DISPLAY BOX COMPRISING HINGEDLY CONNECTED SECTIONS

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This invention relates generally to hinges, and has particular reference to a hinge construction connecting two walls of a box in edge-to-edge relation.

The type of box for which the invention is primarily intended is one in which there are opposed box and cover sections each of which has a main wall and upwardly peripheral side walls, the box sections being hingedly connected in edge-to-edge relation. A principal object of the invention is to provide a hinge construction whose components are integral parts of the box sections, thus obviating the necessity for extraneous hinge elements.

A more particular object of the invention is to provide an integral hinging arrangement in which the components are of such structural nature that the box sections can be readily formed of molded plastic even though one of them is to be made of clear transparent plastic.

Another objective is to provide hinge components so designed that the molding operations remain feasible even though the walls to be hingedly connected do not lie at right angles to the main walls from which they extend.

The invention is particularly useful in providing a structurally simple and relatively inexpensive display box (e.g., for toys or the like) in which a cover section molded of rigid clear transparent material such as the moldable polyvinyls and acrylics in hinged to a body section formed as a separate molded element. A low-cost but sturdy and long-lasting hinge connection is provided by forming the body section of a material, such as polypropylene, characterized by inherent rigidity except in thinned web-like regions, such regions being freely flexible and unusually resistant to wear and fatigue. This characteristic permits the body section to be provided with an integral hinge part in the form of a specially configured tongue connected to an edge of one of the side walls by a thinned hinge-defining region of this kind.

The corresponding side wall of the cover section is provided with a complementary integral formation adapted to cooperate with the tongue to create a tightly interlocked relation. The interlock can be expeditiously established during the manufacturing procedure without recourse to any special tools, skills, or extraneous connectors.

The preferred way of achieving these objects and advantages, and such other advantages as may hereinafter be pointed out, is illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a box embodying the features of this invention;
FIG. 2 is an enlarged cross-sectional view along the line 2—2 of FIG. 1;
FIG. 3 is a cross-section along the line 3—3 of FIG. 2;
FIG. 4 is an exploded view of the hinge components before they are assembled; and
FIGS. 5 and 6 are outside and inside views, respectively, of the hinge connection in its assembled state.

The box chosen for illustration has a body section 10 and a cover section 11, these sections being hinged together in edge-to-edge relation at hinge areas 12. Each section is formed as a separate element and comprises a main wall and upwardly peripheral side walls. The box shown is substantially rectangular and has outwardly flaring sides. The main wall 13 of the cover section has side walls 14 inclined slightly so that they diverge from the part 13 and the body section 10 is similarly provided with a main wall or box bottom 15 and outwardly flaring side walls 16.

The cover section 11 is transparent and can be a molded element of plastic selected from the class which includes the acrylics, the butyrates, the propionates, the acetates, polystyrene, and the like. A special problem is presented by virtue of the fact that materials such as these, which are clear and transparent, are not sufficiently bendable to permit the formation of integral hinges. For this reason the body section 10 is composed of molded polypropylene or equivalent plastic having the quality of form-retaining rigidity except in regions of thinned cross-section.

The hinges 12 are located at appropriately spaced regions. They are identical, and one of them is illustrated in detail in FIGS. 2—6.

The tongue 17 is formed as an integral part of the wall 16 to whose edge 8 it is attached. The connection is along a thinned region 18 which is freely flexible and admirably suited, because of its toughness and fatigue resistance, to serve as a hinge, as indicated in dot-dash lines in FIG. 2. The tongue 17 is shown as being of substantially rectangular shape. In its central region it is formed with a rectangular opening 19. The outer end 20 of this opening is a shoulder facing in the direction of the hinge 18.

Secured to the side edges of the tongue 17 are integral wings 21 extending in a direction perpendicular to the hinge axis, and at their ends the wings 21 are hooked, i.e., there are outwardly turned parts 22.

The molding of the body section 16 is entirely practical, and the provision on the molded element of integral tongues 17 shaped as described is no problem. Moreover, the molding procedure can be readily carried out even though the side walls 16 are inclined, as shown, to the main part 15.

