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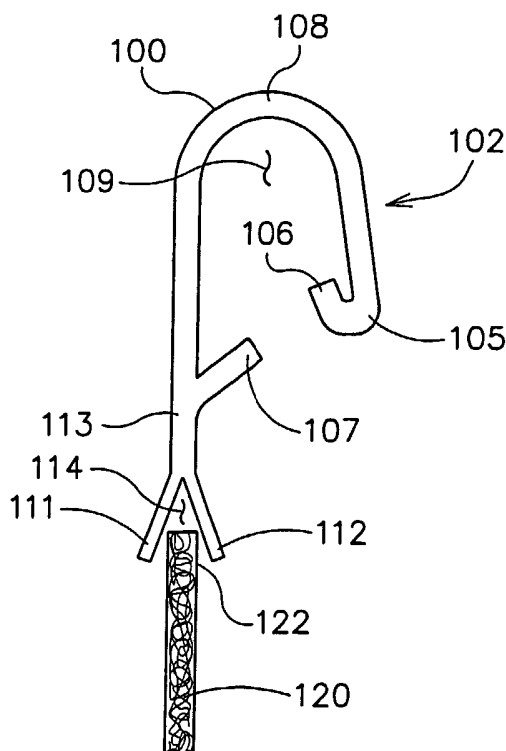
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[Continued on next page]

(54) Title: FASTENING SYSTEM



(57) Abstract: A fastening system for connecting an edge of a fabric material with a mounting structure includes a retaining clip (100). The retaining clip (100) includes a thermoplastic securing member and a body portion. The retaining clip also includes a first portion of the body configured for connecting the thermoplastic securing member to the structure. The retaining clip also includes a second portion of the body located distal from the first portion and comprising a channel (114) between a first extension member (111) and a second extension member. The channel has received therein the edge (122) of the fabric material and the first and second extension members (111, 112) sandwich the edge of the fabric material therebetween. A system comprising an integral suspension fabric having an edge and a fastening clip for use in securing a seat cover to a seat is also disclosed. A method of making an integrated and unitary retainer clip and material is also disclosed.



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FASTENING SYSTEM

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This application claims priority to U.S. Patent Application No. 60/399,098 titled "Integrated Retainer Clip and Material and Method of Manufacture" filed July 26, 2002, which is hereby incorporated by reference.

FIELD

[0002] The present invention relates generally to the field of fasteners and fastening systems. The present invention relates more particularly to a integrated retainer clip and material and method of manufacture and more particularly to a fastener for connecting a material to a seat structure within a vehicle seat.

BACKGROUND OF THE INVENTION

[0003] It is known that vehicle seats include a cover of some sort for finishing the seat to provide an acceptable aesthetic and comfort to an occupant. Seat covers are commonly attached to the seat frame or other similar seat structure using various known connectors. These connectors commonly attach to the fabric or material of the seat cover or an intermediate fabric or material attached to the seat cover.

[0004] FIGURES 1 through 2B show prior art devices for use in attaching a fabric material to a vehicle seat structure. FIGURE 1 discloses a thermoplastic fabric material 20 made of a non-woven polypropylene fabric material having approximately a 1 millimeter thickness. The material 20 is connected to a seat structure 30 shown as a square metallic member using a "hog ring" connector 32 as is well known in the vehicle seating industry. The hog ring connector 32 is one type of known connector there being many

known types having various functions and their related benefits and drawbacks.

[0005] The material 20 includes an edge portion 22 having a thermoplastic bead 25 connected thereto. The thermoplastic bead 25 is preferably also made of the same polypropylene material as is used to make the material 20. The bead 25 is preferably made integral and unitary with the material 20 by fusing the bead 25 to the edge 22 of the material 20 in a heated extrusion process. In this process the bead 25 is extruded from a multi-piece extrusion die using known techniques. The extrusion die (not shown) is preferably modified to allow a given width of the material to be fed through the die and aligned with the extruded bead 25 leaving the die.

[0006] The bead 25 connected to the material 20 provides additional strength and rigidity to the edge 22 to help in preventing the hog ring connector 32 from tearing out of the edge 22 of the material 20. Because the material 20 is introduced at the point of extrusion of the bead 25, there is a very strong and close bond created between the bead 25 and the fabric material 20. However, the resulting combination is not sufficient for all applications, in particular, those applications for which hog ring connectors are undesirable.

[0007] FIGURE 2A shows a thermoplastic J-shaped clip 40 used for connecting the material 20 to a seat frame or other mounting structure (not shown). The J-shaped clip 40 is connected to the material 20 using a sewn stitch 42 as is well known in the art. The J-shaped clip 40 includes a first end 43 for connecting the J-shaped clip to the seat structure and a second end 45 having the material 20 stitched thereto. The end 45 is extended in length to provide sufficient overlap between the material 20 and the J-shaped clip 40 so the sewn stitch 42 will assuredly catch both the J-shaped clip 40 and the material 20. The end 45 of the J-shaped clip 40 is approximately a millimeter in thickness and made of the polypropylene material.

