

Description

The present invention relates to an apparatus for manufacturing a slide fastener stringer including a woven stringer tape and a coiled coupling element woven into the stringer tape along a longitudinal edge thereof.

Woven slide fastener stringers are manufactured by a loom for weaving a stringer tape and a rotor assembly for coiling a monofilament along a conical orbital path into a coiled coupling element as it is woven into the stringer tape along a longitudinal edge thereof. One known such apparatus is disclosed in GB—A—2008159, published 31.5.1979, and another in U.S. patent No. 3,941,163, issued March 2, 1976 where the loom includes two harness groups, one for warp threads making up a major tape portion and the other for binding warp threads for fastening the woven coupling element along the tape edge, the harness groups being spaced laterally away from each other such that the binding warp threads extend considerably obliquely with respect to the major warp threads. Resulting slide fastener stringers are structurally defective in that the binding warp threads undergo undue strain when interlaced with the weft thread.

According to the invention, there is provided an apparatus for manufacturing a slide fastener stringer including a woven stringer tape and a coiled coupling element woven into the stringer tape along a longitudinal edge thereof, said apparatus including means for weaving the stringer tape of warp and weft threads, said means including harnesses for binding warp threads extending adjacent to said warp threads, a mandrel for extending at an angle to the warp threads, a stationary shaft, a rotor rotatably mounted on said stationary shaft and having an axial guide hole for passage therethrough of a monofilament while being wound around said mandrel in an orbital path to form the coiled coupling element, which coiled coupling element is then woven into the stringer tape by the weft thread, and a drive gear for rotating said rotor, characterized in that said rotor is disposed in eccentric relation to said stationary shaft and has an axial pin, there being a radial arm rotatably mounted on said stationary shaft and having a radial slot in which said axial pin is slidably received, said drive gear being rotatably mounted on said shaft and drivingly connected to said radial arm, whereby said axial guide hole is rotatable about the axis of said rotor at a varying angular velocity in response to rotation of said drive gear to allow said harnesses to move across said orbital path without interference with the monofilament being wound.

The present invention seeks to provide an apparatus for producing a woven slide fastener stringer, the apparatus including means for coiling an element-forming monofilament around a mandrel at different speeds to allow

harnesses for binding warp threads to be moved up and down across an orbital path for the monofilament without interference therewith.

The invention further seeks to provide an apparatus for manufacturing a high-quality woven slide fastener stringer at an increased rate of production.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:—

Figure 1 is a schematic front elevational view of an apparatus according to a first embodiment of the present invention;

Figure 2 is a plan view, with parts in cross section, of the apparatus shown in Figure 1;

Figures 3A through 3D are cross-sectional views taken along line III—III of Figure 2, illustrating successive angular positions of parts as a drive gear rotates through increments of 90 degrees;

Figure 4 is a diagram showing the varying angular velocity of a rotor;

Figures 5A and 5B are schematic cross-sectional views taken along line V—V of Figure 2, showing successive angular parts positions as the drive gear rotates through 180 degrees;

Figure 6 is a cross-sectional view of a portion of an apparatus according to a second embodiment of the present invention;

Figures 7A through 7D are cross-sectional views taken along line VII—VII of Figure 6, illustrating successive positions of parts as a drive gear rotates through increments of 90 degrees; and

Figure 8 is a diagram showing the varying angular velocity of a rotor according to the second embodiment.

The principles of the present invention are particularly useful when embodied in an apparatus such as shown in Figs. 1 and 2, generally indicated by the numeral 10.

The apparatus includes a needle loom 11 of a known construction for producing a narrow, continuous slide fastener stringer tape 12, and a rotor assembly 13 disposed adjacent to the needle loom 11 for winding an element-forming monofilament 14 into a helically coiled coupling element as it is woven into the stringer tape 12 along a longitudinal edge thereof.

