

Description

The present invention relates to a device for guiding an elongate article such as a tape, particularly a surface-type fastener having engagement elements such as loops or hooks projecting from a foundation fabric piece.

Japanese patent Publication No. 57-43 discloses a guide device for guiding an elongate article such as a tape, the guide device having a single cylindrical guide roll rotatable for guiding and feeding the elongate article through frictional contact therewith. As disclosed in Japanese Patent Publication Nos. 51-47102 and 56-52563, another known device for guiding and feeding an elongate article includes two upper and lower cylindrical guide rolls disposed parallel to each other. The elongate article is gripped between and fed by the guide rolls as they rotate. Since these cylindrical guide rolls have smooth circumferential surfaces, the elongate article guided thereby tends to move transversely back and forth on the guide rolls in the axial direction thereof, and hence to be fed in an undulated path across the guide rolls. Where a plurality of parallel elongate articles are guided by a pair of cylindrical guide rolls of the conventional design, adjacent ones of the elongate articles are apt to overlap each other because they fluctuate laterally on the guide rolls.

To solve the above problem, there has been proposed a guide device comprising a guide roll having a plurality of guide grooves for receiving and guiding a plurality of elongate articles, respectively, along their corresponding straight paths, while avoiding mutual overlapping interference between adjacent ones of the elongate articles (see Japanese patent Publication No. 50-25495). The guide grooves are defined by distance-adjusting pieces alternating with roll elements projecting radially outwardly beyond the distance-adjusting pieces. For guiding elongate articles of different widths, the width of each of the guide grooves must be changed by replacing the distance-adjusting pieces to meet the width of the new elongate articles.

The present invention seeks to provide a guide device capable of guiding an elongate article without transverse fluctuation and also of guiding elongate articles of different widths without involving any complex width-changing adjustment process.

According to the present invention, there is provided a guide device for guiding elongate articles, of different widths without transverse fluctuation and without involving any complex width changing adjustment process, said guide device comprising a substantially vertical comprising: a base plate; a turntable rotatably supported on said base plate for rotation around a substantially horizontal axis; and a guide assembly supported on said turntable and comprising a plurality of guide units spaced circumferentially around said axis and having different widths for guiding the elongate article, to prevent transverse movement thereof in both directions and detent means for selectively locking the turntable in each of a plurality of rotatable positions, in each of which one of said guide

units is in fixed pre-determined operative position.

Many other advantages and features of the present invention will manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which preferred structural embodiments incorporating the principles of the invention are shown by way of illustrative example.

Figure 1 is a perspective view, partly cut away, of a guide device according to the present invention;

Figure 2 is a cross-sectional view taken along line II-II of Figure 1;

Figure 3 is a schematic elevational view of an apparatus for coating surface-type fasteners, with the guide device of the invention being incorporated in the apparatus;

Figure 4 is a side elevational view, partly in cross section, of a guide device according to another embodiment of the present invention; and

Figure 5 is a fragmentary side elevational view of a guide rod according to still another embodiment of the present invention.

Like or corresponding parts are denoted by like or corresponding reference characters throughout several views.

The principles of the present invention are particularly useful when embodied in a guide device, generally denoted by the reference numeral 10 in Figure 1, for guiding an elongate article such as a surface-type fastener, a ribbon, or any of various narrow pieces of fabric or other materials.

As shown in Figure 1, the guide device 10 generally comprises a base plate 11 extending vertically and a guide assembly 12 rotatably mounted on the base plate 11.

As illustrated in Figure 2, the guide assembly 12 comprises a turntable 13 including a first circular side plate 14 having a coaxial shaft 15 projecting through and rotatably supported on the base plate 11 by a bearing 16. The shaft 15 can be rotated about its own axis by a handle 17 attached to the projecting end of the shaft 15. The turntable 13 also includes a second circular side plate 18 extending parallel to and spaced axially from the first circular side plate 14, the first and second circular side plates 14, 18 having the same diameter and being coaxial with each other.