[0008] The characteristics of the materials comprising the J-shaped clip 40 make it a very difficult and task intensive process to sew the stitch 42 through the needled non-woven polypropylene material 20 and the end 45 of the J-shaped clip 40. The process for continuously sewing the stitch 42 to connect the material 20 to the end 45 involves significant time and significant wear on the sewing machines. This associated excessive wear on the machines and the additional material costs add significantly to the cost per linear foot of the combined J-shaped clip 40 and the material 20. Further, due to the intricacies and size of the materials being handled, it has not been possible to automate the sewing of the stitch 42.

[0009] FIGURE 2B discloses a further known retainer clip 50 for use in a vehicle seat (not shown). In particular, the retainer clip 50 of FIGURE 2B is used for connecting a material 20 within the vehicle seat. The clip 50 includes an end 45 similar to that shown in FIGURE 2A. The clip 50 is disclosed as being made of an extruded unitary polypropylene material. The fabric material 20 is connected with the end 45 of the clip 50 by having an edge 22 of the material overlaid on the end 45 and heated polypropylene liquid is applied to an "A" surface shown as a side A of the end 45 prior to the needled, non-woven, fabric material 20 being applied to the end 45 of the clip 50. In the process related to the clip 50 of FIGURE 2B, it is known to apply a sufficient amount of pressure to the side A along the transverse direction of the end 45 of the clip 50. This causes the fabric material 20 contacting the surface of side A of the end 45 to allow the liquid polypropylene material to bond with the polypropylene fabric material 20 as the liquid polypropylene material cools and bonds the fabric material 20 to the end 45.

[0010] Several problems exist with the design of the clip 50 combined with the material 20 as shown in FIGURE 2B. In particular, the material 20 is applied on only one side to the clip 50. Thus, the strength of the bond between the end 45 and the material 20 is limited to a bonded

region 47 as shown in FIGURE 2A. Further, the strength of the bond 47 between the end 45 and the material 20 is different depending on the direction that a force is applied to the material 20. Further, due to the application of a liquid material essentially an adhesive, the appearance of the fabric material 20 on the side A is distorted.

[0011] Accordingly, there remains a significant need to address the problems associated with the noted prior art. The development of a simple, low-cost design and method of manufacturing for connecting a material to a fastening clip would represent a significant advance in the art and would eliminate significant costs associated with the prior art designs and methods of manufacture. Further, the development of such a design and method of manufacture to allow for the adoption and incorporation of fasteners in locations for securing a seat cover to a seat structure which have previously been avoided would also represent a significant advance in the art. Further, the development of such a design and method of manufacture for an integrated retainer clip and material would avoid significant costs associated with the prior art design of sewing the fabric to the retainer clip. For example, costs associated with the cutting and scrap removal of fabric and the sewing procedure are eliminated and the procedures within a plant for processing the prior art design are also avoided. There is also a need for a fastening system having one or more of these or other advantageous features.

SUMMARY OF THE INVENTION

[0012] One embodiment of the present invention relates to a fastening system for connecting an edge of a fabric material with a mounting structure. The fastening system includes a retaining clip. The retaining clip includes a thermoplastic securing member. The retaining clip also includes a body portion. The retaining clip also includes a first portion of the body configured for connecting the thermoplastic securing member to the

structure. The retaining clip also includes a second portion of the body located distal from the first portion and comprising a channel between a first extension member and a second extension member. The channel has received therein the edge of the fabric material and the first extension member and the second extension member sandwich the edge of the fabric material therebetween.

[0013] In an alternate embodiment of the present invention, a system comprising an integral suspension fabric having an edge and a fastening clip for use in securing a seat cover to a seat structure includes a main body portion made of a thermoplastic material. The main body portion includes a first end configured for connection to the seat structure. The main body portion also includes a second end unitarily formed with an edge of a thermoplastic fabric material. The fastening clip also includes a clip unitarily formed with the first end.

[0014] An alternate embodiment of the present invention relates to a method of making an integrated and unitary retainer clip and material. The method includes selecting a thermoplastic retainer clip having a first portion comprising a clip securing portion and a second portion comprising a material integrating portion. The method also includes selecting a thermoplastic material having a heat characteristic similar to a heat characteristic of the thermoplastic retainer clip. The method also includes positioning the thermoplastic material with respect to the material integrating portion of the thermoplastic retainer clip. The method also includes applying sufficient heat to the thermoplastic material and the material integrating portion of the retainer clip to cause the thermoplastic material and the retainer clip to become secured together as an integrated and unitary piece.

[0015] An alternate embodiment of the present invention relates to a method of making an integrated retainer clip and material. The method includes introducing an end of a fabric material between a first extension member and a second extension member substantially coincident

with introducing a heated liquid material between the extension members having material characteristics similar to the material comprising the extension members and the fabric material. The method also includes pressing the extension members, the liquid material and the end of the fabric material together between a pair of rollers and allowing the liquid material to cool to form a bond between the first extension member and the second extension member and the fabric material.

