

PATENT SPECIFICATION

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(54) SLIDING CLASP FASTENER

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumicho, 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 sliding clasp fastener of the discrete element type in which a series of uniformly spaced fastener elements are mounted astride an inner beaded edge of each of oppositely disposed stringer tapes.

With reference to Figure 3 of the accompanying drawings, a known sliding clasp fastener 10 of this general type comprises a slider 14 having a pair of upper and lower wings (not shown) interconnected by a neck (not shown) located at its front end to define, together with a pair of guide flanges 18' formed along lateral edges of each of the upper and lower wings, a generally Y-shaped guide channel 22' through the slider for guiding the movement of the fastener elements 13' therethrough. The lengths of each pair of guide flanges 18' and the pitch of the fastener elements 13' have not been taken into consideration so that one or other of those two opposed fastener elements 13' c, located within the Y-shaped guide channel 22' in adjacent relation to the front end of the slider 14', is necessarily positioned with respect to the front ends 34' of the corresponding guide flanges 18' in the manner shown in Figure 3 when the slider 14' is in its lowermost position. More specifically, the fastener element 13' c has its lateral axis A' disposed upwardly of the front ends 34' of the guide flanges 18'. When a lateral pull (indicated by arrow F') tending to separate the opposed stringer tapes is exerted on the sliding clasp fastener, the fastener element 13' c is pivoted or angularly moved in a counterclockwise direction about inner edges 36' of the guide flanges 18' which make contact with an end face 25' of the fastener element 13' c and serve as an axis of

rotation. Thus, the end face 25' and the inner edges 36' function as the lever and fulcrum. Since the distance between the front side face 26' of the fastener element 13' c and the inner edges 36' is greater than the distance between the inner edges 36' and the rear side face 27', an inwardly directed force (indicated by arrow f₁) exerted on the outer rear corner 37' of the fastener element is substantially greater than an outwardly directed force (indicated by arrow f₂) exerted on the outer front corner 38' of the fastener element 13' c. The result is that even when the lateral pull F' is not so severe, the fastener element can easily be turned or angularly moved in a counterclockwise direction about the inner edges 36' representing the fulcrum to forcibly disengage the fastener element 13' c from the beaded tape edge 12'.

According to the invention, there is provided a sliding clasp fastener comprising a pair of oppositely disposed stringer tapes carrying on and along their confronting longitudinal edges a pair of series of uniformly spaced discrete fastener elements, a slider movable along said fastener elements for coupling and uncoupling the same, and a bottom end stop member inseparably interconnecting said stringer tapes adjacent to the bottom ends thereof, said slider including a body having a pair of spaced apart upper and lower wings each having a pair of guide flanges on and along the lateral edges thereof, said upper and lower wings being interconnected by a neck located at the front end of said slider to define together with said guide flanges a generally Y-shaped guide channel therethrough for guiding the movement of said fastener elements therethrough, and each of said fastener elements including a body of generally rectangular configuration having a pair of front and rear side faces and an outer end face, said end stop member having a base portion against which the rear end of said slider abuts in its lowermost position to restrict the downward movement of said slider, said end stop member having a plug portion which

extends from said base portion in a direction away from the bottom ends of said stringer tapes, and said plug portion being snugly receivable in the rear end portion of said Y-shaped guide channel for preventing said slider from tilting relatively to said end stop member when said slider is in its lowermost position, one guide flange being longer than the other guide flange of each pair of guide flanges the respective lengths of the two guide flanges of each pair of guide flanges being so related to the pitch of said fastener elements that those two opposed fastener elements, located within said Y-shaped guide channel in adjacent relation to the front ends of said two pairs of guide flanges have their respective longitudinal axis disposed downwardly of the front ends of said lateral guide flanges when said slider is in its lowermost position.

The invention will now be described by way of example, with reference to the drawings, in which:—

Figure 1 is a fragmentary plan view of a sliding clasp fastener provided in accordance with the present invention, showing a slider engaging a bottom end stop member in its lowermost position;

Figure 2 is an enlarged, fragmentary view of the sliding clasp fastener, showing the relative positions of the slider and those fastener elements received in a guide channel of the slider; and

Figure 3 is a view similar to Figure 2 but showing the known sliding clasp fastener in accordance with the prior art.

