

Description

The present invention relates generally to the manufacture of slide fasteners, and more particularly to an apparatus for automatically closing a plurality of longitudinally spaced slide fastener coupling element chains partly disengaged upon automated threading of sliders on the respective chains through element-free spaces disposed between the successive chains.

In the manufacture of slide fasteners, a pair of contiguous slide fastener stringers is partly separated or disengaged when a slider is threaded on each of a plurality of longitudinally spaced chains of interengaged coupling elements from an element-free portion disposed between the successive chains, and then the fastener stringers are severed at the element-free space to thereby produce a slide fastener of an individual length.

Due to the threading of slider, the coupling element chain is partly separated or disengaged and hence the slide fastener is flared at one end. The slide fastener having such flared end portion cannot easily be attached by sewing to garment such as trousers. With the foregoing difficulty in view, there has been a desire for an apparatus capable of automatically closing the chains of partly disengaged coupling elements subsequent to threading of the sliders on the respective chains.

British Patent Application 2 044 140-A discloses an apparatus which closes chains of disengaged coupling elements by the use of a pair of guide plates, one of which pair is movable toward and away from the other. The guide plates together form a Y-shaped guide channel between them. This Y-shaped guide channel causes the slide fastener stringers to become paired as they pass through. It is not, however, possible, to use this apparatus with chains of coupling elements having sliders attached thereto, and because this apparatus deals with continuous lengths of slide fastener stringers, which it initially cuts, it is not able to pair slide fastener stringers which are already partly engaged.

The present invention seeks to provide an apparatus for automatically closing a plurality of longitudinally spaced chains of partly disengaged slide fastener coupling elements with the sliders mounted respectively thereon.

According to the present invention, there is provided an apparatus as claimed in each of the claims, to which reference is directed.

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

Fig. 1 is a schematic front elevational view, partly in cross section, of an apparatus embodying the present invention;

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

Fig. 3 is a perspective view of a support plate of the apparatus shown in Fig. 1;

Figure 4 is an enlarged exploded perspective view of a movable element-engaging block assembly of the apparatus shown in Figure 1;

Figure 5 is an enlarged perspective view of a stationary element-engaging block of the apparatus shown in Figure 1;

Figure 6 is a view similar to Figure 2, showing the movable element-engaging block held in its upper working position;

Figure 7 is a view similar to Figure 1, illustrative of the operation of a spreading roller of the apparatus;

Figures 8A through 8C and 9A through 9C are fragmentary plan views of slide fastener stringers of different types illustrative of the manner in which a chain of coupling elements is closed by the apparatus of the present invention; and

Figures 10A through 10C and 11A through 11C are views similar to Figures 9A - 9C, but showing different modes of chain-closing operation.

The principles of the present invention are particularly useful when embodied in a chain-closing apparatus such as shown in Figure 1, generally indicated by the numeral 10.

The apparatus 10 generally comprises a stationary element-engaging block 11 fixedly mounted on a vertical support plate 12, a movable element block 13 slidably mounted on the support plate 12 and vertically movable toward and away from the stationary element-engaging block 11, a photoelectric sensor 14 disposed upstream of the stationary element-engaging block 11 and spanning the path of movement of a pair of continuous slide fastener stringers F to be processed on the apparatus 10, for detecting a disengaged portion of each coupling element chain or an element-free space disposed adjacent to the disengaged portion of the chain, and a spreading roller 15 disposed between the sensor 14 and the stationary element-engaging block 11 for spreading the disengaged portion of the chain or the element-free space to thereby assure reliable space sensing by the sensor 14. The stationary and movable element-engaging blocks 11, 13 jointly constitute an element engaging block assembly 16.

As shown in Figure 8A, the slide fastener stringers F to be processed on the apparatus 10 include a plurality of longitudinally spaced chains C of two rows of interengaged coupling elements having a plurality of element-free gaps or spaces G (only one shown) disposed between the chains C. Each of the chains C has a bottom end stop B secured at one end (bottom end) thereof. Before being processed on the apparatus 10, a slider S is threaded on each chain C from the other end (top end) thereof through the adjacent element-free space G while a rear end of the slider S is facing away from the bottom end stop B of the preceding chain C. Due to this threading of slider, the rows of coupling elements E of the chain C are separated or disengaged from the top ends thereof, as shown in Figure 8B.

