Feb. 14, 1956 E. L. RICHARDSON 2,734,368

CYLINDER AND FLUID DISPERSING RIB

Filed Aug. 18, 1950 2 Sheets-Sheet 1

Fig. 1

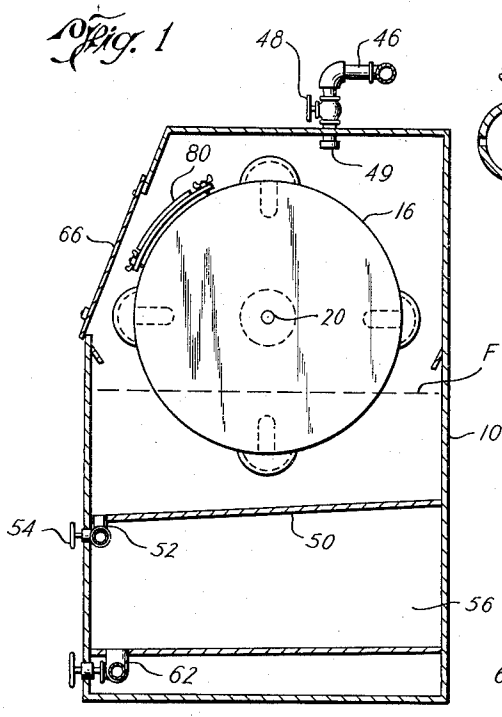


Fig. 2

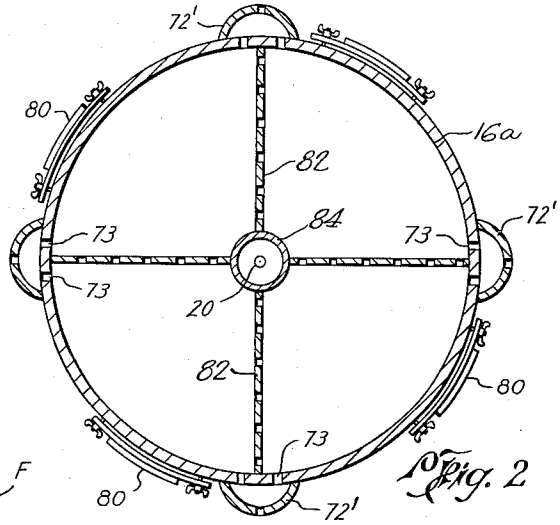


Fig. 7

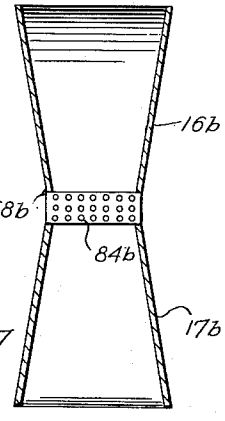


Fig. 8

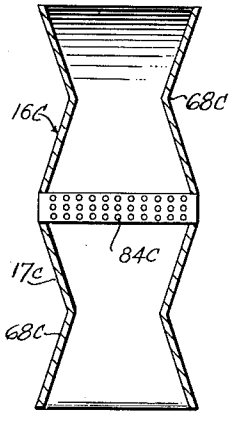
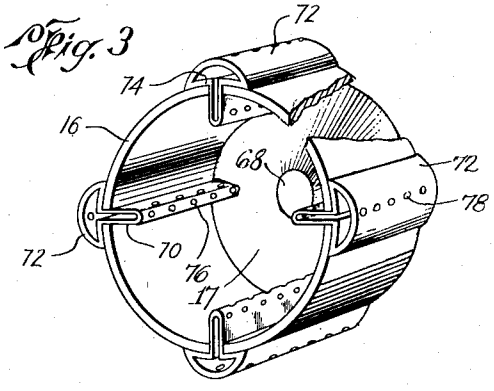


Fig. 3



Elmer L. Richardson
INVENTOR.

