An environmentally-friendly visor stiffening member and a manufacturing method thereof may provide a smoothly curved shape without using an environmentally-bad plastic material and being easily sewn. The environmentally-friendly visor stiffening member is sandwiched with at least one fabric piece layer, an adhesive resin layer disposed under the fabric piece layer, and a pulp or cellulose board layer disposed under the fabric piece layer via the adhesive resin layer. With this structure, the visor portion may have a smoothly curved shape even though it is not made of an environmentally-bad synthetic resin material, it may not be easily ruptured even if excessive force is applied thereto, and it may be easily sewn to provide a beautiful aesthetic appearance.
FIG. 2B
FIG. 2C

10"
ENVIRONMENTALLY-FRIENDLY VISOR STIFFENING MEMBER AND MANUFACTURING METHOD THEREOF

BACKGROUND OF THE INVENTION

[0001] (a) Field of the Invention
[0002] The present invention relates to an environmentally-friendly visor stiffening member and a manufacturing method thereof. More particularly, the present invention relates to an environmentally-friendly visor stiffening member and a manufacturing method thereof that are capable of providing a smoothly curved shape without using an environmentally-bad plastic material.
[0003] (b) Description of the Related Art
[0004] Generally, headwear (which may include a baseball cap, visor, and other caps) includes a crown portion for covering a head and a visor portion for blocking sunlight and that is protruded from a part portion or entire portion of a lower circumference of the crown portion.
[0005] The visor portion is formed by overlapping several fabrics with each other and sewing the same. However, when it rains, the visor portion may be deformed or weighted because it absorbs moisture. Accordingly, it has been recently proposed for the visor portion to be made of a synthetic resin.
[0006] In order to make the visor portion with the synthetic resin, a volatile organic compound or petrochemical such as benzene, toluene, and ethereal oils or organic solvents may be used, which may generate environmental pollution or may generate a large amount of air pollutants.
[0007] Such materials may not be recycled or may generate hypersensitivity due to organic dust, for example, headaches, as well generating environmental pollution.
[0008] In addition, when the visor portion is to be decorated and sewn for aesthetic appearance, it is difficult to sew and decorate the visor portion because the synthetic resin material is very hard and it is melted by thermal friction of a high-speed sewing needle and thus the melted synthetic resin material pollutes a peripheral portion of the visor portion.
[0009] Accordingly, aesthetic appearance of the visor portion may be decreased or productivity thereof may be deteriorated.
[0010] In addition, in a case in which the visor portion is made by overlapping an environmentally-friendly material such as several fabrics so as to solve these problems, such environmentally-friendly material may not provide a smoothly curved shape. When excess force is applied for the visor to form a curved shape, a crease may be easily formed on the visor and accordingly it may generate discontent of a consumer.
[0011] The above information disclosed in this Background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