The corresponding side wall 14 of the cover section 11 is provided with slots 23 extending at right angles to the edge 9. Each slot has a width about equal to the thickness of each of the wings 21, and the slots are spaced so that the wings 21 can be inserted into them.

The area 24 between the slots 23 may be rounded at its outer end. On its outer face there is a wedge-shaped boss or elevation 25 whose blunt end defines a shoulder 26 facing away from the hinge axis. The formation 25 is adapted to be accommodated within the opening 19 when the parts are fully assembled.

The molding of the cover section 11 is entirely feasible since neither the slots 23 nor the boss 25 present any undercut formation that would preclude removal of the molded element from the mold. Moreover, the molding procedure is unaffected by the circumstance that the marginal side walls 14 may if desired be inclined to the main part 13, as shown.

The assembly of the sections is a simple procedure, involving merely the slidable interengagement of the parts in the direction of the arrows shown in FIG. 4. The wings 21 enter the slots 23, and as the body of the tongue 17 slides over the outer face of the area 24 it is held flat against this area by the locking effect of the hooked ends 22 of the wings 21 as they slide along the inside margins of the slots 23 (see FIG. 6). The tongue 17 and the area 24 are inherently elastically deflectable to a sufficient degree to allow the tongue to force its way over the wedge-shaped bump 25 whereupon the complementary shoulders 20 and 26 snap into firmly locked and practically inseparable interengagement. This interlocks the body and cover sections in secure long-lasting permanently hinged relationship.

The inner face of the area 24 may if desired be pro-
vided with a strengthening rib 27 extending parallel to the slots 23 and preferably slightly beyond the inner end of the area 24 (see FIG. 6).

It will thus be seen that by means of this invention an attractive display box can be produced at low cost, embodying hingedly connected sections one of which is of clear transparent molded plastic, and without requiring extraneous hinge elements or special manufacturing skills or tools. The features of the improved hinge construction are of course not in all respects restricted to a box of this specific kind.

It is to be understood that many of the details herein described and illustrated may be modified without necessarily departing from the spirit and scope of the invention as expressed in the appended claims.

What is claimed is:

1. A hinge construction connecting two walls of a box in edge-to-edge relation, comprising a tongue formed as an integral part of the first wall and joined to it along a flexible area defining the hinge axis, a pair of wings integral with the tongue and extending from its side edges along directions transverse to the hinge axis, a pair of slots in the second wall perpendicular to its edge and spaced to receive said wings, each wing having a hooked end that engages the slot margin to hold the tongue flat against the area between the slots, said area bearing a wedge-shaped boss whose blunt end defines a shoulder facing away from the hinge axis, and the tongue being provided with an oppositely facing complementary shoulder, said tongue and the area between the slots being resiliently deflectable so that the tongue can be forced over said boss to bring said shoulders into interlocked relation.

2. A hinge construction as defined in claim 1, in which said first wall is composed of polypropylene.

3. A hinge construction as defined in claim 2, in which the shoulder on said tongue is defined by the end of an opening in said tongue, the opening being shaped to accommodate said boss when the shoulders are interlocked.

4. A display box comprising opposed body and cover sections each of which has a main wall and upstanding peripheral side walls, said sections being hingedly connected in edge-to-edge relation, the cover section being composed of rigid clear transparent material, the body section being composed of a molded plastic which is substantially rigid except in thinned web-like regions and is flexible and fatigue-resistant in such regions, said body section walls being of a thickness which imparts rigidity thereto whereby the box has a fixed size and shape, one of the side walls of the body section being provided on its edge with at least one projecting tongue connected to the wall by an integral hinge-defining thinned region of the character described, a pair of wings integral with said tongue and extending from its side edges along directions transverse to the hinge axis, said cover section having its corresponding side wall provided with a pair of slots perpendicular to its edge and spaced to receive said wings, each wing having a hooked end that engages the slot margin to hold the tongue flat against the area between the slots, and interlocking shoulders on said tongue and area.

5. A box as defined in claim 4, in which said body section is composed of polypropylene.

No references cited.

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