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(54) **Plate-shaped playground components**

(57) A method for forming and assembling playground components consisting of plate members of extruded plastic of polyethylene (PE or PEHD, and which e.g. are constituted by tables, benches, chairs, stools, swing sets, slides, and/or staircases, wherein the plate members are connected to each other by means of mutually complementary connecting members extending predominantly at right angles to each other, and which are constituted by countersunk grooves and complementary shaped edge parts fitting therein. A playground component consisting of extruded, dimensionally stable, laminated plastic plate of polyethylene (PE or PEHD) which is designed with one or more mutually parallel bends with varying bending radius, wherein the plastic plate at the side which in the situation of use is the back side of the plastic plate is formed with mutually parallel notches, the width, spacing and number of which determined by the actual bending radius of the bends.

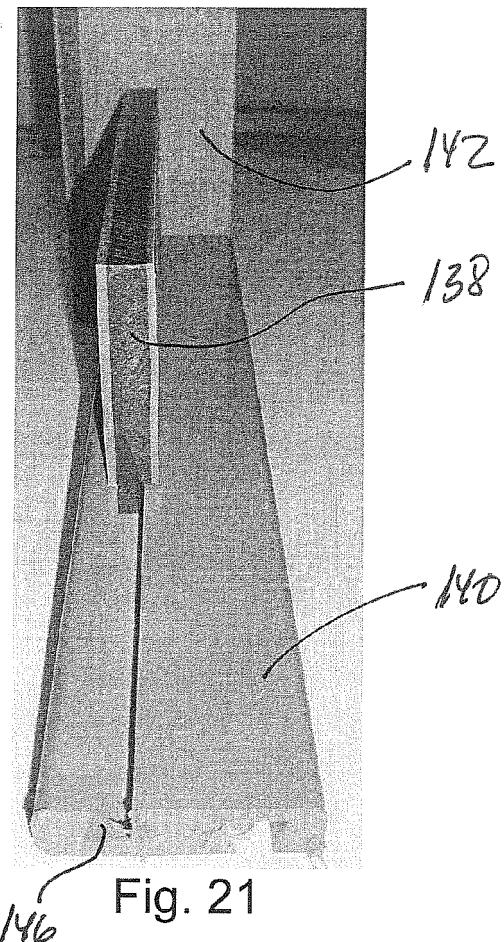


Fig. 21

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Description

Field of the Invention

[0001] The present invention concerns a method for forming and assembling plate-shaped playground components and of the kind indicated in the preamble of claim 1.

[0002] The invention also concerns playground components made by the method.

Background of the Invention

[0003] Plate-shaped playground components are traditionally made of painted boards of water-proof plywood. Today, plate-shaped playground components are increasingly made of plastic plates, for example extruded plates of polyethylene, e.g. PE or PEHD. The plastic plates can be laminated and consist of a relatively thick core material of darkly coloured recycled plastic and of front and back side layers of solid coloured plastic in the wanted colour. For example, a plate with a thickness of about 15 mm consists of a core with a thickness of about 10 mm, a front side layer with a thickness of about 3 mm and a back side layer with a thickness of about 2 mm.

[0004] In addition, it is known to make large curving, circular or tubular playground components by rotary moulding or vacuum moulding which, however, are relatively expensive and imprecise production methods.

Object of the Invention

[0005] On that background it is the object of the invention to indicate a method for forming and assembling playground components that consist of plate members with the purpose of increasing plasticity and enabling new and exciting designs of the playground components in question.

[0006] At the same time, the invention enables achieving an appreciable reduction of the maintenance costs and at the same time a substantial improvement of the safety of playground components, which for the greater part consist of extruded, dimensionally stable plastic plates of polyethylene - PE/PEHD.

Description of the Invention

[0007] The method according to the invention is peculiar in that the plate members are connected to each other by means of mutually complementary connecting members extending predominantly at right angles to each other, and which are constituted by countersunk grooves and complementary designed edge parts fitting therein. In a simple way is hereby achieved possibility of a new and exciting design of the type of playground components in question. At the same time, the invention enables achieving an appreciable reduction of the maintenance costs and at the same time a substantial improvement

of the safety of playground components, which for the greater part consist of extruded, laminated and dimensionally stable plastic plates of polyethylene - PE/PEHD.

[0008] The method according to the invention is preferably modified in that the extruded plastic plate is laminated with a central core which e.g. consists of contrastingly coloured recycled plastic, whereas opposing side parts consist of completely smooth coloured surfaces.

[0009] For example, a plastic plate of extruded laminated polyethylene (PE or PEHD) has a thickness of about 15 mm wherein the core - which consists of a contrastingly coloured recycled plastic - has a thickness of about 10 mm whereas the front and back side layers have a thickness of e.g. 2.5 mm, corresponding to the depth of the indicated notches being about 12.5 mm such that the notches at the back side layer cannot be seen from the front side of the plastic plate.

[0010] By engraving patterns in the front or back side layer of the extruded plastic plate with a depth corresponding to the thickness of the front or back side layer, a decorative effect can be achieved in a very simple way by making the contrastingly coloured core material of recycled plastic visible.

[0011] In that connection it is further to be noted that it will mean an appreciable cheaper plastic plate if the core material consists of recycled plastic.

[0012] With the object of increasing the flexibility, the method according to the invention can advantageously be modified such that the plate members are made extra bendable by means of parallel notches transverse to the bending direction in a back side of the plate members, and that opposing edges of the plate members after bending are fixed in the desired shape in complementarily shaped countersunk grooves of plate members extending at right angles to the bent plate members, and possibly by clamping together at certain points.

[0013] The method according to the invention can advantageously be performed such that the spacing between the notches is reduced by small bending radius of the plate members and is increased by greater bending radius of the plate members.

[0014] With the purpose of providing easily reproducible connecting members it may be advantageous if the method according to the invention is performed such that as the mentioned connecting members are used countersunk dovetailed grooves and complementarily shaped edge parts with dovetail shape.

[0015] Alternatively, the method according to the invention can be modified such that as the mentioned connecting parts are used countersunk straight-sided grooves for receiving edge parts of the plate members and clamping at certain points, which particularly can be advantageous when fixing opposing side edges of a flight of stairs or a slide.

[0016] The invention furthermore concerns playground components consisting of extruded, dimensionally stable, laminated plastic plate of polyethylene (PE or PEHD) designed with one or more mutually parallel

bends with varying bending radius, and which are peculiar in that the plastic plate at the side which in the situation of use is the back side of the plastic plate is formed with mutually parallel notches, the width, spacing and number of which determined by the actual bending radius of the bends.

[0017] An embodiment of a playground component according to the invention and consisting of extruded plastic plate of polyethylene (PE or PEHD) in the form of a slide with plate-shaped sides can advantageously be designed such that opposing side edges of the plastic plate constituting the slide itself and which has a varying, undulating shape, are embedded in complementarily shaped grooves of the plate-shaped sides and are connected therewith at certain points.

[0018] Another embodiment of a playground component consisting of extruded plastic plate of polyethylene (PE or PEHD) in the form of a staircase with plate-shaped sides is characterised in that the staircase is constituted by horizontal plate-shaped steps, the opposing edges of which are embedded in horizontal grooves in the plate-shaped sides, and by vertical plate members the opposing horizontal edges of which are fixed in transverse countersunk grooves in bottom and top sides of the plate-shaped steps, and the opposing side edges of which are embedded in vertical grooves in the plate-shaped sides, and that the step parts are fixed at certain points between the plate-shaped sides.

