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ABSTRACT

A method of forming a component including the steps of obtaining a sheet of thermoplastic polymer material; heating the sheet; pressing the sheet to form a fold line in the sheet; and bending the sheet along the fold line to form the component.

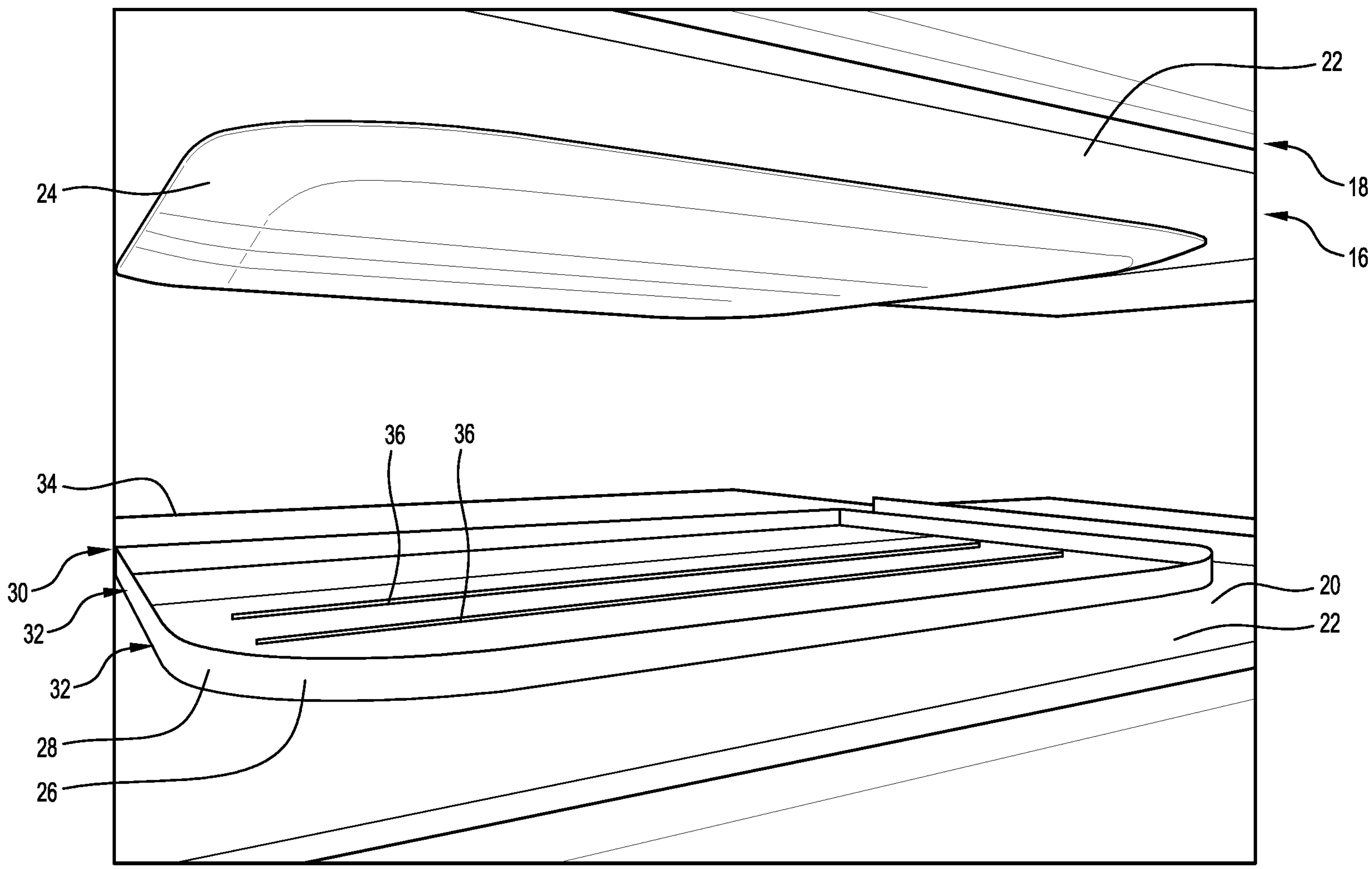

FIG. 1

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COMPONENT AND METHOD OF FORMING A COMPONENT

Field of the Invention

The invention relates to a method of forming a component and, more specifically, but not exclusively, to a cost-effective method of forming a three-dimensional component from non-woven polyethylene terephthalate (PET) board to form furniture, privacy screens, and the like.

Background of the Invention

It is known to use polyethylene terephthalate (PET) to form products such as privacy screens of the kind generally used for screening work spaces in a work or study environment. However, the applicant has identified that three-dimensional (3D) products such as privacy screens (or "work pods") require expensive tooling as the tooling typically requires a large press having a movable action between parts of the press sufficient to accommodate the height of the product. In the case of a work pod which may have length, width and height dimensions all in excess of 1 metre, the applicant has identified that a press of sufficient size to produce such a product would be prohibitively expensive for many manufacturers. Tooling using existing methods also requires a complex and typically expensive three-dimensional cutter to cut/trim the product. In turn, this has resulted in work pods of this type (and other products such as chairs and other furniture formed from PET board) to be expensive for consumers to purchase.

The applicant has identified that it would be advantageous for it to be possible to manufacture three-dimensional products from non-woven PET board without the use of prohibitively large presses/cutters to facilitate production of these products at a price point which would make them widely available to consumers.

Examples of the present invention seek to provide a method of manufacturing a component which overcomes or at least alleviates one or more disadvantages associated with existing manufacturing methods.

Alternatively or additionally, an example of the present invention seeks to at least provide the public with a useful choice.

Summary of the Invention

A first aspect of the present invention provides a method of forming a component including the steps of:

obtaining a sheet of thermoplastic polymer material;

heating the sheet;

pressing the sheet to form a fold line in the sheet; and

bending the sheet along the fold line to form the component;

wherein the thermoplastic polymer material is non-woven polyethylene terephthalate (PET) board, and

the non-woven PET board is formed of low-melt fibres and high melt-fibres, and the step of heating the sheet includes heating the sheet to a forming temperature which is above a melting temperature of the low-melt fibres and below a melting temperature of the high-melt fibres.

A second aspect of the present invention provides a method of forming a composite component including the steps of:

forming a first component according to a method according to the first aspect of the present invention;

forming a second, like component according to a method according to the first aspect of the present invention; and

adhering together the planar peripheral edge of the first component to the planar peripheral edge of the second component to form the composite component.

A third aspect of the present invention provides a composite component formed according to a method according to the second aspect of the present invention, including an internal support frame located internally of the adhered components.

A fourth aspect of the present invention provides an enclosure formed by engaging together a plurality of composite components in end-to-end relationship, wherein each of the composite components is a composite component formed according to a method according to the second aspect of the present invention or a composite component according to the third aspect of the present invention, each of the composite components is arranged to stand substantially vertically on a floor surface, the plurality of composite

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components at least partly surround a volume sufficiently large to be occupied by a person, and each of the composite components has an inwardly-facing wall facing said volume.

A fifth aspect of the present invention provides a method of forming a component including the steps of:

obtaining a portion of thermoplastic polymer material;

heating the portion;

pressing the portion to form a fold line in the portion; and

bending the portion along the fold line to form the component;

wherein the thermoplastic polymer material is non-woven polyethylene terephthalate (PET) board, and

the non-woven PET board is formed of low-melt fibres and high melt-fibres, and the step of heating the portion includes heating the portion to a forming temperature which is above a melting temperature of the low-melt fibres and below a melting temperature of the high-melt fibres.

There is disclosed herein a method of forming a component including the steps of:

obtaining a sheet of thermoplastic polymer material;

heating the sheet;

pressing the sheet to form a fold line in the sheet; and

bending the sheet along the fold line to form the component.

