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(71) Applicant: **YKK CORPORATION**

Chiyoda-ku, Tokyo 101 (JP)

(72) Inventors:

• **KUSE, Kazuki**

Toyama-shi, Toyama-ken 939 (JP)

• **MORITA, Toyoo**

Uozo-shi, Toyama-ken 937 (JP)

• **FUJII, Osamu**

Namerikawa-shi, Toyama-ken 936 (JP)

• **HIRASAWA, Masanori**

Kurobe-shi, Toyama-ken 938 (JP)

(74) Representative: **Casalonga, Axel**

BUREAU D.A. CASALONGA - JOSSE

Morassistrasse 8

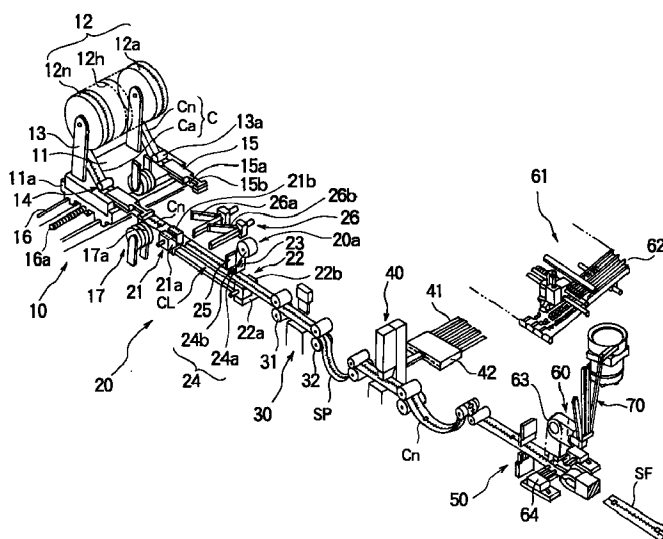
80469 München (DE)

(54) **METHOD OF MANUFACTURING SLIDE FASTENER**

(57) A method of manufacturing a slide fastener, which can efficiently accommodate various demands for slide fasteners, reduces an amount of scrapped fastener chain required for slide fasteners of the same kind as much as possible, and facilitates production control. The method comprises feeding a lengthy continuous fastener chain (Ch) from a supply section (10) irrespective of the number of slide fasteners which are planned to be manufactured, measuring the fastener chain (Ch)

for each length of individual slide fasteners (SF) being manufactured by means of a measuring roll (31) to form space portions (SP), and after formation of as many space portions (SP) as the number of slide fasteners, automatically changing over to a fastener chain (Ch) of another kind in the supply section (10) to sequentially and continuously manufacture slide fasteners (SF) of many kinds in desired numbers.

FIG. 1



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Description

TECHNICAL FIELD

This invention relates to a method of effectively manufacturing a required number of slide fasteners of a desired kind selectively from various continuous fastener chains.

BACKGROUND ART

For example, Japanese Patent Laid-Open Publications Nos. Hei 3-99602 and Hei 4-40902 disclose a method of successively manufacturing individual slide fasteners by continuously supplying a continuous fastener chain, forming successive space portions, which have a predetermined size, one at every slide fastener length, attaching a set of slide-fastener-constituting parts, such as a pair of top stops, a slider and a bottom stop, to the continuous fastener chain at every slide fastener length and cutting the fastener chain at every slide fastener length.

Various demands of customers with respect to color tone, product length and form of slide fasteners cause a tendency of multiproduct small-quantity manufacturing; in a production line for successively manufacturing individual slide fasteners from continuous fastener chains, it is necessary to control the quantity of production according to orders of customers efficiently with high reliability.

In order to cope with these demands, according to the slide fastener manufacturing method disclosed in Japanese Patent Laid-Open Publications Nos. Hei 3-99602 and 4-40902, a required number of slide fasteners are manufactured by stocking in a fastener chain supply source a continuous fastener chain, as previously measured in whole length, and supplying the whole length of the continuous fastener chain to the production line.

However, since orders of customers are made in numbers of slide fasteners rather than in whole length of fastener chain, they should be controlled in terms of numbers of slide fasteners.

In this conventional manufacturing method, successive space portions are formed in a necessary length of fastener chain, the whole length of which is previously measured, one at every slide fastener length by removing a predetermined length of opposed rows of fastener elements, and the fastener chain supplied to a space-portion forming station to form the next space portion therein is measured to have the slide fastener length.