BY James H. Weiler

ATTORNEY

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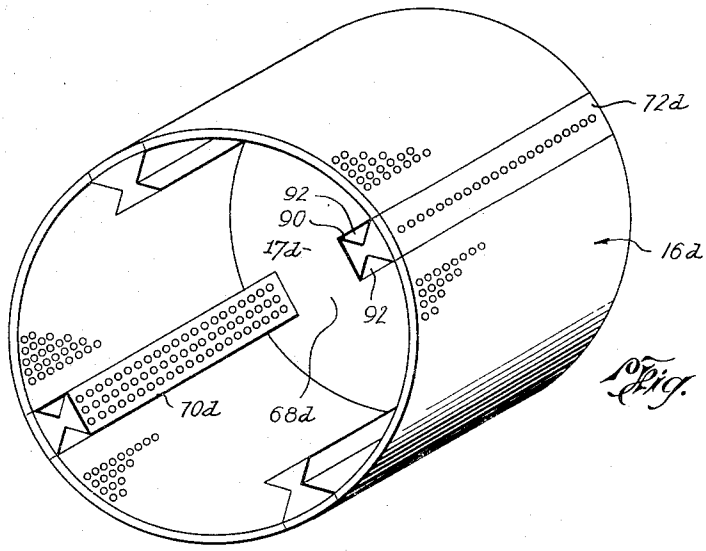


Fig. 4

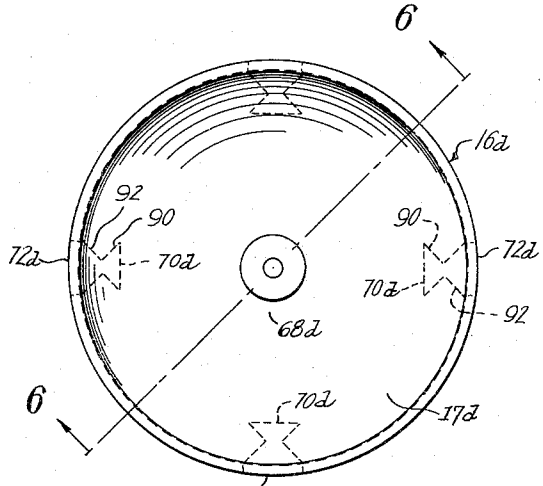


Fig. 5

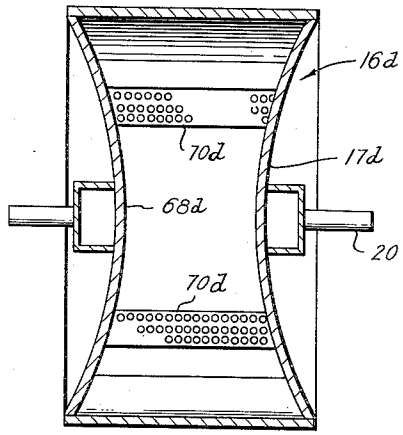


Fig. 6

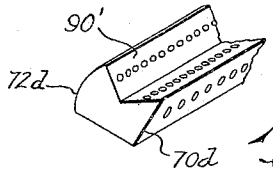


Fig. 9

Elmer L. Richardson
INVENTOR.

BY James H. Weiler

ATTORNEY

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CYLINDER AND FLUID DISPERSING RIB

Elmer L. Richardson, Houston, Tex.

Application August 18, 1950, Serial No. 180,211

3 Claims. (Cl. 68—142)

This invention relates to apparatus for cleaning or washing all character of fabrics and the like and more particularly relates to cylinders or drums and fluid dispersing ribs therefor.

The present invention is a continuation in part of my co-pending application Serial No. 109,497 filed August 10, 1949, now abandoned.

In the conventional washing or cleaning devices, particularly those having rotating fabric containing drums or cylinders to house the fabrics being treated, the latter become saturated with cleaning fluid and have a tendency to cling or adhere together in a common mass or aggregate as they revolve or tumble inside of the drum. Normally, lifting ribs are provided in these cylinders to lift the mass of fabrics to the top thereof, and the falling of the mass of fabrics pounds the latter against the bottom of the cylinder thereby providing a squeezing action to the mass and forcing cleaning fluid therethrough. The clothes or fabrics in the center of the aggregate tend to remain in place and do not receive as much squeezing action as those disposed at or near the periphery of the mass; consequently, relatively small amounts of fluids are forced through the centrally disposed fabrics of the aggregate. Moreover, the pounding action produced by the mass falling from the top to the bottom of the cylinder causes considerable wear and tear on the fabrics being treated as well as breaking buttons, ornaments and the like disposed thereon.