The needle loom 11 comprises a group of harnesses 15 for forming sheds by raising and lowering warp threads 16 selectively, a weft inserter 17 having a filling carrier 18 for inserting a weft thread or filling 19 through the warp sheds, a latch needle 20 reciprocable in warp direction alongside of a longitudinal edge of the tape 12 for catching and knitting loops of the weft thread 19 carried by the filling carrier 18 so as to form a tape selage 21 along the longitudinal tape edge, and a reed 22 for beating the weft thread 19 into the fell 23 of the tape 12 being woven.

The rotor assembly 13 includes a mandrel 24 mounted on a mandrel support 25 and around

which the monofilament 14 can be wound or coiled into a slide fastener coupling element 26.

The monofilament 14 is made of plastic material and has a succession of widened, flattened portions 27 spaced at predetermined intervals therealong, such portions 27 being formed as by stamping. The widened, flattened portions 27 permit the monofilament 14 to be bent or folded over easily at such portions when the monofilament 14 is being coiled, and alternate widened, flattened portions 27 serve as coupling heads 28 of the element 26.

A reinforcing core thread 29 is fed along the mandrel 24 and inserted through the coupling element 26 as the latter is helically formed on the mandrel 24. Binding warp threads 30 are selectively raised and lowered by a group of harnesses 31, and are interlaced with the weft thread 19 and the helically coiled monofilament 14 for binding and securing the coupling element 26 to the stringer tape 12.

The rotor assembly 13 comprises a stationary shaft 34 supported immovably and non-rotatably by suitable means and having an axial hole 35 for passage therethrough of the core thread 29, and a stationary circular disk 36 disposed eccentrically with respect to and extending substantially at a right angle to the stationary shaft 34. The disk 36 is composed of a pair of circular plates 37, 38 secured together by a screw 39. The circular plate 38 includes a sleeve 40 fitted over a small-diameter end portion of the stationary shaft 34 and fixed thereto by a setscrew 41. The circular plates 37, 38 jointly define an annular groove 42 opening radially outwardly and receiving an annular rotor 33 slidably rotatable around the stationary disk 36. The rotor 33 has an axial guide hole 43 for passage therethrough of the monofilament 14 and an axial pin 44 that is located substantially in diametrically opposite relation to the guide hole 43.

The circular plates 37, 38 jointly have an axial hole 45 in alignment with the axial hole 35 in the stationary shaft 34 for allowing the core thread 14 to pass through the disk 36. The mandrel support 25 is fixedly mounted on the stationary circular plate 37 by a screw 46.

A radial arm 47 is mounted on the sleeve 40 for rotation therearound. The radial arm 47 has a radial slot 48 in which the axial pin 44 is slidably received. A drive gear 49 is rotatably mounted by a bearing 50 on the stationary shaft 34, and is drivable by a motor gear 51 held in mesh therewith. The radial arm 47 includes a flange 52 secured by a screw 53 to the drive gear 49, whereby the radial arm 47 can revolve with the drive gear 49 around the stationary shaft 34 upon rotation of the motor gear 51. The drive gear 49 has an axial guide hole 54 for passage therethrough of the monofilament 14.

Operation of the apparatus 10 will be described now. Figures 2 and 3A illustrate a starting position in which the axial guide hole

43 in the rotor 33 is located farthest from the warp threads 16 and the axial pin 44 is located closest to the warp threads 16. When the drive gear 49 is angularly moved clockwise in the direction of the arrow 56 through 90 degrees from the position of Figure 3A to that of Figure 3B, the radial arm 47 is also angularly moved together with the drive gear 49 through 90 degrees. Whereas the axial pin 44 as being slidably guided in the radial slot 48 is angularly displaced through more than 90 degrees due to the eccentricity of the rotor 33 with respect to the stationary shaft 34. The axial guide hole 43 is therefore angularly moved through a corresponding angle of α which is approximately 129 degrees in the illustrated embodiment.

