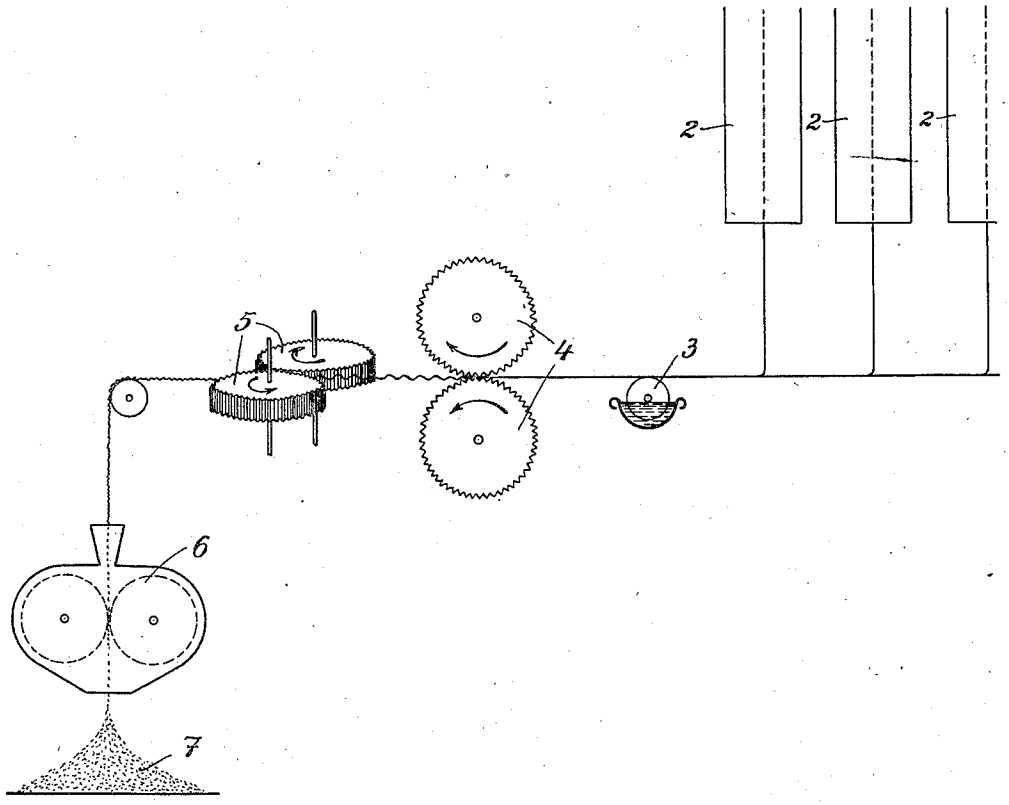
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METHOD AND APPARATUS FOR THE PRODUCTION OF CURLED THREADS FROM CELLULOSE ACETATE

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METHOD AND APPARATUS FOR THE PRODUCTION OF CURLED THREADS FROM CELLULOSE ACETATE

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3 Claims. (Cl. 18—54)

The invention relates to a method and an apparatus for the production of curled threads from cellulose acetate.

It is known to utilise the thermoplastic properties of a structure from cellulose acetate or esters which may still contain swelling- or softening-media, in order to impart to these structures a certain shape. In utilising this property and by means of fluted rolls an undulating, especially a curling, can be produced on an acetate-artificial silk thread.

However, different difficulties occur in such curling methods. If for curling a normal, ready spun, dry thread is employed, the curling is not lasting, or only when high temperatures and pressures are employed which cause damaging of the thread treated in this manner. If a thread, which contains a swelling or softening medium already added to the spinning mass, is treated in a similar manner, difficulties of various kinds also result. For instance it easily happens that the threads are stuck the one on the other or on the fluted rolls, so that it is impossible to continually carry out the method, or these swelling and softening media must be removed again after the curling, as otherwise the curling does not last and a thread containing these media shows a much too strong elasticity and results in an unelastic, unsuitable product. If however the swelling and softening media are subsequently applied only externally on to the ready spun thread, such as cellulose acetate, swelling aqueous salt solutions, or mixtures of organic liquids such as, for instance, a mixture of a dissolving or swelling medium for cellulose acetate together with a non-dissolver or filling medium, a treatment of longer duration preceding the curling is necessary with these media and must be very accurately regulated or supervised. This is not simple and requires additional time, arrangement and auxiliary substances. After the curling a re-treatment has to take place to liberate the threads from these media.