Meanwhile, in the continuously manufacturing method of slide fastener as described above, since the fastener chain traveling through many stations tends to vary in length-measuring conditions, such as tension, a difference would occur between the measured whole length of the fastener chain and the measured length of individual slide fasteners. Although the difference between each adjacent pair of slide fasteners is very

small, the total difference with respect to the successive slide fasteners is very large, which would be influential on the actual total number of slide fasteners.

In other words, assuming that a continuous fastener chain of a previously measured length corresponding to the total length of a predetermined number of slide fasteners is supplied to the production line, the total length of fastener chain might be short with respect to the length of the total number of slide fasteners to be actually manufactured; consequently, the whole length of fastener chain should be previously set to exceed the total length of the predetermined number of slide fasteners to supplement an estimated shortage. If the whole length of fastener chain is previously set to thus exceed, the slide fastener chain would be more than enough with respect to the total number of actually manufactured slide fasteners, and such an excessive part of the fastener chain must be dumped, thus causing a reduced rate of production. Further, since the excessive quantity is not constant all the time, production control would be very laborious and time-consuming.

With the foregoing problems in view, it is a particular object of this invention to provide a slide fastener manufacturing method which can efficiently cope with various demands of slide fasteners, can minimize waste of a fastener chain for the same kind of slide fasteners and can facilitate production control.

DISCLOSURE OF INVENTION

In order to accomplish the above object, according to this invention, there is provided a method of successively manufacturing individual slide fasteners from a continuous fastener chain by forming successive space portions in the fastener chain, which is continuously supplied from a slide fastener supply source, one at every slide fastener length, attaching a set of slide-fastener-constituent parts one after another to the fastener chain and cutting the fastener chain at every slide fastener length, the method comprising the steps of: measuring successive slide fastener lengths of the fastener chain one after another by measuring means disposed in a space-portion forming station, and supplying the successive slide fastener lengths of the fastener chain one after another to the space-portion forming station; forming in the fastener chain a number of successive space portions corresponding to a predetermined number of slide fasteners in the space-portion forming station, and intermittently cutting the fastener chain based on a succession of commands from a controller; and upon completion of the cutting, automatically switching over to supplying another continuous fastener chain for a subsequent production according to the chain switching commands from the controller.

Further, the method further includes the step of automatically connecting, after automatically switching over to supplying another continuous fastener chain of different kind for the subsequent production of slide fasteners, a cut end of the succeeding continuous fastener

chain with a cut trailing end of the preceding continuous fastener chain. Furthermore, the cutting of the fastener chain based on a command from the controller is performed upon termination of forming the second to last space portion if the distance between the fastener chain supply source and the space-portion forming station is larger than the slide fastener length, or upon termination of forming the last space portion if the distance between the fastener chain supply source and the space-portion forming station is smaller than the slide fastener length.

Namely, according to this invention, a desired number of each of various kinds of slide fasteners are successively manufactured by supplying a continuous fastener chain to be processed to the space-portion forming station from the fastener chain supply source having plural kinds of continuous fastener chain regardless of the number of slide fasteners to be manufactured, measuring every slide fastener length of the fastener chain by length-measuring rollers, forming successive space portions in the fastener chain one at every slide fastener length, and automatically switching over to supplying another fastener chain of different kind when the number of the formed space portions reaches the predetermined number of slide fasteners.

Therefore, unlike the conventional method in which a continuous fastener chain of a length corresponding to the total length of a predetermined number of slide fasteners to be manufactured is stocked in a fastener chain supply source, after the whole length of fastener chain is previously measured, and in which the length of the individual slide fastener is measured again in a space-portion forming station, it is possible to manufacture a predetermined number of slide fasteners using a minimum length of fastener chain. Further, since the current fastener chain being supplied is automatically switched over to another fastener chain for the next production at the supply source, it is possible to readily meet the demand for flexible manufacturing, thus remarkably improving the rate of production.

Furthermore, as the cutting of the fastener chain based on a command from the controller is performed upon termination of forming of the second to last space portion if the distance between the fastener chain supply source and the space-portion forming section is larger than the slide fastener length, or upon termination of forming of the last space portion if the distance between the fastener chain supply source and the space-portion forming station is smaller than the slide fastener length, it is possible to reduce waste of fastener chain to a minimum.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view, generally showing a succession of stations for manufacturing a slide fastener according to this invention; and FIG. 2 is a block diagram showing the manner in which the manufacturing stations are controlled.

