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(56) Documents Cited
US 5571581 A US 4965103 A

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Online databases: EDOC, WPI

(54) Abstract Title
Thermally stable vehicle body side moulding

(57) The moulding comprises i) a stabilising strip 2 (eg of aluminium), ii) a layer 4 of a polymeric material with a relatively low coefficient of thermal expansion, and iii) a layer 5 of a polymeric material with a relatively high coefficient of thermal expansion; the layers of polymeric material being so arranged that the moulding does not bend at low temperatures (eg below -35°C). The polymeric material may be PVC or propylene with the thermal expansion characteristics being determined by the amount of filler. The coefficient of low thermal expansion may be in the range 40-60 x 10^{-6} 10 / °C and the coefficient of high thermal expansion may be in the range 140-160 x 10^{-6} / °C.

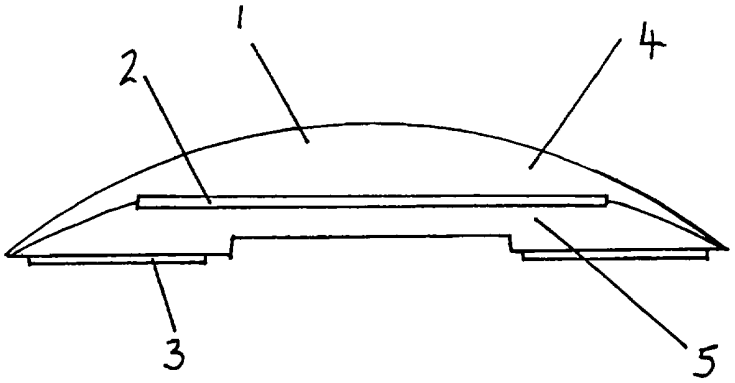

Figure 4

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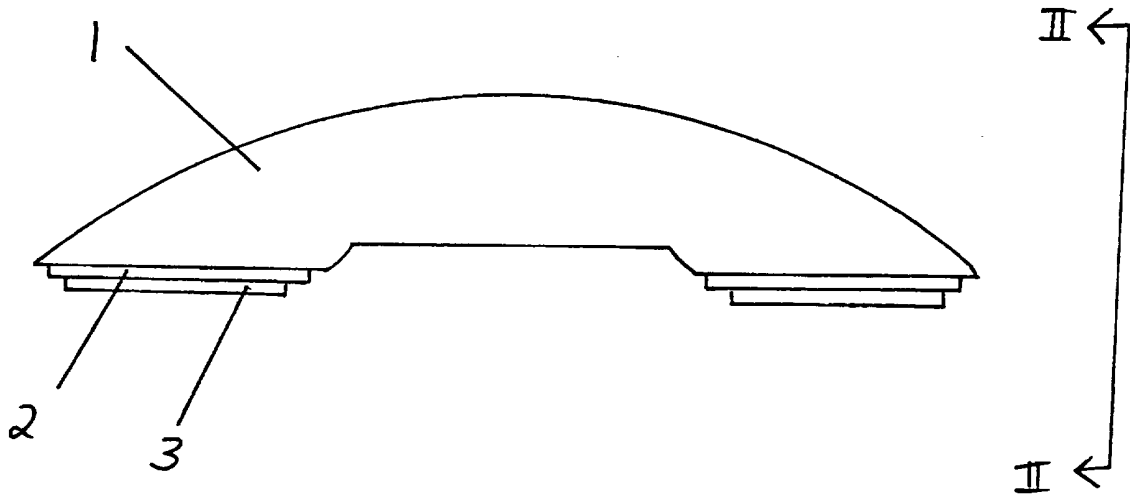
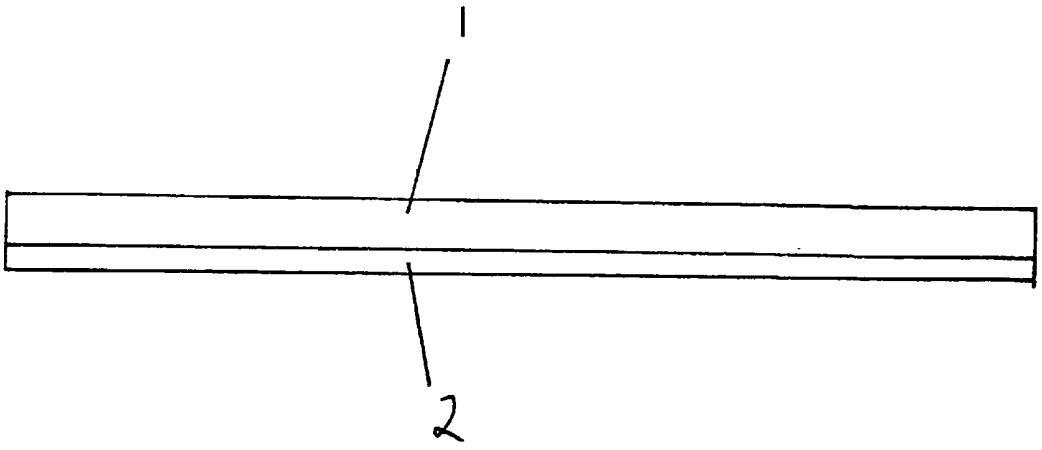


