Sept. 5, 1944. A. Z. BENDAR 2,357,446

CLEANING DEVICE

Filed Nov. 27, 1940 2 Sheets-Sheet 1

FIG. 1.

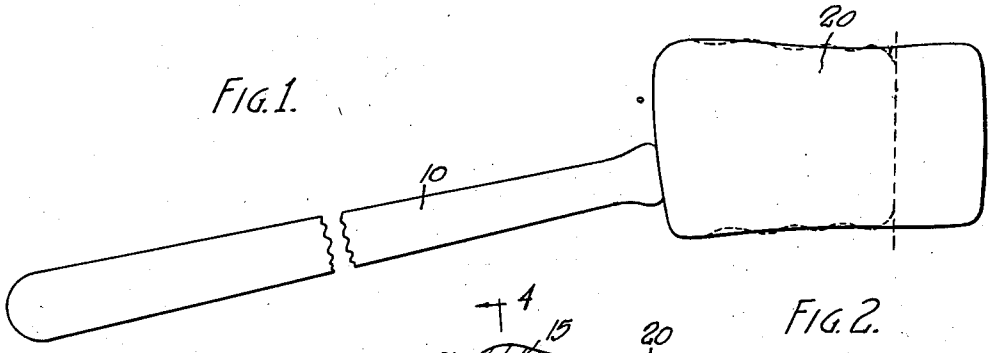


FIG. 2.

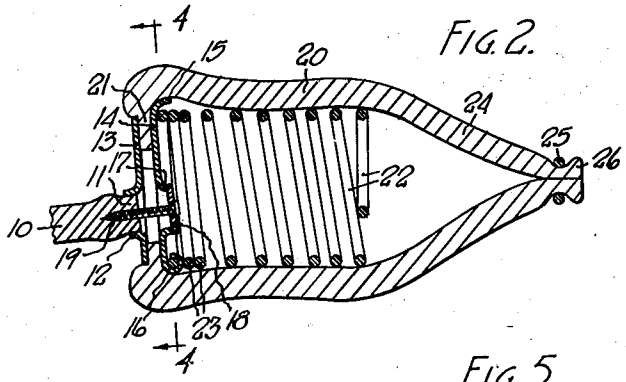


FIG. 3.

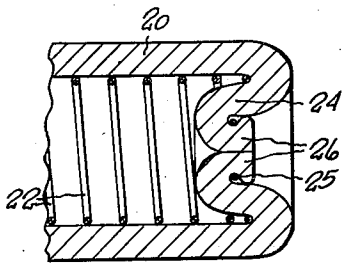
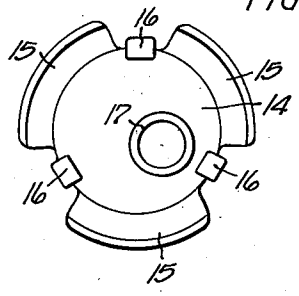


FIG. 5.



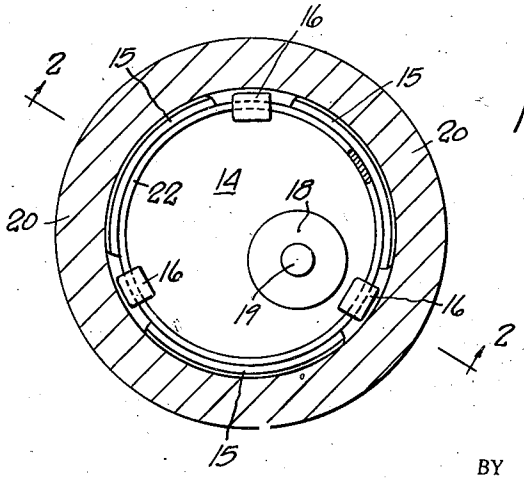


FIG. 4.

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Sept. 5, 1944. A. Z. BENDAR 2,357,446

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Filed Nov. 27, 1940 2 Sheets-Sheet 2

FIG. 6.

