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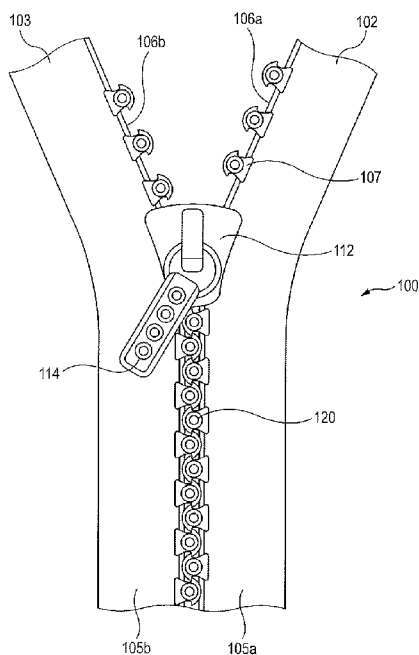
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(54) Title: METHOD OF PREPARING SLIDE FASTENER

FIG. 5



(57) Abstract: The present invention relates to a method of preparing a slide fastener comprising: a pair of first and second stringers (102, 103) each comprising a tape (105a, 105b) and a row of coupling elements (107) mounted on one longitudinal edge of the tape; and a slider (112) adapted to slideably move along the rows of the coupling elements; wherein the coupling elements comprise plastic material; and wherein the coupling elements further comprise decorative elements (120) and which comprises the steps of: shaping and securing the plastic coupling elements to the tape prior to attachment of the decorative elements; followed by heating the coupling elements and the decorative elements together to secure the decorative elements to the coupling elements.

**METHOD OF PREPARING SLIDE FASTENER**TECHNICAL FIELD

[0001]

5 The present invention relates to a method of preparing a slide fastener, more specifically to a method of preparing coupling elements for a slide fastener comprised of plastics material in which the coupling elements are adorned with decorative elements.

10

BACKGROUND

[0002]

With the ever present desire to produce new designs for the fashion and home furnishings industries the nature of slide or zip fastener on a particular garment or article can have a significant effect on the overall look of the finished article. This holds true for all aspect of the slide fastener ranging from the coupling elements to the slider and the pull tab for the slide fastener.

[0003]

However, whilst often requiring an attractive appearance, a slide fastener still possesses a functional role which ensures successful operation of the garment or home furnishing article.

[0004]

A problem associated with slide fasteners is the inherent nature of the coupling or fastening elements that form the closure mechanism for the slide fastener to receive foreign materials. The presence of the foreign materials, if left unchecked may damage the closure mechanism by preventing movement of a slider along the length of the slide fastener. In addition, removal of the foreign body may result in damage to the coupling elements such that the slide fastener no longer closes.

[0005]

30 This is particularly the case for plastic coupling agents which may be easily damaged by the presence of errant plastic fibres generated during the manufacturing process and which if left unchecked can lead to abrading of the edges of the coupling agents.

[0006]

For this reason, the further embellishment of coupling agents comprised of plastics material which are of a sufficient strength to withstand the operation of the slide fastener yet still have a suitably attractive appearance has been a significant challenge to slide fastener manufactures. For example, the molding of coupling agents comprised of plastic material with the provision of holes or indents for receiving ornamentation such as jewels or beads increases the likelihood of plastic fibres which can remain on the teeth until the decorated slide fastener has been used a number of times. The wear of the coupling agents subsequently leads to the fibres becoming detached from the coupling agents but at the same time increases the chance of the fibres becoming trapped in between the coupling agents and thereby causing damage.

[0007]

In addition, the decorative elements such as beads and crystals used to adorn clothing and hence slide fasteners are not only difficult to handle but are also costly to manufacture and utilise. Consequently, when a slide fastener is embellished with such crystals and decorative beads it is important that the decorative element is not only retained securely in place on the slide fastener but also that the decorative elements are protected from excessive wear and damage which could ultimately lead to the decorative elements losing their lustre but which are also displayed on the slide fastener to maximum effect.

[0008]

This list of demanding requirements has led to many difficulties associated with the manufacture of coupling elements comprised of plastic material which are suitably sized and sufficiently strong to hold decorative elements. In addition, the usual injection moulding and thermoplastic setting procedures associated with mass producing coupling elements comprised of plastic material allows very little control over the shape of the coupling elements. Consequently, if a decorative element is placed in the mould prior to injection moulding, at best the decorative element may be covered by the moulded coupling element and at worst, the injection moulding process may actually lead to damage of the decorative elements.

[0009]

There is therefore a need to provide a method for the preparation of coupling elements comprised of plastics material which are decorated with elements such as for example beads or crystals which can subsequently be used to prepare plastic slide fasteners. There is also a need to provide a method for the preparation of coupling element decorated or adorned with decorative elements which can withstand the rigours of everyday use on the particular garment or soft furnishing to which the slide fastener is attached and in which the decorative elements are protected from damage. That is, there is a need for a method which produces coupling elements comprised of plastic material which do not possess roughened edges on the coupling elements, and which are attractive in appearance and furthermore still possess an efficient closure mechanism compared with existing slide fasteners.

[0010]

Conventional slide fasteners usually traditionally comprise a pair of fastener tapes upon which are mounted rows of individual coupling elements which cooperate or interdigitate when the fastener tapes pass through a slider mounted on one of the fastener tapes and in so doing either close or open the slide fastener accordingly.

[0011]

However, the interdigitation of the coupling elements has a limiting effect on the visible appearance of the slide fastener. That is, due to the required interconnection of the coupling elements needed to ensure a sufficient closing of the slide fastener, the design of the external appearance of the slide fastener has been strictly limited not least of all because the coupling elements are required to pass through the slider.

[0012]

Furthermore, the need to ensure an efficient closure of the coupling elements has lead to restrictions in the positioning of any decorative elements on for example the coupling elements.

[0013]

There have been various attempts to embellish the outer appearance of for example the coupling elements, slider or pull tab of the slide fastener.

[0014]

For example, in US 3,028, 647 there is described a lock for a zipper or slide fastener in which both the lock and teeth of the zipper comprise 'brilliants' or jewels as ornamentation. However, there are no details in US 3028647 as to how the brilliants are secured or retained in place on the coupling agents and the interdigitation of the coupling agents is achieved by small protrusion on each coupling agents which are received by an opening on an adjacent coupling agent and which are prone to damage and prevent close packing of the coupling agents.