Figure 1 partially shows a sliding clasp fastener 10 including a pair of oppositely disposed stringer tapes 11,11 carrying on and along their respective confronting beaded edges 12,12 a pair of series of uniformly spaced fastener elements 13 which are taken into and out of mutual engagement by a slider 14 movable along the fastener elements 13 to close and open the sliding clasp fastener 10 also includes a bottom end stop member 15 fixedly secured to and holding the opposed marginal portions of the stringer tapes 11,11 in parallel, inseparable relation adjacent to the bottom end 16 of the sliding clasp fastener 10.

The slider 14 includes a body having a pair of spaced apart upper and lower wings 17,17 each having a pair of upwardly diverging guide flanges 18,19 extending on and along its lateral margins. The upper and lower wings 17,17 are interconnected by a neck 20 located at the front end 21 of the slider 14 to define together with the two pairs of guide flanges 18,19 a generally Y-shaped guide channel 22 through the slider 14 for guiding the movement of the fastener elements 13 therethrough.

Each of the fastener elements 13 includes a body of generally rectangular configuration having a coupling head portion 23 and a base portion 24 extending from the head portion 23 and peripherally embracing the beaded tape edge 12, the base portion 24 being of generally

square configuration and having a flat end face 25 and a pair of flat front and rear side faces 26,27.

The end stop member 15 includes a body having a base portion 28 of square cross-section 70 and a plug portion 29 of square cross-section extending from the base portion 28 in a direction away from the bottom end 16 of the sliding clasp fastener 10. The plug portion 29 has a smaller dimension in the transverse direction of the sliding clasp fastener 10 than the base portion 28 so that the opposite side faces 30,30 of the end stop member 15 are stepped at regions at which the base and plug portions 28,29 are joined together, to define a pair of shoulders 31,31 which are capable of serving as abutment surfaces as will hereinafter more fully be described. The plug portion 29 is so sized and shaped as to be snugly received in a throat or rear end portion 32 of the slider guide channel 22 when the slider 14 is in its lowermost position.

The end stop member 15 as well as the fastener elements 13 is made of a synthetic resin and injection-moulded on the inner marginal portions of the opposed stringer tapes 11,11. The lowermost fastener element 13a is integrally united with the plug portion 29. With this arrangement, the lowermost fastener element 13a is positively held in position with respect to the beaded tape edge 12, and serves to block the flow of molten synthetic resin escaping from the mould by which the end stop member 15 is formed. The rear side face 27 of the penultimate fastener element 13b also serves to prevent the flow of such escaped molten synthetic resin.

The slider 14 engages the bottom end stop member 15 in its lowermost position, with the plug portion 29 snugly received in the throat portion 32 and with the rear ends 33,33' of each pair of the guide flanges 18,19 held respectively in abutting engagement with the shoulders 31,31, as shown in Figure 1, so that the slider 14 is held against movement and tilting action relatively to the end stop member 15. The guide flange 18 of each pair of guide flanges 18,19 is longer than the guide flange 19, as may be seen from Figure 1. The length of each of the guide flanges 18 is so related to the pitch of the fastener elements 13 that the fastener element 13c, located within the guide channel 22 in adjacent relation to the front ends 34,34 of the flanges 18,18 has its longitudinal axis A disposed downwardly of the front ends 34 of the guide flanges 18. Similarly, the length of each of the guide flanges 19 is so related to the pitch of the fastener elements 13 that the fastener element 13d, located within the guide channel 22 in adjacent relation to the front ends 35,35 of the flanges 19,19, has its longitudinal axis disposed downwardly of the front ends 35 of the guide flanges 19. Although the front ends 34,35 of the guide flanges 18,19 are shown in the drawings to lie generally flush respectively 130

with the front side faces 26,26 of the fastener elements 13c,13d, the front ends 34,35 can be located between the rear side faces 27,27 of the adjacent fastener elements 13e,13f and their lateral axes A,A, respectively, so long as the front ends 34,35 do not interfere with the adjacent fastener elements 13e,13f. Further, although the guide flange 18 is made longer than the guide flange 19 and hence has its front end 34 extended beyond the front end 35 of the guide flange 19 in the longitudinal direction of the sliding clasp fastener 10, they may have the same length so long as they meet the above-mentioned requirements.