[0019] A further embodiment of a playground component in the form of a table with integrated benches and consisting of extruded plastic plates of polyethylene (PE or PEHD) is characterised in that table top, gables, benches and support members are assembled by means of tongue and groove joints in the form of countersunk, milled grooves with dovetail cross-section and edge parts formed with complementary connecting parts with dovetail cross-section for insertion into the grooves.

[0020] Alternative embodiments of a playground component in the form of supporting girders or columns consisting of extruded plastic plates of polyethylene (PE or PEHD) can suitably be designed such that the girders or columns consist of elongated, relatively narrow plate members that are connected to each other by means of mutually complementary connecting members extending predominantly at right angles to each other, and which are constituted by countersunk grooves and complementarily formed edge parts fitting therein.

Description of the Drawing

[0021] The invention is explained more closely in the following with reference to the drawing, on which:

Fig. 1 shows a perspective view of an embodiment of a play table according to the invention;

Fig. 2 shows a plan view of an embodiment of a bench for the play table shown in Fig. 1 ac-

cording to the invention, as seen from the side;

Fig. 3 shows a perspective view of the bench shown in Fig. 2 according to the invention;

Fig. 4 shows a perspective view of an embodiment of a combined table with benches according to the invention;

Fig. 5 shows a perspective view of an embodiment of a sandpit table according to the invention;

Fig. 6 shows a plan view of the sandpit table shown in Fig. 5, as seen from the side;

Fig. 7 shows a perspective view of an embodiment of a water splash table according to the invention;

Fig. 8 shows a perspective view of an embodiment of a stool according to the invention;

Fig. 9 shows a plan view of the stool shown in Fig. 8, as seen from the side;

Fig. 10 shows a perspective view of an embodiment of a slide according to the invention;

Fig. 11 shows a perspective view of the slide shown in Fig. 10, as seen from the opposite end;

Fig. 12 shows a perspective view of a second embodiment of a slide according to the invention;

Fig. 13 shows a perspective view of the slide shown in Fig. 12, as seen from the opposite end;

Fig. 14 shows a plan schematic view of the slide shown in Figs. 12 and 13, as seen from the side;

Fig. 15 shows a plan schematic view of the slide shown in Figs. 10 and 11, as seen from the side;

Fig. 16 shows views of an embodiment of a swing set according to the invention;

Fig. 17 shows a plan view of all plate members of which the table with benches shown in Fig. 4 consist;

Fig. 18 shows a perspective view of an embodiment of a joint between plate members according to the invention;

Fig. 19 shows a perspective view of a second embodiment of a joint between plate members ac-

cording to the invention;

- Fig. 20 shows a perspective view of the embodiment of a joint between plate members shown in Fig. 19 according to the invention, wherein the plate members are mutually offset;
- Fig. 21 shows in a perspective view examples of joints according to the invention;
- Fig. 22 shows a perspective view of the joint examples shown in Fig. 21, as seen from another side;
- Fig. 23 shows a perspective view showing how a plate is made more bendable by means of parallel notches in the back side of the plate;
- Fig. 24 shows a perspective view of a box-shaped girder or post which is made up of elongated plate members interconnected by means of countersunk grooves and complementing pegs; and
- Fig. 25 shows the box-shaped girder or post shown in Fig. 24, wherein a plate member is offset relative to the other plate members.

Detailed Description of Embodiments of the Invention

[0022] The table 2 shown in Fig. 1 consists of a table top 4 made of extruded laminated plate of polyethylene (PE or PEHD) and two leg supports 6 also consisting of plate material similar to that of the table top, each made up of plate members 8, 10 of polyethylene.

[0023] The plates 8, 10 are assembled in T-shape by means of a central countersunk groove with dovetail cross-section formed in the plate 10, whereas the plate 8 is designed along a straight side edge with a similarly dovetailed edge profile which from an open lower end of the plate 10 has been pushed into the countersunk groove in the plate 10. The leg supports 6 are correspondingly connected with opposite end parts of a vertical rib 12 (Fig. 2) extending along an underside of the table top 4, the rib 12 being formed with a dovetail edge profile along an upper long side edge inserted in a complementarily shaped groove at the underside of the table top 4.

[0024] Leg supports 6 and rib 12 are subsequently fastened at certain points to the underside of the table top 4 by bolts or screws extending through it from the top side of the table top 4 via vertical holes in a top side edge to furniture fittings known per se which from a side of leg supports 6 and the rib 12, respectively, are embedded in preferably cylindrical borings which only open to one side of the leg supports 6 and the rib 12.

[0025] The bench 14 shown in Figs. 2 and 3 has gen-

erally a shape corresponding to the table 2, though with less width and height. The bench 14 consists of a seat plate 16, two leg supports 18 and a vertical rib running there between which also is connected to an underside of the seat plate 16. The leg supports 18 consists of two plates 20, 22 which are joined in the same way as described above in connection with the table 2.

[0026] Figs. 4 and 17 show a piece of playground equipment 24 in the form of a combined table 26 with integrated benches 28 constructed of plate-shaped sub-components of extruded polyethylene (PE or PEHD), and which consists of two uniform gables 30, a table top 32, two narrow ribs 34, two seat plates 36, two width ribs 38, two gable brackets 40 and two foot plates 42.

[0027] It appears most clearly in Fig. 17 how respective plate-shaped sub-components are to be assembled as the gables 30 are provided with the necessary holes for connecting bolts. For example, bolt holes 44 in the gables 30 fit with cylindrical borings 46 in the wide ribs 38 which are to be mounted in the above described way between the gables 30 and at the underside of the seat plates 36.

[0028] Correspondingly, bolt holes 48 in the gables 30 fit with cylindrical borings 50 in the narrow ribs 34 which are disposed immediately at the underside of the table top 32 and connected therewith in the previously described way as an upper long side edge of the ribs 34 is designed with a dovetailed edge profile that fits with and is inserted in longitudinal complementary grooves with dovetail cross-section at the underside of the table top 32.

[0029] By the playground equipment 24 it is generally so that all joints between the gables 30, gable brackets 40 and the ribs 34, 38 are made such that the connections between plate-shaped sub-components are designed in the previously described way by means of mutually complementing edge profiles and countersunk groove of respective plate-shaped sub-components.

[0030] Figs. 5 and 6 show a smaller table 52 with a table top 54 and a leg support 56 consisting of two plates 58, 60 which are joined at a right angle along a straight side edge of the plate 58 and a central vertical countersunk groove at one side of the plate 60, i.e. in a similar way as described above. The leg support 56 is adapted to be fastened at the bottom of a sandpit, and to this end the leg support 56 may comprise a not shown earth rod of steel.

[0031] Fig. 7 shows a piece of playground equipment 62 in the form of a so-called water splash table 64 which is made up of plate-shaped polyethylene with a hollow 66 for filling with water with a plate-shaped bottom 68 and a curving side plate 69 and an upper edge plate 70. The water splash table 64 is mounted on leg supports 72, the design of which corresponding to the leg supports 56 described in connection with Figs. 5 and 6.

[0032] The curving side plate 69 is preferably designed as one piece of plate bent into shape, the inner side is formed with vertical notches, i.e. transverse parallel notches in the bending direction at an inner side of the side plate 69 (Fig. 23), and after bending the opposing

longitudinal edges of the side plate are fixed in the desired shape in a complementarily shaped countersunk groove at the underside of the edge plate 70 and connected with the edge of the bottom plate 68 in a corresponding way, and possibly by clamping at certain points.