As the sheet of thermoplastic polymer material is processed through the steps of the above method, in particular the steps of pressing and bending, the sheet may be formed into a 3D “shell”. Specifically, the pressing step may include pressing the sheet to change the cross-sectional profile of the sheet (for example, providing a concave profile to the sheet) so that the sheet is no longer symmetrical about a central plane parallel to the sheet. Owing to the change in cross-sectional profile, the resulting product may be termed a “shell” rather than a “sheet”. Accordingly, a method according to the present disclosure is able to achieve a 3D thermoform by folding along an integral hinge pressed into the base material.

As the sheet of thermoplastic polymer material is processed through the steps of the above method, in particular the steps of pressing and bending, the sheet may be formed into a 3D “shell”. Specifically, the pressing step may include pressing the sheet to change the cross-sectional profile of the sheet (for example, providing a concave profile to the sheet) so that the sheet is no longer symmetrical about a central plane parallel to the sheet. Owing to

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the change in cross-sectional profile, the resulting product may be termed a "shell" rather than a "sheet". Accordingly, a method according to the present disclosure is able to achieve a 3D thermoform by folding along an integral hinge pressed into the base material.

Preferably, the method further includes the step of cutting the sheet. More preferably, the method further includes the step of allowing the sheet to cool. Even more preferably, the step of cutting the sheet is performed after the step of pressing of the sheet, while the sheet remains at an elevated temperature.

In a preferred form, the pressing step includes pressing the sheet in a press to form a planar panel, and the bending step includes bending the panel out of a plane of the panel along the fold line. Accordingly, the method may include the step of pressing the sheet in a press to form a 2D panel and bending the panel about the fold line to form a 3D component.

Preferably, the step of cutting the sheet is done in a press with a press cutter. More preferably, the press cutter has a planar cutting edge.

In one form, the step of pressing the sheet is performed by a press, and the fold line in the sheet is formed by an edge of the press which extends in a plane substantially perpendicular to a direction of operation of the press.

Preferably, the pressing step includes operating a press to form a predetermined cross-sectional profile in the sheet to increase structural rigidity of the sheet. More preferably, the pressing step includes operating the press to form a predetermined vertical cross-sectional profile in the sheet to increase structural rigidity of the sheet. More preferably again, the pressing step includes operating the press to form a predetermined horizontal cross-sectional profile in the sheet to increase structural rigidity of the sheet.

In a preferred form, the pressing step includes operating the press to form a planar peripheral edge of the component.

There is also disclosed herein a method of forming a composite component including the steps of:

forming a first component according to a method as described above;

forming a second, like component according to a method as described above; and

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adhering together the planar peripheral edge of the first component to the planar peripheral edge of the second component to form the composite component.

Preferably, the adhering step includes adhering together the components such that the fold line of the first component abuts against the fold line of the second component to form a composite fold line, and wherein the method further includes the step of bending the composite component along the composite fold line.

Preferably, the thermoplastic polymer material is Polyethylene terephthalate (PET). More preferably, the thermoplastic polymer material is non-woven PET board. Even more preferably, a portion of the non-woven PET board is formed from recycled PET packaging, for example recycled PET bottles. In non-limiting examples, the board may have a thickness of 12mm or 7mm, +/- 7%, as per existing non-woven board products. More broadly, the applicant has demonstrated that the method of the present disclosure may be used to thermoform nonwoven board having a range of thickness from 3mm to 45mm and, more preferably, from 4mm to 24mm.

In one form, the non-woven PET board is formed of low-melt fibres and high melt-fibres, and the step of heating the panel includes heating the panel to a forming temperature which is above a melting temperature of the low-melt fibres and below a melting temperature of the high-melt fibres. More preferably, the low-melt fibres have a melting temperature of approximately 110 degrees Celsius and the high-melt fibres have a melting temperature of approximately 215 degrees Celsius. It is to be understood that these specifications are provided by way of non-limiting example to demonstrate that the board may be in the form of existing non-woven board products. Other board manufacturers/suppliers may vary from these specific temperature specifications with non-woven board products (including low-melt and high-melt fibres) which are still able to be used in the method of the present disclosure.

There is also disclosed herein a composite component, formed according to a method as described above including an internal support frame located internally of the adhered components.

There is also disclosed herein an enclosure formed by engaging together a plurality of composite components in end-to-end relationship, wherein each of the composite components is a composite component as described above, each of the composite

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components is arranged to stand substantially vertically on a floor surface, the plurality of composite components at least partly surround a volume sufficiently large to be occupied by at least one person, and each of the composite components has an inwardly-facing wall facing said volume. In examples of the present disclosure, two or more person collaborative work pods and meeting work pods may be produced, possibly being formed as a combination of modular components.

Preferably, the composite components are releasably engaged together by way of a locking arrangement. More preferably, the locking arrangement is concealed within the composite components when in a locked configuration.

Preferably, the locking arrangement is fitted to an internal frame of at least one of the composite components and includes a locking member having an actuator for moving the locking member between an unlocked condition and a locked condition. More preferably, the actuator is in the form of a lever having a cam arrangement whereby the lever moves the locking member. Even more preferably, the locking member includes a plurality of lugs for engaging fixed lugs of a neighbouring composite component.

In the description in this specification reference may be made to subject matter which is not within the scope of the appended claims. That subject matter should be readily identifiable by a person skilled in the art and may assist in putting into practice the invention as defined in the presently appended claims.

Brief Description of the Drawings

The invention is described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Figure 1 is a side perspective view of a press for forming a component in accordance with an example of the present invention;

Figure 2 shows a side perspective view of the press, with a pressed panel shown resting in the press;

Figure 3 shows a top perspective view of the pressed panel resting in the press;

Figure 4 shows an inside view of a pressed panel;

Figure 5 shows an external view of the pressed panel of Figure 4;

Figure 6 shows a cutter for use in the press shown in Figures 1 to 3;

Figure 7 shows a prototype work pod formed using a plurality of components similar to the component shown in Figures 4 and 5;

Figure 8 shows a plurality of non-woven PET boards prior to forming;

Figure 9 shows a perspective side view of an internal support frame of a composite component in accordance with an example of the present invention; and

Figure 10 shows detail of a locking arrangement which forms part of the internal support frame shown in Figure 9.

Detailed Description

The applicant has identified that, in order to use non-woven PET board for forming three-dimensional components using existing methods, it is necessary to use an expensive 3D thermo-forming tool as well as an expensive 3D robotic cutter. These tools are typically expensive and therefore restrict many potential manufacturers from making products of this type. The applicant has identified that it would be beneficial to reduce the cost of manufacture so that the products can become more widely available to consumers.

With reference to Figures 1 to 8, there is shown a method of forming a component in accordance with an example of the invention. Advantageously, the method depicted in the drawings enables the component to be cut in a two-dimensional (2D) plane and to be subsequently bent about a fold line pressed into the component so as to form the component into the desired three-dimensional (3D) shape.

More specifically, with reference to Figures 1 to 8, there is depicted a method of forming a component 10 including the steps of:

1. Obtaining a sheet of thermoplastic polymer material;
2. Heating the sheet;
3. Pressing the sheet to form a fold line in the sheet; and
4. Bending the sheet along the fold line to form the component.

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As shown in Figure 8, the sheet 12 of thermoplastic polymer material may be in the form of a non-woven PET board 14. A portion of the non-woven PET board 14 may be formed from recycled PET bottles. The board 14 may have a thickness of 12mm or 7mm, +/- 7%. In the example shown, the board 14 which is grey in colour is used to form the component 10 so that additional colouring is not required. In alternative examples, the board may be any one or combination of a number of available colours, and may include one or more patterns.

With reference to Figure 1, there is shown a press 16 having an upper part 18 which is moveable relative to a lower part 20. The press 16 is shown in Figure 1 in an open condition, showing interchangeable boards 22 which are clamped to the upper part 18 and the lower part 20. The interchangeable board 22 clamped to the upper part 18 has a curved protrusion 24 which cooperates with metal rails 26 fixed to the interchangeable board 22 on the lower part 20 so as to press the sheet 12 in the desired manner. In other examples, the protrusion may have other shaped profiles, for example other non-curved shaped profiles, as may be specified on a case-by-case basis as per the desired profile shape of the component being formed.