Since the slider 14 is held against movement and tilting action relatively to the end stop member 15 in its lowermost position as previously mentioned, the relative positions of the fastener elements 13c,13d and the guide flanges 18,19 are maintained as described in the preceding paragraph even when oppositely directed lateral forces tending to separate the stringer tapes 11,11 away from each other are exerted on the sliding clasp fastener 10, the lateral forces being indicated by arrows F,F.

As best shown in Figure 2, upon application of the lateral forces F,F to the stringer tapes 11,11, the end face 25 of the fastener element 13c makes contact with the inner edges 36,36 of the front ends 34,34 of the guide flanges 18,18. The end face 25 and the inner edges 36,36 function as the lever and fulcrum as earlier mentioned with reference to the prior art, but since the distance between the front side face 26 of the fastener element 13c and the inner edges 36,36 is smaller than the distance between the inner edges 36,36 and the rear side face 27, an inwardly directed force (indicated by arrow f_1) exerted on the outer rear corner 37 of the fastener element 13c is substantially less in magnitude than an outwardly directed force (indicated by arrow f_2) exerted on the outer front corner 38. Therefore, except when the lateral forces F,F are excessively severe, the fastener element 13c will not be pivoted or angularly moved in a counterclockwise direction about the inner edges 36,36 representing the fulcrum to thereby prevent the forcible disengagement of the fastener element 13c from the beaded tape edge 12. Similarly, the fastener element 13d is prevented from angular movement about the inner edges 35,35 in a clockwise direction.

WHAT WE CLAIM IS:-

1. A sliding clasp fastener comprising a pair of oppositely disposed stringer tapes carrying on and along their confronting longitudinal edges a pair of series of uniformly spaced discrete fastener elements, a slider movable along said fastener elements for coupling and uncoupling the same, and a bottom end stop member inseparably interconnecting said

stringer tapes adjacent to the bottom ends thereof, said slider including a body having a pair of spaced apart upper and lower wings each having a pair of guide flanges on and along the lateral edges thereof, said upper and lower wings being inter-connected by a neck located at the front end of said slider to define together with said guide flanges a generally Y-shaped guide channel therethrough for guiding the movement of said fastener elements therethrough, and each of said fastener elements including a body of generally rectangular configuration having a pair of front and rear side faces and an outer end face, said end stop member having a base portion against which the rear end of said slider abuts in its lowermost position to restrict the downward movement of said slider, said end stop member having a plug portion which extends from said base portion in a direction away from the bottom ends of said stringer tapes, and said plug portion being snugly receivable in the rear end portion of said Y-shaped guide channel for preventing said slider from tilting relatively to said end stop member when said slider is in its lowermost position, one guide flange being longer than the other guide flange of each pair of guide flanges, the respective lengths of the two guide flanges of each pair of guide flanges being so related to the pitch of said fastener elements that those two opposed fastener elements, located within said Y-shaped guide channel in adjacent relation to the front ends of said two pairs of guide flanges, have their respective longitudinal axes disposed downwardly of the front ends of said lateral guide flanges when said slider is in its lowermost position.

2. A sliding clasp fastener according to claim 1, in which one of each pair of guide flanges has its front end extended beyond that of the other in the longitudinal direction of said sliding clasp fastener.

3. A sliding clasp fastener according to claim 1, in which said base portion is of generally square cross-section and a smaller dimension in the transverse direction of said sliding clasp fastener than said base portion so that the opposite side faces of said end stop body are stepped at regions at which said base and plug portions are joined together, to define a pair of abutment shoulders with which the rear ends of each pair of guide flanges are engageable when said slider is in its lowermost position.

4. A sliding clasp fastener according to claim 1, in which said two opposed fastener elements have their front side faces lying substantially flush with the front ends of said lateral guide flanges, respectively.

5. A sliding clasp fastener according to claim 1, in which the lowermost one of said fastener elements is integrally united with said plug



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with the front side faces 26,26 of the fastener elements 13c,13d, the front ends 34,35 can be located between the rear side faces 27,27 of the adjacent fastener elements 13e,13f and their lateral axes A,A, respectively, so long as the front ends 34,35 do not interfere with the adjacent fastener elements 13e,13f. Further, although the guide flange 18 is made longer than the guide flange 19 and hence has its front end 34 extended beyond the front end 35 of the guide flange 19 in the longitudinal direction of the sliding clasp fastener 10, they may have the same length so long as they meet the above-mentioned requirements.