[0016] An alternate embodiment of the present invention relates to a fastening system for connecting an edge of a thermoplastic fabric material with a mounting structure. The fastening system includes a retaining clip. The retaining clip includes thermoplastic means for attachment to the mounting structure. The retaining clip also includes thermoplastic means for providing a channel. The edge of the fabric material is received in the means for providing the channel.

[0017] How these and other features of the present invention are accomplished will be described in the following detailed description of the preferred embodiment, taken generally in conjunction with the FIGURES. Generally, however, the above features are provided by providing a thermoplastic fastening device such as a clip and a thermoplastic material having similar properties and characteristics and providing a continuous operation for heating portions of the two elements to become melted into a unitary device. The alternatives to the features of the invention will be apparent to those skilled in the art after reviewing the present application, such other ways falling within the scope of the present invention if they fall within the scope of the claims which follow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIGURE 1 is a partial side view of a fabric suspension material for use in a vehicle seat connected to a seat structure using a hog ring fastener as known in the prior art;

[0019] FIGURE 2A is a plan side view of a clip fastener having a material stitched to an end of the clip fastener as known in the prior art;

[0020] FIGURE 2B is a plan side view of a clip fastener having a material adhered to one side of an end of a clip fastener as known in the prior art;

[0021] FIGURE 3 is a plan side view of a thermoplastic clip fastener according to an exemplary embodiment of the present invention;

[0022] FIGURE 4 is a plan side view of a thermoplastic clip fastener and a thermoplastic fabric material according to an exemplary embodiment of the present invention;

[0023] FIGURE 5 is a plan side view of a thermoplastic clip fastener made unitary with the thermoplastic fabric material according to the present invention; and

[0024] FIGURE 6 is a plan side view of a thermoplastic clip fastener made unitary with the thermoplastic fabric material according to an alternate embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0025] Referring generally to FIGURES 3 through 6, there is shown a thermoplastic retaining clip 100. The clip 100 includes a securing member. The retaining clip also includes a thermoplastic means for providing a channel or first end 102 and a material integrating portion or second end 104 located distal from the first end 102. The first end 102 includes a structure for connecting the clip 100 to a portion or structure of a vehicle seat (not shown). The first end 102 (e.g. thermoplastic means for attachment to the mounting structure) is preferably J-shaped in form but may have other shapes as desired or appropriate. The clip 100 includes a hook or end 105 shaped to define a first barb 106 pointing inward for retaining the

clip 100 on a structure (not shown). As such, the first barb 106 obstructs access to the J-shaped end 105.

[0026] The clip 100 further includes a second barb 107 connected thereto and located across from the end 105 and the first barb 106. The second barb 107 also helps to retain the clip 100 on the vehicle seat structure (not shown) similar to the first barb 106. Preferably the first barb 106 and the second barb 107 are sufficiently flexible or pliable to bend when a user desires to connect the clip 100 to a mounting structure but are sufficiently stiff to prevent the clip 100 from being easily removed from the structure.

[0027] The clip 100 further includes a "bight" or middle portion 108 located between and further defined by the end 105, the first barb 106 and the second barb 107. The middle portion 108 has a preferably arcuate shape but may be made to have a square, oval, rectangular, triangular or any other known or appropriate shape according to an alternative embodiment. The middle 108 portion has defined therein a space 109 for receiving the structure to which the clip 100 is intended to be attached. As with the first barb 106 and the second barb 107, the middle 108 is also preferably flexible to allow the end 105 to move laterally with respect to the second barb 107 to allow access to the space 109. Similarly, the middle 108 is sufficiently stiff to prevent the clip 100 from being undesirably removed from the structure.

[0028] The second end 104 of the clip 100 has a first "leaf" or extension member 111 and a second "leaf" or extension member 112. The first and second extension members 111 and 112, respectively, extend from a main body portion or member 113 of the clip 100. The first extension member 111 has a thickness approximately half of the main body member 113 according to a particularly preferred embodiment. Similarly, the second extension member 112 also has a thickness approximately half of the main body member 113 according to a particularly preferred embodiment.

However, it should be understood that it is possible to have the thickness for the first and second extension members 111 and 112, respectively, vary relative to the main body member 113 according to alternative embodiments. As best shown in FIGURE 3, the first extension member 111 is preferably produced separated laterally from the second extension member 112 to define an internal void or space 114 between the first extension member 111 and the second extension member 112. The space 114 is shown in FIGURE 3 as being essentially triangular in shape having an open end outward or away from the main body member 113 according to a preferred embodiment.

[0029] The clip 100 as shown in FIGURES 3 through 5 is preferably made of a polypropylene material in an extrusion process as is well known in the art. The clip 100 as shown in FIGURES 3 through 5 is preferably made separately from the other elements to which it will be combined according to a preferred embodiment.