More specifically, the metal rails 26 include a curved rail 28 which extends around a periphery of the component 10, and a straight edge rail 30 which defines a straight edge of the component 10. The metal rails 26 also include two cross rails 32 which extend parallel to the straight edge rail 30. Advantageously, the metal rails 26 may be formed in a symmetrical configuration with an opposite curved rail 34 so as to facilitate the formation of components 10 extending in an opposite direction to that shown in Figure 3. The curved rail 28, straight edge rail 30, cross rails 32 and opposite curved rail 34 have edges which are co-planar. In the particular example shown, two shallower metal rails are provided in the form of ornamentation rails 36 to provide ornamentation to the component 10 being formed. In other examples, additional ornamentations may take different forms (virtually any pattern may be used as ornamentation, including, for example, a dot-grid made with dowels or a diamond pattern made by criss-crossed rails).

Figure 2 shows further detail of the protrusion 24 on the upper interchangeable board 22. More specifically, Figure 2 shows that there are in fact a plurality of protrusions 24 and indentations which correspond to the configuration of the metal rails 26 so as to form the component 10 with the desired shape.

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The form of the component 10 is shown in Figure 3 which depicts the material of the component 10 having been pressed by the protrusions 24 between the metal rails 26. In this way, the cross rails 32 are used to form fold lines 38 in the component 10. Advantageously, the applicant has found that forming fold lines 38 in this way enables the component 10 to be bent along the fold lines 38 out of the plane of the edges of the metal rails 26 so as to form a 3D component 10 of the kind used for forming the work pod 40 shown in Figure 7.

More specifically, Figure 4 shows a component 10 formed in the press 16 after removal from the press 16. Figure 4 shows the rear of the fold lines 38 formed by the cross rails 32. The opposite side of the component 10 shown in Figure 4 is depicted in Figure 5 which shows the well-defined fold lines 38 formed by the cross rails 32, as well as ornamentation lines 42 formed by the ornamentation rails 36. The ornamentation lines 42 may also provide structural rigidity to the component 10 in addition to providing a desired visual appearance.

Figure 6 shows a cutter 44 which is mounted on an interchangeable board 22 for fitting in the press 16. The cutter 44 has a cutting edge which is arranged to cut out the component 10 from the board 14 after the step of pressing the board 14. The sharp edge of the cutter 14 is planar and extends around the same path as the curved rail 28 and straight edge rail 30 of the pressing interchangeable board 22 shown in Figure 1. Accordingly, the interchangeable board 22 carrying the cutter 44 may be interchanged with the interchangeable board 22 carrying the metal rails 26 so as to cut out the component 10 in a manner similar to a cookie cutter. In this way, the component 10 is cut in a 2D operation prior to bending of the component 10.

The non-woven PET board 14 may be formed of low-melt fibres and high-melt fibres, and the step of heating the panel may include heating the panel to a forming temperature which is above a melting temperature of the low-melt fibres and below a melting temperature of the high-melt fibres. In the example shown, the low-melt fibres have a melting temperature of approximately 110 degrees Celsius and the high-melt fibres have a melting temperature of approximately 215 degrees Celsius. Accordingly, with this particular combination of fibres a suitable forming temperature is found between 110 degrees Celsius and 215 degrees Celsius. In particular, it is desirable for the forming temperature to be sufficiently hot to melt the low-melt fibres but not to melt the high-melt fibres. Melting of the low-melt fibres enables the board 14 to be formed in the pressing

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operation whilst the high-melt fibres being unmelted enables the board 14 to retain sufficient strength during the forming operations. The applicant has found that the board 14 can be heated for approximately two minutes to achieve a suitable forming temperature.

The forming method includes the step of allowing the sheet 12 to cool after the pressing step and, preferably, the step of cutting the sheet 12 with the cutter 44 is performed while the sheet 12 remains at an elevated temperature which may facilitate the cutting of the PET material. Alternatively, the step of cutting the sheet may be performed once the sheet has fully (or partially) cooled, as may be dictated by the cycle time and, in particular, the time required to change to the cutting tool. A separate press and separate cutter may be used to improve cycle time.

Accordingly, as shown in the drawings, the pressing step forms a generally planar panel (as shown in Figures 2 to 5) which is then able to be bent out of the plane of the panel along one or more of the fold lines 38. The components 10 shown in Figure 7 demonstrate the appearance of the components 10 after bending. In this way, the method includes pressing the sheets 12 to form 2D panels and, subsequently, bending the panels about the fold lines 38 to form 3D components.

As can be seen in Figure 2 to 5, the configuration of the protrusions 24 and the metal rails 26 achieves during the pressing operation a predetermined cross-sectional profile in the sheet 12 to increase structural rigidity of the sheet 12. More specifically, the formed sheet 12 shown in Figures 2 to 5 has an altered vertical cross-sectional profile and an altered horizontal cross-sectional profile to increase structural rigidity of the sheet 12. Accordingly, although the sheets 12 are able to be bent along the fold lines 38 as desired, the formed components 10 have sufficient rigidity to support their own weight vertically and to resist damage from impact.

The pressing step also serves to press the sheet 12 so as to form a planar peripheral edge 46 in the formed component 10, as depicted by the lip of the component 10 which abuts the curved rail 28 in Figure 3. This planar peripheral edge 46 facilitates the attachment together of two separate components 10 to form a composite component 48. More specifically, the applicant has also determined a method of forming a composite component 48 including the steps of forming a first component 10 as described above, forming a second, like component 10 as described above, and adhering together the planar peripheral edges 46 of the first and second components to form the composite component 48. As shown in Figure 7, the components 10 are adhered together such that the fold lines 38 of the first component abut against the fold lines 38 of the second component to form a composite fold line about which the composite component is bent. By adhering the components 10 in this way, the composite components 48 have an internal void space which may be used for the routing of cabling, for housing a locking/attachment mechanism, and for improving sound insulation of the work pod 40. Also, an aesthetically pleasing appearance is provided by the curved edges of the inside components 10 of the work pod meeting together with the curved edges of the external components 10 of the work pod 40.

The enclosed cavity between the adhered components may provide significant advantages as concealing the wiring of power and data to the work point may be particularly beneficial. While the enclosed air cavity may be highly advantageous from an acoustic insulation point of view, the design also has scope for filling the cavity with greater acoustically absorbent substrates. In this way, the product could be tuned to different frequencies that may need to be absorbed depending on the environment.

Each of the composite components 48 may have an internal support frame located internally of the adhered components 10 to provide additional strength to the composite components 48 and to provide an inner frame to which both components 10 can be adhered. The internal support frame may also be used to facilitate the inter-engagement of the composite components 48 which may be inter-engaged in a modular nature so as to form work pods in different configurations.

The adhering together of the components 10, and particularly the adhering together of the components 10 using an internal support frame, may assist in maintaining the formed components 10 in the desired bent 3D configuration.

In the example work pod 40 shown in Figure 7, the work pod 40 is in the form of an enclosure formed by engaging together a plurality of composite components 48 in end-to-end relationship, each of the composite components 48 being a composite component formed of a pair of components 10 with an internal support frame located internally of the adhered components 10. Each of the composite components 48 is arranged to stand substantially vertically on a floor surface, either directly or by way of feet which raise the components 10 above the ground. The feet 50 provide the advantage of raising the work

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pod 40 such that external vision of occupancy of the work pod 40 is enabled to others outside the work pod 40. The work pod 40 shown in Figure 7 has a plurality of composite components 48 partly surrounding a volume sufficiently large to be occupied by a person, each of the composite components 48 having an inwardly facing wall facing said volume. In the particular example shown, the volume is sufficiently large for housing a desk and chair of a work station. Advantageously, examples of the present invention provide a reconfigurable modular design of work bay – from a few modules it is possible to form a number of work pod types.

Each of the composite components 48 may be releasably engaged together by way of a locking arrangement which may be concealed within the composite components 48 when in a locked configuration. The locking arrangement may be operated by an actuator which is accessible from an upper edge of the work pod 40.

