Flexible grill

Transparent grill or griddle device

Electrically operated cooking apparatus having a base 100 with a first heating surface upon which food may be placed and a lid 101 having a see-through second heating surface; the second heating surface comprises a transparent layer with a heating element to heat the layer and a second transparent layer spaced apart from the first layer. The see through heating surface may have a doped semiconductor heating element and can act to radiate or conduct heat to food in a griddle or a grilling mode. There may be a third transparent or translucent layer spaced apart from the second layer between the first and second layers. The second heating surface may be used as a griddle or as a grill. The lid and base may be movable relative to each other by both rotational and translational movement. The lid and base may be connected to each other by a connection means having a member having an elongate slot aperture wherein at least one elongate member in the slot may move along the slot. The connection means may comprise upright mounting members which hold the lid at a range of positions along the length of the mounting members.
FLEXIBLE GRILL

Field of the Invention
The present invention relates to an improved cooking device, particularly although not exclusively for use as a grill and/or griddle.

Background to the Invention
Conventional electrically heated griddles comprise a flat plate of metal, usually aluminum, stainless steel or cast iron, which is heated by an electric heating element. Food is placed on the hot plate and cooks by direct conduction of heat to the outer surface of the food.

On the other hand, a conventional grill is a form of cooking device in which heat is applied to the surface of the food either from above or below. Usually the food is placed on a open wire grid with the heat source being above or below the wire grid. Heat transfer to the food when using a grill is primarily via thermal radiation.

A known sandwich toaster (also known as a sandwich maker) is a variation of a griddle, in which a sandwich is placed between a pair of electrically heated metal plates, which are often, but not essentially, coated with a non-stick surface. The plates form a “shell” which clamp together to form an enclosed compartment, in which the sandwich is contained. Usually the plates are contoured, so that they meet together around the edges and often across the centre of the sandwich, so as to divide the sandwich in to triangular shaped pieces with sealed edges.

There are known combined griddles and grills, for example the Cuisinart GR4U griddle and grill which has an open out griddle having interchangeable griddle and grill plates. The grill allows cooking of food on both sides, and the device can be used in an open, closed or flat (double surface) configuration. The griddle plates have optional spouts which allow grease or fat to run away from
the food for healthier lower fat cooked food. The device features a floating hinge which enables the lid to rest on top of the food, or to fully open out to provide two side by side cooking surfaces.

However, with the Cuisinart GR4U product, when in “closed” mode, the user cannot see the food being cooked without opening the lid and disturbing the cooking process. It is therefore difficult for the user to monitor the cooking operation without continually disturbing the cooking process.

It is an ongoing objective of the development of cooking devices to produce devices which are more compact, more lightweight, more efficient, easier to clean, and which take up less storage space and worktop space, which have improved features, and which have innovative additional features.

Summary of the Invention
According to a first aspect there is provided an electrically operated cooking apparatus comprising:

a base having a first heating surface upon which food may be placed; and

a lid having a substantially see-through second heating surface,

said lid comprising a substantially transparent or translucent layer having a heating element for heating said layer; and

a second substantially transparent or translucent layer spaced apart from said first layer.

Preferably, there is provided a third substantially transparent or translucent layer spaced apart from said second layer.

Preferably the second substantially transparent / translucent layer is positioned between said first and third layers.
Preferably, the substantially see through second heating surface can be used as a griddle or as a grill.

Preferably, the second heating surface is moveable relative to said first heating surface, such that said first and second heating surfaces can be opened and closed relative to each other.

Preferably, there is provided a connection means for connecting the lid to the base such that said lid and said base are moveable relative to each other.

Preferably, the connection means permits movement of the two heating surfaces in a rotational movement relative to each other.

The base may be connected to the lid by a connection means which permits movement of the respective two heating surfaces in a translational movement relative to each other.

Preferably a connection means connects the lid to the base such that said lid and said base are moveable relative to each other.

The connection means may comprise:

at least one member having an elongate slot aperture; and

at least one elongate member which locates in said slot and is capable of moving along said slot.

The connection means may comprise:

a pair of spaced apart upright mounting members, each having a corresponding respective elongate slot;

one or more elongate members, which pass through said slots; and
a pair of bearing surfaces arranged to co-operate with an outer surface of said pair of upright mountings, to allow said lid to be held by said mounting members at a range of positions along a length of said mounting members.

In some embodiments, the connection means is operable to connect said lid to said base in a cantilevered manner wherein said lid is positioned substantially parallel to and spaced apart from said base, there being a cooking space there between.

The connection means may connect said lid to said base such that said lid may move relative to said base:

in a translational movement in which said lid and said base remain substantially parallel to each other; and

in a rotational movement in which a main plane of said lid rotates relative to a main plane of said base.

