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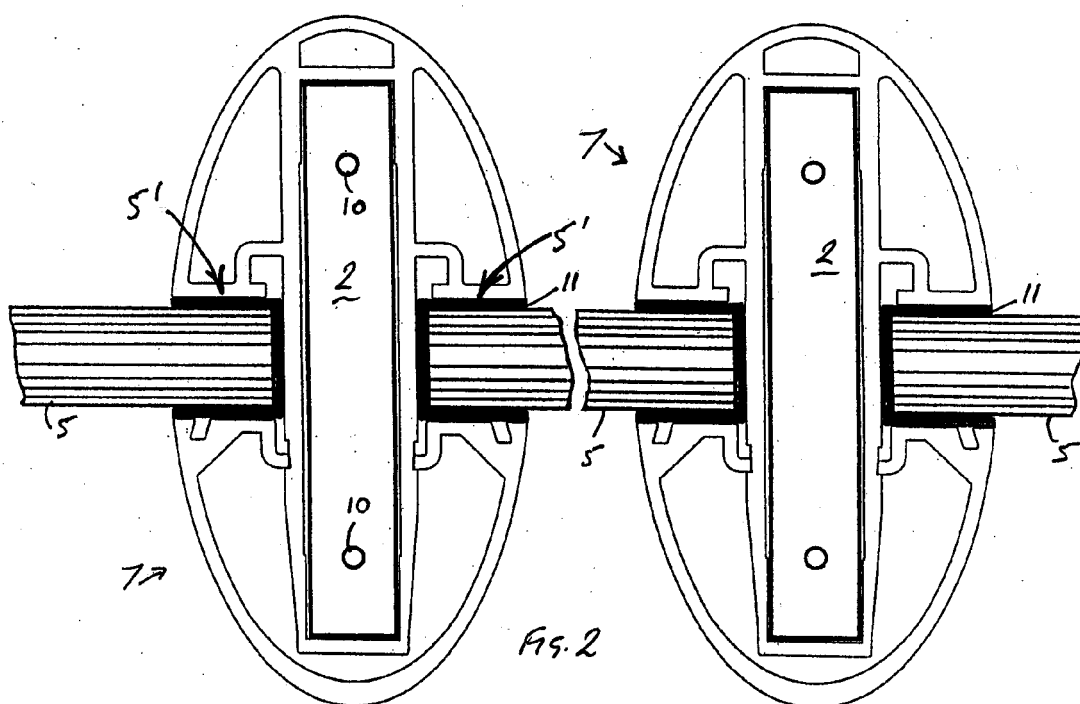
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(54) **Post and panel assembly and method, e.g. for glazed parapet**

(57) A barrier comprises an array of glass panels supported between fixed posts; each panel is retained in a channel defined by opposed walls of first and second shroud portions which are assembled together in snap-fit relation around the posts. The posts may be used to

support a safety barrier during building construction before assembling the shrouds and panels to provide a permanent parapet or the like. The shroud portions may be separated by flexibly deforming one of the portions using a special tool.



Description

[0001] This invention relates to fixed assemblies comprising panels supported by posts, and particularly (but not exclusively) to parapets comprising glass panels.

[0002] In this specification a parapet is a low freestanding wall, often topped with a handrail, which may be used for example as a safety barrier at the outer edge of a balcony or other floor region, or to guard the edge of a staircase. Such walls are often referred to as balustrades, and in this specification the terms "parapet" and "balustrade" are synonymous. Parapets are often constructed using glass panels supported by posts which are fixed at their lower end in an upright position (which is to say, in a position which is typically vertical but may be somewhat inclined, but not horizontal.) Post and panel assemblies are also found for example in fixed, glazed internal barriers used to subdivide commercial or residential buildings, and in curtain walls and large windows where the post comprises a mullion (a vertical post arranged between two adjacent panels of glass.)

[0003] Parapets are conventionally constructed by fixing panels of glass or metal to brackets welded to the posts. Usually each panel must be drilled to accept the fixing; where glass panels are used, this is relatively difficult and makes the panels vulnerable to failure at the fixing points where loads are concentrated. Since the fixings are accessible they are also vulnerable to tampering which may leave the parapet in an unsafe condition.

[0004] A further problem arises during building construction, when it is desirable to install a parapet at an early stage so as to provide protection at the otherwise unguarded edge of the balcony, roof terrace or the like; this however exposes the parapet to damage during the construction phase.

[0005] It is a general object of the present invention to provide a post and panel assembly and a corresponding method which may be used in particular to provide an improved parapet in light of the abovementioned problems.

[0006] In accordance with the present invention there are provided respectively an assembly and a method as defined in the claims.

[0007] Further features and advantages will be apparent from the following illustrative embodiments which will now be described, purely by way of example and with reference to the accompanying drawings, in which:

Figs. 1A and 1B show first and second stages in the assembly of a parapet in accordance with a first embodiment;

Fig. 2 is a top view of part of the parapet of Fig. 1B before installation of the handrail;

Figs. 3 and 4 are end views of the first and second shroud portions of the first embodiment, respectively before and after they are assembled together to form

the shroud;

Fig. 5A is an enlarged view showing two corresponding abutment surfaces of the first and second shroud portions;

Figs. 5B, 5C and 5D are views corresponding to Fig. 5A in accordance with three variants;

Fig. 6 shows how the shroud of the first embodiment is deformed after removal of one panel before engaging it with a disassembly tool;

Figs. 7 and 8 show a variant of the first embodiment whereby the shroud is engageable by the disassembly tool, respectively with two intact panels and with an infill block;

Fig. 9 shows the disassembly tool;

Figs. 10A and 10B show the disassembly tool engaged with the shroud of the first embodiment, respectively before and after deformation of the shroud;

Fig. 11 shows a second shroud in accordance with an alternative embodiment;

Figs. 12 and 13 are cross sections through a third shroud and post in accordance with a yet further embodiment, respectively before and after assembly of the first and second shroud portions; and

Fig. 14 shows an alternative disassembly tool.

[0008] Corresponding reference numerals indicate corresponding parts in each of the figures.

[0009] Referring to Fig. 1A, a horizontal floor surface 1 of a balcony, roof terrace, car parking space or the like is protected by a series of upright fixed posts 2, each comprising a solid steel bar of rectangular cross-section, which are fixed to the surface by means of footplates 3; of course, other materials and cross-sections may be used, and the posts could be fixed by other means, for example, by embedding them in the concrete floor slab.