BEST MODE FOR CARRYING OUT THE INVENTION

A typical embodiment of this invention will now be described in detail with reference to the accompanying drawings. FIG. 1 is a diagram showing one example of a succession of stations for manufacturing a slide fastener, according to this invention.

According to this embodiment, a fastener chain supply unit 10 serves as a fastener chain exchange unit of the invention. The fastener chain supply unit 10 in this embodiment has a structure substantially identical with a tape supply unit disclosed in Japanese Patent Laid-Open Publication No. Hei 4-144689; therefore, its detailed structural description is omitted, and the following description is concentrated upon its operation.

The fastener chain supply unit 10 in this embodiment includes a plurality of continuous fastener chains Ca - Cn of different color tones wound respectively on a plurality of parallel reels as fastener chain cassettes 12 supported by support brackets 13 standing on a table 11. On the table 11, guide rollers 13a are disposed for directing the individual fastener chains Ca - Cn, which are to be supplied from the respective fastener chain cassettes 12a - 12n, to respective fastener chain delivery lines 14. Further, in front of each fastener chain delivery lines 14, a vertical pair of delivery plates 15 horizontally extends along the fastener chain delivery lines 14 for sandwiching on upper and lower surfaces of the individual fastener chain Ca - Cn to guide.

The table 11 is exchangeably mounted on a slide table 11a which is supported on a pair of guide rails 16 extending parallel to the chain cassettes 12a - 12n and which is slidable along the guide rails 16. The slide table 11a is moved back and forth along the guide rails 16 in response to the rotation of a ball screw 17 which is controllably rotated by a control drive unit, such as a servo motor, based on a command from a controller CP as shown in FIG. 2.

The controller CP selects a desired fastener chain cassette 12h from the plural fastener chains 12a - 12n arranged on the table 11 and then shifts the slide table 11a along the guide rails 16 to bring the delivery plates 15, which guides the fastener chain Ch of the desired fastener chain cassette 12h, into longitudinal alignment with a fastener chain processing line CL.

The upper and lower delivery plates 15 are identical in shape with each other and have each in opposite sides near its downstream end a pair of cutouts 15a from which opposed fastener tape surfaces of the fastener chain C are exposed. In confronting relation to the cutouts 15a of the upper and lower delivery plates 15, upper and lower contact feed rollers 17 are disposed which are controllably moved vertically by actuators, such as non-illustrated cylinders, and controllably rotated by a rotation drive unit rotatable in both directions, such as a servo motor, based on a command from the controller CP and each of which has centrally in its circumferential surface an annular groove 17a.

As the current fastener chain cassette is switched

over to a desired fastener chain cassette 12h upon receipt of a cassette switchover command from the controller CP, the upper and lower contact feed rollers 17 are moved toward each other to contact the fastener tape surfaces, which are exposed from the cutouts, to sandwich the fastener chain Ch from upper and lower sides. At that time, a connecting portion 15b between the opposite cutouts 15a of each of the upper and lower delivery plates 15 is received in the groove 17a of the corresponding contact feed roller 17. The contact feed rollers 17 are thereby rotated by a predetermined number of rotations to feed the fastener chain Ch by a desired length forwardly.

In this invention, for manufacturing a scheduled number of slide fasteners of, for example, red in color, successive space portions SP corresponding in number to the scheduled number of slide fasteners SF of the same kind are formed in a space-portion forming unit 30 while the fastener chain Ch is fed.

When the number of the formed space portions SP reaches a predetermined value, a command is issued from the controller CP to the fastener chain exchange unit 10 so that the red fastener chain Ch being currently supplied is cut. After cutting, another command is issued from the controller CP to the fastener chain exchange unit 10 so that the cut red fastener chain Ch is wound back to the fastener chain cassette 12h and, at the same time, the slide table 11a is shifted to position another chain cassette 12n, in which a fastener chain Cn of another color tone, such as blue, in alignment with the fastener chain processing line. And the blue fastener chain Cn is supplied and is then connected with the cut end of the previously processed red fastener chain Ch so that the blue fastener chain Cn is fed to the space-portion forming unit 30.

At that time, the red fastener chain Ch in which a predetermined number of space portions SP have been formed would be waste with respect to the length between the space-portion forming unit 30 and the fastener chain exchange unit 10, which waste part will be dumped later. Assuming that the length L of the individual slide fastener to be manufactured is smaller than the length L' of the waste fastener chain part which is equal to the distance between the space-portion forming unit 30 and the fastener chain exchange unit 10, i.e. $L < L'$, a command is issued from the controller CP to the fastener chain exchange unit 10 upon termination of forming of the second to last of the scheduled number of space portions SP so that the fastener chain Ch is cut and is then connected with the succeeding blue fastener chain Cn, whereupon the last of the predetermined number of space portions is formed in the fastener chain Ch. To load such a program in the controller CP is effective in minimizing the length of the waste fastener chain part.

