Feb. 2, 1960 J. A. TULLY 2,923,121

APPARATUS FOR IMPARTING TWISTS TO YARNS

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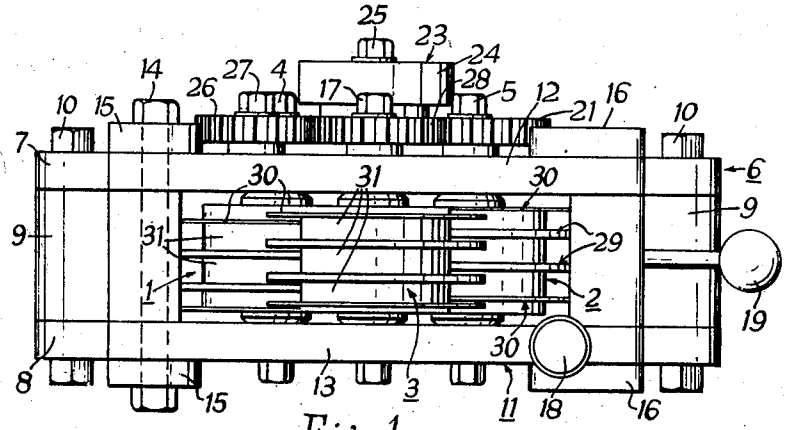

Fig. 1.

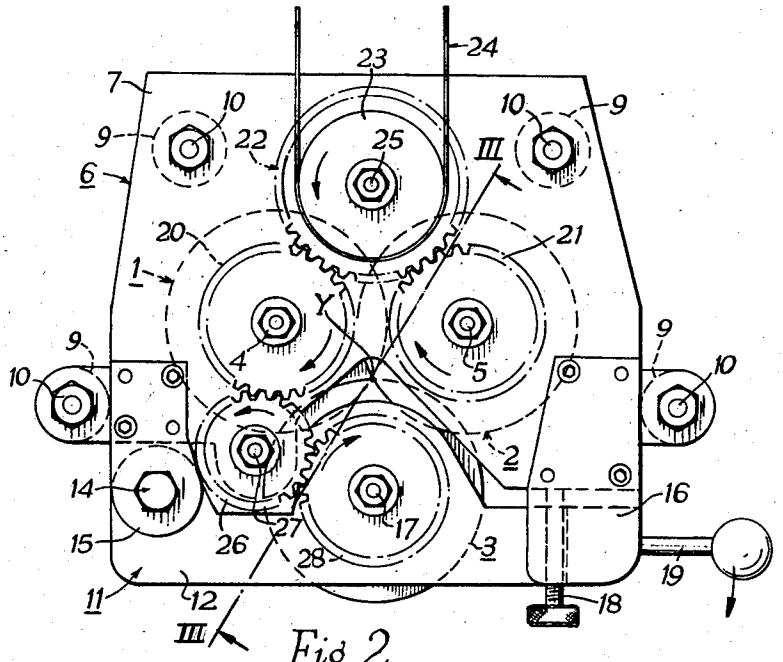

Fig. 2.

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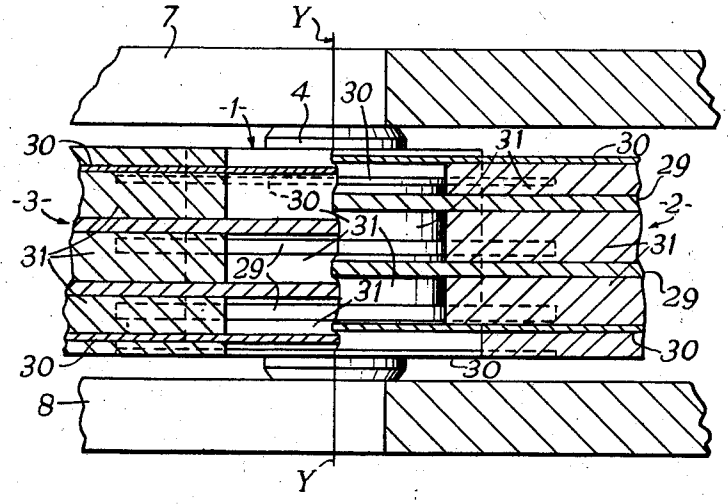
Fig. 3.



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APPARATUS FOR IMPARTING TWISTS TO YARNS

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6 Claims. (Cl. 57—77.4)

This invention is concerned with the twisting and doubling of yarns and especially to the imparting of a permanent crimp to synthetic yarns. It is an object of this invention to provide for improvements relating to the known method of imparting a temporary high twist to yarn made from artificial fibres by means of a so-called false twisting device, particularly as a step in applying a permanent crimp to the yarn.

The present invention is characterised by the step of bringing a yarn (as it is unwound from a bobbin or equivalent form of yarn storage and before it is wound into a package of cheese, cone or other form) into contact with rotating surfaces, preferably surfaces rotating substantially parallel to the general direction of longitudinal travel of the yarn at that time.

The rotating surfaces have a coefficient of friction such as to impart twist to the yarn without applying thereto drag sufficient to affect the orientation of the fibres or filaments comprising the yarn.

These friction surfaces are constituted by rotating pulleys or rollers which may comprise two or more longitudinally spaced, coaxial portions, the arrangement being such that the yarn is deflected slightly from its normal direction of travel by the intrusion between two such coaxial portions of a guide element so that intimate, though not excessive contact is maintained between the yarn and the rotating frictional surfaces.

According to this invention the guide element is also constituted by a rotating pulley or roller and may comprise two or more longitudinally spaced coaxial sections, the peripheries of the sectional rotating pulleys or rollers slightly overlapping.