[0010] The posts are preferably installed at an early stage of construction so that they can be used to support boards 4 or the like providing a temporary safety barrier for the edge of the floor.

[0011] Referring to Fig. 1B, when construction of the building is complete, the boards 4 are removed and the posts are used to support glass panels 5 to form a permanent fixed parapet; each panel is received at its vertical edges in a channel 6 in a two-part shroud 7, 7' which encloses the post as shown in Fig. 2 and further described below. Each shroud comprises first and second shroud portions 20, 30 which are arranged around the post so that they both extend along the full length of the

post in parallel with its vertical length axis X1; of course, if desired, part of the post may remain visible, for example, in the region immediately above the footplate. At the corner of the parapet the shroud 7 comprises two channels arranged to support the panels at an angle of 90 degrees, whereas the remaining shrouds 7 comprise two channels supporting pairs of adjacent panels in a straight line (180 degrees) configuration. (In the following description only the straight line configuration will be illustrated; it will be understood however that each shroud may comprise one, two or even more channels in any required angular configuration.)

[0012] A top cap 8 comprising an elliptical plate supporting a handrail 9 may be fixed by screws which engage in threaded holes 10 in the upper end of each post, which extends along its length axis X1 for the whole length of the shroud, providing a very strong assembly which is suitable for use where substantial loads are anticipated. The top cap may be configured to restrain both of the first and second shroud portions and the panels against upward movement. Since the posts are enclosed by the shrouds, surface damage to the posts during construction is not visible in the finished parapet.

[0013] In a variant, each post may extend for only part of the length of the shroud, in which case the rail may be attached to the shroud instead of to the upper end of the post, and the shroud may be retained against upward movement by fixing the first shroud portion (e.g. by fastenings passing through walls 27) to the post.

[0014] Referring to Figs. 2, 3 and 4, each shroud 7 comprises a first shroud portion 20 and a separate, second shroud portion 30, each being an elongate aluminium or aluminium alloy extrusion with a cross-section which is continuous along its length and having complementary or identical outer surfaces; in the example illustrated, the outer surfaces conform to an elliptical surface so that the assembled shroud has an elliptical cross-section with rounded contours. This is convenient because the longer axis X2 of the ellipse is aligned with the longer cross-sectional axis of the post which extends transversely to the length axis X3 of the parapet (which is aligned with the shorter axis of the ellipse), providing maximum bending resistance in the transverse direction. Advantageously, the rounded outer contours provide a safe environment for use, for example as a parapet on a balcony used by children, and make it very difficult to attempt to disassemble the shroud using conventional tools. The elliptical shape of the second shroud portion also facilitates its elastic deformation during disassembly as further described below. It will be understood however that the outer shell of the shroud may be adapted to conform to almost any desired geometry.

[0015] The first shroud portion 20 includes a tubular portion 21 defining a cavity 22 which receives the post; in use, the first shroud portion is positioned above the fixed post and the post is inserted into the cavity by sliding the first shroud portion 20 vertically downwardly over the post along its length axis X1. It is thus impossible to re-

move the first shroud portion other than by sliding it upwardly off the post.

[0016] The first shroud portion includes a pair of first surfaces 23, 23' which are arranged, one on either side of the tubular portion 21 and aligned with the length axis X3 of the parapet. In the example shown, the first shroud portion is arranged on the post so that its elliptical outer surface lies on the outward side of the balcony and its surfaces 23, 23' face inwardly towards the balcony; it will be understood that a panel bearing against the surfaces 23, 23' is therefore supported against outward movement even in the absence of the second shroud portion 30.

[0017] The second shroud portion comprises an elliptically curved outer wall 31 having two second surfaces 32, 32' which extend in parallel with the length axis X3 of the parapet so that they are arranged in opposed spaced parallel relation to the corresponding surfaces 23, 23' of the first shroud portion when the two portions are assembled together (Fig. 4), defining a channel 6 between each pair of surfaces.

[0018] With the post received in the cavity 22 of the first shroud portion, the peripheral vertical edge regions 5' of the respective glass panels 5 are protected by a resilient (e.g. elastomeric) beading 11 and arranged against the surfaces 23, 23'. The second shroud portion 30 is then positioned in an upright orientation alongside the post and parallel with its vertical length axis X1 so that each panel is arranged between the respective opposed surfaces 23, 32 and 23', 32', and the shroud 7 is assembled by moving the second shroud portion 30 laterally in the direction D 1 of the arrow (Fig. 3) along the axis X2 transversely to the length of the parapet to engage the first shroud portion.

[0019] As the two shroud portions are pushed together, the end wall 24 of the tubular portion 21 is received in the aperture 33 defined by two opposed projections 34 of the second shroud portion. The projections are urged apart by contact with ramped surfaces 25 of the tubular portion against the restoring force of the outer wall 31 which acts as a spring, until they enter into recesses 26 formed in the side walls 27 of the tubular portion to engage the first and second shroud portions together in snap-fit relation with the peripheral regions of the panels being securely received in the channels 6. Once assembled it is found that the elastomeric beading 11 provides sufficient frictional engagement between the panels and the opposed walls of the channels that it is impossible to slide the panels within the channels.

[0020] Referring to Fig. 5A, each recess 26 has square internal corners and defines a first abutment surface 26' and each projection 34 defines a second abutment surface 34' which are engaged together in snap-fit relation. Figs. 5B, 5C and 5D show alternative exemplary configurations of the respective abutment surfaces. In Figs. 5B and 5C the recess is undercut so that the first abutment surface 26' forms a lip which captures the second abutment surface 34', and in Figs. 5A and 5B it will be noted that the end surface 34" of the projection 34 is angled

away from the base of the recess 26. These and other features may be selected by those skilled in the art to ensure that after the first and second shroud portions are assembled around the fixed post to form the shroud, the second shroud portion 30 is securely retained in the recesses (even where the recesses are very shallow, for example, in the order of 0.5mm in depth), so that it cannot be detached without a specially adapted tool as will now be explained.

[0021] The second shroud portion 30 is provided with an engagement profile comprising two recesses 35, each recess extending from one of the surfaces 32, 32' so that it is arranged in a respective one of the channels 6. When the shrouds and panels are assembled these recesses 35 are concealed by the panels 5 and beading 11 so that the smoothly curved outer shell of the assembled shroud 7 is virtually impossible to engage (other than destructively) using tools. This ensures that once assembled, the parapet is secure against tampering, which is important for example where it forms a safety barrier for children in a domestic environment.