[0015]

10 In US 5,511,292 (Covi et al) there is disclosed a zipper closure comprising a first and second row of teeth formed on a first and second band, each band comprising an edge bead or web. The teeth have free ends, and each have a channel such that when said zipper closure is being closed the free ends of said first row of teeth extend into an area of attachment of the teeth of the second row of teeth and vice versa, whereby the channels receive the edge beads or webs. The zipper closure further comprises a slider with a top cover plate and a bottom cover plate connected by a cross-piece, said slider having a wider front end and a narrower back end, said cross-piece having a front end directed towards said wider front end of said slider and a back end directed towards said narrower back end of said slider.

[0016]

In addition, decorative stones are arranged on the teeth and also on the zipper pull. However, there are no details provided as to how the teeth are secured and maintained in place. The decorative stones are substantially centrally located with respect to the coupling elements and protrude out of the plane of the coupling elements. Consequently the stones are prone to damage.

[0017]

30 In US 5,588,185, also by Covi et al, there is described a zipper closure which again includes teeth or coupling elements having decorative stones. Details are provided as to how the teeth engage each other and the size of the support surfaces and extensions on the teeth relative to the diameter of the decorative stones. Likewise details are provided with respect to how the decorative stones can be arranged in a straight line and with a narrow spacing

in comparison to their size even when the support surfaces on the teeth are relatively small, due to the extension of the stones at a sharp angle to the direction of the teeth which ensures that the submerged part of each stone is surrounded by a satisfactory amount of plastic material. However, US  
5 5,588,185 is silent as to how the stones are satisfactorily secured in place and again, even though the stones protrude out of the plane of the teeth there is no mention of how damage to the stones can be prevented.

[0018]

In US 5,713,110 also by Covi et al there is again described a zipper closure  
10 comprised of first and second rows of plastic teeth formed on first and second bands, each band having an edge bead. The teeth have free ends and opposed back ends fixed to the bands. Close to the back ends of the teeth are decorative stones wherein each decorative stone has a tapered portion with a tip, and the tip is directed to the respective band. The stones are  
15 formed in the teeth during injection molding but are mounted close to the rear edge of the teeth so that the front edges of the teeth can engage to a sufficient amount to effect closure of the zipper. The stones protrude out of the plane of the teeth and there is no mention as to how damage to the stones can be prevented.

20 [0019]

In US 6,092,267, again by Covi et al there is described a zipper closure including first and second rows of teeth formed on first and second bands. Each tooth has a free end in which a channel is formed. Each channel has a bottom which is convexly curved. The zipper closure includes a slider with a  
25 projection for opening and closing the zipper closure and decorative stones are arranged in a straight line along the zipper by the spacing between the stones being small in comparison to the size of the stones and the support surfaces for the stones on the teeth being kept correspondingly small. The arrangement of the invention allows each stone to be adequately surrounded  
30 by plastic material while nonetheless the spacing between successive stones being small. The stones are embedded in substantially the centre of the teeth to allow suitable connection between protrusions residing on the sides of the plastic teeth. There is no mention as to how the stones may be protected from damage.

[0020]

In the prior art patents described above, each stone significantly protrudes from the outer surface of the tooth to which it is attached. Consequently, sliders present on the zippers have to negotiate the raised jewels which can also lead to interference of the slider and damage thereto as well as damage to the jewels which can result in reduced lustre.

[0021]

In WO 00/27237 there is disclosed a jewelry article in which jewelry stones are injected into a support body made of plastic. The jewelry stones are arranged on both sides of a flat support body. In this invention the support body is produced in two successive injection molding processes and, during a second method step, all of the stones rest on an injection molded part produced in a first method step. The stones protrude out of the plane of the injected molded surface which means that the stones are prone to damage and may also cause damage through interaction with other soft materials.

[0022]

Likewise in JP 30-15033, JP 1031757, CN 3066227D, JP 265926, and CN 2285075Y there are disclosed teeth for zippers, all of which comprise jewels which protrude from an outer or upper face of the teeth and for which no further protection is afforded.

[0023]

In CN 2293229Y there is disclosed a zipper tooth or coupling agent with a recess for receiving a projecting stone and in which the platform for the stone is also curved thereby providing an impediment for the smooth movement of a slider along a zipper.

## SUMMARY

[0024]

The present invention therefore seeks to overcome the problems associated with the methods of producing plastic coupling elements for slide fasteners wherein the coupling elements are provided with attractive ornamentation whilst still retaining the required flexibility and strength required for modern slide fasteners and whilst still providing a sleek and attractive appearance of the slide fastener. In addition, the ornamentation does not provide any

impediment for the smooth movement of a slider along the zipper and the ornamentation are also protected from damage.

[0025]

Surprisingly, the inventors of the present invention have now found a method  
5 that allows the manufacture of plastic coupling elements embellished with  
jewels and/or beads in a sufficiently strong and effective manner whilst not  
impairing the closure mechanism of the slide fastener and which also affords  
protection for the decorative elements or ornamentation. In addition, the  
insertion of the ornamentation or jewels into the teeth in accordance with the  
10 present invention allows the jewels to be optionally positioned in the coupling  
elements.

[0026]

The present invention finds particular application as an improved slide  
fastener for the clothing and soft furnishings industry, but it not limited thereto.

15 [0027]

The present invention therefore seeks to address the problems outlined above  
and provides an improved slide fastener that is able to meet the stringent  
requirements of modern slide fasteners and the aesthetic requirements of  
modern designs.

20 [0028]

Therefore according to a first aspect of the present invention there is provided  
A method of preparing a slide fastener comprising:

25 a pair of first and second stringers each comprising a tape and a row of  
coupling elements mounted on one longitudinal edge of the tape; and  
a slider adapted to slideably move along the rows of the coupling  
elements; wherein

the coupling elements comprise plastic material; and wherein  
the coupling elements further comprise decorative elements, the  
method comprising the steps of:

30 shaping and securing the plastic coupling elements to the tape  
prior to attachment of the decorative elements; followed by  
heating the coupling elements and the decorative elements  
together to secure the decorative elements to the coupling  
elements.

[0029]

In accordance with the method of the present invention, the decorative elements secured to the coupling elements do not substantially protrude out of a plane of the coupling elements.