With reference to Figures 9 and 10, there is shown an internal support frame 52 to be located internally of the adhered components 10 to provide additional strength to the composite components 48 and to provide an inner frame to which both components 10 can be adhered. The internal support frame 52 has a locking arrangement 54 (see Figure 10) to facilitate the inter-engagement of the composite components 48 which may be inter-engaged in a modular nature so as to form work pods in different configurations. In particular, one edge of the frame 52 has a plurality of fixed lugs 56 spaced along a length of the edge, and an opposite edge of the frame 52 has a plurality of movable lugs 58 spaced along a length of the opposite edge. The locking arrangement 54 includes a lever 60 and a cam mechanism 62 so that the lever 60 is able to be actuated to move the movable lugs 58 between an unlocked condition and a locked condition. In this way, first and second like composite components 48 are able to be interengaged by engaging the movable lugs 58 of the first composite component with the fixed lugs of the second composite component. Specifically, the lever 60 is lifted to move the movable lugs 58 into the unlocked condition, then the two components are brought together edge-to-edge, then the lever is lowered to being the movable lugs 58 to the locked condition so that the movable lugs 58 engage with the fixed lugs 56 of the neighbouring component. The components are locked together until the lever 60 is raised.

Advantageously, the present invention enables a 3D component to be formed from non-woven PET board by using a 2D cutting edge to cut the component 10 in 2D, with fold lines 38 being formed in the component 10 to bend the component 10 along the fold lines 38 after pressing. The components 10 are able to be formed using inexpensive machinery and relatively efficiently. By way of non-limiting example, a relatively basic heater may be used to heat the non-woven PET board for a duration in the order of 2 minutes, the pressing operation to form the fold lines/hinges may take in the order of 4 minutes, and the cutting operation may be achieved within a few seconds. It will be appreciated that times are a factor of temperature, material thickness, and material colour (ie. infra-red oven performance changes depending on substrate colour) and will vary accordingly.

While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not by way of limitation. It will be apparent to a person skilled in the relevant art that various changes in form and detail can be made therein without departing from the spirit and scope of the invention. Thus, the present invention should not be limited by any of the above described exemplary embodiments.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of forming a component including the steps of:
obtaining a sheet of thermoplastic polymer material;
heating the sheet;
pressing the sheet to form a fold line in the sheet; and
bending the sheet along the fold line to form the component;
wherein the thermoplastic polymer material is non-woven polyethylene terephthalate (PET) board, and
the non-woven PET board is formed of low-melt fibres and high melt-fibres, and the step of heating the sheet includes heating the sheet to a forming temperature which is above a melting temperature of the low-melt fibres and below a melting temperature of the high-melt fibres.

2. A method of forming a component as claimed in claim 1, further including the step of cutting the sheet.

3. A method of forming a component as claimed in claim 2, further including the step of allowing the sheet to cool.

4. A method of forming a component as claimed in claim 3, wherein the step of cutting the sheet is performed after the step of pressing of the sheet, while the sheet remains at an elevated temperature.

5. A method of forming a component as claimed in any one of claims 1 to 4, wherein the pressing step includes pressing the sheet in a press to form a planar panel, and the bending step includes bending the panel out of a plane of the panel along the fold line.

6. A method of forming a component as claimed in any one of claims 2, and claims 3 to 5 when dependent on claim 2, wherein the step of cutting the sheet is done in a press with a press cutter.

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7. A method of forming a component as claimed in claim 6, wherein the press cutter has a planar cutting edge.

8. A method of forming a component as claimed in any one of claims 1 to 7, wherein the step of pressing the sheet is performed by a press, and the fold line in the sheet is formed by an edge of the press which extends in a plane substantially perpendicular to a direction of operation of the press.

9. A method of forming a component as claimed in any one of claims 1 to 8, wherein the pressing step includes operating a press to form a predetermined cross-sectional profile in the sheet to increase structural rigidity of the sheet.

10. A method of forming a component as claimed in claim 9, wherein the pressing step includes operating the press to form a planar peripheral edge of the component.

11. A method of forming a composite component including the steps of:
forming a first component according to a method as claimed in claim 10;
forming a second, like component according to a method as claimed in claim 10; and
adhering together the planar peripheral edge of the first component to the planar peripheral edge of the second component to form the composite component.

12. A method of forming a composite component as claimed in claim 11, wherein the adhering step includes adhering together the components such that the fold line of the first component abuts against the fold line of the second component to form a composite fold line, and wherein the method further includes the step of bending the composite component along the composite fold line.

13. A composite component formed according to a method as claimed in claim 11 or claim 12, including an internal support frame located internally of the adhered components.

14. An enclosure formed by engaging together a plurality of composite components in end-to-end relationship, wherein each of the composite components is a composite component formed according to a method as claimed in claim 11 or claim 12 or a

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composite component as claimed in 13, each of the composite components is arranged to stand substantially vertically on a floor surface, the plurality of composite components at least partly surround a volume sufficiently large to be occupied by a person, and each of the composite components has an inwardly-facing wall facing said volume.

15. An enclosure as claimed in claim 14, wherein the composite components are releasably engaged together by way of a locking arrangement.

16. An enclosure as claimed in claim 16, wherein the locking arrangement is concealed within the composite components when in a locked configuration.

17. An enclosure as claimed in claim 15 or claim 16, wherein the locking arrangement is fitted to an internal frame of at least one of the composite components and includes a locking member having an actuator for moving the locking member between an unlocked condition and a locked condition.

18. A method of forming a component including the steps of:
obtaining a portion of thermoplastic polymer material;
heating the portion;
pressing the portion to form a fold line in the portion; and
bending the portion along the fold line to form the component;
wherein the thermoplastic polymer material is non-woven polyethylene terephthalate (PET) board, and
the non-woven PET board is formed of low-melt fibres and high melt-fibres, and the step of heating the portion includes heating the portion to a forming temperature which is above a melting temperature of the low-melt fibres and below a melting temperature of the high-melt fibres.

19. A method of forming a component as claimed in any one of claims 1 to 12 and 18, wherein the low-melt fibres have a melting temperature of approximately 110 degrees Celsius and the high-melt fibres have a melting temperature of approximately 215 degrees Celsius.

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20. A method of forming a component as claimed in in any one of claims 1 to 12, 18 and 19, wherein the board has a thickness of 12mm or 7mm, +/- 7%.