The apparatus 10 of the present invention is also effectively operative to process a pair of slide fas-

tener stringers F1 such as shown in Figures 9A, 10A and 11A. The slide fastener stringers F1 are the same as the slide fastener stringers F of Figure 8A with the exception that a bottom end stop is not mounted on each chain C of coupling elements. The chain C is therefore separable from either one or both ends as shown in Figures 9B, 10B and 11B when a slider S is threaded on the chain C.

As shown in Figure 3, the support plate 12 has a vertical guide groove 17 extending therethrough.

The movable element-engaging block 13 includes, as shown in Figure 4, a horizontal guide groove 18 defined in its upper surface for constrictingly receiving the partly disengaged coupling element chains to close the same in the manner as described later. The guide groove 18 has a width slightly larger than the width of the chains C of interengaged coupling elements. The guide groove 18 includes a flared inlet portion 18a for easy entry of the coupling element chains C into the guide groove 18. The movable element-engaging block 13 is secured by a pair of screws (Figure 2) to a horizontal arm 19 of an L-shaped support bracket 20 slidably received in the vertical groove 17 in the support plate 12. Connected to the horizontal arm 19 is a piston rod 21 of an air cylinder 22 which is actuated to reciprocate the bracket 20 along the vertical guide groove 17, thereby moving the movable element-engaging block 13 toward and away from the stationary element-engaging block 11.

The stationary element-engaging block 11 has an L-shape as shown in Figure 5 and includes a guide groove 23 which is defined in the underside of a horizontal arm 24 of the stationary element-engaging block 11 in confronting relation to the guide groove 18 in the movable element-engaging block 13. The guide groove 23 has the same shape as the guide groove 18 and hence includes a flared inlet portion 23a. When the movable element-engaging block 13 is moved upwardly to its upper working position shown in Figure 6, the stationary and movable element-engaging blocks 11, 13 jointly constitute the element-engaging block assembly 16. The assembly 16 has a guide channel 16a formed jointly by the guide grooves 18, 23 of the movable and stationary element-engaging blocks 13, 11 so that it functions as a slide fastener slider for closing the partly disengaged coupling element chains C. The stationary element-engaging block 11 further includes a guide ridge 25 disposed centrally in and extending longitudinally through the guide groove 23 for restricting lateral movement or wobbling of the coupling element chains C as they pass through the guide channel 16a in the element-engaging block assembly 16.

The photoelectric sensor 14 is disposed between the element-engaging block assembly 16 and a tension roller 26 rotatably mounted on the vertical support plate 12 at a position upstream of the element-engaging block assembly 16. The tension roller 26 is held in contact with the slide fastener stringers F to exert a tension on the latter while the fastener stringers F are fed along the path. The photoelectric sensor 14 includes a light projector 27 and a photoelectric cell 28 disposed on opposite side of the path of movement of the fastener stringers F in

confronting relation to each other. The photoelectric cell 28 is connected, for energization and de-energization, in circuit with the cylinder 22 through a control unit 29. When an element-free space G or a disengaged portion Ea (Figure 10B) of the coupling element chain C arrives at the photoelectric sensor 14 and opens the light beam path from the light projector 27, the photoelectric cell 28 sends an electric signal to the control unit 29 which in turn sends an output signal to the cylinder 22 to cause the latter to extend its piston rod 21. Consequently, the movable element-engaging block 13 is moved upwardly toward the stationary element-engaging block 11. When the slider S arrives at the photoelectric sensor 14 and blocks the light beam path from the light projector 27, the photoelectric cell 28 sends an electric signal to the control unit 29 which at a predetermined interval of time after receipt of the electric signal, sends an output signal to the cylinder 22 to cause the latter to reverse its mode of operation. That is, the cylinder is de-energized to lower the movable element-engaging block 13. The light beam projected from the light projector 27 may be a laser beam.

The spreading roller 15 is rotatably mounted on a lower end of an inverted L-shaped lever 30. The lever 30 is pivotably connected by a pin 31 to a vertical elongate member 32 secured by a pair of screws 33, 33 to the stationary element-engaging block 11. A compression coil spring 34 acts between the stationary element-engaging block 11 and the lever 30 to turn the latter about the pin 31 in the counter-clockwise direction in Figure 1, thereby urging the spreading roller 15 downwards. The spreading roller 15 has a tapered outer peripheral edge 35 as shown in Figure 2.