Accordingly, it is one of the principal objects of my invention to provide an improved cylinder for washing or cleaning apparatus which will provide a squeezing action to the mass of fabrics in addition to that of the pounding action of the falling mass.

A feature of my invention is the provision of means which will interrupt or slow down the descent of the mass of fabrics from the top to the bottom of the cylinder to minmize wear and tear of the fabrics being cleaned, to minimize breakage of buttons, ornaments and the like, and which cooperates to produce a more uniform dispersion of fluid throughout the mass.

A further feature of my invention is the provision of a cylinder which will continuously separate or rearrange the fabrics from or in the common mass as the latter fall from the top to the bottom of the cylinder and which will prevent the clothes from becoming a revolving or tumbling substantially common mass or aggregate, thereby providing uniform squeezing or forcing of cleaning or washing fluid through the fabrics rather than merely providing such action in or near the outer edges of the aggregate.

It is necessary to the proper cleaning of fabrics that cleaning fluid be evenly and continuously dispersed throughout the fabrics to be cleaned, and in the conventional apparatus, cleaning fluid is not so dispersed on the fabrics when the mass is at the upper portion of the cycle of the fabric containing rotors. Accordingly, it is one of the major objects of my invention to provide means to continuously sprinkle and substantially evenly disperse fluid onto the fabrics during the upper portion of the cycle of the fabric containing rotors.

A further object of my invention is the provision of an apparatus fulfilling the above objects and possessing the above features which may be easily and inexpensively manufactured both for commercial and home use and which is efficient and simple of operation.

A still further feature of my invention is the provision of a cylinder which will continuously separate or rearrange fabrics from or in the common mass as the latter falls from the top to the bottom of the cylinder whereby the fabrics may be more readily aerated and dried.

A still further feature of my invention is the provision of a cylinder in which the cleaning or washing occurs at substantially the central portion of the cylinder rather than at the bottom of the cylinder and, accordingly, a constant fluid level in the machine is not necessary.

Other and further objects and features will be apparent from a detailed description of a preferred embodiment of my invention, which is by way of description and not limitation, and by reference to the drawings where like character references designate like parts throughout the several views and wherein

Fig. 1 is a side elevation in section illustrating an apparatus embodying an embodiment of my invention,

Fig. 2 is a vertical sectional view illustrating one form of my fabric containing rotor or cylinder,

Fig. 3 is a perspective view of my improved cylinder with parts broken away, and illustrates an example of my novel rib construction,

Fig. 4 is a perspective view of my improved cylinder with one of the side walls removed illustrating a further example of my novel rib construction,

Fig. 5 is a side elevation of the construction illustrated in Fig. 4,

Fig. 6 is a sectional view taken along the line **6—6** of Fig. 5,

Fig. 7 is a vertical sectional view illustrating a modification of my fabric containing rotor or cylinder,

Fig. 8 is a cross-sectional view illustrating a still further modification of my fabric containing cylinder or rotor, and

Fig. 9 is a fragmentary view of a modification of my rib.

Referring to the drawings and particularly to Fig. 1 the reference numeral **10** designates the case of a washing or cleaning apparatus in which my novel cyllinder **12** may be disposed. As illustrated cleaning or washing fluid may be supplied to the apparatus by means of the header **46**, controlled by the valve **48** and nozzle **49**.