[0030] The space 114 in the clip 100 is intended for receiving a piece of fabric material 120 according to a preferred embodiment. The fabric material 120 is preferably a nonwoven, needle punched polypropylene mat material. The fabric material 120 is preferably about 100 percent polypropylene fibers or an approved equivalent. The fabric material meets a specification such as GM2703M which is incorporated by reference herein according to a particularly preferred embodiment. While the above fabric material is particularly useful in the present invention, it should be understood that any needle punched, nonwoven polypropylene material will suffice provided it has characteristics equivalent to the characteristics of the fabric material identified above.

[0031] The fabric material 120 is preferably formed or made to have an edge 122 to be received in the space 114 between the first extension member 111 and the second extension member 112 (see FIGURE 5). The edge 122 is preferably made in manufacturing the fabric material 120 to a particular size of by cutting the fabric material 120 to a particular size.

However, it should be understood that the edge 122 may be formed by folding the fabric material 120 or using any other treatment for creating an edge within the fabric material 120 provided the edge 122 is usable to be connected to the clip 100 according to any alternative embodiment.

[0032] The edge 122 is located between the first extension member 111 and the second extension member 112. The extension members 111 and 112 are pressed together using any known or appropriate means such that the fabric material 120 is sandwiched between the extension members 111 and 112. In the embodiment shown in FIGURE 5, preferably before and/or during the moment at which the fabric material 120 is sandwiched between the extension members 111 and 112, heat is applied to the extension members 111 and 112 and the edge 122 using any known or appropriate heating means (e.g. heater, press, etc.) to cause the polypropylene materials of the extension members 111 and 112 and the fabric material 120 to heat above the bonding temperature of the material. Alternatively, appropriate heating means are used to cause the polypropylene materials of the extension members 111 and 112 and the fabric material 120 to heat above the melting temperature of the materials. Since the materials are all made from polypropylene they have very similar heat characteristics according to a preferred embodiment.

[0033] Preferably, the extension members 111 and 112 and the fabric material 120 are evenly heated throughout the sandwich such that the materials of the first and second extension members 111 and 112, respectively, and the fabric material 120 are permanently combined such that the fabric material 120 becomes a unitary coextensive material with the clip 100.

[0034] As best shown in FIGURE 5, once sufficient heat is applied to the clip 100, the fabric material 120 becomes an integral extension of the second end 104 of the clip 100. Accordingly, the fabric material 120 of FIGURE 5 becomes a permanent, single coextensive attachment of the clip

100 according to a preferred embodiment. Further, the combination of the clip 100 to the fabric material 120 is accomplished without the need to needle sew the fabric material 120 to the second end 104 of the clip 100. Further, the fabric material 120 is connected to the second end 104 of the clip 100 in a central or "non-handed" location such that the design will work equally well in alternative installation directions on the seat structure. The above process is preferably automated using machinery such that the process can be continuous and highly efficient.

[0035] In an alternate embodiment as best shown in FIGURE 4, the fabric material 120 is essentially glued between the first and second extension members 111 and 112, respectively, using a liquid polypropylene material 124 that is applied on the internal area proximate and/or including the space 114 between the first and second extension members 111 and 112. Preferably, the liquid polypropylene material 124 is placed within the space 114 at the same time the edge 122 of the fabric material 120 is placed therein and the first extension member 111 is compressed with the second extension member 112 to form a sandwich of the first and second extension members 111 and 112, the fabric material 120 and the liquid polypropylene material 124. Further, the pressing of the first and second extension members 111 and 112 together causes the liquid polypropylene material 124 to pass through the fabric material 120 and create an extensive and thorough connection between the first extension members 111 and 112 and the fabric material 120 according to a preferred embodiment. According to a preferred embodiment, it is preferred to press the extension members 111 and 112 together very quickly (e.g. within a few seconds) after applying the liquid polypropylene material 124 since the liquid polypropylene material 124 cools at a very rapid rate. Further, because of the rapid rate of cooling of the liquid polypropylene material 124 located along the internal space 114, the first extension member 111 and second extension member 112 are caused to move toward one another and close the space 114 and further contact the edge 122 of the fabric material 120.

[0036] The extrusion tooling and machinery for creating the clip 100 may be located proximate a roll of the fabric material 120. As the clip 100 is continuously extruded, the fabric material 120 from the roll can be let out and aligned with the second end 104 of the clip 100 either directly in the extrusion tooling or downstream from the extrusion tooling for the clip 100.

