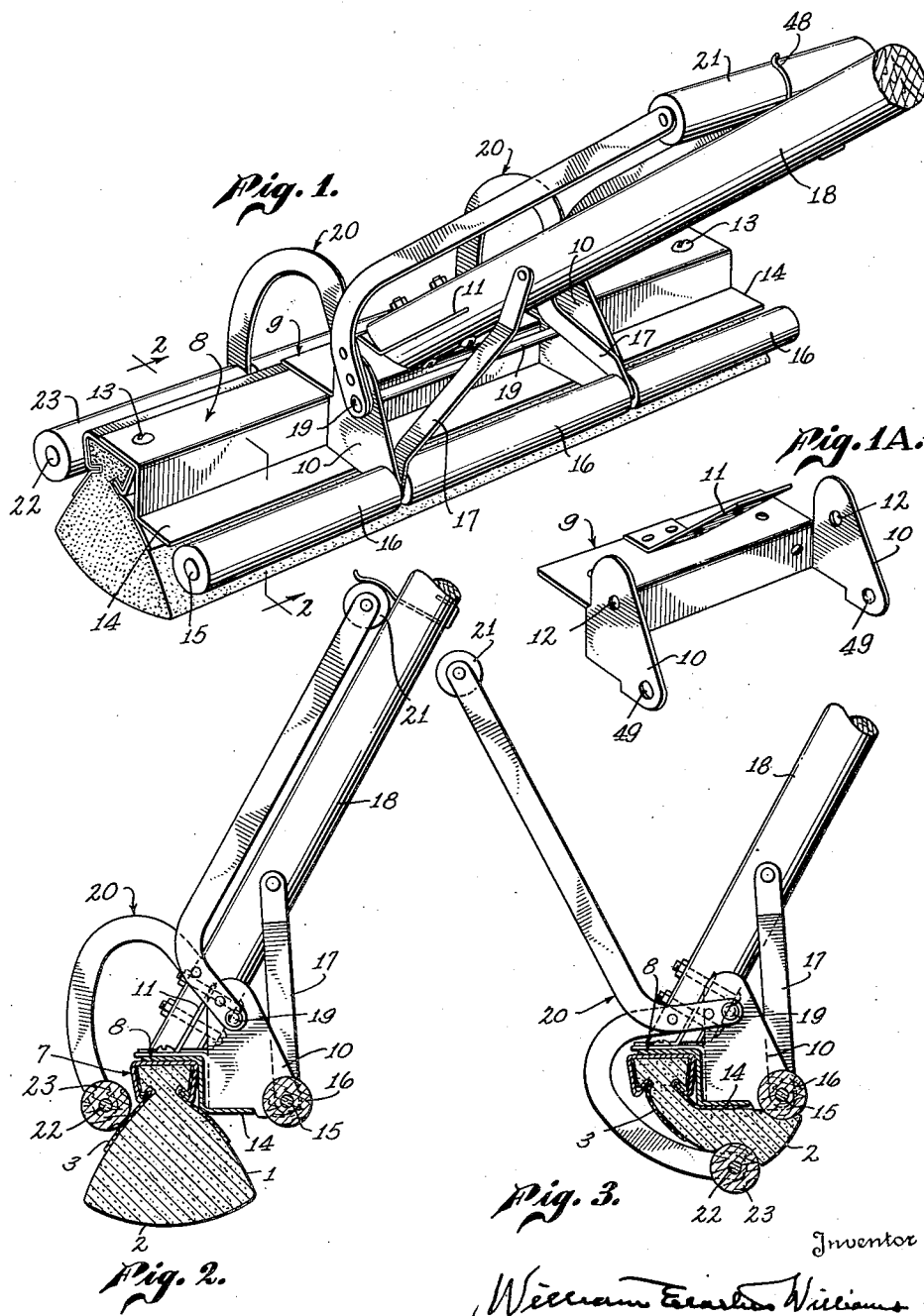


Fig. 3.
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3 Sheets-Sheet 2

