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HINGES, AND PANEL ASSEMBLIES INCORPORATING SUCH HINGES

This invention concerns hinges, and panel assemblies incorporating such hinges.

In the construction of panel assemblies, e.g. in the form of free-standing display panel structures or of screens or the like, it is often desirable to
5 be able to connect together two or more adjacent panels in such a way that these may stand not only in a common upright plane, but so that they may also be arranged in upright planes at an angle to one
10 another, so that the relative dispositions of the

panels will ensure that the entire structure is stable, is of a desired configuration (e.g. to occupy a desired location), and/or presents a desired appearance.

5 An object of the present invention is to provide a construction of hinge which, when providing a connection between an adjacent pair of panels as afore-said, will permit one of the panels to swing to either side of the plane of the other in a simple, convenient, and economic manner.

10 With this object in view, the present invention provides a hinge structure comprising first and second hinge bodies adapted for securement thereto of respective members desired to be hingedly connected to one another, said bodies presenting, to each other, confronting
15 faces having parallel first and second hinge edges with corresponding said edges aligned with one another, and connecting means in the form of a first flexible web or strap hingedly connecting the first hinge edge of the first hinge body to the second hinge edge of the
20 second hinge body, and a second flexible web or strap hingedly connecting the second hinge edge of the first hinge body to the first hinge edge of the second body, so that the bodies may be pivoted relative to one another

as desired about the one or the other of two alternative pivot axes corresponding approximately to the first and second hinge edges, the first and second webs or straps being secured to the first and second hinge bodies respectively by provision, at each end of each web or strap, of a bead-like or rod-like enlargement being extending transversely to the web or strap, these enlargements being accommodated in respective bores in each hinge body with the adjacent web or strap portions accommodated in respective slots in each hinge body.

The hinge structure may be moulded of a suitable plastics material, such as polypropylene.

The first and second webs or straps preferably each correspond in extent to about one half of the confronting faces of the hinge bodies. Then, when the hinge bodies are aligned with one another, the two webs or straps disposed between the two bodies fit snugly therebetween.

Advantageously, each hinge body is in the form of a substantially rectangular block adapted to form a corner piece of a rectangular frame. For this purpose

each said block may have projecting therefrom, substantially at right angles, a pair of spigots engageable into the ends of respective tubular frame members.

Masking plates may be provided for masking the
5 bores in each hinge body, in which the bead-like or rod-like enlargement are accommodated, so that they are not visible in the assembled hinge structure.

The invention further provides, as a development made possible by the hinge assemblies as above discussed,
10 a panel assembly comprising two or more rectangular frames, the or each adjacent pair of rectangular frames being hingedly connected together in side-by-side disposition so as to be swingable relative to one another about a pivot axis corresponding approximately
15 to adjacent side edges of the frames, the hinged connection being provided by respective hinge structures, as aforesaid, provided one at each end of said pivot axis and providing respective corner pieces for each of said frames.

20 The frames may conveniently each be composed of tubular frame members, spigots on the respective

hinge bodies engaging into the ends of the respective said members to connect them together, and each said frame may be enclosed by a respective fabric envelope, e.g. of a look pile fabric.

5 Each said fabric envelope may be of a fabric which is of thermoplastics material or is thermoplastics backed, being stretched over the frame and retained in position by edge welding on three side of the frame.

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

Fig. 1 is an exploded perspective view illustrating a first embodiment of the hinge assembly of the invention;

15 Fig. 2 is a plan view illustrating the hinge assembly of Fig. 1 in its assembled condition, and indicating how it connects two panels together;

Fig. 3 is a front view corresponding to Fig. 2 but also showing how the connecting means thereof
20 may be masked;

Fig. 4 is a plan view comparable with Fig. 2, but showing how the two panels can be pivoted about either of two alternative pivot axes relative to one another;

Fig. 5 is a view comparable with Fig. 4, but showing the panels fully pivoted to lie against one another; and

Fig. 6 is an exploded view illustrating the connecting webs, one of the bodies, and one of the masking plates of a fourth embodiment of the invention, which is a modification of that illustrated in Figs. 1 to 5.

Throughout the figures of the drawings, similar reference numerals have been allocated to similar parts.

Referring firstly to Figs. 1 to 5, a first embodiment of the hinge structure of the present invention comprises a first hinge body indicated generally by the reference numeral 120 and a second hinge body indicated generally by the reference numeral 121. The first hinge body 120 has parallel first and second hinge edges 122 and 123, and the second hinge body 121 has corresponding first and

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second hinge edges 124 and 125. Each such hinge body body 120, 121 is basically in the form of an approximately cubic block, with its hinge edges along adjacent edges of the block, and in the full open
5 disposition shown in Figs. 2 and 3 where the two said bodies 120 and 121 lie substantially in alignment, the corresponding sides of the bodies face one another, with the hinge edges 122 and 124 aligned, and the hinge edges 123 and 125 aligned.