As the drive gear 49 continues to be angularly moved clockwise through another angle of 90 degrees to the position shown in Figure 3C, the rotor 33 is angularly moved through approximately 51 degrees, whereupon the axial guide hole 43 is located closest to the warp threads 16. Continued angular movement of the drive gear 49 through 90 degrees causes the axial guide hole 43 to be angularly displaced through about 51 degrees as illustrated in Figure 3D. The axial guide hole 43 is further angularly moved through about 129 degrees from the position of Figure 3D back to the starting position of Figure 3A by continued 90-degree angular movement of the drive gear 49.

Accordingly, while the drive gear 49 angularly moves through 180 degrees from the position of Figure 3B to the position of Figure 3D, the axial guide hole 43 angularly moves through only about 102 degrees, that is, it moves at a lower speed of rotation than that of the drive gear 49. During the angular movement of the drive gear 49 through subsequent 180 degrees from the position of Figure 3D to the position of Figure 3B, the guide hole 43 angularly moves through about 258 degrees, that is, it, moves at a speed of rotation higher than that of the drive gear 49.

Figure 4 is a diagram of the angular velocity of the rotor 33 which varies during one cycle of revolution as a function of angular displacement of the drive gear 49, it being assumed that the amount of eccentricity "e" of the guide disk 36 with respect to the stationary shaft 34 is 12 mm, the distance "L" between the axis of rotation of the rotor 33 and the central axis of the axial pin 44 is 20 mm, and the drive gear 49 is rotated at a constant angular velocity ω (rad/sec). The angular velocities of the rotor 33 at the respective positions shown in Figures 3A through 3D correspond to the points a through d, respectively, on the curve illustrated in Figure 4.

As shown in Figures 5A and 5B, the harnesses 31 for the binding warp threads 30 are located off center with respect to a conical orbital path 55 for the monofilament 14 and as closely to the warp threads 16 as possible to

maintain the binding warp threads 30 substantially parallel to the warp threads 16. The guide axial hole 43 and hence the monofilament 14 passing therethrough are relatively slow in their angular movement adjacent to the warp threads 16 during a half cycle of revolution of the drive gear 49, so that the harnesses 31 can be moved up and down across the conical orbital path 55 reliably without hitting the monofilament 14 being circled. As the drive gear 49 moves through another half cycle of revolution, the monofilament 14 angularly moves relatively rapidly through a portion of the conical orbital path 55 which is remote from the binding warp threads 30, and hence is free from interference with the harnesses 31. The speed of revolution of the drive gear 49 can therefore be increased as a whole for a larger rate of production of a slide fastener stringer inasmuch as the monofilament 14 moves adjacent to the warp threads 16 slowly enough to allow reliable operation of the harnesses 31.

The tangential velocity V of the axial pin 44 on the rotor 33 can be determined by the formula:

$$V = \frac{\omega L(e \cos \theta + \sqrt{e^2 \cos^2 \theta + L^2 - e^2})}{\sqrt{L^2 - e^2 \sin^2 \theta}}$$

where

ω =angular velocity of the drive gear 49 (rad/sec),

L =distance between the rotational axis of the rotor 33 and the central axis of the axial pin 44,

e =amount of eccentricity of the disk 36 with respect to the stationary shaft 34, and

θ =angular displacement of the radial arm 47.

The speed of rotation of the axial guide hole 43 can thus be adjusted by selecting the distance L and the amount e of eccentricity. Stated otherwise, the interval of time in which the axial guide hole 43 moves angularly from the position of Figure 3B to the position of Figure 3D can be varied by changing these parameters L and e .

According to another embodiment of the present invention, a rotor assembly 60 as shown in Figures 6 and 7A—7B comprises a stationary shaft 61 having a central axial hole 62 for passage therethrough of the monofilament 14, and a circular guide disk 63 attached eccentrically to the stationary shaft 61 lying in a plane extending at a right angle to the shaft 61. The guide disk 63 is comprised of a pair of circular plates 64, 65 fixed together by a screw 66, the circular plate 65 being secured by a screw 67 to a sleeve 68 fitted over a small-diameter end portion of the stationary shaft 61. The sleeve 68 is nonrotatably fixed to the shaft 61 by a radially extending setscrew 69.

