Nov. 10, 1936. L. G. NILSON 2,060,238

APPARATUS FOR AND METHOD OF CLEANING

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Fig. 1.

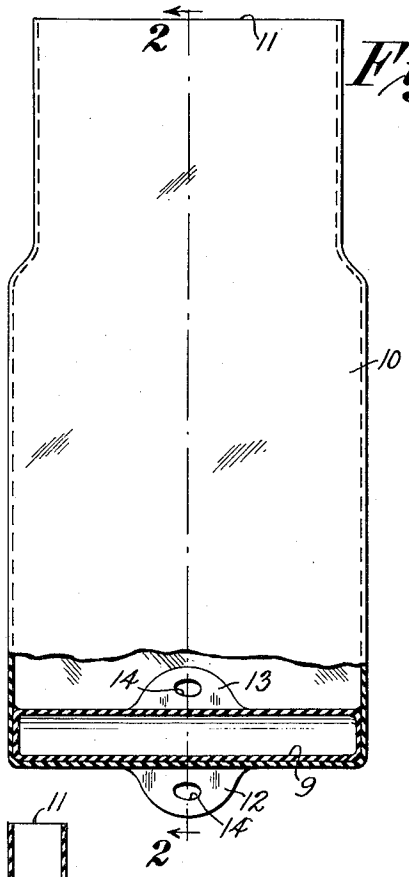
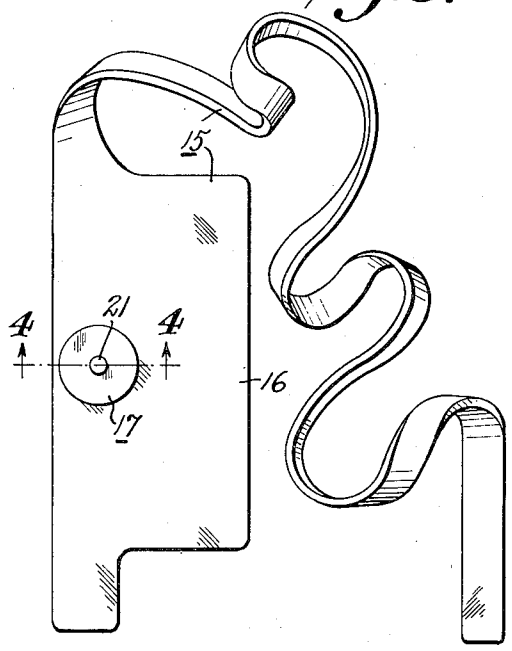


Fig. 3.



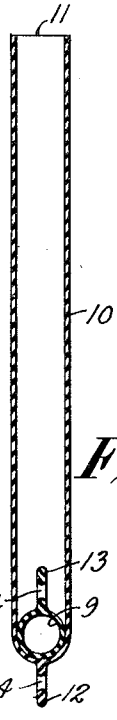


Fig. 2.

Fig. 5.

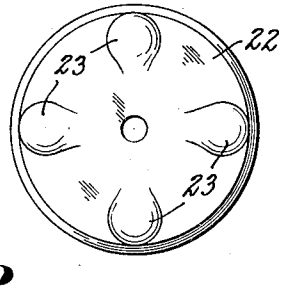


Fig. 4.

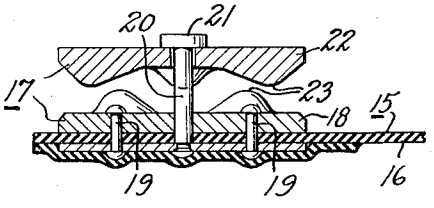
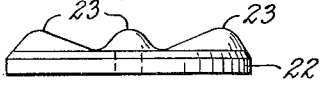


Fig. 6.



