

PATENT SPECIFICATION

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(54) FLEXURAL HINGES

(71) We, MIDLAND ELECTRIC MANUFACTURING COMPANY LIMITED, a British Company of Reddings Lane, Birmingham, B11 3E2, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a flexural hinge of the kind formed of a single piece of a synthetic resin material, exemplified by polypropylene. The flexural hinge has a pair of mounting portions on opposite sides respectively of a thinner portion about which the mounting portions are pivotally movable relative to one another. The invention also relates to a container formed by a body and a lid hingedly secured together by such a flexural hinge.

When a flexural hinge as described is used in the mounting of a lid on a container body, where it is required to ensure that there is a sufficiently good seal between the container body and its lid to prevent the ingress of foreign matter, considerable difficulty often arises in the mounting of the mounting portions of the hinge. It has been found that a satisfactory seal can only be obtained if a large number of closely spaced fasteners are employed for each mounting portion or each mounting portion is held down by a metal strip of relatively heavy gauge, both of which solutions tend to increase the cost of using a flexural hinge.

The invention resides in a flexural hinge formed of a single piece of synthetic resin and comprising a pair of mounting portions on opposite sides of a thinner part about which the mounting portions are pivotally movable relative to one another; and, on each mounting portion, an integral extension which is shaped to provide between it and the associated mounting portion a channel to receive an edge of the part on which the mounting portion is to be mounted; the integral extension of one of the mounting portions extending from its attachment to its mounting portion in a direction towards the

thinner part. Such a hinge is preferably employed with a container having a body with an intumed flange at its mouth and a co-operating lid; in that case the flexural hinge has the extension of a first of the two mounting portions extending towards the thinner part and the extension of the second of those mounting portions extending away from the thinner part, an edge of the intumed flange of the body being secured in the channel formed by the first mounting portion and its extension and an edge of the lid being secured in the channel formed by the second mounting portion and its extension.

In the accompanying drawings:—

Figure 1 is a section through an example of a hinge in accordance with the invention,

Figure 2 is a section showing the hinge in position on a container with a lid, and

Figures 3 and 4 are views like Figures 1 and 2 respectively but showing an alternative embodiment of the invention.

The hinge shown in Figure 1 is formed as a single piece in polypropylene with two coplanar mounting portions 10 and 11 interconnected by a thinner portion 12 which forms a pivotal joint between the two mounting portions 10 and 11. A pair of extensions 13, 14 are formed on the mounting portions 10, 11 respectively, such extensions being integral with the mounting portions 10 and 11. In each case the extension 13 or 14 combines with the respective mounting portion 10 or 11 to form a channel 15, 16. The extension 13, which is provided at the edge of the mounting portion 10 remote from the thinner portion 12, extends from its attachment to its mounting portion 10 towards the thinner portion 12. The extension 14, which is on the mounting portion 11 adjacent to the thinner portion 12, however extends from its attachment away from the thinner portion 12.

It will be noted that the extension portions 13 and 14 do not lie parallel to the mounting portions 10 and 11 but converge towards these in the direction of the open-

ing of the mouths of the channels 15 and 16. This enables a particular design of flexural hinge to be used in connection with sheet metal parts of varying thicknesses within a predetermined range.

Figure 2 shows the hinge in use on a box having a body 17 with an intumed flange 18 at its mouth. The box has a lid 19 with a marginal flange 20. As shown the edge of the flange 18 fits under the extension portion 13 whereas the edge of the flange 20 fits under the extension portion 14 and the two mounting portions 10, 11 are secured to the respective flanges 18 and 20 by a relatively small number of rivets, screws or other fasteners 21.

It will be appreciated that the fitting of the flanges 18, 20 into the channels formed by the extension portions 13, 14 ensures that buckling of the mounting portions 10, 11 between the fasteners 21 does not occur so that an adequate seal is provided along the hinge edge of the box. The remaining edges of the box can readily be sealed by means of rubber or other channels 22 fitted on the remaining portions of the flange 20 and bearing on the flange 18.

It will also be appreciated that the extension portions 13, 14 ensure proper location of the hinge mounting portions relative to the lid and the body of the box, so that the hinge axis is correctly positioned relative thereto.

In the alternative embodiment shown in Figures 3 and 4, the two mounting portions 110 and 111 are not coplanar but are offset from one another at the thinner portion 112. Thus one extension 114 is continuous with the other mounting portion 110, being connected together by the thinner portion 112.

When the hinge of Figure 3 is in use as shown in Figure 4, the extensions 113, 114 embrace, as before, the flanges 118 and 120 on the box 117 and the lid 119 respectively. In this case, however, the lid may be opened through some 150° instead of being limited to an angle of little more than 90° as is the case in the example shown in Figures 1 and 2. In addition the external step in the hinge profile resulting from the extension 14 of Figures 1 and 2 is omitted, giving a neater appearance.