[0033] Figs. 8 and 9 show a stool 74 with a circular seat plate 76 and a leg support 78 consisting of perpendicularly interconnected plate members 80 and 82, i.e. constructed as previously described.

[0034] Figs. 10 and 11 show a dragon slide 84 constructed of plate-shaped sub-components in the form of two uniform seat plates 86, a slide part 88 and a staircase part 90. Opposite the staircase part 90, the side plates 86 include a curving side edge part 92 which is designed with elongated gripping apertures 94 which together form a kind of handrail 96.

[0035] Figs. 12 and 13 show a whale slide 98 constructed of plate-shaped sub-components in the form of two uniform seat plates 100, a slide part 102 and a staircase part 104. Opposite the staircase part 104, the side plates 100 include a curving side edge part 106 which is designed with elongated gripping apertures 108 which together form a kind of handrail 110.

[0036] Figs. 14 and 15 serve to illustrate the course and the position, respectively, of the transverse connecting plates disposed between the seat plates 86, 100 and which together form the slide and the staircase.

[0037] Fig. 16 shows how a unilaterally supported swing set 112 according to the idea of the invention can be constructed with the required support rigidity by means of an internal system of plate-shaped reinforcement ribs 114.

[0038] Fig. 18 shows a joint between two mutually perpendicular plates 116 and 118 where a side edge 120 of the latter plate 118 is inserted in a straight sided recess 122 with the same width as the side edge 120. The mutual connection is additionally secured by means of a furniture fitting known per se with a cylindrical anchor 124 with screw thread for a screw or bolt which is introduced from the opposite side of the plate 116.

[0039] Figs. 19 and 20 show a joint between two mutually perpendicular plates 126 and 128 wherein a side edge 130 of the latter plate 128 is designed with a dovetail side edge provide 132 that fits into a complementing countersunk groove 134, i.e. so that the side edge profile 132 can be inserted from an open side edge 136 of the plate 126 into the groove 134 and form a stable connection between the plates 126 and 128.

[0040] Figs. 21 and 22 show joints between plate members 138, 140 and 142 wherein a plate member 138 by means a side edge profile 144 with dovetail cross-section is embedded in a complementary groove 146 in the plate member 140, whereas an opposite end edge of the plate member 138 is additionally connected with the plate member 142 by means of a furniture fitting 148 known per se.

[0041] Fig. 23 shows how an extruded plate 150 of polyethylene can be made more bendable by providing

a back side of the plate 150 with parallel notches 152 at right angles to the bending direction such that a small spacing between the notches 152 corresponds to the plate 150 capable of being bent with a small radius of curvature, and greater spacing between the notches corresponds to greater radius of curvature of a given bend.

[0042] Figs. 24 and 25 show views of e.g. a box-shaped girder 154 made up of elongated plate members 156, 158, 160, 162 of extruded polyethylene, the plate members 156, 158, 160, 162 being joined by means of opposing edge parts with dovetail cross-section 164 of the plate members 156 and 158, whereas the plate members 160 and 162 are designed with complementarily designed countersunk grooves 166, also with dovetail cross-section.

[0043] In other words, it is within the scope of the invention to design structural elements with any suitable profile, they being perpendicular angle profile girders, I-girders, H-girders and support girder with two or more mutually parallel vertical plate profiles, i.e. horizontal support girders made up of such plate-shaped sub-components can be adapted to a concrete task with the desired rigidity/load capacity.

Claims

1. A method for forming and assembling playground components consisting of plate members of extruded plastic, preferably polyethylene, and which e.g. are constituted by tables, benches, chairs, stools, swing sets, slides, and/or staircases, **characterised in that** the plate members are connected to each other by means of mutually complementary connecting members extending predominantly at right angles to each other, and which are constituted by countersunk grooves and complementary designed edge parts fitting therein.
2. Method according to claim 1, **characterised in that** the extruded plastic plate is laminated with a central core which e.g. consists of contrasting coloured recycled plastic whereas opposite side parts consist of completely smooth coloured surfaces.
3. Method according to claim 1, **characterised in that** the plate members are made extra bendable by means of parallel notches transverse to the bending direction in a back side of the plate members, and that opposing edges of the plate members after bending are fixed in the desired shape in complementarily shaped countersunk grooves of plate members extending at right angles to the bent plate members, and possibly by clamping together at certain points.
4. Method according to claim 1-3, **characterised in that** the spacing between the notches is reduced by

small bending radius of the plate members and is increased by greater bending radius of the plate members.

5. Method according to claim 1-3, **characterised in that** as connecting members there are used countersunk dovetail grooves and edge parts that are complementarily shaped with dovetail cross-sections. 5
6. Method according to claim 1-3, **characterised in that** as connecting members there are used countersunk straight-sided grooves for receiving edge parts of the plate members and for clamping at certain points. 10 15
7. A playground component consisting of extruded plastic plate of polyethylene (PE or PEHD) which is designed with one or more mutually parallel bends with varying bending radius, **characterised in that** the plastic plate at the side which in the condition of use is the back side of the plastic plate is formed with mutually parallel notches, the width, spacing and number of which determined by the actual bending radius of the bends. 20 25
8. Playground component according to claim 6 and consisting of extruded plastic plate of polyethylene (PE or PEHD) in the form of a slide with plate-shaped sides, **characterised in that** opposing side edges of the plastic plate constituting the slide itself and which has a varying, undulating shape, are embedded in complementarily shaped grooves of the plate-shaped sides and are connected therewith at certain points. 30 35
9. Playground component consisting of extruded plastic plate of polyethylene (PE or PEHD) in the form of a staircase with plate-shaped sides, **characterised in that** the staircase is constituted by horizontal plate-shaped steps, the opposing edges of which are embedded in horizontal grooves in the plate-shaped sides, and by vertical plate members the opposing horizontal edges of which are fixed in transverse countersunk grooves in bottom and top sides of the plate-shaped steps, and the opposing side edges of which are embedded in vertical grooves in the plate-shaped sides, and that the step parts are fixed at certain points between the plate-shaped sides. 40 45 50
10. Playground component in the form of a table with integrated benches and consisting of extruded plastic plates of polyethylene (PE or PEHD), **characterised in that** table top, gables, benches and support members are assembled by means of tongue and groove joints in the form of countersunk, milled grooves with dovetail cross-section and edge parts formed with complementary connecting parts with 55

dovetail cross-section for insertion into the grooves.

11. Playground component in the form of supporting girders or columns and consisting of extruded plastic plates of polyethylene (PE or PEHD), **characterised in that** the girders or columns consist of elongated, relatively narrow plate members that are connected to each other by means of mutually complementary connecting members extending predominantly at right angles to each other, and which are constituted by countersunk grooves and complementarily formed edge parts fitting therein.