5 [0030]

It is also preferred that the coupling elements are prepared by injection moulding of plastic material. Furthermore, it is preferred that the decorative elements are held in a position prior to heat treatment with the coupling elements. Preferably the decorative elements are fitted in an indentation on  
10 the coupling elements prior to heat treatment with the coupling elements. In addition, it is preferred that the decorative elements are further secured to the coupling elements by adhesive.

[0031]

Furthermore, also in accordance with the present invention the decorative  
15 elements are further secured to the coupling elements by mechanical means and wherein the mechanical means comprises a protrusion or fastening means on the pre-formed coupling element when the coupling elements and the decorative elements are heated to the maleable transition temperature of the coupling elements. Consequently, the mechanical means may be  
20 removed or lost when the coupling elements and decorative elements are heated to the maleable transition temperature of the coupling elements.

[0032]

It is also preferred that the decorative elements are allowed to equilibrate with the coupling elements prior to heat treatment. In addition, the coupling  
25 elements and the decorative elements are heated to a sufficient temperature to allow the plastic coupling element to become maleable without losing the entire shape of the coupling elements.

[0033]

Also according to the method of the present invention, once the plastic  
30 material for the coupling elements has reached a desired maleable transition state the decorative elements are immersed into the softened coupling elements so that each decorative element is substantially flush with an outer face of each coupling element. Consequently, further pressure is applied to

the decorative elements to ensure immersion of the decorative elements within the coupling elements.

[0034]

5 Furthermore following heating of the coupling elements and the decorative elements to the maleable transition temperature of the coupling elements to allow immersion of the decorative elements into the coupling elements the coupling elements and the decorative elements are then cooled to further set the decorative elements into position on the coupling elements.

[0035]

10 The decorative elements are preferably moulded to the coupling elements using sonic or radio waves. Microwaves may also be used. Most preferably, the sonic or radio waves are applied using an ultrasonic horn.

[0036]

15 Furthermore, the decorative elements may be pre-heated prior to insertion into the coupling elements. The decorative elements are pre-heated whilst in the indentation in the coupling elements prior to the heat treatment of the coupling elements and decorative elements.

[0037]

20 Furthermore, the decorative elements may be pre-shaped prior to insertion into the coupling elements.

[0038]

According to a second aspect of the present invention there is provided the use of a slide fastener prepared by the method of the present invention for clothing and/or furnishings.

25 [0039]

Further aspects and preferred features of the invention will be apparent from the following description and the accompanying claims.

#### BRIEF DESCRIPTION OF DRAWINGS

30 [0040]

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

Figure 1 is a top plan view of a prior art plastic coupling element fitted with a jewel decoration.

Figure 2 is a top plan view of a plastic coupling element for a slide fastener to which has been applied a decorative crystal according to the present invention.

5 Figure 3a is a side view of a plastic coupling element prior to treatment with the method of the present invention.

Figure 3b is a perspective view of a plastic coupling element prior to treatment with the method of the present invention.

10 Figure 4a is a side view of a plastic coupling element after treatment with the method of the present invention to which a decorative element has been applied.

Figure 4b is a perspective view of a plastic coupling element after treatment with the method of the present invention to which a decorative element has been applied.

15 Figure 5 illustrates a slide fastener prepared with coupling elements comprised of plastic material and prepared according to the method of the present invention.

### EMBODIMENTS

[0041]

20 Referring to Figure 1 which is a top plan view of a prior art plastic coupling element (10) fitted with a jewel decoration (12). In Figure 1, the support body (14) of the coupling element is comprised of plastic material and completely surrounds the jewel (12). Preparation of the coupling element (10) is effected by injection moulding. In the injection moulding process the jewel (12) is for  
25 example held in position with respect to a blank of thermoplastic material. The blank and jewel are then both subjected to an injection moulding process after which the blank is formed in coupling element and in so doing completely surrounds the jewel contained within the coupling element.

[0042]

30 This process suffers from a number of drawbacks. For example, in the injection moulding process in which the coupling elements are mass produced, irregularities will occur in the process so that some of the coupling elements may be covered to a lesser or greater extent by the plastic material. Consequently, as there is a limited and a varying amount of control over the

shape of the coupling elements, some of the coupling elements may not sufficiently secure the decorative elements to the required extent. Therefore, the known prior art processes may only be employed to a limited extent when for example expensive decorative elements are to be applied to the plastic  
5 coupling elements.

[0043]

In Figure 5 there is illustrated a slide fastener prepared with coupling elements comprised of plastic material and prepared according to the method of the present invention. The slide fastener (100) comprises a pair of first stringer  
10 (102) and second stringer (103). Each stringer (102, 103) is comprised of a tape (105a, and 105b respectively) and a row of coupling elements (50) which are attached to one longitudinal edge of the tape. The edge of each tape is provided with a cord (106a and 106b) which protrudes from the upper and lower faces of the tape and upon which the coupling elements (107) are  
15 mounted. The slider (112) preferably comprises a pull tab (114) to allow a user to slidably move the slider along the row of the coupling elements and in so doing separate the coupling elements of the first stringer and the coupling elements of the second stringer to open the slide fastener or engages the coupling elements of the first stringer and the coupling elements of the second  
20 stringer to close the slide fastener.

[0044]

In the embodiment of the slide fastener illustrated in Figure 5, the coupling elements are comprised of plastic material and have been prepared by the method according to the present invention. The coupling element (50) has a  
25 body upon which a decorative element is mounted. The body has a head portion (51) and a base portion (52). The head portion (51) is arranged away from the tape edge in the width direction of the tape. The head portion has a shape expanded in the longitudinal direction of the tape. The head portions of the coupling elements are engaged with one another when the opposing  
30 coupling elements are interdigitated. The base portion (52) is arranged so as to cover the cord (106a, 106b) in the front-back direction. The coupling elements are mounted along the cord (106a and 106b) at predetermined intervals. The top surface of the coupling element is planar.

[0045]

At one end of the stringers (102, 103) the slide fastener may comprise a retaining box and an insert pin (not shown) mounted on the respective tapes (105a, 105b) to enable the stringers (102, 103) to be coupled together as is well known in the art of slide fasteners. The first and second stringers (102, 5 103) of the slide fastener (100) are preferably separable as is also known in the art.

[0046]

A key feature of the slide fastener prepared with plastic coupling elements by the method of the present invention as illustrated in Figure 5 is that the 10 coupling elements (107) are fitted or adorned with decorative elements (120) which may include for example but not limited to: crystals, beads, jewels or mixtures thereof. The decorative elements may be comprised of for example glass or coloured plastic material. It is preferred however that the decorative elements are comprised of crystal.