Designated by the numeral 36 (Figure 1) is an idler roller for guiding the slide fastener stringers F as they are fed through the apparatus 10 by a non-illustrated feed means.

The apparatus 10 of the foregoing construction operates as follows. The slide fastener stringers F, F shown in Figure 8B are introduced into the apparatus 10 and fed longitudinally along the path at a first or high speed until an element-free space G between adjacent two chains C is detected by the photoelectric sensor 14. During that time, the spring-biased spreading roller 15 is held in rolling engagement with two rows of interengaged coupling elements of the preceding chain C, and then is urged into the element-free space G under the force of the spring 34, thereby spreading the element-free space G. With the element-free space G thus spread, detection of the same by the photoelectric sensor 14 can be achieved reliably. Upon detection of the element-free space G, the photoelectric cell 28 of the sensor 14 sends an electric signal to the control unit 29 which in turn sends an output signal to the non-illustrated feed means to cause the same to operate in a different mode in which the slide fastener stringers F, F are fed at a second or low speed. At the same time, the control unit 29 sends an output signal to the air cylinder 22 to energize the same, whereupon the movable element-engaging block 13 is moved upwardly from a lower

stand-by position of Figure 2 to an upper working position of Figure 6. The stationary and movable element-engaging blocks 11, 13 now constitute a element-engaging block assembly 16 which has the same function as a slide fastener slider. While the slide fastener stringer F, F are being continuously fed at the low speed, a disengaged portion E of the next following chain C is introduced into the guide grooves 18, 23 in the element-engaging block assembly 16 and then coupling elements of the disengaged chain portion E are brought into inter-digitating engagement with each other.

As the slide fastener stringers F, F are further advanced, a slider S on the chain C arrives at the photoelectric sensor 14 and blocks the light beam path from the light projector 27. The photoelectric cell 28 then sends an electric signal to the control unit 29 to cause it to set a time switch (not shown) in the control unit 29. The control unit 29, at a predetermined interval of time after setting of its time switch, sends an output signal to the air cylinder 22 to de-energize the same. That is, upon its de-energization, the cylinder 22 retracts its piston rod 21 to lower the movable element-engaging block 13 to its lower stand-by position shown in Figure 2. At the same time, the control unit 29 also sends an output signal to the feed means to cause the same to reverse its mode of stringer feeding operation. The slide fastener stringers F, F are fed again at the high speed. The time interval is selected such that coupling engagement of the disengaged portion E of the chain C (Figure 8B) continues after detection of the slider S by the sensor 14 until the chain C is fully closed, as shown in Figure 8C after the slider S on the chain C has been detected by the photoelectric sensor 14. As the slide fastener stringers F, F are further advanced after the full closure of the chain C, the slider S abuts against the spreading roller 15, then is urged the latter upwardly against the force of the compression coil spring 34 (Figure 7), and finally passes through the element-engaging block assembly 16.

Thus, the foregoing cycle of operation of the apparatus 10 can be repeated automatically until all the partly separated coupling element chains C are closed. It appears that since individual slide fasteners produced by severing the slide fastener stringers F, F, at the element-free spaces G have respective fully closed coupling element chains C, they can be easily attached by sewing the garment fabrics.

In case where the slide fastener stringers F1, F1 shown in Figure 10B are to be closed, the chain-closing apparatus 10 operates in the same manner as it has done to close the slide fastener stringers F, F shown in Figure 8B.

When the slide fastener stringers F1, F1 shown in Figure 10B are to be closed, the cylinder 22 is energized to move the movable element-engaging block 13 toward its upper operating position (Figure 6) upon arrival of a disengaged portion E_a of the preceding coupling element chain C at the photoelectric sensor 14. As the slide fastener stringer F1, F1 are fed forwardly, the spreading roller 15 projects into the disengaged chain portion E_a and spreads the

same to assure reliable detection of the disengaged chain portion E_a by the photoelectric sensor 14. A continuous advancing movement of the slide fastener stringers F1, F1 causes the disengaged portion E_a of the preceding chain C and a disengaged portion E of the next following chain to be closed as they move through the guide channel 16a in the element-engaging block assembly 16. Other operational steps of the apparatus 10 are the same as the apparatus 10 has done in closing the slide fastener stringers F, F and F1, F1 shown respectively in Figures 8B and 9B and no description is necessary.