SUMMARY OF THE INVENTION

[0012] The present invention has been made in an effort to provide an environmentally-friendly visor stiffening member and a manufacturing method thereof having advantages of being smoothly curved without using a synthetic resin that emits a volatile organic compound.
[0013] In addition, the present invention has been made in an effort to provide an environmentally-friendly visor stiffening member and a manufacturing method thereof having advantages of replacing a synthetic resin visor stiffening member with an environmentally-friendly natural material, providing good shape maintenance, and that is not easily deformed due to excess pressure or moisture.
[0014] An exemplary embodiment of the present invention provides an environmentally-friendly visor stiffening member sandwiched with at least one fabric piece layer, an adhesive resin layer disposed under the fabric piece layer, and a pulp or cellulose board layer disposed under the fabric piece layer via the adhesive resin layer.
[0015] Another exemplary embodiment of the present invention provides a method for manufacturing an environmentally-friendly visor stiffening member, including supplying a fabric piece having a hardened adhesive resin layer of a thickness of about 0.52±0.02 mm on at least one surface thereof and a cellulose or pulp board in a sandwiched sheet; cutting the fabric piece and the cellulose or pulp board in correspondence with a shape of a visor portion protruding outward from at least a part of the crown portion of a headwear to shield sunlight; softening the adhesive resin layer by indirectly heating the same via the fabric piece or the cellulose or pulp board with the cellulose or pulp board being smoothly curved along a curve forming portion by a thermal forming unit having a recess portion and the curve forming portion; and curing and setting the sandwiched fabric piece or the cellulose or pulp board with the softened adhesive resin layer in a curved state by a cooling unit.
[0016] Another exemplary embodiment of the present invention provides a headwear comprising a crown portion that is placed on the head and a visor portion protruding outward from at least a part of the crown portion to shield sunlight, wherein the visor portion includes a sandwiched environmentally-friendly visor stiffening member surrounded by an upper fabric piece and a lower fabric piece thereof and the environmentally-friendly visor stiffening member is sandwiched with at least one fabric piece layer, an adhesive resin layer disposed under the fabric piece layer, and a pulp or cellulose board layer disposed under the fabric piece layer via the adhesive resin layer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. 1 is a perspective view of headwear exposing a part of a visor portion according to an exemplary embodiment of the present invention.
[0018] FIG. 2A to FIG. 2C are respectively cross-sectional views taken along a line II-II of FIG. 1.
[0019] FIG. 3A illustrates initial moisture resistance in a case of cellulose boards or paper boards applied with a resin according to an exemplary embodiment of the present invention.
[0020] FIG. 3B illustrates a variance of moisture resistance of after 1 hour in a case of cellulose boards or paper boards applied with a resin according to an exemplary embodiment of the present invention.
[0021] FIG. 4 illustrates a must occurrence test in a case of cellulose boards or paper boards applied with a resin according to an exemplary embodiment of the present invention.
[0022] FIG. 5 schematically illustrates an apparatus for manufacturing a visor stiffening member according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0023] The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown.
[0024] As those skilled in the art would realize, the described embodiments may be modified in various different ways, all without departing from the spirit or scope of the present invention.

[0025] The drawings and description are to be regarded as illustrative in nature and not restrictive. Like reference numerals designate like elements throughout the specification.

[0026] An exemplary embodiment of the present invention will hereinafter be described in detail with reference to the accompanying drawings.

[0027] FIG. 1 is a perspective view of headwear exposing a part of a visor portion according to an exemplary embodiment of the present invention, and FIG. 2A to FIG. 2C is respectively a cross-sectional view taken along a line II-II of FIG. 1.

[0028] Referring to FIG. 1, Headwear 100 according to an exemplary embodiment of the present invention may include a crown portion 101 for covering a head and a visor portion 103 for blocking sunlight and that is protruded from a part portion or entire portion of a lower circumference of the crown portion 101.

[0029] The visor portion 103 may be formed by means of sewing an upper fabric piece 103a and 103b each other.

[0030] Particularly, the visor portion 103 further includes a visor stiffening member 10 for maintaining a shape of the visor portion 10, which is surrounded by the upper fabric piece 103a and the lower fabric piece 103b.

[0031] The visor stiffening member 10 may be made of an environmentally-friendly natural material having good shape maintenance and durability.

[0032] The environmentally-friendly natural material having good shape maintenance and durability may include a natural fabric such as cotton, a flax plant, and hemp, and cellulose or pulp or the like except for a synthesis resin.

[0033] Accordingly, the upper fabric piece 103a of the visor portion 103 may be provided with a complexly sewn ornament 103ab regardless of the visor stiffening member 10 because the visor stiffening member 10 may be easily sewn.

[0034] In addition, the visor portion 103 may have a smoothly curved shape even though it is not made of an environmentally-bad synthetic resin material, it may not be easily ruptured even if excessive force is applied thereto, and it may be easily sewn to provide a beautiful aesthetic appearance.

[0035] These characteristics of the visor stiffening member 10 are provided by a sandwiched structure of the visor stiffening member 10.

[0036] The sandwiched structure of the visor stiffening member 10 according to an exemplary embodiment of the present invention is described in detail with reference to FIG. 2A to FIG. 2D.

[0037] As shown in FIG. 2A, the visor stiffening member 10 is formed by applying an adhesive resin layer 13 on both sides of a cellulose board or pulp board 11, sandwiching the cellulose board or pulp board 11 with a fabric piece 15, indirectly heating and softening the adhesive resin layer 13 via the fabric piece 15 at a predetermined temperature of 120-180°C, and setting the same at room temperature to form a sandwiched sheet.

