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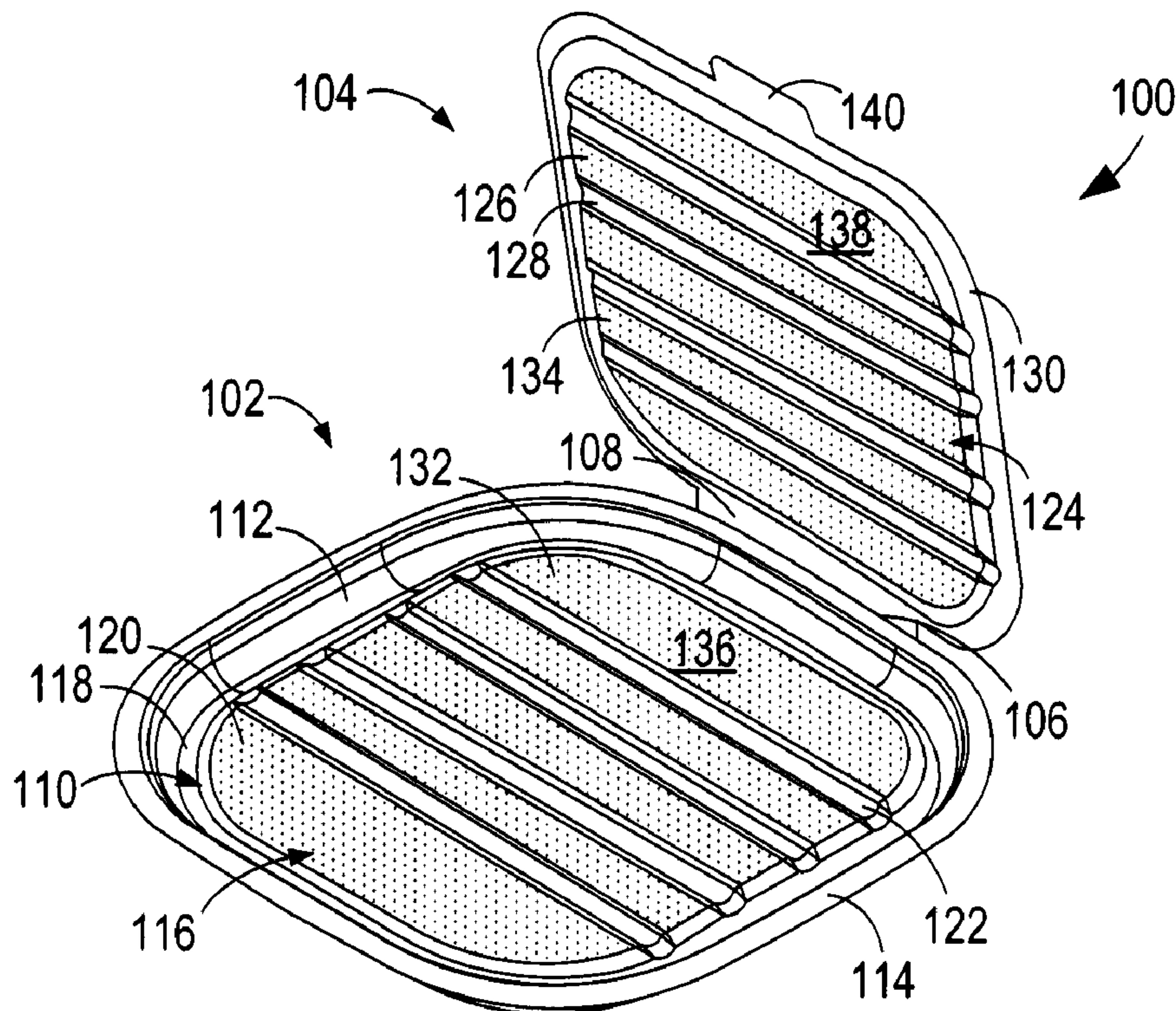
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(54) Title: APPARATUS FOR PREPARING A FOOD ITEM IN A MICROWAVE OVEN



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An apparatus for preparing a food item in a microwave oven comprises a tray including a plurality of elevated heating areas and a plurality of channels disposed between the elevated heating areas, the elevated heating areas each including a microwave energy interactive material, a cover pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position, and a locking feature operative for releasably maintaining the cover in the closed position.



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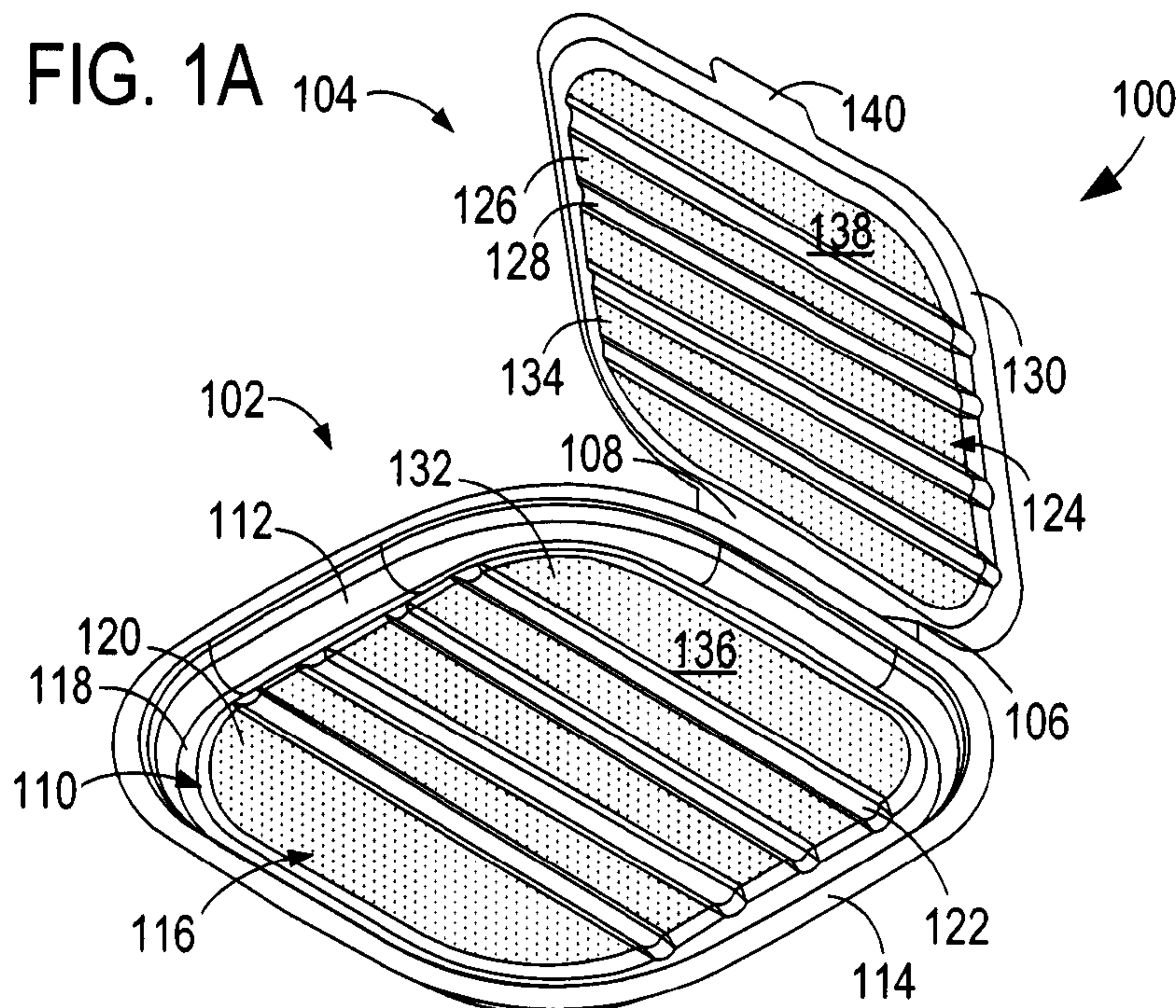
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(54) Title: APPARATUS FOR PREPARING A FOOD ITEM IN A MICROWAVE OVEN



(57) Abstract: An apparatus for preparing a food item in a microwave oven comprises a tray including a plurality of elevated heating areas and a plurality of channels disposed between the elevated heating areas, the elevated heating areas each including a microwave energy interactive material, a cover pivotally connected to the tray for pivoting the cover relative to the tray between an open position and a closed position, and a locking feature operative for releasably maintaining the cover in the closed position.

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APPARATUS FOR PREPARING A FOOD ITEM IN A MICROWAVE OVEN

TECHNICAL FIELD

Various constructs or apparatuses for heating or cooking a food item in a
5 microwave oven are disclosed. In particular, this disclosure relates to various
constructs and systems for heating or cooking a food item in a microwave oven,
where the food item may have more than one surface to be browned and/or
crisped.

10 BACKGROUND

Microwavable packages provide a convenient means for preparing a variety
of food items in a microwave oven. However, many of such packages tend to brown
and/or crisp only one surface of the food item at a time, so the food item must be
rotated and/or inverted during heating. Thus, there is a need for a microwave
15 heating construct that is capable of browning and/or crisping multiple surfaces of a
food item concurrently.

SUMMARY

This disclosure is directed generally to various apparatuses and methods for
20 preparing a food item in a microwave oven. The apparatus generally comprises a
pair of opposed heating surfaces, constructs, or structures (e.g, tray and cover)
adapted to heat, brown, and/or crisp multiple sides of a food item simultaneously.
One or both of the opposed structures may be shaped and/or contoured to
accommodate the shape of food item. The structures may be joined to one another
25 and/or may include a locking mechanism to secure the structures in a superposed,

substantially parallel relationship with one another. The apparatus may be formed from a disposable material, for example, paperboard, molded pulp, molded fiber, or a polymeric material.

5 The apparatus may be used to prepare various food items in a microwave oven, for example, waffles, French toast, pancakes, sandwiches, breaded food items, or any other food item that desirably is heated, browned, and/or crisped on more than one side or surface.

10 In one exemplary embodiment, an apparatus for preparing a food item in a microwave oven comprises a tray, a cover pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position, and a locking feature operative for releasably maintaining the cover in the closed position. The tray includes a plurality of elevated heating areas and a plurality of channels disposed between the elevated heating areas. At least a portion of at least some of the heating areas include a microwave energy interactive material, for
15 example, a microwave energy interactive material operative for converting at least a portion of impinging microwave energy into thermal energy.

The elevated heating areas may have any suitable profile, for example, a substantially planar profile or a contoured profile. Likewise, the channels may have any suitable profile, for example, a substantially semi-circular profile. The channels
20 may be arranged in any manner, and in one example, the channels are substantially parallel to one another.

The cover may likewise include a plurality of heating areas, each including a microwave energy interactive material, and a plurality of channels disposed between the heating areas of the cover. The channels in the cover may generally recede in a
25 direction away from the tray when the cover is in the closed position. The heating areas of the cover may have any suitable profile, for example, a substantially planar profile or a contoured profile. The channels in the tray and the channels in the cover may be in register with one another or may be out of register with one another when the cover is in the closed position.

30 The cover may be pivotably connected to the tray by a separator panel. The

locking feature may include a slot in the tray distal from the separator panel, and a tab extending from a portion of the cover distal from the separator panel, where the tab is adapted to be received in the slot. When the tab is inserted into the slot, the cover is urged towards the tray.

5 According to one aspect of the present invention there is provided an apparatus for preparing a food item in a microwave oven, comprising a tray including a plurality of elevated heating areas, the elevated heating areas having a substantially planar profile, wherein the elevated heating areas comprise microwave energy interactive material, and a plurality of channels disposed between the
10 elevated heating areas; a cover pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position; and a locking feature operative for releasably maintaining the cover in the closed position.