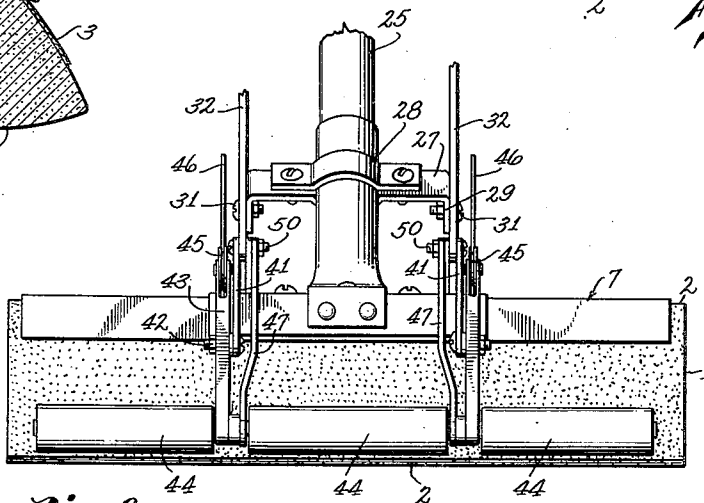
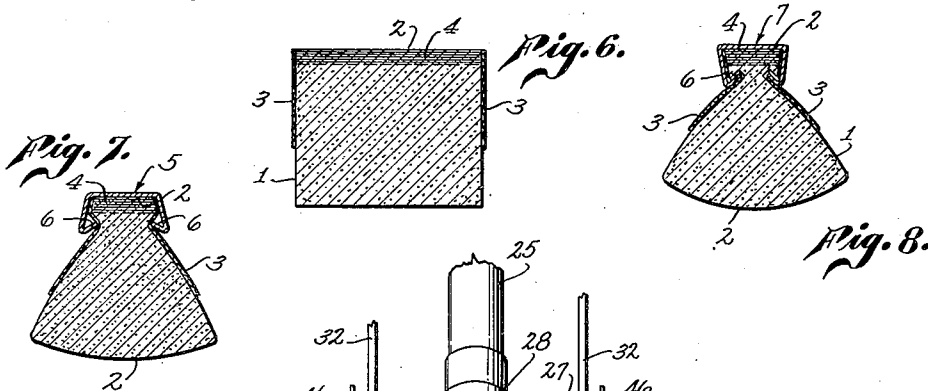
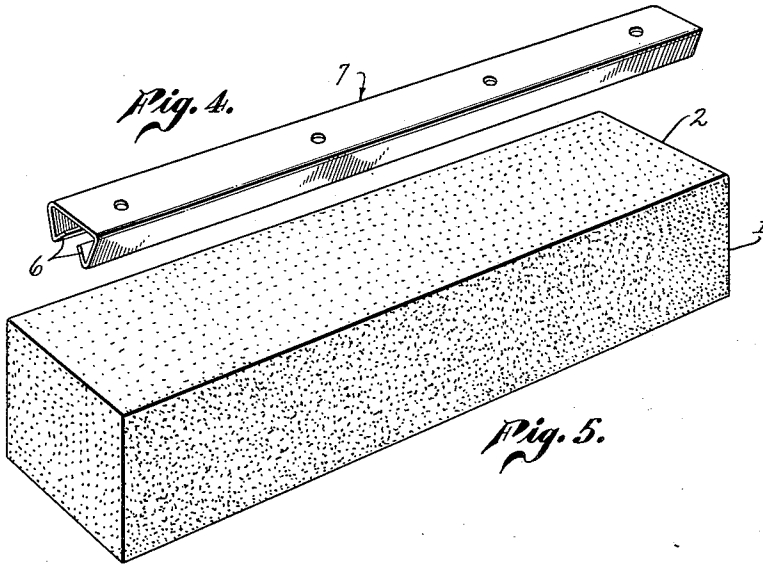


Fig. 9.