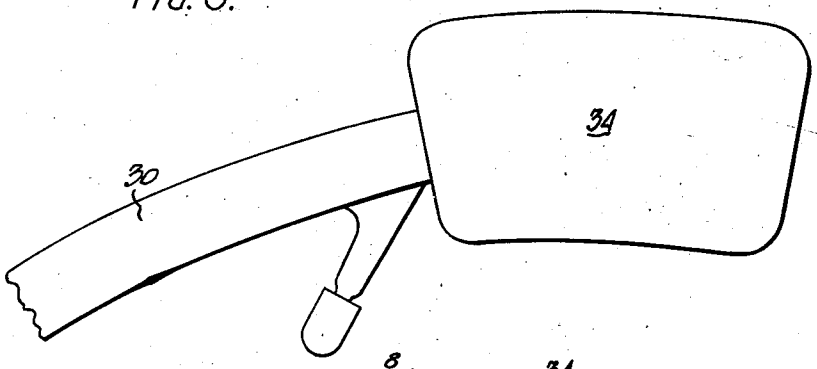


FIG. 7.

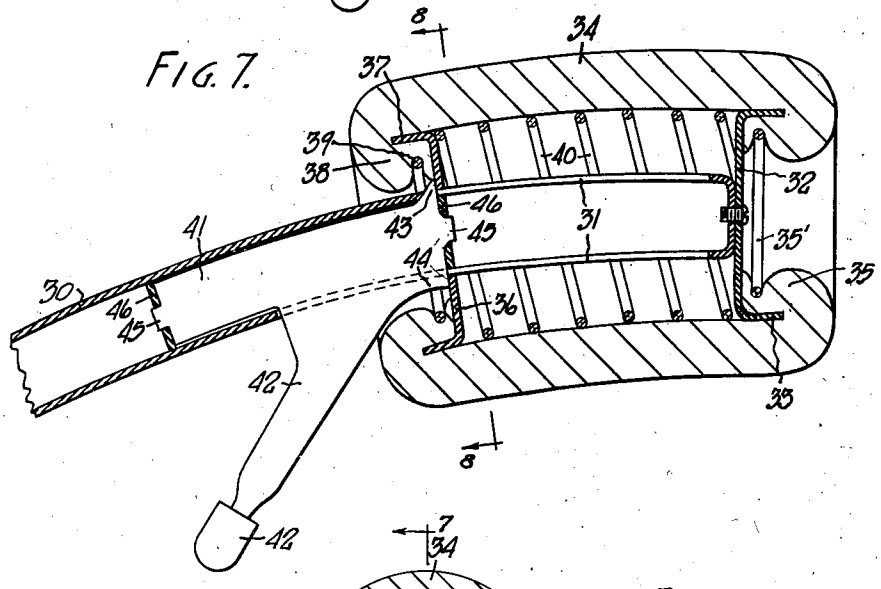
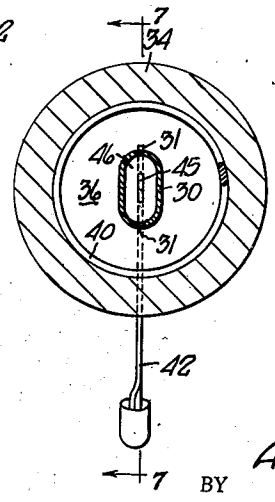


FIG. 8.



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UNITED STATES PATENT OFFICE

2,357,446

CLEANING DEVICE

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Application November 27, 1940, Serial No. 367,307

14 Claims. (Cl. 15—244)

This invention relates to improvements in cleaning devices, and more particularly to cleaning devices utilizing sponge rubber as the cleaning element thereof.

The primary object of the invention is to provide a device which is simple in construction and which may be used conveniently and easily.

A further object is to provide a device of this character utilizing a tubular cleaning element formed of sponge rubber and expanded around a compressible coil spring.

A further object is to provide a device of this character from which excess liquid may be extracted by pressing the cleaning element thereof against a stationary object to compress said element.

A further object is to provide a cleaning device of this character including a sponge rubber element supported by resilient, compressible means to accommodate compression thereof for extraction of water therefrom and to accommodate flexing thereof to conform with the contour of a surface to be cleaned.

A further object is to provide a device of this character comprising a sponge rubber tube mounted on supporting means including a coil spring, wherein one end of the tube is positively held in fixed relation to the supporting means and the opposite end of the tube is compressed and folded around and within the coil spring to be held therein by its tendency to expand.