Figure 1

a)



b)

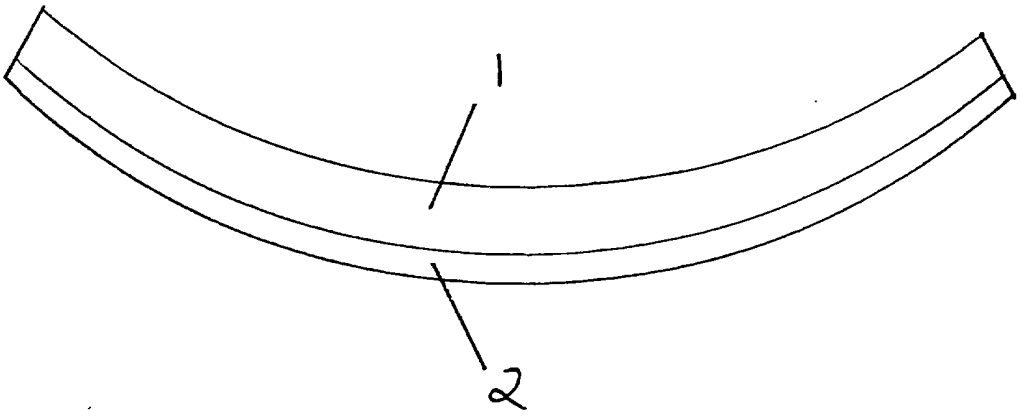


Figure 2

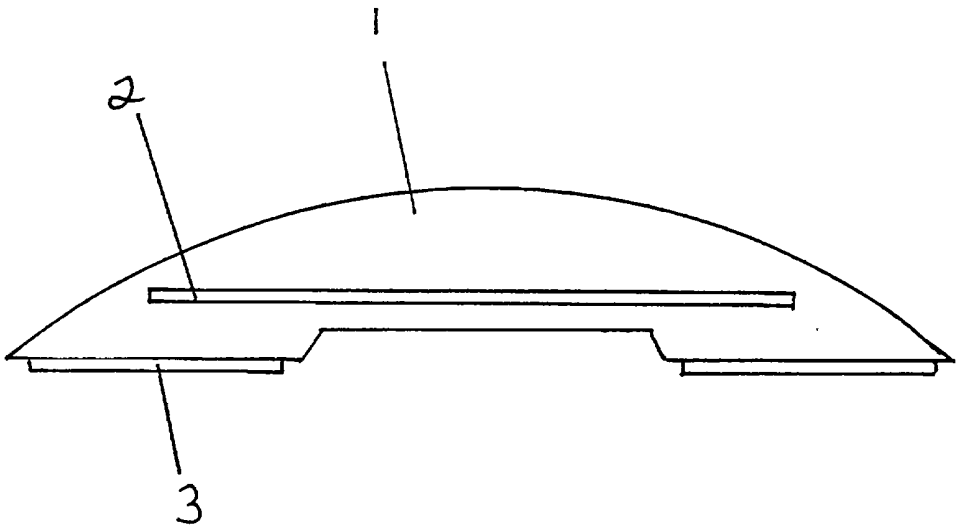


Figure 3

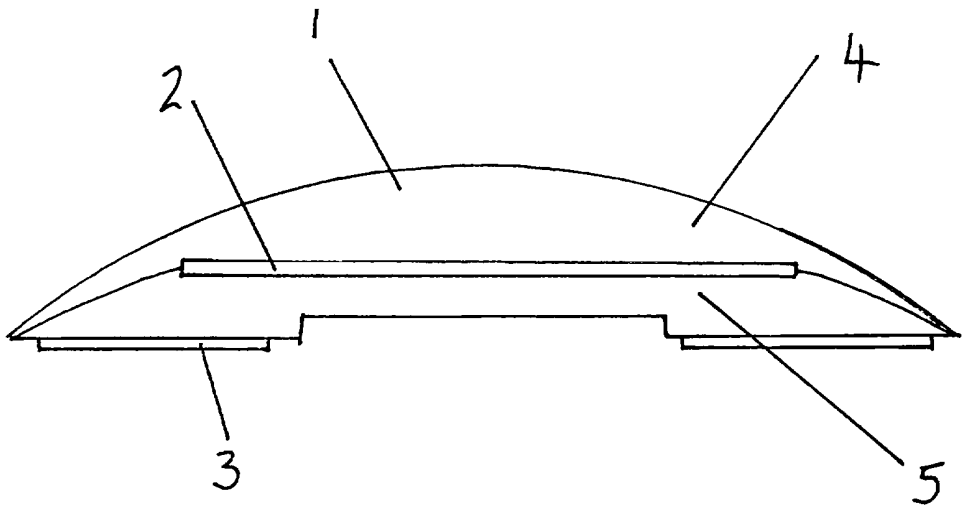


Figure 4

BODY SIDE MOULDING

This invention relates to an elongate body side moulding suitable for attachment to the side of a vehicle body and to a vehicle with such a moulding attached.

In the automotive industry, it is relatively common to fit elongate mouldings of elastomeric material to the side body panels of a vehicle. Such mouldings are decorative and afford a degree of protection to the vehicle body upon side impact. The mouldings form a physical barrier to objects in a side-on collision and have a degree of deformability which will absorb a low-impact blow. The mouldings therefore protect the vehicle to an small extent from damage such as denting the body panels or scratching the paintwork.

Such mouldings may also comprise one or more metal strip(s) or a metal core, which is included to prevent the moulding from shrinking to a significant extent at low temperatures, in other words the metal strip gives the moulding temperature length stability. The metal strip also gives the moulding a degree of lateral stiffness.

One problem associated with body side mouldings which comprise metal strip(s) is that, at low temperatures, they have a tendency to become detached from the side of the vehicle body. As the elastomeric material has a higher coefficient of thermal expansion than the metal, the moulding is caused to bend at low temperatures, so that the ends of the moulding lift off from the side of the vehicle (as shown in Figure 2).

This effect is reduced to a certain extent in body side moulding designs in which the metal strip is located within the elastomeric material (as shown in Figure 3). However, the propensity for such mouldings to become detached from the vehicle at low temperatures is dependent on the location of the metal strip within

the moulding.

According to a first aspect of the present invention there is provided an elongate body side moulding suitable for attachment to the side of a vehicle body, which moulding comprises:

i) one or more stabilising strip(s);

ii) one or more layer(s) of a polymeric material with a relatively high coefficient of thermal expansion; and

iii) one or more layer(s) of a polymeric material with a relatively low coefficient of thermal expansion;

the layers of polymeric material with high and low coefficients of thermal expansion being so arranged that, over a predetermined range of temperatures, the overall shape of the body side moulding is substantially maintained.