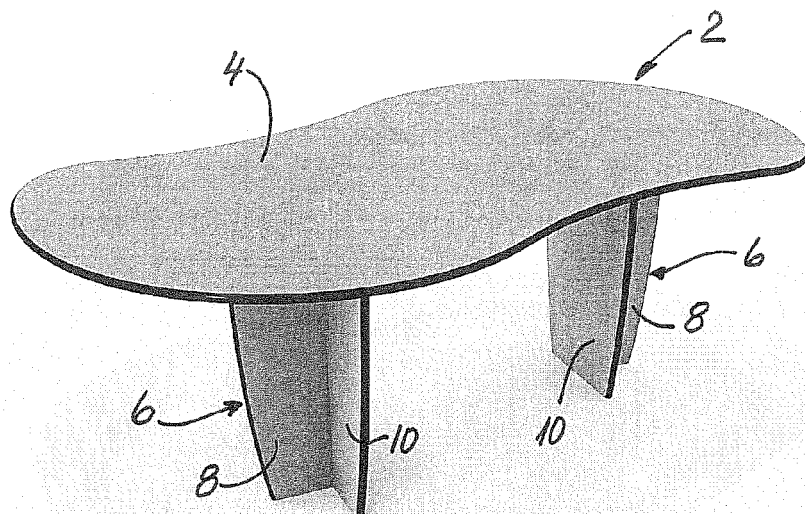


Fig. 1

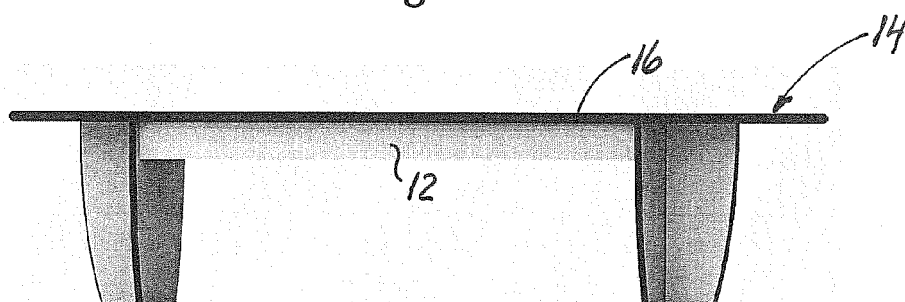


Fig. 2

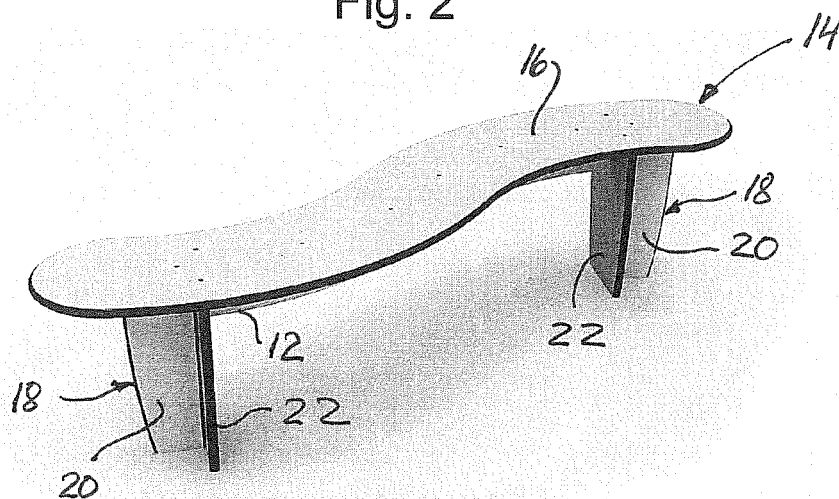


Fig. 3

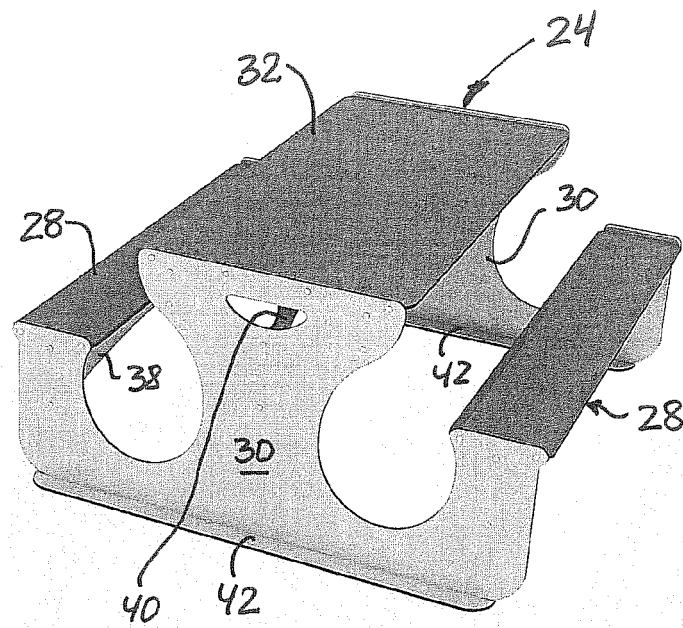


Fig. 4

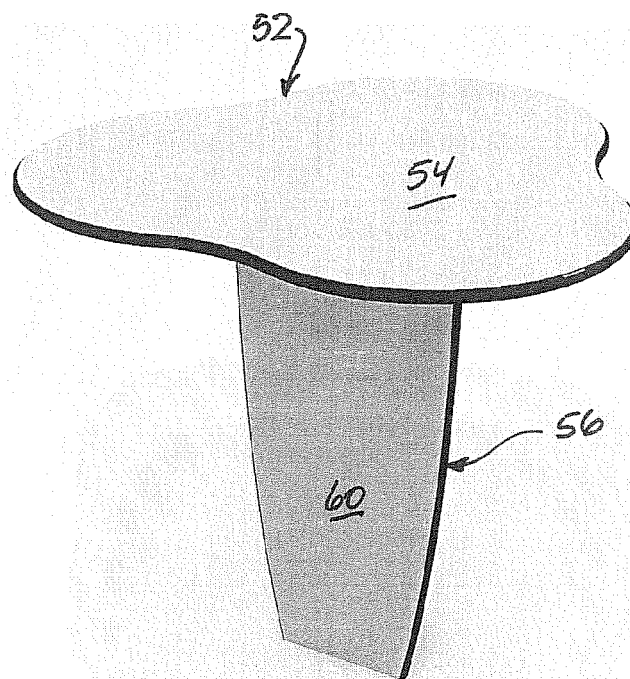


Fig. 5