[0022] Referring to Fig. 6, when a panel is broken, the second shroud portion is no longer restrained by abutment of the respective surface 32' against the panel and so can be elastically deformed by rotating it in the direction D2 of the arrow to expose also the corresponding surface 32 in the opposite channel, so that both recesses 35 are accessible to be engaged by a specially adapted tool.

[0023] Referring to Figs. 7 and 8, in a variant arrangement, the elastomeric beading 11' may be arranged so that the recesses 35 are exposed in normal use. Where an infill block 12 is used to fill a part of a channel 6 not occupied by glass (such as the unused channels on the outer sides of the end posts in Fig. 1B, or beneath each panel to provide a gap between the bottom edge of the panel and the ground), the infill block may be similarly arranged to leave the recesses 35 exposed.

[0024] Referring to Figs. 9 — 10, a tool 40 comprises jaws 41 which are adapted to engage the recesses 35 of the second shroud portion 30 and to elastically deform the second shroud portion against the resilient restoring force of the outer wall 31 as the wingnut 42 is tightened to move the jaws apart about the pivot 43. As the second shroud portion is resiliently opened out, the abutment surfaces 34' and 26' are released so that the second shroud portion may then be pulled away from the first shroud portion to disassemble the shroud and release the panel or panels (Fig. 10B.) In practice, two tools may be used simultaneously, for example in the upper and lower end regions of the shroud. Even where the recesses are normally exposed, by locating them in the channels 6, it is advantageously made extremely difficult for unauthorised persons not possessing the special tool to dismantle the shroud and hence reduce the security of the barrier.

[0025] In alternative embodiments an engagement profile could be provided on either or both shroud por-

tions.

[0026] Referring to Fig. 11, a second shroud 50 is similar in all respects to the first shroud except that the end wall 24 of the first shroud is removed, so that the cavity 22 which receives the post is defined, not by a tubular portion, but by a recess which is open along the length axis X1 of the shroud, which is to say, the recess has an opening 51 which extends along the entire length axis of the shroud.

[0027] In this embodiment, the shroud may be assembled, not only around a freestanding post 2 as illustrated in the first embodiment, but also around a post which is fixed at its upper and lower ends, such as a post forming the core of a mullion in a large window or glazed dividing wall or the like, and which extends along the entire length axis of the shroud. Assembly is achieved by positioning the first shroud portion 52 parallel with the post and then sliding it onto the post in the lateral direction D3 along the transverse axis X2 of the line of panels, and then positioning the panels in the channels 6 and sliding the second shroud portion 53 in the opposite direction D 1 to engage the first shroud portion as described above. The first shroud portion 52 is preferably screwed or bolted to the post, conveniently via the side walls 27, before assembling the other components.

[0028] In a variant (not illustrated), the post may extend for only part of the length of the shroud, in which case the opening 51 need extend for only part of the length of the shroud, which is to say, the recess is open along at least part of the length axis of the shroud. For example, the shroud 50 may be mounted between two short posts which form lugs projecting respectively upwards from a floor surface and downwards from a soffit or the like. The first shroud portion 52 may comprise a tubular portion similar to that of the first embodiment, with the end wall 24 being removed only locally at the upper and lower end regions of the first shroud portion to define two openings 51 which extend for only part of the length of the shroud, through which the lugs may enter into the cavity 22. The tubular portion (comprising an end wall similar to the end wall 24 of the first embodiment) thus extends for a central portion of the shroud between the openings 51 and adds rigidity, so that the shroud is self supporting without a solid core between the two short posts.

[0029] Referring to Figs. 12 and 13, a third shroud 60 comprises first 61 and second 62 shroud portions generally corresponding to those of the first shroud and assembled together in snap-fit relation, but the inner surface of the outer wall 63 of the second shroud portion includes a recess 64 which receives the end wall 24 of the tubular portion 21 when the two shroud portions are assembled together as shown in Fig. 13. This prevents the second shroud portion from being rotated as illustrated in Fig. 6, even where one of the panels is broken and removed. In the example illustrated, two infill blocks 13 are provided by way of illustration, being similar to the infill block 12 already described but retained in both portions of the shroud by ears 14 and formed so that they

completely fill the respective channel 6, which is not provided with recesses 35. This makes the assembled shroud extremely difficult to dismantle by any means, which may be preferred for some very secure applications such as glazed partitions in banks and the like, with one or both of the infill blocks being replaced by a panel of laminated security glass.

[0030] Referring to Fig. 14, an alternative disassembly tool 40' is generally similar to the disassembly tool 40, comprising jaws 41 which engage the recesses in the second shroud portion 30 and urge them apart as the wingnut 42 is tightened, pivoting the arms 44 about the pivot 43' which comprises a spring. The second shroud portion 30 is flexed by the tool until its abutment surfaces disengage from the first shroud portion (not shown).

[0031] In summary, in a preferred embodiment a barrier comprises an array of glass panels supported between fixed posts; each panel is retained in a channel defined by opposed walls of first and second shroud portions which are assembled together in snap-fit relation around the posts. The posts may be used to support a safety barrier during building construction before assembling the shrouds and panels to provide a permanent parapet or the like. The shroud portions may be separated by flexibly deforming one of the portions using a special tool.

[0032] If desired, the first shroud portion could be fixed to the post, for example, by screws passing through the side walls 27. In alternative embodiments, rather than attaching the second shroud portion to the first shroud portion, both shroud portions may be attached to the post. Alternatively the second shroud portion may be fixed to the tubular portion or to another part of the first shroud portion by other means than snap-fit engagement.

[0033] In alternative embodiments the posts may be fixed for example on a staircase so that the assembly performs the function of a balustrade. The novel shroud may also be used for retrofitting over existing fixed posts.

[0034] The shroud may be suitably finished, e.g. by polyester powder coating or anodising. In alternative embodiments, rather than extruding the shroud portions from aluminium or aluminium alloy, they may be formed for example from suitable plastics materials (depending on the loading that the assembly is designed to withstand) or from pressed steel sheet. The posts are preferably made from steel for strength.

[0035] The novel shroud assembly provides support for each panel along the entire length of its vertical edges, which is particularly advantageous when the panels are made from glass since it distributes any loading on the panel and avoids damage from stress concentrations. Of course, the panels could alternatively be made from metal, plastics or any other material.

[0036] The novel assembly may find uses in many fields, including without limitation canopies, shelters, balcony rails, balustrade replacement systems, clothing rail systems, curtain wall systems, direction boards, direction signs, display boards, display stands, guard rails, guide

rails, parapet rails, partition screens, privacy screens, queuing rails, screens, signs, terrace rails and tables, all including panels.