A false bottom **50** may be provided which slopes downwardly to the valved drain pipe **52** by which fluid is expelled from the chamber **10**. By manipulating the valve **54** fluid may be permitted to flow into the compartment **56** to serve as a ballast and I have provided the valved outlet **62** whereby cleaning fluid may be expelled from the casing **10**. Any conventional type of cleaning or washing fluid may be supplied, such as water, steam or carbon tetrachloride and the like, and if desired, the fluid may be permitted to maintain a fluid level F in the compartment. However, it is not necessary to maintain such a fluid level for reasons which will be apparent later. In order that clothes may be inserted into the apparatus I have provided the door **66** at the upper portion of the case **10** and the cylinder **16** is secured in the device by means of the stub shafts **20**, the cylinder being powered by any conventional means through suitable linkage not shown. For a more detailed description of an apparatus utilizing my novel cylinder and tumbling or lifting ribs reference is made to my co-pending application above identified.

Turning now to my novel cylinder and fluid dispersing ribs reference is made to Fig. 3 and, as illustrated, the outer substantially cylindrical peripheries of the fabric containing cylinders **16** are perforate in order that fluid may be freely admitted to the interior of the cylinder. In order to avoid the fabrics housed in the revolving containers **16** from becoming a common tumbling mass or aggregate, and to break the fall of the mass of fabrics from the top to the bottom of the cylinder I have provided materially inwardly bowed or dished ends **17** to the cylinders **16**, the internal narrowing preferably being at the central portion **68**. This is best illustrated in Fig. 6. Thus as the cylinders **16** revolve or tumble, the fabrics therein are lifted by the radial ribs **70** to an uppermost position in the fabric containing cylinders, and as the mass of fabrics fall from the top to the bottom of the cylinder, the inwardly narrowed portion **68** squeezes or compresses the clothing or fabrics during their downward fall thereby working the fluid more uniformly through the mass of fabrics and thereby separating the fabrics as they pass beyond the inwardly converging portion **68** and fall against the bottom of the revolving container. Thus a squeezing action is produced at the central portion of the revolving container **16** and the actual cleaning or washing of the fabrics to a large extent takes place at the central portion of the cylinder in addition to the pounding action produced by the clothing falling from the top of the cylinder. Thus as the rotors **16** revolve this process is repeated and it seems obvious that a substantial working of cleaning fluid through the fabrics is obtained as well as a constant separating or rearranging of the fabrics in the mass whereby all fabrics being treated have fluid worked therethrough rather than merely those fabrics disposed at or near the outer edges of the mass as in the conventional cleaning or washing apparatus.

As illustrated in the drawings I have developed a combination fluid disperser and lifting rib which cooperates to lift the fabrics housed in the fabric containing cylinder and to provide a constant spray of cleaning fluid to the fabrics being cleaned.

In Fig. 3 I have illustrated the combination lifting rib and fluid disperser as having the hollow radial rib portion **70** which extends inwardly a short distance from the inner periphery of the substantially cylindrical walls of the fabric containing cylinder. The ribbed portion is preferably integral with a fluid receiving and containing member **72** disposed on the outer periphery of the cylinder, and this member may have the generally semi-cylindrical portion and an inner body member **74** of a configuration to fit snugly on cylindrical portions of the revolving drums **16**. As illustrated the outer body member of the lifting rib is hollow and communicates with the hollow lifting rib **70**, and the apertures **76** and **78** are provided in the rib and body member respectively. While I have illustrated four combination ribs or fluid dispersers, it is apparent that any number may be used in operation. Thus as the drum **16** containing the fabrics, not shown, are rotated and as the ribs pass through the body of fluid in the lower portion of the compartment **10**, the body members and ribs will be substantially completely filled with cleaning fluid. As the rib passes through the upper portion of the revolution of the rotor **16** the fluid will be sprayed onto the fabrics thereby providing a constant supply of cleaning fluid to the fabrics to be cleaned. While I have shown a plurality of rows of apertures in the rib and body portion thereof, it is apparent that any arrangement may be utilized, but I prefer the arrangement illustrated as this arrangement will tend to retain sufficient fluid through the upper portion of the revolution to provide adequate spraying of fluid therethrough and will not commence to spray fluid onto the fabrics until the ribs are in an approximately horizontal position.