The apparatus 10 of the present invention is also effectively operative to close the slide fastener stringers F1, F1 in the manner as shown in Figures 11B and 11C. In this instance, the cylinder 22 is actuated to lift the movable element-engaging block 13 upon expiration of a predetermined interval of time after detection by the sensor 14 of a disengaged portion E_a of the preceding coupling element chain C. The time interval is selected such that the disengaged chain portion E_a has advanced beyond the element-engaging block assembly 16 after its detection by the sensor 14. This selection of the time interval is achieved by a time switch of the control unit 29. As the slide fastener stringers F1, F1 are fed forwardly while the movable element-engaging block 13 is being held in the upper working position, the disengaged portion E of the next following chain C is closed, as shown in Figure 11C. The disengaged portion E_a of the preceding chain C still remains unclosed.

Claims

1. An apparatus (10) for closing a pair of slide fastener stringers (F, F; F1, F1) including a plurality of longitudinally spaced chains (C) of coupling elements, there being an element-free space (G) between successive chains (C), said apparatus comprising: a stationary element-engaging block (11) disposed on one side of a path of movement of the coupling element chains (C) and having a first guide groove (23) facing towards the path; a movable element-engaging block (13) disposed on the other side of the path, said movable element-engaging block (13) being reciprocative towards and away from the stationary element-engaging block (11); a sensor (14) disposed upstream of said stationary element-engaging block (11) for detecting the element-free space (G); and an actuator (22) under the control of said sensor (14) and operatively connected to said movable element-engaging block (13) for reciprocating the latter; characterised in that said movable element-engaging block (13) has a second guide groove (18) facing toward said first guide groove (23), such that, upon the reciprocation of said movable element-engaging block (13) toward and away from the stationary element-engaging block (11) said first and second guide grooves (23, 18) selectively form a guide channel (16a) to constrictingly receive therein, and hence to close, a disengaged chain portion (E) which extends between a top of the chain (C) and a slider (S) which is mounted



stand-by position of Figure 2 to an upper working position of Figure 6. The stationary and movable element-engaging blocks 11, 13 now constitute a element-engaging block assembly 16 which has the same function as a slide fastener slider. While the slide fastener stringer F, F are being continuously fed at the low spaced, a disengaged portion E of the next following chain C is introduced into the guide grooves 18, 23 in the element-engaging block assembly 16 and then coupling elements of the disengaged chain portion E are brought into inter-digitating engagement with each other.

As the slide fastener stringers F, F are further advanced, a slider S on the chain C arrives at the photoelectric sensor 14 and blocks the light beam path from the light projector 27. The photoelectric cell 28 then sends an electric signal to the control unit 29 to cause it to set a time switch (not shown) in the control unit 29. The control unit 29, at a predetermined interval of time after setting of its time switch, sends an output signal to the air cylinder 22 to de-energize the same. That is, upon its de-energization, the cylinder 22 retracts its piston rod 21 to lower the movable element-engaging block 13 to its lower stand-by position shown in Figure 2. At the same time, the control unit 29 also sends an output signal to the feed means to cause the same to reverse its mode of stringer feeding operation. The slide fastener stringers F, F are fed again at the high speed. The time interval is selected such that coupling engagement of the disengaged portion E of the chain C (Figure 8B) continues after detection of the slider S by the sensor 14 until the chain C is fully closed, as shown in Figure 8C after the slider S on the chain C has been detected by the photoelectric sensor 14. As the slide fastener stringers F, F are further advanced after the full closure of the chain C, the slider S abuts against the spreading roller 15, then is urged the latter upwardly against the force of the compression coil spring 34 (Figure 7), and finally passes through the element-engaging block assembly 16.

Thus, the foregoing cycle of operation of the apparatus 10 can be repeated automatically until all the partly separated coupling element chains C are closed. It appears that since individual slide fasteners produced by severing the slide fastener stringers F, F, at the element-free spaces G have respective fully closed coupling element chains C, they can be easily attached by sewing the garment fabrics.