[0037] Many further adaptations may be made within the scope of the claims.

Claims

1. An assembly comprising at least one panel supported by at least one post, the post being fixed in an upright position;
characterised in that a shroud is provided, the shroud being formed from separate, first and second shroud portions and including a cavity, and the first and second shroud portions are arranged around the post so that the post is received in the cavity, and a peripheral region of the panel is received in a channel between opposed surfaces of the first and second shroud portions.
2. An assembly according to claim 1, wherein the second shroud portion is fixed to the first shroud portion.
3. An assembly according to claim 1, wherein the first shroud portion includes a tubular portion defining the cavity.
4. An assembly according to claim 3, wherein the second shroud portion is fixed to the tubular portion.
5. An assembly according to claim 1, wherein the first shroud portion includes a recess which is open along at least part of a length of the shroud, and the post is received in the recess.
6. An assembly according to any of claims 1 — 5, wherein the first and second shroud portions comprise respective abutment surfaces which are engaged together in snap-fit relation.
7. An assembly according to claim 6, wherein at least one of the shroud portions includes an engagement profile, and a tool is provided for engaging the engagement profile, the tool being operable to resiliently deform at least one of the shroud portions so as to release the abutment surfaces and disassemble the shroud portions.
8. An assembly according to claim 7, wherein the engagement profile is arranged in the channel.
9. An assembly according to any preceding claim, wherein the panel is made from glass.
10. An assembly according to any preceding claim,

wherein the first and second shroud portions are aluminium or aluminium alloy extrusions.

11. An assembly according to any preceding claim,
wherein the assembly is a parapet. 5

12. An assembly according to any preceding claim,
wherein two channels are defined by respective opposed
surfaces of the first and second shroud portions,
and respective peripheral regions of two panels
are received respectively in the two channels. 10

13. A method comprising:
 - providing at least one post and at least one panel, 15
 - and fixing the post in an upright position;
 - and **characterised by**:
 - providing separate, first and second shroud 20
 - portions,
 - and assembling the first and second shroud
 - portions around the fixed post to form a
 - shroud, the shroud including a cavity, so
 - that the post is received in the cavity and a 25
 - peripheral region of the panel is received in
 - a channel between opposed surfaces of the
 - first and second shroud portions.

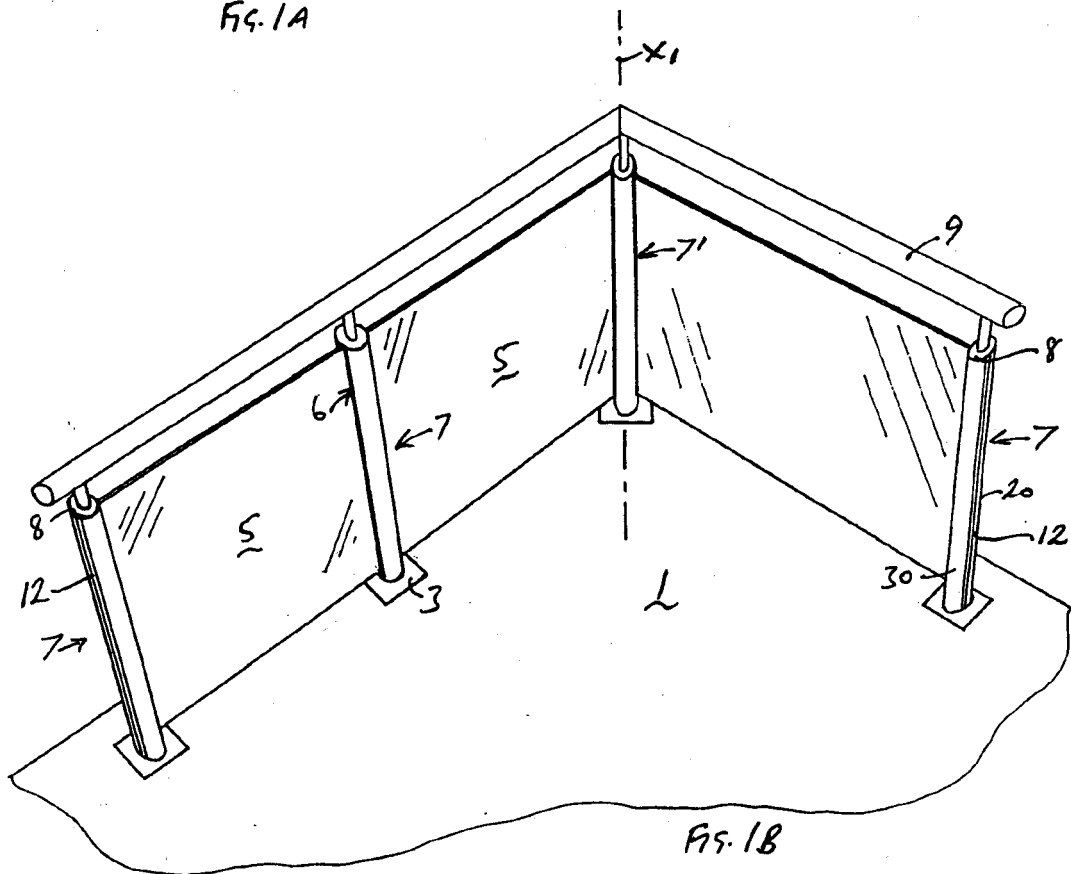
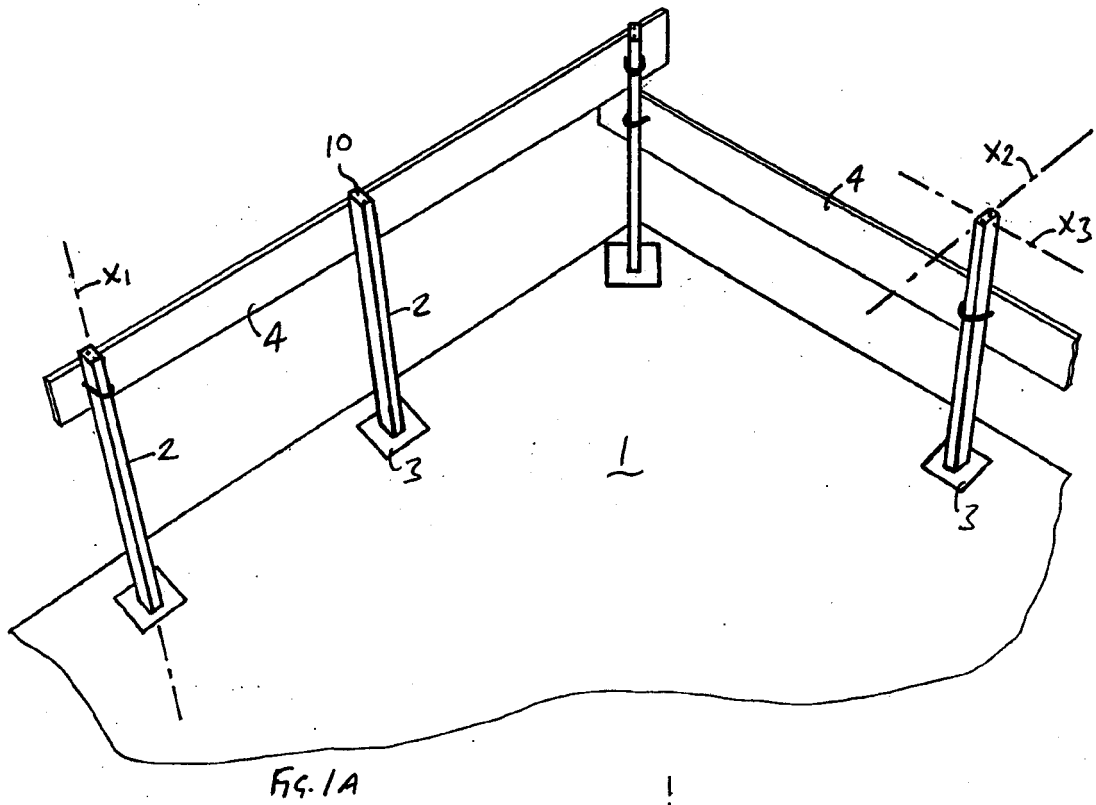
14. A method according to claim 13, wherein the post is 30
inserted into the first shroud portion by sliding the
first shroud portion down over the post,
and then the second shroud portion is positioned in
an upright orientation alongside the post, the panel
is arranged between the respective opposed surfaces, 35
and the shroud is assembled by moving the second
shroud portion laterally to engage the first
shroud portion.

