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2,372,983

SPINNING BUCKET

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Fig. 1.

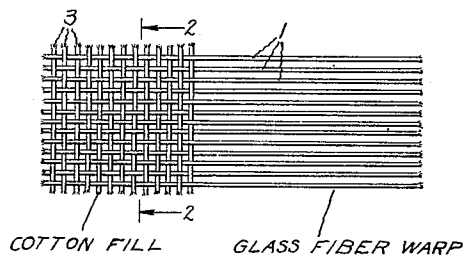
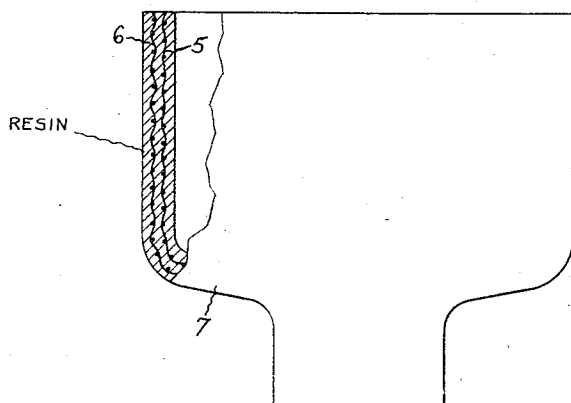


Fig. 2.



Fig. 3



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SPINNING BUCKET

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3 Claims. (Cl. 57—76)

The invention relates to spinning buckets for use in the manufacture of artificial silk or rayon.

An object of the present invention is to provide a new and improved spinning bucket.

Another object of the invention is to provide a new and improved molded spinning bucket comprising a resinous binder and a filler so arranged that the bucket is capable of withstanding very high rotational speeds whereby the output thereof may be greatly increased.

A further object of the invention is to provide a new and improved spinning bucket which is well balanced, inexpensive to manufacture, and which during use is capable of withstanding the excessive strains and stresses due to centrifugal force.

A specific object of the invention is to provide a new and improved molded spinning bucket comprising a glass fiber filler and reinforcing material which is not crushed or broken under the molding pressures employed in molding the bucket.

Other and further objects and advantages of my invention will become apparent from the following description of the invention taken in connection with the accompanying drawing in which:

Fig. 1 is a plan view of the filler employed in the manufacture of my spinning bucket;

Fig. 2 is an enlarged cross-section of Fig. 1 along lines 2—2; and

Fig. 3 is a side elevation partly in section of a spinning bucket embodying my invention.

The baths employed in the manufacture of artificial silk or rayon contain acid. Since the spinning buckets come in contact with the acidic baths they are usually made of acid-resistant materials. Artificial resins, such as the phenolic condensation products, have been found particularly useful materials for making the buckets. To impart strength to the resin, various fillers or reinforcing materials have been mixed with the resin prior to the molding of the bucket or have been introduced just prior to or during the molding operations. For example, it has been proposed to increase the strength of the buckets by winding metal wire around the exterior of the bucket or embedding wire in the molded walls of the bucket. The use of such reinforcing materials increases the number of operations necessary for the manufacture of the bucket with the resultant increase in the cost of the finished article. Various fillers have also been added to the resinous binder in an effort to find a combination of filler and resin binder having the necessary strength.

It has been known for some time that glass fibers of small diameters possess extraordinarily

high tensile strengths. However, the use of such fabrics in which both the warp and fill are of glass fibers have not proven satisfactory in the molding of spinning buckets. During molding, the high pressures involved in the molding process appear to become concentrated where the warp and filler yarns cross. As a result, the glass yarns are crushed and the individual fibers ruptured at the numerous points of crossover. Consequently, it has not been possible heretofore to produce a molded bucket possessing the full tensile strength of glass fibers. Buckets made from such fabrics have not stood up under severe and constant usage.