An annular groove 70 is defined jointly by

and between the circular plates 64, 65, and an annular guide rotor 71 is rotatably received in the annular groove 70. The rotor 71 has an axial guide hole 72 and an axial pin 73 which are diametrically opposite to or angularly spaced 180 degrees from each other. The circular plate 64 has a hole 74 axially aligned for communication with the axial hole 62 for passage therethrough of the core thread 29. A radial arm 75 rotatably mounted on the sleeve 68 has a pair of diametrically opposite radial slots 76, 77, the axial pin 73 on the rotor 71 being slidably received in the radial slot 76. A drive gear 78 is rotatably supported by a bearing 79 on the stationary shaft 61 and is held in mesh with a gear 80 drivable by a motor (not shown). The drive gear 78 supports an eccentric gear 81 mounted thereon by a pin 84 and meshing with a fixed gear 82 that is integral with the sleeve 68 and coaxial with the stationary shaft 61, the gears 81, 82 having the same dimensions. The eccentric gear 81 has an axial off-center pin 83 slidably received in the radial slot 77 in the arm 75.

The drive gear 78 is rotated to enable the eccentric gear 81 to revolve therewith around the stationary shaft 61 and at the same time to rotate about the pin 84 by meshing engagement with the fixed gear 82. The rotor 71 now starts rotating clockwise from the position of Fig. 7A. As the drive gear 78 angularly moves through 90 degrees, the radial arm 75 angularly moves through an angle of β (Figure 7B) which is greater than 90 degrees because the gear 81 is turned about the pin 84 to advance the arm 75 angularly ahead of the drive gear 78 through angular displacement of the off-center pin 83. Simultaneously, the rotor 71 and hence the axial guide hole 72 therein are angularly moved through an angle of γ which is much greater than the angle β because of the axial pin 73 radially movably in the radial slot 76 being angularly moved by the radial arm 75. The angle γ is approximately 142.5 degrees in the illustrated embodiment. The drive gear 78 continues to move angularly through another 90 degrees, whereupon the radial arm 75 is angularly moved through 180 degrees from the starting position. At this time, the axial guide hole 72 is angularly moved through approximately 37.5 degrees from the position of Figure 7B to the position of Figure 7C wherein the axial guide hole 72 is located closest to the warp threads 16. Continued angular movement of the drive gear 78 through 90 degrees causes the axial guide hole 72 to angularly move through about 37.5 degrees to the position illustrated in Figure 7D. The axial guide hole 72 is continuously angularly moved through about 142.5 degrees from the position of Figure 7D to the starting position of Figure 7A, whereupon one cycle of operation is completed.

During 180-degree angular movement of the drive gear 78 from the position of Figure 7B to the position of Figure 7D, the axial guide hole

72 angularly moves only through about 75 degrees and hence at a low speed of rotation. While the drive gear 78 is angularly moved from the position of Figure 7D through the position of Figure 7A to the position of Figure 7B, the axial guide hole 72 angularly moves through about 285 degrees and hence at a high speed of rotation.

The tangential velocity of the axial pin 73 and hence the speed of rotation of the axial guide hole 72 can be adjusted by changing the distance L between the rotational axis of the rotor 71 and the central axis of the pin 73, the amount e of eccentricity of the guide disk 63 with respect to the shaft 61, and the amount r of eccentricity of the off-center pin 83 with respect to the pin 84 of the gear 81. Accordingly, the interval of time in which the guide hole 72 moves from the position of Figure 7B to the position of Figure 7D can be varied by changing the parameters L , e and r .