 According to a further aspect of the present invention there is provided a method of preparing a food item in a microwave oven, the food item having a
15 plurality of surfaces intended to be browned and/or crisped, the method comprising: positioning the food item in an apparatus including a tray comprising a plurality of elevated heating areas and a plurality of channels disposed between the elevated heating areas, wherein the elevated heating areas having a substantially planar profile and wherein the elevated heating areas comprise microwave energy
20 interactive material, a cover pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position, the cover comprising a plurality of heating areas and a plurality of channels disposed between the heating areas, wherein the heating areas comprise microwave energy interactive material, and wherein the channels recede away from the base when the cover is in
25 the closed position, and a locking feature operative for releasably securing the cover in the closed position, wherein the food item is positioned between the base and the cover such that the respective heating surfaces of the base and the cover are proximate to the surfaces of the food item intended to be browned and/or crisped; operating the locking feature to releasably secure the cover in the closed position;
30 and exposing the food item within the apparatus to microwave energy, so that the

microwave energy interactive material generates thermal energy and at least partially browns and/or crisps the surfaces of the food item intended to be browned and/or crisped.

According to another aspect of the present invention there is provided an
5 apparatus for preparing a food item in a microwave oven, comprising a tray comprising a susceptor film joined to paperboard, wherein the susceptor film comprises a layer of microwave energy interactive material supported on a polymer film, the layer of microwave energy interactive material having a thickness of from about 60 to about 100 angstroms, wherein the polymer film defines a food
10 contacting surface of the tray and cover, so that the microwave energy interactive material is for being closely proximate to the food item, wherein the tray includes a plurality of heating areas, wherein the heating areas comprise a substantially planar surface for contacting food, and a plurality of channels disposed between the heating areas; a cover foldably connected to the tray for moving the cover relative to
15 the tray between an open position and a closed position; and a locking feature operative for securing the cover in the closed position.

According to a still further aspect of the present invention there is provided a microwave heating apparatus, comprising a tray and a cover hingedly joined to one another, so that the cover is movable relative to the tray between an open position
20 and a closed position, the closed position defining an interior space for receiving a food item, wherein the tray and cover each comprise paperboard joined to a susceptor film, wherein the susceptor film comprises a layer of microwave energy interactive material on a polymer film, wherein the layer of microwave energy interactive material comprises a layer of at least one of aluminum and indium tin
25 oxide having a thickness of from about 60 to about 100 angstroms, and wherein the polymer film faces the interior space when the cover is in the closed position, wherein the tray and cover each comprise an interior and an exterior, and the interior of the tray and the interior of the cover each include a plurality of elongate protrusions that extend towards the interior space when the cover is in the closed
30 position, the protrusions having a substantially planar food-contacting surface, and a

plurality of elongate indentations between the protrusions, and the exterior side of the tray and the exterior side of the cover each respectively include a plurality of protrusions in register with the indentations on the interior side of the tray and the interior side of the cover.

5 According to another aspect of the present invention there is provided a microwave heating apparatus, comprising a tray and a cover joined to one another along a hinge, so that the cover is pivotable relative to the tray between an open position and a closed position, wherein the closed position defines an interior space for receiving a food item, wherein the tray and cover each comprise a laminate
10 including a susceptor film joined to paperboard, wherein the susceptor film comprises a layer of microwave energy interactive material supported on a polymer film, the layer of microwave energy interactive material having a thickness of from about 60 to about 100 angstroms, the polymer film at least partially defining an inner side of the tray and cover, and the paperboard at least partially defining an
15 outer side of the tray and over, wherein the laminate of the tray and the laminate of the cover are pressed to define a plurality of heating areas for being in contact with the food item, and a plurality of elongate channels between the heating areas, wherein the channels have a substantially arcuate profile, and a plurality of protrusions in register with the channels on the interior side of the tray and cover.

20 According to a further aspect of the present invention there is provided a microwave heating apparatus, comprising a single piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy, wherein the single piece of the laminate is shaped to
25 define an integral tray and cover foldably joined to one another, wherein the tray includes a plurality of heating areas, the heating areas each including the microwave energy interactive material, and a plurality of downwardly extending channels disposed between the heating areas.

 According to yet another aspect of the present invention there is provided a
30 microwave heating apparatus, comprising a piece of a laminate, wherein the

laminates comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy, wherein the piece of the laminate is pressed to define an integral tray and cover foldably joined to one another so that the cover can
5 be moved between an open position and a closed position, the tray including an interior space, wherein the tray and cover each comprise an interior side and an exterior side, and the interior side of the tray and the interior side of the cover each include a plurality of elongate protrusions that extend towards the interior space when the cover is in the closed position, and a plurality of elongate indentations
10 between the protrusions, wherein the indentations extend away from the interior space when the cover is in the closed position, and the exterior side of the tray and the exterior side of the cover each respectively include a plurality of protrusions in register with the indentations on the interior side of the tray and the interior side of the cover.

15 According to a still further aspect of the present invention there is provided a microwave heating apparatus, comprising a single piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy, wherein the single piece of the laminate is shaped to
20 define an integral tray and cover foldably joined to one another so that the cover can be moved between an open position and a closed position, wherein the tray includes an interior side and an exterior side, the interior side of the tray including a plurality of substantially planar heating areas for being in contact with food, a plurality of elongate channels between the heating areas, wherein the channels extend
25 downwardly away from the heating areas so that the elongate channels are not for being in contact with food, and the exterior side of the tray including a plurality of indentations in register with the heating areas on the interior side of the tray, and a plurality of protrusions in register with the channels on the interior side of the tray.

According to one aspect of the present invention there is provided a
30 microwave heating apparatus, comprising a piece of a laminate, wherein the

lamine comprises microwave energy interactive material on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy, wherein the piece of the laminate is pressed to define an integral tray and cover joined to one another along a fold line so that the cover can be moved between an open position and a closed position, the tray including an interior space, wherein the tray and cover each comprise an interior side and an exterior side, and the interior side of the tray and the interior side of the cover each include a plurality of substantially planar heating surfaces for being in contact with food, and a plurality of channels between the heating surfaces, wherein the channels extend away from the heating surfaces so that the channels are not for being in contact with food, and wherein the cover includes a tab opposite the fold line joining the integral tray and cover to one another, wherein the tab comprises the laminate so that the tab is integral with the tray and cover, the tray includes a slot for receiving the tab within the interior space of the tray, the slot being opposite the fold line joining the integral tray and cover to one another, and when the cover is in the closed position with the tab received in the slot, the cover extends obliquely downwardly from the fold line towards the tab and slot.

According to a further aspect of the present invention there is provided a microwave heating apparatus, comprising a single piece of a laminate, wherein the single piece of the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy; a portion of the single piece of the laminate being a press-formed integral tray of the apparatus; another portion of the single piece of the laminate being a press-formed integral cover of the apparatus; and the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line of disruption in the single piece of the laminate, wherein the press-formed integral tray includes a base and a peripheral wall that define an interior space of the press-formed integral tray, the wall extends upwardly from a periphery of the base, the upwardly extending wall extends around the interior space, an upper surface of the base comprises a plurality

of heating areas and a plurality of downwardly extending press-formed channels disposed between the heating areas, a lower, exterior surface of the base comprises a plurality downwardly extending press-formed protrusions, the press-formed protrusions being respectively vertically aligned with the press-formed channels, the
5 heating areas are elevated relative to the press-formed channels, and the heating areas each include the microwave energy interactive material.

According to another aspect of the present invention there is provided a microwave heating apparatus, comprising a piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer
10 film, the microwave energy interactive material being operative for heating in response to microwave energy; a portion of the piece of the laminate being a press-formed integral tray of the apparatus; and another portion of the piece of laminate being a press-formed integral cover of the apparatus; the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line
15 of disruption in the laminate so that the press-formed integral cover can be moved between an open position and a closed position, the press-formed integral tray including an upright wall extending around an interior space of the press-formed integral tray, wherein the press-formed integral tray and the press-formed integral cover each comprise an interior side and an exterior side, and the interior side of the
20 press-formed integral tray and the interior side of the press-formed integral cover each include a plurality of elongate press-formed protrusions that extend towards the interior space when the press-formed integral cover is in the closed position, and a plurality of elongate press-formed indentations between the press-formed protrusions, wherein the press-formed indentations extend away from the interior
25 space when the press-formed integral cover is in the closed position, and the exterior side of the press-formed integral tray and the exterior side of the press-formed integral cover each respectively include a plurality of press-formed protrusions in register with the press-formed indentations on the interior side of the press-formed integral tray and the interior side of the press-formed integral cover.

30 According to a still further aspect of the present invention there is provided a

microwave heating apparatus, comprising a single piece of a laminate, wherein the single piece of the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy; a portion of the single piece
5 of the laminate being a press-formed integral tray of the apparatus; the press-formed integral tray including an upright wall extending around an interior space of the press-formed integral tray; another portion of the single piece of the laminate being a press-formed integral cover of the apparatus; the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line
10 of disruption in the single piece of laminate so that the press-formed integral cover can be moved between an open position and a closed position relative to an upper opening of the press-formed integral tray, wherein the press-formed integral tray includes an interior side and an exterior side, the interior side of the press-formed integral tray including a plurality of substantially planar heating areas for being in
15 contact with food on the press-formed integral tray, and a plurality of elongate press-formed channels between the heating areas, wherein the press-formed channels extend downwardly away from the heating areas so that the elongate press-formed channels are not for being in contact with food on the press-formed integral tray, and the exterior side of the press-formed integral tray including a
20 plurality of indentations in register with the heating areas on the interior side of the press-formed integral tray, and a plurality of press-formed protrusions in register with the press-formed channels on the interior side of the press-formed integral tray.

According to another aspect of the present invention there is provided a
25 microwave heating apparatus, comprising a piece of a laminate, wherein the piece of the laminate comprises microwave energy interactive material on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy; a portion of the piece of the laminate being a press-formed integral tray of the apparatus; the press-formed integral tray including an upright
30 wall extending around an interior space of the press-formed integral tray; another

portion of the laminate being a press-formed integral cover of the apparatus; the press-formed integral tray and the press-formed integral cover being joined to one another along a fold line in the piece of laminate so that the press-formed integral cover can be moved between an open position and a closed position relative to an upper opening of the press-formed integral tray, wherein the press-formed integral tray and the press-formed integral cover each comprise an interior side and an exterior side, and the interior side of the press-formed integral tray and the interior side of the press-formed integral cover each include a plurality of substantially planar heating surfaces for being in contact with food, and a plurality of press-formed channels between the heating surfaces, wherein the press-formed channels extend away from the heating surfaces so that the press-formed channels are not for being in contact with food, and wherein the press-formed integral cover includes a tab opposite the fold line joining the press-formed integral tray and the press-formed integral cover to one another, wherein the tab comprises the laminate so that the tab is integral with the press-formed integral tray and the press-formed integral cover, the press-formed integral tray includes a slot for receiving the tab within the interior space of the press-formed integral tray, the slot being opposite the fold line joining the press-formed integral tray and the press-formed integral cover to one another, and when the press-formed integral cover is in the closed position with the tab received in the slot, the press-formed integral cover extends obliquely downwardly from the fold line towards the tab and slot.

According to a further aspect of the present invention there is provided a microwave heating apparatus, comprising a single piece of a laminate consisting essentially of a layer of microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy, a layer of paperboard having a basis weight of from about 60 to about 330 lb/ream, and a layer of adhesive positioned directly between the layer of microwave energy interactive material and the layer of paperboard, so that the layer of microwave energy interactive material is joined to the layer of paperboard by the layer of adhesive; a portion of the single piece of the

laminate being a press-formed integral tray of the apparatus; the press-formed integral tray including a base, and an upright peripheral wall extending around an interior space of the press-formed integral tray; another portion of the single piece of the laminate being a press-formed integral cover of the apparatus; the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line of disruption in the single piece of laminate so that the press-formed integral cover can be moved between an open position and a closed position relative to an upper opening of the press-formed integral tray, wherein the polymer film defines an interior surface on an interior side of the press-formed integral tray and the press-formed integral cover, the paperboard defines an exterior surface on an exterior side of the press-formed integral tray and the press-formed integral cover, the interior side of the press-formed integral tray and the interior side of the press-formed integral cover include elongate press-formed protrusions that extend towards one another when the press-formed integral cover is in the closed position, the press-formed protrusions of the press-formed integral cover extending into the interior space of the press-formed integral tray, wherein the press-formed protrusions of the press-formed integral tray and the press-formed protrusions of the press-formed integral cover are substantially parallel to one another when the press-formed integral cover is in the closed position, and elongate, arcuate press-formed indentations between the press-formed protrusions, wherein the press-formed indentations extend away from one another when the press-formed integral cover is in the closed position, and the exterior side of the press-formed integral tray and the exterior side of the press-formed integral cover include a plurality of press-formed protrusions in register with the respective press-formed indentations on the interior side of the press-formed integral tray and the interior side of the press-formed integral cover.