WHAT WE CLAIM IS:—

1. A flexural hinge formed of a single piece of synthetic resin and comprising a pair of mounting portions on opposite sides of a thinner part about which the mounting

portions are pivotally movable relative to one another; and, on each mounting portion, an integral extension which is shaped to provide between it and the associated mounting portion a channel to receive an edge of the part on which the mounting portion is to be mounted, the integral extension of one of the mounting portion extending from its attachment to its mounting portion in a direction towards the thinner part.

2. A flexural hinge according to claim 1, in which each integral extension is shaped to converge towards the associated mounting portion from its attachment to that mounting portion.

3. A flexural hinge according to claim 1 or claim 2, in which the mounting portions are offset from one another, such that, when the mounting portions are disposed parallel to one another, the extension on one mounting portion is continuous with the other mounting portion.

4. A flexural hinge substantially as hereinbefore described with reference to and as shown in Figures 1 and 2 of the accompanying drawings.

5. A flexural hinge substantially as hereinbefore described with reference to and as shown in Figures 3 and 4 of the accompanying drawings.

6. A box having a lid hingedly connected thereto by a flexural hinge as claimed in any preceding claim.

7. A container having a body with an intumed flange at its mouth and a co-operating lid, and a flexural hinge according to any one of claims 1 to 3 having the extension of a first of the two mounting portions extending towards the thinner part and the extension of the second of those mounting portions extending away from the thinner part, an edge of the intumed flange of the body being secured in the channel formed by the first mounting portion and its extension and an edge of the lid being secured in the channel formed by the second mounting portion and its extension.

8. A container according to claim 7, in which the edges of the body and lid are secured in the channels by separate securing devices passed through the edges and the flexural hinge.

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ing of the mouths of the channels 15 and 16. This enables a particular design of flexural hinge to be used in connection with sheet metal parts of varying thicknesses within a predetermined range.

Figure 2 shows the hinge in use on a box having a body 17 with an intumed flange 18 at its mouth. The box has a lid 19 with a marginal flange 20. As shown the edge of the flange 18 fits under the extension portion 13 whereas the edge of the flange 20 fits under the extension portion 14 and the two mounting portions 10, 11 are secured to the respective flanges 18 and 20 by a relatively small number of rivets, screws or other fasteners 21.

It will be appreciated that the fitting of the flanges 18, 20 into the channels formed by the extension portions 13, 14 ensures that buckling of the mounting portions 10, 11 between the fasteners 21 does not occur so that an adequate seal is provided along the hinge edge of the box. The remaining edges of the box can readily be sealed by means of rubber or other channels 22 fitted on the remaining portions of the flange 20 and bearing on the flange 18.

It will also be appreciated that the extension portions 13, 14 ensure proper location of the hinge mounting portions relative to the lid and the body of the box, so that the hinge axis is correctly positioned relative thereto.

In the alternative embodiment shown in Figures 3 and 4, the two mounting portions 110 and 111 are not coplanar but are offset from one another at the thinner portion 112. Thus one extension 114 is continuous with the other mounting portion 110, being connected together by the thinner portion 112.

When the hinge of Figure 3 is in use as shown in Figure 4, the extensions 113, 114 embrace, as before, the flanges 118 and 120 on the box 117 and the lid 119 respectively. In this case, however, the lid may be opened through some 150° instead of being limited to an angle of little more than 90° as is the case in the example shown in Figures 1 and 2. In addition the external step in the hinge profile resulting from the extension 14 of Figures 1 and 2 is omitted, giving a neater appearance.

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portions are pivotally movable relative to one another; and, on each mounting portion, an integral extension which is shaped to provide between it and the associated mounting portion a channel to receive an edge of the part on which the mounting portion is to be mounted, the integral extension of one of the mounting portion extending from its attachment to its mounting portion in a direction towards the thinner part.

2. A flexural hinge according to claim 1, in which each integral extension is shaped to converge towards the associated mounting portion from its attachment to that mounting portion.

3. A flexural hinge according to claim 1 or claim 2, in which the mounting portions are offset from one another, such that, when the mounting portions are disposed parallel to one another, the extension on one mounting portion is continuous with the other mounting portion.

4. A flexural hinge substantially as hereinbefore described with reference to and as shown in Figures 1 and 2 of the accompanying drawings.

5. A flexural hinge substantially as hereinbefore described with reference to and as shown in Figures 3 and 4 of the accompanying drawings.

6. A box having a lid hingedly connected thereto by a flexural hinge as claimed in any preceding claim.

7. A container having a body with an intumed flange at its mouth and a co-operating lid, and a flexural hinge according to any one of claims 1 to 3 having the extension of a first of the two mounting portions extending towards the thinner part and the extension of the second of those mounting portions extending away from the thinner part, an edge of the intumed flange of the body being secured in the channel formed by the first mounting portion and its extension and an edge of the lid being secured in the channel formed by the second mounting portion and its extension.

8. A container according to claim 7, in which the edges of the body and lid are secured in the channels by separate securing devices passed through the edges and the flexural hinge.

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