The cooking apparatus is preferably capable of adopting the following modes of operation:

a mode of operation in which said lid lies above and opposite said base, with said lid and said base in contact with a food item, so as to griddle said food item from upper and lower sides; and

a mode of operation in which said base and said lid lay side by side, and wherein a food item placed on said base is heated by conduction of heat from underneath said food, and wherein a food item placed on said see-through heating surface of said lid is heated by conduction of heat from underneath said food item.
In some embodiments, the cooking apparatus is capable of adopting a mode of operation in which said lid lies above and space apart from said base, such that there is a gap between a food item placed on said base, and said see-through heating surface, such that an underside of said food is heated by conducted heat from said base, and an upper side of said food is heated by radiation of heat from said see-through heating surface.

Preferably, said upper heating surface is located to a peripheral outer frame member.

Preferably the outer frame holds the layers in fixed spaced apart relationship to each other.

Preferably, the cooking apparatus has a window containing said transparent or see through heated plate, wherein:

said upper heating surface is located within a peripheral frame; and

said upper heating surface is substantially transparent, and/or see-through;

said second transparent layer, which lays parallel to said first substantially transparent/see-through heating layer, there being provided a thermally isolating cavity between said second layer and said first transparent heating layer.

Preferably, the cooking apparatus further comprises a plurality of air vents in said frame, to allow air to pass into and out of said cavity.

Said plurality of air vents may be positioned opposite each other and on first and second sides of said frame.

Preferably, the cooking apparatus comprises a removable substantially transparent glass plate configured to lie adjacent to said electrically heated transparent/see-through first layer.
Preferably the removable plate is robust enough to stand up to cleaning in a dishwasher or in a washing up bowl.

Preferably, a surface of the lid in direct contact with the food may be undulated or ribbed, to minimise sticking of the food to the lid.

The lid may comprise a hand operable retaining means that can be operated to retain or release said removable transparent glass plate from said lid.

In some embodiments, the lid and base may open out so that the upper and lower heating surfaces can be positioned side by side each facing upright.

Preferably, the removable plate has a thickness in the range 3mm to 8mm.

Preferably, the first and second heating surfaces are independently electrically operable.

In one embodiment, the cooking apparatus comprises a handle attached to said lid, for raising or lowering said lid relative to said base and/or for swinging said lid away from and towards said base.

In another embodiment, the cooking apparatus comprises a pair of handles on either side of said base, for lifting said cooking apparatus.

In one embodiment, in use, the first heating surface is arranged to be tilted relative to the horizontal, to allow cooking fluids to drain from said lower heating surface.

The cooking apparatus may comprise a drip tray positioned at a front edge of said base for collecting fluid draining from said lower heating surface.
The drip tray may alternatively be positioned at the rear of the base so as to be positioned between the base and the lid when the lid is opened out 180° to the base, so that it can receive liquid draining from both the base and the lid.

Preferably, the substantially see-through first layer comprises a thin film semi-conducting heating element.

The film semi-conductor heating element may be patterned so as to heat different areas of said see-through heating surfaces to different temperatures, for providing a seared effect on cooked food.

There may be provided one or more temperature sensors positioned at a peripheral region of said first layer for measuring a temperature of said first layer.

In various embodiments, a distance between the first substantially transparent or translucent layer and an outermost said substantially transparent or translucent layer on an opposite side of the lid may be in the range 20 mm to 35 mm.

A gap between the first layer and the second layer is preferably in the range 20 mm to 35 mm.

A gap between the intermediate layer and the outermost transparent/translucent layer is preferably in the range 10mm to 20mm.

A gap between the intermediate (third) layer and the first layer is preferably in the range 5mm to 15 mm.

A thickness of the first layer is preferably in the range 3mm to 8 mm. A thickness of the second layer is preferably in the range 3mm to 8mm. A thickness of the third layer is preferably in the range 3mm to 8mm.

Other aspects are as recited in the claims herein.
Brief Description of the Drawings

For a better understanding of the invention and to show how the same may be carried into effect, there will now be described by way of example only, specific embodiments, methods and processes according to the present invention with reference to the accompanying drawings in which:

Figure 1 illustrates schematically, a prototype combined griddle and grill according to a first specific embodiment herein in a first mode of operation;

Figure 2 illustrates schematically, the prototype griddle/grill of Figure 1 in perspective view from the rear;

Figure 3 illustrates schematically the prototype griddle/grill of Figure 1 in view from above;

Figure 4 illustrates schematically the prototype griddle/grill of Figure 1, in a second mode of operation where the lid lies spaced apart from and parallel to a base of the device;

Figure 5 illustrates schematically in cut away view from one side, the lid of the prototype griddle/grill of Figure 1;

Figure 6 illustrates schematically in cut away view from the front, the lid of the prototype griddle/grill of Figure 1;