According to yet another aspect of the present invention there is provided an apparatus for preparing a food item in a microwave oven, comprising a tray formed using a pressing technique, the tray including opposite interior and exterior sides, and the exterior side of the tray forming a portion of the exterior of the apparatus

while the apparatus is in a closed configuration, wherein the interior side of the tray includes a plurality of elevated heating areas, the elevated heating areas each including a microwave energy interactive material, and a plurality of channels disposed between the elevated heating areas, and the exterior side of the tray
5 includes a plurality of protrusions corresponding to the channels on the interior side of the tray; a cover formed using a pressing technique, the cover including opposite interior and exterior sides, and the exterior side of the cover forming a portion of the exterior of the apparatus while the apparatus is in the closed configuration; a line of
10 disruption, the tray and the cover being foldably joined to one another along the line of disruption so that the cover is pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position; and a locking feature operative for releasably maintaining the cover in the closed position.

Additional aspects, features, and advantages of the present invention will become apparent from the following description and accompanying figures.

15

BRIEF DESCRIPTION OF THE DRAWINGS

The description refers to the accompanying drawings in which like reference characters refer to like parts throughout the several views, and in which:

FIG. 1A is a schematic perspective view of an exemplary microwave heating
20 apparatus, in a partially open configuration;

FIG. 1B is a schematic perspective view of the microwave heating apparatus of **FIG. 1A**, in a closed configuration; **FIG. 1C** is a schematic end view of the microwave heating apparatus of **FIG. 1B**, viewed along a line **1C-1C**;

FIG. 1D is a schematic cross-sectional view of the microwave heating
25 apparatus of **FIG. 1B**, taken along a line **1D-1D**;

numerous other combinations and configurations are contemplated hereby.

FIGS. 1A-1F schematically depict a microwave heating apparatus **100** (i.e., a microwave energy interactive heating apparatus) for preparing a food item, for example, a warm sandwich. As shown in **FIG. 1A**, the apparatus **100** generally includes a tray **102** and a cover **104** foldably joined to one another along a line of disruption (e.g., a score line, fold line, cut-crease line, perforation line, or the like), for example, a fold line **106**, such that the cover **104** can be pivoted between an open position and a closed position relative to the tray **102**. In the illustrated embodiment, the cover **104** is pivotably connected to the tray **102** by a separator panel **108**. However, it is contemplated that the cover and tray may be joined in any other suitable manner. It is also contemplated that in other embodiments the tray **102** and cover **104** may be separate from one another (i.e., not joined to one another).

The tray **102** generally includes a base **110** and a wall **112** extending upwardly from a peripheral margin of the base **110**. All or a portion of the wall **112** may have a sloped profile, as shown in **FIGS. 1D** and **1F**, an upright profile, or any other suitable profile. A rim or flange **114** may extend around an uppermost margin of the wall **112**. The wall **112** and/or flange **114** may be constructed to provide dimensional stability to the apparatus **100**.

The base **110** generally includes a central portion **116** circumscribed by a peripheral portion **118**. The peripheral portion **118** may have a slightly curved profile when viewed in cross-section, as shown in **FIGS. 1D** and **1F**, or may have any other suitable profile. The central portion **116** includes a plurality of substantially planar surfaces or portions **120** that may be somewhat raised or elevated relative to the peripheral portion **118**, such that the peripheral portion **118** defines a lowermost portion of the tray **102** (**FIG. 1D**). A plurality of elongated indentations, recesses, or channels **122** extend in a direction **D1** (transverse to a direction **D2**) across the central portion **116** of the base **110** between the planar portions **120** to provide venting of moisture generated by the food item (**FIG. 1E**). The channels **122** generally recede in a downward direction towards the lowermost part of the base

110, in this instance, the peripheral portion 118. In the illustrated embodiment, the channels 122 do not extend as far downwardly as the lowermost point of the peripheral portion 118. However, it is understood that the channels 122 may have any suitable depth and may extend to the depth of the peripheral portion 118 if desired.

Likewise, as shown in FIGS. 1A, 1E, and 1F, the cover 104 may include a central portion 124 including a plurality of substantially planar surfaces or portions 126, and a plurality of elongated indentations, recesses, or channels 128 extending in a direction D1 (transverse to a direction D2) across the central portion 124 between, and receding from, the planar portions 126. The cover 104 also may include a rim 130 that circumscribes the central portion 124 and generally defines at least a portion of a peripheral margin of the cover 104.

When viewed in a fully open condition (FIGS. 1E and 1F), the rim 130 may define the lowermost portion of the cover 104, and the central portion 124 may be somewhat elevated relative to the rim 130. In the illustrated embodiment, the channels 128 do not extend as far downwardly as the lowermost point of the rim 130. However, it is understood that the channels 128 may have any suitable depth and may extend to the depth of the rim 130 if desired.

Conversely, when viewed in a fully closed condition (FIGS. 1B-1D), the rim 130 may define an uppermost portion of the cover 104 and the planar portion 126 of the cover 104 may define a lowermost portion of the cover 104. Optionally, the central portion 124 of the cover 104 may extend at least partially into the interior of the tray 102 when the cover 104 is in the closed position, as shown schematically in FIG. 1D. In other examples (not shown), the cover may be generally planar with a plurality of channels receding away from the planar surface, such that the central portion and the rim are substantially coplanar (i.e., the rim and the planar surface lie within substantially the same horizontal plane). In such an example, the cover may be sized and/or dimensioned to extend into the interior of the tray if desired, or may be dimensioned to be in face-to-face contact with the rim 114 of the tray 102.

As shown in FIGS. 1B-1D, when the apparatus 100 is in a closed configuration,

that is, when the cover **104** is brought into face-to-face contact with the tray **102**, the respective channels **122**, **128** are substantially in register with one another (**FIG. 1D**), with the respective channels **122**, **128** in the base **110** and cover **104** receding away from one another. However, in other embodiments, the channels **122**, **128** may be out of register (i.e., not aligned) with one another. Further, in this example, the base **110** and cover **104** each include four channels **122**, **128** that are substantially parallel to one another, each channel **122**, **128** having a substantially arcuate profile (e.g., curved or semi-circular) when viewed in cross-section (**FIGS. 1D** and **1F**). However, any number, arrangement, and shape of channels **122**, **128** may be used, as needed to provide the desired degree of venting for the particular heating application.

If desired, one or more microwave energy interactive elements **132**, **134** (shown schematically with stippling in **FIGS. 1A** and **1E**) may overlie at least a portion of the substantially planar portions **120**, **126** of the tray **102** and/or cover **104**, such that the planar portions **120**, **126** serve as respective heating areas or surfaces **120**, **126**. In one example, the elements may be susceptors, which generally comprise a thin layer of microwave energy interactive material (generally less than about 100 angstroms in thickness, for example, from about 60 to about 100 angstroms in thickness) that tends to absorb at least a portion of impinging microwave energy and convert it to thermal energy (i.e., heat) at the interface with the food item. Susceptors often are used to promote browning and/or crisping of the surface of a food item. However, other microwave energy interactive elements may be used. The susceptors **132**, **134** may be supported on a polymer film, which generally may define respective food-contacting surfaces **134**, **136** of the tray **102** and cover **104**. In the illustrated example, the susceptors **134**, **136** only overlie the substantially planar surfaces **120**, **126** of the tray **102** and cover **104**. However, it is contemplated that the susceptor may overlie any other part of the tray **102** or cover **104**, for example, any part intended to be in close proximity to the food item (e.g., channels **122**, **128**, the peripheral portion **118** of the base **110** and/or the wall **112** of the tray **102**).

Still viewing the figures, the apparatus **100** may include a locking mechanism to releasably secure the cover **104** in a closed, superposed relationship with the tray **102**. In this example, as best seen in **FIGS. 1A, 1B, 1C, and 1E**, the locking mechanism includes a tab **140** adapted to be received in a slot **142** (**FIG. 1E**) in the wall **112** of the tray **102**. In this example, the tab **140** and the slot **142** are in respective portions of the cover **104** and tray **102** distal from the separator panel **108**. If desired, the positions of the tab and slot could be interchanged, such that the slot is in the cover and the tab extends from the tray.

To use the apparatus **100** according to one acceptable method, a food item (not shown) may be placed on the central portion **116** of the tray **102**. The apparatus **100** may be closed by pivoting the cover **104** toward the tray **102** until the cover **102** is in a superposed relationship with the tray **102**. In this configuration, the respective planar portions (i.e., the respective heating surfaces) **120, 126** of the tray **102** and cover **104** at least partially engage opposite surfaces of the food item. The cover **104** then may be locked in the closed position by inserting the tab **140** into the slot **142**, as shown in **FIGS. 1B and 1C**.

It will be noted that **FIGS. 1B-1D** are representative of the closed apparatus **100** in an empty condition or containing a relatively thin food item. However, a food item having a greater thickness may cause the tray **102** and cover **104** to be more distant from one another in the closed configuration. In such an instance, some downward force may need to be exerted on the food item and/or tray **102** to insert the tab **140** into the slot **142**. The cover **104** may remain urged toward the food item during the heating cycle, which may enhance heating, browning, and/or crisping further. In some examples, depending on the thickness of the food item and the force needed to engage the tab **140** and slot **142**, this compressive force may advantageously be maintained even if the height of the food item, and therefore, the distance between the tray **102** and cover **104** decreases, for example, when a frozen cheese sandwich is heated. It will be understood that as the height of the food item decreases, the magnitude of the compressive force also may decrease. At the same time, as the magnitude of the compressive force decreases, the distance the tab **140**

protrudes from the slot **142** may increase. Conversely, where an item expands during heating, the magnitude of the compressive force may increase and the distance the tab **140** protrudes from the slot **142** (on the exterior of the tray) may decrease. In either case, a compressive force may be maintained on the food item
5 to secure the food item in position and provide the desired degree of heating, browning, and crisping of the food item.

As the microwave heating cycle proceeds, the susceptors **132**, **134** convert at least a portion of the impinging microwave energy to thermal energy (i.e., sensible heat), which then may be transferred to the adjacent surface of the food item to
10 enhance browning and/or crisping of the affected areas. At least some of any steam released from the food item may be carried away from the food item along the channels **122**, **128**, which serve as venting channels, thereby further enhancing browning and/or crisping. Additionally, the elevated central portion **116** of the tray **102** maintains the food item in an elevated position, which reduces the amount of
15 sensible heat transferred from the susceptor **132** on the tray **102** to the ambient environment of the microwave oven, still further enhancing the browning and/or crisping of the food item. The pattern of browning and/or crisping may include an overall darkened appearance with somewhat lighter areas corresponding to the areas overlying channels **122**, **128**, generally resembling the visual appearance of grill
20 marks. When the heating cycle is complete, the food item may be removed and the apparatus **100** may be discarded.

It will be noted that many conventional microwave heating packages including a susceptor are prone to warping or twisting as the susceptor generates thermal energy. However, the apparatus **100** of the present disclosure may be
25 formed from materials having sufficient strength and/or rigidity to minimize any structural change or deformation. Further, the wall **112** of the tray **102**, the locking mechanism (e.g., tab **140** and slot **142**), and other components of the apparatus **100** may provide further structural stability, and therefore resistance to warping, during heating, so that the susceptors **132**, **134** substantially remain in the desired position

relative to the surfaces of the food item to attain the desired degree of heating, browning, and crisping of the food item.

Numerous other microwave heating apparatuses, constructs, and structures are encompassed by the disclosure. Any of such apparatuses have any suitable
5 shape and dimensions, depending on the type of food item being heated, the desired heating time, the desired degree of browning and/or crisping, or any other suitable criteria. For example, in the illustrated embodiment, the central portions **116, 124** of the base **110** and cover **104** are substantially square in shape with rounded corners, and the peripheral portion **118** of the tray **102** is substantially
10 square annular in shape with rounded corners. However, it is contemplated that any of the various parts of the apparatus **100** may have any suitable shape, for example, circular, square, triangular, or any other regular or irregular shape, as needed or desired for a given heating application.

