April 15, 1952 H. D. HALEY 2,592,562

METALLIC BUCKET LINER

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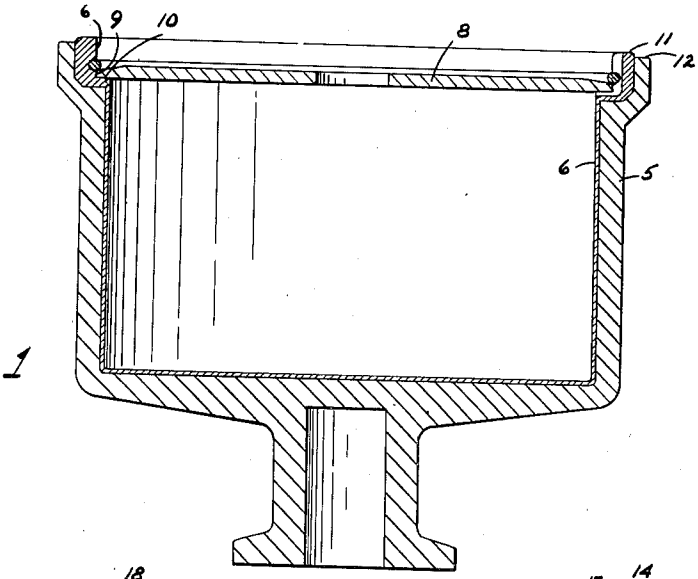


Fig. 1

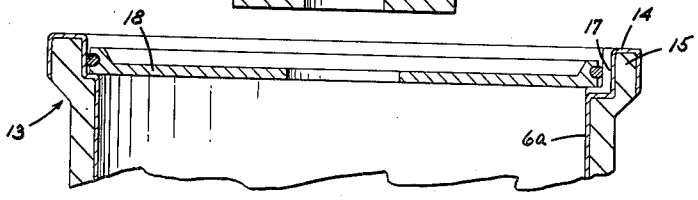


Fig. 2

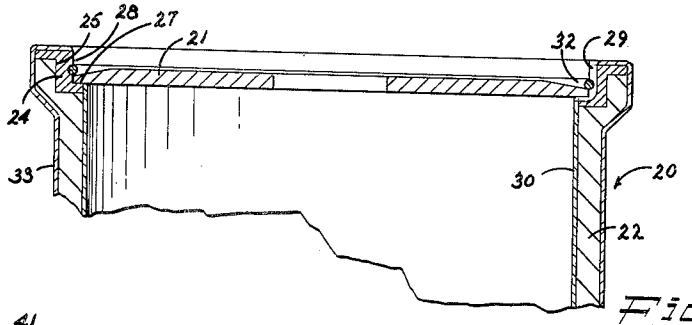


Fig. 3

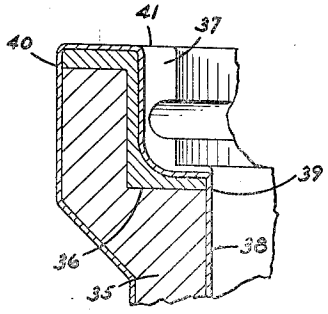


Fig. 4

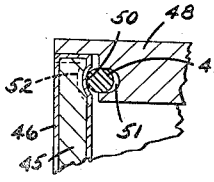


Fig. 5

INVENTOR.
HUGH D. HALEY
BY
Thomas O'Malley
ATTORNEY.

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METALLIC BUCKET LINER

Hugh D. Haley, Drexel Hill, Pa., assignor to American Viscose Corporation, Wilmington, Del., a corporation of Delaware

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8 Claims. (Cl. 57—76)

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The present invention relates to corrosion-resistant spinning buckets of metallic construction.

Spinning buckets fabricated from metallic materials which are sufficiently inexpensive to permit their use in large scale production, such as aluminum and various types of stainless steel, are not entirely resistant to chemical attack from the acid and other corrosive materials which are present in the spinning operation of the viscose process for making rayon yarn. It is customary to protect such buckets from corrosion by applying a coating material to the surfaces thereof. Although there are many coating materials, such as those of the resinous types, which may be applied to the surfaces of the bucket to provide efficient corrosion-resistance, such materials are, in general, not sufficiently abrasion-resistant to withstand the chafing and abrasion which occurs along the surface of the bucket in contact with the bucket lid or cover. The metallic base material of the bucket body becomes exposed as the coating wears away or becomes chipped or otherwise perforated, and thereafter rapidly deteriorates from reaction with the corrosive materials carried into the bucket by the yarn. Such resinous coating materials as have heretofore been applied to buckets lack the toughness or durability to withstand the wear occurring along the upper edge of the bucket when the bucket is decelerated to a stop by applying a lever or canvas to the rim as a brake. Moreover, such resinous coatings are often chipped or perforated along the upper edge of the bucket when the bucket is removed for cleaning or for extracting a yarn package.

