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MEANS FOR STRETCHING CORDS, YARNS AND THE LIKE

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FIG. 1

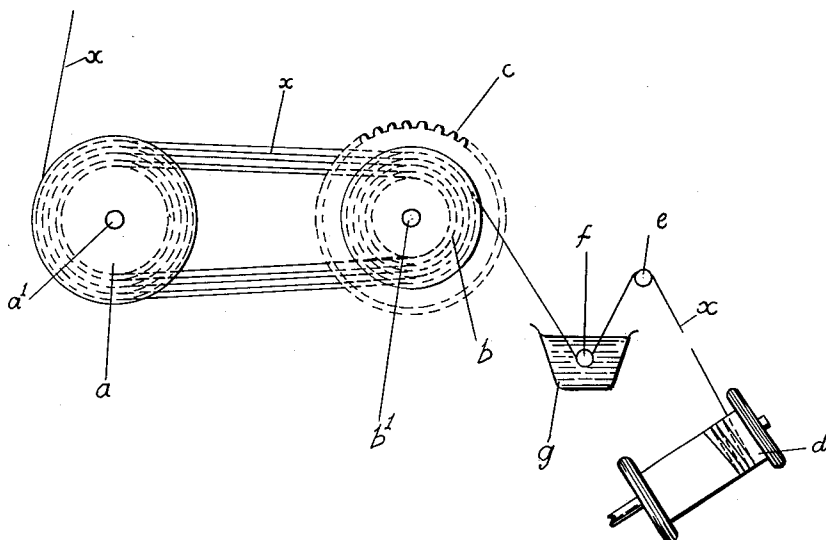
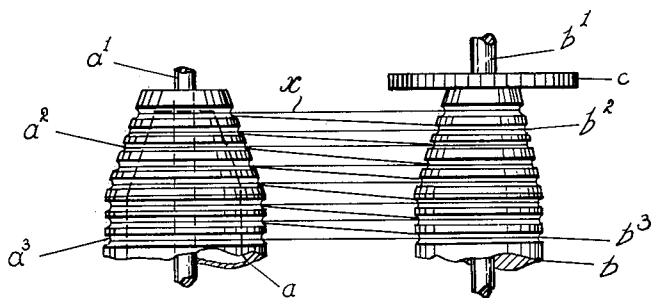


FIG. 2

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MEANS FOR STRETCHING CORDS, YARNS AND THE LIKE

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4 Claims. (Cl. 28—59.5)

This invention has reference to means for stretching cords, yarns and the like and has for its object to provide means whereby cords, yarns and the like can be stretched to a desired degree of elongation and maintained at that degree of elongation.

For some purposes it is necessary to stretch cords, yarns and the like hereinafter referred to as cords for convenience—and machines for effecting such stretching and using stretching cones are well known, but there is a difficulty in maintaining or fixing the stretch that has been given to the cord. In order to obtain a cord having an elongation of five per cent—the figures taken being by way of example only—it is customary to stretch the cord much more than is required in the hope that it will settle to the required percentage of elongation. To effect this first stretch it is customary to wet the cord and stretch it while wet, thus putting a great strain on the cord which often results in breakages, particularly where a very low elongation cord is required.

The cord after being stretched is wound while wet onto bobbins, and after contains as much as 20% moisture. The cord contracts in this condition on the bobbins; thereby causing much of the stretching effect which has been done on the stretching cones to be lost. The cord in some operations is drawn, while wet from the bobbins on a creel, into a loom where it passes over driers to dry it just before it is woven.

It will be appreciated that the wet cord on the bobbins will dry on the outside more than on the inside when exposed for any length of time to the atmosphere. Furthermore, it takes normally several days to produce a sufficient number of bobbins to equip a loom creel. It is thus apparent that there can be an appreciable variation in the moisture content of the various bobbins comprising a creel according to how long it happens to be before the weaving commences after the stretched yarn has been produced.

We thus have cords of differing moisture contents reaching the loom drier at the same time, with the result that unequal drying takes place. When the warp ends of the woven fabric do ultimately reach the same moisture content, as they will after some time, some ends will be tighter than others, because, when a wet cord dries out, it increases in length. This is one of the main causes for what is known as "baggy" fabric in tire cord manufacture. If the cord is covered to prevent this loss of moisture from the surface of the bobbins there is a very serious risk that it will become mildewed, thus causing considerable damage to the yarn. Where looms are stopped overnight or at week ends further surface drying of the bobbins can take place during a weaving with results as stated above.

The driers which are normally used behind the looms are heated electrically and it is difficult to keep them always at the necessary temperature to ensure consistent drying of the cords being woven.

The present invention provides a means whereby the difficulties and objections referred to are largely, if not entirely, overcome, and a better and less expensive way of

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providing cords ready for the loom is provided, which eliminates the use of a heater behind the loom, thus reducing space and power required.

The present invention comprises the method of stretching cords and the like which comprises a continuous length of wet cord to traverse progressively increasing loops or bights under tension whilst being heated and retaining the tension until the cord is dried to the required condition.

The invention also includes apparatus for carrying out the aforesaid method and wherein the cord or the like is caused to be looped around and extend between two pulleys, rollers or drums, having substantially parallel axes, each pulley or roller comprising a portion having grooves of increasing diameter and a portion having grooves of uniform maximum diameter, the cord or the like being led first to grooves of smaller diameter, then to grooves of larger diameter, and finally to those of uniform maximum diameter, one or both of said pulleys or rollers being heated to dry the cord during stretching to fix the stretch.