Other objects will be apparent from the description and appended claims.

In the drawing:

Fig. 1 is a view of the device in side elevation and illustrating the compressed extracting position of the cleaning element in dotted lines.

Fig. 2 is a fragmentary longitudinal sectional view of the cleaning device at an intermediate step in its manufacture taken on line 2—2 of Fig. 4.

Fig. 3 is a fragmentary longitudinal sectional view similar to Fig. 2 and illustrating the outer end of the cleaning element in its final form.

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a face view of one of the elements of the device.

Fig. 6 is a fragmentary view in side elevation of a modified embodiment of the invention.

Fig. 7 is a fragmentary longitudinal sectional view of the device illustrated in Fig. 6, taken on line 7—7 of Fig. 8.

Fig. 8 is a transverse sectional view taken on line 8—8 of Fig. 7.

Referring to the drawings, and particularly to Figs. 1 to 5, inclusive, which illustrate the preferred embodiment of the invention, the numeral 10 designates a handle. Handle 10 is preferably elongated and may be formed of wood or any other suitable material. One end portion 11 of handle 10 is of reduced dimension. A collar 12, projecting laterally from a plate 13 in eccentric relation to said plate, fits around the reduced handle portion 11. Plate 13 is preferably circular and extends in a plane which is slightly displaced from the perpendicular with respect to the axes of the handle 10 and collar 12.

A second circular metal plate 14, best illustrated in Fig. 5, has a plurality of transversely curved marginal lip portions 15. Between these lip portions 15 are provided tabs 16 integral with plate 14 and preferably equi-spaced and adapted to serve as spring retainers as will hereinafter appear. Eccentric of the plate 14 is formed a collar 17 against the end of which bears a plate 18. Plate 14 is preferably of larger dimension than plate 13 and is so constructed and arranged that it may be positioned concentrically with plate 13 and at the same time have its collar 17 concentric with the collar 12 of plate 13. Plate 18 is centrally apertured to receive a securing element, such as a drive screw 19, which may be driven into the end of the handle 10, as best illustrated in Fig. 2.

The cleaning element 20 of the device comprises a tube of sponge rubber, such as a tube formed from a sheet of sponge rubber of a thickness in the order of ½ to ⅝ of an inch whose opposite edges are cemented together. The sponge rubber tube has a normal interior diameter smaller than the diameters of the plates 13 and 14. One end or margin 21 of the sponge rubber tube 20 is adapted to be turned in and clamped between the plates 13 and 14, as best illustrated in Fig. 2. It will be obvious in this connection that the single securing member 19 will serve the combined functions of compressing the inner end portion 21 of the rubber tube, and of positioning the plate 14 in operative relation to the handle.

A coil spring 22, of a diameter slightly less than the diameter of plate 14 and substantially greater than the normal inner diameter of the sponge rubber tube 20, is secured at one end to the plate 14 by means of spring retainers 16. The innermost coils 23 of this coil spring 22 are spaced apart a distance much less than the spacing of the remaining coils of the spring. The sponge rubber tube 20 is expanded around the

coil spring 22. Rubber tube 20 extends substantially beyond the outer end of the coil spring 22, with the projecting portion 24 thereof tapering inwardly toward its outer end at which it is tied or otherwise held in compressed contacting relation by the member 25 encircling and constricting the sponge rubber adjacent its extreme outer end 26.

After the tube 20 has been operatively positioned upon the coil spring with its inner end portion 21 clamped between the plates 13 and 14, and with its outer end tied at 25, portion 24 thereof is folded inwardly within the outer portion of the coil spring 22, as best illustrated in Fig. 3. A reverse fold is preferred, with the portion 24 extending inwardly, and the extreme outer portion 26 extending outwardly but terminating in inwardly spaced relation to the point at which portion 24 is folded around the spring 22.

This device is exceedingly effective for use in cleaning closet bowls, lavatories, bath tubs, and the like. The sponge rubber cleaning element 20 is in normal expanded relation by virtue of the fact that it fits around the coil spring 22. Hence, the sponge is always in condition to absorb liquid readily. When excess liquid is to be extracted, the only operation necessary is to longitudinally press the outer end of the cleaning element against a stationary surface, such as a part of the wall of a lavatory, and this permits both the sponge and the spring to be longitudinally compressed, thereby extracting all surplus liquid therefrom to an extent sufficient to prevent dripping of liquid from the cleaning element after such compression.