The first and second circular side plates 14, 18 are interconnected by a plurality (four in Figures 1 and 2) of rods or pins 19 angularly spaced at equal intervals around the axis of the first and second circular side plates 14, 18. Therefore, the first and second side plates 14, 18 of the turntable 13 can be rotated about the axis of the shaft 15 by rotating the handle 17.

Each of the pins 19 has opposite ends fixed to the first and second side plates 14, 18. A collar 20 is fitted over each of the pins 19 and extends from end to end thereon. Each collar 20 supports thereon a pair of flanges 21 axially spaced from each other and fixed to the collar 20 for locating an elongate article therebetween.

The paired flanges 21 on the four collars 20 are

spaced from each other by different axial distances W1, W2, W3, W4 which are progressively greater in the described order, as shown in Figure 2. The pins 19, the collars 20, and the flanges 21 spaced by the distances W1, W2, W3, W4 jointly constitute four guide units 22, 23, 24, 25, respectively.

The first side plate 14 has a plurality of detent mechanisms 26 spaced in the circumferential direction and positioned radially inwardly of the guide units 22 through 25. Each of the detent mechanisms 26 comprises a sleeve 27 disposed on the side surface of the side plate 14 facing the base plate 11 and projecting axially toward the base plate 11, the sleeve 27 having an open end defined by a constricted edge. A ball 28 is disposed in the sleeve 27 and is normally urged by a compression coil spring 29 in the sleeve 27 to be pressed against the base plate 11. The ball 28 is prevented from being displaced out of the sleeve 27 by its constricted end.

The base plate 11 has a plurality of recesses 30 defined in the side surface thereof facing the first side plate 14. Each of the recesses 30 receives part of one of the balls 28. When the balls 28 are partly received by the respective recesses 30, the turntable 13 is locked in one of angular positions with respect to the base plate 11. The detent mechanisms 26 are positioned such that when the turntable 13 is locked in one of the angular positions, one of the guide units 22 through 25 is located in an uppermost position for guiding an elongate article. In Figures 1 and 2, the guide unit 24 is locked in the uppermost position. Although not shown, it is possible to employ only one detent mechanism for locking one of the guide units 22 - 25 in the uppermost position, the detent mechanism consisting of either a combination of a single spring-loaded ball with four circumferentially spaced recesses, or a combination of four circumferentially spaced, spring-loaded balls with a single recess.

The flanges 21 of the guide units 22 through 25 are positioned such that the centers of the respective guide units 22-25 in the longitudinal direction of the pins 19 lie on one vertical plane.

Figure 3 shows an apparatus for coating surface-type fasteners F, the apparatus employing the guide devices 10 constructed as shown in Figures 1 and 2.

For guiding a plurality of spaced and juxtaposed surface-type fasteners F, a corresponding number of guide devices 10 are employed in the coating apparatus. The handles 17 of the guide devices 10 are turned so that the guide units having a width corresponding to that of the surface-type fasteners F to be guided are located in the uppermost position. More specifically, as shown in Figures 1 and 2, each guide unit 24 having the width W3 for guiding a surface-type fastener F between the flanges 21 is brought into the uppermost position by turning the turntable 13 with the handle 17, and is locked in the uppermost position by the detent mechanisms 26. Then, the surface-type fastener F is transversely positioned between the flanges 21 of each guide unit 24. The surface-type fasteners F are guided by the guide devices 10 and an inlet guide roll 31 onto a rotating coating roll 32 that is partly immersed in a

coating solution 33 contained in a coating bath 34. A plurality of spaced doctor blades 36 are held against the coating roll 32 to scrape the excess coating solution off the coating roll 32, leaving parallel layers of the coating solution for application to the respective surface-type fasteners F. The surface-type fasteners F, with their backs coated with the coating solution, are then guided by an outlet guide roll 35 for a next process. The surface-type fasteners F can be fed along respective straight paths by the guide devices 10 of the present invention without being transversely fluctuated since each of the surface-type fasteners F is transversely positioned between the flanges 21. Therefore, the juxtaposed surface-type fasteners F are prevented from being overlapped or interfering with each other.