Otherwise, if the slide fastener length L is larger than the distance L' between the space-portion forming unit 30 and the fastener chain exchange unit 10, i.e. $L > L'$, a command is issued to the fastener chain exchange

unit 10 upon termination of forming of the last of the scheduled number of space portions SP so that the length L' of the excessive red fastener chain Ch is dumped.

Since the distance L' between the space-portion forming unit 30 and the fastener chain exchange unit 10 is constant all the time, it is possible to change the setup of operation of the space-portion forming unit 30 by previously inputting the length L of slide fasteners of a different kind, which are scheduled to be manufactured, to the controller CP and comparing the length L' with the distance L.

In this embodiment, when the continuous fastener chain Ch is cut, a signal is transmitted from the controller CP to a non-illustrated drive unit of the contact feed roller 17 to rotate the contact feed rollers 17 reversely by a predetermined number of rotations to feed the fastener chain Ch backwardly as sandwiched between the upper and lower contact feed rollers 17, thereby retracting the cut end of the fastener chain Ch to the distal ends of the upper and lower delivery plates 15. Upon completion of this retracting, the upper and lower contact feed rollers 17 are moved away from each other to release the fastener tapes.

Subsequently, the slide table 11a is shifted in the above-mentioned manner to bring the delivery plates 15, which guide another continuous fastener chain Cn of, for example, a blue color loaded in the fastener chain cassette 12n corresponding to another kind of slide fasteners to be manufactured, into alignment with the fastener chain processing line CL. Now the upper and lower contact feed rollers 17 are then moved toward each other to contact the upper and lower fastener tape surfaces, which are exposed from the cutouts 15a of the upper and lower delivery plates 15, thus sandwiching the fastener chain C from upper and lower sides. Then, the upper contact feed roller 17 is rotated forwardly to feed the fastener chain Cn from the distal ends of the delivery plates 15 to an automatic fastener chain connecting unit 20 for a subsequent manufacturing step described below. The extent of movement of the fastener chain Cn along the fastener chain processing line CL is previously set and is determined in terms of number of rotations of the contact feed rollers.

Upon termination of feeding the fastener chain Cn by a predetermined length, the upper and lower contact feed rollers 17 are moved away from each other, based on a command from the controller CP, to release the pressing of the fastener chain surface. The continuous fastener chain Cn is then fed to a first fastener chain gripper 21 of the automatic fastener chain connecting unit 20 so that the end of the fastener chain Cn is gripped. The automatic fastener chain connecting unit 20 of this embodiment is composed of the first fastener chain gripper 21, which is movable back and forth by a predetermined distance along the fastener chain processing line CL while supporting and guiding one surface of the traveling fastener chain, and a second fastener chain gripper 22 fixed at a predetermined posi-

tion in the fastener chain processing line CL.

The first and second fastener chain grippers 21, 22 are identical in structure except that one is movable along the fastener chain processing line CL while the other is fixed. Namely, the first fastener chain gripper 21 is repeatedly moved toward and away from the second fastener chain grippers 22 along the fastener chain processing line CL based on a command from the controller CP. This movement is made by the action of a non-illustrated cylinder, for example.

The first fastener chain gripper 21 is composed of a movable gripping member 21a and a fixed gripping member 21b, the movable gripping member 21a being movable toward and away from the fixed gripping member 21b perpendicularly to the fastener chain processing line CL by the action of a non-illustrated drive unit, such as a cylinder. The movable and fixed gripping members 21a, 21b have in their upper confronting edges a pair of opposed stepped portions for sandwiching opposed fastener element rows of the fastener chain C placed on the upper surface of the first fastener chain gripper 21.

Further, the first fastener chain gripper 21 is movable back and forth along the fastener chain processing line CL by the action of a non-illustrated drive unit, such as a cylinder, based on a command from the controller CP to move another fastener chain Cn, with opposed fastener element rows sandwiched between the stepped portions, toward the second fastener chain gripper 22 fixed at a position spaced a predetermined distance downstream of the first fastener chain gripper 21. The second fastener chain gripper 22, like the first gripper 21, is composed of a movable gripping member 22a and a fixed gripping member 22b, the movable gripping member 22b being movable toward the fixed gripping member 22b to grip the opposed fastener element rows at the cut end of the previous fastener chain Ch.