Since the slider 14 is held against movement and tilting action relatively to the end stop member 15 in its lowermost position as previously mentioned, the relative positions of the fastener elements 13c,13d and the guide flanges 18,19 are maintained as described in the preceding paragraph even when oppositely directed lateral forces tending to separate the stringer tapes 11,11 away from each other are exerted on the sliding clasp fastener 10, the lateral forces being indicated by arrows F,F.

As best shown in Figure 2, upon application of the lateral forces F,F to the stringer tapes 11,11, the end face 25 of the fastener element 13c makes contact with the inner edges 36,36 of the front ends 34,34 of the guide flanges 18,18. The end face 25 and the inner edges 36,36 function as the lever and fulcrum as earlier mentioned with reference to the prior art, but since the distance between the front side face 26 of the fastener element 13c and the inner edges 36,36 is smaller than the distance between the inner edges 36,36 and the rear side face 27, an inwardly directed force (indicated by arrow f_1) exerted on the outer rear corner 37 of the fastener element 13c is substantially less in magnitude than an outwardly directed force (indicated by arrow f_2) exerted on the outer front corner 38. Therefore, except when the lateral forces F,F are excessively severe, the fastener element 13c will not be pivoted or angularly moved in a counterclockwise direction about the inner edges 36,36 representing the fulcrum to thereby prevent the forcible disengagement of the fastener element 13c from the beaded tape edge 12. Similarly, the fastener element 13d is prevented from angular movement about the inner edges 35,35 in a clockwise direction.

WHAT WE CLAIM IS:—

1. A sliding clasp fastener comprising a pair of oppositely disposed stringer tapes carrying on and along their confronting longitudinal edges a pair of series of uniformly spaced discrete fastener elements, a slider movable along said fastener elements for coupling and uncoupling the same, and a bottom end stop member inseparably interconnecting said

stringer tapes adjacent to the bottom ends thereof, said slider including a body having a pair of spaced apart upper and lower wings each having a pair of guide flanges on and along the lateral edges thereof, said upper and lower wings being inter-connected by a neck located at the front end of said slider to define together with said guide flanges a generally Y-shaped guide channel therethrough for guiding the movement of said fastener elements therethrough, and each of said fastener elements including a body of generally rectangular configuration having a pair of front and rear side faces and an outer end face, said end stop member having a base portion against which the rear end of said slider abuts in its lowermost position to restrict the downward movement of said slider, said end stop member having a plug portion which extends from said base portion in a direction away from the bottom ends of said stringer tapes, and said plug portion being snugly receivable in the rear end portion of said Y-shaped guide channel for preventing said slider from tilting relatively to said end stop member when said slider is in its lowermost position, one guide flange being longer than the other guide flange of each pair of guide flanges, the respective lengths of the two guide flanges of each pair of guide flanges being so related to the pitch of said fastener elements that those two opposed fastener elements, located within said Y-shaped guide channel in adjacent relation to the front ends of said two pairs of guide flanges, have their respective longitudinal axes disposed downwardly of the front ends of said lateral guide flanges when said slider is in its lowermost position.

2. A sliding clasp fastener according to claim 1, in which one of each pair of guide flanges has its front end extended beyond that of the other in the longitudinal direction of said sliding clasp fastener.

3. A sliding clasp fastener according to claim 1, in which said base portion is of generally square cross-section and a smaller dimension in the transverse direction of said sliding clasp fastener than said base portion so that the opposite side faces of said end stop body are stepped at regions at which said base and plug portions are joined together, to define a pair of abutment shoulders with which the rear ends of each pair of guide flanges are engageable when said slider is in its lowermost position.

4. A sliding clasp fastener according to claim 1, in which said two opposed fastener elements have their front side faces lying substantially flush with the front ends of said lateral guide flanges, respectively.

5. A sliding clasp fastener according to claim 1, in which the lowermost one of said fastener elements is integrally united with said plug

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portion of said end stop member.

6. A sliding clasp fastener substantially as herein described with reference to and as illustrated in Figures 1 and 2 of the accompanying drawings.

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