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APPARATUS FOR TREATING SPUN CAKES OF ARTIFICIAL SILK OR THE LIKE

Filed April 23, 1931

2 Sheets-Sheet 1

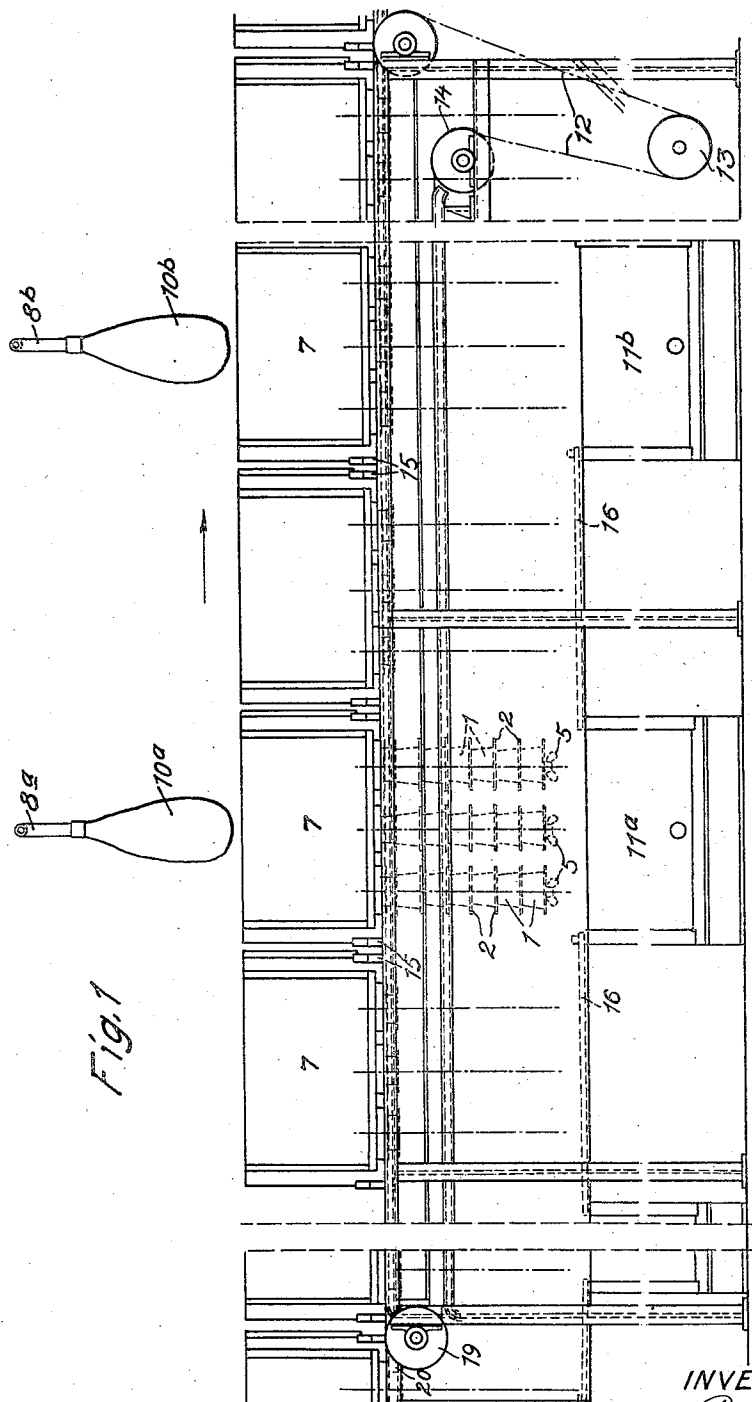


Fig. 1

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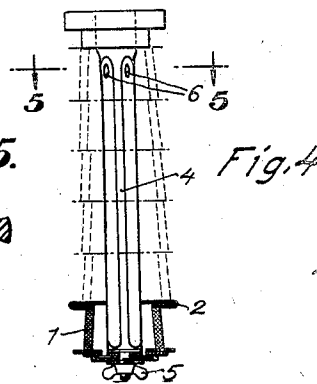
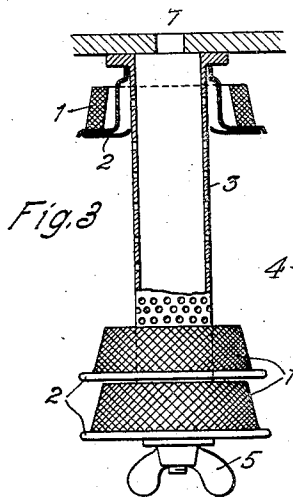
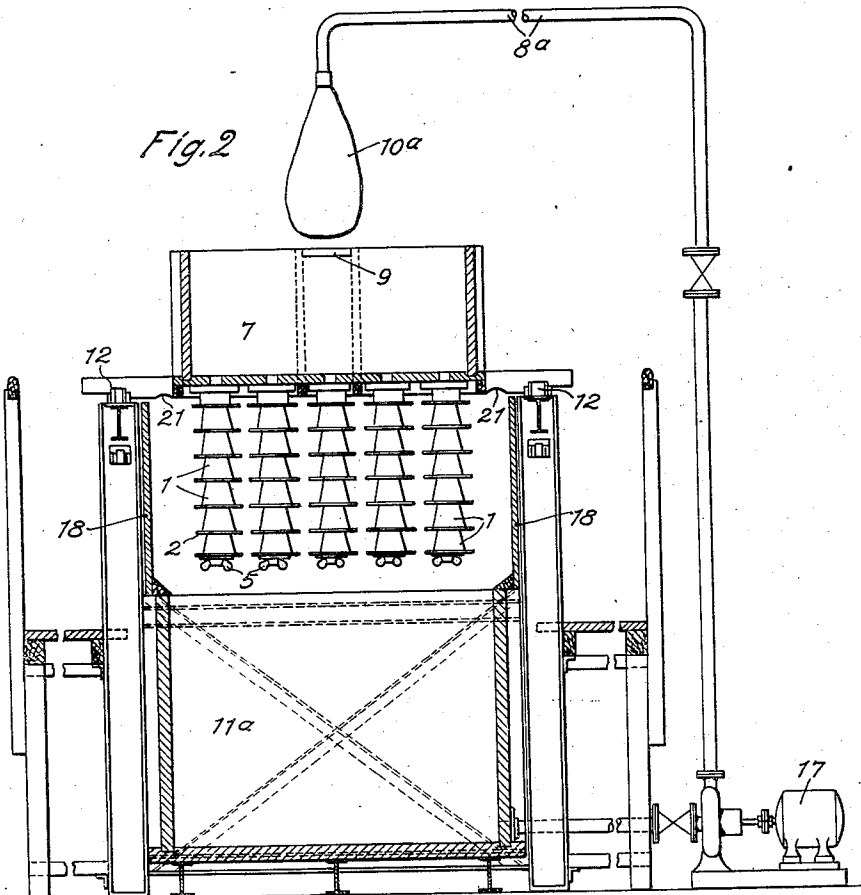
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

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## APPARATUS FOR TREATING SPUN CAKES OF ARTIFICIAL SILK OR THE LIKE

Application filed April 23, 1931, Serial No. 532,226, and in Germany May 7, 1930.

The processes hitherto known for washing and subsequently treating (desulphurizing, bleaching, sizing, dyeing, etc.) spun cakes of artificial silk and cake-like coils of thread generally require complicated apparatus, which permit only of a comparatively uneconomical mode of working on a mass production scale or else they operate so as to change the shape of the cake thus interfering with the further working up thereof.

Now the present invention enables spun cakes or the like to be subjected to subsequent treatment mechanically and in great numbers in a simple way without any change in their shape. This is achieved preferably by presenting the material to be treated to the various liquids in succession in a continuous process.

In the apparatus of the present invention the spun cakes or the like are arranged on perforated or slotted carriers each spun cake being preferably mounted on a separate carrier. A number of such carriers or drums are threaded on to a discharge pipe for the liquid with which they are to be treated, for example, a perforated or slotted discharge pipe.

Now according to this invention, in order to increase the capacity of the apparatus, a plurality, of pipes with spun cakes or the like arranged thereon are provided on the underside of a container which is designed to hold the liquid used for treating the cakes and which is fed by suitably disposed liquid supply pipes. A number of such containers are arranged in series and they may be conveyed in succession by a transporting device to the various points where the different liquids for treating the cakes are supplied. Liquid caught in draining receptacles after being used to treat the coils of thread or spun cakes may be returned to the containers which carry the cakes. If necessary a purifying apparatus may be interposed in the return path of such liquid.