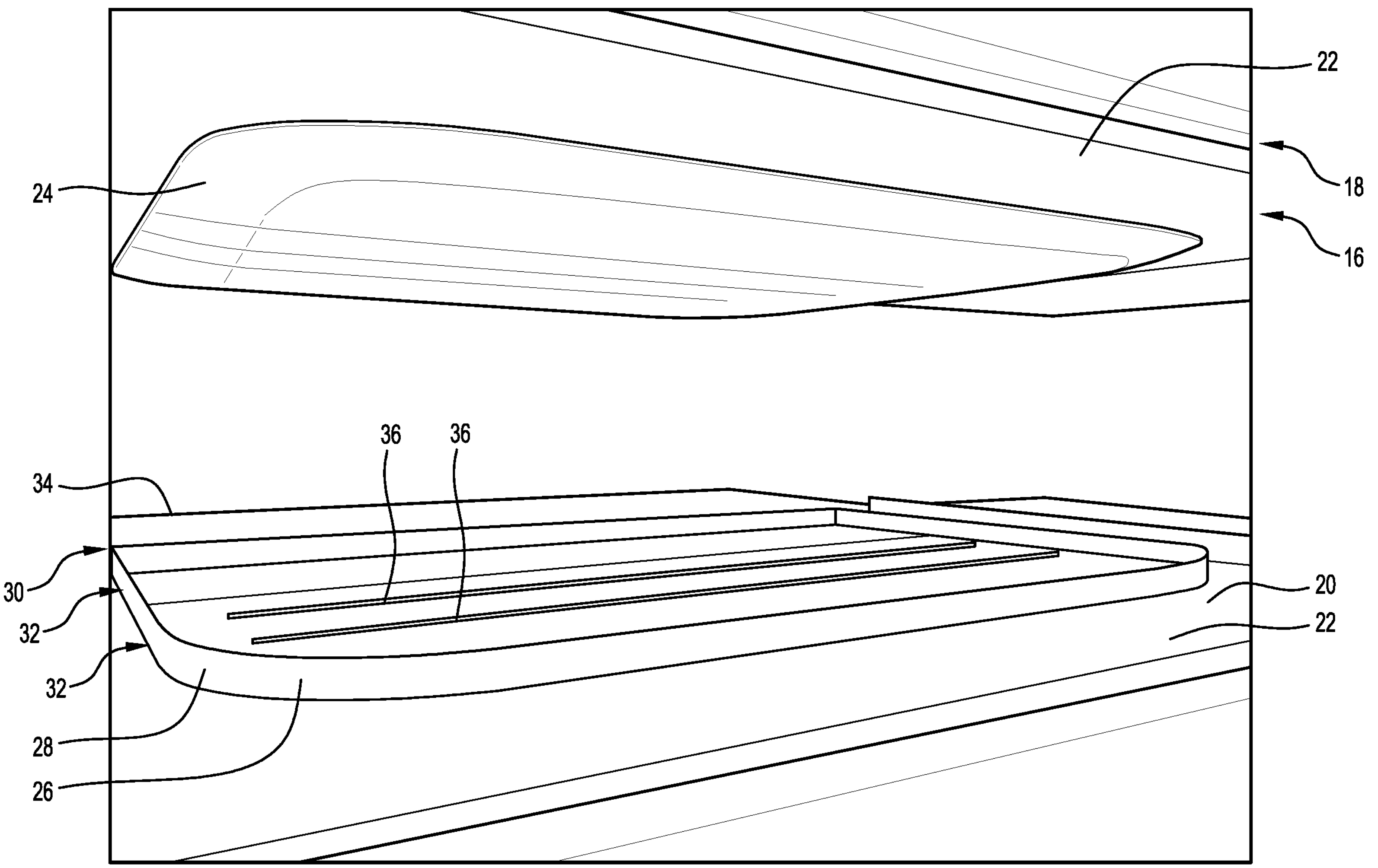

FIG. 1

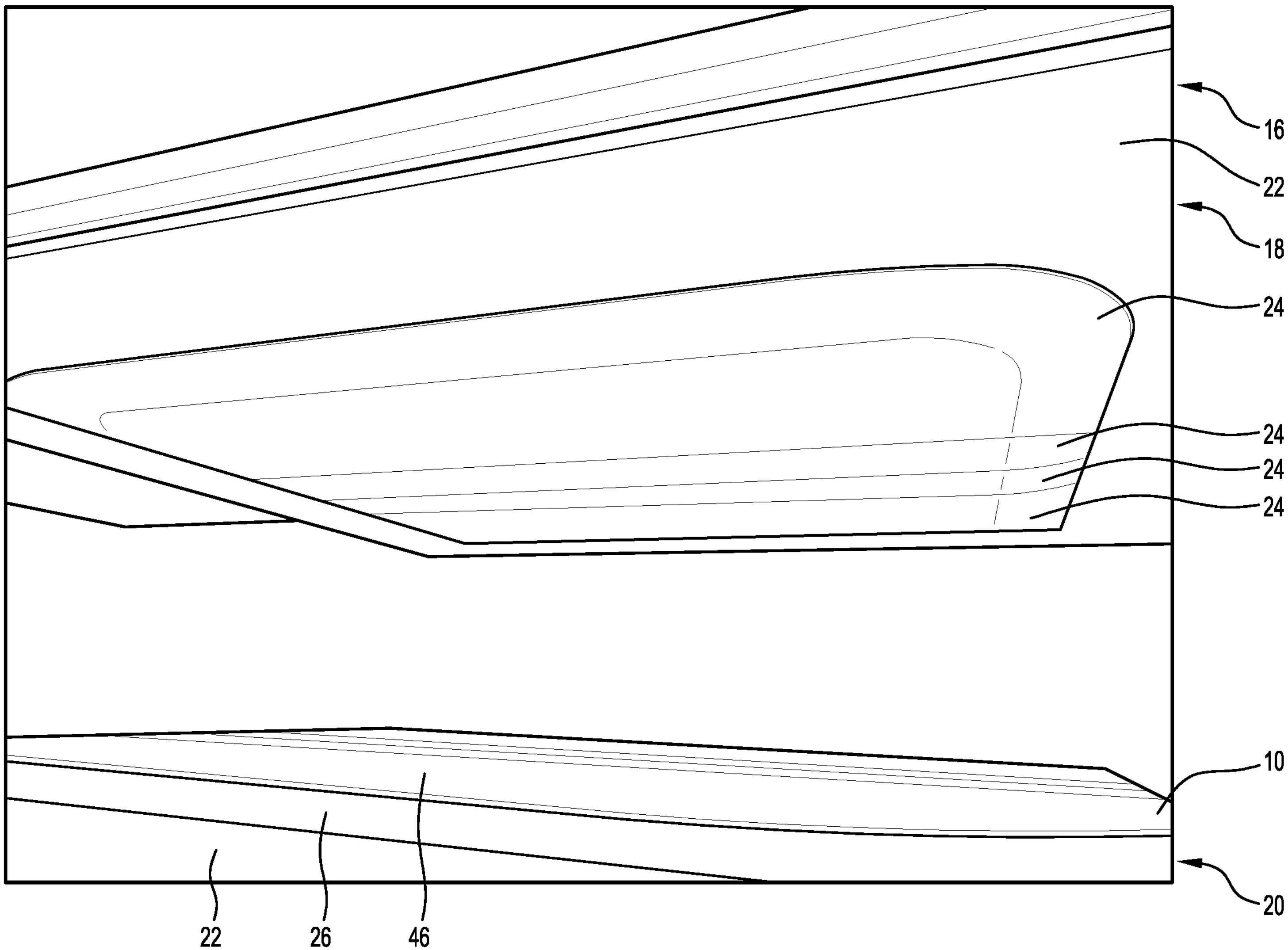

FIG. 2

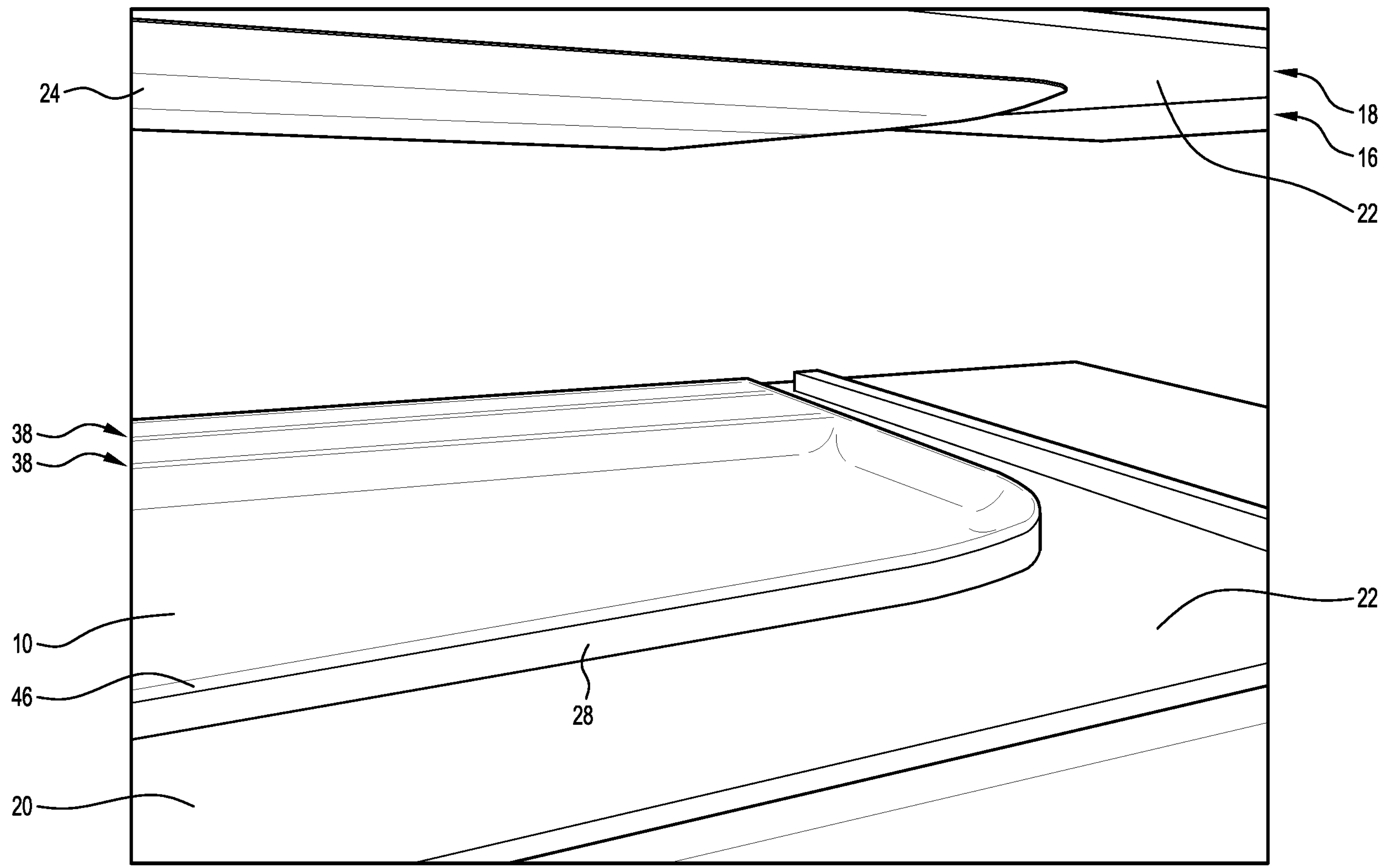

FIG. 3