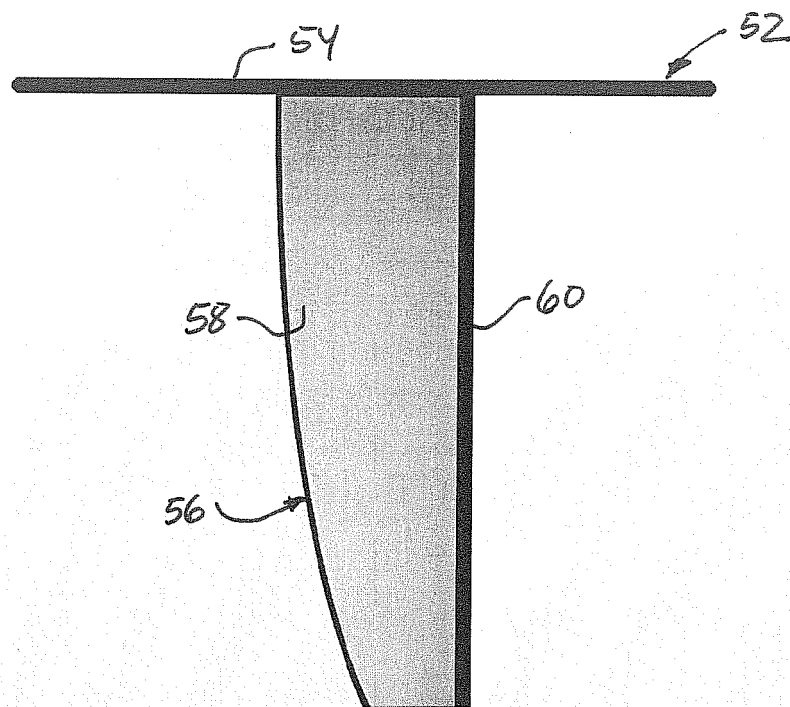


Fig. 6

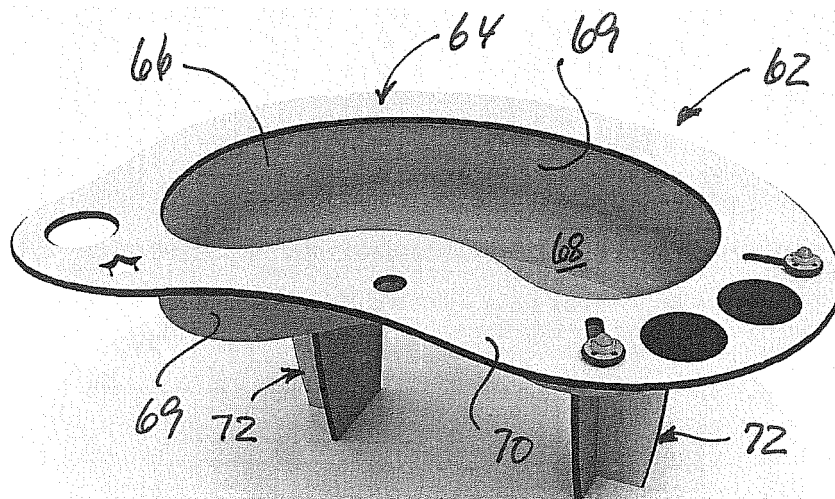


Fig. 7

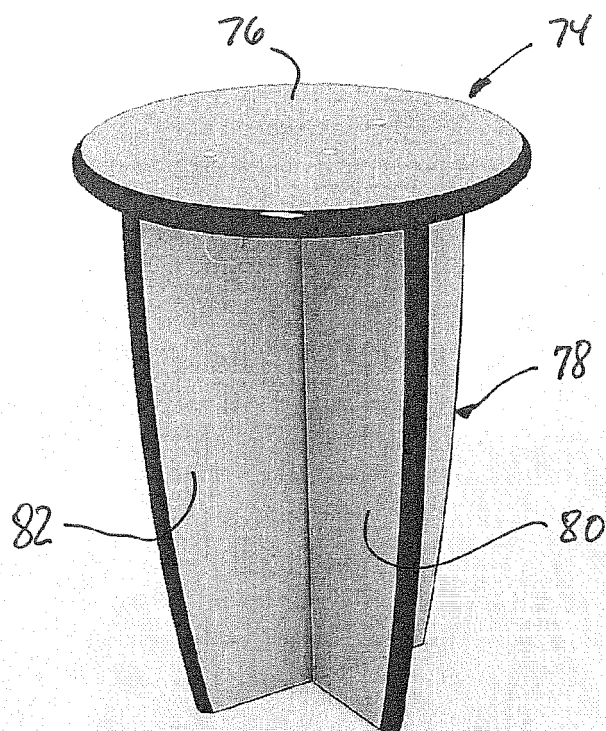


Fig. 8

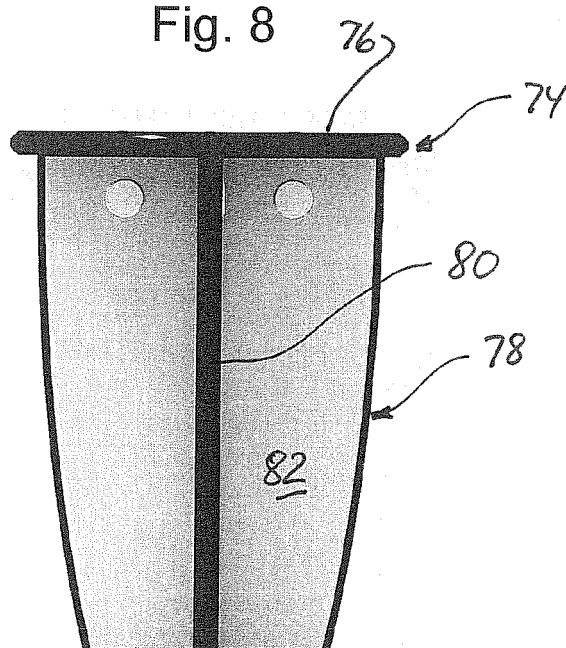


Fig. 9

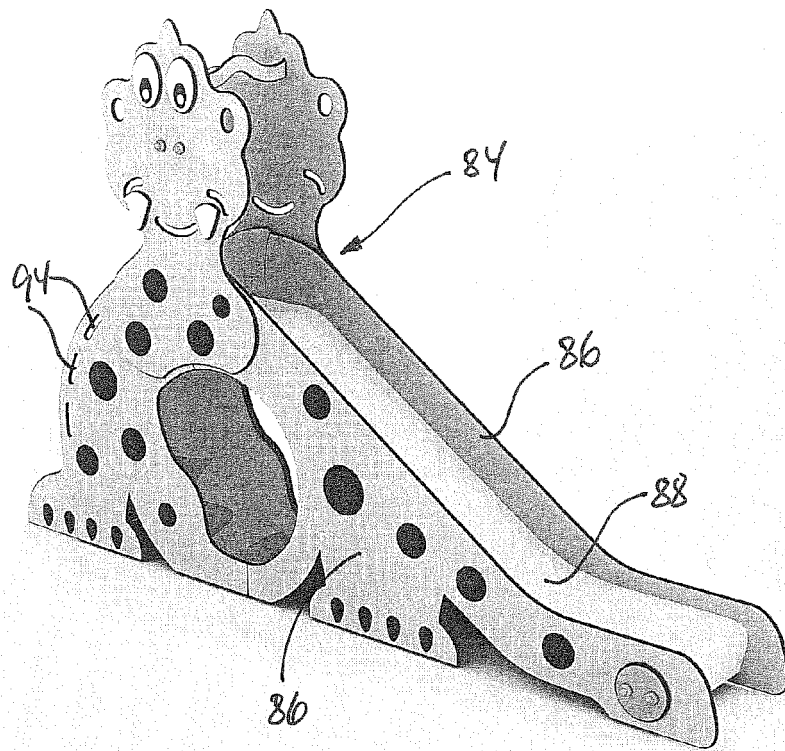


Fig. 10