The principal advantages of this construction from the water extraction angle, therefore, are that it is not necessary to operate any wringing element or the like, and, further, that it is not necessary that the wet cleaning element be touched by the hands of the user.

Another important advantage of this construction resides in the fact that the coil spring, while normally holding the cleaning element in expanded position, as illustrated in Fig. 1, nevertheless, will permit the bending of the cleaning element under pressure to conform at the portion thereof pressing against a surface with the contour of that surface. In cases where the contour of the surface being cleaned is of irregular curvature, such as of ogee curved form, it will be obvious that the application of pressure to the device at the handle in use will cause the cleaning element to bend as it is passed over the various portions of the irregular curved surface, and will thus permit it to automatically accommodate itself to the curvature of each portion of said surface as it passes thereover.

Another important advantage of the device is that, with the exception of the handle element 10, all of the other parts of the device are fully protected and cushioned by the sponge rubber material against possibility of contact thereof with the surface being cleaned. In this connection, note that the compression of the sponge portion 21 between the plates 13 and 14, coupled with the fact that plate 13 is of smaller diameter than plate 14, produces a flaring of the cleaning element around the margin of plate 13, thus protecting against the possibility of edge-wise striking of the plate 13 upon an object being cleaned. Likewise, the infolded relation of the outer end of the sponge with respect to the spring positively guards against the possibility of direct contact by spring 22 with a surface being cleaned.

Referring now to the embodiment of the invention illustrated in Figs. 6 to 8, inclusive, the numeral 30 designates a handle member preferably of tubular character and of oval cross sectional shape. Handle 30 is preferably longitudinally curved adjacent one end thereof and is provided with opposed longitudinal slots 31 at said curved portion. A cup-shaped plate 32 is secured to the outer end of handle 30, said plate being provided with a cylindrical marginal flange portion 33 which is outwardly turned. A tubular sponge rubber cleaning element 34, of a normal inner diameter less than the dimension of plate 32, is expanded around the flange 33 of the plate 32 adjacent one of its ends, with the end portion 35 of said sponge rubber tube being infolded around and within the flange. The infolded sponge portion 35 is held in place by an expanding wire spring element 35', which presses sponge portion 34 against the inner face of the cylindrical flange 33 of plate 32. A second circular plate 36, provided with a central opening accommodating sliding movement thereof upon the handle 30, is positioned in inwardly spaced relation to plate 32. Plate 36 has a cylindrical flange portion 37 at its margin, with the flange 37 projecting therefrom in opposite relation to the direction in which flange 33 projects from plate 32. Sponge rubber tube 34 is of a length greater than the normal spacing between the outer edges of flanges 33 and 37, whereby end portion 38 thereof may be folded around and within flange 37, to be pressed inwardly against the flange 37 by means of an expanded spring ring 39. A coil spring 40, of substantially the same diameter as the diameters of the cylindrical flanges 33 and 37, is positioned between the plates 32 and 36 and holds the intermediate portion of the sponge rubber tube 34 in cylindrical form.

Mechanical means are provided to compress the sponge rubber cleaning element against the tension of the spring 40 in this embodiment of the invention. As here illustrated, such means may comprise a member having an elongated portion 41 positioned in coplanar relation to slots 31, curved in conformity with the curvature of the handle 30, and of a width slightly less than the complementary inner transverse dimension of handle 30. From this plate portion 41 may project a lever or gripping portion 42 which extends freely through one of the slots 31. At its inner end, plate 41 is provided with a lateral enlargement 43 projecting through one of the slots for engagement with plate 36 at one point, and with an enlarged portion 44 at the opposite side thereof projecting through the other slot for engagement with plate 36 at a second point opposite the first point. A reduced dimension projection 45 is formed at each end of the plate portion 41 to mount a transversely disposed plate 46 of a contour complementary to the cross sectional contour of the handle 30, and of a size to fit closely but slidably within said handle. Plates 46 are preferably rigidly secured to the projection 45 of plate 41.

