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H. D. HALEY

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METALLICALLY SHEATHED BUCKET RIM

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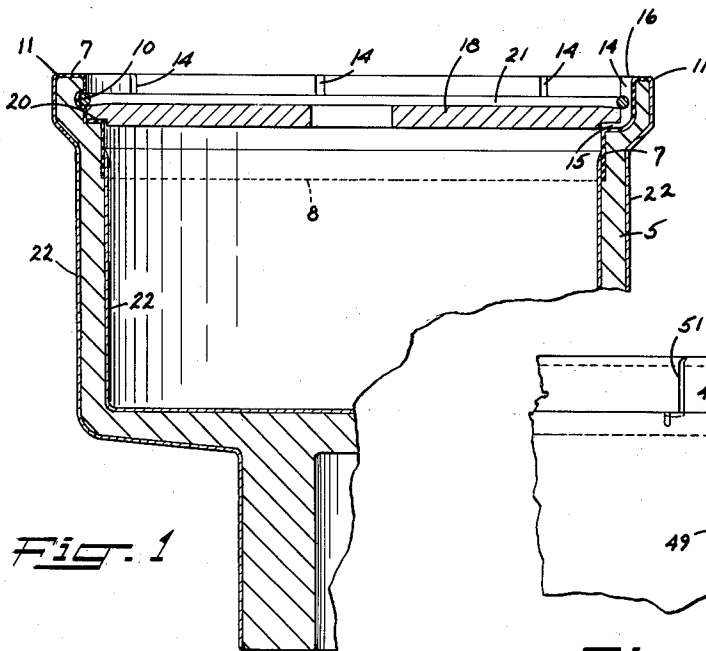


Fig. 1

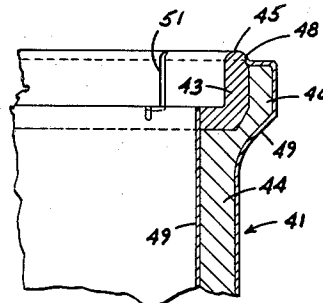


Fig. 3

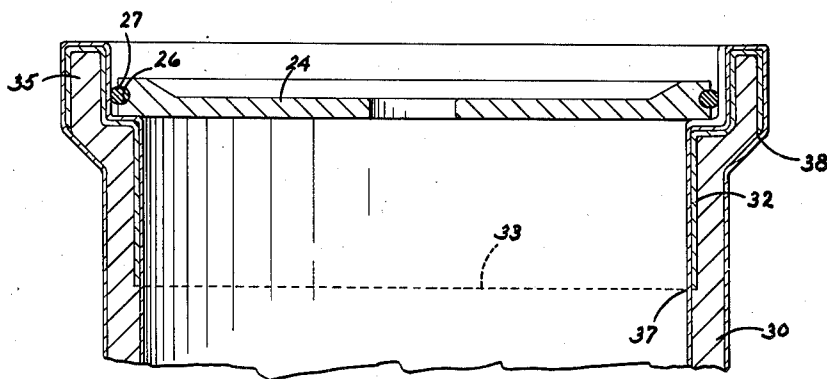


Fig. 2

INVENTOR.
HUGH D. HALEY

BY

Thomas R. Mally

ATTORNEY.

UNITED STATES PATENT OFFICE

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METALLICALLY SHEATHED BUCKET RIM

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

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10 Claims. (Cl. 57-76)

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

Many of the preferred metallic materials used for fabricating spinning buckets have, in general, the disadvantage of not being completely resistant to corrosion, particularly when used to collect yarn produced by the regeneration of cellulose from a viscose solution. Various resinous coatings which are resistant to the corrosive materials that are present in the viscose process of making rayon may be applied to the metallic buckets but, in general, these resins lack the toughness to resist the abrasion and chafing to which the bucket, particularly the rim portion thereof, is subjected from contact with the bucket cover for substantial service periods. Moreover, the coating is likely to be damaged at the end of the doffing periods when the packages are removed from the buckets, especially if the buckets are removed from their nests and bumped or dropped on a hard surface to loosen the packages. As the metallic base material of the bucket becomes exposed, it is subjected to corrosive attack.