When a surface-type fastener having a different width corresponding to the distance W1, W2, or W3 is to be set on the guide device 10, the handle 17 is turned to move the guide unit 22, 23, or 25 into the uppermost position, in which the guide unit is automatically locked by the detent mechanisms 26. Since the guide units 22 through 25 have their centers on the same plane, the surface-type fastener desired to be guided is not manually required to be transversely shifted into proper alignment with the guide unit that has been brought up to the uppermost position, but can automatically be centered on the guide unit in the uppermost position. Inasmuch as the guide unit in the uppermost position is securely locked by the detent mechanisms 26, the surface-type fastener can stably be guided by the guide unit.

Figure 4 shows a guide device according to another embodiment of the present invention. The guide device, generally denoted at 40 in Figure 4, differs from the guide unit 10 of Figures 1 and 2 in that each of guide units 46 through 49 of a guide assembly 41 on a turntable 42 comprises three pairs of axially spaced flanges 45 supported on collar 44 fitted over a pin 43 supported by and extending between the first and second side plates 14, 18. The flanges 45 in each pair of the guide unit 46 are spaced the distance W1, the flanges 45 in each pair of the guide unit 47 are spaced the distance W2, the flanges 45 in each pair of the guide unit 48 are spaced the distance W3, and the flanges 45 in each pair of the guide unit 49 are spaced the distance W4. The guide device 40 can guide three spaced elongate articles with the guide unit locked in the uppermost position. In Figure 4, the guide unit 48 is in the uppermost position. The guide device 40 is advantageous for use with the coating apparatus shown in Figure 3 since three surface-type fasteners can simultaneously be guided by the single guide device 40 into the coating apparatus.

Figure 5 illustrates a guide rod 51 of a circular cross section having a plurality of guide grooves 50 defined between axially spaced flanges 52, each of the guide grooves 50 having a predetermined width or flange-to-flange distance W. The guide units of a guide device may be composed of a plurality of guide rods 51, respectively, with their guide grooves 50 having different widths for guiding elongate articles of different widths.



Claims

1. A guide device (10, 40) for guiding elongate articles (F), of different widths without transverse fluctuations and without involving any complex width-exchanging adjustment process characterized in that it comprises a substantially vertical base plate (11); a turntable (13; 42) rotatably supported on said base plate (11) for rotation around a substantially horizontal axis; and a guide assembly (12; 41) supported on said turntable (13; 42) and comprising a plurality of guide units (22, 23, 24, 25; 46, 47, 48, 49) spaced circumferentially around said axis and having different widths (W1, W2, W3, W4) for guiding the elongate article (F) to prevent transverse movement thereof in both directions and, detent means (26) for selectively locking the turntable in each of a plurality of rotated positions, in each of which one of said guide units (22, 23, 24, 25; 46, 47, 48, 49) is in a fixed pre-determined operative position.

2. A guide device (10, 40) according to claim 1, characterized in that said turntable (13; 42) comprising a first circular side plate (14) having a coaxial shaft (15) rotatably supported on said base plate (11), said shaft (15) having said axis, and a second circular side plate (18) spaced from said first circular side plate (14) and connected thereto by said guide units (22, 23, 24, 25; 46, 47, 48, 49).

3. A guide device (10) according to claim 1, characterized in that each of said guide units (22, 23, 24, 25) comprising an axial pin (19) supported on said turntable (13), a collar (20) fitted over said pin (19), and a pair of flanges (21) supported on said collar (20), the flanges (21) of said guide units (22, 23, 24, 25) being axially spaced by said different widths (W1, W2, W3, W4), respectively.

4. A guide device (40) according to claim 1, characterized in that each of said guide units (46, 47, 48, 49) comprising an axial pin (43) supported on said turntable (13), a collar (44) fitted over said pin (43), and a plurality of pairs of flanges (45) supported on said collar (44), said flanges (45) in each pair of said guide units (46, 47, 48, 49) being axially spaced by said different widths (W1, W2; W3, W4), respectively.