[0037] Once the fabric material 120 is combined with the second end 104 (e.g. thermoplastic means for providing a channel) by having the edge 122 located between the extension members 111 and 112, the combination second end 104 is preferably fed to a rolling machine. The rolling machine preferably receives the combined clip 100 and fabric material 120 in an inverted orientation, i.e., having the first end 102 of the clip 100 at the lower position and the fabric material 120 at the upper position. According to a preferred embodiment, the rolling machine includes a trough positioned below the rollers for receiving the first end 102 of the clip 100. In the embodiment shown in FIGURE 5, as the second end 104 of the clip 100 and the fabric material 120 are fed through the rolls of the rolling machine, heat is applied to the rolls proximate the second end 104 for transferring heat to the extension members 111 and 112 with the edge 122 of the fabric material 120 sandwiched therebetween. After sufficient heat is applied to the "sandwiched" portion and the edge 122 and the extension members 111 and 112 have become a physically combined structure, the combination is transferred to a cooling area where the clip 100 and fabric material 120 may cool sufficiently for further processing or use. Alternatively, the trough below the rolling machine is provided with a coolant, such as water, to rapidly and evenly remove heat from the clip 100 of the embodiment shown in FIGURES 3 through 5.

[0038] Referring to FIGURE 6, a clip 200 is provided according to an alternative embodiment having a structure similar to the clip 100 of FIGURES 3 through 5 except that the clip 200 does not include any extension

members (such as the first and second extension members 111 and 112, respectively) for receiving the fabric material 120. Instead, the clip 200 has an end 204 having a recess 214 for receiving and connecting with the fabric material 120. According to a preferred embodiment as shown in FIGURE 6, the end 204 of the clip 200 has a shape similar to the overall shape of the bead 25 of FIGURE 2. This overall round shape of the end 204 provides a shorter end and a material-saving design as compared to the second end 104 of the clip 100 of FIGURES 3 through 5. Again, this material savings while slight can be quite significant when considering the millions of liner feet of combined clip and fabric material produced annually.

[0039] However, in manufacturing the embodiment shown in FIGURE 6, the clip 200 is preferably extruded using a process similar to that used to produce the embodiment shown in FIGURE 2 except that the tool is modified to produce the entire clip 200 during the extrusion process. Further, the trough below the extrusion tool is modified to receive the clip 200 during manufacture and process thereof. While the bond of the clip 200 and the fabric material 120 of FIGURE 6 may not be as strong as the bond between the clip 100 and the fabric material 120 of FIGURES 3 through 5, it is sufficient for most applications such as those associated with a vehicle seat according to a preferred embodiment. Further, the design of the clip 200 is also non-handed according to a preferred embodiment and thus can be installed in either direction with similar load carrying results.

[0040] Generally speaking the process of manufacturing clips 100 and 200, and the combined structures (clip 100 and fabric material 120 of FIGURES 3 through 5; or clip 200 and fabric material 120 of FIGURE 6) may include the processing of the clips 100 and 200 for a particular vehicle seat application by being cut or trimmed to size and shape. Alternatively, it should be understood that the combined structures may be utilized in applications other than a vehicle seat in which a material is to be connected or suspended to a structure without departing from the present invention.

[0041] It is important to note that the construction and arrangement of the elements of the fastening system as shown in the preferred and other exemplary embodiments is illustrative only. Although only a few embodiments of the present invention have been described in detail in this disclosure, those skilled in the art who review this disclosure will readily appreciate that many modifications are possible (e.g. variations in sizes, dimensions, structures, shapes and proportions of the various elements, values of parameters, mounting arrangements, use of materials, orientations, etc.) without materially departing from the novel teachings and advantages of the subject matter recited in the claims. Accordingly, all such modifications are intended to be included within the scope of the present invention as defined in the appended claims. The order or sequence of any process or method steps may be varied or re-sequenced according to alternative embodiments. Other substitutions, modifications, changes and omissions may be made in the design, operating conditions and arrangement of the preferred and other exemplary embodiments without departing from the spirit of the present invention as expressed in the appended claims.

WHAT IS CLAIMED IS:

1 1. A fastening system for connecting an edge of a fabric material with
2 a mounting structure comprising:
3 a retaining clip comprising:
4 a thermoplastic securing member;
5 a body portion;
6 a first portion of the body portion configured for
7 connecting the thermoplastic securing member to the mounting
8 structure;
9 a second portion of the body portion located distal from
10 the first portion and comprising a channel between a first extension
11 member and a second extension member;
12 wherein the channel has received therein the edge of the fabric
13 material and the first extension member and the second extension member
14 sandwich the edge of the fabric material therebetween.

1 2. The system of Claim 1 wherein the first extension member and the
2 second extension member and the edge of the fabric material comprise a
3 single coextensive unit.

1 3. The system of Claim 2 wherein the first extension member and the
2 second extension member are closed onto the edge of the fabric material.

1 4. The system of Claim 2 wherein the first extension member and the
2 second extension member are attached to the edge of the fabric material.

1 5. The system of Claim 4 wherein the first extension member and the
2 second extension member are bonded to the edge of the fabric material.

1 6. The system of Claim 1 wherein the securing member comprises a
2 clip configured for attachment to the mounting structure.

1 7. The system of Claim 6 wherein the first portion comprises a first
2 end configured for coupling to the mounting structure.

