

March 26, 1968

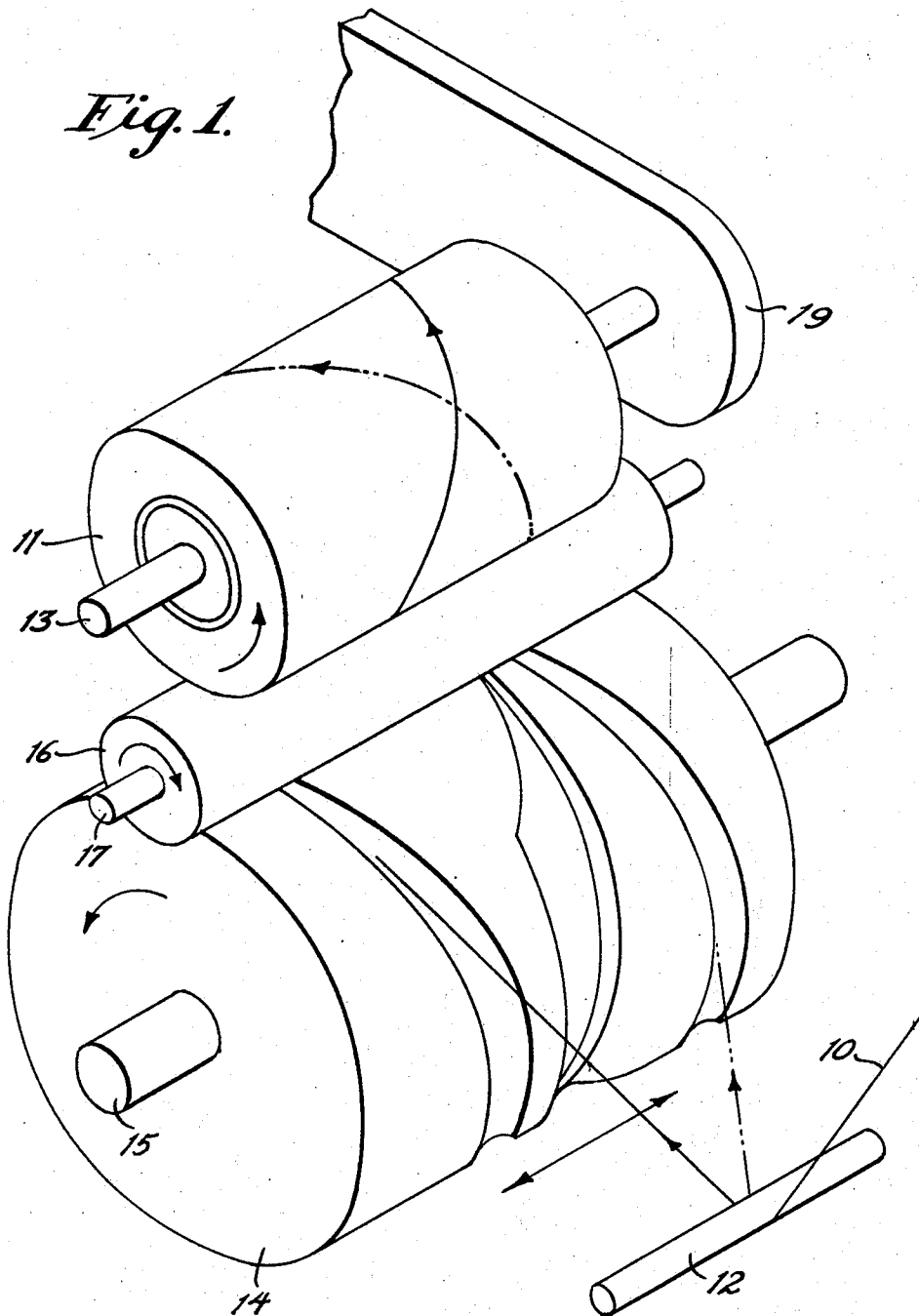
R. K. STANLEY

3,374,960

STRAND WINDING

Filed Oct. 23, 1965

3 Sheets-Sheet 1



INVENTOR,
ROBERT K. STANLEY
BY *Mc Clurg & Weiser*
ATTORNEYS.