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3 Sheets-Sheet 3

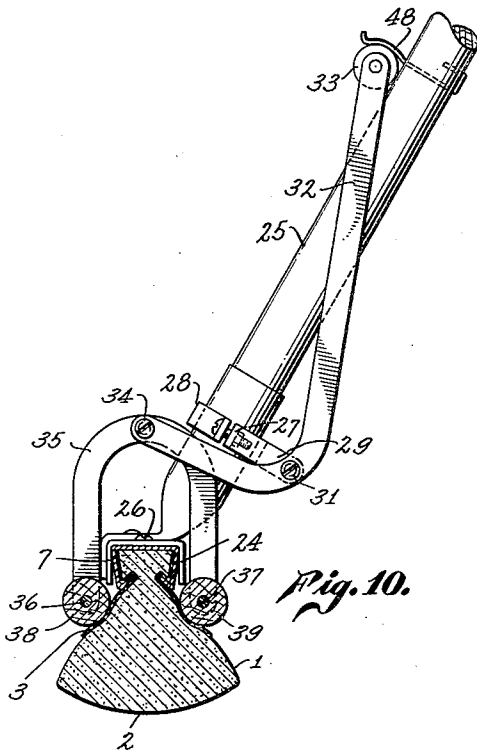


Fig. 10.

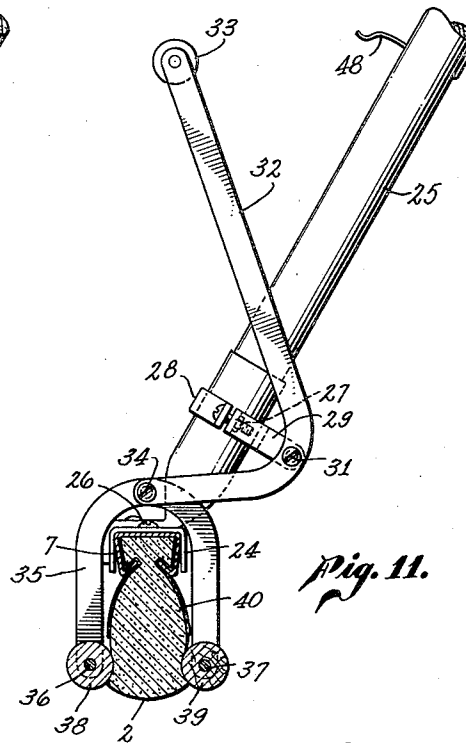


Fig. 11.

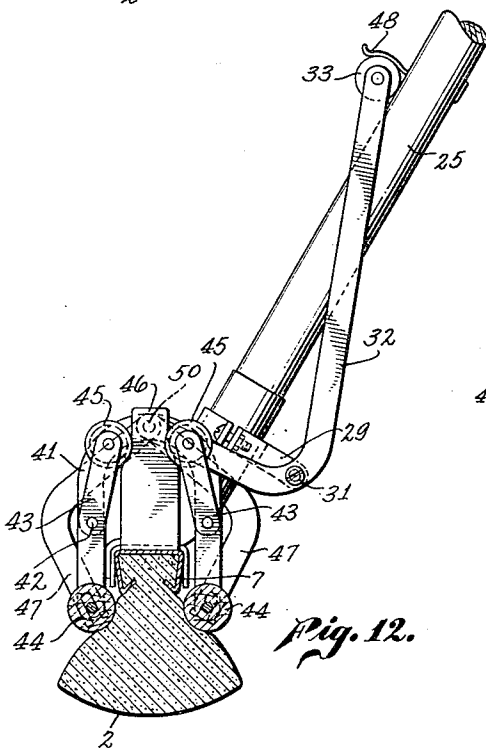


Fig. 12.