Further, if desired, the base **110** and/or cover **104** and/or the respective
15 heating surfaces **120, 126** may be contoured to accommodate the shape of a food item having a shaped or irregular surface, for example, a domed or bowed surface. In doing so, the microwave energy interactive elements may be brought into closer proximity with the surface of the food item. Numerous examples of contoured surfaces that may be suitable for use with the present invention are provided in U.S.
20 Patent Application Publication No. 2008/0164178 A1, published July 10, 2008, and U.S. Patent Application Publication No. 2008/0000896 A1, published January 3, 2008. In some instances, such contoured surfaces may cooperate with one or more venting channels and/or microwave transparent areas to create the visual appearance of grill marks.

25 As another example, the heating surfaces of the base and/or cover may be adapted to heat, brown, and/or crisp multiple food items concurrently, by for example, using more than one elevated area.

Further, any of the apparatuses according to the disclosure may be formed from various materials, provided that the materials are substantially resistant to

softening, scorching, combusting, or degrading at typical microwave oven heating temperatures, for example, at from about 250°F to about 425°F. The materials may include microwave energy interactive materials, for example, those used to form susceptors and other microwave energy interactive elements, and microwave energy
5 transparent or inactive materials, for example, those used to form the remainder of the apparatus.

The microwave energy interactive material may be an electroconductive or semiconductive material, for example, a metal or a metal alloy provided as a metal foil; a vacuum deposited metal or metal alloy; or a metallic ink, an organic ink, an
10 inorganic ink, a metallic paste, an organic paste, an inorganic paste, or any combination thereof. Examples of metals and metal alloys that may be suitable include, but are not limited to, aluminum, chromium, copper, inconel alloys (nickel-chromium-molybdenum alloy with niobium), iron, magnesium, nickel, stainless steel, tin, titanium, tungsten, and any combination or alloy thereof.

15 Alternatively, the microwave energy interactive material may comprise a metal oxide, for example, oxides of aluminum, iron, and tin, optionally used in conjunction with an electrically conductive material. Another metal oxide that may be suitable is indium tin oxide (ITO). ITO has a more uniform crystal structure and, therefore, is clear at most coating thicknesses.

20 Alternatively still, the microwave energy interactive material may comprise a suitable electroconductive, semiconductive, or non-conductive artificial dielectric or ferroelectric. Artificial dielectrics comprise conductive, subdivided material in a polymeric or other suitable matrix or binder, and may include flakes of an electroconductive metal, for example, aluminum.

25 While susceptors are illustrated herein, the apparatus alternatively or additionally may include a foil or high optical density evaporated material having a thickness sufficient to reflect a substantial portion of impinging microwave energy. Such elements are typically formed from a conductive, reflective metal or metal alloy, for example, aluminum, copper, or stainless steel, in the form of a solid
30 "patch" generally having a thickness of from about 0.000285 inches to about 0.05

inches, for example, from about 0.0003 inches to about 0.03 inches. Other such elements may have a thickness of from about 0.00035 inches to about 0.020 inches, for example, 0.016 inches.

5 Larger microwave energy reflecting elements may be used where the food item is prone to scorching or drying out during heating. Smaller microwave energy reflecting elements may be used to diffuse or lessen the intensity of microwave energy. A plurality of smaller microwave energy reflecting elements also may be arranged to form a microwave energy directing element to direct microwave energy to specific areas of the food item. If desired, the loops may be of a length that
10 causes microwave energy to resonate, thereby enhancing the distribution effect. Microwave energy distributing elements are described in U.S. Patent Nos. 6,204,492, 6,433,322, 6,552,315, and 6,677,563, each of which is incorporated by reference in its entirety.

If desired, any of the numerous microwave energy interactive elements
15 described herein or contemplated hereby may be substantially continuous, that is, without substantial breaks or interruptions, or may be discontinuous, for example, by including one or more breaks or apertures that transmit microwave energy therethrough. The breaks or apertures may be sized and positioned to heat particular areas of the food item selectively. The breaks or apertures may extend
20 through the entire structure, or only through one or more layers. The number, shape, size, and positioning of such breaks or apertures may vary for a particular application depending on the type of construct being formed, the food item to be heated therein or thereon, the desired degree of shielding, browning, and/or crisping, whether direct exposure to microwave energy is needed or desired to attain
25 uniform heating of the food item, the need for regulating the change in temperature of the food item through direct heating, and whether and to what extent there is a need for venting.

It will be understood that the aperture may be a physical aperture or void in one or more layers or materials used to form the construct, or may be a non-physical
30 "aperture". A non-physical aperture is a microwave energy transparent area that

allows microwave energy to pass through the structure without an actual void or hole cut through the structure. Such areas may be formed by simply not applying a microwave energy interactive material to the particular area, or by removing microwave energy interactive material in the particular area, or by chemically and/or mechanically deactivating the microwave energy interactive material in the particular area. While both physical and non-physical apertures allow the food item to be heated directly by the microwave energy, a physical aperture also provides a venting function to allow steam or other vapors to escape from the interior of the construct.

10 The arrangement of microwave energy interactive and microwave energy transparent areas may be selected to provide various levels of heating, as needed or desired for a particular application. For example, where greater heating is desired, the total inactive area may be increased. In doing so, more microwave energy is transmitted to the food item. Alternatively, by decreasing the total inactive area, more microwave energy is absorbed by the microwave energy interactive areas, converted into thermal energy, and transmitted to the surface of the food item to enhance browning and/or crisping.

 In some instances, it may be beneficial to create one or more discontinuities or inactive regions to prevent overheating or charring of the apparatus. When exposed to microwave energy, the concentration of heat generated by overlapping areas may be sufficient to cause the underlying support, in this case, paperboard, to become scorched. As such, the overlapping areas may be designed to be microwave energy transparent (as shown), for example, by forming such areas without a microwave energy interactive material, by removing any microwave energy interactive material that has been applied, or by deactivating the microwave energy interactive material in these areas.

 Further still, one or more panels, portions of panels, or portions of the construct may be designed to be microwave energy transparent to ensure that the microwave energy is focused efficiently on the areas to be browned and/or crisped, rather than being lost to portions of the food item not intended to be browned

and/or crisped or to the heating environment. This may be achieved using any suitable technique, such as those described above. For example, in the construct **100** illustrated in **FIGS. 1A-1F**, the channels **122**, **128**, wall **112**, and various other portions of the apparatus **110** may be designed to be microwave energy transparent if such areas are not intended to be in intimate and/or proximate contact with the surface of the food item.

As stated above, the microwave energy interactive element may be supported on a microwave inactive or transparent substrate, for example, a polymer film or other suitable polymeric material, for ease of handling and/or to prevent contact between the microwave energy interactive material and the food item. Examples of polymer films that may be suitable include, but are not limited to, polyolefins, polyesters, polyamides, polyimides, polysulfones, polyether ketones, cellophanes, or any combination thereof. In one particular example, the polymer film comprises polyethylene terephthalate. The thickness of the film generally may be from about 35 gauge to about 10 mil. In each of various examples, the thickness of the film may be from about 40 to about 80 gauge, from about 45 to about 50 gauge, about 48 gauge, or any other suitable thickness. Other non-conducting substrate materials such as paper and paper laminates, metal oxides, silicates, cellulose, or any combination thereof, also may be used.

The microwave energy interactive material may be applied to the substrate in any suitable manner, and in some instances, the microwave energy interactive material is printed on, extruded onto, sputtered onto, evaporated on, or laminated to the substrate. The microwave energy interactive material may be applied to the substrate in any pattern, and using any technique, to achieve the desired heating effect of the food item. For example, the microwave energy interactive material may be provided as a continuous or discontinuous layer or coating including circles, loops, hexagons, islands, squares, rectangles, octagons, and so forth.

Various materials may serve as the base material for the apparatus. For example, the apparatus may be formed at least partially from a polymer or polymeric material. As another example, all or a portion the apparatus may be

formed from a paper or paperboard material. In one example, the paper has a basis weight of from about 15 to about 60 lbs/ream (lb/3000 sq. ft.), for example, from about 20 to about 40 lbs/ream. In another example, the paper has a basis weight of about 25 lbs/ream. In another example, the paperboard having a basis weight of
5 from about 60 to about 330 lbs/ream, for example, from about 80 to about 140 lbs/ream. The paperboard generally may have a thickness of from about 6 to about 30 mils, for example, from about 12 to about 28 mils. In one particular example, the paperboard has a thickness of about 12 mils. Any suitable paperboard may be used, for example, a solid bleached or solid unbleached sulfate board, such as SUS® board,
10 commercially available from Graphic Packaging International.

The apparatus may be formed according to numerous processes known to those in the art, including using adhesive bonding, thermal bonding, ultrasonic bonding, mechanical stitching, or any other suitable process. Any of the various components used to form the apparatus may be provided as a sheet of material, a
15 roll of material, or a die cut material in the shape of the apparatus to be formed (e.g., a blank).

In one example, the tray **102** and/or cover **104** each may be formed using a thermal, mechanical, or thermomechanical pressing technique. With such a method, the exterior side of the cover **104** may have a plurality of protrusions **144**
20 corresponding to the channels or indentations **128** on the interior side of the cover **104**, as shown in **FIG. 1B**. The tray **102** may similarly include a plurality of protrusions (not shown) on an exterior side of the base **110** opposite the channels or indentations **122**. However, it is contemplated that in other embodiments, the exterior side of the tray **102** and/or cover **104** may be substantially planar and/or
25 may be provided with indentations or channels on the respective interior side in some other suitable manner.

While the present invention is described herein in detail in relation to specific aspects and embodiments, it is to be understood that this detailed description is only illustrative and exemplary of the present invention and is made merely for purposes
30 of providing a full and enabling disclosure of the present invention and to set forth

the best mode of practicing the invention known to the inventors at the time the invention was made. The detailed description set forth herein is illustrative only and is not intended, nor is to be construed, to limit the present invention or otherwise to exclude any such other embodiments, adaptations, variations, modifications, and equivalent arrangements of the present invention. All directional references (e.g.,
5 upper, lower, upward, downward, left, right, leftward, rightward, top, bottom, above, below, vertical, horizontal, clockwise, and counterclockwise) are used only for identification purposes to aid the reader's understanding of the various embodiments of the present invention, and do not create limitations, particularly as
10 to the position, orientation, or use of the invention unless specifically set forth in the claims. Joinder references (e.g., joined, attached, coupled, connected, and the like) are to be construed broadly and may include intermediate members between a connection of elements and relative movement between elements. As such, joinder references do not necessarily imply that two elements are connected directly and in
15 fixed relation to each other. Further, various elements discussed with reference to the various embodiments may be interchanged to create entirely new embodiments coming within the scope of the present invention.

WHAT IS CLAIMED IS:

1. An apparatus for preparing a food item in a microwave oven, comprising:
a tray including
a plurality of elevated heating areas, the elevated heating areas having a substantially planar profile, wherein the elevated heating areas comprise microwave energy interactive material, and
a plurality of channels disposed between the elevated heating areas;
a cover pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position; and
a locking feature operative for releasably maintaining the cover in the closed position.
2. The apparatus of claim 1, wherein the substantially planar profile of the elevated heating areas defines a surface for receiving food.
3. The apparatus of claim 1, wherein the channels have a substantially arcuate profile.
4. The apparatus of claim 1, wherein the channels are substantially parallel to one another.
5. The apparatus of any one of claims 1 to 4, wherein the cover includes
a plurality of heating areas comprising microwave energy interactive material, and
a plurality of channels disposed between the heating areas of the cover, the channels in the cover receding in a direction away from the tray when the cover is in the closed position.
6. The apparatus of claim 5, wherein the heating areas of the cover have a substantially planar profile.
7. The apparatus of claim 5 or 6, wherein the channels in the tray and the channels in the cover are in register with one another when the cover is in the closed position.
8. The apparatus of claim 5 or 6, wherein the channels in the tray and the channels in the cover are out of register with one another when the cover is in the closed position.

