Inventor:
Sven R. Bergman,
by Henry E. Dunham
His Attorney.
METHOD OF MANUFACTURING CENTRIFUGE BUCKETS

Sven R. Bergman, Nahant, Mass., assignor to
General Electric Company, a corporation of
New York

Original application July 13, 1932, Serial No.
625,272. Divided and this application October
24, 1933, Serial No. 694,979

4 Claims. (Cl. 18—59)

The present invention relates to centrifuge buckets such as are used in the spinning of rayon, and is a division of my application, Serial No. 625,272, filed July 13, 1932.

The object of my invention is to provide an improved method of manufacturing a bucket wherein the bucket is reinforced with metal in a manner such that it is capable of operating efficiently at high speeds and at the same time is not affected adversely by the acid solution to which it is subjected.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and the claims appended thereto.

In the drawing, Fig. 1 is a side elevation of a preform used in constructing a bucket according to my invention; Fig. 2 is a side elevation illustrating further steps which are utilized in carrying out my invention; Fig. 3 is a vertical sectional view showing additional steps used in carrying out my invention; Fig. 4 is a sectional view of a completed bucket, and Fig. 5 is a detailed view.

Referring to the drawing, Fig. 4, which shows a completed bucket constructed according to my invention, I indicates the side wall provided with circumferentially extending rings of spaced holes 2 for the escape of acid, 3 indicates the bottom wall, and 4 indicates the hub provided with openings 5 to receive the driving spindle. The rows of holes 2 are spaced apart a suitable distance and between such rows, side wall 1 is provided with shallow circumferentially extending grooves 6 in which is wound reinforcing wire 7. Grooves 6 are preferably connected to each other by angularly extending slots 8 as shown in Fig. 2 so that the reinforcing wire 7 may be one continuous wire extending from top to bottom of side wall 1.

The bucket is constructed from an acid resisting moldable material. As a moldable material, I utilize preferably spinnable textile fibres, for example woven or unwoven cotton impregnated with and held in a highly compressed state by an artificial resin such as a phenolic condensation product. The side walls may be constructed from woven cotton duck united by artificial resin while the bottom wall and hub, in which the stresses are not so high, may be constructed from unwoven cotton united by an artificial resin or from small pieces of woven cotton cloth (for example, pieces of scrap material) united by an artificial resin. An artificial resin, such as a phenolic condensation product, is acid resisting and forms a covering which protects the cotton fibres from the acid.

To protect the wire from the acid and to form a bond between it and the side wall 1, I utilize wire provided with a wrapping of acid resisting material which forms a bond with side wall 1. For this purpose, I use preferably cotton covered wire wherein the cotton covering is impregnated with artificial resin. I have found steel wire having a quadruplex cotton covering to be satisfactory. During the molding operation, the artificial resin integrally unites the coverings on successive turns of wire with each other and with side wall 1, thus forming a unitary structure.

This is a feature of my invention which I regard as being important since by this arrangement, if one or more turns of wire become broken, it does not affect appreciably the strength of the wire reinforcement for by the arrangement described, each turn becomes in substance independent of the other turns in so far as its function of reinforcing is concerned. The arrangement has the advantage also that it makes the holding in place of the turns of wire independent of the anchoring of the ends of the wire.

In constructing a bucket according to my invention, I first take the moldable material from which the bucket is to be constructed and make a preform as shown in Fig. 1, which has the general contour of the completed bucket. The side walls 1 may be constructed from successive layers of woven cotton duck and may be formed by winding a strip of cotton duck of suitable width on a mandrel, the duck having been treated before winding with the artificial resin. The preform is constructed by placing the moldable material in a suitable mold and giving it an initial pressing at a suitable temperature to cause it to take the desired shape and adhere together, the operation being such as not to completely cure the moldable material. The preform is then taken from the mold and the grooves 6 and slots 8 are cut therein, there being left between the grooves the lands 9 in which the openings 2 are to be formed. At this time, I form also grooves 10 and 11 which receive the ends of the reinforcing wire. I next take wire which is to form the reinforcement, it being in the illustrated embodiment of my invention a wire having a cotton covering which has been treated with artificial resin and dried, place one end in the groove 10, and wrap the wire under suitable tension in the grooves 6, the successive turns of the wire being in close engagement with each other and the wire passing from groove to groove through the slots...
8. After the wrapping of the wire is completed, the end is positioned in the lower groove 11 as shown in Fig. 3. I next place a suitable amount of molding material in the grooves 10 and 11 so as to cover the ends of the wire, after which, the structure is placed in a suitable mold (which may be the mold used in making the preform) and the moldable material is cured under heat and pressure. The method of molding material of this type is well known in the art and requires no detailed description. When finished, the bucket is smooth on the outside and the steel wire is completely protected by the acid resisting covering.

15 It is important that a bucket of this type be as smooth on the outside as possible and to improve the bucket in this respect, I may provide on the outside of the bucket a special wrapping of thin woven cloth such as thin tape. For example, I have found cotton tape of a thickness of the order of 0.007 of an inch satisfactory. The tape is first treated with the adhesive, such as an artificial resin, after which it is wound on the outside of the bucket, successive turns overlapping, it being applied after the wire is wound on and before the final molding operation. The tape in process of being wound, is indicated at 12 in Fig. 3, it being wound so that successive layers overlap about one-half their width. The bucket is then given the final molding operation and when completed, the tape provides a thin integral covering which is very smooth on the outer surface. In the finished bucket, Fig. 4, the tape covering is indicated at 13.

In connection with my improved construction, it is to be noted that the reinforcing wire is not embedded in the body of the bucket but is wound on the outer surface thereof. This is an important consideration because by locating the wire on the surface, the maximum reinforcing effect is obtained. The winding of the wire on the outer surface is made possible by reason of the fact that the wire is covered with the acid resisting coating and, as pointed out above, the fact that this acid resisting coating adheres to the material of the side wall adds greatly to the reliability of the structure since if one or more turns of wire become broken, the other turns are not affected and the strength of the structure is not appreciably decreased.

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

1. The method of manufacturing a centrifuge bucket which comprises making a preform from moldable material, winding successive turns of metal covered with acid resisting material on the preform, winding thin tape on the preform over the metal, and molding the structure thus formed under heat and pressure.

2. The method of manufacturing a centrifuge bucket which comprises making a preform from moldable material, winding successive turns of wire on the outer surface of the preform, the wire being covered with spinnable fibres and an artificial resin, winding thin tape over the wire, and molding the structure thus formed under heat and pressure.

3. The method of manufacturing a centrifuge bucket which comprises making a preform from moldable material, winding successive turns of metal covered with an acid resisting material over the preform, placing a surface covering on the preform over the metal, and molding the structure thus formed under heat and pressure.

4. The method of manufacturing a centrifuge bucket which comprises making a preform from spinnable fibres treated with an artificial resin, winding successive turns of metal on the outer surface of the preform, the metal being covered with spinnable fibres and an artificial resin, placing a surface covering comprising material treated with an artificial resin over the metal, and molding the structure thus formed under heat and pressure.

SVEN R. BERGMAN.