According to this embodiment, the leading end of the new fastener chain Cn substituted as described above and gripped by the first fastener chain gripper 21 is cut along the end surface of the first fastener chain gripper 21 by a first cutting blade 26a. The cut end of the previous fastener chain Ch is fed forwardly by feed rollers described below until it is aligned with the end surface of the second fastener chain gripper 22, and then its opposed fastener element rows are gripped from opposite sides by the second fastener chain gripper 22 in the above-mentioned manner.

The confronting ends of the fastener chains Ch, Cn gripped by the first and second fastener chain grippers 21, 22 are brought into contact against each other when the first and second fastener chain grippers 21, 22 meet as the first fastener chain gripper 21 is moved toward the second fastener chain gripper 22.

Then, a fastener chain end connecting unit 20a is rendered operative to connect the fastener chains Ch, Cn end to end. The fastener chain end connecting unit 20a is disposed in such a position that it is located upwardly of the position where the first fastener chain

gripper 21 is stopped when the confronting ends of the fastener chains Ch, Cn are brought into contact against each other. The fastener chain end connecting unit 20a in this embodiment is composed of an adhesive film attaching member 24, for attaching an adhesive film tape 23 having a metallic surface, and a film cutter 25, as shown in FIG. 1. The adhesive film attaching member 24 is raised and lowered by a non-illustrated cylinder and is composed of an adhesive film roll 24a and a film attaching roller 24b. The film cutter 25 is disposed downstream of the film attaching roller 24b and is moved back and forth, together with the adhesive film attaching member 24, by a predetermined stroke along the fastener chain processing line CL as a non-illustrated moving means is driven by a command from the controller CP. The blade edge of the film cutter 25 is disposed slightly upwardly of the lower end of the adhesive film attaching roller 24b.

The adhesive film attaching member 24 for the above-described adhesive film tape 23 is lowered by a non-illustrated drive unit, such as a cylinder, so as to press the film attaching roller 24b against the fastener chain Cn on the first fastener chain gripper 21, thus attaching the end of the adhesive film strip 23 to the fastener chain Cn. The adhesive film attaching member 24 is moved forwardly along the traveling path of the fastener chain Cn, and the adhesive film roll 24a attaches the adhesive film strip 23 to the upper surface of the fastener chain Cn as it is moved from the first fastener chain gripper 21 onto the fastener chain Ch of the second fastener chain gripper 22, thus connecting the abutting fastener chains Cn, Ch together by the adhesive film strip 23. The adhesive film strip 23 is cut by the film cutter 25 as the adhesive film attaching member 24 is raised.

Each of the first and second fastener chain grippers 21, 22 releases the opposed fastener element rows as the movable gripping member 21a, 22a are moved away from the corresponding fixed gripping member 21b, 22b so that the connected fastener chains Cn, Ch are released. Then upon receipt of a command from the controller CP, the first fastener chain gripper 21 is moved away from the second fastener chain gripper 22 to return to its original position. The connected fastener chain C is fed by a predetermined length to the space-portion forming unit 30 as feed rollers 32 disposed downstream in the fastener chain feeding direction of the space-portion forming unit 30 are rotated by a non-illustrated drive unit, such as a motor.

A cutting unit 26 disposed between the first and second fastener chain grippers 21, 22 for cutting the fastener chain C is composed of a first and second cutting blades 26a, 26b parallel spaced from each other along the fastener chain processing line CL and movable toward and away from the fastener chain perpendicularly to the fastener chain processing line CL by a non-illustrated drive unit.

In each of the continuous fastener chain Ca - Cn wound in the respective fastener chain cassette 12a -

12n, when a fault portion, if any, is cut off, the cut ends of the separated fastener chain Ca - Cn are connected together by a staple. If the connected portion of the individual fastener chain Ca - Cn is detected by a non-illustrated detector before it reaches the cutting unit 26, the controller CP issues a command upon receipt of a detection signal from the detector to move the cutting unit 26 to the cutting position of the individual fastener chain Ca - Cn so that the fastener chain Ca - Cn is cut at positions downstream and upstream of the stapled portion simultaneously. After the connected portion is cut off, these cut ends of the separated fastener chain parts are connected again to each other by the adhesive film strip 23 in the above-mentioned manner, and then the resulting fastener chain is fed to the next station, i. e. the space-portion forming unit 30.