Preferably, the diameter of one of the pulleys or rollers is larger than the other, and the grooves in the rollers are made proportionate so that their surface speeds groove for groove are the same.

The invention is more particularly set forth with reference to the accompanying drawing wherein is illustrated schematically one example of apparatus for stretching cords in accordance with the invention, and in said drawings:

Fig. 1 is a side elevation; and

Fig. 2 a plan view to a larger scale of the two grooved pulleys, rollers or drums showing how the cord is looped around the same.

As illustrated in the drawings, the apparatus comprises two multi-grooved rollers *a*, *b*, mounted respectively on parallel shafts *a*¹, *b*¹, and each roller has a tapered or frusto-conical portion and a cylindrical portion in which are fashioned annular peripheral grooves, those in the conical portions being identified with the reference characters *a*², *b*², and those grooves in the cylindrical portions *a*³, *b*³. The grooves in the rollers are made proportionate so that they run at the same surface speed groove for groove.

It will thus be appreciated in both the rollers the grooves in the conical portion increase in diameter and those in the cylindrical portion are of maximum uniform diameter. The roller *b*, which is smaller in diameter than roller *a*, is driven from any source of power through gear wheel *c* which may be attached to roller *b* by any suitable means or may be fashioned integral therewith.

The larger and front roller *a* is hollow and is provided with internal heating means (not shown) which may be electrical, a gas flame, steam, hot water or other liquid. The preferred method is to use an electrical induction heater roller, as this provides a means of heating which can be readily controlled and adjusted to the requirements for the drying of varying sizes of cords.

The cord *x* to be stretched is drawn from a package bobbin *d* which can be controlled to adjust delivery tension and is led over guide rollers *e*, *f*, and through a bath *g* of water or other setting solution which may be or contain a penetrant solution or over a damping roller carrying water or setting solution. If maximum stretching is desired, the cord after leaving the bath *g* is passed round the smallest groove of the smaller roller *b* and then looped round the larger roller *a* in the smallest groove, then back to the next slightly larger diameter groove in the small roller and so on until it leaves the last of the maximum diameter grooves in the larger roller thus causing the wet cord to traverse progressively increasing loops or bights under tension. If less stretching is required, the cord is taken initially around the 2nd or 3rd smallest groove of

the smaller roller and back to its corresponding groove on the idler pulley.

It will be appreciated that the stretching of the wet cord is done as the cord passes round the rollers by the grooves of increasing diameter, and it will also be appreciated that during this stretching the cord is heated. It is furthermore heated as it passes round the other uniform maximum diameter grooves of the two rollers, and by the time it leaves the last groove of the larger and heated roller it is stretched, fixed at its desired elongation and is dried to the required condition and can be wound on the take-up bobbin and used at once in the loom without any further drying or can be stored until required.

We claim:

1. Apparatus for stretching a cord comprising, a pair of drums for rotation on parallel axes each having adjacent and axially extending frusto-conical and cylindrical portions, the conical and cylindrical portions of one of said drums being of greater diameter than corresponding portions of the other of said drums, the conical and cylindrical portions of each of said drums having axially spaced circumferential grooves, the grooves of the conical portion of each of said drums being of progressively varying diameters and the grooves of the cylindrical portion being of uniform diameters, all adapted and arranged whereby a cord may extend alternately and progressively between a groove of the conical portion of one of said drums and a groove of slightly larger diameter of the conical portion of the other of said drums and then alternately between a groove of the cylindrical portion of one of said drums and a corresponding groove of the cylindrical portion of the other of said drums.

2. Apparatus for continuously stretching a cord comprising, a pair of drums for rotation on parallel axes each having adjacent and axially extending frusto-conical and cylindrical portions, the conical and cylindrical portions of one of said drums being relatively greater in diameter than corresponding portions of the other of said drums, the conical and cylindrical portions of each of said drums being provided with axially spaced circumferential grooves for a cord whereby the grooves of the conical portions are of progressively varying diameters and the grooves of the cylindrical portions are of uniform diameter so that a cord may extend alternately and progressively from a groove of the conical portion of one drum having a certain diameter to a groove of the conical portion of the other

drum having a relatively greater diameter and then alternately from the groove of the cylindrical portion of one drum to a corresponding groove of the other drum, a bobbin for a supply of cord to extend therefrom to a groove of the conical portion of one of said drums, and means between said bobbin and said one drum for moistening liquid for the passage of cord therethrough extending between said bobbin and said one drum.

3. Apparatus for continuously stretching a cord while being dried under tension comprising, a pair of rollers having substantially parallel axes, each of said rollers consisting of a portion having annular grooves of increasing diameter and a portion having annular grooves of uniform diameter, means for heating one of said rollers, means for rotating said rollers, and means for leading the cord while wet from one of said rollers to the other of said rollers progressively over grooves of increasing diameter and subsequently over grooves of uniform diameter, all adapted and arranged whereby the cord traverses progressively increasing loops extending between said rollers.

4. Apparatus for continuously stretching cords comprising a pair of rollers of different diameters and having substantially parallel axes, each of said rollers consisting of a frusto-conical portion having annular grooves of increasing diameter and a cylindrical portion having annular grooves of uniform diameter, means for heating one of said rollers, means for rotating said rollers, and means for leading the cord while wet from one of said rollers to the other of said rollers, progressively over the grooves of increasing diameter, and subsequently over the grooves of uniform diameter, all arranged whereby the cord traverses progressively increasing loops extending between said rollers whilst being dried under tension.

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