1 8. The system of Claim 7 wherein the second portion comprises a
2 second end configured for coupling to the fabric material.

1 9. The system of Claim 8 further comprising a layer of liquid
2 polypropylene in the channel.

1 10. A system comprising integral suspension fabric having an edge
2 and a fastening clip for use in securing a seat cover to a seat structure
3 comprising:

4 a main body portion made of a thermoplastic material
5 comprising:

6 a first end configured for connection to the seat structure;

7 a second end unitarily formed with an edge of a
8 thermoplastic fabric material;

9 a clip unitarily formed with the first end.

1 11. The system of Claim 10 wherein the clip is configured to couple
2 the integral suspension fabric to the seat structure.

1 12. The system of Claim 11 wherein the first end comprises a hook.

1 13. The system of Claim 12 wherein the second end comprises a
2 first leaf and a second leaf.

1 14. The system of Claim 12 wherein the second end comprises a
2 first extension member and a second extension member.

1 15. The system of Claim 14 further comprising a channel between
2 the first extension member and the second extension member.

1 16. The system of Claim 15 further comprising a layer of liquid
2 polypropylene in the channel.

1 17. The system of Claim 15 wherein the edge of the fabric is fixed in
2 the channel to form a single coextensive unit with the first extension member
3 and the second extension member.

1 18. A method of making an integrated and unitary retainer clip and
2 material comprising:

3 selecting a thermoplastic retainer clip having a first portion
4 comprising a clip securing portion and a second portion comprising a material
5 integrating portion;

6 selecting a thermoplastic material having a heat characteristic
7 similar to a heat characteristic of the thermoplastic retainer clip;

8 positioning the thermoplastic material with respect to the
9 material integrating portion of the thermoplastic retainer clip;

10 applying sufficient heat to the thermoplastic material and the
11 material integrating portion of the retainer clip to cause the thermoplastic
12 material and the retainer clip to become secured together as an integrated and
13 unitary piece.

1 19. The method of Claim 18 wherein applying sufficient heat further
2 comprises applying sufficient heat to cause the thermoplastic material and the
3 material integrating portion of the retainer clip to sufficiently melt into a single
4 coextensive unit.

1 20. A method of making an integrated retainer clip and material
2 comprising:

3 introducing an end of a fabric material between a first extension
4 member and a second extension member substantially coincident with
5 introducing a heated liquid material between the extension members having
6 material characteristics similar to the material comprising the extension
7 members and the fabric material;

8 pressing the extension members, the liquid material and the end
9 of the fabric material together between a pair of rollers and allowing the liquid

10 material to cool to form a bond between the first extension member and the
11 second extension member and the fabric material.

12 21. The method of Claim 20 wherein introducing the heated liquid
13 material comprises introducing a layer of liquid polypropylene between the
14 first extension member and the second extension member.

15 22. The method of Claim 21 wherein pressing the first extension
16 member and the second extension member comprises closing the first
17 extension member and the second extension member so that they are brought
18 into contact with the edge of the fabric material to secure the fabric material
19 to the first and second extension members.

1 23. A fastening system for connecting an edge of a thermoplastic
2 fabric material with a mounting structure comprising:
3 a retaining clip comprising:
4 thermoplastic means for attachment to the mounting
5 structure;
6 thermoplastic means for providing a channel;
7 wherein the edge of the fabric material is received in the means
8 for providing the channel.

1 24. The fastening system of Claim 23 wherein the means for
2 attachment comprises a hook.

1 25. The fastening system of Claim 24 wherein the means for
2 providing the channel comprises a first extension member and a second
3 extension member.

1 26. The fastening system of Claim 25 wherein the channel has
2 received therein the edge of the fabric material and the first extension
3 member and the second extension member sandwich the edge of the fabric
4 material therebetween.

1 27. The fastening system of Claim 26 wherein the retaining clip
2 comprises a body, the means for attachment comprises a first portion of the
3 body and the means for providing the channel comprises a second portion of
4 the body located distal from the first portion.