The present invention may be considered also from the aspect of providing three, four or even more pulleys or rollers mounted for rotation about axes which are parallel or substantially parallel one to the others, the peripheries of said pulleys or rollers being so disposed by relative longitudinal spacing as to provide between their nearest portions an "eye" or passage which is such as to ensure that yarn passing therethrough is maintained in intimate but light frictional contact with said pulleys or rollers. The peripheries of adjacent pulleys or rollers rotate in the same direction so as to impart a twist to the yarn. As long as the size of the "eye" or passage between the rotating surfaces—as viewed along the normal direction of travel of the yarn—is less than the diameter of the yarn, contact therewith sufficient for twist-imparting is obtained, but if desired the rotating pulley or roller peripheries may slightly overlap, so that when viewed in a direction perpendicular to the planes of rotation no clear way through said "eye" opening or passage would be discerned, though yarn can thread through the interlaced pulleys or rollers in a slightly tortuous path.

Any suitable mode of imparting a rotary motion to the three or more pulleys or rollers may be employed. In preferred arrangements a series of multi-rim rollers are driven from a main drive pulley; to prevent slip between the rollers they may be positively gear driven from the main drive pulley.

By way of example one embodiment of the invention is illustrated in the accompanying drawings, and wherein Figures 1 and 2 are a front view and plan respectively and Figure 3 is a fragmentary cross section on line III—III of Figure 2.

In the arrangement illustrated three multi-rim rollers 1, 2, 3 are employed and two of these (rollers 1 and 2) are secured to parallel spindles 4, 5 respectively journalled for rotation in a main body 6 comprising plates 7, 8 spaced apart by sleeves 9 and secured together by screw fasteners 10. The third multi-rim roller 3, which constitutes the guide element hereinbefore referred to, is carried by a hinged frame 11 comprising plates 12, 13 corresponding to plates 7, 8 respectively, said frame 11 being pivoted on a pin 14 extending between ears 15 secured to main body 6; the unhinged end of frame 11 is received snugly between ears 16 projecting from main body 6.

The roller 3 is mounted on frame 11 by means of a spindle 17 and when the frame 11 is in the closed position, that is, the position of use, the spindles 4, 5, 17 of the three rollers are parallel one to the others and located in space approximately at the three corners of an equilateral triangle.

The setting of roller 3 relatively to rollers 1 and 2 may be altered by adjustment of a stop screw 18 carried by frame 11 and adapted to abut the front edge of main body plate 8. The frame 11 may be swung into and out of the closed position by use of a handle 19; means for locking the frame 11 in the closed position normally would not be required.

The rollers 1 and 2 are rotated in similar directions by the direct meshing of spur gear wheels 20, 21 on spindles 4, 5 respectively with a similar gear wheel 22 secured to or integral with a pulley 23 adapted to be frictionally driven by a belt 24, the gear wheel 22 and associated pulley 23 being rotatable on a stub axle 25 mounted on main body plate 7. The third roller 3 on frame 11 is rotated in the same direction to rollers 1 and 2 by the use of an intermediate idler gear pinion 26 also mounted on a stub axle 27 carried by plate 7, said pinion 26 meshing, when frame 11 is closed, with a spur gear wheel 28 on the spindle 17 of roller 3.

Each of the rollers 1, 2, 3 comprises a pair of middle friction discs 29 interposed between thin outer discs 30 (for instance, of chrome steel), the various discs being separated by spacing collars 31. The discs 29 and 30 are conveniently of the same diameter and are so arranged that their peripheries combine to form a very small eye or preferably overlap, so that yarn y threaded through the roller disc peripheries follows a slightly tortuous path (see Fig. 3 especially, which shows the tortuous path of the yarn somewhat exaggerated), ensuring intimate contact between the disc peripheries and the yarn.

I claim:

1. Apparatus for imparting a high twist to synthetic yarn by bringing a yarn into contact with rotating friction surfaces, said apparatus comprising a plurality of pulleys comprising at least two longitudinally spaced, coaxial portions disposed with their axes in parallel formation, and a guide element adjacent the peripheries of said pulleys to deflect the yarn slightly from its normal direction of travel by the intrusion of said guide element between said pulley coaxial portions, so that intimate, though not excessive contact is maintained between the yarn and the frictional surfaces of said rotating pulleys.

2. Apparatus as claimed in claim 1, in which the guide element is also constituted by a rotating pulley.

3. Apparatus as claimed in claim 2, wherein said rotating guide pulley comprises two or more longitudinally spaced coaxial sections, the peripheries of the sectional friction and guide pulleys or rollers slightly overlapping to form an "eye" or passage of a size, viewed in plan, not greater than the diameter of the yarn.

4. Apparatus for imparting a high twist to synthetic yarn by bringing a yarn into contact with rotating frictional surfaces, said apparatus comprising not less than three pulleys mounted for rotation about axes which are parallel one to the others, each of said pulleys having multiple rims so disposed by relative longitudinal spacing as to provide between their nearest portions an "eye" or passage which is such as to ensure that yarn passing therethrough is maintained in intimate but light frictional contact with said pulleys, the peripheries of adjacent pulleys rotating in the same direction.

5. Apparatus as claimed in claim 4, characterised in that the rotating pulley rims overlap sufficiently, when viewed in a direction perpendicular to the planes of rotation, to provide an "eye" or passage through which yarn can pass in a slightly tortuous path.

6. Apparatus as claimed in claim 4, wherein the multi-rim pulleys are driven from a main drive pulley through positively driven gearing.

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