In particular, the layers of polymeric material with high and low coefficients of thermal expansion are so arranged that, over a predetermined range of temperatures, the body side moulding does not curve significantly about an axis parallel to the general plane of the strip(s) and perpendicular to the length of the strip(s).

According to a second aspect of the present invention there is provided an elongate body side moulding suitable for attachment to the side of a vehicle body, which moulding comprises:

i) one or more stabilising strip(s);

ii) one or more layer(s) of a polymeric material with a relatively high coefficient of thermal expansion; and

iii) one or more layer(s) of a polymeric material with a relatively low coefficient of thermal expansion;

wherein the layers of polymeric material with high and low coefficients of thermal expansion are so arranged that, when the moulding is attached to the

side of a vehicle body, at temperatures below a predetermined figure, the moulding tends to curve, about a axis parallel to the general plane of the strip(s) and perpendicular to the length of the strip(s), such that the two ends of the moulding are urged towards the side of the vehicle body.

Preferably the moulding comprises a first layer and a second layer wherein:

i) the first layer is made from the polymeric material with the relatively low coefficient of expansion and, when the moulding is fitted to the side of a vehicle body, is relatively far from the vehicle body;

ii) the second layer is made from the polymeric material with the relatively high coefficient of expansion and, when the moulding is fitted to the side of a vehicle body, is relatively close to the vehicle body; and

iii) the stabilising strip is positioned between the first and second layers.

According to a third aspect of the present invention there is provided a vehicle which has fitted to it a moulding according to the first or second aspect of the present invention.

By using two kinds of elastomeric materials (with different coefficients of thermal expansion) the present inventors have shown that it is possible to reduce the extent to which metal-containing body-side mouldings curve such that they become detached from the vehicle body. It is also possible to control the curvature, so that at low temperatures, the moulding tends to curve in such a way that the ends are pushed on to the vehicle body side. A further advantage of the body side moulding in accordance with the present invention is that their propensity for curvature at low temperatures is less sensitive to the location of the

stabilising strip on or in the moulding.

For a better understanding of the present invention and to show how the same may be put into effect, reference will now be made, by way of example, to Figures 1 to 4 of the accompanying drawings, in which:

Figure 1 is a lateral cross section of a body side moulding of the prior art;

Figure 2 is a sketch to show the effect of low temperatures on a moulding of the prior art from the direction II-II shown in Figure 1;

Figure 3 is a lateral cross section of an alternative body side moulding of the prior art; and

Figure 4 is a lateral cross section of a body side moulding in accordance with the present invention.

Referring firstly to Figure 1, there is shown a moulding which comprises a generally segment-shaped body 1 made from polymeric material, to the flat surface of which body 1 are adhered two strips of aluminium 2. A strip of double-sided tape 3 is adhered to each aluminium strip 2, in order to facilitate attachment of the moulding to the side of a vehicle body. Reference numerals 1, 2 and 3 indicate equivalent features in the body side mouldings shown in Figures 2 to 4.

Figure 2 is a sketch to illustrate one of the disadvantages of mouldings such as the one shown in Figure 1. Figures 2a and 2b show a side view of a moulding from the direction II-II (Figure 1) without showing the double sided tape. The size of the aluminium strip is exaggerated for clarity. Figure 2a shows the configuration of the moulding at ambient temperatures, whereas Figure 2b shows the configuration of the moulding at low temperatures.

Turning to Figure 3, there is shown a body side moulding in which the aluminium strip 2 is located

within the body 1 made from polymeric material. Body side mouldings of this general design are more resistant to curvature at low temperatures than those shown in Figure 1, but the effect is sensitive to the location of the aluminium strip 2 in the body 1 of the moulding.

