

PATENT SPECIFICATION

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(54) PROCESS FOR PRODUCTION OF SLIDING CLASP FASTENER CHAIN

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan of No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process for the production of sliding clasp fastener chains.

According to one aspect of the invention there is provided a process for the production of a sliding clasp fastener chain which comprises rotating a rotary mechanism of a circular shape which carries on its circumference a continuous coupling element of a zig-zag configuration made of thermally fusible material at an elevated temperature and having spaced-apart upper and lower shanks, feeding a stringer tape in such a manner that one of the longitudinal edges of said stringer tape passes between those shanks of said coupling element located with a given length portion of the coupling element path, and applying heat and pressure directed transversely to the plane of the stringer tape to fuse the shanks of said coupling element to said one longitudinal edge of said stringer tape while said coupling element is still being partly carried by said rotary mechanism.

According to another aspect of the invention there is provided a process for the production of a sliding clasp fastener chain which comprises rotating a die wheel which has a groove formed in its circumference for holding therein a continuous coupling element of a zig-zag configuration made of thermally fusible material at an elevated temperature and having spaced-apart upper and lower shanks, feeding a stringer tape along a path extending substantially tangentially of said die wheel while latter is in rotation in a prescribed direction with the plane of the stringer tape oriented transversely to the wheel axis of rotation, gradually releasing said coupling element

from within said groove of the die wheel to receive one of the longitudinal edges of said stringer tape between the upper and lower shanks of said coupling element, and applying heat and pressure directed generally normal to the plane of the stringer tape to fuse the shanks of said coupling element to said one longitudinal edge of said stringer tape while said coupling element is still being partly held in said groove of said die wheel.

The invention will be described by way of example with reference to the accompanying drawings, wherein like reference characters denote like parts throughout the several views, and wherein:

Figure 1 is a fragmentary top plan view of means adapted for carrying out a preferred process in accordance with this invention;

Figure 2 is a sectional view taken along the plane of line II—II in Figure 1; and

Figure 3 is a cross sectional view of a completed sliding clasp fastener chain.

The preferred process in accordance with this invention is hereinafter described in more specific aspects thereof with reference to Figures 1 and 2 which illustrate means suitable for use in carrying out the preferred process. The reference numeral 10 in the drawings denotes a rotary die wheel of apparatus for forming a continuous coupling element E of a zig-zag configuration from an elongate filament of a thermoplastic synthetic resin or like thermally fusible material. The die wheel 10 may have a built-in heater, not shown, and is held heated during operation of the apparatus.

Formed on the circumference of the die wheel 10 are rows of teeth 11 with a groove 12 running therebetween for forming the elongate filament into the continuous coupling element E of the desired configuration by hot-working operation in the usual manner. A scraper 13 arranged tangentially of the die wheel 10 has its front end portion slidably received in the groove 12 for gradually releasing the formed continuous coupling element E from the die

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wheel as the latter is caused to rotate intermittently in the direction of the arrow A in Figure 1.

5 An elongated stringer tape T is adapted to be fed in the direction of the arrow B along suitable guides 14 in parallel relationship to the scraper 13 with a prescribed spacing therebetween. It may be noted from Figure 2 that this stringer tape T is arranged in such a plane that one of its longitudinal edges will be received between the upper and lower shanks 15 and 16 of the continuous coupling element E. An ultrasonic horn 17 and an anvil 18 are arranged in registered relationship on opposite sides of the stringer tape T.

For carrying out the preferred process in accordance with this invention in the arrangement explained in the foregoing with reference to Figures 1 and 2, the stringer tape T is caused to advance along the guides 14 in timed relationship to the rotation of the die wheel 10. As the formed continuous coupling element E is gradually released from the die wheel 10 by the scraper 13, its upper and lower shanks 15 and 16 receive the said one longitudinal edge of the stringer tape T therebetween. It is considered important that the upper and lower shanks 15 and 16 of the continuous coupling element E should be substantially integrally clamped onto the said one edge of the stringer tape T through application of heat and pressure, as by the ultrasonic horn 17 and anvil 18, while the element is still partly received in the groove 12 of the die wheel 10.

With the continuous coupling element E thus fused to the stringer tape T while being still held at elevated temperatures, the completed sliding clasp fastener chain shown in cross section in Figure 3 continues to be fed along the scraper 13 and is thereby completely released from the die wheel 10.

45 In a modification, the coupling element may be fused onto the stringer tape by means other than the ultrasonic horn 17 and anvil 18.