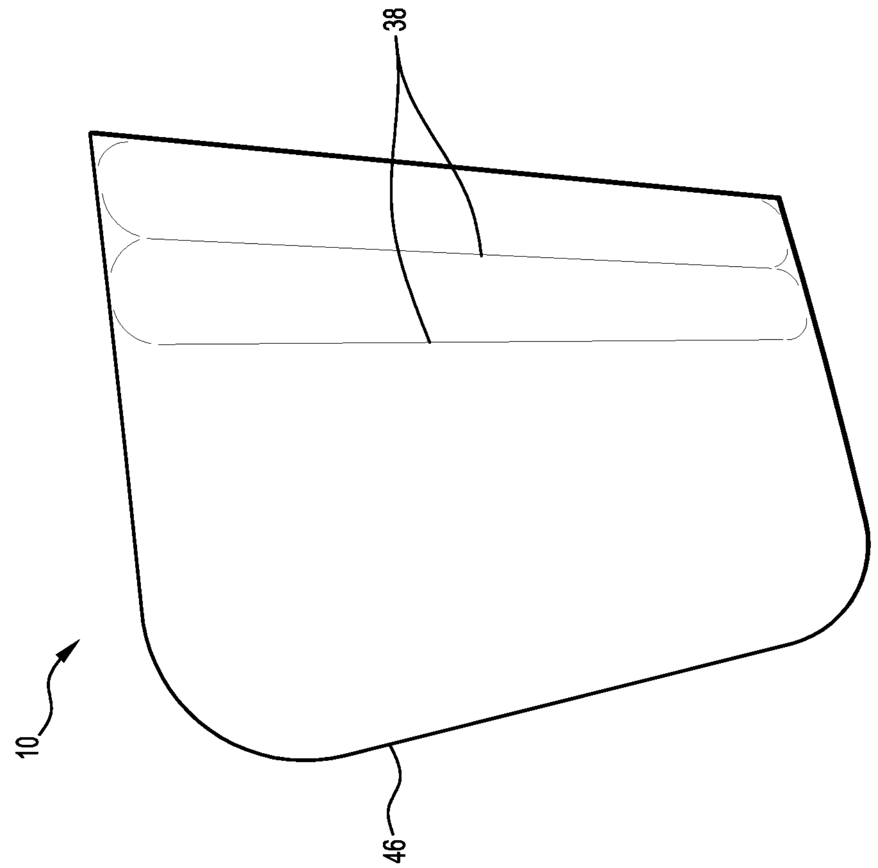

FIG. 4

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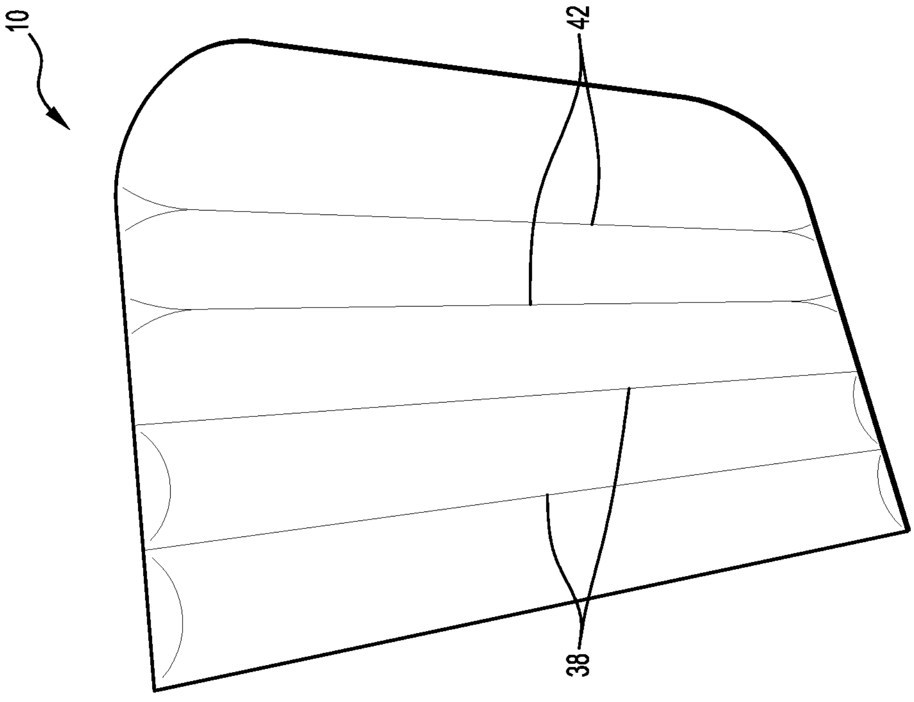