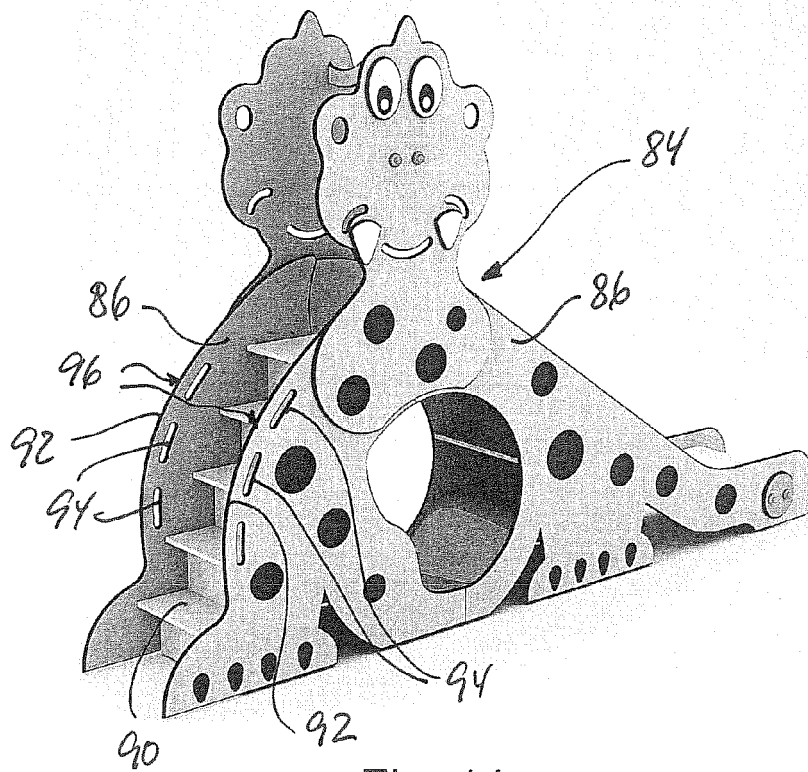


Fig. 11

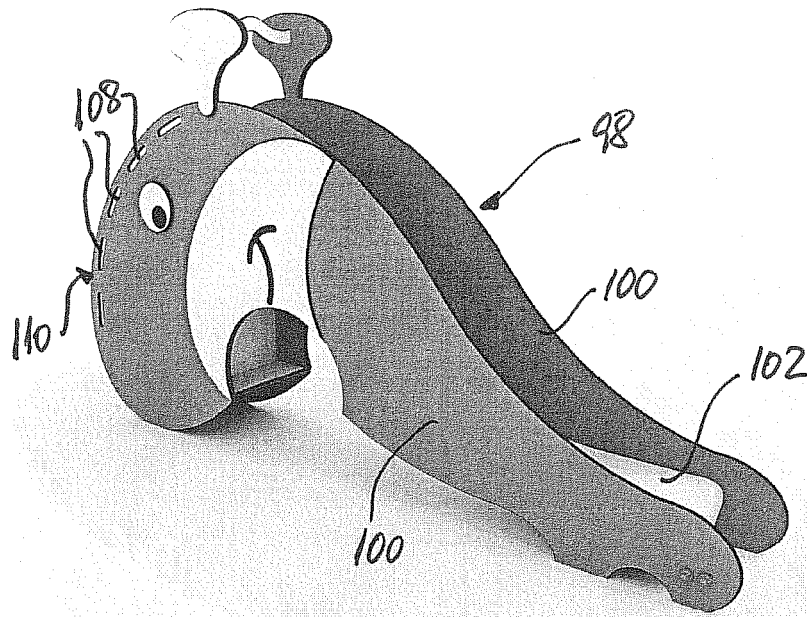


Fig. 12

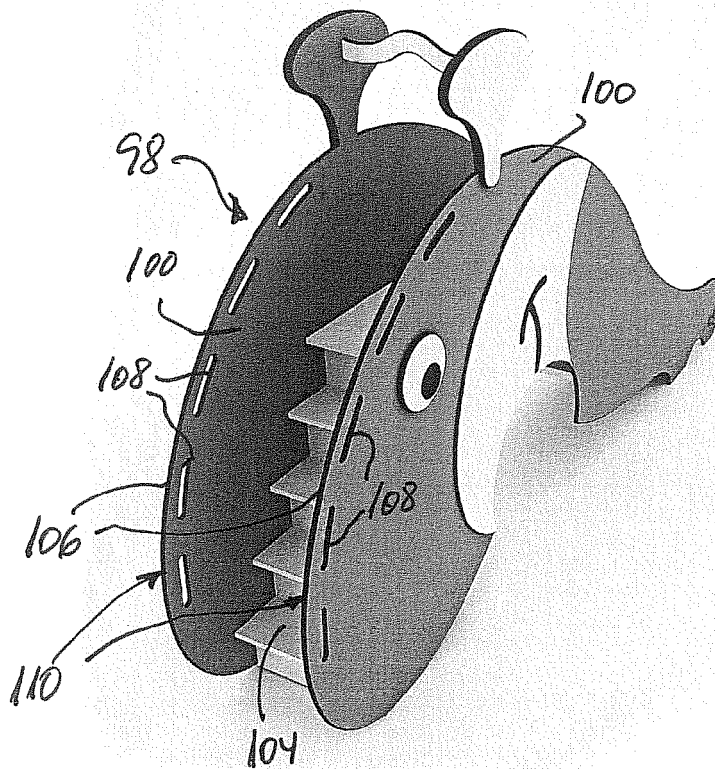


Fig. 13

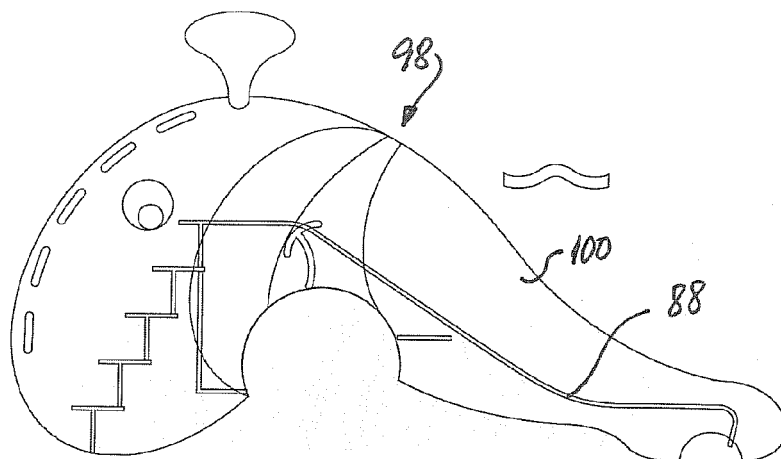


Fig. 14

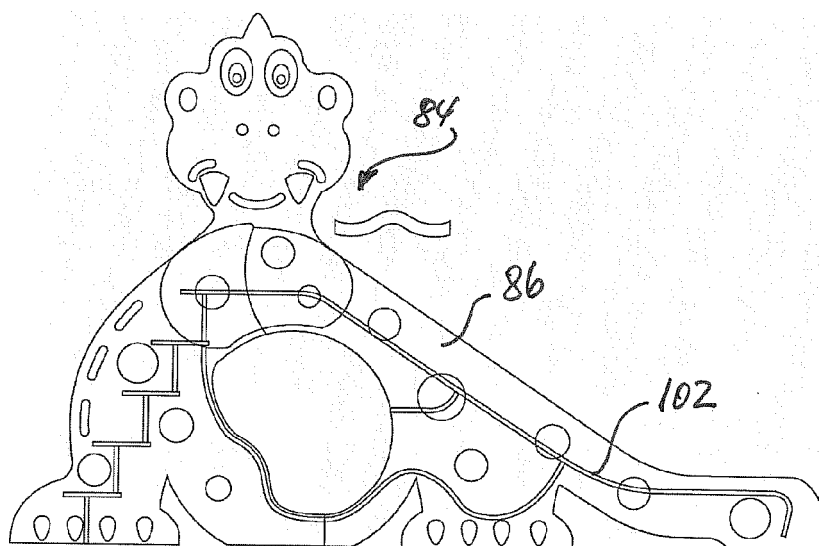


Fig. 15