A pair of length-measuring rollers 31 is disposed adjacent to and upstream in the fastener chain feeding direction of the space-portion forming unit 30. In this invention, the length-measuring rollers 31 is one of components or elements serving as important part of the invention with respect to the fastener chain exchange unit 10. Namely, the timing to form a space portion is determined based on a length-measuring signal issued from the length-measuring rollers 31. For this purpose, the length-measuring roller 31 is equipped with a number-of-rotations detector, such as an encoder, for detecting the number of rotations of the length-measuring roller 31 all the time and for transmitting a detection signal to the controller CP. Upon receipt of a detection signal, the controller CP compares the number of rotations with a preset value, and if it reaches the preset value, the controller CP gives a rotation stop signal to a non-illustrated drive unit of the feed rollers 32 to stop the feed rollers 32 and also an actuation signal to the space-portion forming unit 30 to form a space portion SP by removing a part of the opposed fastener element rows of the fastener chain C.

The controller CP counts the number of rotation stop signal or space-portion-forming actuation signal, and when the counted number reaches a preset value corresponding to the total number of slide fasteners to be manufactured or corresponding to one less than the number to be manufactured, the controller CP gives actuation signals to the respective non-illustrated actuators, such as cylinders, of the first and second fastener chain grippers 21, 22 and the fastener chain cutting unit 26 according to the individual actuation procedures to cut the fastener chain C.

After the space portion has been formed, the fastener chain C is moved successively through a bottom stop attaching unit 40, a fastener chain cutting unit 50, a slider mounting unit 60 and a top stop attaching unit 70 so that slide fasteners of a desired kind and of a predetermined length are continuously manufactured. In FIG. 1, reference numeral 41 designates various kinds of bottom stop blanks; 42, a bottom stop supply unit for cutting a desired bottom stop blank and automatically supplying the cut blank piece to the bottom stop attach-

ing unit 40; 61, an automatic slider supply unit for selectively supplying a desired slider of various kinds of sliders; 62, a slider guide portion; 63, a slider holder; and 64, a fastener chain feed gripper. The foregoing units or parts to be used in the slide-fastener-constituent-parts attaching stations may be of conventional type, and the individual units or parts disclosed in Japanese Patent Laid-Open Publication No. Hei 3-99602 are used in this embodiment. Therefore their detailed description in construction and operation is omitted here.

As is understood from the foregoing description, in this embodiment, all of the actuation timing and procedure for the individual actuators are determined by the controller CP. FIG. 2 is a block diagram showing the operation of the controller CP.

In this embodiment, slide fasteners to be manufactured are of a so-called non-separable type having an ordinary structure. This invention may be applied also to slide fasteners of the separable type having a separable bottom stop assembly. In the latter case, an auxiliary tape attaching unit, a hole-in-reinforced-portion forming unit and a separable-bottom-stop attaching unit, all of which are not shown, are substituted for the bottom stop attaching unit 50 between the space-portion forming unit 30 and the slider mounting unit 60. Thus various modifications may be suggested without departing from the principles of this invention.

INDUSTRIAL APPLICATION

As is apparent from the foregoing description, this method successively manufactures a desired number of each of various kinds of slide fasteners by supplying a continuous fastener chain regardless of the number of slide fasteners to be manufactured, measuring every slide fastener length of the fastener chain, forming successive space portions in the fastener chain one at every slide fastener length, and automatically switching over to supplying another fastener chain of different kind when the number of the formed space portions reaches the predetermined number of slide fasteners. According to this method, unlike the conventional method in which continuous fastener chains each having a length corresponding to the total length of a predetermined number of slide fasteners to be manufactured is measured and prepared respectively, and in which the length of the individual slide fastener is measured in a space-portion forming station, it is possible to meet the demand of various kinds, small quantity products and to manufacture a predetermined number of slide fasteners using a minimum length of fastener chain without measuring the total length of the fastener chain previously, thus remarkably improving the rate of production.

Furthermore, in this invention, the cutting of the fastener chain based on a command from the controller is performed upon termination of forming of the second to last space portion if the distance between the fastener chain supply source and the space-portion forming sec-

tion is larger than the slide fastener length, or upon termination of forming of the last space portion if the distance between the fastener chain supply source and the space-portion forming station is smaller than the slide fastener length. It is therefore possible to reduce waste of fastener chain to a minimum, which further improves productivity.