Assuming that the amounts e and r of eccentricity are 16 mm and 8 mm, respectively, the fixed gear 82 has a radius of 12 mm, the distance L is 29 mm, and the drive gear 78 is rotated at a constant angular velocity ω (rad/sec), the angular velocity of the rotor 71 changes as a function of the angular displacement of the drive gear 78 as illustrated in Figure 8. The points a through d on the curve of Figure 8 correspond to the positions of Figures 7A through 7D, respectively.

The rotor 71 according to the embodiment shown in Figure 6 angularly moves more slowly during the interval between the Figure 7B and Figure 7D positions than the rotor 33 of the embodiment shown in Figure 2 angularly moves from the Figure 3B to the Figure 3D position.

List of reference numerals

- 10—apparatus
- 11—needle loom
- 12—stringer tape
- 13—rotor assembly
- 14—monofilament
- 15—harness
- 16—warp thread
- 17—weft inserter
- 18—filling carrier
- 19—filling
- 20—latch needle
- 21—tape
- 22—reed
- 23—fell
- 24—mandrel
- 25—mandrel support
- 26—coupling element
- 27—flattened portion
- 28—coupling head
- 29—core thread
- 30—binding warp thread
- 31—group of harnesses
- 33—guide rotor
- 34—stationary shaft
- 35—axial hole

- 36—guide disk
- 37—circular plate
- 38—circular plate
- 39—screw
- 40—sleeve
- 41—set screw
- 42—annular groove
- 43—guide hole
- 44—guide pin
- 45—axial hole
- 46—screw
- 47—radial arm
- 48—radial slot
- 49—drive gear
- 50—bearing
- 51—motor gear
- 52—flange
- 53—screw
- 54—guide hole
- 55—orbital path
- 56—arrow
- 60—rotor assembly
- 61—stationary shaft
- 62—axial hole
- 63—guide disk
- 64—circular plate
- 65—circular plate
- 66—screw
- 67—screw
- 68—sleeve
- 69—setscrew
- 70—annular groove
- 71—guide rotor
- 72—guide hole
- 73—pin
- 74—hole
- 75—arm
- 76—radial slot
- 77—radial slot
- 78—drive gear
- 79—bearing
- 80—gear
- 81—eccentric gear
- 82—gear
- 83—off-center pin
- 84—pin

Claims

1. An apparatus for manufacturing a slide fastener stringer including a woven stringer tape (12) and a coiled coupling element (26) woven into the stringer tape (12) along a longitudinal edge thereof, said apparatus including means (15, 17) for weaving the stringer tape of warp (16) and weft threads (19), said means including harnesses (31) for binding warp threads (30) extending adjacent to said warp threads (16), a mandrel (24) for extending at an angle to the warp threads (16), a stationary shaft (34; 61), a rotor (33; 71) rotatably mounted on said stationary shaft and having an axial guide hole (43; 72) for passage there-through of a monofilament (14) while being

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72 angularly moves only through about 75 degrees and hence at a low speed of rotation. While the drive gear 78 is angularly moved from the position of Figure 7D through the position of Figure 7A to the position of Figure 7B, the axial guide hole 72 angularly moves through about 285 degrees and hence at a high speed of rotation.

The tangential velocity of the axial pin 73 and hence the speed of rotation of the axial guide hole 72 can be adjusted by changing the distance L between the rotational axis of the rotor 71 and the central axis of the pin 73, the amount e of eccentricity of the guide disk 63 with respect to the shaft 61, and the amount r of eccentricity of the off-center pin 83 with respect to the pin 84 of the gear 81. Accordingly, the interval of time in which the guide hole 72 moves from the position of Figure 7B to the position of Figure 7D can be varied by changing the parameters L , e and r .

Assuming that the amounts e and r of eccentricity are 16 mm and 8 mm, respectively, the fixed gear 82 has a radius of 12 mm, the distance L is 29 mm, and the drive gear 78 is rotated at a constant angular velocity ω (rad/sec), the angular velocity of the rotor 71 changes as a function of the angular displacement of the drive gear 78 as illustrated in Figure 8. The points a through d on the curve of Figure 8 correspond to the positions of Figures 7A through 7D, respectively.