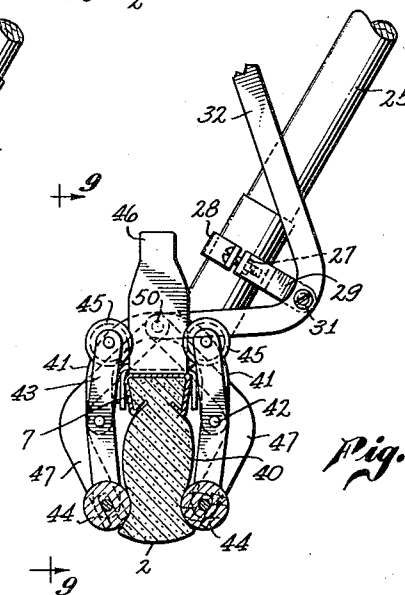


Fig. 13.

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UNITED STATES PATENT OFFICE

2,224,462

WRINGER MOP

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3 Claims. (Cl. 15—119)

My invention relates to mops and cleaners of the type that have an absorbent fluid carrying cleaning element that contacts the surface to be cleansed, and this element held in a wooden or metal backing but preferable the metal and with this there is associated a wringing mechanism mounted permanently in the assembly of the device.

This invention is chiefly associated with a sponge of rubber or of a synthetic construction or any other highly absorbent cleaning element for the purpose desired.

The objects of the invention are primarily in the means and methods of securing the absorbent cleaning element into the backing together with a special wringing mechanism adapted to be highly convenient for use and efficient in pressing out the absorbed water after any stage of use and thus put the absorbent cleaning element in condition to more readily take up the water or fluids from the surface being cleaned after the frictional scrubbing work has been accomplished.

The further object of the invention is to provide especial handy and serviceable means for fastening and releasing the cleaning element to and from the assembly of the device.

A further object of the invention is the form and construction of the parts arranged to give sufficient strength and yet be of light weight for handling a feature of especial merit for this type of cleaner when it is used on vertical walls and windows.

A further object of the invention is the arrangement of the wringer that permits the wringing to be accomplished with little labor and much convenience.

Reference will be had to the accompanying drawings in which Fig. 1 is a perspective view of the assembled mop. Fig. 1A is a perspective view of an angle member of the frame. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 3 is a sectional view showing the wringer in position of completion of a wringing operation. Fig. 4 is a perspective view of the channel metal backing for the cleaning element. Fig. 5 is a perspective view of a block of sponge which forms the absorbent cleaning element here shown in these drawings. However any suitable absorbent cleaning element may be used for this service. Fig. 6 is an end view of what is shown in Fig. 5 after the block of sponge has been treated as later described. Fig. 7 indicates the first step in assembling the sponge cleaning element into the backing channel holder. Fig. 8 is an end

view of the sponge cleaning element completely assembled into the backing.

Fig. 9 is a front elevation in the direction of 9—9 of Fig. 13 of parts of a modified form of wringer. Fig. 10 is an end sectional view of another modified form of wringer. Fig. 11 shows the wringer of Fig. 10 in position of completion of a wringing operation. Fig. 12 is an end sectional view of the modified form of Fig. 9. Fig. 13 indicates an end sectional view showing the completion of a wringing operation of the form indicated by Figs. 9, 12 and 13.

In describing wringing operations of mechanisms such as the type herein shown, it is common to use the word squeeze or squeezing out the water or fluid from the mop or cleaner by rollers.

A rubber or synthetic sponge of cellulose such as is preferred to be used in this type of mop, serves well as a broom or cleaner to take up dust or tobacco ashes from floor or rugs when the sponge is dry or slightly moist and thus the words mop, cleaner or broom may apply to this device. Hereinafter the word "mop" will be used designating the unit as a whole and the words "cleaning element" for the absorbent unit, and the word "channel" to indicate the sponge cleaning element backing.