If in such methods higher spinning speeds are applied such as usual for instance in the dry-spinning method, the above mentioned methods fail as the time during which the swelling media act is too short to enable a sufficient action of the running thread. A finished product insufficiently curled would then be obtained or preliminary and subsequent treating devices would have to be employed.

The invention avoids in a very simple manner these inconveniences and admits of obtaining a regular and permanently lasting curling in that by adjusting the spinning conditions a small portion of its volatile solvent is left in the thread bundle coming out of the spinning shaft, this thread bundle being then sprinkled at once with water, preferably hot water, by means of a moistening device and finally conducted through one or several pairs of heated fluted rolls. The thread bundle thus curled is then cut to the desired staple length immediately and continually. If necessary, a re-drying can take place following on the cutting or later, but this has nothing to do with the curling to be obtained.

In this simple manner it is possible, to obtain on a moving thread bundle of acetate artificial silk a permanent and lasting, very regular curling. Sticking or winding of the fibres on the rolls does not take place. By selection of the fluted rolls the fibres can be set as regards number of curlings per unit of length and shape of the curling arcs (round, flat, acute arcs). If the bundles of thread are conducted between two successive pairs of rolls, the axial planes of which are inclined at an angle the one to the other, or if the thread bundles are turned after the first curling and prior to the introduction into the second, parallel pair of rolls, it is possible to produce, according to the invention, a curling after the manner of a double curve.

The curling thus obtained is even more like the natural wool curling, very lasting and does not disappear by carding or combing in the machine for further treatment. The curled fibres further can be subjected repeatedly to a longitudinal stressing or moistened and dried, colored or otherwise treated without causing the curling to disappear. The curling is permanent and lasting.

The method presents the advantage that it can be applied on to the moving thread bundle, space being saved owing to the simplicity and small size of the treating elements, this having an especially favourable effect if the method is applied to the rapidly running thread bundle.

The threads coming from the spinning shaft are moistened, curled and cut in a continuous operation, so that the curled acetate cellulose wool is obtained quite ready, this being especially valuable for production in large quantities.

The manufacturing process of the ready cellulose wool requires a very short time, only about two seconds being necessary for the spinning, curling and cutting. Owing to these high speeds a machine unit with 100 spinning points turns out per day at least 1000 kg. The several ma-

chine elements work so securely and reliably, that practically no one is required for attendance except for the pressing of the ready bales. The cellulose wools produced according to the new method have an extraordinarily uniform and lasting curling, the curving and the number of curlings being as desired.

The method can be carried out at any spinning speeds usual in the dry-spinning process. For instance a bundle of fibres of 500 to 1000 titre at 3¾ titre per single fibre is spun in any spinning shaft at a speed of at least 150 m. per minute. The drying process in the cell is adjusted so that the delivered thread contains 4 to 10, preferably 6% solvent. In front of the curling roll one or several bundles of fibre of the above titre are moistened with water, preferably hot water, so that they show a water content from 6 to 18, preferably 14%. The fibres then moistened with volatile solvent and water are fed to a pair of curling rolls heated to 80° C. to 180° C., preferably 130° C., this pair of curling rolls rotating at a speed of about 100 m. per minute. The curling which is produced shows 6 to 7 arcs per cm. The cutting machine following on the curling rolls draws the curled bundle off the curling roll in slightly stretching it and cuts the threads in staples of for instance about 120 mm. length.

The accompanying drawing shows by way of example an apparatus for carrying out the method according to the invention.

In this drawing **2** designates the spinning shafts or the drying chambers of the same, **3** the moistening roll, **4** a pair of fluted rolls, **5** another pair of fluted rolls, the axis of the latter pair of rolls being perpendicular to that of the curling rolls **4**. **6** designates the cutting machine and **7** the pile of cut curled wool.

I claim:

1. Method for the production of curled threads spun by the dry spinning process from cellulose acetate, which comprises moistening with water in a proportion of from 6% to 18% freshly spun threads still retaining from the spinning process from 4% to 10% of solvent, and then feeding the threads to curling rolls.

2. Method for the production of curled threads spun by the dry spinning process from cellulose acetate, which comprises moistening with water in a proportion of from 6% to 18% freshly spun threads still retaining from the spinning process from 4% to 10% of solvent, then feeding the threads to curling rolls, and cutting the curled threads to form a wool-like material.

3. Method for the production of curled threads according to claim 1 in which the rolls are heated to approximately 130° C.

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