Figure 4 shows a body side moulding in accordance with the present invention. The body 1 is made up of two layers of polymeric material 5, 6. A first layer 4 which is made from a polymeric material with a relatively low coefficient of thermal expansion, and a second layer 5 which is made from a polymeric material with a relatively high coefficient of thermal expansion. The two layers 4, 5 are so positioned that at low temperatures the moulding does not curve significantly in the orientation shown in Figure 2b. By careful selection of the two polymeric materials, it is possible to produce a moulding which does not curve to any appreciable extent at low temperatures or tends to curve in the opposite orientation, so as to "push" the ends of the moulding towards the vehicle body.

The stabilising strip may be made from a metal such as aluminium or steel, or it may be made from a plastics material. Preferably the stabilising strip is aluminium.

The term "strip" is intended to include any elongate structure which, when applied to a body-side moulding material such as PVC, may cause the moulding to curve at low temperatures.

By "low temperature", temperature below, for example, -35°C may be indicated.

The material with a relatively low coefficient of thermal expansion may have a coefficient of thermal expansion of in the range of, for example, 60-40 x 10^{-6}/°C, preferably 55-45 x 10^{-6}/°C, more preferably about 50 x 10^{-6}/°C. The material with a relatively high

coefficient of thermal expansion may have a coefficient of thermal expansion in the range of, for example, 160-140 x 10^{-6}/°C, preferably 155-145 x 10^{-6}/°C, more preferably 150 x 10^{-6}/°C.

The term "polymeric material" includes materials such as PVC or polypropylene. The coefficients of expansion may be adjusted by varying the amount of the filler in the material.

The term "vehicle" is intended to include automotive vehicles such as cars, vans, buses and lorries. The term also includes towable "vehicles" such as caravans, trailers and side-cars.

CLAIMS

1. An elongate body side moulding suitable for attachment to the side of a vehicle body, which moulding comprises:

i) one or more stabilising strip(s);

ii) one or more layer(s) of a polymeric material with a relatively high coefficient of thermal expansion; and

iii) one or more layer(s) of a polymeric material with a relatively low coefficient of thermal expansion;

the layers of polymeric material with high and low coefficients of thermal expansion being so arranged that, over a predetermined range of temperatures, the overall shape of the body side moulding is substantially maintained.

2. A body side moulding according to claim 1, in which the layers of polymeric material with high and low coefficients of thermal expansion are so arranged that, over a predetermined range of temperatures, the body side moulding does not curve significantly about an axis parallel to the general plane of the strip(s) and perpendicular to the length of the strip(s).

3. An elongate body side moulding suitable for attachment to the side of a vehicle body, which moulding comprises:

i) one or more stabilising strip(s);

ii) one or more layer(s) of a polymeric material with a relatively high coefficient of thermal expansion; and

iii) one or more layer(s) of a polymeric material with a relatively low coefficient of thermal expansion;

wherein the layers of polymeric material with high and low coefficients of thermal expansion are so arranged that, when the moulding is attached to the side of a vehicle body, at temperatures below a predetermined figure, the moulding tends to curve,

about a axis parallel to the general plane of the strip(s) and perpendicular to the length of the strip, such that the two ends of the moulding are urged towards the side of the vehicle body.

4. A moulding according to any preceding claim, which comprises a first layer and a second layer wherein:

i) the first layer is made from the polymeric material with the relatively low coefficient of expansion and, when the moulding is fitted to the side of a vehicle body, is relatively far from the vehicle body;

ii) the second layer is made from the polymeric material with the relatively high coefficient of expansion and, when the moulding is fitted to the side of a vehicle body, is relatively close to the vehicle body; and

iii) the stabilising strip is positioned between the first and second layers.

5. A vehicle which has fitted to it a moulding according to any preceding claim.

6. A moulding substantially as hereinbefore defined, with reference to, and as illustrated in, Figure 4 of the accompanying drawings.

Application No: GB 9809568.0 **Examiner:** Graham Russell
Claims searched: 1-6 **Date of search:** 28 September 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): B6G (GD)

Int Cl (Ed.6): B60R 13/04

Other: Online: EDOC, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	US 5571581	(TOYODA) see Table 4	1,3
A	US 4965103	(COLOR CUSTOM) see Fig 1	1,3

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.