The most important single item of a mop of this class is the sponge cleaning element and this is the only element that wears out in normal use. The wear results in shortening the depth of the element and thus there is economy in providing a backing channel of a short depth allowing as much as possible of the cleaning element to extend out beyond the channel into the wear region.

A synthetic sponge of cellulose is now available for mops and is highly desirable for this purpose as it will absorb a larger quantity of water or mopping or cleaning fluid than a rubber sponge available at this time. However this synthetic sponge is not as strong to resist tearing and further it dries out to a stage of dryness when it loses almost entirely its elasticity which revives abundantly when the sponge is wet.

To hold this synthetic sponge cleaning element securely to the channel in all stages of use for a mop and also to consume as little of the element as conveniently possible in the backing channel I use a special method to bring about these desired results.

The block is cut to the size as desired as shown in Fig. 5 where in the vertical height 1 is shorter than the top width 2. To strengthen the side

vertical walls 1, I reinforce these sides with a fabric or membrane sheets 3 cemented thereto with suitable cement which is allowed to fully and finally set while the sponge is dry.

After these reinforcing sheets are firmly secured to the sponge, I then apply to the top 2 a cement coating 4 which is absorbed by the sponge to desired depth indicated by the shading at the top of Fig. 6. When this cement coating is only partly set and while yet in a plastic state the sponge is wetted and made highly elastic and then the surplus water is pushed or squeezed out and then the top surface 2 is compressed across its width and pressed into the open metal channel 5, see Fig. 7. This compression amounts to confining the top surface of the sponge or cleaning element to about one third its width and this results in concentrating the cement and fibers of the element to a somewhat compact mass of the sponge fibers and cement with an excess of cement going into contact with metal of the channel 5. The channel 5 is provided with inturned flanges 6, which when closed finally on the cleaning element assume an upwardly inwardly inclined position simulating hooks holding the cleaning element in place as shown in Fig. 4 in which shape the channel is indicated by 7.

The channel with the sponge cleaning element inserted as shown by Fig. 7 is at once after insertion and before further setting of the cement takes place, placed into a special machine and closed onto the cleaning element as indicated in Fig. 8, thus completing that element of the mop. In the form of Fig. 8 the channel and its attached sponge is allowed to rest until the cement has finally set. It is desirable with some types of cement to wet the sponge and squeeze out the surplus water and then apply the top coating of the cement. The cement used must when set become waterproof. There are various kinds of such cement. Ordinary Portland hydraulic cement can be used. This will be made into a grout to be more easily absorbed by the sponge. Melted sulphur may be used when proper arrangements are made to handle it in association with the sponge and the channel.

This method makes a secure fastening and the channel becomes a permanent associate with the cleaning element and is discarded with it when the cleaning element is worn down beyond further use.

What is termed the frame of the mop is composed of a Z bar 8 supplemented by an angle section 9 having end flanges 10 together with an attached flanged piece 11 attached to the horizontal leg of the angle 9. The flanges 10 are provided with bearing apertures 12, see Fig. 1A, and apertures 49. The angle section 9 is permanently attached by rivets or spot welds to the Z bar 8 and thus those pieces become a single unit to which the channel 7 is detachably fastened to the Z bar by four brass screws 13. The Z bar has its lower horizontal flange located in position to act as an abutment plate 14, see Fig. 3.

The lower apertures 49 of the flanges 10 of the angle section 9 support an axle 15 of an idle roller 16. This roller is made in three sections on the axle 15. Diagonal braces 17 extend from the axle 15 and are fixed to the mop handle 18 which is also fixed to the before mentioned attached flange 11 by a slot in the end of the handle extending over the flange 11 and secured thereto by bolts thru the handle and the flange.

The upper apertures 12 of angle section 9 have

mounted therein a shaft 19 on which are carried two hand lever arms 20. The upper ends of these arms are connected across by a hand hold roller 21 thus forming a ball by means of which the arms are rocked from position of Fig. 1 to position of Fig. 3 in the wringing operation. On the forward end of the lever arms 20 there is an axle rod 22 on which are mounted segments of a wringer roller 23 at the front of the mop. Thus by the rocking of the ball of the lever arms 20 the cleaning element is compressed and wrung out by the path of travel of the wringer roller 23 passing across and under the cleaning element as indicated by Fig. 3.