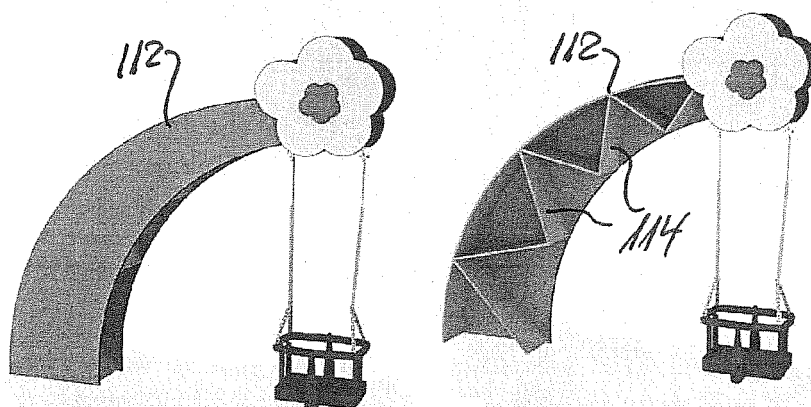


Fig. 16

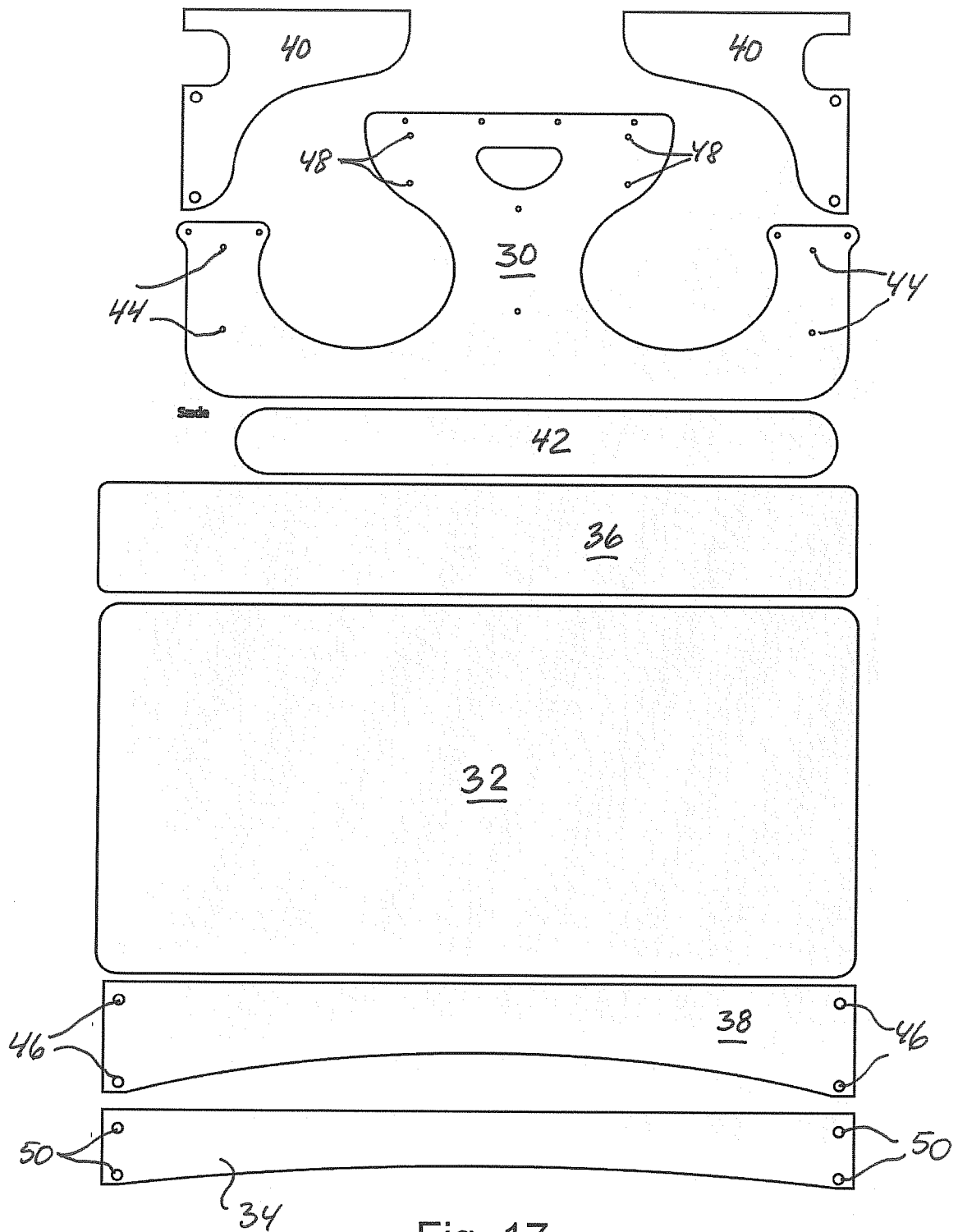


Fig. 17

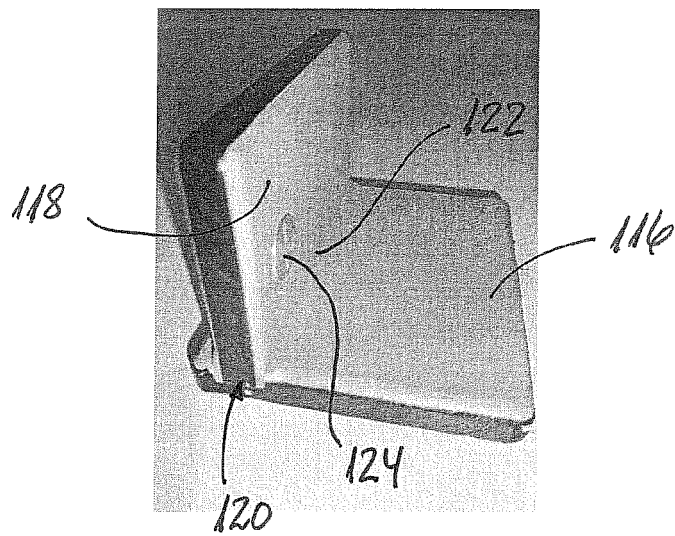


Fig. 18

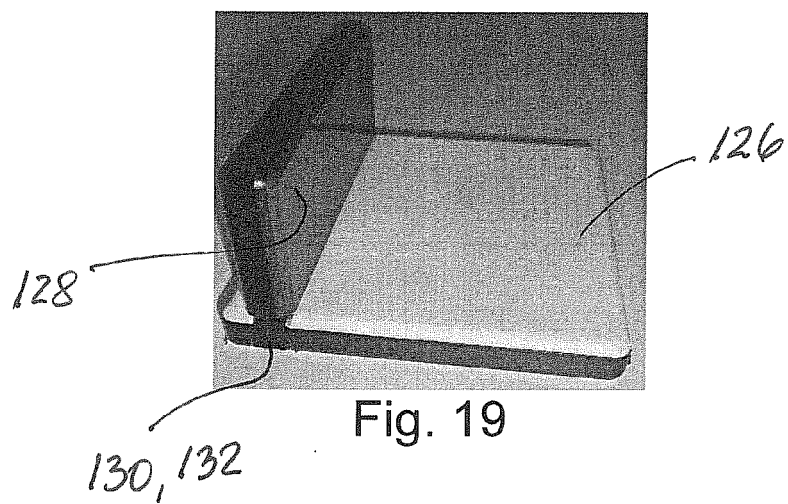


Fig. 19

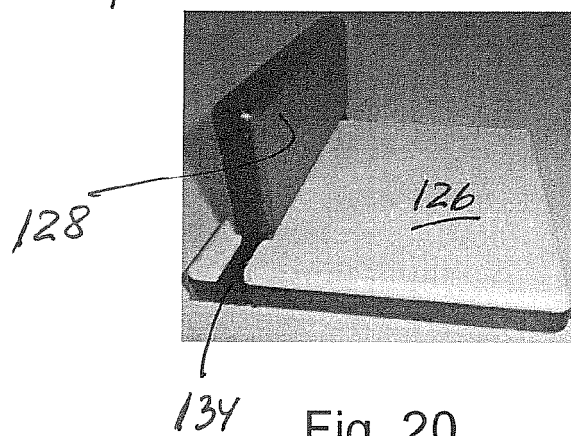


Fig. 20