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APPARATUS FOR AND METHOD OF CLEANING

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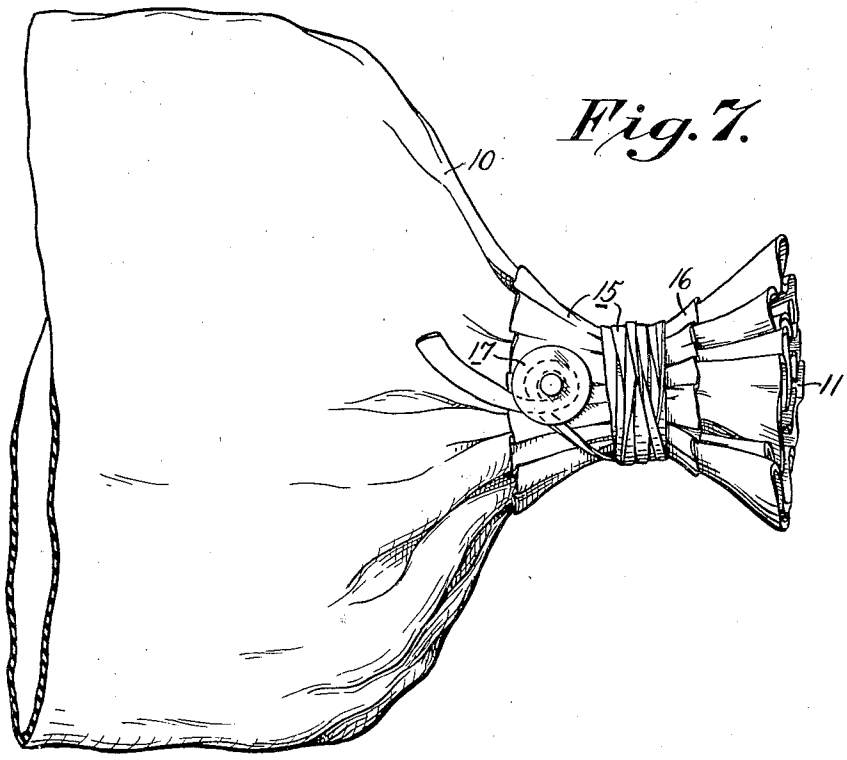


Fig. 7.

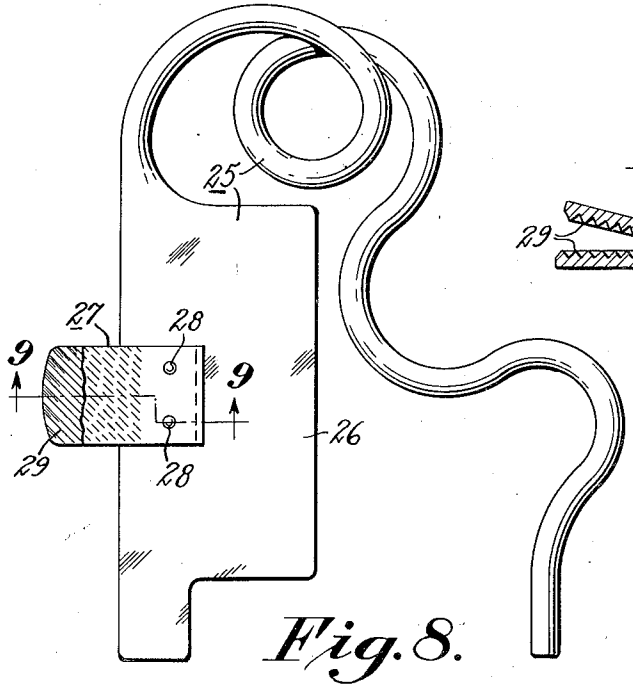


Fig. 8.

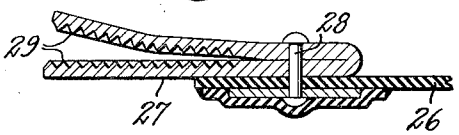


Fig. 9.

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UNITED STATES PATENT OFFICE

2,060,238

APPARATUS FOR AND METHOD OF CLEANING

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Application November 28, 1933, Serial No. 700,027

6 Claims. (Cl. 150—3)

My invention relates to the art of washing or cleaning and more particularly to washing or cleaning pliable fabric material, such as clothes. My invention is particularly well adapted for the washing or cleaning of articles made of comparatively delicate materials, such as silk and lace.