1/2

FIGURE 1
PRIOR ART

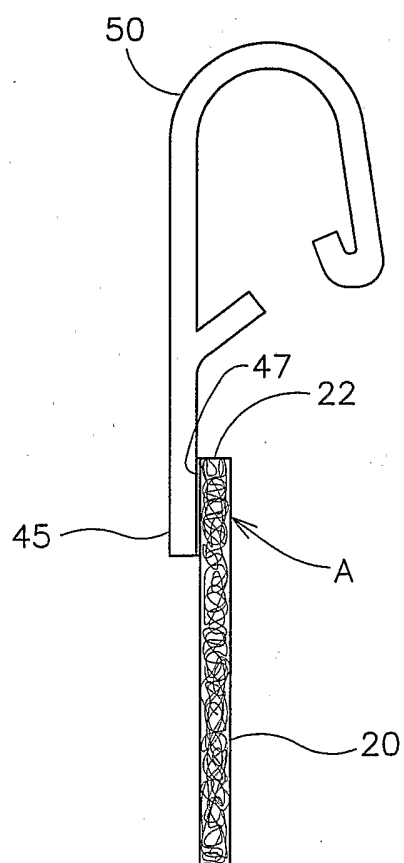
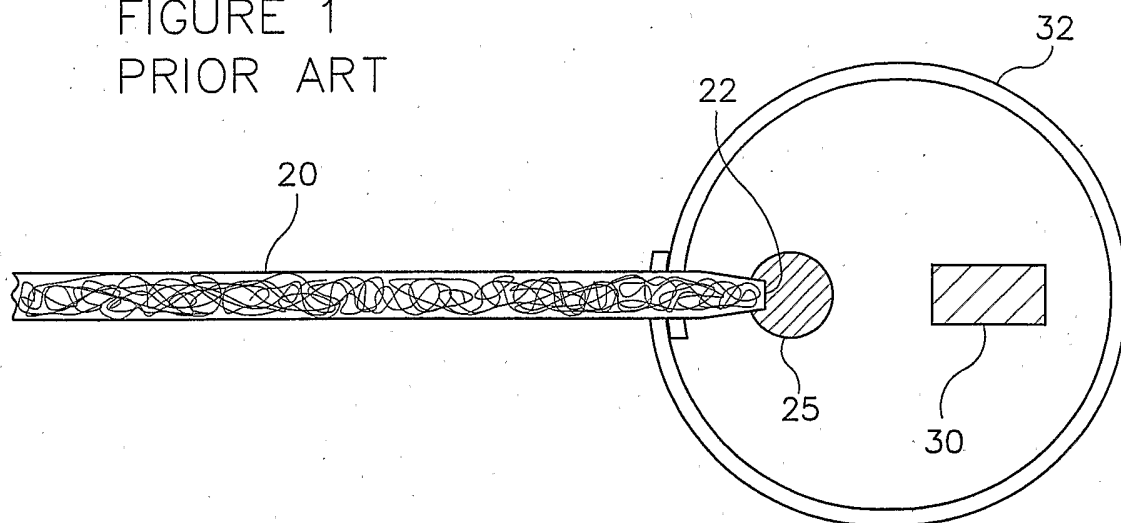


FIGURE 2B
PRIOR ART

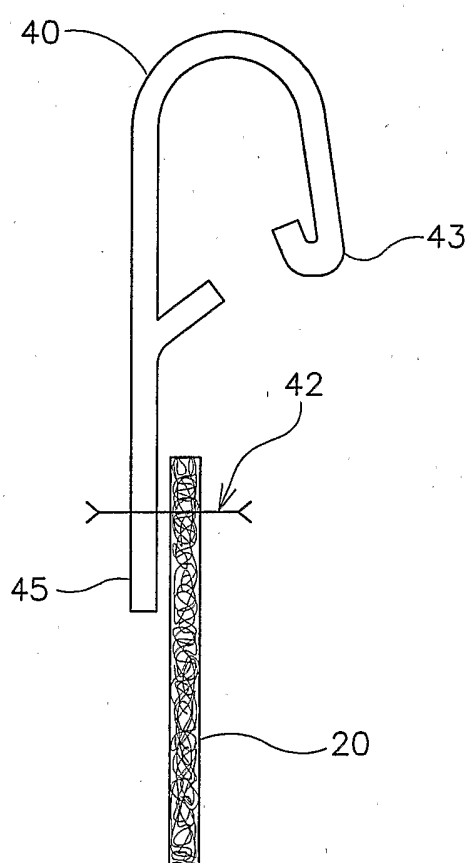


FIGURE 2A
PRIOR ART

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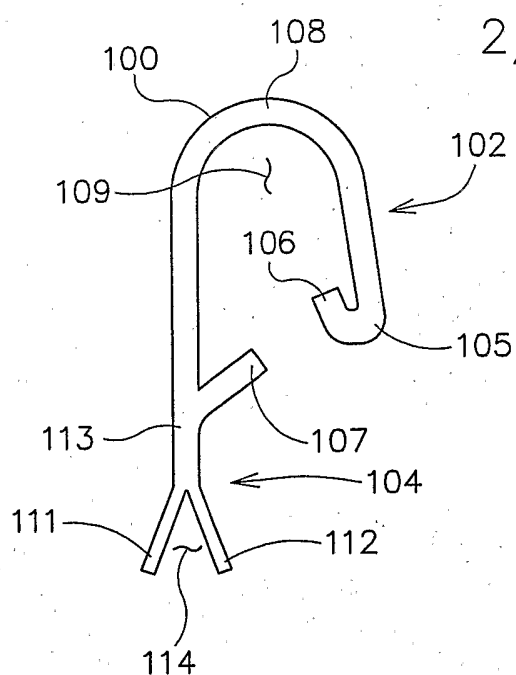