WHAT WE CLAIM IS:—

50 1. A process for the production of a sliding clasp fastener chain which comprises rotating a rotary mechanism of a circular shape which carries on its circumference a continuous coupling element of a zig-zag configuration made of

thermally fusible material at an elevated temperature and having spaced-apart upper and lower shanks, feeding a stringer tape in such a manner that one of the longitudinal edges of said stringer tape passes between those shanks of said coupling element located within a given length portion of the coupling element path, and applying heat and pressure directed transversely to the plane of the stringer tape to fuse the shanks of said coupling element to said one longitudinal edge of said stringer tape while said coupling element is still being partly carried by said rotary mechanism.

2. A process for the production of a sliding clasp fastener chain which comprises rotating a die wheel which has a groove formed in its circumference for holding therein a continuous coupling element of a zig-zag configuration made of thermally fusible material at an elevated temperature and having spaced-apart upper and lower shanks, feeding a stringer tape along a path extending substantially tangentially of said die wheel while the latter is in rotation in a prescribed direction with the plane of the stringer tape oriented transversely to the wheel axis, of rotation, gradually releasing said coupling element from within said groove of the die wheel to receive one of the longitudinal edges of said stringer tape between the upper and lower shanks of said coupling element, and applying heat and pressure directed generally normal to the plane of the stringer tape to fuse the shanks of said coupling element to said one longitudinal edge of said stringer tape while said coupling element is still being partly held in said groove of said die wheel.

3. A process substantially as herein described with reference to and as illustrated in the accompanying drawings.

4. A sliding clasp fastener chain produced by a process as claimed in Claim 1.

5. A sliding clasp fastener chain produced by a process as claimed in Claim 2.

6. A sliding clasp fastener chain produced by a process as claimed in Claim 3.

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wheel as the latter is caused to rotate intermittently in the direction of the arrow A in Figure 1.

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10 For carrying out the preferred process in accordance with this invention in the arrangement explained in the foregoing with reference to Figures 1 and 2, the stringer tape T is caused to advance along the guides 14 in timed relationship to the rotation of the die wheel 10. As the formed continuous coupling element E is gradually released from the die wheel 10 by the scraper 13, its upper and lower shanks 15 and 16 receive the said one longitudinal edge of the stringer tape T therebetween. It is considered important that the upper and lower shanks 15 and 16 of the continuous coupling element E should be substantially integrally clamped onto the said one edge of the stringer tape T through application of heat and pressure, as by the ultrasonic horn 17 and anvil 18, while the element is still partly received in the groove 12 of the die wheel 10.

35 With the continuous coupling element E thus fused to the stringer tape T while being still held at elevated temperatures, the completed sliding clasp fastener chain shown in cross section in Figure 3 continues to be fed along the scraper 13 and is thereby completely released from the die wheel 10.

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thermally fusible material at an elevated temperature and having spaced-apart upper and lower shanks, feeding a stringer tape in such a manner that one of the longitudinal edges of said stringer tape passes between those shanks of said coupling element located within a given length portion of the coupling element path, and applying heat and pressure directed transversely to the plane of the stringer tape to fuse the shanks of said coupling element to said one longitudinal edge of said stringer tape while said coupling element is still being partly carried by said rotary mechanism.

60 2. A process for the production of a sliding clasp fastener chain which comprises rotating a die wheel which has a groove formed in its circumference for holding therein a continuous coupling element of a zig-zag configuration made of thermally fusible material at an elevated temperature and having spaced-apart upper and lower shanks, feeding a stringer tape along a path extending substantially tangentially of said die wheel while the latter is in rotation in a prescribed direction with the plane of the stringer tape oriented transversely to the wheel axis, of rotation, gradually releasing said coupling element from within said groove of the die wheel to receive one of the longitudinal edges of said stringer tape between the upper and lower shanks of said coupling element, and applying heat and pressure directed generally normal to the plane of the stringer tape to fuse the shanks of said coupling element to said one longitudinal edge of said stringer tape while said coupling element is still being partly held in said groove of said die wheel.

70 3. A process substantially as herein described with reference to and as illustrated in the accompanying drawings.

75 4. A sliding clasp fastener chain produced by a process as claimed in Claim 1.

80 5. A sliding clasp fastener chain produced by a process as claimed in Claim 2.

85 6. A sliding clasp fastener chain produced by a process as claimed in Claim 3.

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