

PATENT SPECIFICATION

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(54) A SLIDE FASTENER HAVING A FILLING CORE

(71) We, YOSHIDA KOGYO KABUSHIKI KAISHA, of No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan; a corporation duly organized under the laws of 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:—

10 This invention relates to slide fasteners of the type having a series of integrally united coupling elements formed from a filamentary preferably plastics material and secured to an inner longitudinal edge of each of a pair of stringer tapes. More particularly, the invention is concerned with slide fasteners of the class described which further includes a filling or reinforcing core utilized to stabilize the position of the coupling elements when secured as by stitching to the stringer tape.

Heretofore, there have been proposed many filling cores of different forms and constructions that are made from stranded, braided or plaited pieces of textile cloth having a round or flattened cross-section. Such prior-art filling cores have suffered from the disadvantage that the core was deformed and moved in a serpentine fashion relative to the longitudinal axis of the fastener when it was subjected to pressure of the sewing needle that sews the same together with fastener coupling elements to the tape. This resulted in irregular gaps or clearances wherein adjacent coupling elements are interengaged or intermeshed, which would therefore inhibit the constant, uniform strength of coupling between the elements throughout the length of the fastener and would often invite a rupture in the chain of fastener elements.

The present invention aims to provide a slide fastener in which the aforesaid disadvantages of the prior-art of fasteners are eliminated or reduced.

[Price 33p]

More particularly the invention seeks to provide a filling core which may be substantially free from objectionable deformation or displacement relative to the longitudinal axis of the fastener when sewn together with the fastener coupling elements to the tape, and which will therefore serve to maintain uniform strength of coupling between the elements throughout the length of the fastener.

Accordingly the invention provides a slide fastener comprising a pair of opposed stringer tapes each having a series of coupling elements secured to its inner longitudinal edge, the coupling elements of each stringer tape being formed of a continuous filament having spaced apart upper and lower leg portions extending across the tape, the fastener further including, for each tape, a filling core extending along the tape between the leg portions of the filament and having at least one longitudinally extending groove or aperture formed therein, and stitching extending through the groove or aperture and attaching the respective coupling elements to the tape.

The invention will become apparent from the following detailed description of certain preferred embodiments taken in conjunction with the accompanying drawings wherein like reference characters or numerals refer to like and corresponding parts throughout the several views in which:

FIG. 1 is a fragmentary, partly broken away, plan view on enlarged scale of the reverse side of a slide fastener according to the invention;

FIG. 2 is a transverse cross-sectional view taken along the line II-II of Fig. 1; showing the two stringer tapes coupled together;

FIG. 3 is a transverse cross section of one of the two stringer tapes, showing a modified form of the invention; and

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FIGS. 4 through 7 inclusive are views similar to FIG. 3 but each showing a different modification according to the invention.

Referring now to the drawings and 5 FIGS. 1 and 2 in particular, there is shown a slide fastener F which comprises a pair of opposed stringer tapes T_1 , T_2 , each carrying along their respective inner longitudinal edges a series of integrally united 10 coupling elements E which are engaged and disengaged by a slider (not shown) to close and open the fastener in the usual manner.

The coupling elements E are formed from a 15 filamentary plastics material into a coiled structure wherein each of the elements E has a coupling head portion Ea , two spaced apart transversely extending leg portions Eb_1 , Eb_2 and a base portion Ec connecting the leg portions Eb of each element to those 20 of adjacent elements.

Designated at 10 is a filling core which is inserted in the space between the upper and lower leg portions Eb_1 and Eb_2 and 25 extends longitudinally throughout the length of the series of elements E and substantially parallel with the longitudinal axis of the stringer tape T_1 , (T_2). The filling core 10 is made of a knitted fabric having at 30 least two longitudinally extending wales $10a$ defining therebetween an inter-wale groove $10b$.