March 26, 1968

R. K. STANLEY
STRAND WINDING

3,374,960

Filed Oct. 23, 1965

3 Sheets-Sheet 2

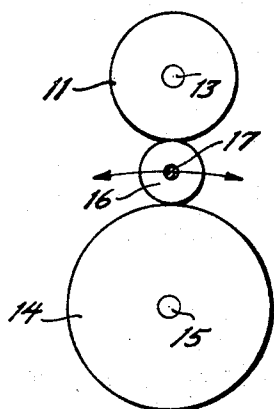


Fig. 2.

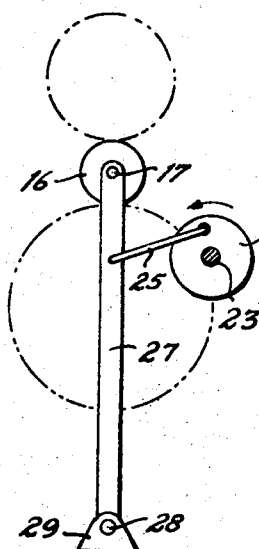


Fig. 3.

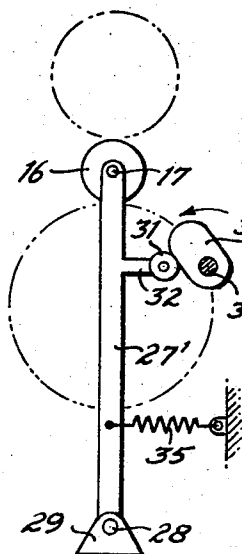
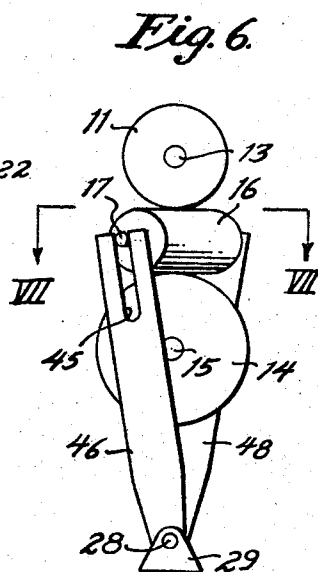


Fig. 4.

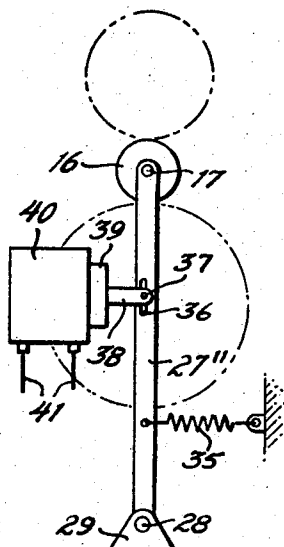


Fig. 5.

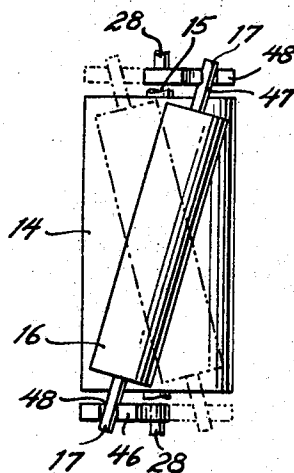


Fig. 7.

INVENTOR.
ROBERT K. STANLEY.
BY *McClung & Weiser*
ATTORNEYS.