In the washing of fabrics with soap solution or other detergents, the removal of the dirt is accomplished both by the chemical action of the soap and the mechanical action caused by agitating the material with respect to the cleaning fluid. In the ordinary type of household washing machine this agitation is accomplished by some kind of rotating, oscillating or reciprocating agitation. While this action may be satisfactory for cleaning many of the more durable materials, many people hesitate to trust silk and other delicate materials to this agitating action. Furthermore, washing machines of this type are expensive and occupy a comparatively large amount of space.

Consequently, it is common practice to wash delicate fabrics by hand in a wash tub or basin. This necessitates placing the hands directly in the washing fluid and involves the possibility that the fluid will be spilled or splashed on the person doing the washing. There are other disadvantages to this kind of cleaning in an open vessel, particularly if chemical or odorous detergents are used.

The principal object of my invention is to provide a novel method of washing or cleaning and novel and compact apparatus for use in carrying it out. In accordance with my invention the fabric is placed in a fluid-tight bag or envelope which is partially filled with washing fluid and then sealed. Thereupon the envelope is manipulated by the hands as gently or as vigorously as may be desired. Thus, the most delicate of fabrics may be cleaned thoroughly without danger of injury and without the hands coming in contact with the washing fluid.

One of the objects of my invention is to provide a simple and efficient fluid-tight closure for a flexible envelope.

Other objects and the nature and advantages of my invention will be apparent from the following description considered in connection with the accompanying drawings which form a part of this specification and of which:

Fig. 1 is a side view, partly in cross-section, of a flexible water-tight envelope for carrying out my invention;

Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 shows a flexible elastic band for use in sealing the opening in the envelope shown in Fig. 1;

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a bottom view of a portion of the device shown in Figs. 3 and 4;

Fig. 6 is a side view of the device shown in Fig. 5;

Fig. 7 is a side view of the envelope shown in Fig. 1 when sealed with the band shown in Fig. 3;

Fig. 8 is a view of another type of sealing band; and

Fig. 9 is a cross-sectional view taken on the line 9—9 of Fig. 8.

Referring more particularly to Fig. 1, reference character 10 designates a bag-shaped envelope made of a suitable flexible fluid-tight compressible material, such as soft rubber. Envelope 10 may be of any desired shape, such as cylindrical or elliptical but preferably formed so that the envelope will be substantially straight and flat when empty. One end of the envelope is formed with a comparatively large opening or mouth 11, preferably large enough to admit a hand into the envelope. Opening 11 need not be as large as the largest diameter of the envelope, but should be large enough so that the material to be cleaned may be easily introduced and removed through it, and large enough so that the bag may be turned inside out. If desired, the envelope may be constricted somewhat adjacent to opening 11, as is shown in Fig. 1. The end of envelope 10 opposite opening 11 is provided with tabs 12 and 13, on both sides of the envelope. That is, when tab 12 is on the outside, tab 13 will be on the inside. When the envelope 10 is turned wrong side out, as may be desirable for drying it, tab 13 will be on the outside. Each of the tabs is advantageously provided with an aperture 14, so that the envelope may be hung up on a hook or the like. I preferably provide an internal round gas or air filled tube 9 inside the bottom of the envelope to facilitate manipulation as hereinafter explained.

In Fig. 3, there is illustrated a long flexible elastic band or strip 15 having free ends, the purpose of which is to seal the opening 11 in envelope 10. Band 15 may be made of good quality soft rubber and is of sufficient length so that it may be wrapped a great number of times around the envelope adjacent to opening 11, the turns of the band overlapping each other

in stretched condition. One end of band 15 is enlarged to provide an apron, as is indicated at 16. Secured to this enlarged portion of the band 15 is a device 17 whereby the other end of the band may be releasably secured in order to hold the band in wrapped and stressed position. As is clearly shown in Figs. 3 through 6, securing device 17 comprises a flat, preferably circular, disc 18 secured to band 15 by any suitable means such as rivets 19. Secured to disc 18 is a central pin 20 provided with a head 21. Loosely mounted on pin 20 between disc 18 and head 21 is a second disc 22. The adjacent faces of discs 18 and 22 are formed with an uneven surface in order that they may grip the other end of band 15 when the band is forced between them. In the embodiment here shown these uneven surfaces are obtained by forming semi-spherical knobs 23 on the adjacent faces of discs 18 and 22.