9. The apparatus of any one of claims 5 to 8, wherein
the heating areas and the channels of the cover define a substantially central portion of the cover, and
the cover further includes a rim circumscribing the substantially central portion of the cover.
10. The apparatus of claim 9, wherein the rim defines an uppermost portion of the cover when the cover is in the closed position.
11. The apparatus of claim 9 or 10, wherein the rim is substantially coplanar with the heating areas of the cover.
12. The apparatus of any one of claims 1 to 11, wherein the cover is pivotably connected to the tray by a separator panel.
13. The apparatus of claim 12, wherein the locking feature includes
a slot in the tray distal from the separator panel, and
a tab extending from a portion of the cover distal from the separator panel, the tab being adapted to be received within the slot.
14. The apparatus of any one of claims 1 to 11, wherein
the elevated heating surfaces and the channels of the tray define a substantially central portion of the tray, and
the tray includes a peripheral portion circumscribing the central portion of the tray, the peripheral portion being a lowermost portion of the tray.
15. The apparatus of claim 14, wherein
the central portion of the tray and the peripheral portion of the tray define a base of the tray, and
the tray further includes a peripheral wall extending upwardly from a peripheral margin of the base.
16. The apparatus of claim 15, wherein
the base and the peripheral wall define an interior space of the tray, and
the heating areas of the cover extend into the interior space when the cover is in the closed position.
17. The apparatus of claim 15 or 16, wherein the locking feature comprises a tab extending from the cover, the tab being adapted to be received in a slot in the wall.

18. A method of preparing a food item in a microwave oven, the food item having a plurality of surfaces intended to be browned and/or crisped, the method comprising:

positioning the food item in an apparatus including

a tray comprising a plurality of elevated heating areas and a plurality of channels disposed between the elevated heating areas, wherein the elevated heating areas having a substantially planar profile and wherein the elevated heating areas comprise microwave energy interactive material,

a cover pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position, the cover comprising a plurality of heating areas and a plurality of channels disposed between the heating areas, wherein the heating areas comprise microwave energy interactive material, and wherein the channels recede away from the base when the cover is in the closed position, and

a locking feature operative for releasably securing the cover in the closed position,

wherein the food item is positioned between the base and the cover such that the respective heating surfaces of the base and the cover are proximate to the surfaces of the food item intended to be browned and/or crisped;

operating the locking feature to releasably secure the cover in the closed position; and

exposing the food item within the apparatus to microwave energy, so that the microwave energy interactive material generates thermal energy and at least partially browns and/or crisps the surfaces of the food item intended to be browned and/or crisped.

19. The method of claim 18, wherein operating the locking feature urges the cover towards the tray.

20. The method of claim 18, wherein

the tray further comprises an upstanding peripheral wall,

the locking feature comprises a tab extending from the cover, the tab being adapted to be received in a slot in the wall, and

operating the locking feature comprises inserting the tab into the slot, to urge the cover towards the tray.

21. An apparatus for preparing a food item in a microwave oven, comprising:

a tray comprising a susceptor film joined to paperboard, wherein the susceptor film comprises a layer of microwave energy interactive material supported on a polymer film, the layer of microwave energy interactive material having a thickness of from about 60 to about 100 angstroms, wherein the polymer film defines a food contacting surface of the tray and cover, so that the microwave energy interactive material is for being closely proximate to the food item, wherein the tray includes

a plurality of heating areas, wherein the heating areas comprise a substantially planar surface for contacting food, and
a plurality of channels disposed between the heating areas;
a cover foldably connected to the tray for moving the cover relative to the tray between an open position and a closed position; and
a locking feature operative for securing the cover in the closed position.

22. The apparatus of claim 21, wherein the heating areas are elongate in shape.

23. The apparatus of claim 21 or 22, wherein the channels have a substantially arcuate profile.

24. The apparatus of any one of claims 21 to 23, wherein the channels are substantially parallel to one another.

25. The apparatus of any one of claims 21 to 24, wherein the cover includes
a plurality of heating areas comprising microwave energy interactive material, and
a plurality of channels disposed between the heating areas of the cover, wherein the channels of the cover extend upwardly away from the tray when the cover is in the closed position.

26. The apparatus of claim 25, wherein the heating areas of the cover have a substantially planar surface for contacting food.

27. The apparatus of claim 25 or 26, wherein the heating areas of the tray and the heating areas of the cover are in register with one another when the cover is in the closed position.

28. The apparatus of claim 25 or 26, wherein the heating areas of the tray and the heating areas of the cover are out of register with one another when the cover is in the closed position.

29. The apparatus of any one of claims 25 to 28, wherein the cover includes a rim circumscribing the heating areas of the cover.

30. The apparatus of claim 29, wherein the rim defines an uppermost portion of the cover when the cover is in the closed position.

31. The apparatus of claim 29 or 30, wherein the rim is substantially coplanar with the heating areas of the cover.

32. The apparatus of any one of claims 21 to 31, wherein the tray includes a base extending around the heating areas of the tray, wherein the base is a lowermost portion of the tray.

33. The apparatus of claim 32, wherein the tray further includes a peripheral wall extending upwardly from a periphery of the base.

34. The apparatus of claim 33, wherein
the base and the peripheral wall define an interior space of the tray, and
the heating areas of the cover extend into the interior space when the cover is in the closed position.

35. The apparatus of claim 34, wherein the locking feature comprises a tab extending from the cover, wherein the tab is for being received in a slot in the wall.

36. The apparatus of any one of claims 21 to 34, wherein the cover is pivotably connected to the tray by a separator panel.

37. The apparatus of claim 36, wherein the locking feature includes
a slot in the tray distal from the separator panel, and
a tab extending from a portion of the cover distal from the separator panel,
the tab being adapted to be received within the slot.

38. The apparatus of any one of claims 21 to 37, in combination with the food,
wherein

the food has a surface that is desirably at least one of browned and crisped,
and

the food is positioned so that the surface that is desirably at least one of browned and crisped is in a facing, contacting relationship with the polymer film of the tray, so that the microwave energy interactive material is closely proximate to the surface of the food item.

39. A microwave heating apparatus, comprising:

a tray and a cover hingedly joined to one another, so that the cover is movable relative to the tray between an open position and a closed position, the closed position defining an interior space for receiving a food item, wherein the tray and cover each comprise paperboard joined to a susceptor film, wherein the susceptor film comprises a layer of microwave energy interactive material on a polymer film, wherein the layer of microwave energy interactive material comprises a layer of at least one of aluminum and indium tin oxide having a thickness of from about 60 to about 100 angstroms, and wherein the polymer film faces the interior space when the cover is in the closed position,

wherein

the tray and cover each comprise an interior and an exterior, and
the interior of the tray and the interior of the cover each include

a plurality of elongate protrusions that extend towards
the interior space when the cover is in the closed position, the
protrusions having a substantially planar food-contacting
surface, and

a plurality of elongate indentations between the
protrusions, and

the exterior side of the tray and the exterior side of the cover each
respectively include a plurality of protrusions in register with the indentations
on the interior side of the tray and the interior side of the cover.

40. A microwave heating apparatus, comprising:

a tray and a cover joined to one another along a hinge, so that the cover is pivotable relative to the tray between an open position and a closed position, wherein the closed position defines an interior space for receiving a food item,

wherein the tray and cover each comprise a laminate including a susceptor film joined to paperboard, wherein the susceptor film comprises a layer of microwave energy interactive material supported on a polymer film, the layer of microwave energy interactive material having a thickness of from about 60 to about 100 angstroms, the polymer film at least partially defining an inner side of the tray and cover, and the paperboard at least partially defining an outer side of the tray and cover,

wherein the laminate of the tray and the laminate of the cover are pressed to
define

a plurality of heating areas for being in contact with the food item,
and a plurality of elongate channels between the heating areas, wherein the
channels have a substantially arcuate profile, and

a plurality of protrusions in register with the channels on the interior
side of the tray and cover.

41. A microwave heating apparatus, comprising:
a single piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy,
wherein the single piece of the laminate is shaped to define an integral tray and cover foldably joined to one another, wherein the tray includes
a plurality of heating areas, the heating areas each including the microwave energy interactive material, and
a plurality of downwardly extending channels disposed between the heating areas.
42. The apparatus of claim 41, wherein the heating areas have a substantially planar surface for being in contact with food.
43. The apparatus of claim 41 or 42, wherein the channels have a substantially arcuate profile.
44. The apparatus of any one of claims 41 to 43, wherein the channels are substantially parallel to one another.
45. The apparatus of any one of claims 41 to 44, wherein the cover includes
a plurality of heating areas, the heating areas each including the microwave energy interactive material, and
a plurality of channels disposed between the heating areas, wherein the channels extend upwardly away from the tray when the cover is in a closed position.
46. The apparatus of claim 45, wherein the heating areas of the cover have a substantially planar surface for being in contact with food.
47. The apparatus of claim 45 or 46, wherein the heating areas of the tray and the heating areas of the cover are in register with one another when the cover is in the closed position.
48. The apparatus of claim 45 or 46, wherein the heating areas of the tray and the heating areas of the cover are out of register with one another when the cover is in a closed position.
49. The apparatus of any one of claims 41 to 48, wherein the cover includes a substantially planar rim extending along a peripheral margin of the cover.

50. The apparatus of claim 49, wherein the rim defines an uppermost portion of the cover when the cover is in the closed position.

51. The apparatus of claim 49 or 50, wherein the rim is substantially coplanar with the heating areas of the cover.

52. The apparatus of any of claims 41 to 51, wherein the tray includes a base extending around the heating areas of the tray, wherein the base defines a lowermost portion of the tray.

53. The apparatus of claim 52, wherein
the tray further includes a peripheral wall extending upwardly from a peripheral margin of the base.

54. The apparatus of claim 53, wherein
the base and the peripheral wall define an interior space of the tray, and
the heating areas of the cover extend into the interior space when the cover is in a closed position.

55. The apparatus of any one of claims 41 to 54, wherein
the cover includes a tab extending from the cover, and
the tray includes a receptacle for receiving the tab.

56. The apparatus of any one of claims 41 to 55, wherein the single piece of the laminate is shaped to further define a separator panel disposed between the cover and tray.

57. A microwave heating apparatus, comprising:
a piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy,
wherein the piece of the laminate is pressed to define an integral tray and cover foldably joined to one another so that the cover can be moved between an open position and a closed position, the tray including an interior space,
wherein
the tray and cover each comprise an interior side and an exterior side,
and
the interior side of the tray and the interior side of the cover each include
a plurality of elongate protrusions that extend towards
the interior space when the cover is in the closed position, and

a plurality of elongate indentations between the protrusions, wherein the indentations extend away from the interior space when the cover is in the closed position, and the exterior side of the tray and the exterior side of the cover each respectively include a plurality of protrusions in register with the indentations on the interior side of the tray and the interior side of the cover.

58. The apparatus of claim 57, wherein the protrusions have a substantially planar surface for being in contact with food.

59. The apparatus of claim 57 or 58, wherein the indentations have a substantially arcuate profile.

60. The apparatus of any one of claims 57 to 59, wherein the indentations are substantially parallel to one another.

61. The apparatus of any one of claims 57 to 60, wherein the cover includes a plurality elongate protrusions, the protrusions each including the microwave energy interactive material, and a plurality of elongate indentations disposed between the protrusions, wherein the indentations extend upwardly away from the tray when the cover is in the closed position.

62. The apparatus of claim 61, wherein the protrusions of the cover have a substantially planar surface for being in contact with food.

63. The apparatus of claim 61 or 62, wherein the protrusions of the tray and the protrusions of the cover are in register with one another when the cover is in the closed position.

64. The apparatus of claim 61 or 62, wherein the protrusions of the tray and the protrusions of the cover are out of register with one another when the cover is in the closed position.

65. The apparatus of any one of claims 57 to 64, wherein the cover includes a substantially planar rim extending along a periphery of the cover.

66. The apparatus of claim 65, wherein the rim defines an uppermost portion of the cover when the cover is in the closed position.

67. The apparatus of claim 65 or 66, wherein the rim is substantially coplanar with the protrusions of the cover.
68. The apparatus of any of claims 57 to 67, wherein the tray includes a base extending around the protrusions of the tray, wherein the base defines a lowermost portion of the tray.
69. The apparatus of claim 68, wherein the tray further includes a peripheral wall extending upwardly along a periphery of the base.
70. The apparatus of claim 69, wherein the protrusions of the cover extend into the interior space when the cover is in the closed position.
71. The apparatus of any one of claims 57 to 70, wherein
the cover includes a tab extending from the cover, and
the tray includes a receptacle for receiving the tab.
72. The apparatus of any one of claims 57 to 71, wherein the piece of the laminate is further pressed to define a separator panel between the cover and tray.
73. A microwave heating apparatus, comprising:
a single piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy,
wherein the single piece of the laminate is shaped to define an integral tray and cover foldably joined to one another so that the cover can be moved between an open position and a closed position,
wherein the tray includes an interior side and an exterior side,
the interior side of the tray including
a plurality of substantially planar heating areas for being in contact with food,
a plurality of elongate channels between the heating areas, wherein the channels extend downwardly away from the heating areas so that the elongate channels are not for being in contact with food, and
the exterior side of the tray including
a plurality of indentations in register with the heating areas on the interior side of the tray, and
a plurality of protrusions in register with the channels on the interior side of the tray.

74. The apparatus of claim 73, wherein the channels have a substantially arcuate profile.
75. The apparatus of claim 73 or 74, wherein the channels are substantially parallel to one another.
76. The apparatus of any one of claims 73 to 75, wherein the cover includes
a plurality of heating areas, the heating areas each including the microwave energy interactive material, and
a plurality of channels disposed between the heating areas, wherein the channels extend upwardly away from the tray when the cover is in the closed position.
77. The apparatus of claim 76, wherein the heating areas of the cover have a substantially planar surface for being in contact with food.
78. The apparatus of claim 76 or 77, wherein the heating areas of the tray and the heating areas of the cover are in register with one another when the cover is in the closed position.
79. The apparatus of claim 76 or 77, wherein the heating areas of the tray and the heating areas of the cover are out of register with one another when the cover is in the closed position.
80. The apparatus of any one of claims 73 to 79, wherein the cover includes a substantially planar rim extending along a peripheral margin of the cover.
81. The apparatus of claim 80, wherein the rim comprises an uppermost portion of the cover when the cover is in the closed position.
82. The apparatus of claim 80 or 81, wherein the rim is substantially coplanar with the heating areas of the cover.
83. The apparatus of any one of claims 73 to 82, wherein the tray includes a base extending around the heating areas of the tray, wherein the base defines a lowermost portion of the tray.
84. The apparatus of claim 83, wherein the tray further includes a peripheral wall extending upwardly from a peripheral margin of the base.
85. The apparatus of claim 84, wherein

the base and the peripheral wall define an interior space of the tray, and the heating areas of the cover extend into the interior space when the cover is in the closed position.

86. The apparatus of any one of claims 73 to 85, wherein the cover includes a tab extending from the cover, and the tray includes a receptacle for receiving the tab.

87. The apparatus of any one of claims 73 to 86, wherein the single piece of the laminate is shaped to further define a separator panel disposed between the cover and tray.

88. A microwave heating apparatus, comprising:

a piece of a laminate, wherein the laminate comprises microwave energy interactive material on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy,

wherein the piece of the laminate is pressed to define an integral tray and cover joined to one another along a fold line so that the cover can be moved between an open position and a closed position, the tray including an interior space, wherein

the tray and cover each comprise an interior side and an exterior side,

and

the interior side of the tray and the interior side of the cover each include

a plurality of substantially planar heating surfaces for being in contact with food, and

a plurality of channels between the heating surfaces, wherein the channels extend away from the heating surfaces so that the channels are not for being in contact with food, and

wherein

the cover includes a tab opposite the fold line joining the integral tray and cover to one another, wherein the tab comprises the laminate so that the tab is integral with the tray and cover,

the tray includes a slot for receiving the tab within the interior space of the tray, the slot being opposite the fold line joining the integral tray and cover to one another, and

when the cover is in the closed position with the tab received in the slot, the cover extends obliquely downwardly from the fold line towards the tab and slot.

89. The apparatus of claim 88, wherein the channels have a substantially arcuate profile.
90. The apparatus of claim 88 or 89, wherein the channels are substantially parallel to one another.
91. The apparatus of any one of claims 88 to 90, wherein the cover includes
a plurality of heating surfaces, the heating surfaces each including the microwave energy interactive material, and
a plurality of channels disposed between the heating surfaces, wherein the channels extend upwardly away from the tray when the cover is in the closed position.
92. The apparatus of claim 91, wherein the heating surfaces of the cover have a substantially planar surface for being in contact with food.
93. The apparatus of claim 91 or 92, wherein the heating surfaces of the tray and the heating surfaces of the cover are in register with one another when the cover is in the closed position.
94. The apparatus of claim 91 or 92, wherein the heating surfaces of the tray and the heating surfaces of the cover are out of register with one another when the cover is in the closed position.
95. The apparatus of claim 91 or 92, wherein the cover further includes a substantially planar rim extending around the cover.
96. The apparatus of claim 95, wherein the rim defines an uppermost portion of the cover when the cover is in the closed position.
97. The apparatus of claim 95 or 96, wherein the rim is substantially coplanar with the heating surfaces of the cover.
98. The apparatus of any of claims 88 to 97, wherein the tray includes a base extending around the heating surfaces of the tray, wherein the base defines a lowermost portion of the tray.
99. The apparatus of claim 98, wherein the tray further includes a peripheral wall extending around the base.
100. The apparatus of claim 99, wherein

the base and the peripheral wall define the interior space of the tray, and the heating surfaces of the cover extend into the interior space when the cover is in a closed position.

101. The apparatus of any one of claims 88 to 100, wherein the cover includes a tab extending from the cover, and the tray includes a receptacle for receiving the tab.

102. The apparatus of any one of claims 88 to 101, wherein the piece of the laminate is pressed to further define a separator panel, wherein the separator panel is positioned between the cover and tray.

103. A microwave heating apparatus, comprising:

a single piece of a laminate, wherein the single piece of the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy;

a portion of the single piece of the laminate being a press-formed integral tray of the apparatus;

another portion of the single piece of the laminate being a press-formed integral cover of the apparatus; and

the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line of disruption in the single piece of the laminate,

wherein

the press-formed integral tray includes a base and a peripheral wall that define an interior space of the press-formed integral tray,

the wall extends upwardly from a periphery of the base,

the upwardly extending wall extends around the interior space,

an upper surface of the base comprises a plurality of heating areas and a plurality of downwardly extending press-formed channels disposed between the heating areas,

a lower, exterior surface of the base comprises a plurality downwardly extending press-formed protrusions, the press-formed protrusions being respectively vertically aligned with the press-formed channels,

the heating areas are elevated relative to the press-formed channels, and

the heating areas each include the microwave energy interactive material.

104. The apparatus of claim 103, wherein the heating areas have a substantially planar surface for being in contact with food.

105. The apparatus of claim 103 or 104, wherein the press-formed channels have a substantially arcuate profile.

106. The apparatus of any one of claims 103 to 105, wherein the press-formed channels are substantially parallel to one another.

107. The apparatus of any one of claims 103 to 106, wherein the press-formed integral cover includes

a plurality of heating areas, the heating areas each including the microwave energy interactive material, and

a plurality of press-formed channels disposed between the heating areas, wherein the press-formed channels extend upwardly away from the press-formed integral tray when the press-formed integral cover is in a closed position.

108. The apparatus of claim 107, wherein the heating areas of the press-formed integral cover have a substantially planar surface for being in contact with food.

109. The apparatus of claim 107 or 108, wherein the heating areas of the press-formed integral tray and the heating areas of the press-formed integral cover are in register with one another when the press-formed integral cover is in the closed position.

110. The apparatus of claim 107 or 108, wherein the heating areas of the press-formed integral tray and the heating areas of the press-formed integral cover are out of register with one another when the press-formed integral cover is in the closed position.

111. The apparatus of any one of claims 107 to 110, wherein the heating areas of the press-formed integral cover extend into the interior space when the press-formed integral cover is in a closed position.

112. The apparatus of any one of claims 103 to 110, wherein the press-formed integral cover further includes a substantially planar rim extending along a peripheral margin of the press-formed integral cover.

113. The apparatus of claim 112, wherein the rim defines an uppermost portion of the press-formed integral cover when the press-formed integral cover is in the closed position.

114. The apparatus of claim 112 or 113, wherein the rim is substantially coplanar with the heating areas of the press-formed integral cover.

115. The apparatus of any one of claims 103 to 114, wherein a peripheral portion of the base extends around the heating areas and defines a lowermost portion of the press-formed integral tray.

116. The apparatus of any one of claims 103 to 115, wherein
the press-formed integral cover includes a locking tab extending from the press-formed integral cover, and
the press-formed integral tray includes a receptacle for receiving the locking tab.

117. The apparatus of any one of claims 103 to 116, wherein another portion of the single piece of the laminate is shaped to further define a separator panel

disposed between the press-formed integral cover and the press-formed integral tray.

118. A microwave heating apparatus, comprising:

a piece of a laminate, wherein the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy;

a portion of the piece of the laminate being a press-formed integral tray of the apparatus; and

another portion of the piece of laminate being a press-formed integral cover of the apparatus;

the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line of disruption in the laminate so that the press-formed integral cover can be moved between an open position and a closed position,

the press-formed integral tray including an upright wall extending around an interior space of the press-formed integral tray,

wherein

the press-formed integral tray and the press-formed integral cover each comprise an interior side and an exterior side, and

the interior side of the press-formed integral tray and the interior side of the press-formed integral cover each include

a plurality of elongate press-formed protrusions that extend towards the interior space when the press-formed integral cover is in the closed position, and

a plurality of elongate press-formed indentations between the press-formed protrusions, wherein the press-formed indentations extend away from the interior space when the press-formed integral cover is in the closed position, and

the exterior side of the press-formed integral tray and the exterior side of the press-formed integral cover each respectively include a plurality of press-formed protrusions in register with the press-formed indentations on

the interior side of the press-formed integral tray and the interior side of the press-formed integral cover.

119. A microwave heating apparatus, comprising:

a single piece of a laminate, wherein the single piece of the laminate comprises microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy;

a portion of the single piece of the laminate being a press-formed integral tray of the apparatus;

the press-formed integral tray including an upright wall extending around an interior space of the press-formed integral tray;

another portion of the single piece of the laminate being a press-formed integral cover of the apparatus;

the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line of disruption in the single piece of laminate so that the press-formed integral cover can be moved between an open position and a closed position relative to an upper opening of the press-formed integral tray,

wherein the press-formed integral tray includes an interior side and an exterior side,

the interior side of the press-formed integral tray including

a plurality of substantially planar heating areas for being in contact with food on the press-formed integral tray, and

a plurality of elongate press-formed channels between the heating areas, wherein the press-formed channels extend downwardly away from the heating areas so that the elongate press-formed channels are not for being in contact with food on the press-formed integral tray, and

the exterior side of the press-formed integral tray including

a plurality of indentations in register with the heating areas on the interior side of the press-formed integral tray, and

a plurality of press-formed protrusions in register with the press-formed channels on the interior side of the press-formed integral tray.

120. A microwave heating apparatus, comprising:

a piece of a laminate, wherein the piece of the laminate comprises microwave energy interactive material on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy;

a portion of the piece of the laminate being a press-formed integral tray of the apparatus;

the press-formed integral tray including an upright wall extending around an interior space of the press-formed integral tray;

another portion of the laminate being a press-formed integral cover of the apparatus;

the press-formed integral tray and the press-formed integral cover being joined to one another along a fold line in the piece of laminate so that the press-formed integral cover can be moved between an open position and a closed position relative to an upper opening of the press-formed integral tray,

wherein

the press-formed integral tray and the press-formed integral cover each comprise an interior side and an exterior side, and

the interior side of the press-formed integral tray and the interior side of the press-formed integral cover each include

a plurality of substantially planar heating surfaces for being in contact with food, and

a plurality of press-formed channels between the heating surfaces, wherein the press-formed channels extend away from the heating surfaces so that the press-formed channels are not for being in contact with food, and

wherein

the press-formed integral cover includes a tab opposite the fold line joining the press-formed integral tray and the press-formed integral cover to one another, wherein the tab comprises the laminate so that

the tab is integral with the press-formed integral tray and the press-formed integral cover,

the press-formed integral tray includes a slot for receiving the tab within the interior space of the press-formed integral tray, the slot being opposite the fold line joining the press-formed integral tray and the press-formed integral cover to one another, and

when the press-formed integral cover is in the closed position with the tab received in the slot, the press-formed integral cover extends obliquely downwardly from the fold line towards the tab and slot.

121. A microwave heating apparatus, comprising:

a single piece of a laminate consisting essentially of

a layer of microwave energy interactive material supported on a polymer film, the microwave energy interactive material being operative for heating in response to microwave energy,

a layer of paperboard having a basis weight of from about 60 to about 330 lb/ream, and

a layer of adhesive positioned directly between the layer of microwave energy interactive material and the layer of paperboard, so that the layer of microwave energy interactive material is joined to the layer of paperboard by the layer of adhesive;

a portion of the single piece of the laminate being a press-formed integral tray of the apparatus;

the press-formed integral tray including a base, and an upright peripheral wall extending around an interior space of the press-formed integral tray;

another portion of the single piece of the laminate being a press-formed integral cover of the apparatus;

the press-formed integral tray and the press-formed integral cover being foldably joined to one another along a line of disruption in the single piece of laminate so that the press-formed integral cover can be moved between an open position and a closed position relative to an upper opening of the press-formed integral tray, wherein

the polymer film defines an interior surface on an interior side of the press-formed integral tray and the press-formed integral cover,

the paperboard defines an exterior surface on an exterior side of the press-formed integral tray and the press-formed integral cover, the interior side of the press-formed integral tray and the interior side of the press-formed integral cover include

elongate press-formed protrusions that extend towards one another when the press-formed integral cover is in the closed position, the press-formed protrusions of the press-formed integral cover extending into the interior space of the press-formed integral tray, wherein the press-formed protrusions of the press-formed integral tray and the press-formed protrusions of the press-formed integral cover are substantially parallel to one another when the press-formed integral cover is in the closed position, and

elongate, arcuate press-formed indentations between the press-formed protrusions, wherein the press-formed indentations extend away from one another when the press-formed integral cover is in the closed position, and

the exterior side of the press-formed integral tray and the exterior side of the press-formed integral cover include a plurality of press-formed protrusions in register with the respective press-formed indentations on the interior side of the press-formed integral tray and the interior side of the press-formed integral cover.

122. An apparatus for preparing a food item in a microwave oven, comprising:

a tray formed using a pressing technique, the tray including opposite interior and exterior sides, and the exterior side of the tray forming a portion of the exterior of the apparatus while the apparatus is in a closed configuration, wherein

the interior side of the tray includes

a plurality of elevated heating areas, the elevated heating areas each including a microwave energy interactive material, and

a plurality of channels disposed between the elevated heating areas, and

the exterior side of the tray includes a plurality of protrusions corresponding to the channels on the interior side of the tray;

a cover formed using a pressing technique, the cover including opposite interior and exterior sides, and the exterior side of the cover forming a portion of the exterior of the apparatus while the apparatus is in the closed configuration;

a line of disruption, the tray and the cover being foldably joined to one another along the line of disruption so that the cover is pivotably connected to the tray for pivoting the cover relative to the tray between an open position and a closed position; and

a locking feature operative for releasably maintaining the cover in the closed position.

123. The apparatus of claim 122, wherein

relative to the elevated heating areas the channels in the cover recede in a direction away from the tray when the cover is in the closed position, and
each of the elevated heating areas has a substantially planar profile.

124. The apparatus of claim 122 or 123, wherein the channels have a substantially arcuate profile.

125. The apparatus of any one of claims 122 to 124, wherein the channels are substantially parallel to one another.

126. The apparatus of any one of claims 122 to 125, wherein

the interior side of the cover includes

a plurality of heating areas, each of the heating areas of the cover including a microwave energy interactive material, and

a plurality of channels disposed between the heating areas of the cover, relative to the heating areas of the cover the channels in the cover receding in a direction away from the tray when the cover is in the closed position, and

the exterior side of the cover includes a plurality of protrusions corresponding to the channels on the interior side of the cover.

127. The apparatus of claim 126, wherein each of the heating areas of the cover has a substantially planar profile.

128. The apparatus of claim 126 or 127, wherein the channels in the tray and the channels in the cover are in register with one another when the cover is in the closed position.

129. The apparatus of claim 126 or 127, wherein the channels in the tray and the channels in the cover are out of register with one another when the cover is in the closed position.

130. The apparatus of any one of claims 126 to 129, wherein
the heating areas and the channels of the cover define a substantially central portion of the cover, and
the cover further includes a rim circumscribing the substantially central portion of the cover.

131. The apparatus of claim 130, wherein the rim defines an uppermost portion of the cover when the cover is in the closed position.

132. The apparatus of claim 130 or 131, wherein the rim is substantially coplanar with the heating areas of the cover.

133. The apparatus of any one of claims 122 to 125, wherein the cover being pivotably connected to the tray comprises the cover being connected to the tray by a separator panel.

134. The apparatus of claim 133, wherein the locking feature includes
a slot in the tray distal from the separator panel, and
a tab extending from a portion of the cover distal from the separator panel,
the tab being adapted to be received within the slot.

135. The apparatus of any one of claims 122 to 125, wherein
the elevated heating surfaces and the channels of the tray define a substantially central portion of the tray, and
the tray includes a peripheral portion circumscribing the central portion of the tray, the peripheral portion being a lowermost portion of the tray.

136. The apparatus of claim 135, wherein
the central portion of the tray and the peripheral portion of the tray define a base of the tray, and
the tray further includes a peripheral wall extending upwardly from a peripheral margin of the base.

137. The apparatus of claim 136, wherein
the base and the peripheral wall define an interior space of the tray, and
the heating areas of the cover extend into the interior space when the cover is in the closed position.

138. The apparatus of claim 136 or 137, wherein the locking feature comprises a tab extending from the cover, the tab being adapted to be received in a slot in the peripheral wall.

139. A method of preparing a food item in a microwave oven, the food item having a plurality of surfaces intended to be browned and/or crisped, the method comprising:

placing the food item within the apparatus of any one of claims 122 to 125, comprising the food item being between the tray and the cover such that the respective heating surfaces of the base and the cover are proximate to the surfaces of the food item intended to be browned and/or crisped;

operating the locking feature to releasably secure the cover in the closed position; and

exposing the food item within the apparatus to microwave energy, whereby the microwave energy interactive material generates thermal energy and at least

partially browns and/or crisps the surfaces of the food item intended to be browned and/or crisped.

140. The method of claim 139, wherein operating the locking feature urges the cover towards the tray.

141. The method of claim 139, wherein
the tray further comprises an upstanding peripheral wall,
the locking feature comprises a tab extending from the cover, the tab being adapted to be received in a slot in the wall, and
operating the locking feature comprises inserting the tab into the slot, thereby urging the cover towards the tray.

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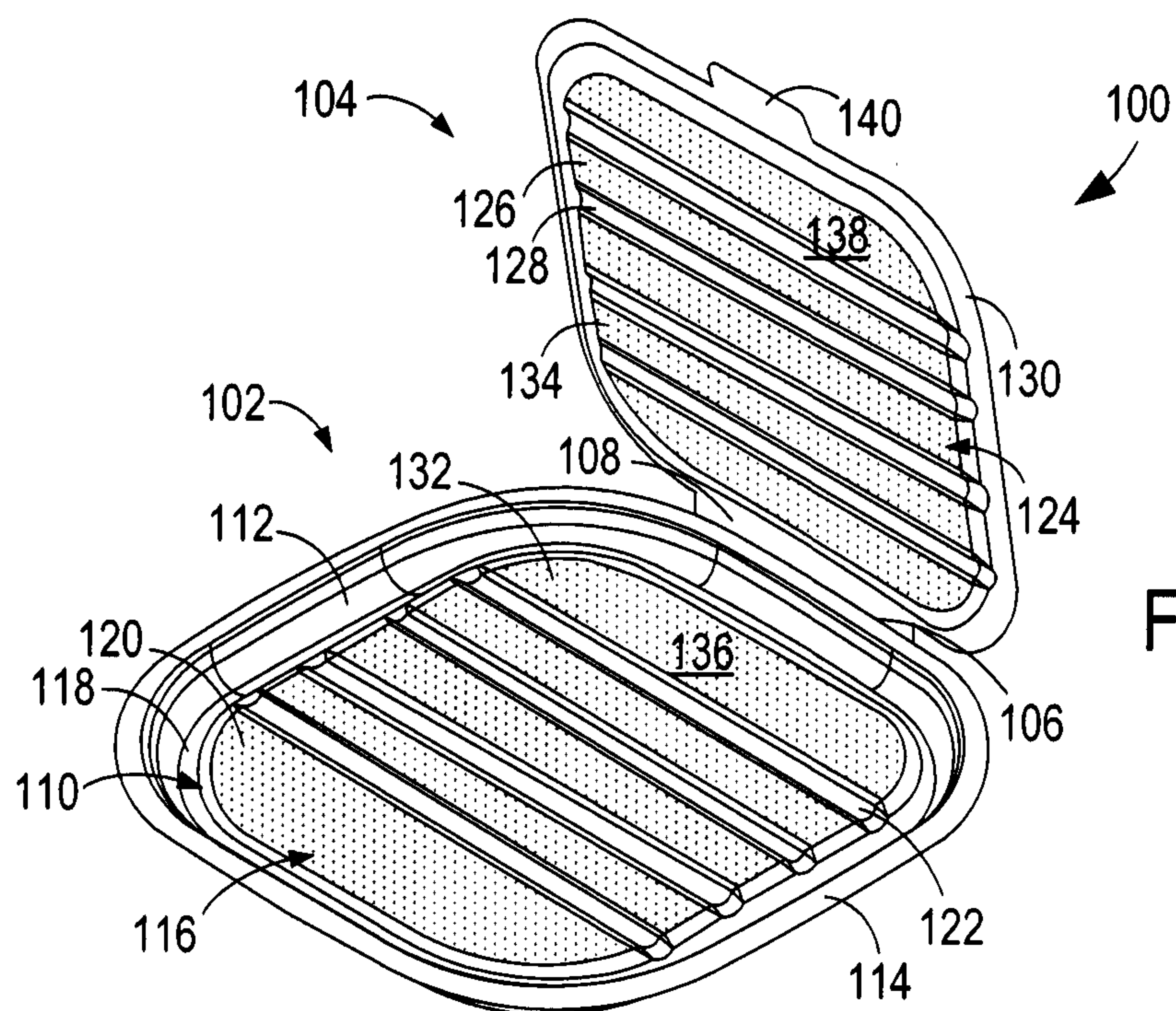


FIG. 1A

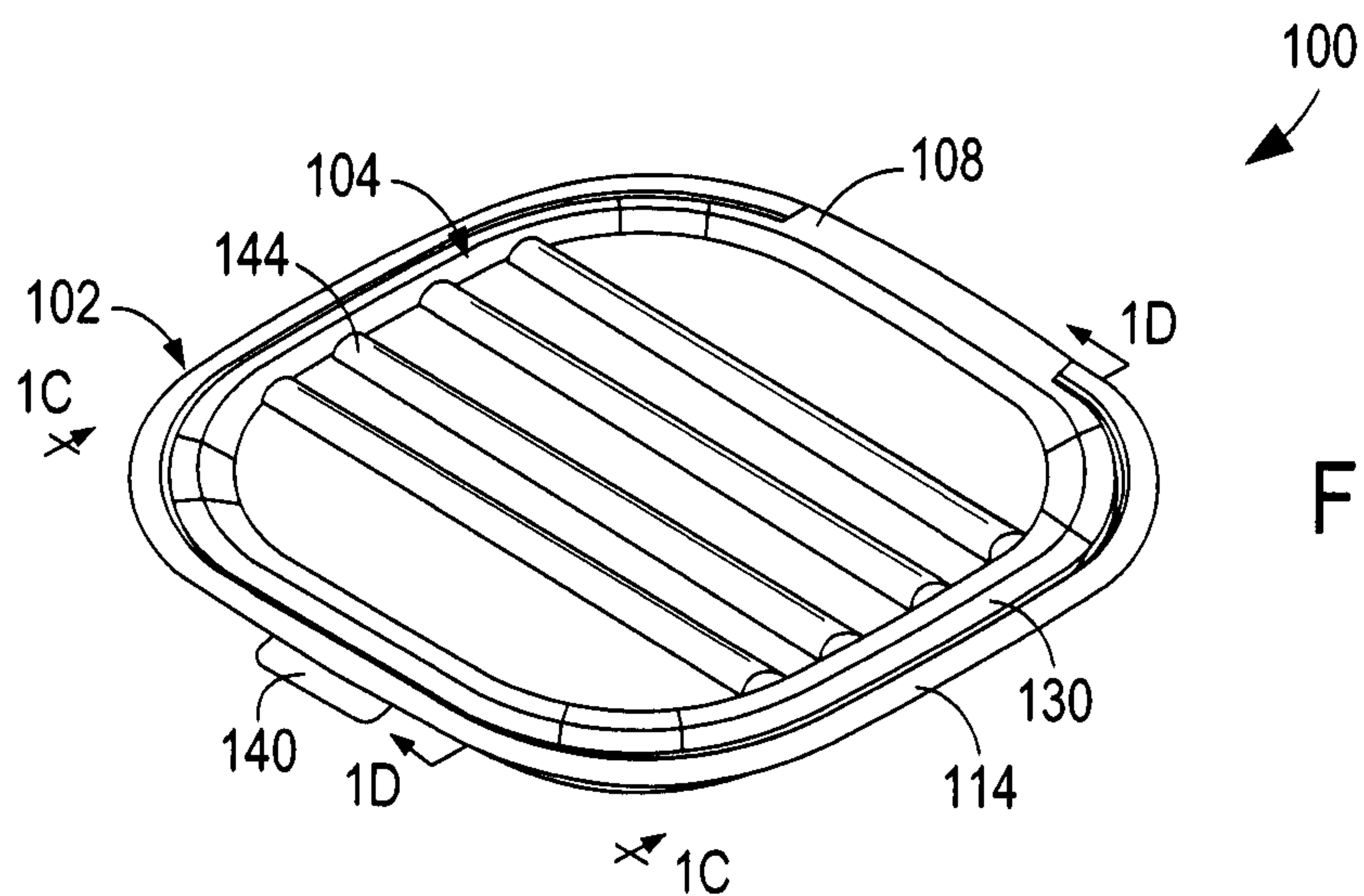


FIG. 1B

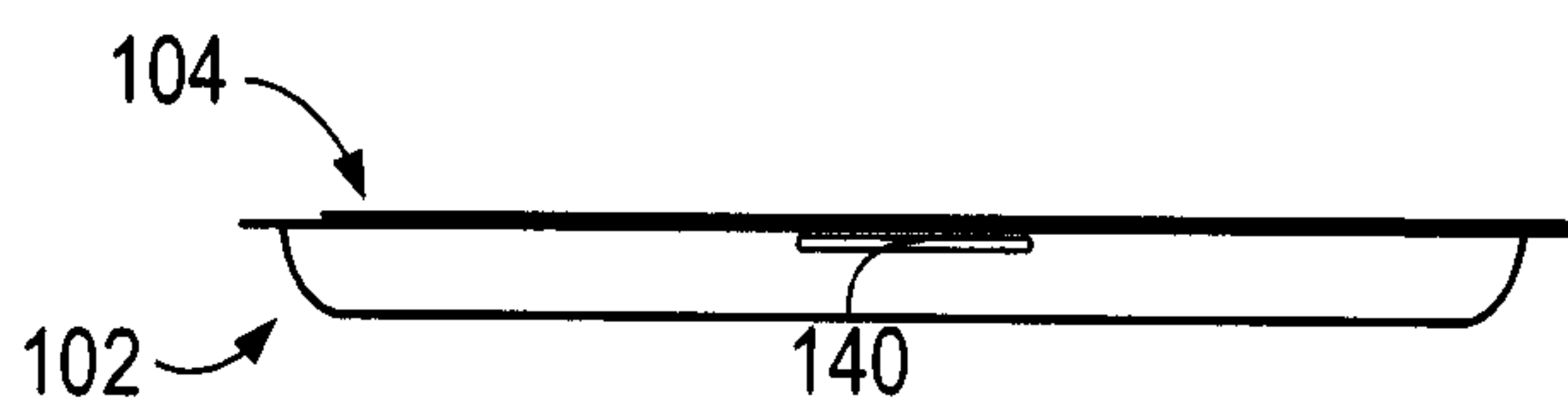


FIG. 1C

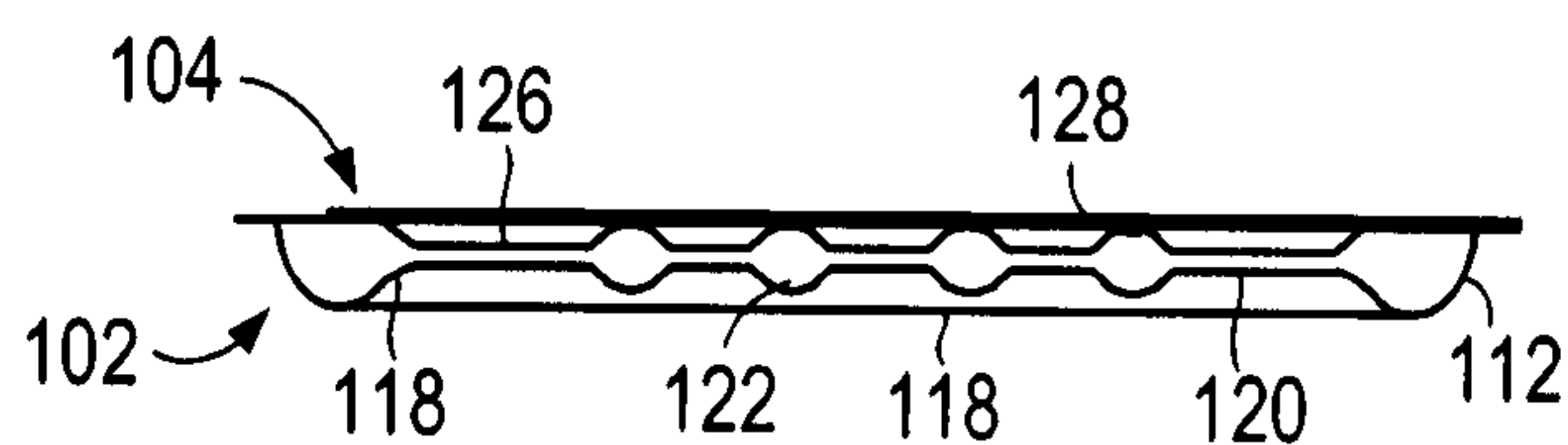


FIG. 1D

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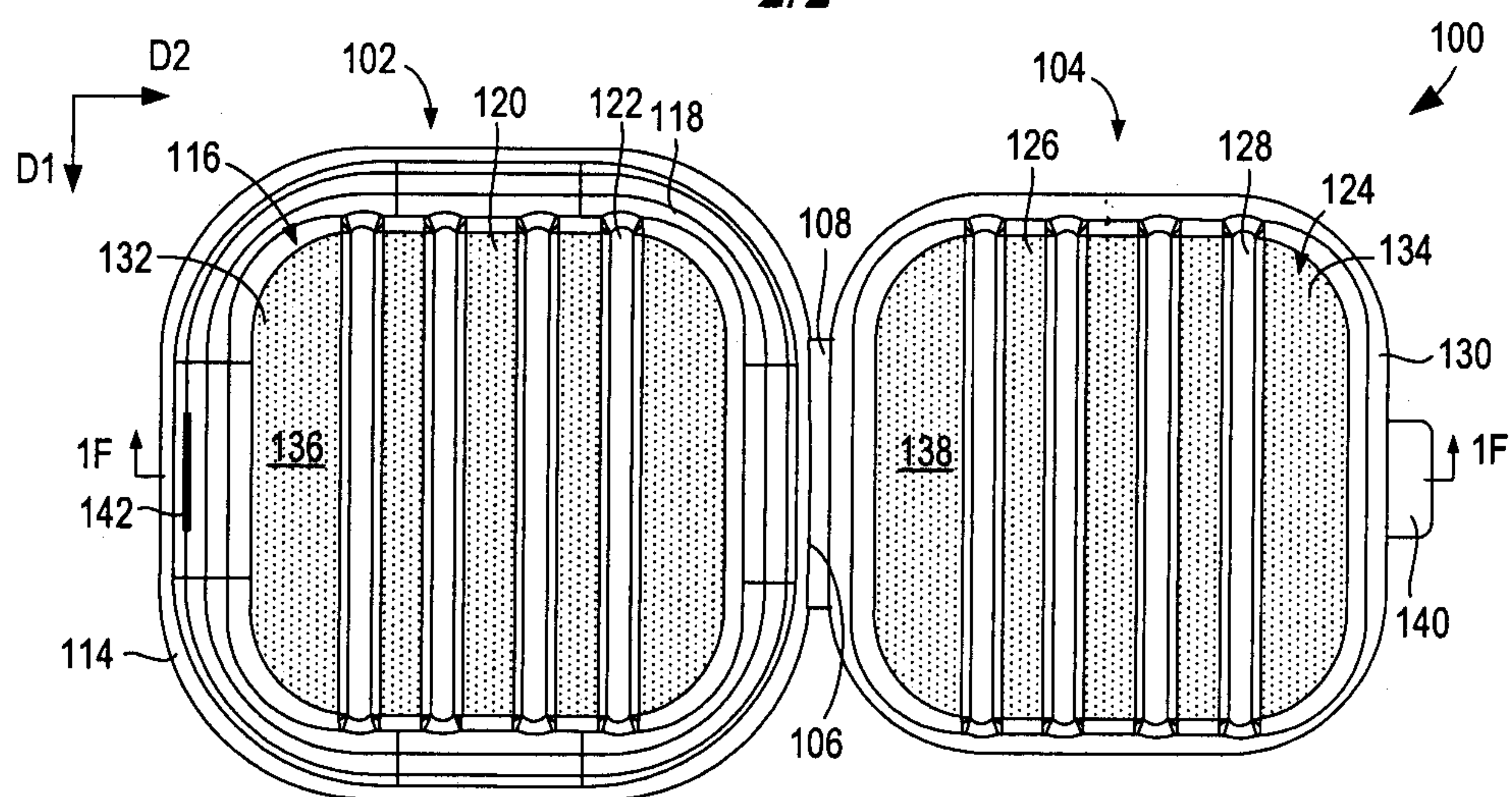


FIG. 1E

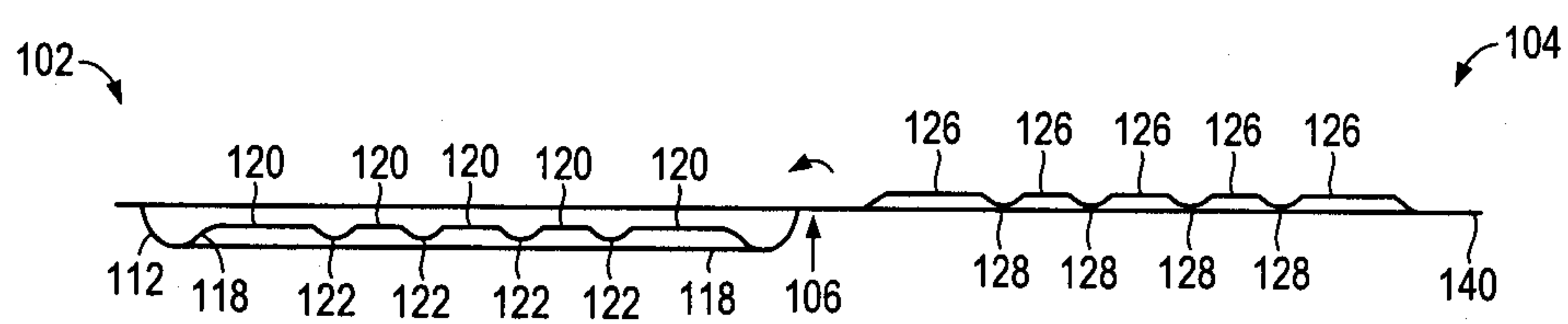


FIG. 1F