10 Connecting means are provided to connect such bodies in such a way as to enable the two bodies 120 and 121 to swing or hinge relative to one another from the aligned condition shown in Figs. 2 and 3, These connecting means comprise first and second webs or
15 straps 126 and 127 each of which corresponds in width to approximately one half of the height of the respective hinge body faces (of which one only is visible at 200 in Fig. 1) which confront one another in the full open condition of the hinge shown in Figs. 2 and 3 and
20 which together form a thin intermediate spacer between the two bodies 120 and 121.

The webs or straps 126 and 127 are connected with the bodies 120 and 121 by each said web being formed,

on each of its ends, with a respective enlargement in the form of an integral transverse rod or bead 201 which fits into a respective bore 202 provided in the respective bodies 120, 121 with the adjacent sections of the webs or straps 126, 127 accommodated in and extending through respective slots 203 provided in the block between the bores 202 and the corresponding hinge edges 122, 123, 124 and 125 of the bodies. The webs or straps 126 and 127 are formed of a suitable flexible plastics material such as polypropylene and, as can be seen, the web 126 provides a connection between the first hinge edge 122 of the first hinge body 120 and the second hinge edge 125 of the second hinge body 121. Conversely, the second web 127 provides a connection between the second hinge edge 123 of the first hinge body 120 and the first hinge edge 124 of the second hinge body 121.

As shown in Figs. 4 and 5 this arrangement of the webs 126 and 127 enables the hinge bodies 120, 121 to be swung, as desired, relative to one another, to one side or the other towards either of its closed-together conditioned (of which one is illustrated in full lines and the other is shown in chain-dotted lines in Fig.5). In swinging to the one side, as shown in full lines in Figs. 4 and 5, the hinge bodies 120 and 121 pivot relative

to one another about a pivot axis corresponding approximately to the registering hinge edges 122 and 124. During this swinging movement, the web 127 lies against the body 120 and the web 126 lies against the body 121. Upon swinging
5 movement in the opposit direction to the dotted line positions in Figs. 4 and 5 the web 127 lies against the body 121 and the web 126 lies against the body 120.

It will be appreciated that the two hinge bodies 120 and 121 can be adapted in any convenient manner to
10 enable components to be fixed thereto which are required to pivot relative to one another, such as a door or window and its frame, a container and its lid, and so on.

In this illustrated form of the hinge, each body
15 120 and 121 is adapted for a respective component to be fixed thereto by the body being formed with integrally-moulded spigots indicated generally by the reference numerals 160, 161, 162 and 163, the spigots 161 and 163 being separated from their respective bodies
20 120 and 121 by respective integrally formed collars or stops 205. In the case of the body 120, the two spigots 160 and 161 are at right angles to one another, as also are the spigots 162 and 163 of the body 121. This

arrangement enables each hinge body to serve, in addition to being a hinge component, as a respective corner piece connecting together adjacent members 172 and 174 of a respective frame (see particularly Fig. 3) of a respective rectangular panels 171 desired to be hingedly connected to one another (Figs. 2, 3, 4 and 5).

Each frame comprises square sectioned tubular frame members 173, 174 and these are joined at the ends of the respective side of the panel 171 desired to be connected to the next adjacent panel 171 by respective ones of the spigots being driven therein so as to be a tight friction or interference fit. Thus, in Figs. 2 to 5, the bodies 120 of two of the hinge structures serve as corner pieces of the frame of one panel and the associated bodies 121 serve as the complementary corner pieces of the frame of the next adjacent panel. In each panel, the frame is covered with an appropriate loop-pile or hook-pile fabric layer, e.g. of vinyl or vinyl backed fabric, which is drawn over the frame under tension and is welded along three edges to form a taut envelope over the frame. This envelope may be gapped in register with the hinge bodies if desired.

In the case where there are two panels, 171 only two of the frame corners are provided by the hinge bodies of respective hinge assemblies, and the other corners of the frame will be formed by respective simple block-line bodies which fit by respective spigots similar to the spigots 160, 161 into the respective ends of their respective frame members to form these members into the frame.

The two panel assembly of course, can have its panels arranged at an angle to one another so as to be free standing or can be folded against one another e.g. for storage,

The panel assembly can be used for display, exhibition or like purposes, or may simply be used as a screen in the same manner as prior known free standing foldable screens. If desired each panel may have hinge assemblies in accordance with the invention at all of its four corners, to enable it to be hingedly connected at each side to further panels whose construction is substantially equal to that of the panel 171 and therefore need no further description.