15 [0047]

In the embodiment shown in Figure 5, the decorative elements (120) are located on top surfaces of the coupling elements. In addition, the decorative elements (120) are located towards the head portions of the coupling elements. Consequently, when the slider (112) moves along the slide 20 fastener and the coupling elements are interdigitated, the decorative elements are arranged on a substantially straight line in the longitudinal direction of the tape in line with the slider.

[0048]

As can also be seen in Figure 5, the pull tab may also comprise the same 25 decorative elements in the form of for example glass or plastic materials, jewels, beads or crystals.

[0049]

The decorative elements (120) in the form of beads, crystals or jewels may be 30 secured by additional means to the plastic coupling elements to prevent loss of the decorative elements.

[0050]

A key feature of the coupling elements prepared by the method of the present invention is the fact that the decorative elements are protected by a raised wall and a protective well formed in the coupling elements. The decorative

elements may protrude by a small amount from the top surfaces of the coupling elements or alternatively, depending on the size of the decorative elements the decorative elements may extend by a limited amount, but not enough to cause interference with the movement of the slider along the slide fastener. Consequently, the decorative elements do not pose any resistance to the movement of the slider along the slide fastener.

[0051]

As can also be seen in Figure 5, the coupling elements are arranged such that the coupling elements on opposing tapes are offset with respect to one another in the longitudinal direction of the tape. The shape of the coupling elements ensures a substantially close packed arrangement when slide fastener is closed. Consequently, the gap between individual coupling elements on the same tape and also coupling elements on the opposing tape is particularly small when the slide fastener is closed in order to provide an attractive appearance and substantially straight line arrangement of the decorative elements when the slide fastener is closed.

[0052]

The close packed arrangement of the coupling elements in the closed position and the rounded edges of the coupling elements in combination with the smooth edges of the decorative elements ensures that the material to which the slide fastener is secured is not readily trapped between the coupling elements and the decorative elements. In addition, if by chance material is trapped in the slide fastener, the coupling elements and decorative elements do not damage the material as there are no roughened surfaces on either the coupling elements or the decorative elements.

[0053]

In Figure 2 there is illustrated a top plan view of a plastic coupling element for a slide fastener to which has been applied a decorative crystal according to the present invention. In Figure 2, the coupling element (50) is comprised of a plastic material, more preferably a thermoplastic material and has is initially prepared by an injection moulding process. In the embodiment illustrated in Figure 2 the body of the coupling element (55) is formed into the shape of a mushroom. However, it will be appreciated by one skilled in the manufacture

of slide fasteners that coupling elements of different shapes may be prepared and used in the method of the present invention.

[0054]

As can be seen by Figure 2, the plastic coupling element further comprises a decorative element (60) in the form of a jewel, crystal or bead. The decorative element (60) resides within and is covered by the body of the coupling element. In addition, the decorative element is further surrounded by a well (65) which encircles the decorative element (60) and a raised bund or wall (70) which substantially encircles the well.

10 [0055]

In accordance with the present invention the plastic coupling elements for use in a slide fastener and as described with respect to Figures 2, 4a and 4b is prepared as follows.

[0056]

15 First of all coupling elements or a pre-form set of coupling elements are prepared from a blank of plastic material and are injection moulded onto a tape for a slide fastener. With this step, the coupling elements are fixed to the tape. This not only allows the desired shape of the coupling element to be achieved but also ensures uniformity with respect to the finished coupling element.

20 [0057]

A decorative element is then applied to the coupling element and preferably fitted into a shape or indentation for receiving one or more of the decorative elements and preferably allowed to settle. The decorative element is secured to the coupling element in a number of ways. For example, if starting from a pre-shaped coupling element, the decorative element may be applied to a desired surface of the coupling element and then the coupling element and decorative element are heated to a sufficient temperature to allow the plastic coupling element to become malleable without losing the shape of the coupling element. Once the plastic of the coupling element has reached the desired malleable transition state the decorative element is immersed into the softened coupling element so that the decorative element is substantially flush with the top surface of the coupling element. With this step, the decorative element are securely fixed to the coupling element.

[0058]

If starting from a pre-shaped coupling element which is then subsequently softened the decorative element may be applied to the top surface of the coupling element into which the coupling element is subsequently immersed, or the coupling element may be applied to an indented surface of the pre-formed coupling element into which the decorative element is subsequently immersed.

[0059]

It is preferred that the weight of the decorative elements ensures sufficient immersion of the decorative element into the coupling element. However, if required it is possible to apply additional pressure to the decorative element to ensure sufficient immersion of the decorative element into the coupling element.

[0060]

In addition, if required the decorative element may be further secured to the pre-formed coupling element or shaped coupling element prior to heating of the coupling element and decorative element. This may be achieved for example by a suitable adhesive. Alternatively, a protrusion or fastening means on the pre-formed coupling element may be employed which may be removed or lost when the coupling element and decorative element are heated to the maleable transition temperature of the coupling element.

[0061]

Once the decorative element has been applied to the coupling element and the coupling element and decorative element have been heated to the maleable transition temperature of the coupling element to allow immersion of the decorative element into the coupling element the coupling element and decorative element are then cooled to further set the decorative element into position on the coupling element.

[0062]

As the decorative element is immersed within the body of the coupling element, a well ((65) in Figure 2) forms around the decorative element and a further wall or bund ((70 in Figure 2) forms around the well. In addition, a lip may also be formed around the decorative element which further assists in holding the decorative element in place.

[0063]

In accordance with the method of the present invention a means for ensuring the pre-formed coupling element reaches a maleable state is applied to the coupling elements and decorative elements. Whilst various forms of heat may  
5 be applied to the coupling elements to ensure that the thermoplastic coupling elements may be deformed, a preferred method in accordance with the present application is the use of an ultrasonic horn. The use of sonic waves ensures that the thermoplastic material at the interface between the coupling  
10 element and decorative element melts sufficiently. Whilst not wishing to be bound by any particular theory, it is assumed that the sonic waves pass through the body of the coupling element and as the thermoplastic material of the coupling element melts, the weight of the decorative element ensures that the decorative element is drawn further into the body of the coupling element. As a consequence the displaced thermoplastic material flows in an upwards  
15 direction and over the edges of the crystal thereby further securing the decorative element in place. Finally, as the thermoplastic material of the coupling element solidifies, the grip of the coupling element on the decorative element intensifies.

