METHOD AND APPARATUS FOR COVERING YARN PACKAGES

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This invention relates to the pot spinning of rayon and more particularly to the socking of freshly spun cakes in preparation for their after-treatment.

It has long been customary in the pot spinning of rayon to cover the freshly spun cakes with a liquid permeable envelope in order to protect the exposed layers of yarn during liquid after-treatment and the handling incident thereto. Various methods for socking have been employed ranging from a completely manual operation to a nearly automatic machine operation. In general, past proposals have been either too time consuming or have been so costly that their use is hardly feasible from an economic point of view.

It is therefore an object of the present invention to provide a method and apparatus for socking cakes which are characterized by economical, speedy and reliable operation.

The practice of the method of the present invention does not require elaborate training of personnel or the expenditure of much time per cake socked in order to achieve excellent results. The apparatus of the present invention is simple in design and is characterized by low installation and maintenance cost.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description of a preferred embodiment thereof in conjunction with the appended drawings wherein:

Figure 1 is a top plan view of a cake socker constructed in accordance with the teachings of the present invention;

Figure 2 is a view in side elevation of the apparatus of Figure 1;

Figure 3 is a view in vertical section taken on the line 3—3 of Figure 2; and

Figure 4 is a series of schematic views in side elevation illustrating the successive steps in socking a cake by the method of the present invention and employing the apparatus of Figures 1, 2 and 3.

Referring in detail first to Figures 1, 2 and 3 the apparatus there shown comprises a cake platform 10 in the form of an annular disc mounted on a rod 11 to reciprocate within a cylindrical container 12.

The underside of the disc or platform 10 is provided with a central hub at 13 in which an upper portion of the rod 11 is fastened by set screws 14, the rod terminating in the plane of the platform. A bearing 15 is attached to the upper side of the bottom wall 16 of the container 12 and, below the wall 16, there is a tube 17 provided with bushing 17a. Set collar 18 makes possible the vertical adjustment of the rod 11 and platform 10 inasmuch as the tube 17 is threaded into a plate 19 which is rigidly fastened to the bottom of the wall 16. Thus the tube is so mounted that the bushing 17a is coaxial with the bearing 15.

The structure as a whole may be supported from the container or from the tube 17. In any case the rod 11 is guided to reciprocate vertically in bearing 15 and bushing 17a.

Between the bearing 15 and the hub 13 there extends a coil spring 20 which normally biases the platform 10 to the Figure 3 position.

The container 12 is notched out for 180° at 21 and, in the plane of the lower defining edge of the notch at 21, there extends for the remaining 180° a beading 22.

The use of the apparatus described above and illustrated in Figures 1 to 3, inclusive, will be apparent upon consideration of Figure 4 in which the successive steps of socking a cake are depicted. A liquid permeable, cylindrical body of paper or like material is used as the protective covering or sock. The first step in the operation is to slip a portion of this sock over the top of the cylindrical container 12, see step 1, Figure 4. The diameter of the container 12 is about equal to the diameter of the open sock so that the sock will easily and smoothly fit over the top of the container. The sock is pushed down until its lower edge engages the bead 22 at which time the operator grips the portion of the sock projecting above the platform 10 and crushes it into a stem, see step 2, Figure 4. The cake to be socked is then threaded over the stem and allowed to rest on the top of the platform, see step 3. Once the cake is resting on the platform with the crushed portion of the sock projecting through this core, see step 4, the operator pushes down on the cake thereby depressing the platform 10 against the thrust of spring 20, see step 5. The effect of depressing the cake as in steps 4 and 5 is to cause the portion of the sock which had surrounded the container 12 smoothly to slip off the container, turn inside out and spread itself evenly over the outer surface of the lower portion of the cake being treated. When pressure on the cake is released, the platform 10 under the bias of spring 20 restores it to the step 6 position. At this stage the operator opens out the crushed core of the sock as illustrated in the drawing. The cake is then inverted and the portion of the sock projecting through the center core of the cake is wrapped around and fit over the upper portion of the container 12 in the manner shown in steps 7 and 8. At the completion of step 8, the operator again presses the cake down which again depresses the platform 10 and causes the portion of the sock surrounding the container 12 to turn inside out and to wrap itself about the heretofore uncovered outer portion of the cake. Upon release of the platform the envelopment of the cake is completed with some overlap as shown in step 9.