The operation of the above described structure to wash clothes is as follows:

The material to be cleaned is inserted in the envelope 10 through the opening 11. The cleaning fluid is also placed in the envelope. The cleaning fluid may be for example a solution of soap and water. Preferably the envelope is so filled as to leave an air space of approximately one-fourth or one-third of the volume of the envelope. Opening 11 is then sealed so as to prevent extrusion of water therefrom while the envelope is under pressure. This can be accomplished in a number of ways, but I have found the most suitable and the simplest way to be a band as shown in Fig. 3. The sealing takes place based on the following principle.

If a long rubber band is wrapped, turn after turn, under tension around an object, the turns overlapping each other, the tension of the separate turns is cumulative so that a tremendous force can be obtained. Suppose, for example, that there are ten turns and the tension supplied by each turn is two pounds. The net result of ten overlapping turns is to provide a cumulative pressure of the force of each individual turn multipled by the number of turns, or, in the illustrative example, twenty pounds. Such a cumulative force can be applied to a gathered rubber neck to squeeze the folds of the rubber so tightly as to prevent water passing through the channels of the folds. To accomplish this, the pressure must be so great as to reduce the channels so that, with pressure applied, water cannot seep out. The material must be squeezed together closer than an amount allowing capillary seepage. I have found that by applying a band or cord of stretchable nature so as to give cumulative force, the area of the channels between the folds of the rubber envelope can be reduced so as to effectively prevent any and all seepage.

It is well known that due to capillary action water or other fluid will seep through very minute openings. It is also recognized that considerable pressure is necessary to make a gasket tight against leakage. Mere contact, even of smooth surfaces, is not enough. By using compressible material for the envelope in combination with the cumulative elastic force means, I am able to close up all the crevices, regardless of how the mouth of the envelope is gathered.

Apron 16 provides a protection for the gathers of the envelope. This apron will also be gathered in the process of squeezing the folds of the opening, but it is not gathered to the same extent as the envelope and the elastic band might cut the sharp folds of the envelope itself, but the apron prevents abrasion or cutting of the envelope while permitting the application of a tremendous force to seal the envelope against capillary seepage. Thus I am able to provide a very great force for sealing the envelope although the application of force at any one time is not very great.

After wrapping the band under tension around the envelope a number of times, the end of the band is inserted under the catch formed by the discs 18 and 22 while the band is still under tension. The end of the band may be wound one or more times around the rivet or pin 20. The top disc, being loose and wobbly, tilts due to the uneven packing of the band around the discs, so that at least one of the knobs 23 on the upper disc 22 will not pass one of the knobs on the bottom disc 18. Thus the band will be caught and can be unwound only from its free end.

The band 15 should be of considerable length so as to wind around the envelope a relatively large number of times. Of course the number of turns depends upon the tension applied in wrapping the band, and consequently it should be of sufficient length to take care of the weakest tension which would normally be applied.

The envelope now being sealed with the material to be cleaned or washed inside, it may be allowed to stand for soaking, or some manipulation of the envelope may be made before soaking. A sufficient time should be allowed for soaking to allow the washing solution to penetrate every fiber of the fabric to be cleaned, so as to get under and loosen or dissolve the dirt. After soaking, the major manipulation or agitation takes place. This is best accomplished by rolling the envelope on a flat surface, such as a table, and from time to time squeezing the envelope. This working or agitation may be done in any desired manner, so as to cause the solution or cleaning fluid to move in contact with all parts of the material being cleaned. After the working of the envelope has taken place a sufficient time, the envelope is unsealed by removing the band 15 and the cleaning fluid allowed to drain out. The envelope may then be filled with clear rinsing fluid and sealed up in the same manner as above described, and manipulated so that the material is properly rinsed. This rinsing operation may be repeated as often as is desired. Thereafter, the same envelope may be used to dry the material being washed. In this step, the envelope with the material therein is rolled up tightly from the bottom end. This is facilitated by the round hollow tube 9 which acts as a sort of resilient roller to squeeze the fluid out of the crevices toward the open end of the envelope. The envelope can be emptied by turning it inside out.