[0038] In addition, as shown in FIG. 2B, according to another exemplary embodiment of the present invention, a visor stiffening member 10 may be composed of a sandwiched sheet in which the adhesive resin layer 13 is applied on one surface of the cellulose board or pulp board 11, the fabric piece 15 is joined to one surface of the cellulose board or pulp board 11 via the adhesive resin layer 13, and the adhesive resin layer 13 is indirectly heated and softened via the fabric piece 15 at a predetermined temperature of 120-180°C and hardened at room temperature.

[0039] Further, as shown in FIG. 2C, according to another exemplary embodiment of the present invention, the visor stiffening member 10" may be composed of a sandwiched sheet in which the adhesive resin layer 13 is formed at both sides of the fabric piece 15, cellulose boards or pulp boards 11 are joined to both sides of the fabric piece 15, heat is indirectly applied to the adhesive resin layer 13 via the cellulose boards or pulp boards at a predetermined temperature of 120-180°C to soften the adhesive resin layer 13, and the adhesive resin layer 13 is hardened at room temperature to join the fabric piece 15 with the cellulose boards or pulp boards 11.

[0040] According to an exemplary embodiment of the present invention, the cellulose boards or pulp boards 11 and the fabric piece layer 15 may be sandwiched via the adhesive resin layer 13 in various manners to provide a layered structure, thereby increasing functionality.

[0041] With such a structure, the cellulose boards or pulp boards 11 may have appropriate elasticity by the hardened adhesive resin layer 13 and are covered with the fabric piece layer 15 having heat resistance so that the visor portion may be prevented from being creased or ruptured when it is curved or formed by predetermined heat or pressure.

[0042] In addition, the adhesive resin layer 13 may not leak from the cellulose board or pulp board 11 and the fabric piece layer 15 even when it is melted, and accordingly, it may not pollute an apparatus for manufacturing the structure to form a smoothly curved visor stiffening member 10, 10", and 10"'.

Exemplary Embodiment

[0043] Accordingly, to an exemplary embodiment of the present invention, the visor stiffening member 10 may preferably have a total thickness of 2.2 mm such that it may have a light weight, it may not provide an awkward feeling, and it may prevent ultraviolet rays from permeating as described in Table 1.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>1.0 mm</th>
<th>2.0 mm</th>
<th>3.0 mm</th>
<th>4.0 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultraviolet ray permeability</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

[0044] Firstly, the cellulose board 11 is prepared by blend polyester and cotton cellulose in a ratio of 40:60 to have a thickness of about 1.5±0.5 mm.

[0045] The visor stiffening member 10 may not be heavy because the cellulose board 11 has a density of 0.72±0.20 g/cm³, and it may have a peel strength of equal to or more than 0.3 kN/m and a strain strength of equal to or more than about 0.5 kN/cm² for a submerging test so that it may maintain its inherent shape even when it is wet for a long time such as through sweat and water as well as for a short time such as through laundering or rain.

[0046] In addition, it may not be creased by more than a predetermined force since it has bending strength of equal to or more than 1.9 and moisture at equal to or less than 5%.
[0047] The cellulose board may be replaced with the pulp board. At this time, 100% pulp may be used to form a board having a thickness of 1.5±0.5 mm.

[0048] The visor stiffening member 10 may not be heavy because it may have a density of 0.72±0.20 g/cm³ as the cellulose board 11 and it may have a peel strength of equal to or more than 0.3 kN/m and a strain strength of equal to or more than about 0.5 kN/cm² for a submerging test so that it may maintain its inherent shape even when it becomes wet during laundring or by rain.

[0049] In addition, it may also not be creased by equal to or more than a predetermined force since it has a bending strength of equal to or more than 1.9 and moisture of equal to or less than 5%.

[0050] It is preferable that the fabric piece 15 may be made of a natural fiber that has good heat resistance, because it therefore not may emit a volatile organic compound when it is heated by a thermal molding unit 120 described hereafter.