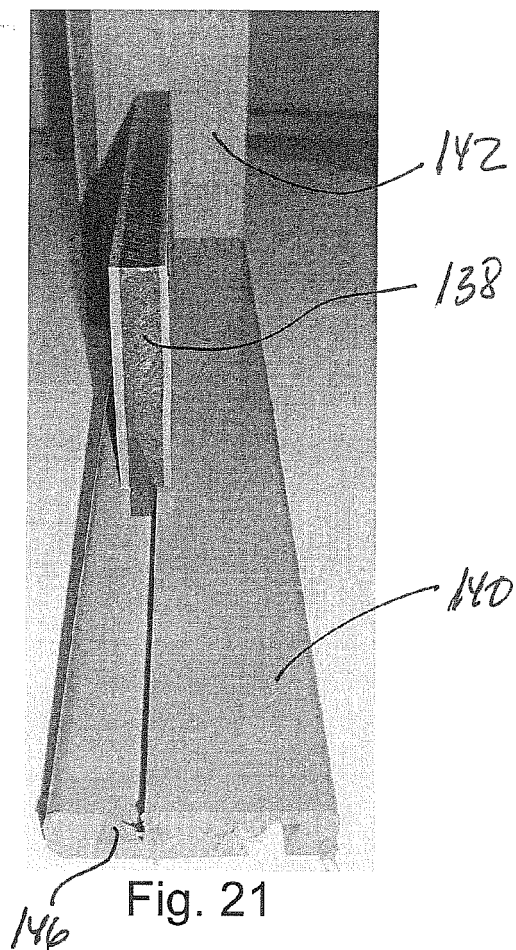


Fig. 21

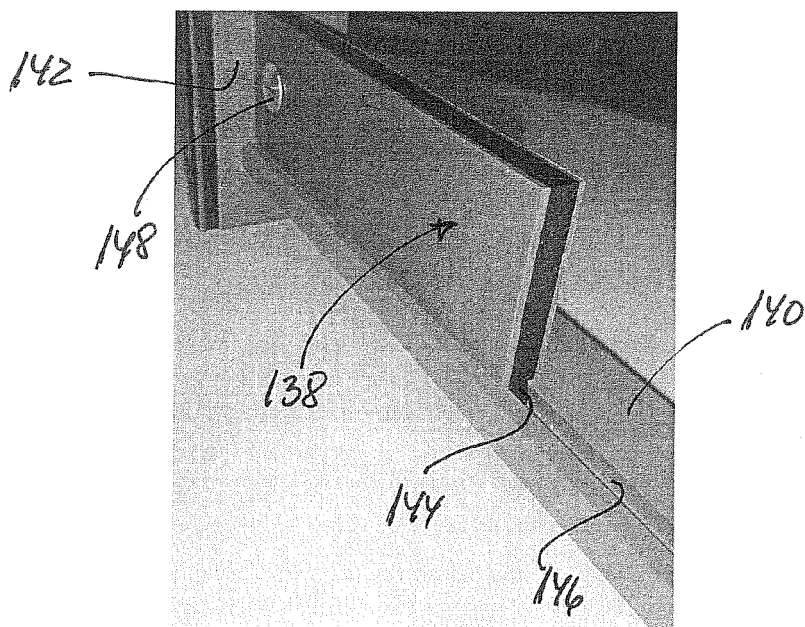


Fig. 22

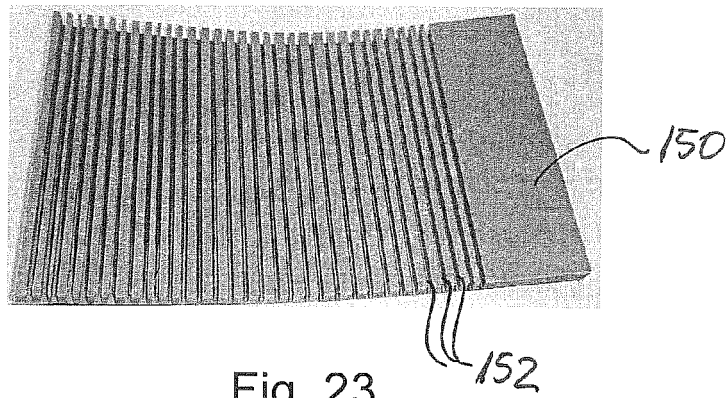


Fig. 23

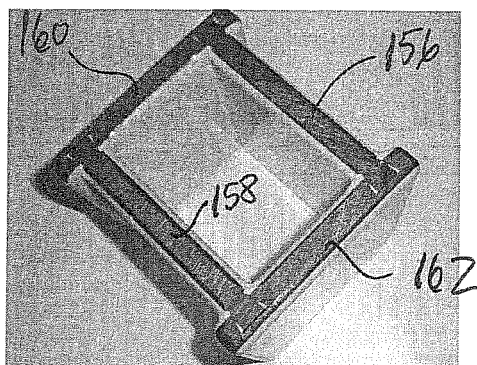


Fig. 24

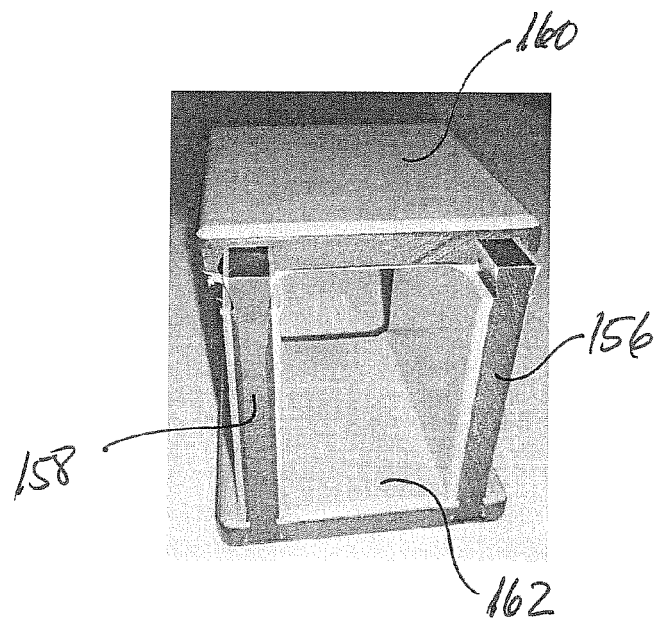


Fig. 25