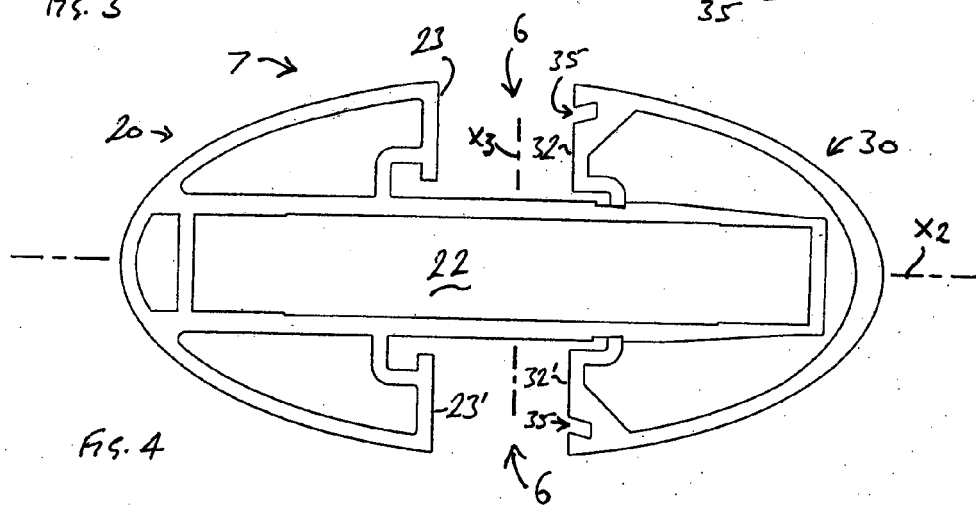
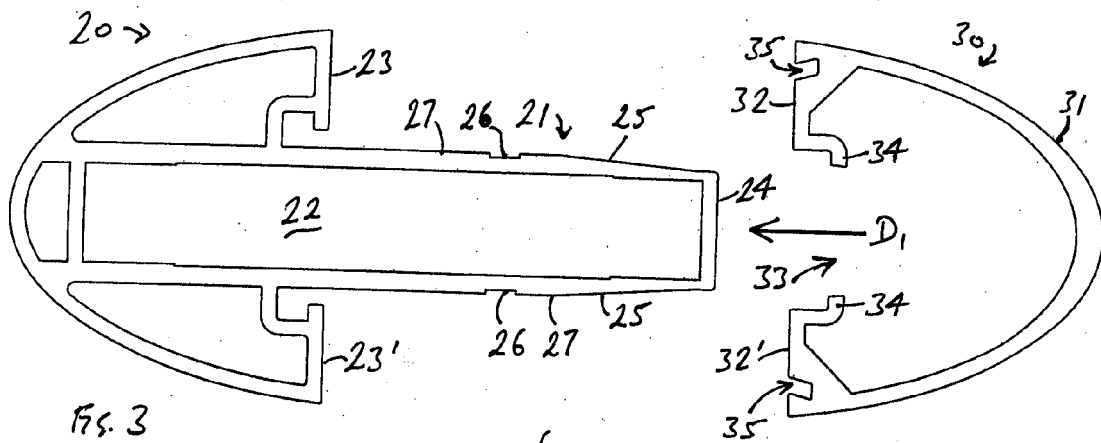
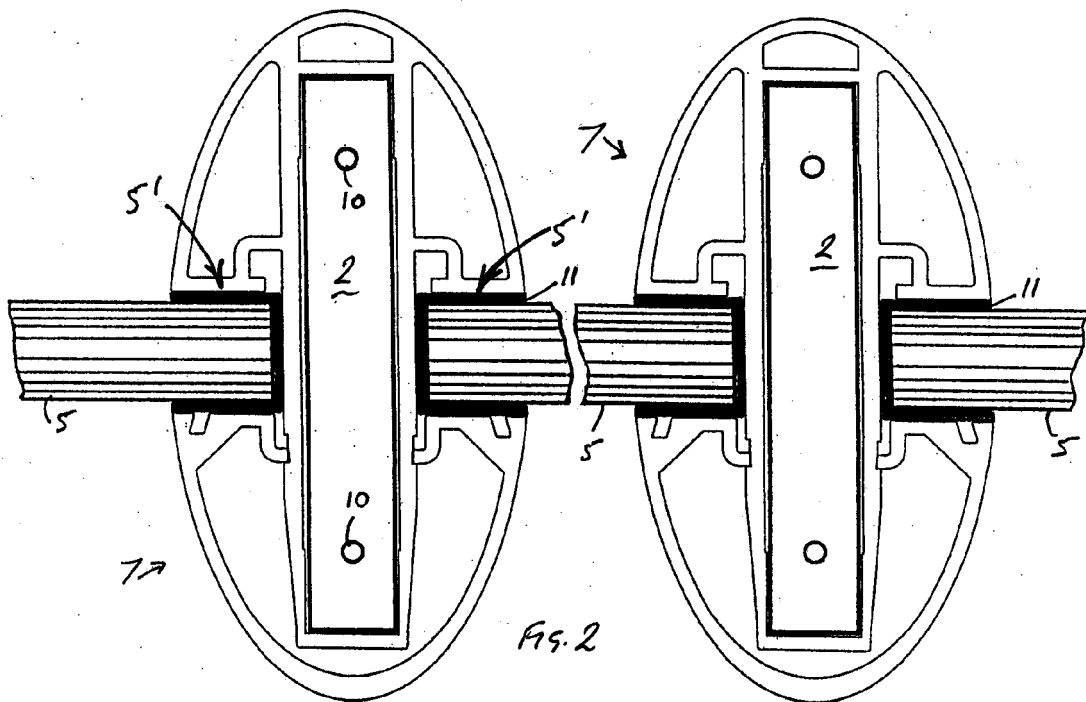
15. A method according to claim 14, wherein the first 40
and second shroud portions are engaged together
in snap-fit relation.