The invention is not confined to the precise details

of the foregoing example, and variations may be made thereto. For instance, as shown each of the hinge bodies 120 and 121 (as well as the block-like corner bodies where provided) may be formed with a respective opening 190 which in use serves to receive a tight-fitting peg (not shown) onto which can be engaged the respective hinge assemblies of a substantially identical screen. This arrangement, therefore, enables height variation of the screen assembly constructed using the hinges, simply by adding an upper row of panels along the upper edges of a lower row of panels. Where such pegs are not provided, a respective masking plate 300 (Fig. 3) having a deformable protrusion 301 for fitting tightly (e.g. as a snap fit,) into the respective opening 190, may be provided for blanking off the ends of the hinge bodies and for ensuring that the rods or beads 201 are retained in the respective bores 202.

In the modification illustrated in Fig. 6 the rods or beads 201 provided on the ends of the webs 126 and 127 are each of length substantially equal to the combined widths of the webs, with the bores 202 being of corresponding axial depth so that the possibility of movement of the rods or beads 201 in

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the bores 202 is minimised compared with the Figs. 1 to 5 embodiment. In this embodiment, also, the shape of the bodies (of which the body 121 is representative) is somewhat different from that of Figs. 1 to 5, and
5 shoulders 401, 402 are provided for abutment thereagainst of the respective frame members (not shown). Moreover, the opening 190 extends both through the body 121 and its spigot 163 to permit use of coupling pegs of substantial axial length.

10 Other modifications are possible within the scope of the following claims.



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CLAIMS

1. A hinge structure comprising first and second hinge bodies adapted for securement thereto of respective members desired to be hingedly connected to one another, said bodies presenting, to each other, confronting faces
5 having parallel first and second hinge edges with corresponding said edges aligned with one another, and connecting means in the form of a first flexible web or strap hingedly connecting the first hinge edge of the first hinge body to the second hinge edge of the
10 second hinge body, and a second flexible web or strap hingedly connecting the second hinge edge of the first hinge body to the first hinge edge of the second body, so that the bodies may be pivoted relative to one another as desired about the one or the other of two
15 alternative pivot axes corresponding approximately to the first and second hinge edges, the first and second webs or straps being secured to the first and second hinge bodies respectively by provision, at each end of each web or strap, of a bead-like or rod-like
20 enlargement disposed with its axis extending transversely of the web or strap, these enlargements being accommodated in respective bores in each hinge body with



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the adjacent web or strap portions accommodated in respective slots in each hinge body.

2. A hinge structure as claimed in claim 1 which is moulded of a plastics material.

5 3. A hinge structure as claimed in claim 2 wherein the plastics material is polypropylene.

4. A hinge structure as claimed in any preceding claim wherein the first and second webs or straps each correspond in extent to about one half of the confronting faces
10 of the hinge bodies.

5. A hinge structure as claimed in any preceding claim wherein each hinge body is in the form of a substantially rectangular block adapted to form a corner piece of a rectangular frame.

15 6. A hinge structure as claimed in claim 5 wherein each said block has projecting therefrom, substantially at right angles, a pair of spigots engageable into the ends of respective tubular frame members.

7. A hinge structure as claimed in any preceding



claim wherein masking plates are provided for masking the bores so that they are not visible in the assembled hinge structure.

5 8. A panel assembly comprising two or more rectangular frames, the or each adjacent pair of rectangular frames being hingedly connected together in side-by-side disposition so as to be swingable relative to one another about a pivot axis corresponding approximately to adjacent side edges of the frames, the
10 hinged connection being provided by respective hinge structures, as defined in any of the preceding claims, provided one at each end of said pivot axis and providing respective corner pieces for each of said frames.

15 9. A panel assembly as claimed in claim 8 wherein the frames are each composed of tubular frame members, spigots on the respective hinge bodies engaging into the ends of the respective said members to connect them together.

20 10. A panel assembly as claimed in claim 9 wherein each said frame is enclosed by a respective fabric



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envelope, e.g. of a loop pile fabric.

11. A panel assembly as claimed in claim 10 wherein
each said fabric envelope is of a fabric which is of
thermoplastics material or is thermoplastics backed,
5 being stretched over the frame and retained in position
by edge welding on three sides of the frame.

12. A hinge structure substantially as hereinbefore
described with reference to and as illustrated in Fig.
1 to 5 or in Fig. 6 of the accompanying drawings.

10 13. A panel assembly substantially as hereinbefore
described with reference to and as illustrated in
Figs. 2 to 5 or Fig. 6 of the accompanying drawings.