It is an object of the present invention to provide a bucket of composite construction comprising a metallic body lined in such a manner as to render the body exceedingly resistant to corrosion particularly along the inner surfaces thereof and to provide a cake-forming surface which facilitates cake removal. It is also an object to provide a spinning bucket of essentially metallic construction having surfaces which engage or come into contact with the cover of the bucket which do not require the protection of a conventional coating material. It is still another object to provide a spinning bucket which is easily and inexpensively constructed and requires little or no maintenance. Other objects, features and advantages will be apparent from the following description of the invention and the drawing relating thereto in which

Figure 1 is an elevation in section of a spinning bucket in accordance with the invention and a cover therefor;

Figure 2 is a fragmentary section view of a bucket of modified construction and a cover therefor;

Figure 3 is an elevation in section of a modified bucket and a cover therefor;

Figure 4 is an enlarged fragmentary sectional view of a modified bucket; and

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Figure 5 is a fragmentary sectional view of a modified bucket and cover.

The objects of the present invention are accomplished by providing a spinning bucket of composite construction comprising a metallic body having a non-metallic protecting layer along the surfaces thereof and particularly along the seating surface for the cover, the layer comprising a mixture of a resinous binder and a fibrous filler in permanent adhesive relationship with the surface of the body.

Figure 1 illustrates a bucket body 5, preferably fabricated from aluminum or other high strength light-weight metallic material, and a protective layer in adhesive relationship with the inner surface of the body to form a permanently attached cake-forming surface. Because of the greater wear occurring along the surfaces 9 and 10 for centering and seating the cover, the rim of the bucket body 5 is recessed to allow the application of the material of layer 6 in greater thickness. The rim portion of the layer 6 is molded or formed with a rounded ridge 11 which protects the adjacent metallic section 12 when a brake is applied to the rim of the bucket, or the bucket is up-ended and dropped on its rim to loosen a cake of yarn contained therein.

In forming the layer 6, any inexpensive paper or fibrous material properly impregnated with a resinous binder of the types hereinafter listed may be used. Although a preferred binding material for the paper is diallyl phthalate because of the smoothly polished or glossy finish with which an acid-resistant protective layer may be formed, other resins which are readily acceptable are various condensation products of a polyhydric-alcohol and a polybasic acid; phenol-aldehyde and urea-aldehyde resins; polymers of halogenated ethylenic compounds, particularly those of the fluorinated types; resins formed from acrylic acid, its homologues and their derivatives; resins from dicarboxylic acids and diamines (nylon type); silicone resins of the polyorganosiloxane and polysiloxane types; and various mixtures of the above recited resins.

The filler entering into the construction of the protective layer secured to the inner surface of the metallic bucket body may comprise an inexpensive paper consisting essentially of wood pulp or vegetable fiber, or mats or webs of such fibrous materials as hemp, flax, jute, kapok, silk, glass fiber, asbestos, and the like.

Figure 2 illustrates a bucket 13 of modified construction of which the protecting layer of the invention has been extended over the top edge of the rim section 15 and along a portion of its exterior surface. The layer 14 may be formed of any thickness desired over the top of the flange to allow for wear such as might result from the practice of applying a lever or canvas brake to the rim of the bucket. A plurality of grooves 17 are provided along the rim of the bucket through

which liquid may pass around the edge of the cover 18 to leave the bucket. The layer 14 conforms to the contour of these grooves. The surfaces of the metallic body member of the bucket are machined to any degree necessary to allow for any desired thickness of the layer upon the body surfaces within the dimensions of the finished bucket.

Figure 3 illustrates a bucket 20 with a cover 21 seated within the rim thereof. The bucket 20 comprises a body 22 preferably of aluminum and an insert 24. The rim of the metallic body 22 is recessed at 25 to receive the insert 24 which has an inner surface providing a shoulder or surface 27 for seating the cover, and a cylindrical surface 28 for centering the cover. A plurality of grooves 29 extend transversely of the surfaces 27 and 28 for draining liquid or liquid-borne materials from the bucket. Preferred materials from which to fabricate the rim insert are those which have high resistance to corrosion such as the compositions already described with respect to the protective layer 6 and 6a of Figs. 1 and 2 respectively.