It is an object of the present invention to provide a metallic bucket which has greater resistance to corrosion. Another object is to eliminate the necessity for coating the interior rim surfaces of the bucket. It is another object to provide spinning buckets which are maintained at less cost and capable of longer service periods. Other objects, features and advantages will be apparent from the following description of the invention in which

Fig. 1 is an axial section of a spinning bucket constructed according to the invention;

Fig. 2 is a fragmentary axial section of a bucket of modified construction; and

Fig. 3 is a fragmentary section of another modified bucket.

In brief, the bucket of the present invention comprises a body member and a thin metal sheath covering at least the interior and top of the rim of the body member including the shoulder for seating a cover. The sheath may also comprise an annular section extending axially within the bucket from the shoulder. The body section is machined or otherwise formed with a recess such as necessary to fit the sheath within the finished dimensions of the bucket.

Fig. 1 illustrates a bucket having a metallic body section 5 and a metallic sheath 7 of readily worked, ductile, thin-gauge material having greater corrosion resistance than the material of the body section. The body section 5 is machined

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or otherwise formed to provide surfaces to receive the sheath 7 such that the outer surfaces of the sheath will conform to the dimensions required of the finished bucket. As shown in Fig. 1, the sheath 7 extends from its circumferential boundary at 8 between the ends of the cylindrical cake-forming surface of the bucket, then over the shoulder between the inner cylindrical rim surface and the cake-forming surface to form a seating surface 20 for the cover 18 of the bucket, then upwardly over a circumferentially extending groove 10 formed in the rim of the body and over the rim of the body to an outer circumference 11 thereof. The material from which the sheath is formed is, in a convenient or preferred form, a length of tubular stock of a desired metal. It is inserted into the bucket and worked into conformity with the surface of the body such as by the well-known metal spinning technique. Although not essential, the surface of the body 5 which receives the sheath may be first coated with a cement for establishing adhesive relationship between the sheath and the body. The cement may comprise, for example, thermosetting or thermoplastic resins such as compositions containing condensation products of phenol-formaldehyde, urea-formaldehyde, or alkyd resins, vinyl resins or vulcanizable compositions containing rubber or one of the synthetic rubbers. The sheath may be made to conform also to a plurality of grooves 14 extending upwardly within the rim from the cake-forming surface at 15 to the top edge of the rim at 16. The grooves 14 preferably extend slightly below the inner surface of a cover 18 when the cover is properly seated within the bucket so that the grooves are contiguous with the cake collecting region of the bucket. The cover 18 is secured against the seating surface of the bucket at 20 by a lock ring 21. A coating 22 of tough corrosion-resistant resinous material such as one from the group hereinafter recited, is preferably applied to the outer and inner surfaces of the bucket with exception of that of the corrosion-resistant sheath 7. Care is taken, however, to carefully coat the surfaces of the sheath and the bucket body 5 adjacent their juncture to forestall possible electrolytic action between the different metals of the sheath and the body.

Preferred materials for the sheaths of buckets used for collecting viscose yarn include tantalum; titanium; a stainless steel designated by SAE number 316 containing approximately 12 to 18 per cent chromium, 10 to 14 per cent nickel, and 2 to 3 per cent molybdenum; and an alloy

containing 55 to 60 per cent nickel, 15 to 20 per cent molybdenum, 6 per cent iron, and 5 per cent tungsten. Such materials in the form of thin-gauge sheeting or tubing are readily cold worked into conformity with the rim surfaces of a bucket. These materials may be also preformed into sheaths of a desired shape and then pressed and/or cemented into place.