Claims

1. A method of successively manufacturing individual slide fasteners from a continuous fastener chain by forming successive space portions in the fastener chain, which is continuously supplied from a slide fastener supply source, one at every slide fastener length, attaching a set of slide-fastener-constituent parts one after another to the fastener chain and cutting the fastener chain at every slide fastener length, said method comprising the steps of:
 - measuring successive slide fastener lengths of the fastener chain one after another by measuring means disposed in a space-portion forming station, and supplying the successive slide fastener lengths of the fastener chain one after another to the space-portion forming station;
 - forming in the fastener chain a number of successive space portions corresponding to a predetermined number of slide fasteners in the space-portion forming station, and intermittently cutting the fastener chain based on a succession of commands from a controller; and
 - upon completion of cutting, automatically switching over to supplying another continuous fastener chain of a different kind for a subsequent production based on commands from the controller to switch the fastener chain.
2. A slide fastener manufacturing method according to claim 1, further including the step of automatically connecting, after switching over to supplying said another continuous fastener chain of different kind for the subsequent production, a cut end of the succeeding continuous fastener chain with a cut trailing end of the preceding continuous fastener chain.
3. A slide fastener manufacturing method according to claim 1, wherein the cutting of the fastener chain based on a command from the controller is performed upon termination of forming the second to last space portion if the distance between the fastener chain supply source and the space-portion forming station is larger than the slide fastener length, or upon termination of forming the last space portion if the distance between the fastener chain supply source and the space-portion forming station is smaller than the slide fastener length.