[0051] The fabric piece 15 may be 100% cotton and may be other fibers having similar functionality. Particularly when the fabric piece 15 is 100% cotton, it is preferable that it has a thickness of 0.65 mm as described in Table 2 because otherwise it may indirectly transfer heat to the adhesive resin layer 13 and soften the same.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>0.2 mm</th>
<th>0.5 mm</th>
<th>0.65 mm</th>
<th>1.0 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat-resistance and thermal transmission</td>
<td>crumples</td>
<td>poor</td>
<td>good</td>
<td>Heat not transferred</td>
</tr>
</tbody>
</table>

[0052] According to an exemplary embodiment of the present invention, the adhesive resin layer 13 is composed of a water soluble adhesive that has a resin ester as a main component. It is preferable that the resin ester has adhesion strength of equal to or more than 1.35 MPa and a transparent yellow color.

[0053] Since the adhesive resin layer 13 is composed of a water soluble adhesive, it may not generate a volatile organic compound or toxic air pollutant material and provide a water resistance and antibiosis as described with reference to FIG. 3A through FIG. 4.

[0054] The resin ester may have a softening point of 75 to 120°C. when it contains anionic acid of the chemical formula C₃H₅O₃, as a white crystal at equal to or less than 3.0% and dehydroabiotic acid at below 15%.

[0055] In addition, it is preferable that it contains oxygen at equal to or less than 0.3% and impurities at equal to or less than 0.04% such that it may not form an air gap on the water soluble adhesive resin layer 11 and may provide stable adhesion strength and stability during a thermal molding process described hereafter.

[0056] In addition, it is preferable that the adhesive resin layer 13 is applied and hardened at a thickness of about 0.05±0.02 mm on the fabric piece layer 15 or the pulp or cellulose board layer 11.

[0057] Such an adhesive resin layer 13 may provide a desired curved shape for the visor stiffening member 10 when it is again hardened at room temperature after it has been softened at a predetermined temperature of 120-180°C, and it may properly join the cellulose/pulp board layer 11 with the fabric piece layer 15.

[0058] The visor stiffening member 10 may not be heavy because it may have a density of 0.72±0.20 g/cm³, and it may have a peel strength of equal to or more than 0.3 kN/m and a strain strength of equal to or more than about 0.5 kN/cm² for a submerging test. In addition, it may also not be creased with equal to or more than a predetermined force since it has bending strength of equal to or more than 1.9 and moisture of equal to or less than 5%.

[0059] Water-resistance and antibiosis of the visor stiffening member according to an exemplary embodiment of the present invention will be described with reference to FIG. 3A through FIG. 4.

[0060] FIG. 3A illustrates initial moisture resistance in a case of cellulose boards or paper boards applied with a rosin according to an exemplary embodiment of the present invention, and FIG. 3B illustrates a variance of moisture resistance after 1 hour in a case of a cellulose boards or paper boards applied with a rosin according to an exemplary embodiment of the present invention. FIG. 4 illustrates a must occurrence test in a case of cellulose boards or paper boards applied with a rosin according to an exemplary embodiment of the present invention.

[0061] As shown in FIG. 3A and FIG. 3B, we know that sample 5 corresponding to the visor stiffening member according to an exemplary embodiment of the present invention has good water resistance compared to not being applied with the resin ester or the adhesive resin layer 13 in that a drop of water on the adhesive resin layer 13 that is sufficiently applied with the resin ester maintains a transparent drop shape.

[0062] As shown in FIG. 4, we know that sample 5 corresponding to the visor stiffening member according to an exemplary embodiment of the present invention has good antibiosis compared to not being applied with the adhesive resin layer 13 or samples 1, 2, 3, and 4 that are applied with other adhesive resin layers in that bacteria may not grow after the bacteria is nurtured for 5 days under the same environment.

[0063] A method for manufacturing a visor stiffening member according to an exemplary embodiment of the present invention is described with reference to FIG. 5.

[0064] FIG. 5 schematically illustrates an apparatus for manufacturing a visor stiffening member according to an exemplary embodiment of the present invention.