FIGURE 3

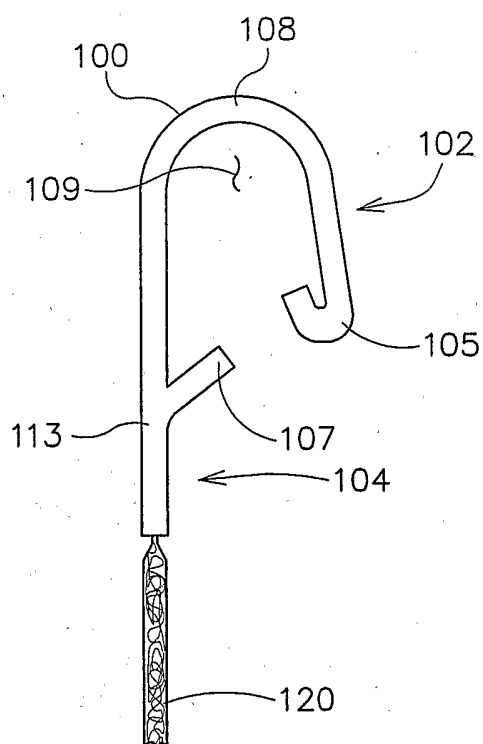


FIGURE 5

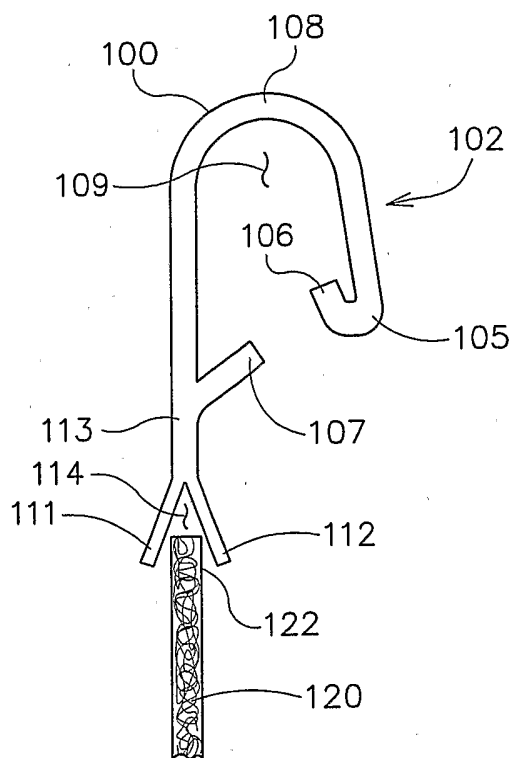


FIGURE 4

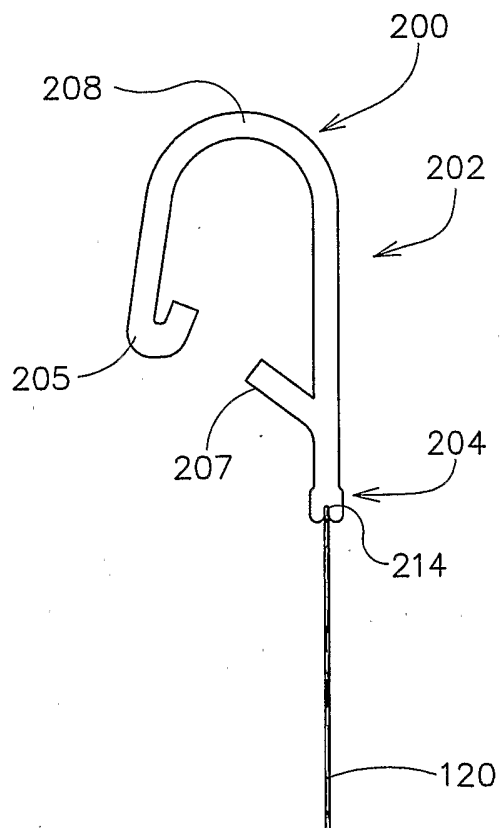


FIGURE 6

INTERNATIONAL SEARCH REPORT

 Internati plication No
 PCT/US 03/23192

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B60N2/58 A47C31/02 B60N2/70 B60N2/72

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)

IPC 7 B60N A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 925 745 A (LAFUMA SA) 30 June 1999 (1999-06-30)	1-8, 10-15, 17-19, 23-27
A	column 3, line 30 - column 3, line 36; figure 6	9,16, 20-22
X	FR 2 735 960 A (DELAHOUSSE ET FILS SA) 3 January 1997 (1997-01-03)	1-8, 10-15, 17-19, 23-27
A	page 8, last line - page 9, line 30; figures 7,8	9,16, 20-22
X	DE 42 19 891 A (BAYERISCHE MOTOREN WERKE AG) 23 December 1993 (1993-12-23)	10
A	column 2, line 29 - column 2, line 50; figure 2	1,18,20, 23
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

29 October 2003

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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