[0064]

20 In addition, the use of sonic waves to melt the thermoplastic material of the coupling element creates a well and wall or bund around the decorative element. Again, whilst not wishing to be bound by any particular theory, it is thought that the provision of a well and bund or wall around the decorative elements enables improves light scattering through the decorative elements  
25 and hence improved brilliance when using decorative elements, especially crystal decorative elements. In addition, to sonic or radio waves, microwaves may also be employed as appropriate to effect the required melting of the thermoplastic material.

[0065]

30 It will also be appreciated by one skilled in the art that the required frequency of the sonic horn, and the time of application of the sonic waves in combination with the melting point of the thermoplastic material will vary according to the nature of the decorative element to be applied to the coupling

elements and composition of the polymeric material used to form the coupling elements.

[0066]

5 If required it may also be desirable to heat the decorative elements separately, either prior to insertion into the coupling elements or indeed whilst the decorative elements are in situ in the coupling elements and prior to application of the sonic heating. This additional heating of the decorative elements may be used to further enhance the bond between the decorative elements and the coupling elements.

10 [0067]

Whilst it is not essential that the coupling elements are shaped to form a recess for receiving the decorative elements prior to application of the heat source in the form of sonic waves, in a preferred embodiment of the method of the present invention the coupling elements are pre-heat treated and shaped  
15 to form a recess for receiving a decorative element and also to form a resilient lip on the rim of the recess used to hold the decorative element in place prior to heating the coupling element and decorative elements.

[0068]

20 In a further preferred method of the present invention, the decorative elements may also be pre-shaped prior to insertion into the coupling elements.

[0069]

Whilst the method of the present invention is primarily designed for the preparation of plastic coupling elements on slide fasteners, it will be appreciated by one skilled in the art that this methodology may also be  
25 applied to the adornment of slide pullers, end stops or plastic buckles and the like wherein the article to be embellished is comprised of plastics material and pre-formed into the desired shape prior to insertion of the decorative element and further sonic heating to provide the desired embellished slide fastener accessory.

30 [0070]

Therefore according to the method of the present invention, the smooth nature of the top of the decorative elements in combination with the smooth arrangement of the coupling elements ensures that the slider is not worn or abraded when it passes along the coupling elements of the slide fastener.

Likewise, the smooth and rounded nature of the coupling elements ensures that the material to which the slide fastener is attached is less prone to damage if brought in contact with the slide fastener and there is also less chance of threads from the material to which the slide fastener is attached  
5 becoming caught around the coupling elements and decorative elements.

[0071]

The smooth and substantially flat appearance of the slide fasteners illustrated in Figure 5 is both aesthetically pleasing to the eye and also to touch. The method of the present invention may also be applied to coupling elements in  
10 which for example a dual row of decorative elements is required for use in clothing and also home furnishing.

[0072]

In Figure 3a there is illustrated a side view of a pre-cast plastic coupling element (80) prior to treatment with the method of the present invention  
15 without decorative element inserted. In Figure 3b there is illustrated a perspective view of the pre-cast plastic coupling element (80) prior to treatment with the method of the present invention without decorative element inserted.

[0073]

In Figure 4a there is illustrated a side view of the plastic coupling element (80) post treatment with the method of the present invention with decorative  
20 element inserted. In Figure 4b there is illustrated a perspective view of the plastic coupling element (80) post treatment with the method of the present invention with decorative element inserted.

25 [0074]

In Figure 3b the perspective view of the coupling element (80) illustrates that the pre-formed orifice (81) for receiving the decorative element is planar. The orifice is an entrance of the indentation. Figure 3b illustrates that the depth of the indentation may have an extremely shallow shape so as to approach the  
30 top surface of the coupling element. Thus, as seen in Figure 3a the top surface (82) of the coupling element (80) is planar.

[0075]

In contrast, in Figure 4b the perspective view of the coupling element (80) illustrates that the orifice for receiving the decorative element is now surround

by a well (65) and a wall of bund (70) which substantially encircles the decorative element.

[0076]

In Figure 4a, it can also be seen that whilst the decorative element (88) is present, the decorative element (88) does not substantially protrude above the top surface (82) of the coupling element.

[0077]

In Figures 4a the coupling element (80) is visible in the side view and the decorative element (88) is visible also in the side view. The decorative element (88) is also positioned towards the front face (91) of the coupling element so as not to be positioned above the code (106a, 106b). The front face of the coupling element is the face which faces towards the stringer to which the opposing coupling elements are attached when the coupling elements are interdigitated.

[0078]

In Figure 4b, the coupling element (80) is illustrated in perspective view and the decorative element (88) is seen in position in the coupling element. Also visible are the well (65) and the bund or wall (70) which substantially surround and protect the decorative element.

[0079]

Also visible in Figures 3a, 3b, 4a and 4b is an orifice (92) which envelops the cord of a tape of the slide fastener when the plastic coupling element is moulded onto the slide fastener. As described above, since the decorative element is positioned so as not to be positioned above the code, the decorative element is not positioned directly above the orifice (92) and is positioned at a side of the front face (91) of the coupling element relative to the orifice.

## CLAIMS:

1. A method of preparing a slide fastener comprising:  
a pair of first and second stringers each comprising a tape and a row of  
5 coupling elements mounted on one longitudinal edge of the tape; and  
a slider adapted to slideably move along the rows of the coupling  
elements; wherein  
the coupling elements comprise plastic material; and wherein  
the coupling elements further comprise decorative elements, the  
10 method comprising the steps of:  
shaping and securing the plastic coupling elements to the tape  
prior to attachment of the decorative elements; followed by  
heating the coupling elements and the decorative elements  
together to secure the decorative elements to the coupling  
15 elements.
2. The method according to claim 1 wherein the decorative elements  
secured to the coupling elements do not substantially protrude out of a plane  
of the coupling elements.  
20
3. The method according to any of the preceding claims wherein the  
coupling elements are prepared by injection moulding of plastic material.
4. The method according to any of the preceding claims wherein the  
25 decorative elements are held in a position prior to heat treatment with the  
coupling elements.
5. The method according to claim 4 wherein the decorative elements are  
fitted in an indentation on the coupling elements prior to heat treatment with  
30 the coupling elements.
6. The method according to claim 4 or 5 wherein, the decorative elements  
are further secured to the coupling elements by adhesive.