From steps 1 and 7 it can be seen that the notch 21 facilitates spreading the sock over the platform 10 and the internal diameter of the container 12 are so chosen in relation to the diameter of the cake to be socked that the space between the inner wall of the container 12 and the cake is just right to cause the paper of the sock to spread smoothly over the cake when the latter is depressed for envelopment as in step 5.

What is claimed is:

1. The method of covering a cake of yarn with a tubular sock that comprises placing a portion of an end peripheral area of said sock into a notch in a hollow cylindrical casing, pulling said sock over said casing to spread a portion of the sock to cylindrical shape, producing a stem from the sock remaining above said casing, passing a cake of yarn around the stem with a portion of the stem projecting therefrom, turning the portion of the sock that is of cylindrical shape inside out by passing the cake therethrough to be partially enveloped thereby, spreading the projecting portion of the stem to cylindrical shape and turning the spread portion inside out by passing the cake therethrough to be enveloped.

2. The method of covering a cake of yarn with a tubular paper sock that comprises placing a portion of the end peripheral area of said sock into a notch of a hollow
cylindrical casing, pulling said sock over said casing to spread a portion of the sock to cylindrical shape, producing a stem from the sock remaining above said casing, passing a cake of yarn around the stem with a portion of the stem projecting therefrom, turning the portion of the sock that is of cylindrical shape inside out by passing the cake therethrough to be partially enveloped thereby, spreading the projecting portion of the stem, inverting the cake and sock, placing a portion of the end peripheral area of the spread portion of the inverted sock into the notch of said hollow cylindrical casing, pulling the spread portion of the inverted sock over said casing to spread a portion of said sock to cylindrical shape, and turning the inverted portion of the sock that is of cylindrical shape inside out by passing the cake therethrough to be completely enveloped by said sock.

3. Apparatus for covering a cake of yarn with a tubular sock comprising a hollow cylindrical casing having a circumference slightly smaller than said sock but slightly larger than a cake of yarn to be socked, a notch in one side of said casing adapted to permit said sock to be easily pulled over said casing, a projecting rib on the outer wall of the casing in the same plane as the notch, a cake platform movable from a normal position closing one end of said casing to a position within the casing and means resiliently biasing said platform to said normal position.

4. Apparatus for covering a cake of yarn with a tubular sock comprising a hollow cylindrical casing having a circumference slightly smaller than said sock but slightly larger than a cake of yarn to be socked, a notch in one side of said casing adapted to permit said sock to be easily pulled over said casing, a projecting rib on the outer wall of the casing in the same plane as the notch, a cake platform movable from a normal position closing one end of said casing to a position within the casing and means resiliently biasing said platform to said normal position.

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3. Apparatus for covering a cake of yarn with a tubular sock comprising a hollow cylindrical casing having a circumference slightly smaller than said sock but slightly larger than a cake of yarn to be socked, a notch in one side of said casing adapted to permit said sock to be easily pulled over said casing, a projecting rib on the outer wall of the casing in the same plane as the notch, a cake platform movable from a normal position closing one end of said casing to a position within the casing and means resiliently biasing said platform to said normal position.

4. Apparatus for covering a cake of yarn with a tubular sock comprising a hollow cylindrical casing having a circumference slightly smaller than said sock but slightly larger than a cake of yarn to be socked, a notch in one side of said casing adapted to permit said sock to be easily pulled over said casing, a projecting rib on the outer wall of the casing in the same plane as the notch, a cake platform movable from a normal position closing one end of said casing to a position within the casing and means resiliently biasing said platform to said normal position.

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