The rotor 71 according to the embodiment shown in Figure 6 angularly moves more slowly during the interval between the Figure 7B and Figure 7D positions than the rotor 33 of the embodiment shown in Figure 2 angularly moves from the Figure 3B to the Figure 3D position.

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- 22—reed
- 23—fell
- 24—mandrel
- 25—mandrel support
- 26—coupling element
- 27—flattened portion
- 28—coupling head
- 29—core thread
- 30—binding warp thread
- 31—group of harnesses
- 33—guide rotor
- 34—stationary shaft
- 35—axial hole

- 36—guide disk
- 37—circular plate
- 38—circular plate
- 39—screw
- 40—sleeve
- 41—set screw
- 42—annular groove
- 43—guide hole
- 44—guide pin
- 45—axial hole
- 46—screw
- 47—radial arm
- 48—radial slot
- 49—drive gear
- 50—bearing
- 51—motor gear
- 52—flange
- 53—screw
- 54—guide hole
- 55—orbital path
- 56—arrow
- 60—rotor assembly
- 61—stationary shaft
- 62—axial hole
- 63—guide disk
- 64—circular plate
- 65—circular plate
- 66—screw
- 67—screw
- 68—sleeve
- 69—setscrew
- 70—annular groove
- 71—guide rotor
- 72—guide hole
- 73—pin
- 74—hole
- 75—arm
- 76—radial slot
- 77—radial slot
- 78—drive gear
- 79—bearing
- 80—gear
- 81—eccentric gear
- 82—gear
- 83—off-center pin
- 84—pin

Claims

1. An apparatus for manufacturing a slide fastener stringer including a woven stringer tape (12) and a coiled coupling element (26) woven into the stringer tape (12) along a longitudinal edge thereof, said apparatus including means (15, 17) for weaving the stringer tape of warp (16) and weft threads (19), said means including harnesses (31) for binding warp threads (30) extending adjacent to said warp threads (16), a mandrel (24) for extending at an angle to the warp threads (16), a stationary shaft (34; 61), a rotor (33; 71) rotatably mounted on said stationary shaft and having an axial guide hole (43; 72) for passage there-through of a monofilament (14) while being



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wound around said mandrel (24) in an orbital path to form the coiled coupling element (26), which coiled coupling element is then woven into the stringer tape (12) by the weft thread (19), and a drive gear (49; 78) for rotating said rotor (33; 71), characterized in that said rotor (33; 71) is disposed in eccentric relation to said stationary shaft (34; 61) and has an axial pin (44; 73), there being a radial arm (47; 75) rotatably mounted on said stationary shaft (34; 61) and having a radial slot (48; 76) in which said axial pin (44; 73) is slidably received, said drive gear (49; 78) being rotatably mounted on said stationary shaft (34; 61) and drivingly connected to said radial arm (47; 75), whereby said axial guide hole (43; 72) is rotatable about the axis of said rotor (33; 71) at a varying angular velocity in response to rotation of said drive gear (49; 78) to allow said harnesses (31) to move across said orbital path without interference with the monofilament (14) being wound.

2. An apparatus according to claim 1 including a fastener (53) by which said radial arm (47) is secured to said drive gear (49) for corotation.

3. An apparatus according to claim 1, said axial guide hole (43; 72) and said axial pin (44; 73) being angularly spaced from each other by 180 degrees.

4. An apparatus according to claim 1, including means (81, 82) acting between said radial arm (75) and said drive gear (78) for angularly displacing said radial arm with respect to said drive gear (78) upon rotation thereof.

5. An apparatus according to claim 4, said angularly displacing means comprising a fixed gear (82) coaxially mounted on said stationary shaft (61), and a driven gear (81) rotatably mounted on said drive gear (78) in eccentric relation and held in driven mesh with said fixed gear (82), said driven gear (81) having an off-center axial pin (83), said radial arm (75) having another radial slot (77) extending diametrically opposite with respect to said first-mentioned radial slot (76), and said last-mentioned off-center axial pin (83) being slidably received in said another radial slot (77).