It will be noted that the entire washing, rinsing and drying operations may be carried out without the necessity of the operator's hands coming in contact with either the cleaning or the rinsing fluid.

With my method, no force is applied directly to the clothes. The force or power is applied on the outside of the envelope and is directed to the cleaning fluid or water and is at all times under the control of the operator.

If it is desired to thoroughly dry the envelope it may be turned wrong side out and hung up by the tab 13.

In Figs. 8 and 9, there is illustrated a band or

strip 25 which serves the same purpose as band 15. One end of band 25 is enlarged to form an apron 26, and is provided with the releasable securing device 27. Securing device 27 comprises a V-shaped clip preferably made of metal, which is secured to the band by means of rivets or the like 28. The adjacent surfaces of the V-shaped clip are preferably formed with parallel diagonally extending grooves 29. The purpose of these grooves is to cause the end of band 25, when placed in the V under tension, to be drawn toward the apex of the V and hence to be securely wedged therein. The band 25 is employed to seal the envelope 10 in the same manner as previously described in connection with the band 15.

It will be appreciated that other clamping or sealing means may be used instead of a rubber band so far as the broad process of cleaning is concerned. For example, an encased spring may be used or a mechanical clamping device may be used having screw-threaded part for obtaining pressure. However I have found the above described structure to be most reliable and easy to use. It will also be appreciated that the specific sealing means may have other uses and that even solid things may be cleaned or sterilized in the envelope. Obviously the envelope need not be all made of one kind of material. The lower part of the envelope need not be made of resilient material.

While I have shown and described certain apparatus for carrying out my invention, it is to be understood that this is for the purposes of illustration only, and that my invention is to be limited only by the appended claims viewed in the light of the prior art.

What I claim is:

1. Apparatus of the class described comprising a fluid-tight envelope having a mouth for receiving material to be cleaned, the material of the envelope adjacent said mouth being flexible, resilient and compressible and means for sealing said opening comprising a flexible elastic band adapted to be wound many times around the gathered mouth of the envelope with superposed turns under tension so that the cumulative force squeezes the gathers at the mouth so close as to prevent seepage of fluid through the mouth, said band having an apron portion adapted to be disposed between the gathers of the envelope and the overlapping turns of the band.

2. Apparatus of the class described comprising a fluid-tight envelope having a mouth for receiving material to be cleaned, the material of the envelope adjacent said mouth being flexible, resilient and compressible and means for sealing said opening comprising a flexible elastic band adapted to be wound many times around the gathered mouth of the envelope with superposed turns under tension so that the cumulative force squeezes the gathers at the mouth so close as to prevent seepage of fluid through the mouth, said band having an apron portion adapted to be disposed between the gathers of the envelope and the overlapping turns of the band, and securing means on the apron portion.

3. A sealing member comprising a relatively wide piece of rubber, securing means thereon, and a relatively long band of rubber attached to said relatively wide piece and adapted to be held in said securing means.

4. Apparatus of the class described comprising a reversible fluid-tight envelope having a mouth for receiving material to be cleaned, the material of the envelope adjacent said mouth being flexible, resilient and compressible and means for sealing said opening comprising a flexible band adapted to be wound many times around the gathered mouth of the envelope with superposed turns under tension so that the cumulative force squeezes the gathers at the mouth so close as to prevent seepage of fluid through the mouth and tabs on the inside and outside of said envelope.

5. Apparatus of the class described comprising a fluid-tight envelope having a mouth for receiving material to be cleaned, the material of the envelope adjacent said mouth being flexible, resilient, and compressible, and means for sealing said opening comprising a flexible elastic strip having free ends adapted to be wound many times around the gathered mouth of the envelope with superposed turns under tension so that the cumulative force squeezes the gathers at the mouth so close as to prevent seepage of fluid through the mouth.

6. Apparatus of the class described comprising an envelope made of flexible, fluid-tight material and having a mouth for receiving material to be cleaned, and a resilient tubular member in said envelope at the end remote from said mouth.

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