In the embodiment shown in FIGS. 1 and 2, the filling core 10 is inserted between the 35 leg portions of the elements with the inter-wale groove $10b$ directed towards the lower leg portions Eb_2 that engage with the surface of the stringer tape T_1 , (T_2). The core 10 is accommodated in and extends longitudinally of the series of elements E such 40 that it fills the part of the space between the two leg portions Eb_1 , Eb_2 which lies in the proximity of the base portion Ec but leaves unfilled the part of the space 45 which lies in the proximity of the coupling head portion Ea to provide a sufficient clearance 11 thereat for interengagement of the elements E on the opposed stringer tapes T_1 and T_2 . The wales $10a$ of the core 50 10 serve as a guide for a sewing needle (not shown) in such a way that the latter runs exactly into and along the inter-wale groove $10b$. It will be readily understood that the needle can thrust, with a minimum 55 of resistance, through the groove portion of the core 10 which is relatively thin and hence does not cause the core 10 to become deformed or move sidewise to interfere with interengagement of the coupling elements E. Thus, the provision of the filling core 60 10 ensures that the clearance 11 extending transversely of the elements E is maintained unvaried and aligned parallel with the longitudinal axis of the fastener F 65 throughout the length of the elements E

whereby the strength of coupling between adjacent elements E is held constant.

The series of elements E are sewn as by a lock stitching S_1 to the respective stringer tapes T_1 and T_2 along the line of seam S 70 which registers with the longitudinally extending grooves $10b$ between the wales $10a$.

FIG. 3 illustrates a modification wherein the core 10 is inserted in the elements E 75 with the wales $10a$ facing the upper leg portion Eb_1 , contrary to the embodiment shown in FIGS. 1 and 2.

The embodiment shown in FIG. 4 is characterized by the provision of a filling 80 core 10 having three wales $10a$ and hence two inter-wale grooves $10b$ and a covering strip 12 of similar construction to the core 10 laid over the upper leg portions Eb_1 of the elements E, both core and strip being 85 secured together with the elements E to the tape T_1 , (T_2) by means of two-thread chain stitches S_2 as shown.

The embodiment of FIG. 5 employs a filling core 10 similar to that shown in FIG. 90 4, which core is secured to together with the elements E to the tape T_1 , (T_2) by means of two needle lock stitches S_3 .

FIG. 6 illustrates a further modification 95 wherein the elements E are mounted on a stringer tape T_1 , (T_2) of a knitted structure and sewn thereto through a filling core 10 having two wales $10a$, the stitchings being accommodated in a recess 13 formed in the upper leg portions Eb_1 . 100

The embodiment shown in FIG. 7 is characterized by the application of a filling core 10 to a serpentine form of coupling 105 elements E which are secured together with the core 10 by two needle lock stitches S_3 .

Having thus described the invention, it will be understood that various changes may be made in the specific form and construction described above and illustrated in the drawings without departing from the scope 110 of the appended claim. Thus the number of wales $10a$ and inter-wale grooves $10b$ may be increased depending upon the size of the elements E employed, and the one or more grooves may be closed so as to 115 form one or more apertures extending along the filling core.

WHAT WE CLAIM IS:—

1. A slide fastener comprising a pair of opposed stringer tapes each having a 120 series of coupling elements secured to its inner longitudinal edge, said coupling elements of each stringer tape being formed of a continuous filament having spaced apart upper and lower leg portions extend- 125 ing across the tape, the fastener further including, for each tape, a filling core extending along the tape between the leg portions of the filament and having at least one longitudinally extending groove or 130

FIGS. 4 through 7 inclusive are views similar to FIG. 3 but each showing a different modification according to the invention.

Referring now to the drawings and
 5 FIGS. 1 and 2 in particular, there is shown a slide fastener F which comprises a pair of opposed stringer tapes T_1 , T_2 , each carrying along their respective inner longitudinal edges a series of integrally united
 10 coupling elements E which are engaged and disengaged by a slider (not shown) to close and open the fastener in the usual manner.

The coupling elements E are formed from
 15 a filamentary plastics material into a coiled structure wherein each of the elements E has a coupling head portion E_a , two spaced apart transversely extending leg portions E_{b_1} , E_{b_2} and a base portion E_c connecting the leg portions E_b of each element to those
 20 of adjacent elements.

Designated at 10 is a filling core which is inserted in the space between the upper and lower leg portions E_{b_1} and E_{b_2} and
 25 extends longitudinally throughout the length of the series of elements E and substantially parallel with the longitudinal axis of the stringer tape T_1 , (T_2). The filling core 10 is made of a knitted fabric having at
 30 least two longitudinally extending wales $10a$ defining therebetween an inter-wale groove $10b$.