Fig. 2 illustrates a bucket of modified construction in which a lock ring groove is not provided in the rim of the bucket; instead, a cover 24 is peripherally grooved at 26 to retain and support a resilient lock ring 27. The base member or body 30 of the bucket is of metallic material such as aluminum. The body 30 is formed in such a manner, such as by a machining or grinding, to receive the metallic sheath 32 extending from the circumference of the inner surface of the body at 33 upwardly and then radially outwardly to form the seating surface of the bucket and then upwardly over the edge of the flange and downwardly over the exterior of the flange. The flange 35 of the body 30 is completely covered by the sheathing so that the flange may be protected from abrasion and corrosion as hereinafter described.

The bucket of Fig. 2 is coated with a material which is resistant to the materials with which the bucket comes in contact in the operation of collecting yarn. For example, suitable materials for coating buckets used to collect yarn produced by the viscose process are solutions and dispersions containing vinyl resins, fluorinated ethylenic compounds, alkyd resins, silicone resins, condensation products of phenol-formaldehyde, urea-formaldehyde and melamine-formaldehyde and others. It is particularly important that the coating material penetrate and seal the seams at the edges 37 and 38 to prevent acid solutions or other electrolyte from entering the joint formed at the interface of the sheath and the body, and producing electrolytic action between the different metals of the body and the sheath. The coating may be applied, if desired, to all surfaces of the bucket including those of the sheath. However, as it is anticipated that the coating will in a short time be worn or abraded from the surface of the sheath, particularly at the seating surface for the cover 24, application of the coating may be restricted to surfaces not covered by the sheath. A high degree of care should be exercised that the coating overlaps the edges of the sheath so as to insure perfect sealing at the seams 37 and 38.

Fig. 3 illustrates another modification of the invention according to which the rim 40 of a bucket 41 is recessed to receive a metallic annular insert 43. In the practice of the invention, the body portion 44 may be fabricated from an inexpensive and easily worked metallic material such as aluminum; the insert 43 comprises any metallic material which is preferably highly resistant to corrosion under the operating conditions to which the bucket will be subjected. Suitable inserts may be fabricated from tantulum, titanium, or the ferrous alloys hereinbefore described. Other well-known commercially prepared ferrous alloys suitable for fabricating inserts for buckets to be used in spinning viscose yarn are those which contain 16 to 24 per cent chromium, 25 to 30 per cent nickel, 1 to 5 per cent copper, less than 0.1 per cent carbon, 2 to 4 per cent molybdenum, and 1 to 5 per cent manganese.

A metallic insert 43 as shown in Fig. 3 is provided with a rounded edge 45 which protrudes above the upper edge 46 of the body section 44 to

protect the adjacent rim area of the body section, or a coating thereover, from damage or excessive wear. A coating 49 of corrosion-resistant resinous material is applied to surfaces of the body section 44. It may or may not entirely cover the surface of the insert 43 but it is highly desirable that the coating overlaps surfaces of the insert which are adjacent to or meet the surface of the body section, and that it thoroughly covers the junction of the surfaces of the insert and the body section to prevent electrolysis. For this reason, the surface of the insert 43 may be formed with a fillet 48 so that the surfaces of the insert and edge 46 of the body portion join in a smoothly contoured protected area adapted to receive and retain a coating of substantial thickness. An insert such as the insert 43 and a bucket body section may be complementarily formed in any desired manner to effect assembly thereof such as by pressing the insert into place, by heating the rim of the body portion and shrinking it about the insert, by cementing the body portion and the insert together, by joining the insert and the bucket body in threaded relationship, or by keying them together. The insert 43 may be formed, for example, as a forging, or consist of a section of tubing machined to the desired shape. A plurality of escape grooves, such as the groove 51 may be provided for passage of liquid material from a yarn package contained within the bucket. The use of the inserts and sheaths herein described is not necessarily limited to the construction of buckets having metallic bodies. When found advantageous, the metallic sheaths or inserts may be applied to bucket bodies of non-metallic construction such as those fabricated from a molded material comprising a phenol-formaldehyde condensation product mixed with a fibrous material.

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 substantially cylindrical yarn cakes comprising a cover, and a two-member body comprising a base member and a metallic lamina secured thereto, said body having a rim section providing seating and centering surfaces for the cover, said surfaces constituting substantially the exposed surfaces of the metallic lamina.