In case where the slide fastener stringers F1, F1 shown in Figure 10B are to be closed, the chain-closing apparatus 10 operates in the same manner as it has done to close the slide fastener stringers F, F shown in Figure 8B.

When the slide fastener stringers F1, F1 shown in Figure 10B are to be closed, the cylinder 22 is energized to move the movable element-engaging block 13 toward its upper operating position (Figure 6) upon arrival of a disengaged portion E_a of the preceding coupling element chain C at the photoelectric sensor 14. As the slide fastener stringer F1, F1 are fed forwardly, the spreading roller 15 projects into the disengaged chain portion E_a and spreads the

same to assure reliable detection of the disengaged chain portion E_a by the photoelectric sensor 14. A continuous advancing movement of the slide fastener stringers F1, F1 causes the disengaged portion E_a of the preceding chain C and a disengaged portion E of the next following chain to be closed as they move through the guide channel 16a in the element-engaging block assembly 16. Other operational steps of the apparatus 10 are the same as the apparatus 10 has done in closing the slide fastener stringers F, F and F1, F1 shown respectively in Figures 8B and 9B and no description is necessary.

The apparatus 10 of the present invention is also effectively operative to close the slide fastener stringers F1, F1 in the manner as shown in Figures 11B and 11C. In this instance, the cylinder 22 is actuated to lift the movable element-engaging block 13 upon expiration of a predetermined interval of time after detection by the sensor 14 of a disengaged portion E_a of the preceding coupling element chain C. The time interval is selected such that the disengaged chain portion E_a has advanced beyond the element-engaging block assembly 16 after its detection by the sensor 14. This selection of the time interval is achieved by a time switch of the control unit 29. As the slide fastener stringers F1, F1 are fed forwardly while the movable element-engaging block 13 is being held in the upper working position, the disengaged portion E of the next following chain C is closed, as shown in Figure 11C. The disengaged portion E_a of the preceding chain C still remains unclosed.

Claims

1. An apparatus (10) for closing a pair of slide fastener stringers (F, F; F1, F1) including a plurality of longitudinally spaced chains (C) of coupling elements, there being an element-free space (G) between successive chains (C), said apparatus comprising: a stationary element-engaging block (11) disposed on one side of a path of movement of the coupling element chains (C) and having a first guide groove (23) facing towards the path; a movable element-engaging block (13) disposed on the other side of the path, said movable element-engaging block (13) being reciprocative towards and away from the stationary element-engaging block (11); a sensor (14) disposed upstream of said stationary element-engaging block (11) for detecting the element-free space (G); and an actuator (22) under the control of said sensor (14) and operatively connected to said movable element-engaging block (13) for reciprocating the latter, characterised in that said movable element-engaging block (13) has a second guide groove (18) facing toward said first guide groove (23), such that, upon the reciprocation of said movable element-engaging block (13) toward and away from the stationary element-engaging block (11), said first and second guide grooves (23, 18) selectively form a guide channel (16a) to constrictingly receive therein, and hence to close, a disengaged chain portion (E) which extends between a top end of the chain (C) and a slider (S) which is mounted on



the chain (C) intermediate the disengaged chain portion (E) and an engaged chain portion; and in that the sensor (14) also detects the slider (S) mounted on the chain (C) next following the element-space (G).

2. An apparatus according to claim 1, further including a spring-biased spreading roller (15) disposed upstream of said stationary element-engaging block (11) for spreading the element-free space (G) and the disengaged chain portion (E).

3. An apparatus according to claim 2, said spreading roller (15) being disposed between said stationary element-engaging block (11) and said sensor (14).

4. An apparatus according to claim 1, 2 or 3, said sensor (14) being of the photo-electric type and spanning the path of movement of the coupling element chains (C).

5. An apparatus according to any one of claims 1-4, each of said first and second guide groove (23, 18) having a flared inlet portion (23a, 18a).

6. An apparatus according to any one of claims 1-5, said stationary element-engaging block (11) including a guide ridge (25) disposed centrally in an extending along said first guide groove (23).

7. An apparatus according to any one preceding claim, further including a control unit (29) responsive to said sensor (14) and connected with said actuator (22) for moving said movable element-engaging block (13) away from said stationary element-engaging block (11) at a predetermined interval of time after detection of each slider (S) by said sensor (14).