FIG. 1

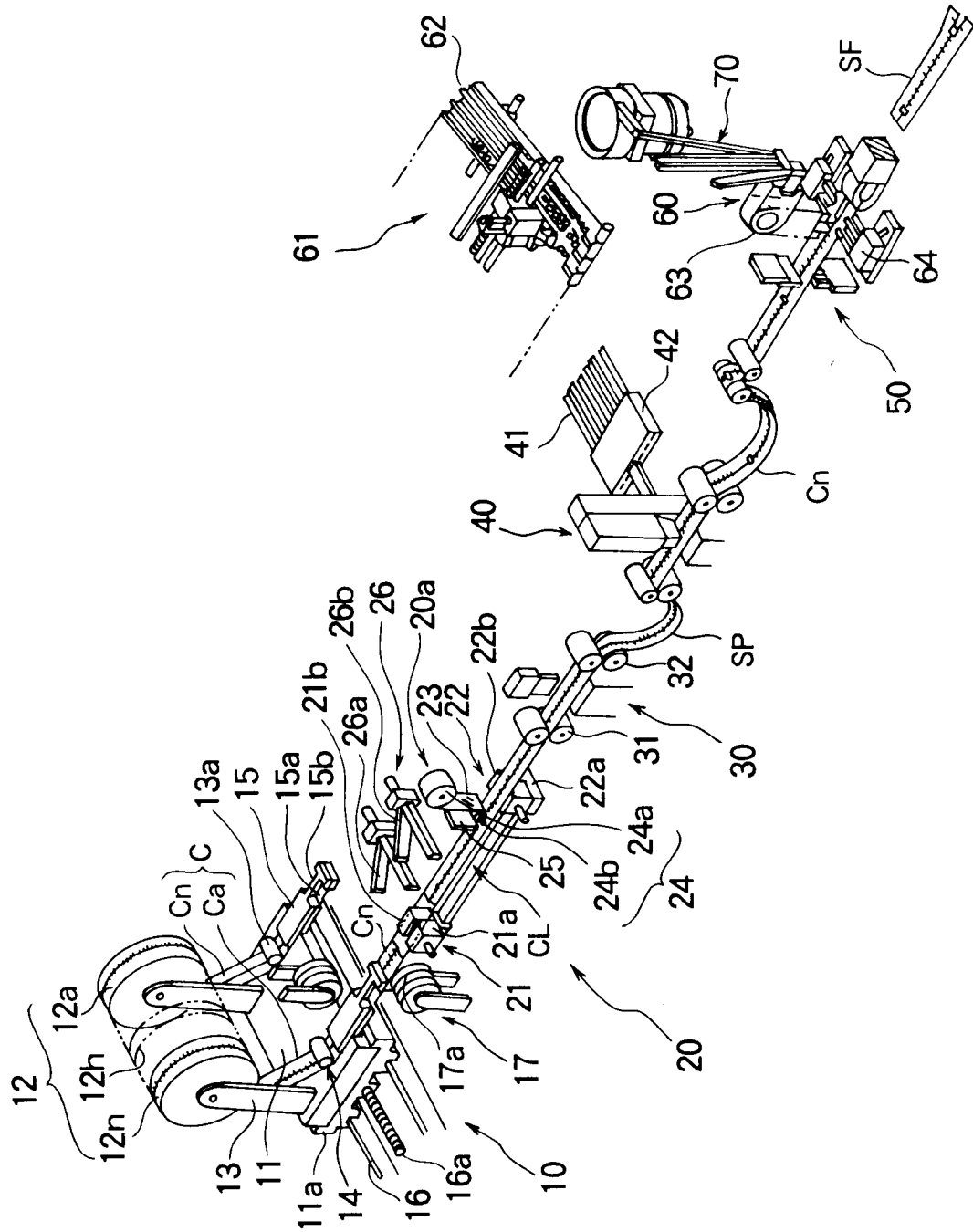
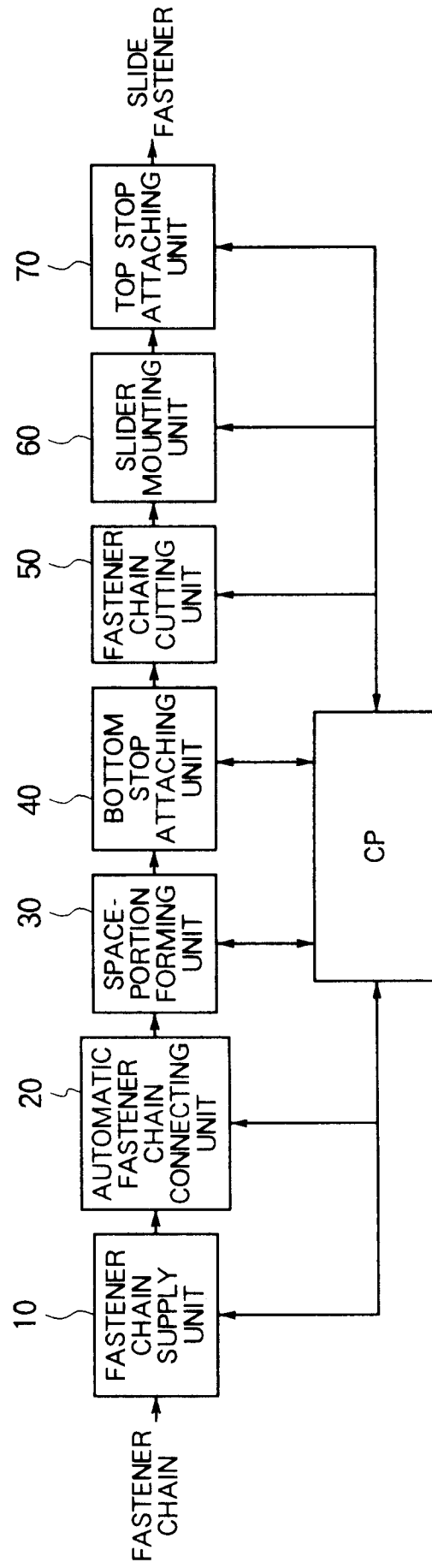


FIG. 2



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP96/01221

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl ⁶ A44B19/42		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Int. Cl ⁶ A44B19/42		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Jitsuyo Shinan Koho 1935 - 1996		
Kokai Jitsuyo Shinan Koho 1971 - 1996		
Toroku Jitsuyo Shinan Koho 1994 - 1996		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
★		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 3-97407, A (Yoshida Kogyo K.K.), April 23, 1991 (23. 04. 91) & EP, 409068, A1 & CA, 2020833, A1 & US, 5077884, A & US, 5403555, A & US, 5138763, A	1 - 3
A	JP, 3-41904, A (Yoshida Kogyo K.K.), February 22, 1991 (22. 02. 91) & EP, 407846, A1 & CA, 2019082, A1	1 - 3
A	JP, 4-24003, A (Yoshida Kogyo K.K.), January 28, 1992 (28. 01. 92) & EP, 458220, A1 & US, 5075949, A & CA, 2042246, A1	1 - 3
A	JP, 4-40902, A (Yoshida Kogyo K.K.), February 12, 1992 (12. 02. 92) & EP, 460633, A1 & CA, 2024614, A1 & US, 5056205, A	1 - 3
A	JP, 3-99602, A (Yoshida Kogyo K.K.),	1 - 3
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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