It is believed that the operation of my cylinder and fluid dispersing ribs is apparent from the above description of an embodiment thereof, but by way of recapitulation the apparatus may be operated in the following manner. The door **66** of the housing **10** may be opened and the cover **80** of the fabric containing cylinder opened and the fabrics to be cleaned deposited in the cylinder **16**. After closing these covers or doors, the cylinder is rotated by a conventional source of power through conventional linkage, not shown, and the valve **48** may be opened and cleaning fluid admitted through the spray nozzle **49** to the top of the compartment **10**, which fluid will spray onto the perforate cylinder **16**. As the cylinder revolves the ribs **70** will lift or tumble the fabrics and the fabrics will be continuously falling through the inwardly narrowed or bowed portion **68** of the cylinders **16** thereby forcing or squeezing fluid through the mass of fabrics and providing constant relative movement of the fabrics in the common aggregate. As the ribs revolve through the fluid in the bottom of the compartment the fluid containing portion of the ribs **70** will become filled with fluid and the ribs **70** will constantly spray cleaning fluid upon the fabrics in addition to the spray from the spray nozzle **49**. If desired, the valve **54** may be adjusted so that a constant fluid level F is maintained, however, a constant fluid level is not necessary inasmuch as the cleaning action in the cylinder substantially takes place in the central portion of the cylinder.

Cylinders constructed according to the present invention include the omission of fluid dispersing ribs, conventional type lifting ribs being substituted therefor. It is manifest, however, that my lifting ribs have many advantages.

A modified form of my cylinder is illustrated in Figure 2. In this modification the cylinder is divided into diametrical or radial compartments, here illustrated as four compartments, by means of the diametrically disposed perforate plates **82**. These plates extend from the periphery of the cylinders and serve to lift the fabrics in place of the ribs **70**; consequently, these ribs may be omitted in this modification. It is desirable, however, to utilize the outer body members **72'** of the ribs, and in this event the outer body members **72'** may be secured directly to the outer surface of the cylinder **16*a***, the inner walls **74** being omitted and the apertures **73** provided in the cylindrical walls of the cylinder **16*a*** so that fluid may flow from the body members **72'** into the cylinder **16*a*** and onto the fabrics being cleaned. In his modification the cylinder **16*a*** has inwardly bowed ends as in the preferred form, and the fabrics are compressed and sqeezed at the top of the revolution by falling into the vertex formed by the sides and partitions **82** of the cylinder **16*a***. A perforated hub **84** may be provided about the shaft **20** to prevent the falling of fabrics on the shaft **20** for the purpose of preventing wear and tear of the fabrics being cleaned in the event it is desired to extend the shaft **20** axially through the cylinders as illustrated. While the cylinder **16*a*** has been divided into four compartments it is apparent that two or more compartments may be formed, and it may be desirable when employing a relatively smaller number of compartments to space lifting ribs above the cylinder. This modification is more useful in commercial models where relatively large cylinders are employed and permits fabrics or clothes to be admitted periodically to the cleaning cylinder as they are taken into the establishment rather than waiting for a large batch of clothing before starting the cleaning operation.

The operation of this modification is the same as the above except that fabrics may be placed into one of the divisions of the cylinder and others added as separate batches from time to time as desired. It is desirable, however, in order to avoid contamination of one type of fabric with lint and dirt of another, that the same type of fabrics be placed in the several compartments of the same cylinder.

A still further modification of my cylinder is illustrated in Figure 7 where the reference letter "*b*" has been added to corresponding parts illustrated in Figure 2. This modification is in all respects similar to that of Figure 2 except that the plates **82** have been omitted thereby providing a single cylinder with the perforated hub **84** through the center. Thus, as fabrics are washed or cleaned in the cylinder **16***b* they will be subjected to the same squeezing action except that they will tend to fall and move around the perforated hub **84**. All remaining parts are the same as that described in connection with Figure 2 and no more detailed description thereof is deemed necessary.