Further features of the invention will be apparent on reference to the accompanying drawings and the following description in which the new apparatus will be more fully explained.

Fig. 1 is a diagrammatic view of apparatus according to the present invention.

Fig. 2 is a vertical section through the apparatus shown in Fig. 1.

Fig. 3 shows partly in section and partly in elevation, a liquid discharge pipe with the spun cakes mounted thereon, one above another.

Fig. 4 shows diagrammatically another way of constructing a pipe for discharging the treating liquid and carrying the spun cakes.

Fig. 5 shows an enlarged cross-section taken on the plane of the line 5—5 of Fig. 4.

The cakes 1 are placed on perforated or slotted sleeves or drum-like carriers 2 which are pushed, one after another, on to perforated pipes 3 (see Fig. 3) or on to rods 4 of star-shaped cross section (see Fig. 4) and are fixed by wing nuts 5. The pipes 3 are perforated and the profiled rods 4 are provided with slots 6 for the liquid to flow through.

The drum-like carriers may be of smaller diameter than the spun cakes and slightly greater in height than such cakes so as to afford room for such cakes to expand both axially and radially and for the layers of thread to loosen. The pipes 3 and the passages formed between the profiled rods 4 and the drums 2 communicate with the boxes 7 to which the particular liquid used for treating the cakes is supplied through feed pipes 8a, 8b. The boxes 7 have recesses 9 at the top, which act as overflows for the liquid supplied. The feed pipes 8a, 8b carry at their outlet ends filter bags 10a, 10b which also prevent the liquid from spurting. As the discharge pipes 3 or 4 are closed at their lower ends the liquid issuing from said pipes flows into the interior parts of the cakes 2 and through the layers of thread comprised in such cakes into the receptacles 11a, 11b, placed underneath for catching it. In order to subject the cakes successively to the several washing treatments the boxes 7 with the cakes arranged beneath them are mounted on transporter chains 12, which worked by driving gear 13 tensioned by a jockey roller 14, bring the boxes at suitable intervals of time, preferably with a pause for draining

purposes, from the feed pipe 8a and the draining box 11a lying therebeneath to a position beneath the next feed pipe 8b and over the underlying draining box 11b. For this purpose the boxes 7 may, for instance, be furnished with supporting bars 15 on each side, said bars being adapted to rest on the transporter chain 12. Between the draining boxes 11 inclined boards 16 may be arranged as required to act as draining boards and return the liquid which drops off the cakes to the corresponding draining vessel. The liquids used for treating the cakes are preferably pumped back in known manner, by the pump 17 out of the draining vessels 11 into the boxes 7. On both sides of the machine and above the receptacles 11 for catching the liquid are arranged walls 18, which prevent the liquid used for treating the cakes from spraying out sideways and so protect the conveying mechanism.

To charge the apparatus with the cakes coming from the spinning machine there is provided at one end of the machine, in front of the reversing roller 19 of the transporter chain, a frame 20 (only just indicated in the drawing) on which the boxes 7 are placed while charging with the cakes, after which they are pushed on to the transporter chain. For this purpose recesses 21 are provided in the supports 15 on the boxes and the slide rails of the frame 20 engage in these recesses. At the other end of the machine a similar frame 20<sup>1</sup> is provided for the removal of the boxes.

The boxes 7 with the cakes attached thereto may, in some cases be moved by hand along suitable rails without using a transporter chain.

In addition to the treatment of cakes which are obtained by the centrifugal process, the apparatus is equally suitable for washing and subsequently treating coils of thread which are spun on to spools on spooling machines and subsequently drawn off from such spools.

What I claim is:—

1. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers adapted to be passed in succession beneath said liquid supply devices so as to receive liquids therefrom, liquid discharge pipes dependent from said containers, a plurality of apertured cake holders adapted for threading on to said discharge pipes and releasable means for retaining said cake holders on said pipes.

2. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers adapted to be passed in

succession beneath said liquid supply devices so as to receive liquids therefrom, liquid discharge pipes dependent from said containers, each of such discharge pipes being constructed to deliver liquid along its dependent length, a plurality of apertured cake holders adapted for threading on to said discharge pipes and releasable means for retaining said cake holders on said pipes.