5. A guide device (10; 40) according to claim 1, characterized in that each of said guide units (22, 23, 24, 25; 46, 47, 48, 49) comprising a plurality of guide rods (51) each having axially spaced guide grooves (50), said guide grooves (50) of said guide rods (51) having different widths (W), respectively.

6. A guide device (10; 40) according to claim 1, characterized in that said guide units (22, 23, 24, 25; 46, 47, 48, 49) having respective centers in the direction of said axis which lie on one plane parallel to said base plate (11).

Patentansprüche

1. Einrichtung (10, 40) zum Führen länglicher Gegenstände (F) von unterschiedlicher Breite ohne seitliches Auswandern und ohne Einbeziehung eines komplizierten Einstellverfahrens zur Breitenan-

derung, dadurch gekennzeichnet, daß sie eine im wesentlichen vertikale Basisplatte (11); einen Drehteller (13; 42), der auf der Basisplatte (11) zu einer Verdrehung um eine im wesentlichen horizontale Achse drehbar abgestützt ist; und eine Führungsbaugruppe (12; 41) umfaßt, die auf dem Drehteller (13; 42) abgestützt ist und zahlreiche Führungseinheiten (22, 23, 24, 25; 46, 47, 48, 49) aufweist, die in Umfangsrichtung um diese Achse herum im Abstand angeordnet sind und unterschiedliche Breiten (W1, W2, W3, W4) haben zum Führen des länglichen Gegenstandes (F), um Querbewegungen desselben in beiden Richtungen zu verhindern, und Arretiermittel (26) aufweist, um wahlweise den Drehteller in einer von mehreren Drehstellungen zu arretieren, in denen sich jeweils eine der besagten Führungseinheiten (22, 23, 24, 25; 46, 47, 48, 49) in einer bestimmten ortsfesten Betriebsstellung befindet.

2. Führungseinrichtung (10, 40) nach Anspruch 1, dadurch gekennzeichnet, daß der Drehteller (13; 42) eine erste kreisrunde Seitenplatte (14) umfaßt, die eine auf der Basisplatte (11) drehbar abgestützte koaxiale Welle (15) aufweist, wobei diese Welle (15) die besagte Achse hat, und eine zweite kreisrunde Seitenplatte (18) umfaßt, die im Abstand von der ersten kreisrunden Seitenplatte (14) angeordnet und durch die besagten Führungseinheiten (22, 23, 24, 25; 46, 47, 48, 49) mit dieser verbunden ist.

3. Führungseinrichtung (10) nach Anspruch 1, dadurch gekennzeichnet, daß jede der besagten Führungseinheiten (22, 23, 24, 25) einen auf dem Drehteller (13) abgestützten axialen Stift (19), einen auf diesen Stift (19) aufgesteckten Kragen (20) und zwei auf dem Kragen (20) abgestützte Flansche (21) umfaßt, wobei die Flansche (21) dieser Führungseinheiten (22, 23, 24, 25) in einem den besagten unterschiedlichen Breiten (W1, W2, W3, W4) entsprechenden axialen Abstand angeordnet sind.

4. Führungseinrichtung (40) nach Anspruch 1, dadurch gekennzeichnet, daß jede der besagten Führungseinheiten (46, 47, 48, 49) einen auf dem Drehteller (13) abgestützten axialen Stift (43), einen auf diesen Stift (43) aufgesteckten Kragen (44) und mehrere Paare von Flanschen (45) umfaßt, die auf diesem Kragen (44) abgestützt sind, wobei die Flansche (45) eines jeden Paares dieser Führungseinheiten (46, 47, 48, 49) in einem den besagten unterschiedlichen Breiten (W1, W2, W3, W4) entsprechenden axialen Abstand angeordnet sind.