March 26, 1968

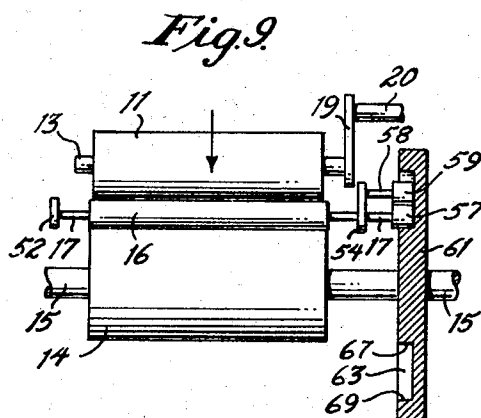
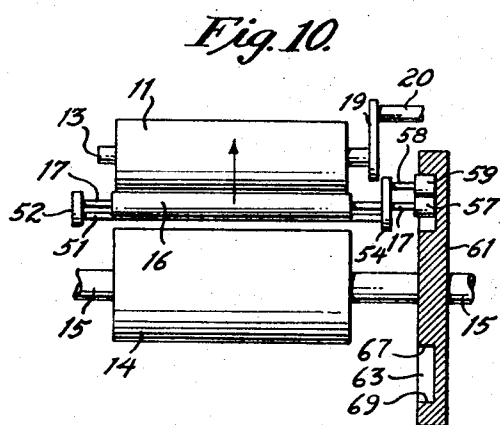
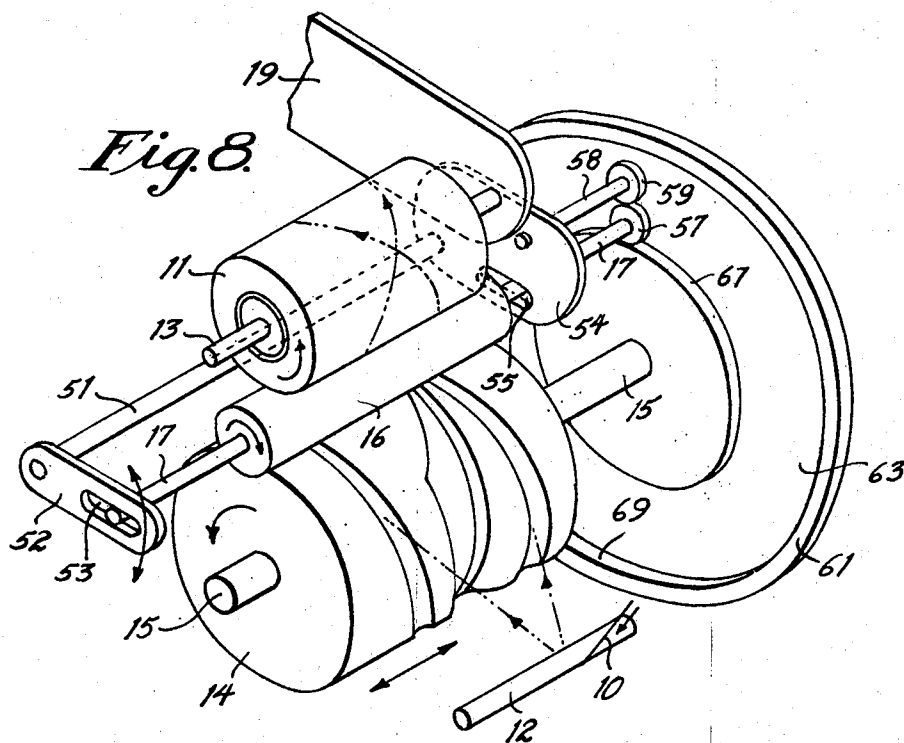
R. K. STANLEY

3,374,960

STRAND WINDING

Filed Oct. 23, 1965

3 Sheets-Sheet 3



INVENTOR
ROBERT K. STANLEY
BY *McClurg & Weiser*
ATTORNEYS.

1

3,374,960

STRAND WINDING

Robert K. Stanley, Media, Pa., assignor to Techniservice Corporation, Lester, Pa., a corporation of Pennsylvania
Filed Oct. 23, 1965, Ser. No. 502,850
18 Claims. (Cl. 242—18.1)

ABSTRACT OF THE DISCLOSURE

This invention relates to winding of textile strands into package form, concerning especially traverse winding thereof. Formation of a ribbon wind is precluded by means of a roll intermediate the package and strand-traversing means. The intermediate roll receives the strand and deposits it onto the package while also normally rotating the package. The intermediate roll also introduces variation into the traverse, both by simply being there and more especially by being moved bodily on its axis with respect to the traversing means, which in preferred form is a grooved traversing drive roll.

In traverse winding of a textile strand into package form there is a tendency for the strand from successive traverses to be superimposed directly upon itself in a so-called "ribbon" configuration when there is a simple relationship between traverse speed and package surface speed. The resulting uneven configuration is unstable, leading to sloughing of the strand, and is conducive to migration and breaking of filaments, especially in multi-filament strands, upon unwinding of the package.

A primary object of the present invention is prevention of ribbon formation in traverse wound packages of textile strands.

Another object is modification of the strand path between traversing means and package.

A further object is controlled variation in spacing of the strand package from the strand-traversing means.

Other objects of the present invention, together with means and methods for attaining the various objects, will be apparent from the following description and the accompanying digrams.