Patentansprüche

1. Vorrichtung zum Herstellen eines Reißverschlußbandes, das ein gewebtes Tragband (12) und eine entlang eines Tragbandrandes in das Tragband (12) eingewebte schraubenlinienförmige Kuppelgliederreihe (26) aufweist, bestehend aus einer Einrichtung (15, 17) zum Weben des Tragbandes aus Kett- und Schußfäden (16 und 19), die Webschäfte (31) für neben den Kettfäden (16) verlaufende Bindekettfäden (30) aufweist, einem unter einem Winkel zu den Kettfäden (16) angeordneten Dorn (24), einer ortsfesten Welle (34; 61), einem auf der ortsfesten Welle drehbar gelagerten Rotor (33; 71) mit einer axialen Füh-

rungsöffnung (43; 72) für den Durchtritt eines Drahtes (14), während dieser zum Formen der Kuppelgliederreihe (26), die anschließend mit Hilfe des Schußfadens (19) in das Tragband (12) eingewebt wird, um den Dorn (24) in einer Orbitalbahn herumgewickelt wird, und einem Antriebsrad (49; 78) zum Verdrehen des Rotors (33; 71), dadurch gekennzeichnet, daß der Rotor (33; 71) exzentrisch zur ortsfesten Welle (34; 61) angeordnet ist und einen axialen Zapfen (44; 73) aufweist, daß ein radialer Arm (47; 75) mit einem radialen Schlitz (48; 76) zur verschiebbaren Aufnahme des axialen Zapfens (44; 73) auf der ortsfesten Welle (34; 61) drehbar gelagert ist, daß das Antriebsrad (49; 78) auf der ortsfesten Welle (34; 61) drehbar gelagert ist und mit dem radialen Arm (47; 75) in Antriebsverbindung steht, so daß die axiale Führungsöffnung (43; 72) in Abhängigkeit von der Verdrehung des Antriebsrades (49; 78) mit veränderlicher Winkelgeschwindigkeit um die Achse des Rotors (33; 71) drehbar ist, damit sich die Webschäfte (31) ohne Behinderung des gewickelten Drahtes (14) quer zu der Orbitalbahn bewegen können.

2. Vorrichtung nach Anspruch 1, gekennzeichnet durch einen Halter (53), mit dem der radiale Arm (47) am Antriebsrad (49) drehfest befestigt ist.

3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die axiale Führungsöffnung (43; 72) und der axiale Zapfen (44; 73) unter einem Winkelabstand von 180° angeordnet sind.

4. Vorrichtung nach Anspruch 1, gekennzeichnet durch eine zwischen dem radialen Arm (75) und dem Antriebsrad (78) wirksame Einrichtung (81, 82) zum Verstellen des Drehwinkels des radialen Armes (75) in Bezug auf das Antriebsrad (78) bei einer Verdrehung desselben.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Einrichtung zum Verstellen des Drehwinkels aus einem auf der ortsfesten Welle (61) koaxial und drehfest angeordneten Zahnrad (82) und aus einem auf dem Antriebsrad (78) exzentrisch angeordneten und drehbar gelagerten getriebenen Zahnrad (81) besteht, das mit dem drehfesten Zahnrad (82) kämmt, wobei das getriebene Zahnrad (81) einen exzentrischen axialen Zapfen (83) aufweist, der radiale Arm (75) einen zweiten radialen Schlitz (77) aufweist, der sich diametral entgegengesetzt zum ersten radialen Schlitz (76) erstreckt, und der genannte exzentrische axiale Zapfen (83) in den zweiten radialen Schlitz (77) verschiebbar eingreift.