8. An apparatus according to claim 7, for use with a pair of continuous slide fastener stringers (F1, F1) of the type wherein each coupling element chain (C) includes a disengaged top portion (E) extending above a slider (S) mounted thereon and a disengaged bottom portion (Ea) at a bottom end thereof, said sensor (14) detecting the disengaged bottom portion (Ea) of a coupling element chain (C) and the slider (S) on the next following chain (C), said control unit (29) being operative to further control operation of said actuator (22) for moving said movable element-engaging block (13) toward said stationary element-engaging block (11) in response to detection of the disengaged bottom portion (Ea) by said sensor (14).

9. An apparatus according to claim 7, for use with a pair of continuous slide fastener stringers (F1, F1) of the type wherein each coupling element chain (C) includes a disengaged top portion (E) extending above a slider (S) mounted thereon and a disengaged bottom portion (Ea) at a bottom end thereof, said sensor (14) detecting the disengaged bottom portion (Ea) of a coupling element chain (C) and the slider (S) on the next following chain (C), said control unit (29) being operative to further control operation of said actuator (22) for moving said movable element-engaging block (13) toward said stationary element-engaging block (11) at a predetermined interval of time after detection of the disengaged bottom portion (Ea) by said sensor (14).

Patentansprüche

1. Vorrichtung (10) zum Schließen eines Paares von Reißverschluß-Bändern (F, F; F1, F1) umfassend mehrere in Längsrichtung beabstandete Ketten (C) von Kopplungselementen, wobei ein elementfreier Raum (G) zwischen aufeinanderfolgenden Ketten (C) liegt, wobei die Vorrichtung umfaßt: einen stationären Element-Eingriffsblock (11), der an einer Seite einer Bewegungsbahn der Kopplungselementketten (C) angeordnet ist und eine erste Führungsnut (23) aufweist, die auf die Bahn gerichtet ist; einen bewegbaren Elementeingriffsblock (13), der auf der anderen Seite der Bahn angeordnet ist, wobei der bewegbare Elementeingriffsblock (13) in Richtung auf und fort vom stationären Elementeingriffsblock (11) hin- und herbewegbar ist; einen Sensor (14), der stromaufwärts des stationären Elementeingriffsblocks (11) angeordnet ist, um den elementfreien Raum (G) festzustellen; ein Betätigungselement (22), das unter einer Steuerung des Sensors (14) steht und in Wirkverbindung mit dem bewegbaren Elementeingriffsblock (13) steht, um diesen hin und her zu bewegen, dadurch gekennzeichnet, daß der bewegbare Elementeingriffsblock (13) eine zweite Führungsnut (18) umfaßt, welche der ersten Führungsnut (23) derart gegenübersteht, daß bei Bewegung des bewegbaren Elementeingriffsblocks (13) in Richtung auf und fort vom stationären Elementeingriffsblock (11) die erste und die zweite Nut (23, 18) selektiv einen Führungskanal (16a) bilden, um einschnürend und damit schließend einen außer Eingriff befindlichen Kettenabschnitt (E) aufzunehmen, der sich zwischen einem Oberende der Kette (C) und einem Schlitten (S) befindet, der auf der Kette (C) zwischen dem außer Eingriff befindlichen Kettenabschnitt (E) und einem in Eingriff befindlichen Kettenabschnitt montiert ist; und daß der Sensor (14) auch den Schlitten (S) detektiert, welcher auf der Kette (C) nächstfolgend dem Elementzwischenraum (G) montiert ist.

2. Vorrichtung nach Anspruch 1, wobei weiterhin eine federbelastete Spreizrolle (15) stromauf des stationären Elementeingriffsblocks (11) vorgesehen ist, um den elementfreien Raum (G) und den außer Eingriff befindlichen Kettenabschnitt (E) zu spreizen.

3. Vorrichtung nach Anspruch 2, wobei die Spreizrolle (15) zwischen dem stationären Elementeingriffsblock (11) und dem Sensor (14) angeordnet ist.