The insert 24 may be preformed and applied to the rim of the bucket and the layer 30 comprising a mixture of fibrous filler and resinous binder applied later, or the protective material covering the entire inner surface of the bucket including the rim section may be applied in a single operation. As shown in Fig. 3, the portion of the protective layer comprising the section 24 is formed in greater thickness to permit considerable wear along the seating surface 27 before it it necessary to discard or recondition the bucket. The greater thickness of the protective material within the rim is necessary also if the design of the bucket is such that a lock ring 32 is required to hold the cover 21 in place. Since the outer surface of the bucket is not subjected to appreciable wear and does not affect the formation of cakes or the separation thereof from the bucket, an outer coating 33 of the body 22 may comprise a conventional resinous material, for example, a vinyl resin such as polyvinyl chloride or a phenol-formaldehyde product.

Since the wear to which the bucket is subjected occurs generally along the inner and upper surfaces of the rim, particularly such surfaces as are adjacent the periphery of the cover during operation, it is entirely within the scope of this invention to apply the mixture of filler and binder such as hereinbefore described only to the rim section of a bucket body 35 as shown in Fig. 4 to form a non-metallic cover-receiving element 36. The element or insert 36 is also readily prefabricated separately from the bucket and then later secured thereinto. When prefabricated inserts comprising a phenol-formaldehyde, urea-formaldehyde or alkyd resinous binder are used to obtain a rim liner of extra thickness, it is advisable to subject the inserts before final finishing to a heat treatment so that no deformation or shrinkage of the inserts will occur after the buckets are put into service. A heat treatment yielding satisfactory results consists of subjecting the unfinished inserts or the stock from which they are formed to an atmosphere having a temperature of 250° F. for 40 hours. The remaining surfaces of the bucket may be coated with a conventional non-corrosive resinous material such as one comprising essentially an alkyd resin, a vinyl resin, or a urea-formaldehyde or phenol-formaldehyde condensation product.

The insert 36 is permanently secured within

the bucket rim in any desired manner such as by cementing it thereto with an acid-proof cement or heat-hardenable resin such as formed by a condensation reaction, or by shrink-fitting such as obtained by machining the surfaces of the bucket recess to a diameter which is slightly smaller than the outer diameter of the insert, then heating the rim of the bucket before positioning the insert within the bucket rim and allowing the rim to shrink tightly around the insert. A preformed insert may also be secured to the bucket rim in threaded relationship, or by keying the insert to the bucket, or by punching or rolling the rim of the metallic body against the insert. The insert may be formed within the rim of the bucket body by well-known low pressure techniques wherein a heat-sensitive plastic material is subjected to molding and a heat treatment by shaping the material to a desired contour by means of a steam heated mold or a curing bag of the desired complementary shape.

When a conventional coating material is to be used along the cake-forming surfaces of the bucket and particularly when the buckets are to be used to collect viscose yarn, the body portion 35 with the insert 36 permanently secured therein is coated with a corrosion-resistant material 38 having a smooth surface which facilitates the removal of packages. In the present invention, it has the further object of sealing the joint between the element 36 and the bucket body at 39 and 40. When the buckets are to be used to collect viscose yarn, it is quite important that the material forming the coating 30 be carefully and adequately applied to the adjacent surfaces of the body and the insert which meet along lines 39 and 40 so as to fill any slight separation thereof in the event there have been slight inaccuracies in forming the recess of the bucket rim, or in fabricating or molding the insert. In order that the element 35 will not have a tendency to work loose from the body rim, it is preferable that a substantial portion of the surface of the recess and the complementary surface of the insert be cylindrical without any appreciable taper.

Escape paths are generally provided for the liquid material carried into the bucket by the yarn. Apertures extending through the wall of a bucket are a source of corrosion trouble in spite of the best coating techniques, it is preferable in the practice of this invention to provide the insert with a plurality of grooves 37 of which one is cut by the plane of section in Fig. 4. The grooves 37 extend between the cylindrical cake-forming surface 38 of the bucket at 39 and the upper surface of the insert at 41. Provision in this manner for the escape of liquids from the strand material contained within the bucket is particularly facilitated when the cake-collecting surface of the bucket tapers to a slightly greater diameter toward the end thereof defined by the seating surface of the cover. In such a bucket, and in buckets of internal cylindrical contour as well, any liquid is centrifugally urged to this end of the cake-collecting surface and will escape therefrom along the grooves 37 which are contiguous with the yarn-collecting region of the bucket. Similar grooves may be provided within the rims of the other embodiments herein illustrated and described.