Revendications

1. Un appareil pour fabriquer une bande-support de fermeture à glissière comprenant un ruban tissé (12) de bande-support et un élément d'accouplement (26) enroulé hélicoïdalement et incorporé par tissage dans le ruban (12) de



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bande-support le long d'un bord longitudinal de
 5 dernier, ledit appareil comprenant un moyen
 (15, 17) pour tisser le ruban de bande-support
 composé de fils de chaîne (16) et de fils de
 trame (19), ledit moyen comprenant des lisses
 (31) pour des fils de chaîne de liaison (30)
 s'étendant de façon adjacente auxdits fils de
 chaîne (16), un mandrin (24) s'étendant suivant
 10 un certain angle par rapport aux fils de chaîne
 (16), un arbre fixe (34; 61), un rotor (33; 71)
 monté de façon tournante sur ledit arbre fixe et
 comportant un trou de guidage axial (43; 72)
 pour le passage à travers ce trou d'un mono-
 filament (14) pendant qu'il est enroulé autour
 dudit mandrin (24) suivant un trajet orbital de
 manière à former l'élément d'accouplement
 (26) enroulé hélicoïdalement, cet élément
 d'accouplement enroulé hélicoïdalement étant
 ensuite tissé dans le ruban (12) de bande-
 support par le fil de chaîne (19), et un pignon
 d'entraînement (49; 78) pour faire tourner ledit
 rotor (33; 71), caractérisé par le fait que ledit
 rotor (33; 71) est disposé de façon excentrée
 par rapport à l'arbre fixe (34; 61) et comporte
 un doigt axial (44; 73), un bras radial (47; 75)
 étant monté de façon tournante sur ledit arbre
 fixe (34; 61) et comportant une fente radiale
 (48; 76) dans laquelle ledit doigt axial (44; 73)
 est logé de façon coulissante, ledit pignon d'en-
 20 traînement (49; 78) étant monté de façon tour-
 nante sur ledit arbre fixe (34; 61) et étant relié
 en vue d'un entraînement audit bras radial (47;
 75), grâce à quoi ledit trou de guidage axial (43;
 72) est entraîné en rotation autour de l'axe
 dudit rotor (33; 71) à une vitesse angulaire
 variable en réponse à la rotation dudit pignon

d'entraînement (49; 78) de manière à per-
 mettre auxdites lisses (31) de se déplacer en
 travers dudit trajet orbital sans interférence
 avec le monofilament (14) en cours d'enroule-
 ment.

2. Un appareil suivant la revendication 1,
 comprenant un élément de fixation (53) au
 moyen duquel ledit bras radial (47) est fixé
 audit pignon d'entraînement (49) en vue d'une
 rotation conjointe.

3. Un appareil suivant la revendication 1,
 ledit trou de guidage axial (43; 72) et ledit doigt
 axial (44; 73) étant espacés angulairement l'un
 de l'autre de 180 degrés.

4. Un appareil suivant la revendication 1,
 comprenant un moyen (81, 82) agissant entre
 ledit bras radial (75) et ledit pignon d'entraîne-
 ment (78) pour déplacer angulairement ledit
 bras radial par rapport audit pignon d'en-
 20 traînement (78) lors de la rotation de ce dernier.

5. Un appareil suivant la revendication 4,
 ledit moyen de déplacement angulaire compre-
 nant un pignon fixe (82) monté de façon co-
 axiale sur ledit arbre fixe (61) et un pignon en-
 25 traîné (81) monté de façon tournante sur ledit
 pignon d'entraînement (78) dans une position
 excentrée et maintenu en prise d'entraînement
 avec ledit pignon fixe (82), ledit pignon en-
 traîné (81) comportant un doigt axial excentré
 (83), ledit bras radial (75) comportant une autre
 fente radiale (77) s'étendant de façon dia-
 30 métralement opposée par rapport à ladite fente
 radiale (76) mentionnée en premier, et ledit
 doigt axial excentré (83) mentionné en dernier
 étant logé de façon coulissante dans ladite
 35 autre fente radiale (77).