FIG. 1 is a perspective view of traverse winding apparatus for textile strands in accordance with this invention;

FIG. 2 is a diagrammatic end elevation of certain of the same apparatus elements, with indication of variation in the relative location thereof;

FIG. 3 is a diagrammatic end elevation of a specific embodiment of means for varying the relative location of certain of the same apparatus elements;

FIG. 4 is a diagrammatic end elevation of a modified embodiment of means for varying the relative location of certain of the same apparatus elements;

FIG. 5 is a diagrammatic end elevation of another embodiment of means for varying the relative location of certain of the same apparatus elements;

FIG. 6 is a diagrammatic end elevation of a further embodiment of means for varying the relative location of the same apparatus elements; and

FIG. 7 is a plan view of certain of the same elements as in FIG. 6 taken as VII—VII thereon;

FIG. 8 is a perspective view of winding apparatus according to the present invention and including yet another embodiment of means for varying the relative location of certain of the elements therein;

FIG. 9 is a front elevation, partly in section, of the apparatus of FIG. 8; and

FIG. 10 is a front elevation, also partly in section, of the same apparatus, with certain of the elements thereof shown in an alternative location.

2

In general, the objects of the present invention are accomplished, in traverse winding of a textile strand into package form, by positively traversing the strand back and forth parallel to the package surface at a location spaced therefrom and constraining the strand therebetween to follow a substantially arcuate path, as viewed in a direction parallel to the package surface, from the traversing location to the package surface. The invention comprehends, in apparatus for practicing the foregoing steps, means for supporting the strand package for rotation, means for traversing the strand back and forth along the package, and a roll intermediate the traverse means and the package location to receive the strand from the traverse means on the way to the package and to rotate the package by surface contact therewith.

FIG. 1 shows, in perspective, package 11 onto which strand 10 is winding from a source thereof (not shown). The strand passes under bar guide 12, then into the traversing groove of traverse roll 14, next about part of intermediate roll 16, which itself is shown in surface contact with both the traverse roll and the package, and finally winds onto the package. It will be apparent that the path of the strand about the intermediate roll approximates a half circle of arc as viewed parallel to the contiguous package surface but actually is a more complex curve, varying in length and location therealong throughout the traverse stroke. Two alternative paths of the strand about the respective illustrated elements (except the intermediate roll, behind which the strand is hidden in this view) are shown in broken lines. Axle 15 of the traverse roll, axle 17 of the intermediate roll, and supporting spindle 13 of the package are parallel to one another; the axles are supported for rotation in conventional frame-supported bearings (not shown), and the spindle is rotatably carried on swing arm 19, which is pivotally supported about a fixed axis provided by pin 20 (not visible in this view) at its opposite end.

The operation of the elements shown in FIG. 1 is readily understood. Either of the rolls is driven appropriately to forward the strand through the described path. The intermediate roll introduces a lag into the traverse path so that the traversing of the strand at the package surface is somewhat out of phase with the traversing in the groove of the traverse roll and, more importantly, decreases the effective traverse stroke somewhat and tends to blur it as compared with the more definite reproducibility of the stroke at the traverse roll surface. Such effects of the use of the intermediate roll vary also as the package increases in size and weight. The overall effect is to inhibit ribbon formation on the package surface. Subsequent views show similar apparatus (in which like parts are identified by identical reference characters and are not necessarily mentioned again) modified for added ribbon-breaking effect.

FIG. 2 shows in schematic end elevation, package 11 and traverse roll 14 located respectively above and below and both contiguous with intermediate roll 16. A double-ended arrow to the right and left through axle 17 of the intermediate roll indicates limited lateral movement thereof (i.e., to and fro circumferentially on the surface of the traverse roll), which introduces another variable in the deposition of the strand (not shown here) onto the package surface.

FIGS. 3, 4, and 5 show, in schematic end elevation, several devices for attaining the limited movement of axle 17 of intermediate roll 16 indicated in FIG. 2. Pair of aligned supporting arms 27 (one visible) for the axle are pivoted by pin 28 on bracket 29 affixed to the frame (not shown). Link 25 eccentrically mounted at one of its ends on wheel 22, which has axle 23, is pivotally secured at its opposite end to one (or a pair of such links to both) of arms 27. Rotation of wheel 22 oscillates the arms

3

through a limited arc, imposing the indicated movement of the intermediate roll on its axle. The drawings are not to scale, and the movement of the roll may be only a few degrees; slight interruption of surface contact between the respective rolls may result in intermittent variation in surface speeds (unless both are driven alike from a common drive) and may be controlled by adjustment of the eccentricity or by relocation of the pivot for the supporting arms with or without appropriate change in the arm length.