[0065] As shown in FIG. 5, an apparatus for manufacturing a visor stiffening member according to an exemplary embodiment of the present invention includes a sheet forming unit 111, a thermal molding unit 120, and a cooling unit 130. The sheet forming unit 110 includes a first roller 111 for supplying the cellulose board or pulp board 11, a second roller 112 for supplying the fabric piece 15, and third rollers 113 for pressing and adhering the supplied cellulose board or pulp board 11 to the supplied fabric piece 15.

[0066] The adhesive resin layer 13 is applied and hardened on one surface at which the supplied cellulose board or pulp board 11 and the supplied fabric piece 15 are opposed to each other.

[0067] Accordingly, when the third rollers 113 or heating rollers 115 press and heat the upper surface of the fabric piece 15, the supplied cellulose board or pulp board 11 and the supplied fabric piece 15 are adhered to each other as one piece. And then a pressure press 116 may cut a pattern 116a of the visor stiffening member 10.
The pressure press 116 may include an iron impression die 117 corresponding to the pattern 110a of the visor stiffening member 10. A working table 118 is disposed under the pressure press 116 so that the pattern 110a of the visor stiffening member 10 may be separated when the iron impression die 117 vertically reciprocates on the working table 118.

Such a pattern 110a may be set as a curved shape by the thermal molding unit 120.

The thermal molding unit 120 may include a curve-forming portion 121 for providing a desired visor stiffening member 10, a jig 122 for vertically reciprocating the curve-forming portion 121, a heating portion 123 for heating the same to a predetermined temperature, a recess portion 124 corresponding to the curve-forming portion 121, and a heating portion 125 that is disposed along the recess portion 124.

Meanwhile, the thermal molding unit 120 may include a fourth roller 126 for supplying a subsidiary member composed of cotton such that the pattern 110a is uniformly pressed and heated not to be deformed and crumbled when the pattern 110a is disposed and pressed by the curve-forming portion 121.

A subsidiary member 127 may be supplied or retrieved by a member supplying portion 127.

The pattern 110a curved in this manner is cooled and hardened at room temperature to set a curved shape.

The cooling unit 130 includes a working table 131 and a protrusion portion 133 for supporting a curved pattern 110a and a covering portion 135 for covering the curved pattern 110a disposed on the protrusion portion 133.

The protrusion portion 133 and the covering portion 135 are composed of a material having good thermal transmission and that is maintained at room temperature of about 25°C. For this purpose, it may further include cooling means 132 for cooling the protrusion portion 133 and the covering portion 135.

According to an exemplary embodiment of the present invention, a desired smoothly curved shape for the visor portion may be provided without using a toxic synthetic resin.

In addition, according to an exemplary embodiment of the present invention, an inherent shape of the visor portion may be maintained even if it becomes wet while laundering or during rain, and it may not grow bacteria.

Further, according to an exemplary embodiment of the present invention, the visor portion may have a smoothly curved shape even though it is not made of an environmentally-bad synthetic resin material, it may not be easily ruptured even if excessive force is applied thereto, and it may be easily sewn to provide a beautiful aesthetic appearance.

While this invention has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

What is claimed is:

1. A environmentally-friendly visor stiffening member sandwiched with at least one fabric piece layer, an adhesive resin layer disposed under the fabric piece layer, and a pulp or cellulose board layer disposed under the fabric piece layer via the adhesive resin layer.

2. The environmentally-friendly visor stiffening member of claim 1, wherein the adhesive resin layer is composed of an environmentally-friendly water-soluble adhesive and is indirectly heated via the fabric piece to be softened and hardened to curve the visor stiffening member.

3. The environmentally-friendly visor stiffening member of claim 2, wherein the adhesive resin layer includes a rosin ester that has a softening point of 75 to 120°C as a main component, and contains abietic acid of the chemical formula C19H28O4 at equal to or less than 3.0% as a white crystal and dehydroabietic acid at below 15%.

4. The environmentally-friendly visor stiffening member of claim 3, wherein the adhesive resin layer contains oxygen at equal to or less than 0.3% and impurities of equal to or less than 0.04%.