In the embodiment shown in FIGS. 1 and 2, the filling core 10 is inserted between the
 35 leg portions of the elements with the inter-wale groove $10b$ directed towards the lower leg portions E_{b_2} that engage with the surface of the stringer tape T_1 , (T_2). The core 10 is accommodated in and extends longitudinally of the series of elements E such
 40 that it fills the part of the space between the two leg portions E_{b_1} , E_{b_2} which lies in the proximity of the base portion E_c but leaves unfilled the part of the space which lies in the proximity of the coupling
 45 head portion E_a to provide a sufficient clearance 11 thereat for interengagement of the elements E on the opposed stringer tapes T_1 and T_2 . The wales $10a$ of the core
 50 10 serve as a guide for a sewing needle (not shown) in such a way that the latter runs exactly into and along the inter-wale groove $10b$. It will be readily understood
 55 that the needle can thrust, with a minimum of resistance, through the groove portion of the core 10 which is relatively thin and hence does not cause the core 10 to become deformed or move sidewise to interfere with
 60 interengagement of the coupling elements E. Thus, the provision of the filling core 10 ensures that the clearance 11 extending transversely of the elements E is maintained unvaried and aligned parallel with the longitudinal axis of the fastener F
 65 throughout the length of the elements E

whereby the strength of coupling between adjacent elements E is held constant.

The series of elements E are sewn as by a lock stitching S_1 to the respective stringer tapes T_1 and T_2 along the line of seam S
 70 which registers with the longitudinally extending grooves $10b$ between the wales $10a$.

FIG. 3 illustrates a modification wherein the core 10 is inserted in the elements E
 75 with the wales $10a$ facing the upper leg portion E_{b_1} , contrary to the embodiment shown in FIGS. 1 and 2.

The embodiment shown in FIG. 4 is characterized by the provision of a filling
 80 core 10 having three wales $10a$ and hence two inter-wale grooves $10b$ and a covering strip 12 of similar construction to the core 10 laid over the upper leg portions E_{b_1} of the elements E, both core and strip being
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The embodiment of FIG. 5 employs a filling core 10 similar to that shown in FIG.
 90 4, which core is secured to together with the elements E to the tape T_1 , (T_2) by means of two needle lock stitches S_3 .

FIG. 6 illustrates a further modification wherein the elements E are mounted on a
 95 stringer tape T_1 , (T_2) of a knitted structure and sewn thereto through a filling core 10 having two wales $10a$, the stitchings being accommodated in a recess 13 formed in the upper leg portions E_{b_1} .
 100

The embodiment shown in FIG. 7 is characterized by the application of a filling
 105 core 10 to a serpentine form of coupling elements E which are secured together with the core 10 by two needle lock stitches S_3 .

Having thus described the invention, it will be understood that various changes may be made in the specific form and construction described above and illustrated in the drawings without departing from the scope
 110 of the appended claim. Thus the number of wales $10a$ and inter-wale grooves $10b$ may be increased depending upon the size of the elements E employed, and the one or more grooves may be closed so as to
 115 form one or more apertures extending along the filling core.

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 120 series of coupling elements secured to its inner longitudinal edge, said coupling elements of each stringer tape being formed of a continuous filament having spaced
 125 apart upper and lower leg portions extending across the tape, the fastener further including, for each tape, a filling core extending along the tape between the leg portions of the filament and having at least
 130 one longitudinally extending groove or



aperture formed therein, and stitching extending through the groove(s) or aperture(s) and attaching the respective coupling elements to the tape.

5 2. A slide fastener as claimed in claim 1, wherein the filling core has at least two wales and an inter-wale groove defined therebetween.

10 3. A slide fastener as claimed in claim 2, wherein said filling core is inserted with said wales directed towards said lower leg portion of the coupling element.

15 4. A slide fastener as claimed in claim 2, wherein said filling core is inserted with

said wales directed towards said upper leg portion of the coupling element.

5. A slide fastener as claimed in any preceding claim, wherein said filling core is made from a knitted fabric. 20

6. A slide fastener substantially as herein described with reference to the accompanying drawings.

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