The present invention is based on my discovery that a combination glass fiber-cotton yarn fabric comprising, for example, a glass fiber warp 1 and a cotton fill 3, as is shown in Figs. 1 and 2, makes an excellent filler in the manufacture of spinning buckets when a plurality of sheets as illustrated by numerals 5 and 6, of this filler are so arranged, as shown diagrammatically in Fig. 3, that the glass yarn warp runs circumferentially through the walls of the molded bucket 7. I have found that with such an arrangement the cotton yarn is sufficiently strong to act as a reinforcing agent in the direction perpendicular to the direction of principal stresses set up during use of the bucket and at the same time serves as a cushion for the glass fibers to prevent them from being crushed and broken during the molding operation. It is thus possible to obtain a molded spinning bucket in which unbroken circumferentially extending strands of glass fiber yarn impart to the molded product the high tensile strengths of such yarns. Preferably the yarn is composed of glass fibers of small diameter, such as fibers having a diameter of about 0.0002 inch and possessing a tensile strength of approximately 300,000 lbs. per square inch.

Test samples of laminated materials formed from a phenolic resin binder and a fabric filler in which the glass yarn formed the warp and the cotton yarn the fill were found to possess extremely high tensile strengths. For example, test samples have been found to have tensile strengths of from 46,000 to 66,000 lbs. per square inch in the direction of the glass yarn. In addition flexural strengths of from 50,000 to 79,000 lbs. per square inch were obtained. When buckets made from these materials are rotated at high speeds the continuous lengths of glass fibers extending circumferentially through the walls of the bucket resist the high stresses due to the centrifugal force to which the buckets are sub-

jected. Furthermore, since the filler itself is of uniform density, molded buckets of uniform density can easily be made. Thus, the product is not only strong but also well-balanced.

Any of the well-known molding methods previously used in molding spinning buckets may be employed in the practice of the present invention with the combination glass fiber-cotton filler comprising the principal filler, at least in the walls of the bucket. The wall portions may be made for example by impregnating sheets of the filler of proper size with a heat-hardenable phenolic or other suitable resin. The sheet is then wound in the form of a tube which is approximately the same diameter as the walls of the finished bucket but is usually slightly longer allowing the material to be folded under to form at least part of the bottom section of the bucket. It is thereafter molded into the general shape of the finished bucket. In some cases it may be found necessary to mold the bucket in two operations, the first a preforming operation and the second a final molding operation at desired pressures and temperatures. When the glass fiber-cotton filler is used principally in the walls or in the walls and part of the bottom section of the bucket, the remaining molded portions of the bucket may comprise a resinous binder, preferably the same as that used with the glass fiber-cotton fabric and a filler such as wood flour, asbestos, cotton flock, chopped or cut fabric, and the like.

While the invention has been described in connection with the use of a phenolic resin binder, it is to be understood that it is not limited thereto

and other acid-resistant resinous binders such as urea-aldehyde, urea-melamine-aldehyde, melamine-aldehyde, etc. resin binders may be substituted therefor. In place of the cotton fill in the fabric filler, threads of other organic materials, such as linen, may be used.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A spinning bucket comprising an acid-resistant resinous binder in combination with a fabric filler comprising glass yarn running circumferentially through the walls of said bucket in the direction of the principal stress and organic yarn running in a direction perpendicular to the principal stress, the said layers being impregnated with said binder.

2. A spinning bucket adapted to withstand high stress in a circumferential direction comprising a plurality of layers of a fabric, said fabric comprising glass yarn generally extending in a circumferential direction and organic yarn generally disposed transversely of said glass yarn, the said layers being impregnated with an acid-resistant binder and united by heat and pressure.

3. A spinning bucket adapted to withstand high stress in a circumferential direction comprising a plurality of layers of a fabric, said fabric comprising glass yarn extending in a circumferential direction through the walls of said bucket and an organic fibrous filler disposed transversely of said glass yarn, the said layers being impregnated with an acid-resistant phenolic binder and united by heat and pressure.

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