This embodiment of the invention has substantially the same advantage of resilience to accommodate bending in conformity with the contour of surfaces being cleaned as above described, as will be observed by reason of the fact that the spring 40 may be flexed laterally.

When a cleaning element of this embodiment is to be wrung, the member 42 is grasped and

pushed in the direction of the outer end of the device, that is, to the right as viewed in Figs. 6 and 7. The movement of the wringing mechanism is guided by end plates **46** on the member **41**. The enlargements **43** and **44** bear against the sliding plate **36** to urge the same in the direction of the plate **32** against the action of the coil spring **40**. The sponge rubber tube is compressed by this operation and, hence, excess liquid is extracted therefrom.

I claim:

1. A cleaning device comprising a handle, a pair of spaced opposed plates mounted transversely on one end of said handle, a tubular sponge rubber cleaning element having one end thereof clamped between said plates, and a coil spring bearing against the outermost plate at one end, said tubular cleaning element constrictively encircling said outermost plate and said spring, the outer end of said tubular cleaning element being folded around and confined within the outer end of said coil spring.

2. A cleaning device as defined in claim 1, wherein said outermost plate has an outwardly bent marginal flange of greater diameter than said spring.

3. A cleaning device as defined in claim 1, wherein said outermost plate has a plurality of tabs projecting therefrom and bent around the inner end of said spring to secure said spring thereto.

4. A cleaning device as defined in claim 1, wherein said tubular cleaning element is of a smaller normal inner diameter than the diameter of said spring, and the outer end of said element carries constricting means.

5. A cleaning device comprising a flexible and compressible shaping member, a hollow sponge rubber member having an inner dimension smaller than said shaping member and stretched around and carried by said shaping member, a handle, and means for securing one end of said shaping member to said handle, said sponge and shaping members comprising a compressible cleaning unit laterally flexible relative to said handle.

6. A cleaning device comprising a handle, a coil spring, means mounting said spring on one end of said handle, said spring being of larger diameter than the thickness of said handle, and an expansible tubular cleaning element having a normal inner diameter smaller than said spring and stretched around and carried by said spring, said spring and cleaning element being compressible and laterally bendable as a unit.

7. A cleaning device comprising a handle, a compressible coil spring, means mounting said spring on one end of said handle, said spring being laterally flexible relative to said handle, and a tubular sponge rubber cleaning element stretched around said spring and folded inwardly around the ends of said spring.

8. A cleaning device comprising a compressible coil spring, a tubular cleaning element formed of compressible material and constrictively encircling said spring, a handle, means mounting one end of said spring on one end of said handle whereby said spring is free to flex laterally and longitudinally, said means serving also to grip one end of said tubular element.

9. A cleaning device as defined in claim 8, wherein the tubular cleaning element is longer than said spring and is folded around and retained within the outer free end of said spring.

10. A cleaning device comprising a flexible, compressible resilient shaping member, a pair of opposed plates engaging the ends of said member, a compressible cleaning element encasing said shaping member and plates to form a cleaning unit, a handle fixedly mounting one plate and slidably mounting the other plate, and means slidably mounted on said handle for shifting said sliding plate against said resilient shaping member.

11. A cleaning device comprising a handle, a pair of plates carried by said handle, one of said plates being stationary and the other slidable on said handle, a tubular cleaning element whose opposite ends encircle said plates, a coil spring of a size substantially equal to said plates, said spring being positioned between said plates and confined by said tubular element, and means shiftably carried by said handle for shifting said sliding plate against the action of said spring.

12. A cleaning device as defined in claim 11, wherein said plates have marginal out-turned flanges around which the ends of said tubular element are folded and secured.

13. A cleaning element as defined in claim 11, wherein said plates are cup-shaped and have their concave faces outwardly disposed to receive the ends of said tubular element folded around the edges thereof, and expanding rings pressing said ends outwardly against the margin of said plate.

14. A cleaning device comprising a handle, a plate fixed on the end of said handle, a plate slidable on said handle, a coil spring encircling said handle between said plates, a tubular cleaning element encircling said plates and spring and secured at its ends to said plates, and an operating member slidably mounted on said handle and bearing against said slidable plate.

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