4. Vorrichtung nach einem der Ansprüche 1, 2 oder 3, wobei der Sensor (14) ein fotoelektrischer Sensor ist und die Bewegungsbahn der Koppellementkette (C) abtastet.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei die erste sowie die zweite Nut (23, 18) einen trichterförmigen Einlaßabschnitt (23a, 18a) umfassen.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, wobei der stationäre Elementeingriffsblock (11) eine Führungsrippe (25) umfaßt, die sich zentral angeordnet entlang der ersten Führungsnut (23) erstreckt.

7. Vorrichtung nach einem der vorhergehenden



Ansprüche, wobei weiterhin eine Steuerungseinheit (29) vorgesehen ist, die auf den Sensor (14) reagiert und mit dem Betätigungselement (22) verbunden ist, um den bewegbaren Elementeingriffsblock (13) vom stationären Elementeingriffsblock (11) zu einem vorbestimmten Zeitabstand nach Feststellen eines jeden Schlittens (S) durch den Sensor (14) fortzubewegen.

8. Vorrichtung nach Anspruch 7 zum Gebrauch mit einem Paar von fortlaufenden Reißverschlußbändern (F1, F1) derart, bei welcher jede Koppellementkette (C) einen außer Eingriff befindlichen Oberabschnitt (E), der sich über einem darauf montierten Schlitten (S) befindet und einen außer Eingriff befindlichen Unterabschnitt (Ea) am Unterende hiervon aufweist, wobei der Sensor (14) den außer Eingriff befindlichen Unterabschnitt (Ea) einer Koppellementkette (C) und den Schlitten (S) auf der nachfolgenden Kette (C) feststellt, wobei die Steuerungseinheit (29) zur weiteren Steuerung des Betätigungselements (22) wirkt, um den bewegbaren Elementeingriffsblock (13) in Richtung auf den stationären Elementeingriffsblock (11) auf ein Feststellen des außer Eingriff befindlichen Unterabschnitts (Ea) durch den Sensor (14) zu bewegen.

9. Vorrichtung nach Anspruch 7 zum Gebrauch mit einem Paar von kontinuierlichen Reißverschlußbändern (F1, F1) derart, bei welcher jede Koppellementkette (C) einen außer Eingriff befindlichen Oberabschnitt (E), der sich über einem darauf montierten Schlitten (S) befindet und einen außer Eingriff befindlichen Unterabschnitt (Ea) an dessen Unterende umfaßt, wobei der Sensor (14) den außer Eingriff befindlichen Unterabschnitt (Ea) einer Koppellementkette (C) und einen Schlitten (S) auf der nachfolgenden Kette (C) feststellt, wobei die Steuerungseinheit (29) zur weiteren Steuerung des Betriebs des Betätigungselements (22) wirksam ist, um den bewegbaren Elementeingriffsblock (13) in Richtung auf den stationären Elementeingriffsblock (11) zu einem vorbestimmten Zeitintervall nach Festlegung des außer Eingriff befindlichen Unterabschnitts (Ea) durch den Sensor (14) zu bewegen.

Revendications

1. Appareil (10) pour refermer une paire de rubans (F, F; F1, F1) d'une fermeture à glissière comportant une pluralité d'éléments d'accouplement s'étendant à distancer les uns des autres longitudinalement en chaîne (C), et comportant également un espace (G) sans éléments de couplage compris entre deux chaînes (C) successives, ledit appareil comprenant:

un bloc d'engagement stationnaire (11) des éléments disposés sur un côté d'une voie de passage pour le mouvement des chaînes (C) d'éléments de couplage et comportant un premier signe de guidage (23) faisant face à ladite voie;

un bloc d'engagement mobile des éléments (13) disposé sur l'autre côté de la voie en question, ledit bloc mobile d'engagement des éléments (13) étant déplacés en va et vient vert s'éloignant du bloc stationnaire d'engagement des éléments (11);

un détecteur (14) disposé en amont dudit bloc stationnaire d'engagement des éléments (11) afin de détecter l'espace sans éléments (G);

un mécanisme de déclenchement (22) commandé par ledit détecteur (14) est connecté de façon fonctionnelle audit bloc mobile des éléments (13) pour faire effectuer le mouvement de va et vient précité à ce dernier;