FIG. 5

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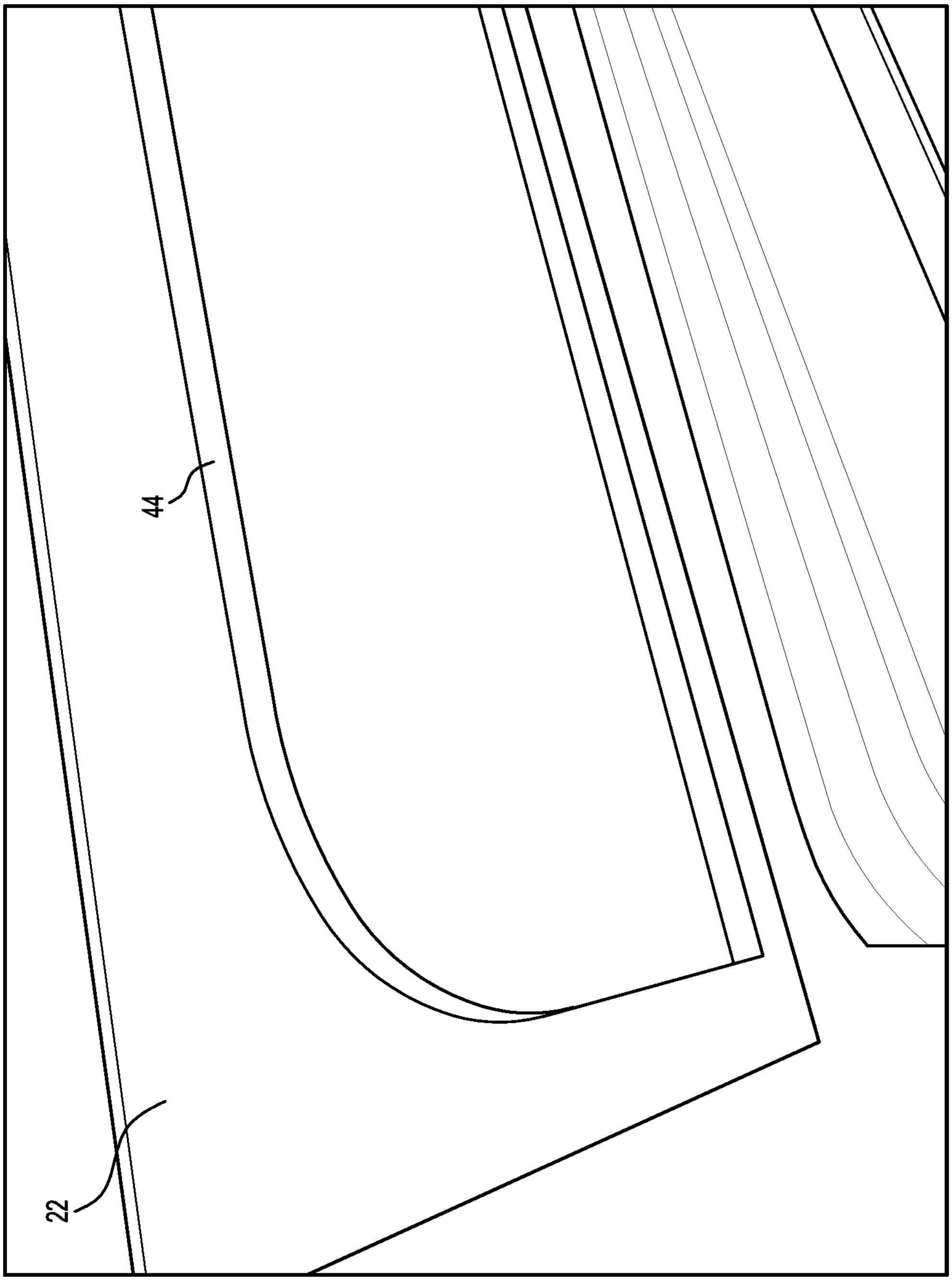

FIG. 6

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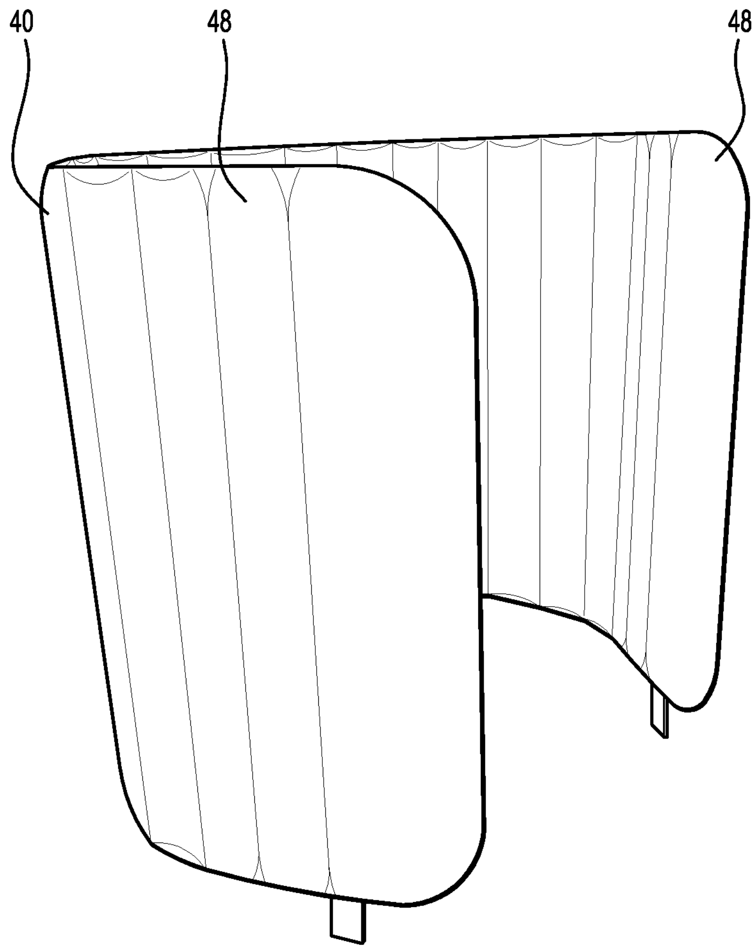

FIG. 7

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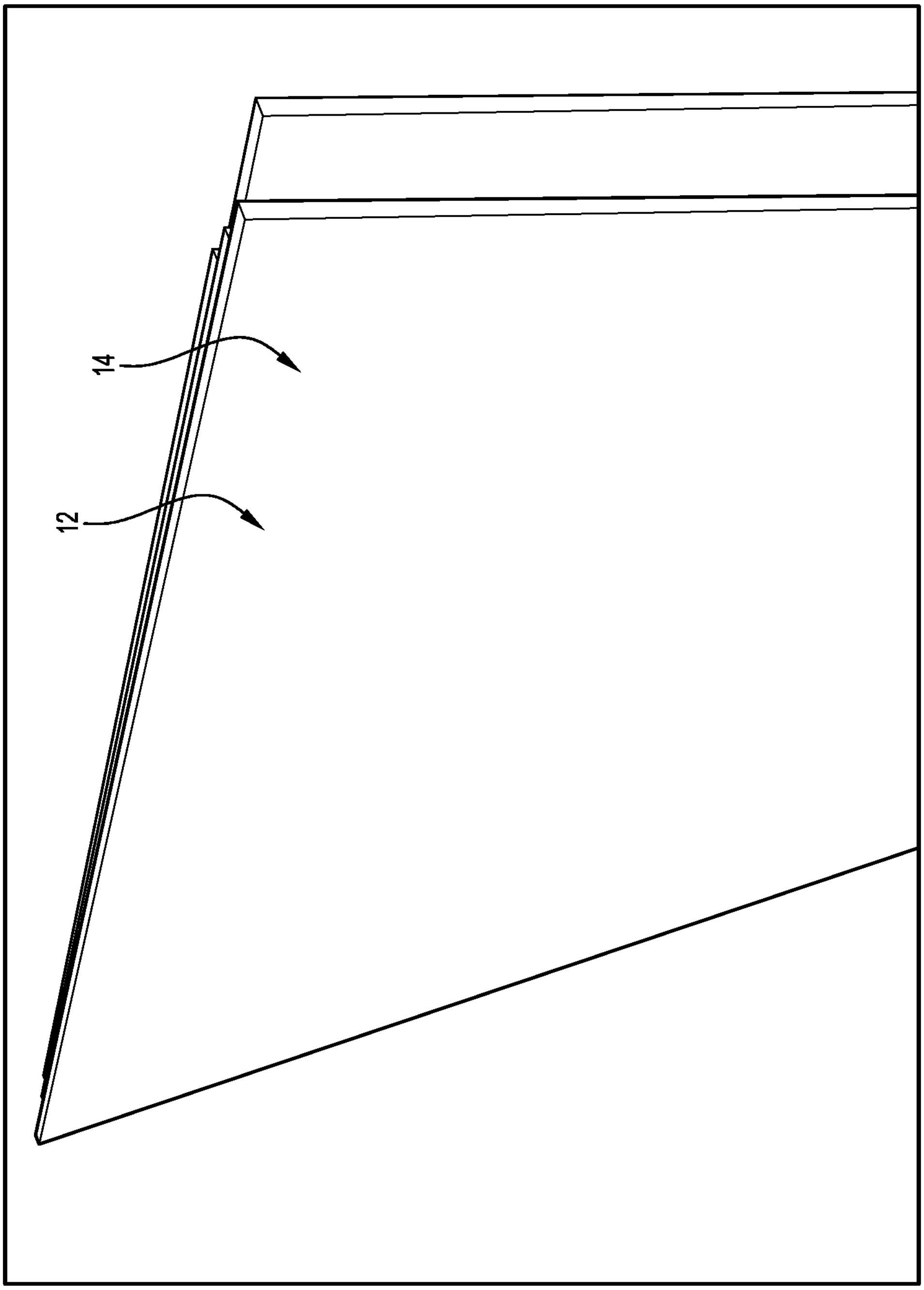