The greatest strair to tear the cleaning element is at the neck just below the channel 7 and this is in the region which is reinforced by the fabric 3, a great desideratum.

Figures 10 and 11 show a modified form wherein the Z bar 8 is wanting and its place is supplied by a short channel 24 to which the mop handle here shown is indicated by 25 is permanently fixed. The channel 24 is detachably fixed by screws 26 to the channel 7 of the mop brush.

A cross bar 27 is fixed by a clamp 28 on the mop handle 25 and is provided with downwardly extending ends 29 in which there are bearing apertures carrying supporting pins 31 which act as hinge pins on which are mounted two hand levers 32 connected across at their upper ends by 30 hand hold roller 33 thus making a ball by which the lever arms are operated. The cross bar 27 is also shown in front view in Fig. 9.

Hinged at 34 in the lower ends of levers 32 there are U shaped bars 35 which carry at their ends axle rods 36 and 37 on which are mounted in sections rollers 38 and 39. The rollers 38 and 39 are moved downward in compressing the cleaning element by the bail handle levers 32 from position of Fig. 10 to that Fig. 11 in the function of wringing the mop sponge.

When a mop is made having a greater width of cleaning element than those indicated in these drawings which then will require a wider backing or channel for holding the cleaning element in place of the channel 7 here shown it will then be desirable in the use of double wringer rollers to provide means to bring the roller closer together from their upward position of repose in their downward movement over the cleaning element for wringing purposes. This result is brought about by the modified form of Figs. 9, 12 and 13. The mechanisms of these figures employ the same ball hand levers 32 as in the forms of Figs. 10 and 11 and there is also used similar U shaped bars 41 to those of 35 save that the U bars 41 are shorter and instead of carrying axle rods for rollers they carry hinge pins 42 on which are hinged levers 43 in the lower ends of which are carried axle rods on which are mounted in sections wringer rollers 44. On the upper ends of levers 43 there are mounted grooved disc rollers 45 which contact vertically arranged cam projections 46 having cam tracks on their opposite edges which are closer together at the top and wider lower down and thus act as the wringer rollers are pushed down over the cleaning element to bring the rollers closer together for greater compression in wringing the cleaning element. This is observed by Figures 12 and 13. To prevent U bars 41 from rocking and thus allow the wringer roller on one side to go down faster than its companion roller on the other side or rather a little ahead of it on account of the rocking, there are provided strut bars 47 hinged at their

upper ends to the levers 32 by the pins 50 and the lower ends of the bars 47 are slotted over the axles of the wringer rollers having the bottoms of the slots with a slight clearance above the axles of the wringer rollers allowing a little rocking.

In all the forms shown by the figures of the drawings herein, when the wringer rollers are in upward position and in repose during the mopping service, the backward and forward movement of the cleaning element sometimes causes a slight vibration of the bail hand roller 21 to and from the contact with the mop handle. To dampen this vibration there is provided a clasp 48 of any suitable construction which holds the slight frictional contact with the hand roller 21 keeping it from vibrating.

The form of wringer indicated by Figures 1 to 3 inclusive wherein there is a bending over as well as a squeezing pressure squeezes out more moisture than the forms of Figs. 10 to 13 inclusive. The bulge of the cleaning element indicated by 40 Fig. 11 produces a pull back of moisture as the wringer rollers pass over the cleaning element.

The idle roller 16 of Figures 1 to 3 inclusive, protect against damaging contact by the edge of abutment flange 14 of Z bar 8 when a back stroke is made against the inside of a furniture leg. This roller 16 is also a protection against the edge of the said flange 14 scraping the floor on a back stroke of the mop when mopping under furniture which is so close to the floor as to cause the mop handle to be lowered almost to the floor. The roller will ride over a tack or a piece of glass while the edge of flange 14 will draw those articles along on the floor and sometimes make scratches on the floor. The roller avoids this.