A still further modification of my cylinder is illustrated in Fig. 8 where the reference letter "*c*" has been added to like or corresponding parts for convenience of reference. This modification is similar to the above described modified cylinder **16***c* in all respects except that the ends **17***c* are inwardly bowed substantially midway between the periphery and the hub or axle of the cylinders as at **68***c* rather than being dished at the central portion. In this modification the operation is similar to that described above, the squeezing action taking place as the fabrics descend or tumble similar to that described in the preferred embodiment. Here, as in the other modification, the cylinder is preferable for commercial use as a large cylinder may be used, and the fabrics are not permitted to fall a great distance, thereby saving wear and tear and minimizing breakage of buttons, ornaments and the like.

A modification of my ribs is illustrated in Figs. 4 and 5, where corresponding parts have the letter "*d*" added for convenience of reference. In this embodiment the rib **70***d* has the outer surface **72***d* flush with the outer perimeter of cylinder **16***d* and the inwardly extending sides **90** are imperforate and have the axially extending V-shaped portion **92** whereby as the ribs pass through the lower portion of the cycle fluid is picked up and held in the dished sides **92** of the ribs **70***d* and the fluid is dispersed onto the fabrics during substantially the upper portion of the revolution of the cylinder **16***d*. While I have illustrated both sides as being V-shaped, which is particularly adapted for cylinders which are reversed, only the side **90'** in the direction of rotation may be V-shaped for non-reversing cylinders as illustrated in Fig. 9. If desired, the V-shaped side **90'** may be perforate or imperforate. In all other respects the modifications illustrated in Figs. 4, 5 and 9 are the same as disclosed in the above modifications.

While for the purpose of the disclosure the particular use of my drum and ribs have been directed toward cleaning or washing machines it is apparent that my drums and ribs have utility in other and different combinations; for example, such could equally well be used in a dyeing machine combination or, if desired, air may be selectively admitted to the compartments by conventional means and the fabrics dried and aerated by means of the tumbling action of my novel cylinder.

It seems manifest that many changes may be made in the details of construction of my tumbling drums and ribs without departing from the scope of my invention. For example, the ribs **70** may be helically disposed in the cylinders; however, the ribs of the embodiments of Figs. 4, 5 and 9 should be axially positioned. Thus I do not intend to limit myself to the details of the description and the examples of my invention illustrated for the purpose of the disclosure, but only by the spirit of the invention as set forth in the appended claims.

I claim:

1. The combination in a fabric washing and cleaning machine of a substantially cylindrical rotatable cylinder, sides of said cylinder having perforations therein, said cylinder adapted to contain fabrics, inwardly bowed ends on said cylinder extending inwardly a substantial distance and defining a restricted passageway, and tumbling means secured to said cylinder, said tumbling means comprising a hollow fabric tumbling rib extending inwardly from the periphery of the cylinder and a hollow body member integral with said rib extending outwardly from said periphery, said inwardly extending rib and body member containing apertures whereby washing or cleaning fluid may flow into the body member and be dispersed by said rib onto said fabric.

2. The combination in a fabric washing and cleaning machine of a substantially cylindrical rotatable cylinder, sides of said cylinder having perforations therein, said cylinder adapted to contain fabrics, inwardly bowed ends on said cylinder extending inwardly a substantial distance and defining a restricted passageway, and tumbling means secured to the cylinder, said tumbling means comprising at least one rib including a radial hollow fabric tumbling member extending radially and inwardly from the periphery of the cylinder, and a hollow body portion communicating with said member and extending outwardly from said periphery, said body member and tumbling member containing apertures whereby washing or cleaning fluid may flow thereinto and be dispersed thereby on said fabrics.

3. A fabric washing and cleaning machine comprising, a hollow and elongated rotor, said rotor having perforate sides, and bowed ends extending inwardly a substantial distance and defining a restricted passageway whereby fabrics contained in such rotor are dropped into said passageway and squeezed therein, and at least one tumbling rib secured to the periphery of said rotor, said tumbling rib comprising a hollow fabric tumbling member extending radially and inwardly of the periphery of the cylinder, and a generally semi-cylindrical hollow body portion communicating with said tumbling member and extending outwardly from said periphery, and apertures in the leading side of said tumbling member and in said body portion whereby washing or cleaning fluid may flow thereinto and be dispersed thereby onto said fabrics.

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