In FIG. 4, modified pair of aligned supporting arms 27' (one visible) for axle 17 of intermediate roll 16 have cam roller 31 (or a pair thereof) mounted on angled extension 32 of one (or both) of the arms for interception by cam 33 on axle 34. Return spring 35 connects the arms to a portion of the frame located adjacent the same side thereof to which the extension projects. In FIG. 5, at least one of further modified aligned supporting arms 27'' (one visible) has short longitudinal slot 36 therein accommodating pin 37 on the end of tongue 38 extending from armature 39 of solenoid 40, which is furnished with electrical leads 41. If desired, elements 39 to 41 may be modified for pneumatic, rather than electrical, actuation (i.e., piston 39 in cylinder 40 furnished with air lines 41), and return spring 35 may be deleted. In all these embodiments the winding of strand 10 onto package 11 is improved in like manner.

FIGS. 6 and 7 show, in end elevation and plan, respectively, a further modification in which intermediate roll 16 is moved in opposite lateral directions at its opposite ends to swivel it, i.e., simultaneously moving one end forward and the opposite end backward with respect to traverse roll 14, for example, and then reversing directions. This is accomplished through use of pair of supporting arms 46, 48 pivoted on pin 27 in bracket 28 and having respective slots 45, 47 (one each) at their upper ends to receive axle 17 of the intermediate roll. Oscillation of the respective arms in opposite directions is accomplished by attaching to each of the arms a device such as shown in any of FIGS. 3 to 5 and operating them out of phase, as will be apparent. The intermediate roll remains in surface contact with the traverse roll, as well as the package, except at the extremities during the resulting swivelling movement of the intermediate roll on its axle.

FIG. 8 shows in perspective, and FIGS. 9 and 10 in front elevation (partly in section), yet another modification of apparatus according to this invention. In this embodiment, intermediate roll 16 moves upward out of contact with traverse roll 14 from time to time, and the relative surface speed of one roll to the other is varied when they are not contiguous. In addition to the elements visible in FIG. 1, these views show pivot bar 51 having affixed to its near end an end of narrow lever 52 with slot 53 therein near the opposite end thereof to accommodate an end of axle 17 of the intermediate roll. The pivot bar has affixed to its opposite end wider lever 54, which has similar slot 55 therein near the opposite end thereof to accommodate the opposite end of the intermediate roll axle. The axle passes through the latter slot and carries at its further end small roll 57. Similar roll 59 contiguous with roll 57 is carried on stub axle 58 journaled at its other end in wide lever 54. Large wheel 61 affixed to axle 15 of traverse roll 14 has wide shallow recess 63 on its near face to accommodate the pair of small rolls; it provides inner track 67 and outer track 69 for respective rolls 57 and 59. In this view roll 57 is riding on the inner track, while contiguous roll 59 is spaced from the outer track.

FIG. 9 shows the apparatus of FIG. 8 with the respective elements in the same orientation, while FIG. 10 shows them with certain of the elements changed in position corresponding to intentional relocation thereof during operation. Specifically, pivot bar 51 is pivoted in FIG. 10 to raise the near ends of small and large levers

4

52 and 54, thereby raising intermediate roll 16 out of contact with underlying traverse roll 14, and small roll 57 on intermediate roll axle 17 out of contact with inner track 67 of large wheel 61, and bringing small roll 59 into contact with outer track 69 of the wheel. The increase in radius from the inner track to the outer track raises the surface speed of the small rolls and of the intermediate roll as well, the large wheel being preferably (but not necessarily) driven by suitable means not shown. This provides a further variation in the lay-down of the strand on the package, as compared with the regularity of the traversing of the strand by the traverse roll and effectively precludes ribboning on the package. Mechanism for pivoting pivot bar 51 to raise and lower the intermediate roll may be similar, except for orientation, to that illustrated previously for oscillating the roll along a locus essentially perpendicular thereto or may be any other suitable means.

Advantages of the present invention have been mentioned above, and other benefits will be apparent and accrue to those practicing it. While modifications have been described, other departures from the description and illustration herein, whether by addition, combination, or subdivision of parts and steps, may be undertaken with retention of all or some of the benefits and advantages of this invention, which itself is defined in the following claims.

The claimed invention:

1. In apparatus for traverse winding a textile strand into package form, means for supporting the package for rotation, a grooved strand-traversing roll for traversing the strand back and forth along the package, and a contiguous roll intermediate the strand-traversing roll and the package location to receive the strand from the traversing roll on the way to the package and to rotate the package by surface contact therewith.