7. The method according to any of claims 4 to 6 wherein the decorative elements are allowed to equilibrate with the coupling elements prior to heat treatment.
- 5 8. The method according to any of the preceding claims wherein the coupling elements and the decorative elements are heated to a sufficient temperature to allow the plastic coupling elements to become maleable without loosing the entire shape of the coupling elements.
- 10 9. The method according to claim 8 wherein after the plastic material for the coupling elements has reached a desired maleable transition state the decorative elements are immersed into the softened coupling elements so that each decorative element is substantially flush with an outer face of each coupling element.
- 15 10. The method according to claim 9 wherein further pressure is applied to the decorative elements to ensure immersion of the decorative elements within the coupling elements.
- 20 11. The method according to any of the preceding claims wherein following heating the coupling elements and the decorative elements to the maleable transition temperature of the coupling elements to allow immersion of the decorative elements into the coupling elements the coupling elements and the decorative elements are then cooled to further set the decorative elements
- 25 into position on the coupling elements.
12. The method according to any of the preceding claims wherein the decorative elements are moulded to the coupling elements using sonic or radio waves.
- 30 13. The method according to claim 12 wherein the sonic or radio waves are applied using an ultrasonic horn.

14. The method according to any of the preceding claims wherein the decorative elements are pre-heated prior to insertion into the coupling elements.
- 5 15. The method according to any of claims 5 to 14 wherein the decorative elements are pre-heated whilst in the indentation in the coupling elements prior to the heat treatment of the coupling elements and the decorative elements.
- 10 16. The method according to any of the preceding claims wherein the decorative elements are pre-shaped prior to insertion into the coupling elements.
- 15 17. Use of a slide fastener prepared by the method according to any of claims 1 to 16 for clothing and/or furnishings.
18. A slide fastener prepared by the method according to any of claims 1 to 16.