5. Führungseinrichtung (10; 40) nach Anspruch 1, dadurch gekennzeichnet, daß jede der besagten Führungseinheiten (22, 23, 24, 25; 46, 47, 48, 49) mehrere Führungsstangen (51) umfaßt, die jeweils im axialen Abstand angeordnete Führungsnuten (50) aufweisen, wobei diese Führungsnuten (50) der Führungsstangen (51) eine unterschiedliche Breite (W) haben.

6. Führungseinrichtung (10; 40) nach Anspruch 1, dadurch gekennzeichnet, daß die besagten Führungseinheiten (22, 23, 24, 25; 46, 47, 48, 49) in der Richtung der besagten Achse zugeordnete Mittelpunkt haben, die in einer zu der besagten Basisplatte (11) parallelen Ebene liegen.



Revendications

1. Dispositif de guidage (10, 40) pour guider des articles (F) de forme allongée de largeurs différentes sans fluctuation transversale et sans nécessiter d'opérations complexes de réglage pour changement de largeur, caractérisé en ce qu'il comprend une plaque de base (11) sensiblement verticale; un plateau (13; 42) supporté de façon tournante sur ladite plaque de base (11) pour tourner autour d'un axe sensiblement horizontal; et un agencement de guidage (12; 41) supporté par ledit plateau tournant (13; 42) et comprenant une pluralité d'éléments de guidage (22, 23, 24, 25; 46, 47, 48, 49) espacés circonférentiellement autour dudit axe et ayant des largeurs différentes (W1, W2, W3, W4) pour guider l'article (F) de forme allongée afin d'empêcher son déplacement transversal dans les deux sens et un moyen d'arrêt (26) pour bloquer sélectivement le plateau tournant dans chaque position d'une pluralité de positions de rotation, dans chacune desquelles un desdits éléments de guidage (22, 23, 24, 25; 46, 47, 48, 49) se trouve dans une position active fixe prédéterminée.

2. Dispositif de guidage (10, 40) selon la revendication 1, caractérisé en ce que le plateau tournant (13; 42) comprend une première plaque latérale circulaire (14) comportant un arbre coaxial (15) supporté de façon tournante par la plaque de base (11), cet arbre (15) ayant comme axe ledit axe, et une seconde plaque latérale circulaire (18) espacée de la première plaque latérale circulaire (14) et reliée à celle-ci par les éléments de guidage (22, 23, 24, 25; 46, 47, 48, 49).

3. Dispositif de guidage (10) selon la revendication 1, caractérisé en ce que chacun des éléments de guidage (22, 23, 24, 25) comprend une tige axiale (19) supportée par le plateau tournant (13), une bague (20) montée sur ladite tige (19) et une paire de joues (21) supportées par ladite bague (20), les joues (21) desdits éléments de guidage (22, 23, 24, 25) étant axialement espacées d'une distance égale auxdites largeurs (W1, W2, W3, W4), respectivement.

4. Dispositif de guidage (40) selon la revendication 1, caractérisé en ce que chacun desdits éléments de guidage (46, 47, 48, 49) comprend une tige axiale (43) supportée par le plateau tournant (13), une bague (44) montée sur ladite tige (43) et une pluralité de paires de joues (45) supportées par ladite bague (44), ces joues (45) de chaque paire des éléments de guidage (46, 47, 48, 49) étant espacées axialement d'une distance égale aux différentes largeurs (W1, W2, W3, W4), respectivement.

5. Dispositif de guidage (10; 40) selon la revendication 1, caractérisé en ce que chacun desdits éléments de guidage (22, 23, 24, 25; 46, 47, 48, 49) comprend une pluralité de tiges de guidage (51) comportant chacune des gorges de guidage (50) espacées axialement, lesdites gorges de guidage (50) des tiges de guidage (51) ayant des largeurs différentes (W) respectivement.

6. Dispositif de guidage (10; 40), selon la revendication 1, caractérisé en ce que lesdits éléments de guidage (22, 23, 24, 25; 46, 47, 48, 49) ont leurs mi-

lieux respectifs, considérés dans la direction dudit axe, situés dans un seul plan parallèle à ladite plaque de base (11).

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