2. The apparatus of claim 1 wherein the strand-traversing roll constitutes drive means for the intermediate roll.

3. The apparatus of claim 1 wherein the intermediate roll is mounted on an oscillatory axle and including means for oscillating the intermediate roll laterally as viewed in a direction parallel to the package surface.

4. The apparatus of claim 1 wherein the intermediate roll is mounted on an oscillatory axle and including means for oscillating the intermediate roll between positions of contiguity and non-contiguity with the strand-traversing roll.

5. The apparatus of claim 4 including means for rotating the intermediate roll at a surface speed different from that of the strand-traversing roll when the respective rolls are non-contiguous.

6. In apparatus for traverse winding a textile strand into package form, means for supporting the package for rotation, a grooved strand-traversing roll, a roll intermediate the strand-traversing roll and the package location and normally contiguous with both the strand-traversing roll and the package to receive the strand from the strand-traversing roll on the way to the package, the package being rotated by surface contact with the intermediate roll.

7. The apparatus of claim 6 wherein the package-supporting means includes a swing arm, whereby the distance between the package axis and the axis of the intermediate roll is variable, and the intermediate roll is mounted for movement of the axis thereof with regard to the axis of the strand-traversing roll.

8. The apparatus of claim 6 including means for oscillating the axis of the intermediate roll to move the intermediate roll along the surface of the strand-traversing roll to and fro successively with and counter to the direction of rotation.

9. The apparatus of claim 6 including means for oscillating the axis of the intermediate roll to move the intermediate roll intermittently out of contact with the strand-traversing roll.

5

10. The apparatus of claim 9 including means for rotating the intermediate roll at a greater surface speed than the strand-traversing roll when the respective rolls are non-contiguous.

11. In apparatus for traverse winding a textile strand into package form from a strand source, means for supporting the package for rotation, adjacent means for traversing the strand back and forth along and for depositing it onto the package and including a roll intermediate the traverse means and the strand source to rotate the package by surface contact therewith, the axis of the intermediate roll being movable with regard to the package outline.

12. The apparatus of claim 11 wherein the adjacent means includes strand-traversing means separate from the intermediate roll but adjacent thereto.

13. The apparatus of claim 11 wherein the intermediate roll itself is grooved to constitute traversing means for the strand.

14. The apparatus of claim 11 including means for moving the axis of the intermediate roll back and forth circumferentially with regard to the package surface, both ends of the axis moving in the same direction at the same time.

15. The apparatus of claim 11 including means for moving the axis of the intermediate roll back and forth circumferentially with regard to the package surface, the respective opposite ends of the axis moving in opposite directions at the same time.

16. In apparatus for traverse winding a strand onto a package, a grooved strand-traversing roll, drive means for the strand-traversing roll, a normally contiguous inter-

6

mediate roll for receiving the strand from the strand-traversing roll and for depositing it onto and driving the package surface, and means for spacing the intermediate and traversing rolls intermittently from one another.

17. The apparatus of claim 16 wherein the mounting for the intermediate roll supports a normally undriven rotatable device interconnected to the intermediate roll and connectable to the drive means for the traversing roll when the intermediate and traversing rolls are spaced from one another.

18. The apparatus of claim 17 wherein the drive means for the traversing roll comprises a wheel having an inner track and an outer track spaced from the axis thereof, and the intermediate roll has interconnected thereto a rotatable device normally in contact with both the inner track and the normally undriven rotatable device, the normally undriven rotatable device being in contact with the outer track when the intermediate and traversing rolls are separated, thereby driving the intermediate roll at a greater speed upon constant speed of the wheel when the rolls are separated than when they are together.

References Cited

UNITED STATES PATENTS

459,040	9/1891	Foster	242—18
1,808,573	6/1931	Remington et al.	242—18
1,964,714	7/1934	Abbott	242—18.1 X
2,090,682	8/1937	Kinsella et al.	242—18.1

FRANK J. COHEN, *Primary Examiner*.

NATHAN L. MINTZ, *Examiner*.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,374,960 Dated 26 March 1968
Inventor(s) ROBERT K. STANLEY

It is certified that error appears in the above-identified patent
and that said Letters Patent are hereby corrected as shown below:

Column 1, line 63, "as" should read --at--;

Column 4, line 2, "wtih" should read --with--;

Column 5, line 10, "source" should read --package--.

Signed and sealed this 8th day of August 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents