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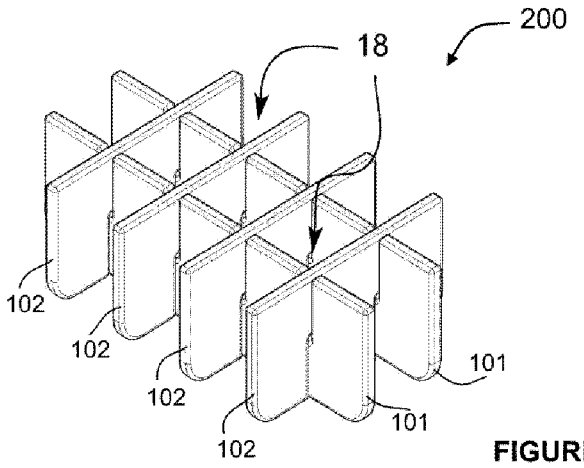

FIGURE 3

(57) Abstract: An ice pack generally shaped as a rectangular cuboid is provided. The ice pack has a first face and a second face which are parallel to each other, each face comprising attachment means adapted to be removably attached to the face of another ice pack generally shaped as a 5 rectangular cuboid, configured to create a grid forming a plurality of open spaces. An ice pack grid system for a plurality of items is also provided. The system has a plurality of ice packs of different lengths, each ice pack having at least one slit running substantially halfway across the ice pack's width, and each ice pack being sized so that the slit can straddle the width of another ice pack and thus interlock in a perpendicular configuration so as to create a grid 0 pattern forming a plurality of spaces to receive items to be cooled.

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ICE PACK AND ICE PACK GRID SYSTEM

Cross-Reference to Related Applications

[0001] The present patent application claims the benefits of priority of commonly assigned UK Patent Application No. GB 1606301.8, entitled "ICE PACK GRID SYSTEM" and filed at the UK Intellectual Property Office on April 12, 2016.

Field of the Invention

[0002] The present invention generally relates to ice packs and more particularly to an ice pack grid system.

Background of the Invention

[0003] Ice packs have been in use for decades. Some are hollow plastic containers that can be filled with tap water and then to be frozen in a freezer, prior to their use in a cooler. Other ice packs contain a high density liquid which can keep cool for an extended period of time. The latter type of ice pack is sealed and its liquid is prevented from leaking. Existing ice packs do not have specific shapes that allow them to be easily combined or to be held in a specific configuration.

Summary of the Invention

[0004] The aforesaid and other objectives of the present invention are realized by generally providing an ice pack that comprises means configured to receive the width of another ice pack.

[0005] The aforesaid and other objectives of the present invention are realized by generally providing an ice pack grid system that is configured to form spaces for items that need to be kept in a specific environment with temperature other than the temperature of the ambient environment.

[0006] In a first aspect, an ice pack generally shaped as a rectangular cuboid is provided. In at least one embodiment, the ice pack has a first face and a second face which are parallel to each other, each face comprising attachment means adapted to be removably attached to the face of another ice pack generally shaped as a rectangular cuboid, configured to create a grid forming a plurality of open spaces.

[0007] The attachment means may comprise at least one first slit extending between the first face and the second face, the first slit being configured to receive at least one portion of a second ice pack.

[0008] The second slit of the ice pack may extend between the first face and the second face. The second slit may be configured to receive at least one portion of at least a third ice pack.

[0009] The first and the second slits of the ice pack may be identical. The ice pack may be configured to interlock with the second ice pack in a substantially perpendicular configuration. The ice pack may have a hollow body configured to receive a freezable substance. The ice pack may also have a cap. For example, the items may be containers. For example, the containers may be beverage containers.

[0010] The ice pack may further have at least one recess on the first face of the hollow body and a second recess on the second face wherein the first and second recesses are aligned with each other.

[0011] The attachment means may be configured as a mortise and tenon.

[0012] In a second aspect, an ice pack for storage and transport of a plurality of items comprising at least one attachment means adapted to receive a second complementary attachment means of another ice pack to form a plurality of spaces for receiving a plurality of items, is provided. It at least one embodiment, the hollow body may be adapted to receive a freezable substance. The attachment means may be configured as a mortise and tenon.

[0013] In a third aspect, an ice pack grid system having at least one first ice pack having at least one first slit and at least one second ice pack having at least a second slit, is provided. In at least one embodiment, each of the at least one first slit is configured to receive at least one portion of the at least one second ice pack and to create a grid forming a plurality of spaces.

[0014] The system may further have at least a third ice pack having at least a third slit, the third slit being configured to receive at least one portion of at least the first ice pack and to create a grid forming a plurality of spaces.

[0015] The system may further have at least a fourth ice pack having at least a fourth slit, the fourth slit being configured to receive at least one portion of at least the second ice pack and to create a grid forming a plurality of spaces.

[0016] The first ice pack may be configured to interlock with said second ice pack in a substantially perpendicular configuration. For example, the first and the second slits may be identical. The first and the second ice packs may be identical.

[0017] In a fourth aspect, provided herein is an ice pack grid system for a plurality of items, the system comprising a plurality of ice packs of different lengths, each ice pack having at least one slit running substantially halfway across the ice pack's width, and each ice pack being sized so that the slit can straddle the width of another ice pack and thus interlock in a perpendicular configuration so as to create a grid pattern forming a plurality of spaces to receive items to be cooled. Each of the first and the second ice packs may have a hollow body configured to receive a freezable substance.

[0018] The ice pack grid system may further have a cooler attachment configured to attach the ice pack grid system to a cooler.

[0019] The ice pack may be configured to interlock with the second ice pack in a substantially perpendicular configuration.

[0020] The ice pack may have a hollow body configured to receive a freezable substance.

[0021] Other and further objects and advantages of the present invention will be obvious upon an understanding of the illustrative embodiments about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

[0022] The features of the present invention which are believed to be novel are set forth with particularity in the appended claims.

Brief Description of the Drawings

[0023] The above and other objects, features and advantages of the invention will become more readily apparent from the following description, reference being made to the accompanying drawings in which:

[0024] Figure 1 is a front view of an example embodiment of an ice pack in accordance with present invention.

[0025] Figure 2A is a sectional view along the axis A-A of the ice pack shown at Figure 1.

[0026] Figure 2B is a sectional view along the axis B-B of the ice pack shown at Figure 1.

[0027] Figure 3 is a perspective view of an example embodiment of an ice pack grid system in accordance with present invention.

[0028] Figure 4 is an exploded perspective view of the ice pack grid system shown in Figure 3 along with containers and a cooler.

[0029] Figure 5 is a perspective view the ice pack grid system, shown in Figures 3 and 4, in the cooler.

[0030] Figure 6 is a top view of the ice pack grid system in the cooler with containers, in accordance with present invention.

[0031] Figure 7 is a perspective view of another example embodiment of the ice pack in accordance with the present invention.

[0032] Figure 8 is a sectional view along the axis C-C of the ice pack shown at Figure 7.

[0033] Figure 9 is a perspective view of another example embodiment of an ice pack grid system in accordance with present invention.

[0034] Figure 10 is a perspective view of the example embodiment of the ice pack grid system shown at Figure 9.

[0035] Figure 11 is a top view of the example embodiment of the ice pack grid system shown at Figure 9.

[0036] Figure 12 is a perspective view of another example embodiment of an ice pack grid system in accordance with present invention.

[0037] Figure 13 is a perspective view of the example embodiment of the ice pack grid system shown at Figure12.

[0038] Figure 14 is a side view of the example embodiment of the ice pack grid system shown at Figure 12.

Detailed Description of the Preferred Embodiment

[0039] A novel ice pack and ice pack grid system will be described hereinafter. Although the invention is described in terms of specific illustrative embodiments, it is to be understood that the embodiments described herein are by way of example only and that the scope of the invention is not intended to be limited thereby.

[0040] Coolers along with ice packs are typically used in order to transport or to temporary store objects in an environment with temperature lower than the temperature outside of the cooler. The ice packs are typically dropped down the cooler or positioned on either side of the cooler and then multiple objects to be cooled are thrown into the cooler to form a pile.

[0041] Such messy arrangement of the objects to be cooled does not lead to equal distribution of temperature in the cooler and the objects that are located closer to the ice packs are usually colder than the ones that are stored in the middle of the pile.

[0042] The ice packs and the ice pack grid system as described herein may help to improve and to provide more uniform distribution of the cold temperature in the cooler.

[0043] The ice pack grid system as described herein may provide a plurality of spaces that are partially surrounded by walls formed by portions of the ice packs. The size of such spaces may be configured to embrace at least partially each individual object to be stored in the cooler. Such configuration may permit the objects to be in almost similar temperature conditions.

[0044] The objects that may need to be cooled may be various items such as, for example, containers and/or objects (including but not limited to, living objects). For example, the objects may be cans (e.g. containing beverages) and/or fruits, vegetables, eggs, etc. Various drugs and medications may also need to be temporary stored and/or transported in a cooler environment.

[0045] Figure 1 shows an example embodiment of an ice pack 100, in accordance with present invention. The ice pack 100 may have a hollow body 110 which may be adapted to receive a freezable substance 150. For example, the freezable substance 150 may be liquid, such as water and/or hydroxyethyl cellulose, carboxymethyl cellulose (also known as CMC), sodium polyacrylate, or vinyl-coated silica gel or any other similar substance preferably approved for use with food. For example, the freezable substance 150 may be superabsorbent polymer, also known as SAP.

[0046] The ice pack 100 has one or more slits 14. Each slit 14 is adapted to receive a portion of another ice pack. Figure 1 shows an example embodiment of the ice pack 100 with four slits 14. It should be understood that the ice pack 100 may have any number of the slits 14. Referring to Figures 1, 2A, and 2B, the body 110 of the ice pack 100 has a width “d”, a length “l” and a height “h”, and the slits 14 may have slit width “s” and slit depth “k”.

[0047] The ice packs 100 are configured to form an ice pack grid system. The ice pack grid system may be formed of the ice packs 100 of identical dimensions or of various dimensions.

[0048] Figure 3 shows an example embodiment of the system 200 with first ice packs 101 and second ice packs 102 having different dimensions.

[0049] Referring to Figures 3-6, the system 200 may be adapted to the dimensions of the cooler 300. The ice packs 100, 101, 102 in one system 200 may have not only different lengths, but also different heights and widths. For example, the ice packs 100, 101, 102 of three or more different lengths may be in one system 200. Alternatively, the first and the second ice packs 101, 102 may be identical.

[0050] Referring to Figure 4, the first ice pack 101 has one or more first-pack slits 141 (hereafter "first slits 141"). The second ice pack 102 has one or more second-pack slits 142 (hereafter "second slits 142").

[0051] Each slit 141 may be configured to receive a portion of a second ice pack 102, and to straddle the width of the second ice pack 102, in order to create a grid 200 forming a plurality of spaces (openings) 18, each configured to receive an item, for example, one container 310, as shown at Figures 5-6.

[0052] For example, the first slits 141 may be configured and dimensioned to receive portions 152 (and in particular, width) of the second ice packs 102, while the second slits 142 may be configured and dimensioned to receive portions 151, and in particular ice pack width d1 of the ice packs 101. The ice packs 101, 102 may form a center lap joint (attachment) when the first slit 141 of the first ice pack receives the second slit 142 of the second ice pack 102.

[0053] For example, the first and the second slits 141, 142 may be identical to receive the portions of ice packs 102, 101 of similar width, respectively.

[0054] Alternatively, the first ice packs 101 in system 200 may be narrower or wider than the second ice packs 102. The first and the second slits 141, 142 may therefore have different dimensions adapted to the dimensions of the ice packs 102, 101, respectively. The slit width *s* of the slits 141 of the first ice pack 101 may therefore be adapted to receive the width *d2* of the second ice pack 102 and vice versa. For example, the width *s* of the slit 141 may be wider (e.g. wider by 0.01mm to 50 mm) than the width *d2* of the second ice pack 102 in order to receive and accommodate the portion 152 of the ice pack 102 to form the system 200.

[0055] The at least one first ice pack 101 and the at least one second pack 102 may be configured to interlock with each other. For example, the first ice pack 101 and second pack 102 may interlock in a substantially perpendicular configuration, as shown at Figures 3-6.

[0056] Referring back to Figure 1, the slits 14 may be located along the length of the ice pack 100. It should be understood that the slits 14 may be located on any side of the ice pack 100. For example, some of the slits 14 may start from the side 115 of the ice pack 100 and the

other may start from the side 116. This may provide another example embodiment ice pack grid system that may have particular interlocking pattern for the ice packs, where some of second ice packs of the system are saddled onto the first ice packs from the top while the first ice packs are saddled onto the other second ice packs.

[0057] The slits 14 may be oriented at an angle alpha ("α" in Figure 1) to the side of the ice pack 100. The angle alpha may be between 10 and 90° to one side 115 of the ice pack 100. Figure 1 shows an example embodiment when the angle alpha is 90°.

[0058] The dimensions of the ice packs 100, 101, 102 such as length, width and/or height, may also be adapted to the size of a cooler 300 the system 200 is used with, so that, when the system 200 is assembled, the system 200 may fit into the cooler 300, as shown at Figures 3-5. For example, the length *l* of the ice pack 100 may be 2 mm to 20 mm shorter than the length or the width of the cooler 300 to fit comfortably inside the cooler 300 when the ice pack 100 is frozen and when it is defrosted.

[0059] In at least one embodiment, the dimensions of the ice pack 100 may be adapted to the dimensions of the containers 310 to be used with the grid system 200. For example, the distance *m* between the slits 14 (see Figure 1) may be designed such that the system 200, when assembled, may embrace in each of the formed spaces 18 at least one item such as a container 310, as shown at Figures 4-6. For example, such spaces 18 may be rectangular. Such spaces 18 may be partially closed.

[0060] The ice pack of claim 1, wherein said attachment means comprises at least one first slit extending between the first face and the second face, the first slit being configured to receive at least one portion of a second ice pack.

[0061] Referring now to Figure 7, shown therein is an example embodiment of the ice pack 700 having the cap 170 configured to close the hollow body. For example, the cap 170 may be unscrewable. For example, the cap 170 may be located on a side of the ice pack 700.

[0062] The ice pack 700 may also have one or more recesses 720 on at least one side of the hollow body 710. For example, the recesses 720 may be located on opposite sides (e.g. front and back sides) of the ice pack 700, as shown at Figures 7 and 8. The recesses 720 may thus form a passage 712 of a passage width *w*. For example, the passage may have a width being of at least 3 times narrower than the width of the body 710.

[0063] The recesses 720 may help to reduce (or prevent) rounding of the ice pack 700 when freezing so that the ice pack 700 may still get into the slits of the other ice pack. Having the

recesses 720 may also reduce the amount of material used to make the ice pack 700 and may reduce the cost of the ice pack 700.

[0064] In at least one embodiment, the ice packs 101, 102, 700 as discussed herein may further have at least one cooler attachment (not shown). Such attachment may help to attach the ice packs 101, 102, 700 to the cooler 300, in order to mount the ice pack grid system 200, for example, to the cooler 300.

[0065] In at least one embodiment, the ice packs in the ice pack grid system as discussed herein may further have at least one clipping system for clipping the ice packs to each other. The clipping system may be, for example, one or more buttons and/or clips located on the ice packs and configured to lock the ice packs to each other.

[0066] In at least one embodiment, the ice pack as described herein is generally shaped as a rectangular cuboid, having a first face and a second face which are parallel to each other. In at least one embodiment, each face comprises attachment means adapted to be removably attached to the face of another ice pack generally shaped as a rectangular cuboid, configured to create a grid forming a plurality of open spaces.

[0067] In at least one embodiment, the attachment means may comprise at least one first slit extending between the first face and the second face, the first slit being configured to receive at least one portion of the second ice pack. For example, the attachment means may be center lap joint.

[0068] In at least one embodiment, the attachment means may be configured as a mortise and tenon. When used herein, the term "mortise and tenon" includes attachment means such as "mortise and tenon", "tongue and groove", and "sliding dovetail" attachments (joints). Examples of mortise and tenon attachment means are shown at Figures 9-14.

[0069] Figures 9, 10 and 11 show another example embodiment of the ice pack grid system 900. The system 900 may have a first ice pack 901, a second ice pack 902, and a third ice pack 903, with channels 905 of the first ice pack 901 and protrusions 906 of the second and third ice pack 902, 903. For example, the ice pack 901 may have at least one channel 905, each adapted to receive a protrusion 906 of another ice pack (902, 903). For example, the first ice pack 901 may have the channels 905 on one side (915 or 916 at Figure 11) or both sides 915, 916.

[0070] For example, the channels 905 and protrusions 906 may be configured such that the protrusion 906 may slidingly fit in the channel 905 to mount the second ice pack 902 (as well

as the third ice pack 903 and other ice packs) to the first ice pack 901. For example, the protrusion 906 may form one or more grooves 908 (preferably two) configured to receive matching ridges 909 of the channels 905 so that the ice packs may be mounted to each other.

[0071] The first ice pack 901 may also have at least one protrusion 907. For example, the protrusion 907 may be configured to fit into a matching channel (not shown) located on the cooler. The protrusion 907 may also be configured to fit into a matching channel of another ice pack.

[0072] It should be understood that the system 900 may include other ice packs similar to the ice packs 901, 902, 903.

[0073] Figures 12, 13 and 14 show another example embodiment of the ice pack grid system 950. The first ice pack 951 may have openings 955, each configured to receive protrusions 956 of another ice pack (second ice pack 952 and/or third ice pack 953). The first ice pack 951 may also have at least one side protrusion 957. Such side protrusion 957 may be configured to fit into the opening of another ice pack and/or fit into a matching opening of the cooler. The first ice pack 951 may also have a side slit 959 configured to receive a matching protrusion (not shown) of another ice pack and/or the cooler.

[0074] It should be understood that the ice packs may have any number of protrusions that may fit into the matching openings of the other ice packs. For example, the ice pack 952 may have two (or more) protrusions on the same side 910, such protrusions being configured to fit into two (or more) openings that may be located on the first ice pack 951 (instead of one opening 955 as shown at Figure 12). It should be understood that the form of the openings 955 and protrusions 956 may be any form (round, oval, square, etc.) so long as they match each other.

[0075] It should be understood that the system 950 may include other ice packs similar to the ice packs 951, 952, 953.

[0076] While illustrative and presently preferred embodiment of the invention have been described in detail hereinabove, it is to be understood that the inventive concepts may be otherwise variously embodied and employed and that the appended claims are intended to be construed to include such variations except insofar as limited by the prior art.

Claims

1. An ice pack generally shaped as a rectangular cuboid, having a first face and a second face which are parallel to each other, each face comprising attachment means adapted to be removably attached to the face of another ice pack generally shaped as a rectangular cuboid, configured to create a grid forming a plurality of open spaces.

2. The ice pack of claim 1, wherein said attachment means comprises at least one first slit extending between the first face and the second face, the first slit being configured to receive at least one portion of a second ice pack.

3. The ice pack of claim 2, further comprising a second slit extending between the first face and the second face, the second slit being configured to receive at least one portion of at least a third ice pack.

4. The ice pack of any one of claims 1 to 3, wherein the first and the second slits are identical.

5. The ice pack of any one of claims 1 to 4, wherein the ice pack is configured to interlock with said second ice pack in a substantially perpendicular configuration.

6. The ice pack of any one of claims 1 to 5, further comprising at least one recess on said first face of the hollow body and a second recess on the second face wherein the first and second recesses are aligned with each other.

7. The ice pack of any one of claims 1 to 6, wherein the ice pack has a hollow body configured to receive a freezable substance.

8. An ice pack for storage and transport of a plurality of items comprising at least one attachment means adapted to receive a second complementary attachment means of another ice pack to form a plurality of spaces for receiving the plurality of items, the hollow body being adapted to receive a freezable substance.

9. The ice pack of claim 8, wherein the items are beverage containers.

10. An ice pack grid system comprising:

    at least one first ice pack having at least one first slit and

    at least one second ice pack having at least a second slit,

each of the at least one first slit being configured to receive at least one portion of the at least one second ice pack and to create a grid forming a plurality of spaces.

11. The system of claim 10, further comprising at least a third ice pack having at least a third slit, the third slit being configured to receive at least one portion of at least the first ice pack and to create a grid forming a plurality of spaces.

12. The system of claim 11, further comprising at least a fourth ice pack having at least a fourth slit, the fourth slit being configured to receive at least one portion of at least the second ice pack and to create a grid forming a plurality of spaces.

13. The system of any one of claims 10 to 12, wherein the first and the second slits are identical.

14. The system of any one of claims 10 to 13, wherein the first ice pack is configured to interlock with said second ice pack in a substantially perpendicular configuration.

15. The system of any one of claims 10 to 14, wherein the first and the second ice packs are identical.

16. An ice pack grid system for a plurality of items, the system comprising a plurality of ice packs of different lengths, each ice pack having at least one slit running substantially halfway across the ice pack's width, and each ice pack being sized so that the slit can straddle the width of another ice pack and thus interlock in a perpendicular configuration so as to create a grid pattern forming a plurality of spaces to receive items to be cooled.

17. The system of any one of claims 10 to 16, wherein the items are beverage containers.

18. The system of any one of claims 10 to 17, wherein each of the first and the second ice packs has a hollow body configured to receive a freezable substance.

19. The system of any one of claims 10 to 18, further comprising a cooler attachment configured to attach the system to a cooler.

20. The ice pack of any one of claims 1 and 8, wherein the attachment means are configured as a mortise and tenon.

21. The ice pack of claim 20, wherein the ice pack is configured to interlock with said second ice pack in a substantially perpendicular configuration.

22. The ice pack of any one of claims 20 to 21, wherein the ice pack has a hollow body configured to receive a freezable substance.

* * *

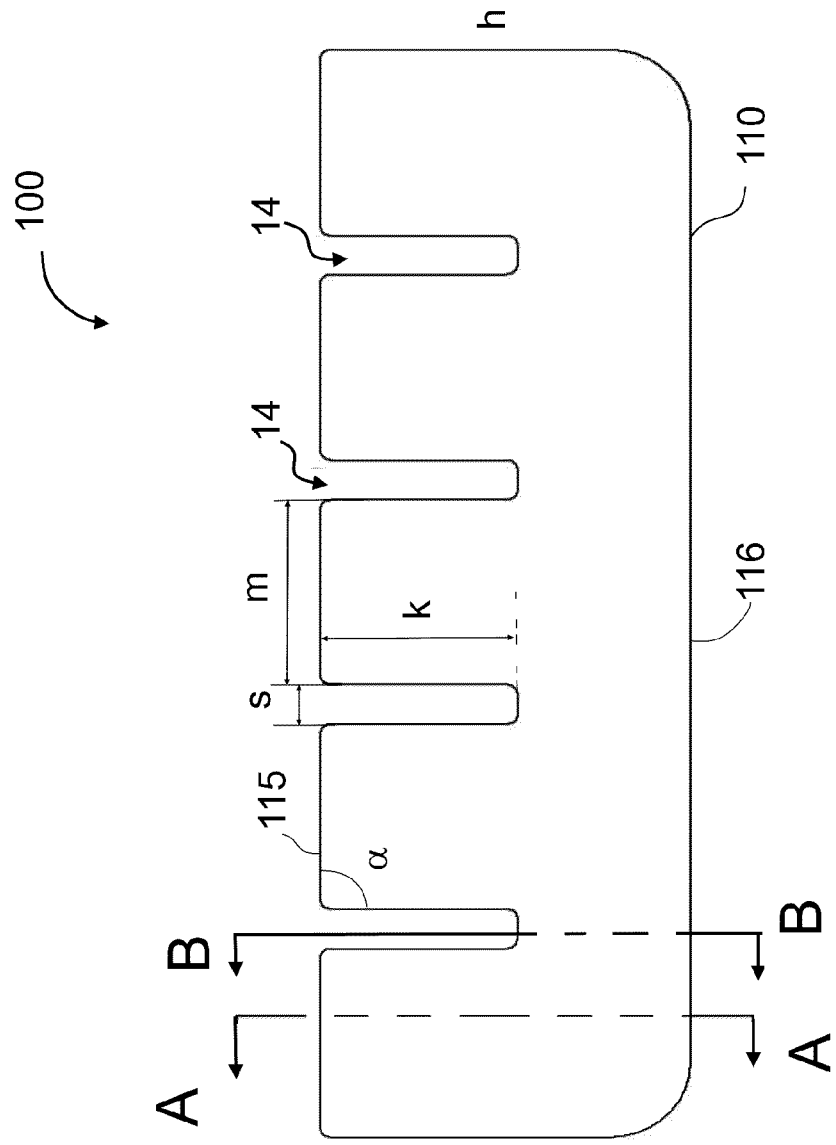
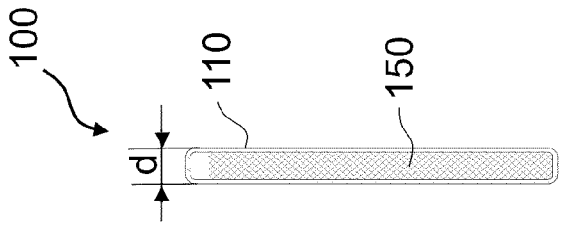
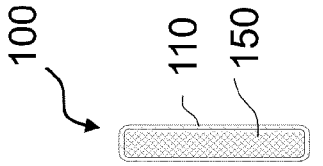


FIGURE 1



A-A

FIGURE 2A



B-B

FIGURE 2B

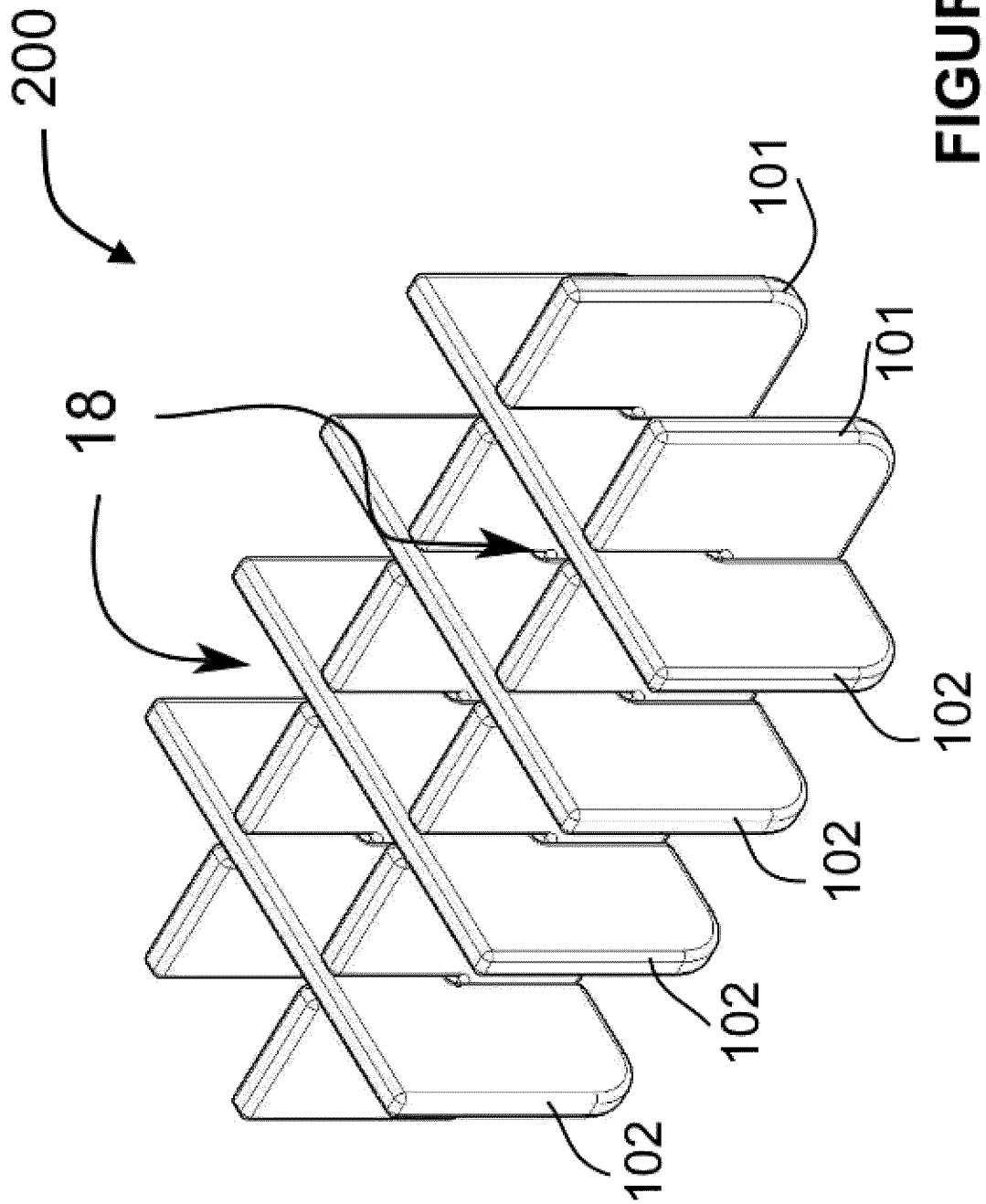


FIGURE 3

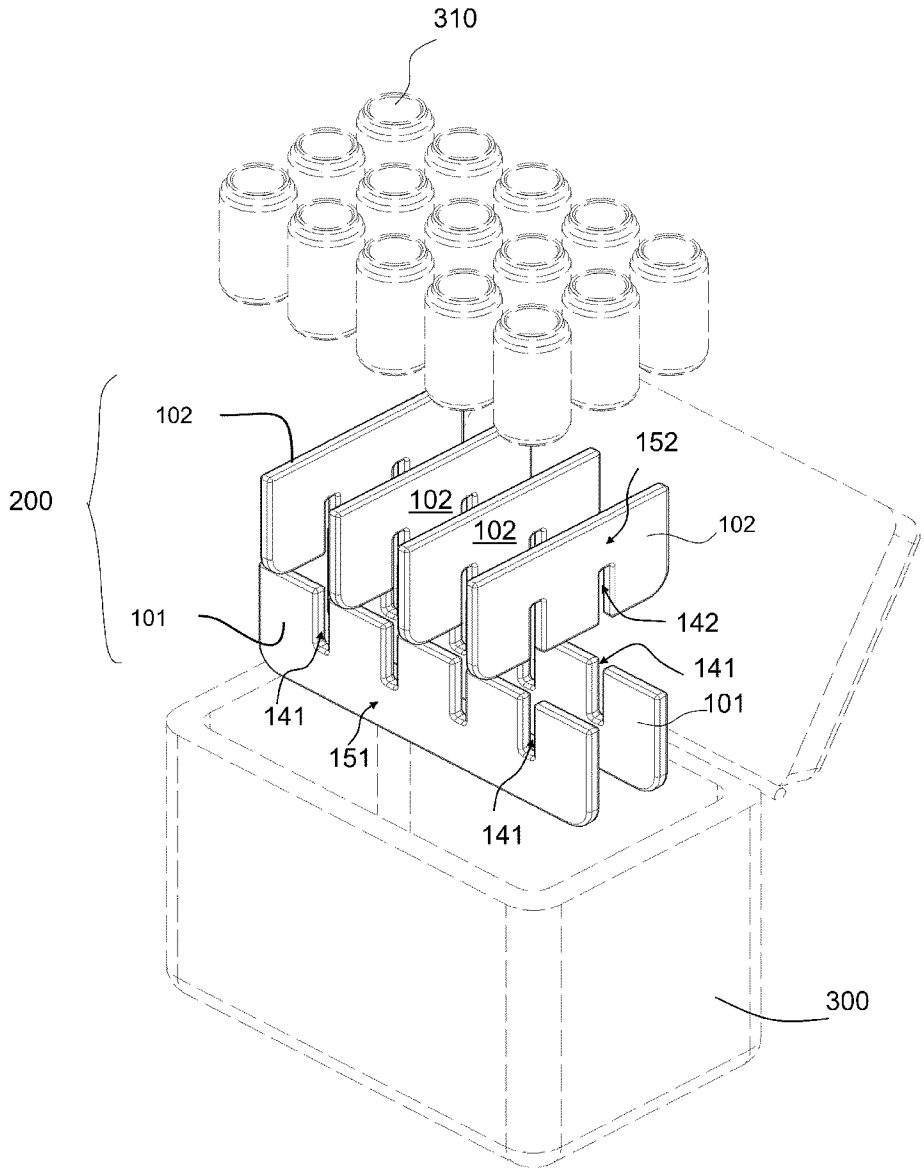


FIGURE 4

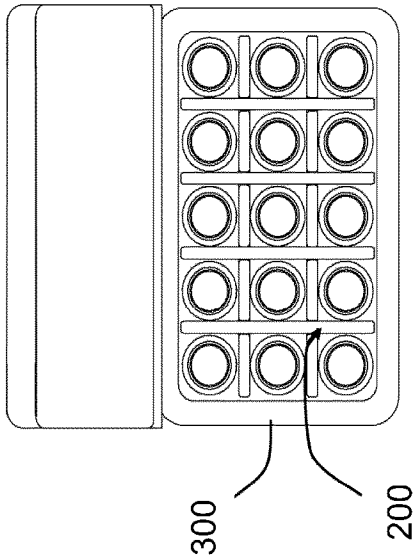


FIGURE 6

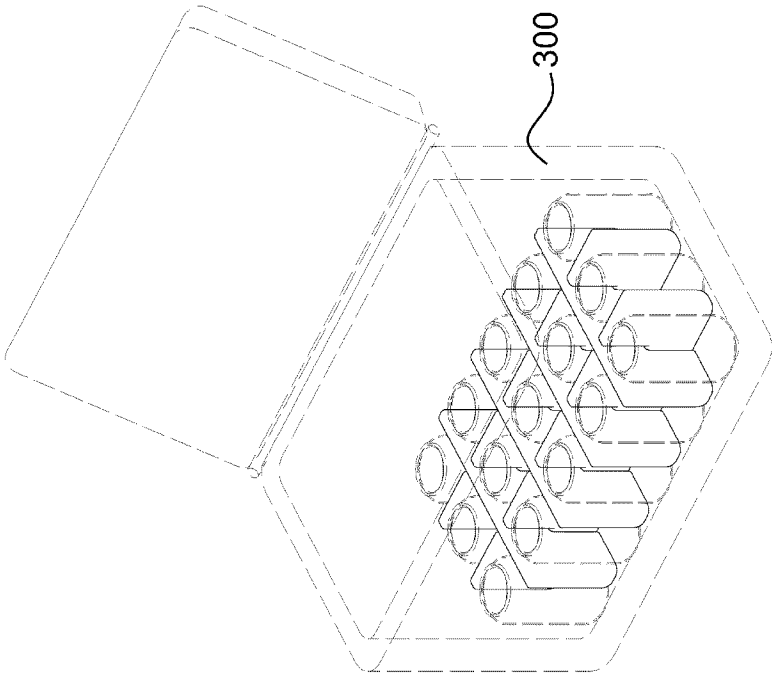


FIGURE 5

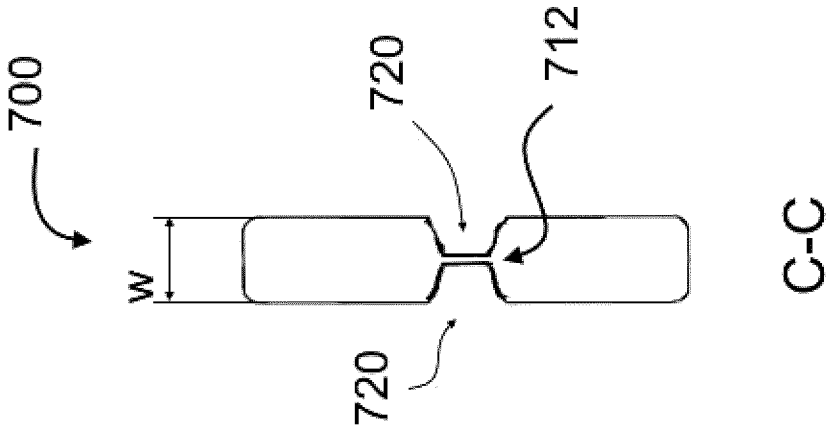


FIGURE 8

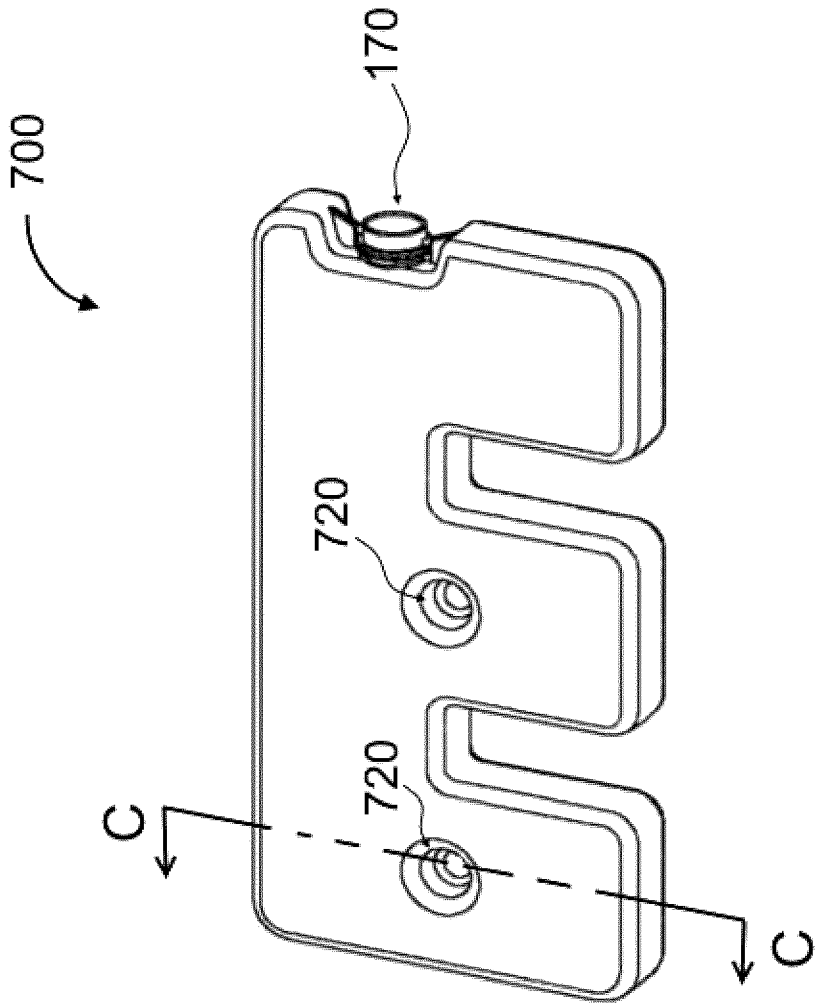


FIGURE 7

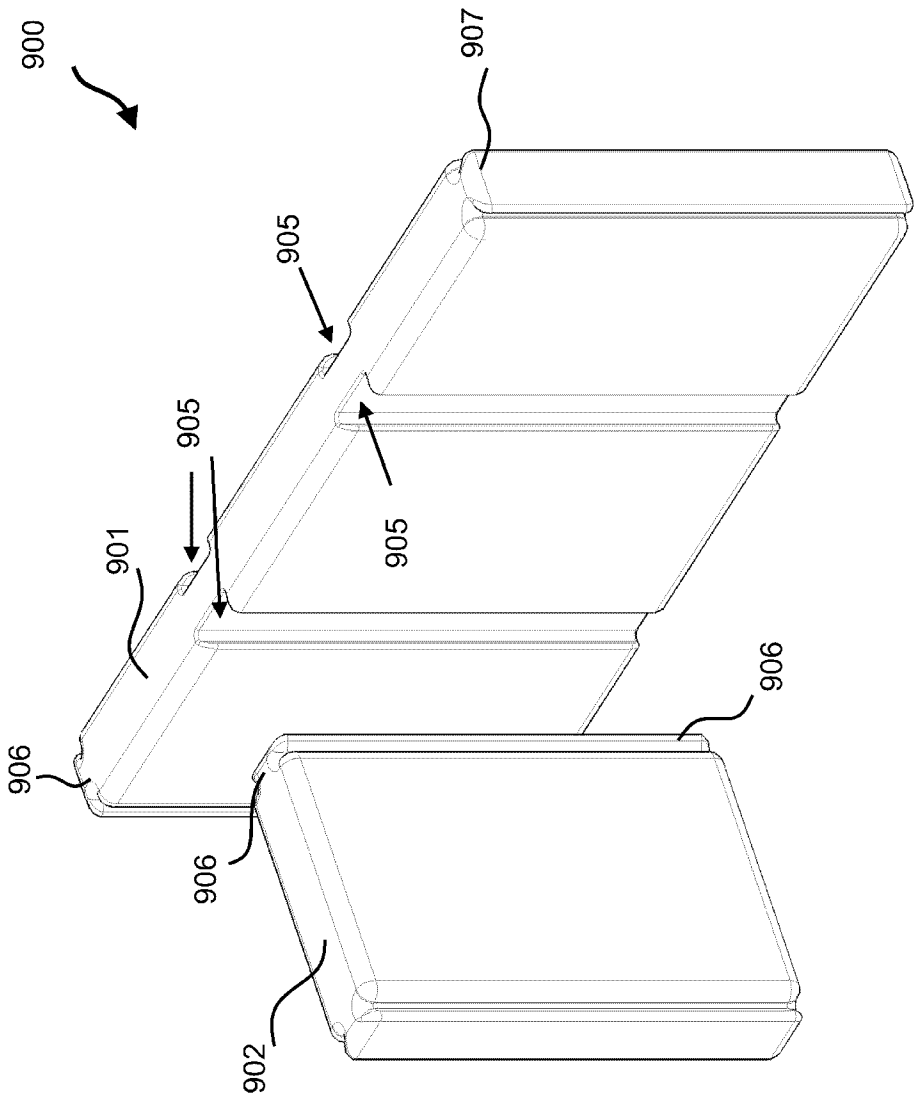
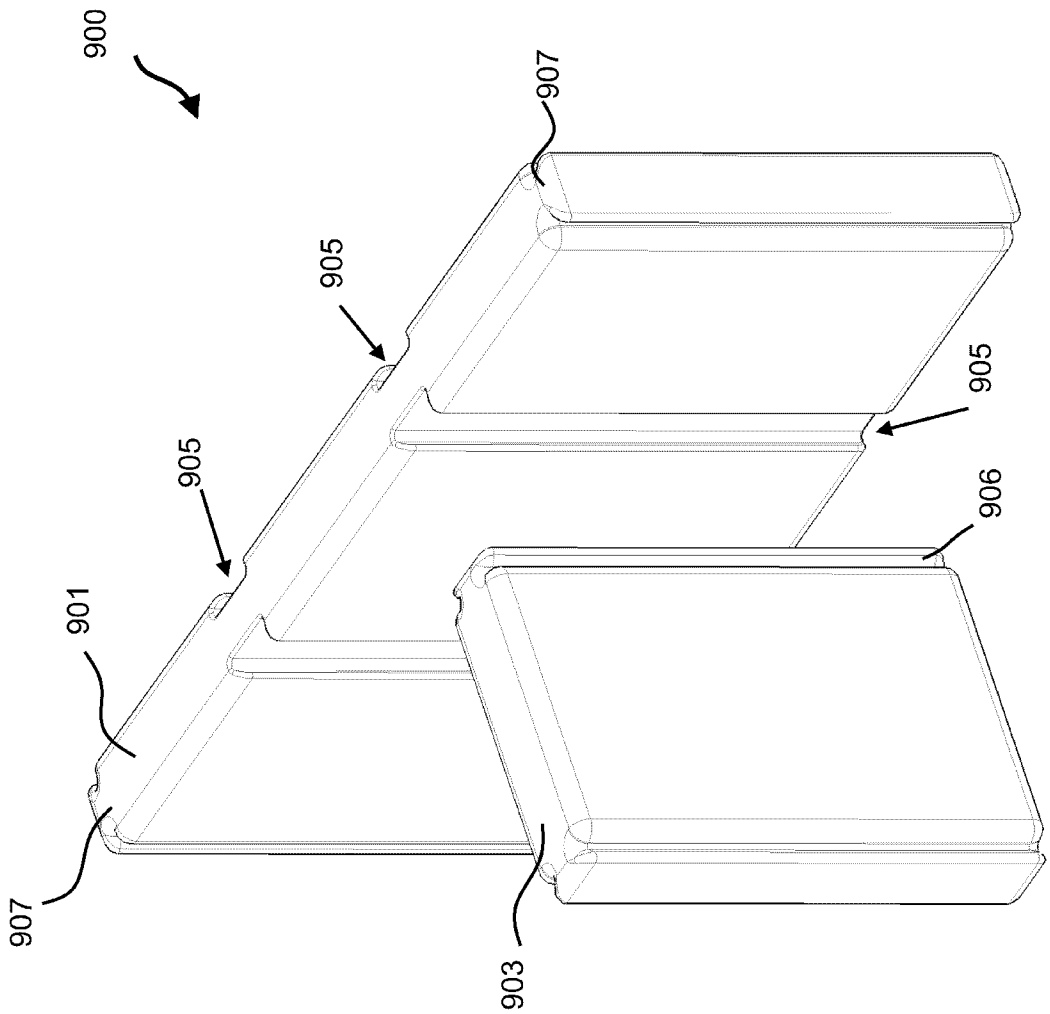


FIGURE 9

FIGURE 10



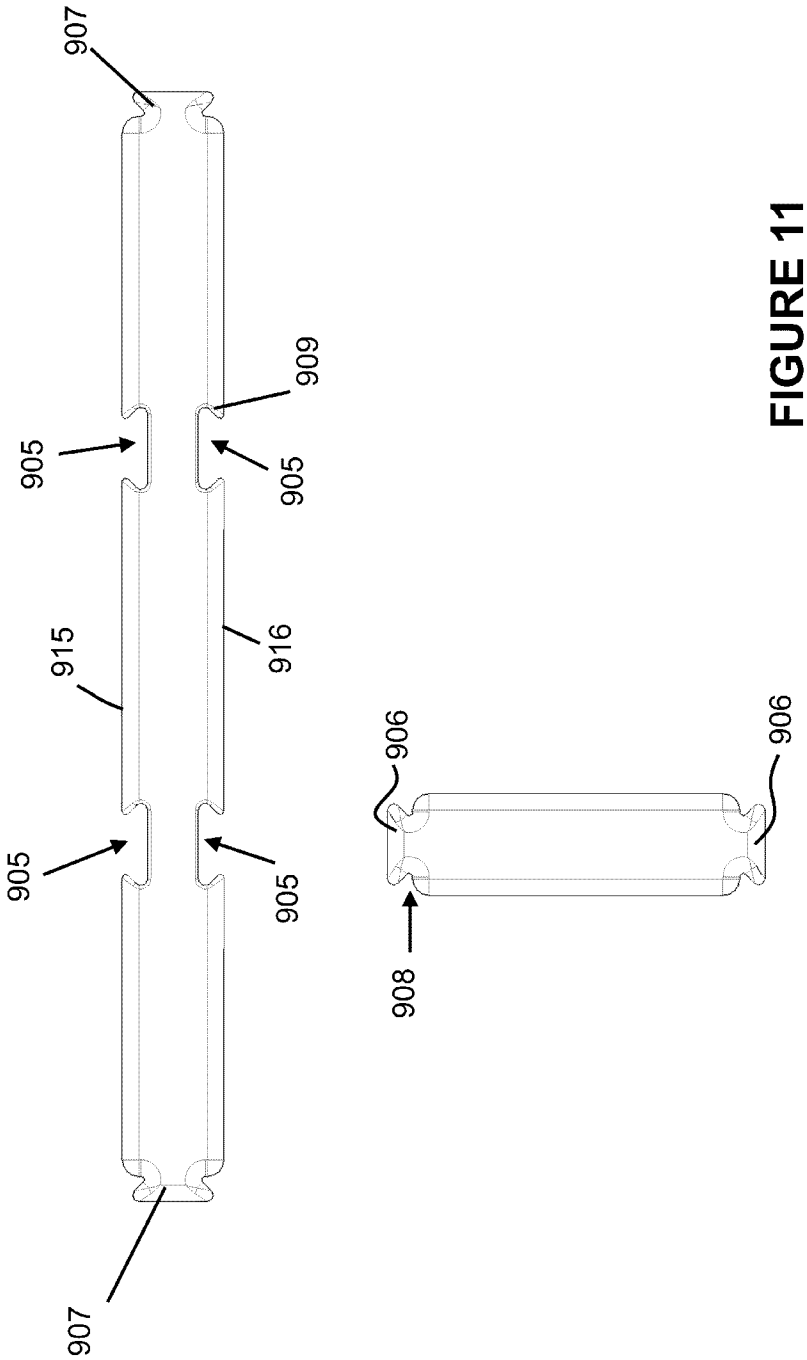


FIGURE 11

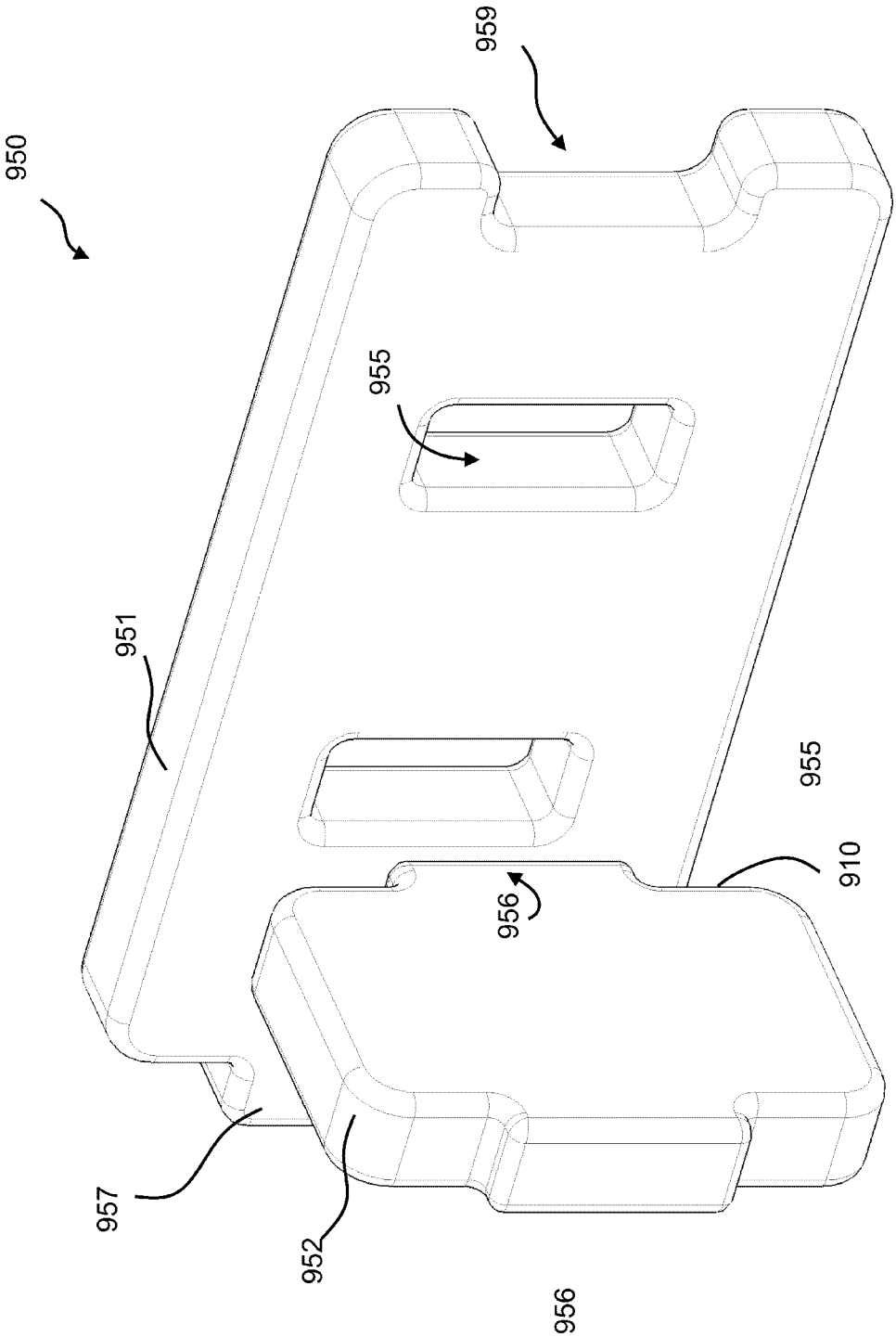


FIGURE 12

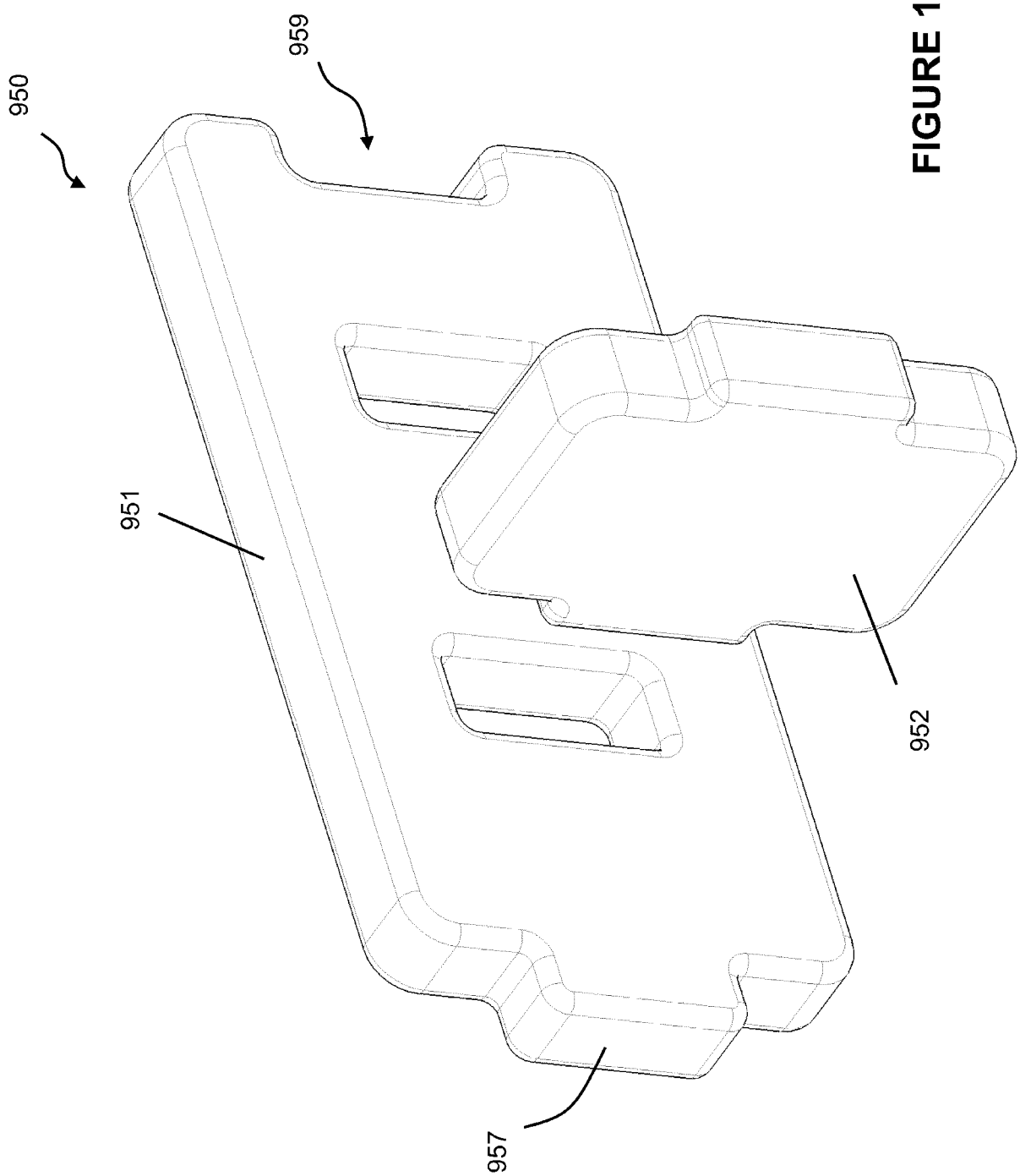


FIGURE 13

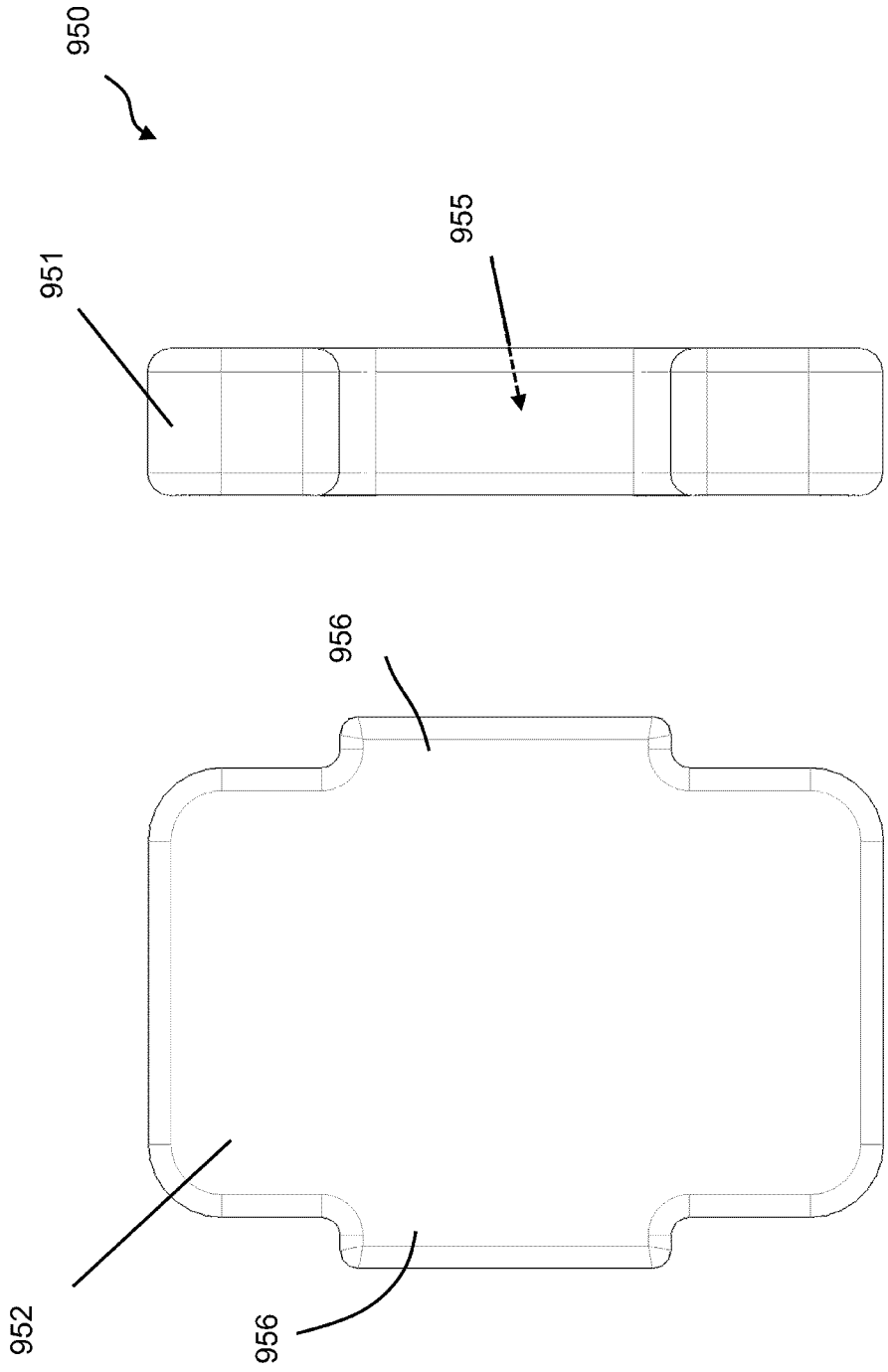


FIGURE 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2017/050453

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***F25D 3/08*** (2006.01) , ***F25C 1/22*** (2006.01) , ***F25D 25/00*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***F25D 3/08*** (2006.01) , ***F25C 1/22*** (2006.01) , ***F25D 25/00*** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Orbit, Google
Keywords: ice pack cans bottle+ connect+ grid modular interlock interconnect slits mortise tongue groove

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB2282661A, (CORNELIUS. R. et al.) 12 April 1995 (12-04-1995) *see abstract and figures, figure 10	1, 5-9, 20-22
A	US7294374B2, (ROMERO, B.) 13 November 2007 (13-11-2007) *see abstract and figures 2 and 3	1-22
A	CA2506463A1, (BUCKINGHAM, C.) 06 November 2006 (06-11-2006) *see abstract and figures	1-22
A	CN204963339U, (ZHIYUAN, L. et al.) 13 January 2016 (13-01-2016) *see abstract and figures	1-22
A	FR2516228A1, (ROYNARD, P.) 13 May 1983 (13-05-1983) *see abstract and figures	1-22

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
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Date of the actual completion of the international search 07 June 2017 (07-06-2017)	Date of mailing of the international search report 03 August 2017 (03-08-2017)
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer Matthew Chisholm (819) 639-7839

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US5806338A, (SCHWARTZ, J. et al.) 15 September 1998 (15-09-1998) *see abstract and figures	1-22
A	US6223551B1, (MITCHELL, B.) 01 May 2001 (01-05-2001) *see abstract and figures	1-22
A	US6990831B2, (FIENE, C.) 31 January 2006 (31-01-2006) *see abstract and figures	1-22

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2017/050453

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		US7743626B2	29 June 2010 (29-06-2010)
CN204963339U	13 January 2016 (13-01-2016)	None	
FR2516228A1	13 May 1983 (13-05-1983)	None	
US5806338A	15 September 1998 (15-09-1998)		None
US6223551B1	01 May 2001 (01-05-2001)	US6223551B1	01 May 2001 (01-05-2001)
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