caractérisé en ce que ledit bloc mobile d'engagement des éléments (13) comporte un second sillon de guidage (18) situé en face du premier sillon de guidage (23) de façon que, lors du mouvement du va et vient dudit bloc mobile d'engagement des éléments (13) à l'encontre et s'éloignant du bloc stationnaire d'engagement d'éléments (11), lesdits premier et second sillons de guidage (23, 18) forment sélectivement un passage de guidage (16a) pour recevoir en le resserant et ainsi en refermant une partie de chaîne (E) dont les éléments ne sont pas en prise les uns avec les autres et qui s'étendent entre l'extrémité supérieure de la chaîne (C) et une glissière (S) qui est montée sur la chaîne (C) entre la partie de chaîne désengagée (E) et une partie engagée de la chaîne, ledit détecteur (14) étant également adapté pour détecter la présence de la glissière (S) montée sur la chaîne (C) après avoir suivi l'espace sans éléments (G).

2. Appareil selon la revendication 1, caractérisé en ce qu'il comprend de plus un rouleau d'extension (15) sollicité par un ressort et disposé en amont du bloc stationnaire d'engagement des éléments (11) afin d'étendre l'espace sans éléments (G) et la partie de chaîne désengagée (E).

3. Appareil selon la revendication 2, caractérisé en ce que ledit rouleau d'extension (15) est disposé entre ledit bloc stationnaire d'engagement des éléments (11) et dudit détecteur (14).

4. Appareil selon l'une des revendications 1, 2 ou 3, caractérisé en ce que ledit détecteur (14) est du type photo-électrique et contourne la voie sur laquelle se déplacent les chaînes (C) d'éléments couplés.

5. Appareil selon l'une des revendications 1 à 4 caractérisé en ce que chacun desdits premier et second sillons de guidage (23, 18) possède une partie évasée (23a, 18a) à son entrée.

6. Appareil selon l'une des revendications 1 à 5, caractérisé en ce que ledit bloc stationnaire d'engagement des éléments (11) comprend une arête de guidage (25) disposée de façon centrale et s'étendant le long dudit premier sillon de guidage (23).

7. Appareil selon l'une des revendications précédentes, caractérisé en ce qu'il comprend de plus une unité de contrôle (29) commandé par ledit détecteur (14) et connecté audit mécanisme de déclenchement (22) afin de déplacer ledit bloc mobile d'engagement des éléments (13) à distance dudit bloc stationnaire d'engagement des éléments (11) à des intervalles de temps prédéterminées après la détection de chacune des glissières (S) repérée par ledit détecteur (14).

8. Appareil selon la revendication 7, adapté pour être utilisé avec une paire de rubans continus (F1, F1) d'une fermeture à glissière dans laquelle chaque chaîne (C) d'éléments de couplage comprend une



partie supérieure (E) où des éléments sont désengagés les uns avec les autres et qui s'étend au dessus d'une glissière (S) montée sur ladite chaîne, et une partie de base (E_a) où les éléments sont désengagés à l'extrémité de base de celle-ci, ledit détecteur (14) sensible aux parties de base désengagées (E_a) de la chaîne d'éléments de couplage (C) et la glissière (S) sur la chaîne (C) suivant ensuite, ladite unité de contrôle (29) étant également capable de contrôler le fonctionnement dudit mécanisme de déclenchement (22) afin de déplacer ledit bloc mobile d'engagement des éléments (13) à l'encontre dudit bloc stationnaire d'engagement des éléments (11) en réponse au signal de détection de la partie de base désengagée (E_a) repéré par le détecteur.

9. Appareil selon la revendication 7, adapté pour être utilisé avec une paire de rubans continus (F1, F1) pour une fermeture à glissière du type dans laquelle chacune des chaînes d'éléments de couplage (C) comporte une partie de sommet avec des éléments désengagés, s'étendant au dessus d'une glissière (S) montée sur celle-ci et une partie de base désengagée (E_a) à l'extrémité de base de celle-ci, ledit détecteur (14) étant capable de détecter de base désengagée (E_a) de la chaîne d'éléments de couplage (C) et la glissière (S) sur la chaîne (C) venant ensuite, ladite unité de contrôle (29) étant capable également de contrôler le fonctionnement dudit mécanisme de déclenchement (22) afin de déplacer le bloc mobile d'engagement des éléments (13) à l'encontre du bloc stationnaire d'engagement des éléments (11) à des intervalles de temps prédéterminées après la détection de la partie de base désengagée (E_a) effectuée par le détecteur (14).

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