FIG. 1

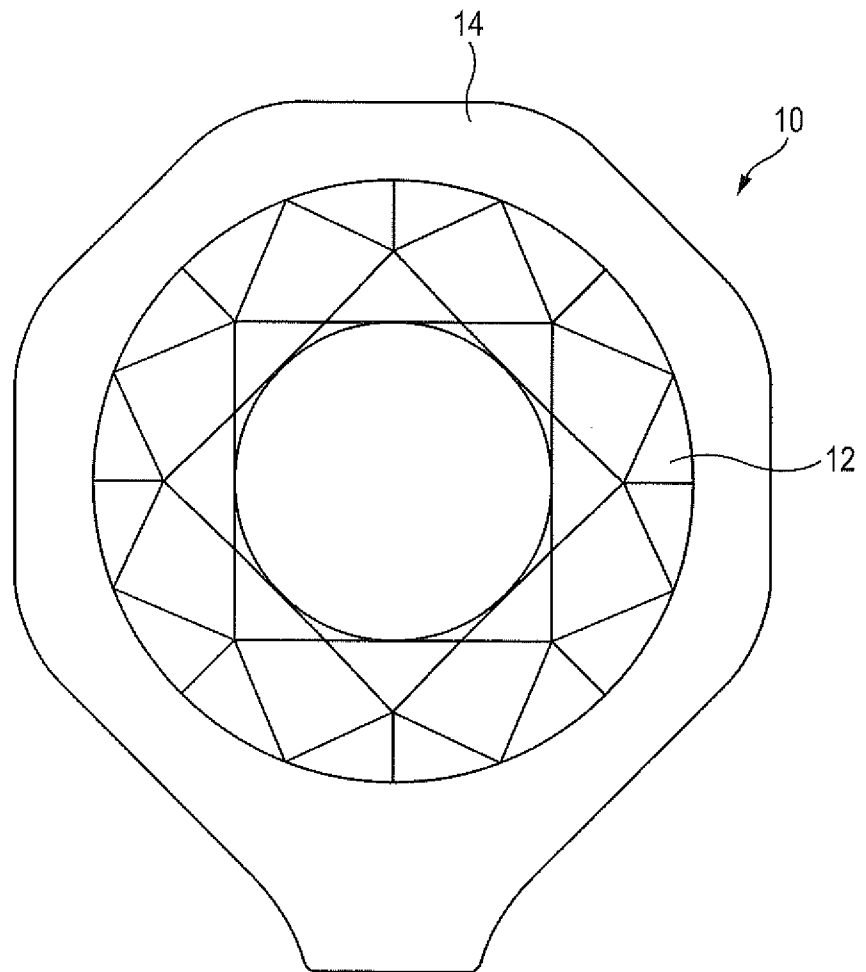


FIG. 2

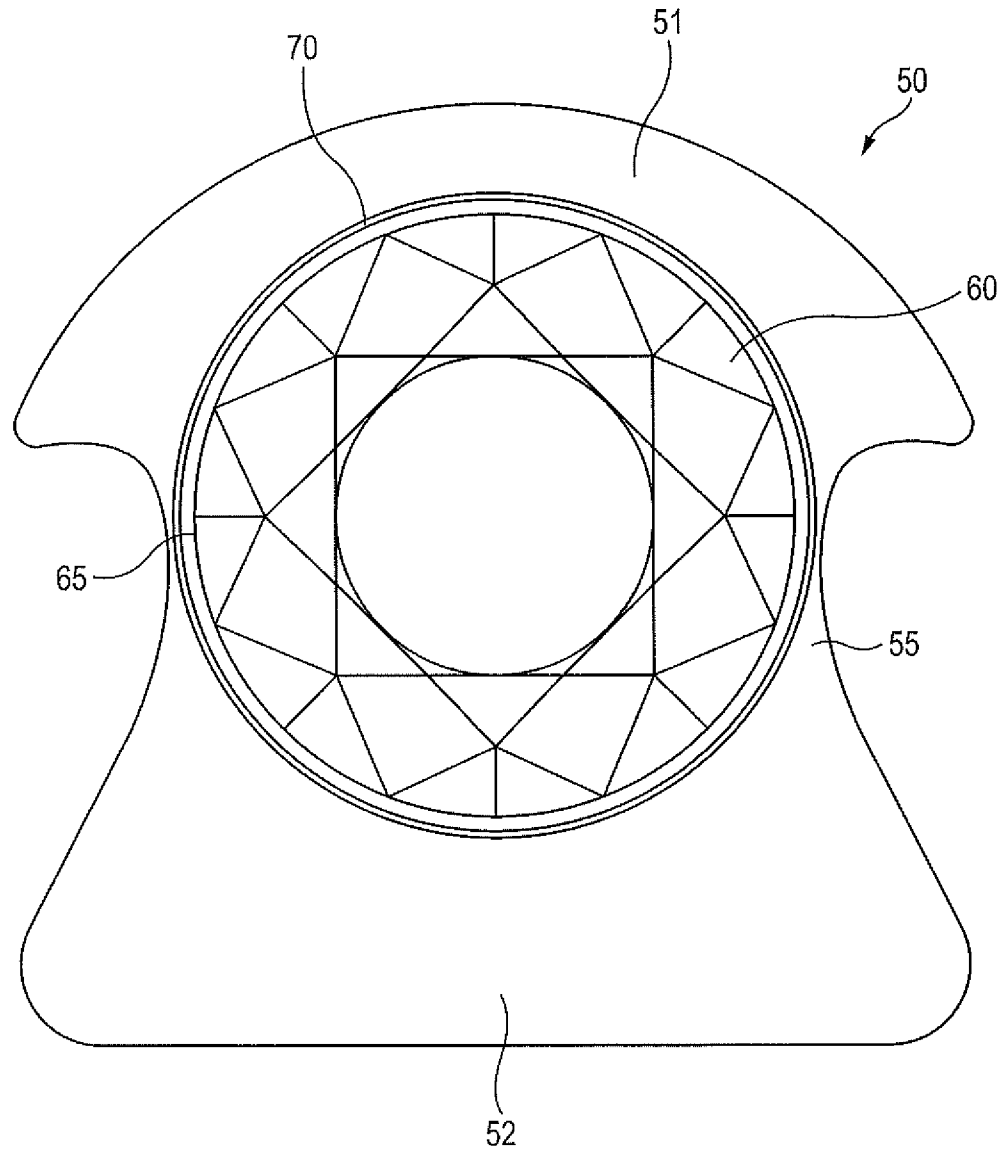


FIG. 3b

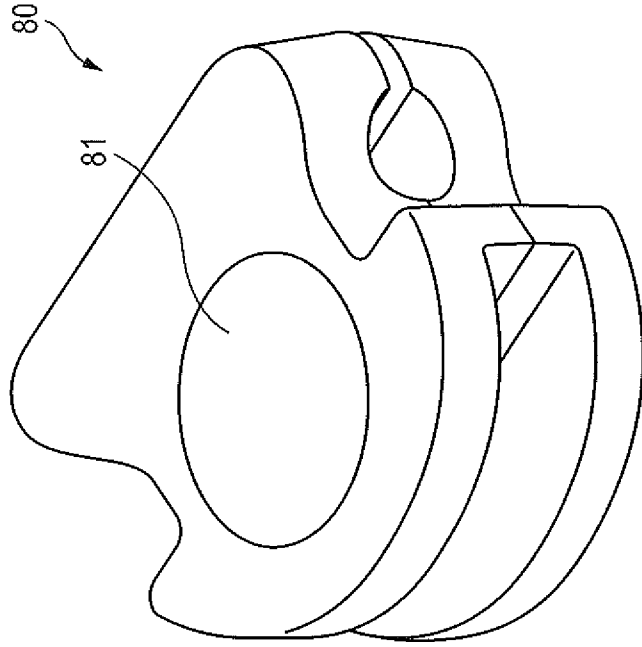


FIG. 3a

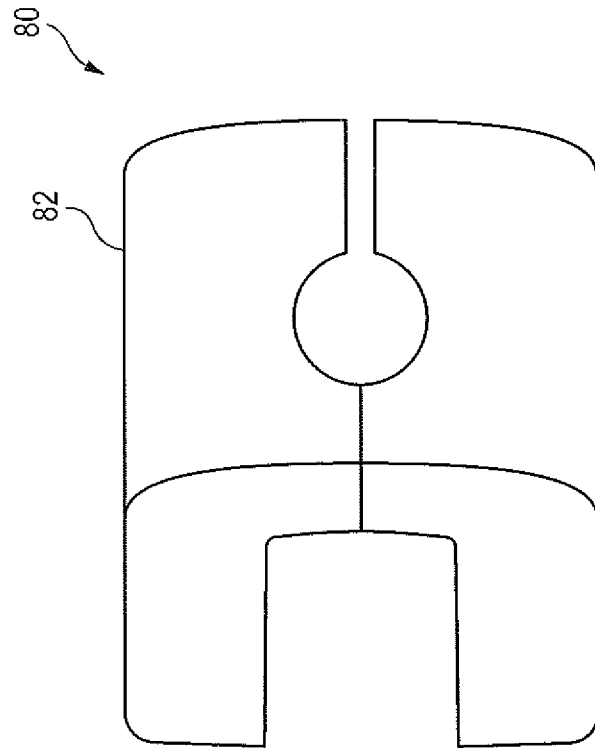


FIG. 4b

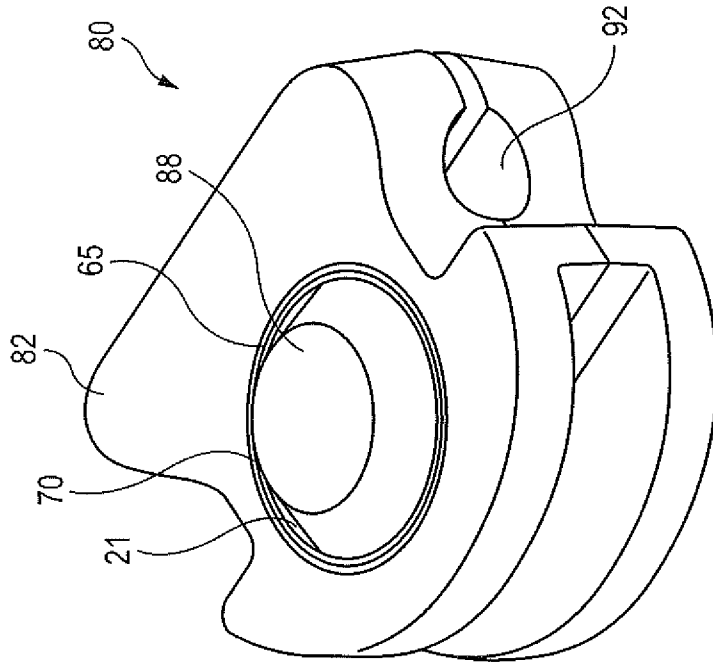


FIG. 4a

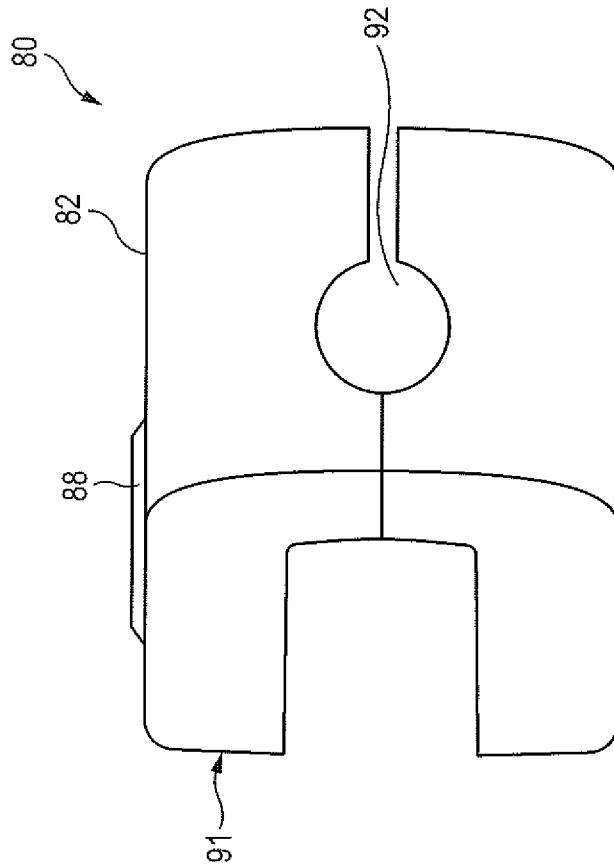
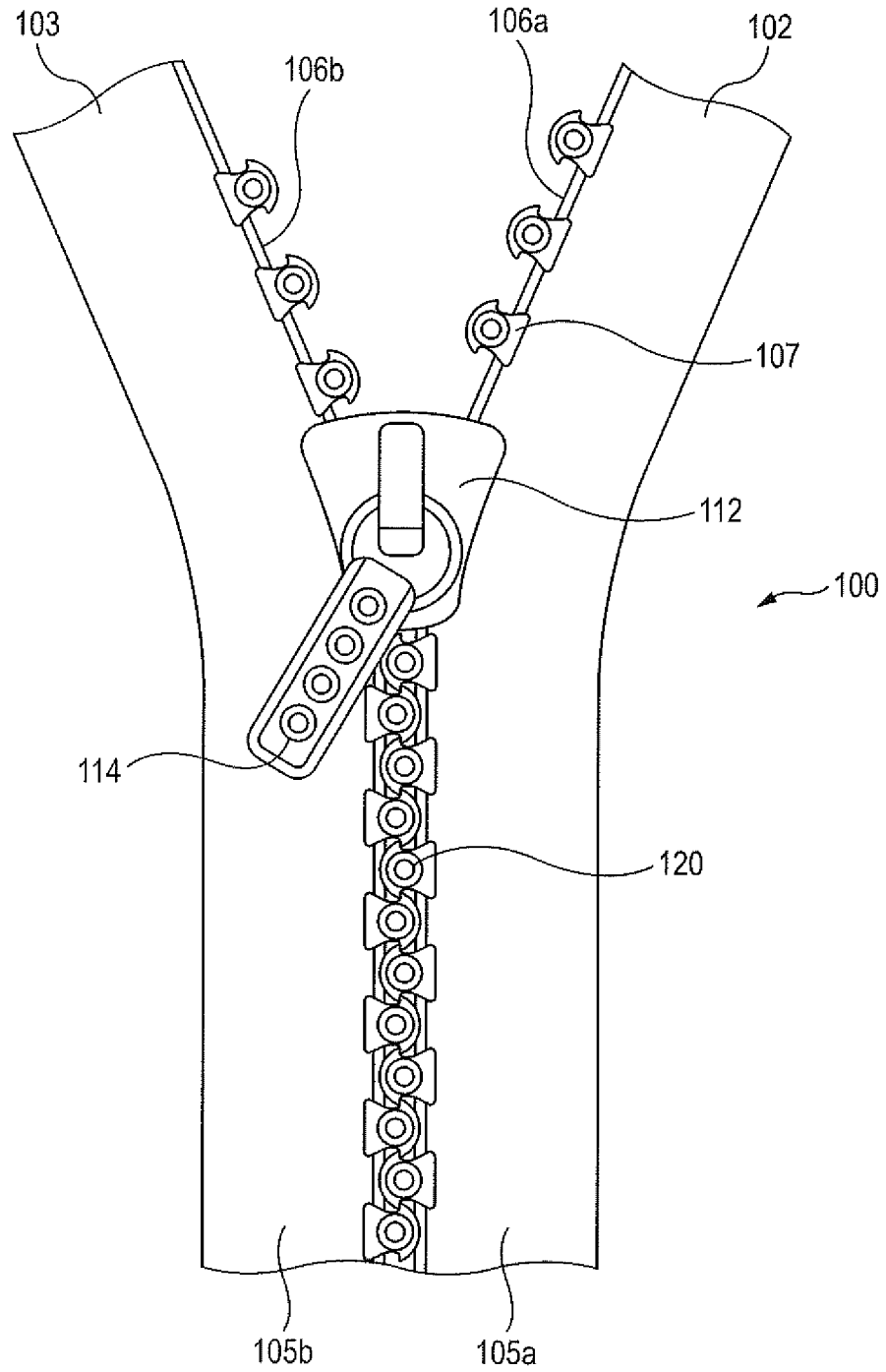


FIG. 5



## INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2012/050809

A. CLASSIFICATION OF SUBJECT MATTER INV. A44B19/04 ADD.		
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) A44B		
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 practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 092 267 A (C. COVI; W. STEINLECHNER) 25 July 2000 (2000-07-25) cited in the application	18
A	column 1, line 58 - column 2, line 25 -----	1,3,17
A	CH 308 551 A (WALTER URBAN & CO GMBH) 31 July 1955 (1955-07-31) page 2, line 34 - page 3, line 2 -----	1,3,6, 17,18
A	CN 201 403 619 Y (JINZE HUANG) 17 February 2010 (2010-02-17) figures 1,2 -----	1,2,17, 18
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
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"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search  8 June 2012	Date of mailing of the international search report  19/06/2012	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Goodall, Colin	

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Information on patent family members

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