Figure 5 illustrates in fragmentary section a metallic bucket body 45 having a fibrous resin impregnated layer 46 overlaying the exterior of the body. The bucket body is straight sided without an enlarged rim section to provide a light

weight construction. A cover 48 for the bucket is seated on the top edge of the bucket and is secured in somewhat locked relationship with the bucket by a resilient ring 49 which expands into a groove 50 of the bucket. The ring 49 is supported loosely within a groove 51 of the cover and during rotation the ring 51 expands away from the inner diameter of the groove 51. The rim of the bucket is provided with a plurality of drainage grooves such as the groove 52. The layer 46 also covers the surfaces of the grooves 50 and 52.

While preferred embodiments of the invention have been shown and described, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A spinning bucket for building a substantially cylindrical yarn cake comprising a metallic body having a recessed rim section and a cover, the body comprising an annular corrosion-resistant insert secured within the rim section in continuous contact with surfaces thereof, said insert having an inner cylindrical surface of slightly greater diameter than the cover and another offset inner surface of a diameter equal to that of the cylindrical cake-forming surface of the bucket, and an annular surface extending between said two surfaces of the insert having different diameters to form a seating surface for the cover, a protective coating for the interior surface of the body and the portion of the insert having the same diameters, said coating having a smoothly polished surface and comprising paper filled with a corrosion-resistant resinous binder.

2. A spinning bucket comprising a cover and a metallic body; the body having a circularly recessed rim portion, an annular insert of corrosion-resistant material secured within the rim portion with surfaces thereof in substantially continuous contact with the surfaces of the recess, said insert having an inner circular surface of slightly greater diameter than the cover and a smaller offset inner concentric surface of a diameter equal to that of the cake-forming surface of the body, and an annular surface extending between said inner surfaces of the insert for seating the cover.

3. A spinning bucket as in claim 2 wherein the insert comprises a composition which is essentially a condensation product of phenol-formaldehyde.

4. A spinning bucket as in claim 2 wherein the insert comprises a composition which is essentially a mixture of fibrous material and a condensation product of phenol-formaldehyde.

5. A spinning bucket comprising a cover and a metallic body; the body having a circularly recessed rim portion, an annular insert of corrosion-resistant non-metallic material secured within the rim portion with surfaces thereof in substantially continuous contact with the surfaces of the recess, said insert having an inner circular surface of slightly greater diameter than the cover and a smaller offset inner concentric surface of a diameter equal to that of the cake-forming surface of the body, an annular surface extending between said inner surfaces of the insert for seating the cover, said insert also having a plurality of axially-extending grooves through which to discharge liquid from the bucket extending from the smaller concentric surface through the annular seating surface and upwardly along the surface of greater diameter to the top of the bucket.

6. A spinning bucket comprising a cover and a metallic body; the body having a circularly recessed rim portion, an annular insert of corrosion-resistant material secured within the rim portion with surfaces in substantially continuous contact with the surfaces of the recess, said insert having an innner circular surface of a diameter equal to that of the cake-forming surface of the body and an inner concentric surface of larger diameter slightly greater than that of the cover, an annular seating surface extending between said inner surfaces of the insert for seating the cover, and a circumferentially extending groove in said surface of larger diameter and a resiliently flexible lock ring having an extreme diameter substantially equal to that of the bottom of the groove for holding the cover against the seating surface.

7. A spinning bucket comprising a cover and a metallic bucket body; the cover having a circumferentially extending groove within its peripheral surface, a resiliently flexible ring supported within the groove having a diameter slightly greater than the peripheral surface of the cover; and the body having a circularly recessed rim portion, an annular insert of non-metallic corrosion-resistant material secured within the rim portion with surfaces thereof in substantially continuous contact with the surfaces of the recess, said insert having an inner substantially cylindrical surface of slightly greater diameter than the cover and a smaller offset inner concentric surface of a diameter equal to that of the cake-forming surface of the body and an annular surface extending between said inner surfaces of the insert for seating the cover, and a corrosion-resistant resinous coating extending over the inner and outer surfaces of the body and the insert.

8. A spinning bucket comprising a cover and a metallic body; the body having a circularly recessed rim portion, an annular insert of corrosion-resistant material secured within the rim portion with surfaces thereof in substantially continuous contact with the surfaces of the recess, said insert having an inner circular surface of slightly greater diameter than the cover and a smaller offset inner concentric surface of a diameter equal to that of the cake-forming surface of the body, an annular surface extending between said inner surfaces of the insert for seating the cover, and a corrosion-resistant resinous coating extending over the inner and outer surfaces of the body and the insert.

HUGH D. HALEY.

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