2. A spinning bucket for building substantially cylindrical yarn cakes comprising a cover, and a two-member body comprising a base member and a metallic lamina secured thereto, said body having a rim section which is internally recessed to provide an annular shoulder on which to seat the cover, the inner surface of the rim section, the surface of the shoulder, and a circumferential portion of the cylindrical cake-forming surface of the body adjacent that of the shoulder being the exposed surfaces of the metallic lamina.

3. A spinning bucket for building substantially cylindrical yarn cakes comprising a cover, and a two-member metallic body comprising a base member and a lamina secured thereto, said body having a rim section which is internally recessed to provide an annular shoulder on which to seat the cover, the inner surface of the rim section, the surface of the shoulder, and a circumferential portion of the cylindrical cake-forming surface of the body adjacent that of the shoulder being the exposed surfaces of the metallic lamina.

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4. A spinning bucket as in claim 3 comprising also adhesive means for securing the lamina to the base member.

5. A spinning bucket as in claim 3 comprising a non-corrosive coating material covering at least the inner surfaces of the base member, and the surfaces of the base member and the lamina adjacent both circumferential edges of the lamina.

6. A spinning bucket as in claim 3 comprising a coating of non-corrosive material covering the outer and inner surfaces of the base member and overlapping the edges of the lamina.

7. A spinning bucket for building substantially cylindrical yarn cakes comprising a cover, a two-member metallic body comprising a base member of aluminum and a lamina of stainless steel secured thereto, said body having a rim section which is internally recessed to provide an outer shoulder on which to seat the cover, the inner edge of the rim section, the surface of the shoulder and a circumferential portion of the cylindrical cake-forming surface of the body adjacent that of the shoulder being the exposed surface of the stainless steel lamina, and a non-corrosive coating for the outer and inner surfaces of the body.

8. A spinning bucket for building substantially cylindrical yarn cakes comprising a cover, a two-member metallic body comprising a base member and a lamina secured thereto, said body having a rim section which is internally cylindrically recessed to provide an annular shoulder on which to seat the cover, the cylindrical surface of the rim section being circumferentially grooved in a radially outward direction to receive a lock ring for securing the cover against the shoulder, and the inner surface of the rim section, the surface of the shoulder and a circumferential portion of the cylindrical cake-forming surface of the body adjacent that of the shoulder being the exposed surface of the metallic lamina, said lamina comprising a metal having greater corrosion-resistance than the base member.

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9. A spinning bucket for building substantially cylindrical yarn cakes comprising a cover having a circumferentially extending groove within its peripheral surface, an elastic resilient ring supported within the groove having an extreme diameter approximately equal to that of the said peripheral surface, a two-member metallic body comprising a base member and a lamina secured thereto, said lamina consisting of a metal having greater corrosion-resistance than that of the base member, said body having a rim section which is cylindrically recessed to a diameter slightly greater than that of the cover to provide an annular shoulder of which the seat cover, the inner surface of the rim section, the surface of the shoulder, and a circumferential cake-forming surface of the body adjacent that of the shoulder being the exposed surface of the metallic lamina, and a resinous non-corrosive coating material extending over the outer and inner surfaces of the body.

10. A spinning bucket for building substantially cylindrical yarn cakes comprising a cover; a two-member metallic body comprising a base member of aluminum and a lamina secured to the base member; the lamina being constituted of an alloy comprising 55 to 60 per cent nickel, 15 to 20 per cent molybdenum, approximately 6 per cent iron, and approximately 5 per cent tungsten; said body having a rim section which is internally recessed to provide an annular shoulder on which to seat the cover; the inner edge of the rim section, the surface of the shoulder and a circumferential section of the cylindrical cake-forming surface of the body adjacent that of the shoulder being the exposed surface of the lamina; and a non-corrosive coating for the outer and inner surfaces of the base member.

HUGH D. HALEY.

No references cited.