FIG. 8

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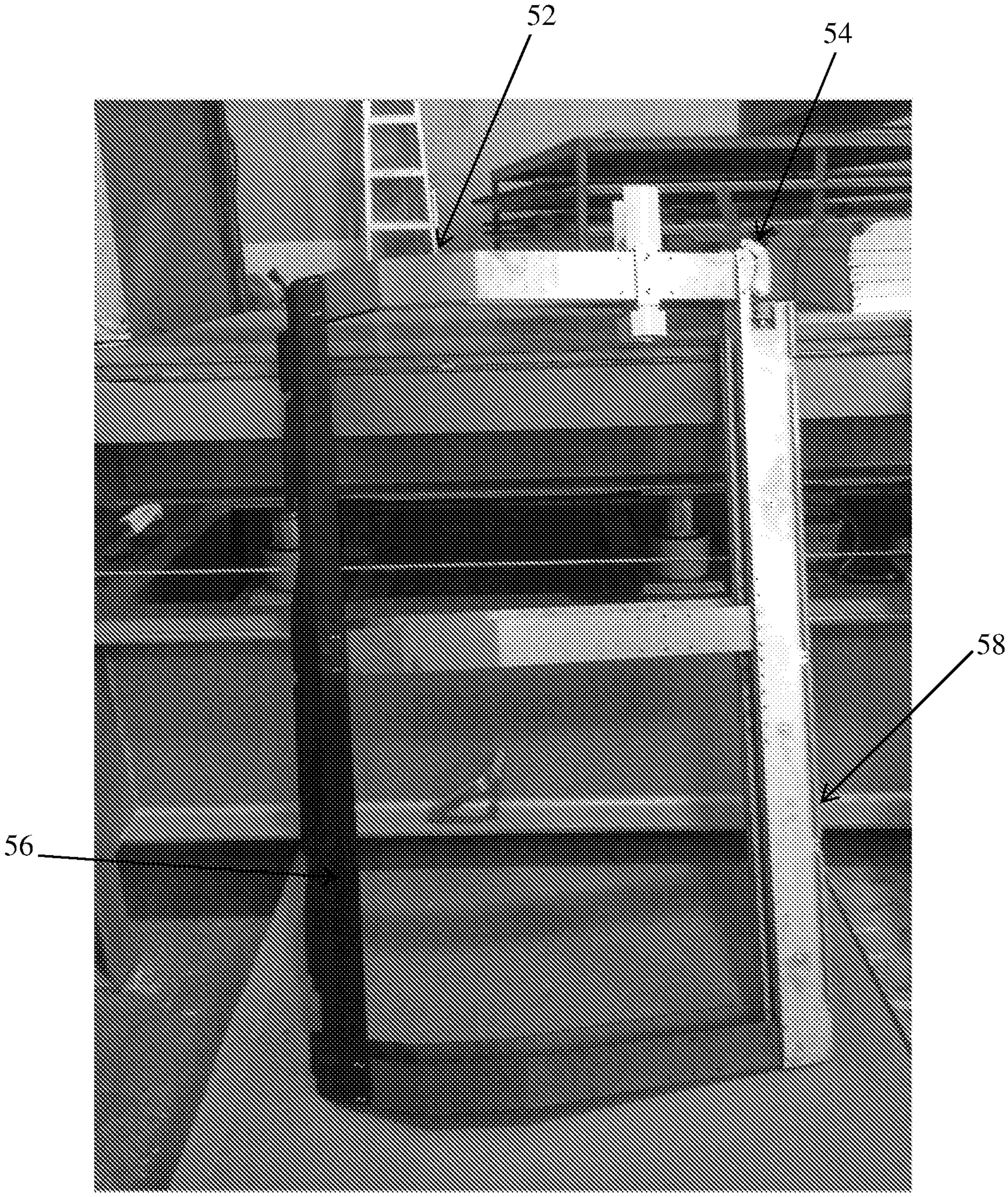

FIG. 9

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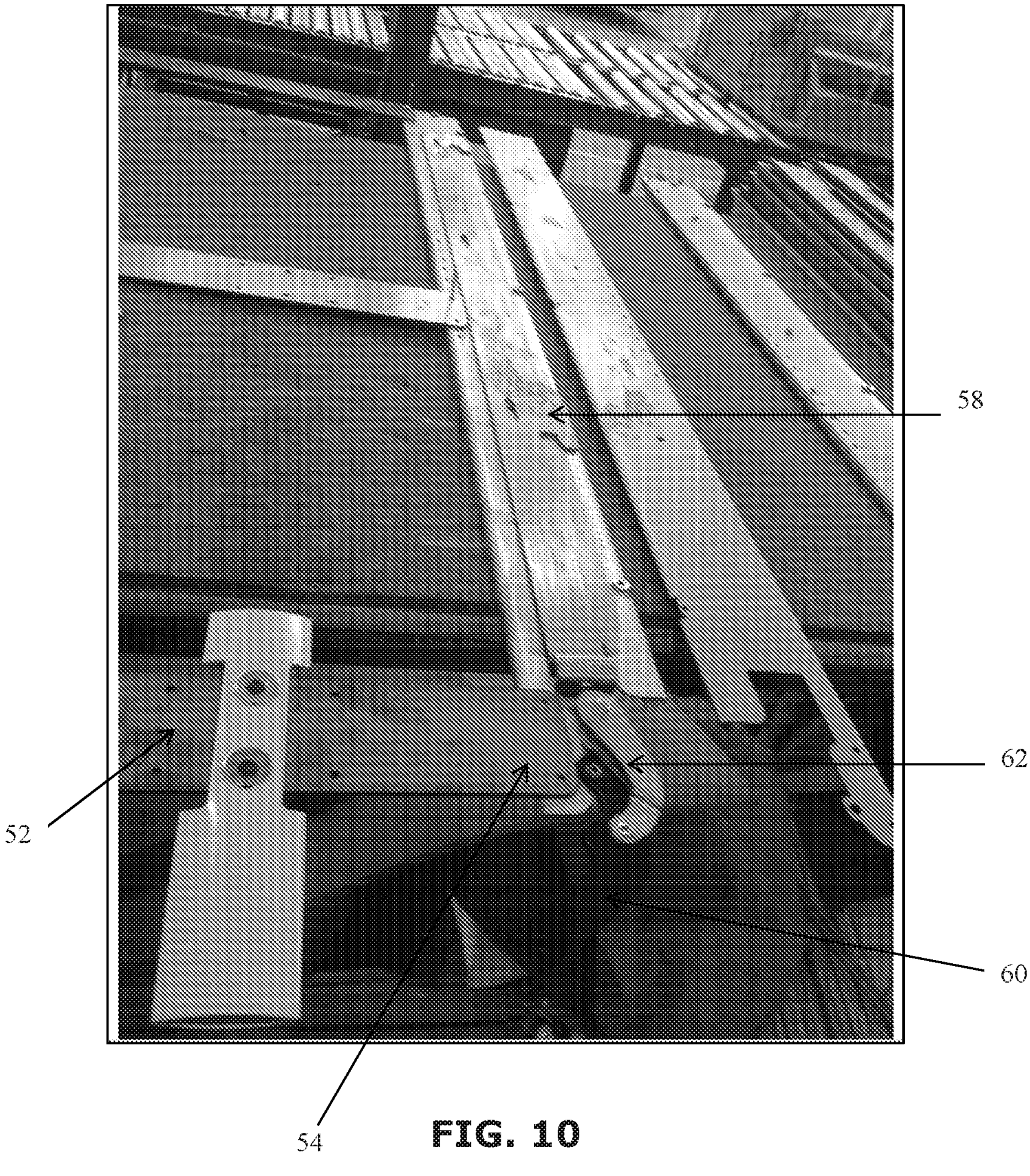

FIG. 10