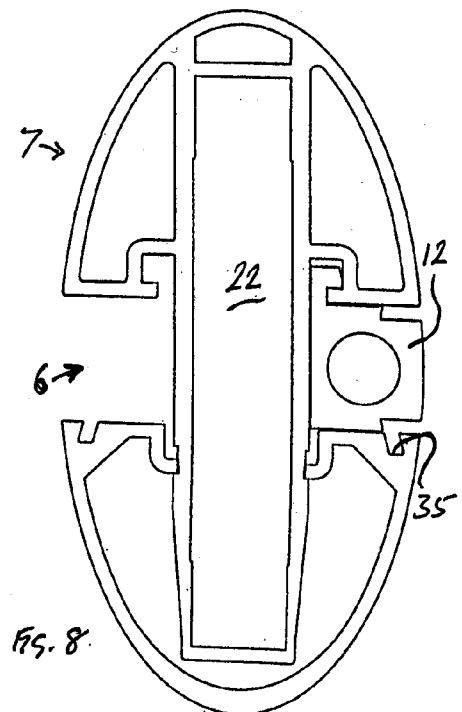
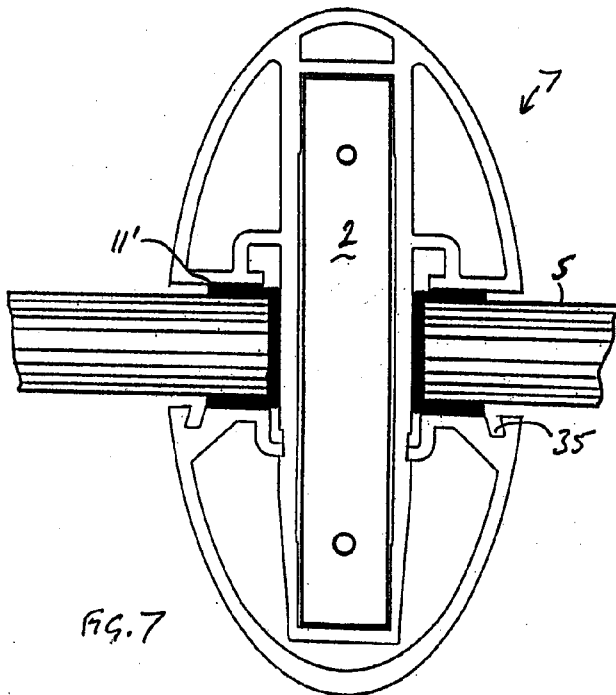
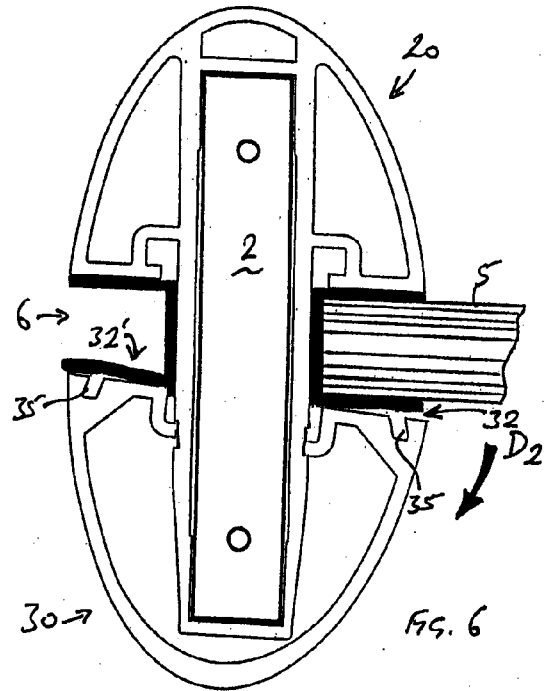
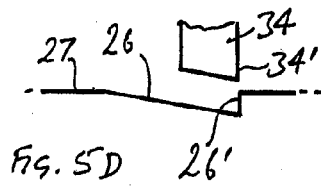
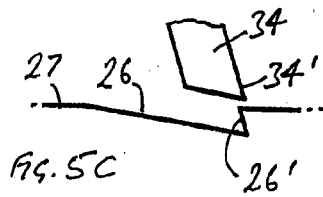
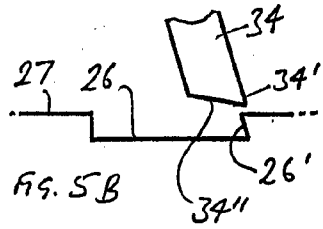