5. The environmentally-friendly visor stiffening member of claim 5, wherein the cellulose or pulp board has a thickness of about 1.50±0.5 mm and a density of 0.72±0.20 g/cm³.

6. The environmentally-friendly visor stiffening member of claim 5, wherein the cellulose or pulp board has a peel strength of equal to or more than 0.3 kN/m, a strain strength of equal to or more than about 0.5 kN/m² for a submerging test, and a bending strength of equal to or more than 1.9.

7. A method for manufacturing an environmentally-friendly visor stiffening member comprising:

supplying a fabric piece having a hardened adhesive resin layer of a thickness of about 0.05±0.02 mm on at least one surface thereof and a cellulose or pulp board in a sandwiched sheet;

cutting the fabric piece and the cellulose or pulp board in a correspondence with a shape of a visor portion protruding outward from at least a part of a crown portion of a headwear to shield sunlight;

softening the adhesive resin layer by indirectly heating the same via the fabric piece or the cellulose or pulp board with the cellulose or pulp board being smoothly curved along a curve forming portion by a thermal forming unit having a recess portion and the curve forming portion;

curing and setting the sandwiched fabric piece or the cellulose or pulp board via the softened adhesive resin layer in a cured state by a cooling unit.

8. The method for manufacturing an environmentally-friendly visor stiffening member of claim 7, further comprising heating the recess portion and the curve forming portion to a temperature 120 to 180°C by a heating portion, and maintaining a protrusion portion and a curve forming portion of the cooling unit at a temperature of 25°C.

9. The method for manufacturing an environmentally-friendly visor stiffening member of claim 8, wherein the adhesive resin layer includes a rosin ester that has a softening point of 75 to 120°C as a main component, and contains abietic acid of the chemical formula C19H28O4 as a white crystal at equal to or less than 3.0% and dehydroabietic acid at below 15%.

10. The method for manufacturing an environmentally-friendly visor stiffening member of claim 9, comprising supplying a subsidiary material having a melting point of equal to or more than about 180°C between the curve forming portion and the recess portion.

11. The method for manufacturing an environmentally-friendly visor stiffening member of claim 10, wherein the cellulose or pulp board has a thickness of about 1.50±0.5 mm and a density of 0.72±0.20 g/cm³.

12. The method for manufacturing an environmentally-friendly visor stiffening member of claim 11, wherein the cellulose or pulp board has a peel strength of equal to or more
than 0.3 kN/m, a strain strength of equal to or more than about 0.5 kN/cm² for a submerging test, and a bending strength of equal to or more than 1.9.

13. A headwear comprising a crown portion that is placed on the head and a visor portion protruding outward from at least a part of the crown portion to shield sunlight, wherein the visor portion includes a sandwiched environmentally-friendly visor stiffening member surrounded by an upper fabric piece and a lower fabric piece thereof and the environmentally-friendly visor stiffening member is sandwiched with at least one fabric piece layer, an adhesive resin layer disposed under the fabric piece layer, and a pulp or cellulose board layer disposed under the fabric piece layer via the adhesive resin layer.

14. The headwear of claim 13, wherein the adhesive resin layer is composed of an environmentally-friendly water-soluble adhesive and is indirectly heated via the fabric piece to be softened and hardened to curve the visor stiffening member.

15. The headwear of claim 14, wherein the adhesive resin layer includes a rosin ester that has a softening point of 75 to 120°C, as a main component, and contains abietic acid of the chemical formula $\text{C}_{20}\text{H}_{30}\text{O}_{2}$ at equal to or less than 3.0% as a white crystal and dehydroabiatic acid at below 15%.

16. The headwear of claim 15, wherein the adhesive resin layer contains oxygen at equal to or less than 0.3% and impurities of equal to or less than 0.04%.

17. The headwear of claim 13, wherein the cellulose or pulp board has a thickness of about 1.50±0.5 mm and a density of 0.72±0.20 g/cm³.

18. The headwear of claim 17, wherein the cellulose or pulp board has a peel strength of equal to or more than 0.3 kN/m, a strain strength of equal to or more than about 0.5 kN/cm² for a submerging test, and a bending strength of equal to or more than 1.9.

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