The U shaped bars 35 of forms of Figs. 10 and 11 in combination with the hand operated levers 32 make a light weight efficient mechanism for wringing the cleaning element.

The two arms 32 and also the two arms 20 of Figs. 1, 2 and 3 connected across by the hand hold rollers thus associated make a bail which is a convenient mechanism for use and a light weight and low cost mechanism.

The method of reinforcing the cleaning element sides by fabric cemented thereto serves a double purpose. First it makes a stronger connection of the cleaning element to the backing or holder by connecting a larger number of fibers of the cleaning element to the backing, which is a great desideratum. Further the best service of such an absorbent material in a mop or cleaner in use is to discharge its load of fluid directly downward out the lower regions or contact area of the surface to be cleaned where the scraping pressure there becomes as it were a water pressure to move the dirt. Then on the pickup of the dirty fluid on the surface cleaned this is taken up only by the bottom of the cleaning element. Thus the substantially impervious, flexible walls of reinforcing fabric confine the flow of the fluids more or less within up and down paths to and from direct contacts with the surfaces being cleaned and restrict the cross paths from the absorbent element, which is a great desideratum.

The cement used for securing the fabric to the cleaning element must be waterproof and at the same time flexible after setting which is the case with the cement I use for this purpose.

Sponge such as rubber or synthetic or natural growth is highly porous and hence not of great strength to resist tearing asunder. The surface of such a cleaning element which contacts a flat or even wall of any type of holder or backing is but a small actual area of the end walls of porous cells and to get a cross section of the full strength of all the fibers of the cleaning element to the backing or holder I use a cement saturation that extends down to the bottoms and sides of cells within the holder and thus gets the best possible contact for holding the cleaning element to the backing.

When the cement saturated edge of the cleaning element is compressed into the channel by the methods herein shown, there is obtained the greatest holding strength possible between the cleaning element and the backing and at the same time takes up the shortest amount of depth value contact in this fastening, which is a great desideratum.

What I claim is—

1. A cleaner comprising a handle, an elongated expansible cleaning element, an elongated carrier mounting said cleaning element at its upper portion, an angularly rearwardly projecting wall carried by said carrier, an elongated wringing element, means mounting said wringing element parallel to said cleaning element and adjacent to and rearwardly of said wall, said handle, carrier and mounting means being fixedly interconnected to constitute a rigid unit wherein said cleaning element extends transversely of the handle, a curved rigid frame pivoted to said unit on an axis parallel to said cleaning element and including an operating handle, a portion of said frame projecting forwardly of said unit, and a second elongated wringing element journaled on the forward portion of said frame parallel to said cleaning element, said frame being shiftable to cause said second wringing element to traverse the front face of said cleaning element and press said cleaning element against said wall with its outermost portion bearing against said first wringing element.

2. A cleaner comprising a sponge rubber cleaning element, a pair of fabric sheets cemented to opposite sides of said element, a metal channel gripping a portion of said element with its opposite sides bearing against said sheets, said element flaring from said channel, a handle, means fixedly connecting said handle and channel to form a unit, and means shiftable mounted on said unit for wringing the flared portion of said cleaning element, said last named means including at least one wringer roller traversing one of the faces of said element reinforced by said sheets.

3. A cleaner comprising an expansible cleaning element, a metal channel gripping a portion of said element, said element flaring from said channel, a handle fixedly connected with said channel to form a rigid unit therewith, means shiftable carried by said unit for wringing the flared portion of said cleaning element and including at least one wringing element traversing a face of the flared portion of said element, and a reinforcing sheet cemented to the face of said cleaning element traversed by said wringing element, said sheet covering the portion of said face gripped by said channel.

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