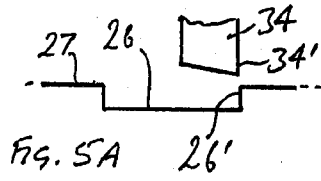
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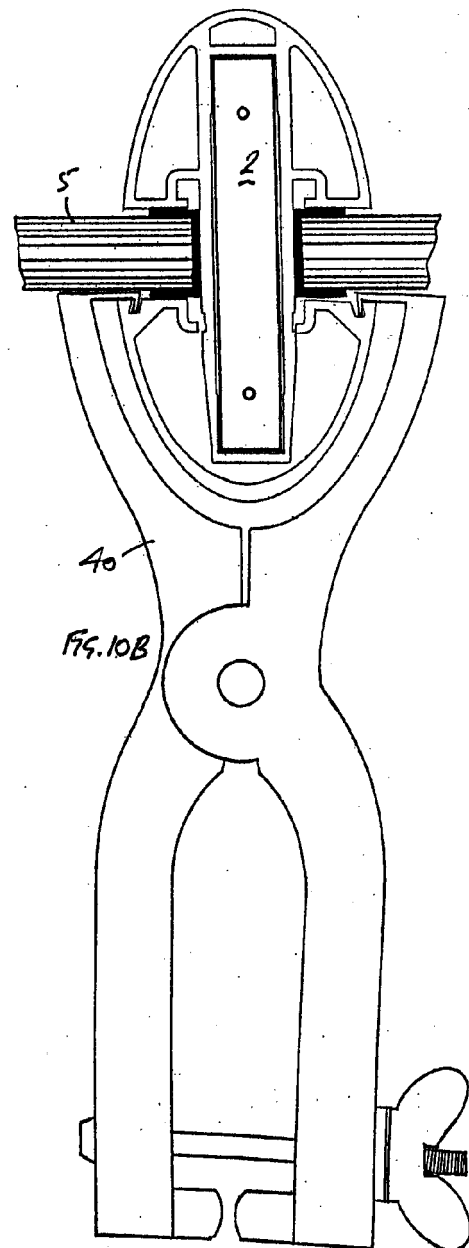
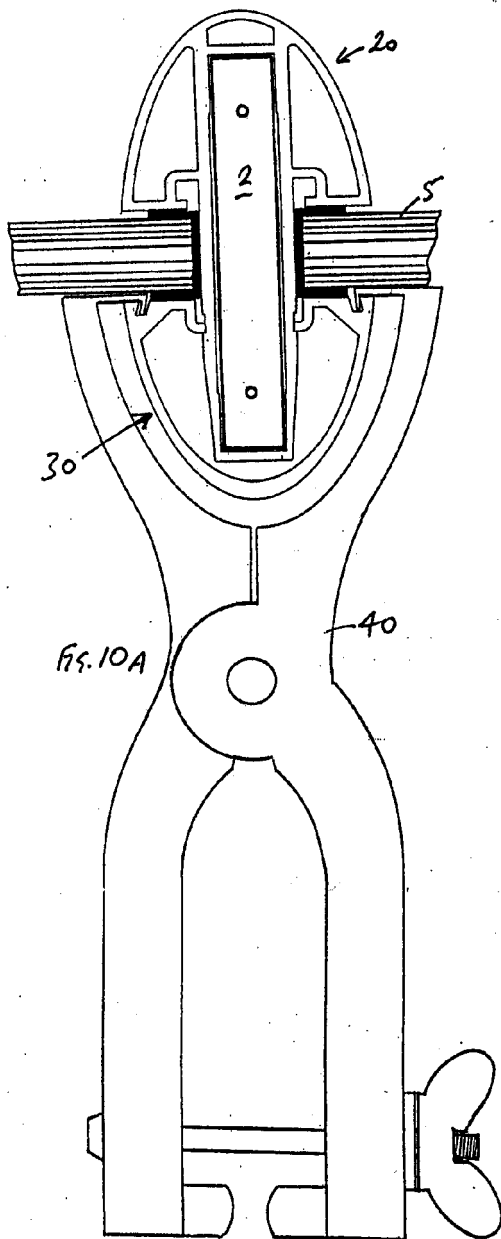
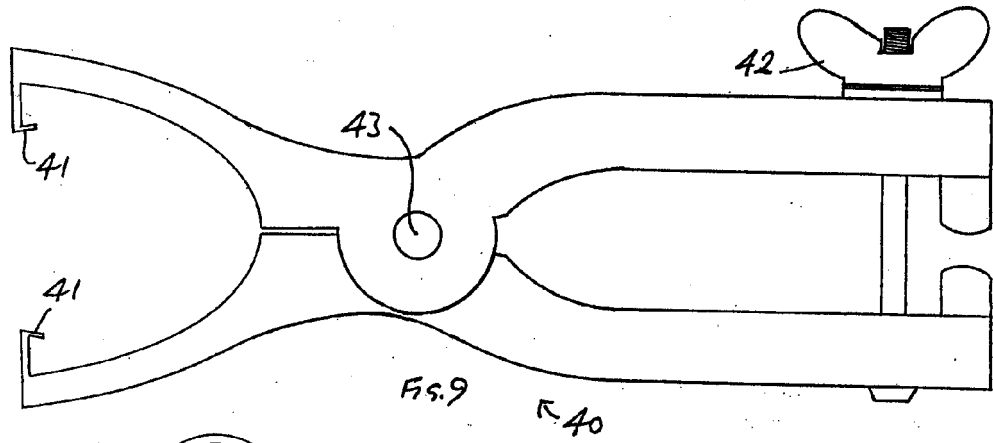