3. In apparatus according to claim 2, a cylindrical liquid discharge pipe having a bottom closure and peripheral apertures for escape of the liquid to be introduced into the cakes.

4. In apparatus according to claim 2 in which the liquid discharge pipes are each in the form of a rod of stellate cross section and means for admitting treating liquid from the top of the rod to the longitudinal flutes in the dependent stellate portion thereof.

5. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers, transporter means adapted to bring said containers one after another beneath the successive liquid supply devices, liquid discharge pipes dependent from said containers, a plurality of apertured cake holders adapted for threading on to said discharge pipes and releasable means for retaining said cake holders on said pipes.

6. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers, mechanical means for bringing said containers one after another beneath the successive liquid supply devices for appropriate time periods and with appropriate pauses for draining, liquid discharge pipes dependent from said containers, a plurality of apertured cake holders adapted for threading on to said discharge pipes and releasable means for retaining said cake holders on said pipes.

7. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers adapted to be passed in succession beneath said liquid supply devices so as to receive liquids therefrom, liquid discharge pipes dependent from said containers, a plurality of apertured cake holders adapted for threading on to said discharge pipes, releasable means for retaining said cake holders on said pipes and draining receptacles arranged below the path of travel of the suspended cake holders.

8. In apparatus for treating cakes of artificial silk and cake-like coils of thread with

different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers adapted to be passed in succession beneath said liquid supply devices so as to receive liquids therefrom, liquid discharge pipes dependent from said containers, a plurality of apertured cake holders adapted for threading on to said discharge pipes, releasable means for retaining said cake holders on said pipes, a plurality of separated draining receptacles arranged severally under the several liquid supply devices and below the path of travel of the suspended cake holders and draining surfaces bridging the spaces between adjacent draining receptacles.

9. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of liquid supply devices severally supplying the various treating liquids, a series of liquid containers adapted to be passed in succession beneath said liquid supply devices so as to receive liquids therefrom, liquid discharge pipes dependent from said containers a plurality of apertured cake holders adapted for threading on to said discharge pipes, releasable means for retaining said cake holders on said pipes, a plurality of draining receptacles arranged below the path of travel of the suspended cake holders and corresponding severally to the several liquid supply devices and means associated with each draining receptacle to withdraw liquid therefrom and to deliver said withdrawn liquid to the liquid supply device pertaining to such draining receptacle.

10. In apparatus for treating cakes of artificial silk and cake-like coils of thread with different liquids in continuous succession, a series of spaced liquid supplying devices severally delivering the various treating liquids, filter means for said liquid supplying devices, a series of liquid containers with laterally projecting supports, a mechanical transporter adapted to receive the supports of said containers and to bring said containers one after another under the several liquid supplying devices for appropriate time periods and at appropriate time intervals, a plurality of liquid discharge pipes dependent from each container, each of said pipes being formed to discharge liquid outwardly along its length, a plurality of apertured annular cake supporting devices, adapted to be threaded on said discharge pipes one after another, releasable means associated with each discharge pipe for retaining a column of superposed cake carriers on such pipe, a draining receptacle arranged beneath each liquid supply device and liquid forcing means for withdrawing liquid from each draining vessel and delivering such withdrawn liquid to the co-related liquid supply device.

11. An apparatus according to claim 1, wherein the cake holders each comprise a hub of smaller diameter and of greater height than the cake to be mounted thereon.

12. An apparatus according to claim 1, wherein each cake holder comprises a cake-supporting flange and a hollow, substantially cylindrical apertured core, the length of which is greater than, and the diameter of which is less than, the corresponding dimensions of the cakes to be supported thereby, whereby to permit both axial and radial expansion of said cakes when mounted upon said cake holders.

13. The process of treating cakes of artificial silk and cakelike coils of thread with different liquids in succession, which comprises mounting the cakes so as to move in unison with a liquid container from which the cakes are to receive the treating liquid, moving said unit of cakes and liquid container to successive stations whereat the liquid container will be supplied with the treating liquid, and permitting said liquid from the liquid container to flow out and act upon the cakes and drain therefrom during the travel of the unit from one liquid-receiving station to another.

In witness whereof, I have hereunto signed my name.

FRITZ PASCHKE.