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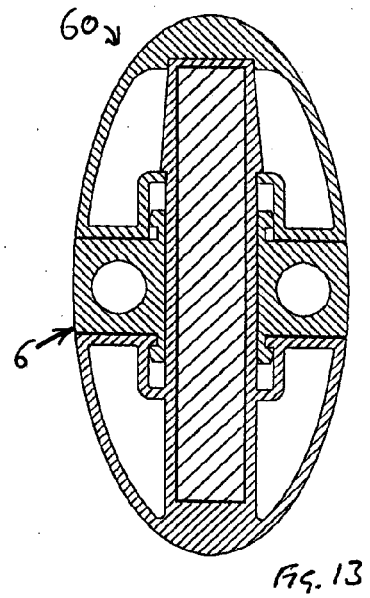
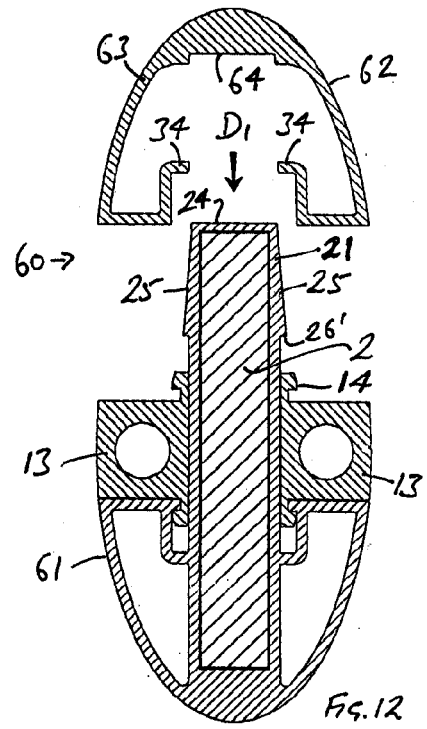
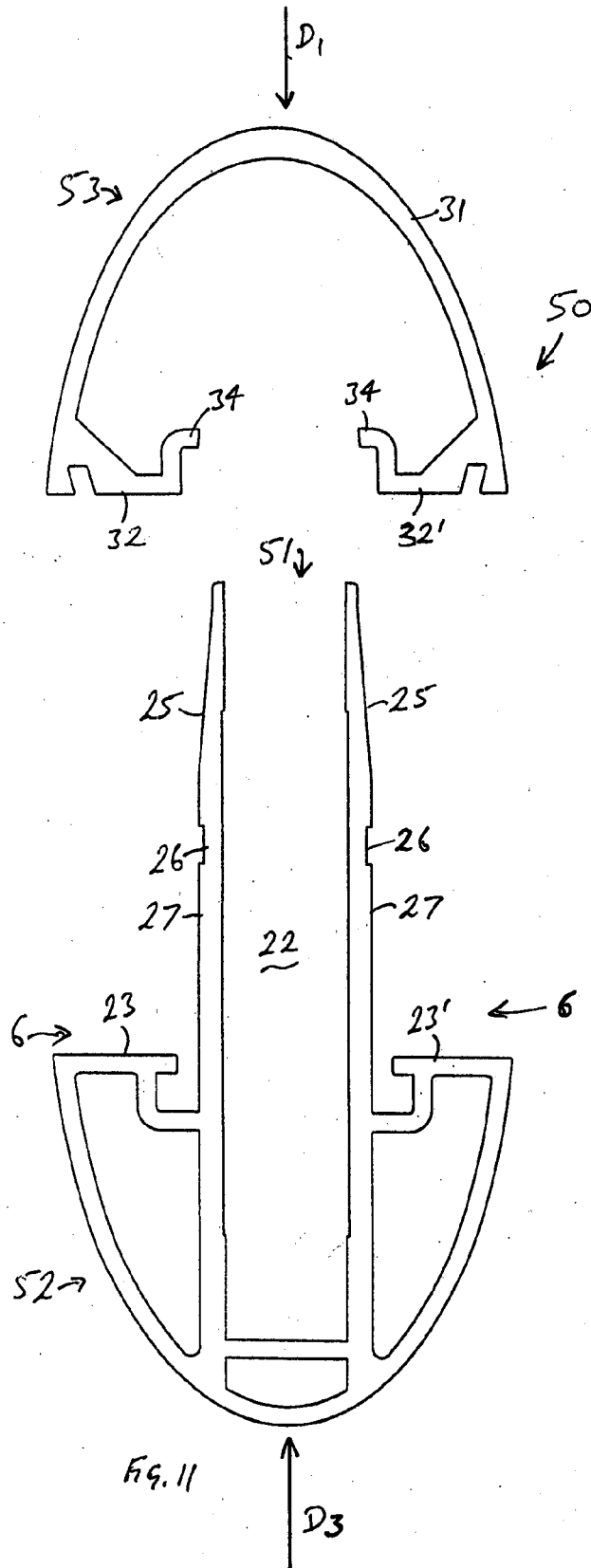
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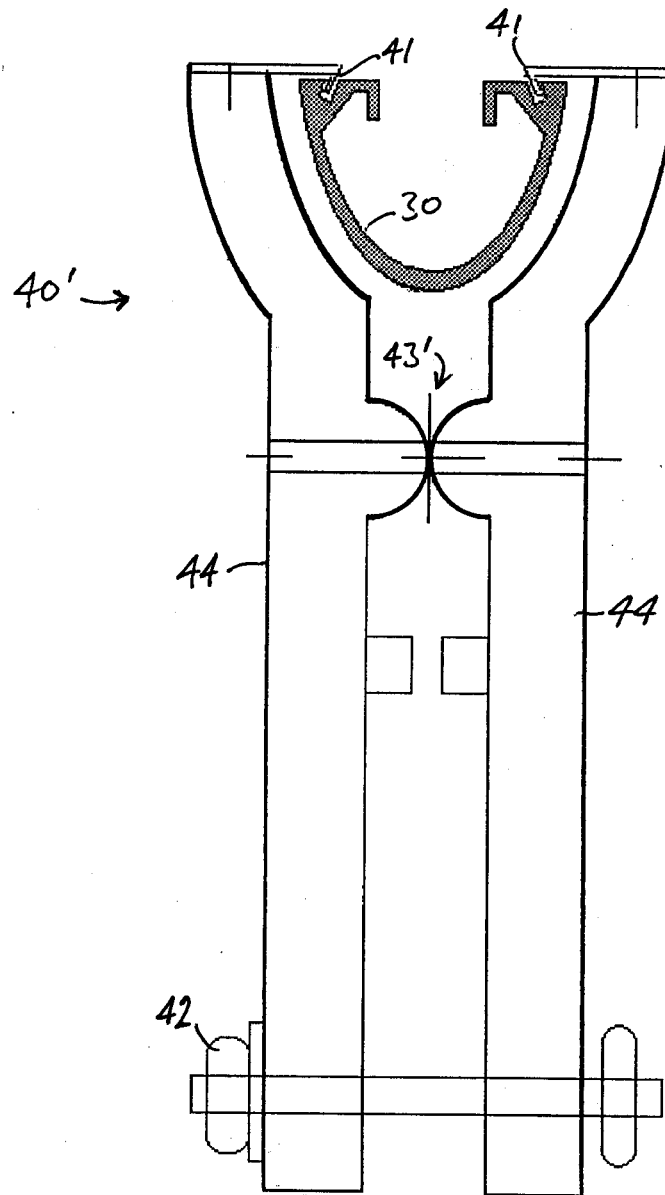


Fig. 14