Figure 7 illustrates schematically in cut away view from the side, a portion of the frame of the lid of the prototype griddle/grill of Figure 1 in an alternative vent arrangement;

Figure 8 illustrates schematically a detail of a connecting arrangement for connecting the lid to the base of the prototype griddle/grill of Figure 1;
Figure 9 illustrates schematically the prototype griddle/grill of Figure 1 in a third, opened out mode of operation;

Figure 10 illustrates schematically in perspective view from above a further prototype griddle and grill according to a second specific embodiment herein;

Figure 11 illustrates schematically in perspective view from above a further embodiment combination griddle and grill in perspective view from above and one side according a third specific embodiment herein;

Figure 12 illustrates schematically in perspective view from above and one side, a fourth prototype cooking device according to a fourth specific embodiment in a first mode of operation;

Figure 13 illustrates schematically in perspective view from one side the fourth cooking device of Figure 12, in a second mode of operation;

Figure 14 illustrates schematically in perspective view from above, the fourth cooking device of Figures 12 and 13 in a third, opened out, mode of operation;

Figure 15 illustrates schematically the fourth cooking device in a transition between the second mode of operation and the third mode of operation;

Figure 16 illustrates schematically a detail of the rear of the fourth cooking device showing air vents in the lid and a detail of a hinge arrangement;

Figure 17 illustrates schematically in perspective view from above a fifth cooking device according to a fifth specific embodiment, in a third, opened out mode of operation;

Figure 18 illustrates schematically in perspective view from above a face plate component of the fifth embodiment cooking device;
Figure 19 herein illustrates schematically in perspective view from above an alternative face plate component of the fifth embodiment cooking device, having a profiled, undulating or ribbed food contacting surface; and

Figure 20 illustrates schematically in view from one side an experimental set up of transparent layers in a lid, to determine the range of gap / cavity distances and plate thickness which are optimum for operation of the lid.

**Detailed Description**

There will now be described by way of example a specific mode contemplated by the inventors. In the following description numerous specific details are set forth in order to provide a thorough understanding. It will be apparent however, to one skilled in the art, that the present invention may be practiced without limitation to these specific details. In other instances, well known methods and structures have not been described in detail so as not to unnecessarily obscure the description.

Specific embodiment cooking devices herein may be used to cook various types of food in a domestic or small commercial kitchen, including meat, burgers, bread, toasted sandwiches, tomatoes, eggs, waffles, bagels, or any type of food which can be cooked by grilling or griddling.

Referring to Figures 1 to 9 herein, there is illustrated schematically a prototype cooking device according to a first specific embodiment:

The cooking device has a combined griddle and grill. The device comprises a base 100, a lid portion 101; a connecting mechanism 102 for connecting the lid to the base; a stand 103; and a drip tray 104.

The base portion 100 comprises a rigid body, having an electric heating element which heats a hob. The base portion has a front edge 105, a rear edge 106 and first and second sides between the front and rear edges. A stand 103 is
positioned at the rear of the base plate, and the drip tray 104 is positioned at the front of the base. On top of the hob, is a detachable cast metal hot plate 107 which provides a griddle surface. The base is angled with respect to the horizontal in use, such that any excess fat released from food items (particularly meat), will drain down the hot plate towards the front of the hot plate and be collected in drip tray 104, thereby reducing the fat content of the cooked food. The angle to the horizontal is shallow, typically of the order of $1^0$ to $4^0$, and the hot plate is tilted such that the juices flow towards the front of the hot plate device.

The lid portion 101 comprises a rectangular frame 108 surrounding a see through or substantially transparent window 109. The window 109 comprises, on a first side a transparent glass or plastics plane or sheet 111, and on a second side, a glass heating plate 112. In contact with the glass heating plate and forming an outer facing to the glass heating plate is a glass face plate 113, which is held either directly above or in contact with food on the hot plate, or which can serve as a separate hot plate itself when the lid is opened out fully with respect to the base. Between the glass heating plate on the second side of the lid, and the transparent pane on the first side of the lid, is an air gap, which is vented through a plurality of vent passages in the frame.

The glass face plate 113 is easily removable from the frame for cleaning in a dish washer, or sink.

The multi-positionable griddle/grill of Figures 1 to 9 herein has three basic modes of cooking:

(i) In a first mode of operation, the face plate of the lid is in contact with the food on the underlying hot plate, so that both the upper and lower surfaces of the food are in contact with the heated surface and both side of the food are cooked at the same time. In this mode, both sides of the food are griddled and are in direct contact with a heated cooking surface.

(ii) In a second mode of operation, the glass face plate of the lid is positioned above the hot plate, with a gap there between so that the lid is above and
spaced apart from the food being cooked. The underside of the food is in direct contact with the metal hot plate, and the upper face of the food receives heat from radiation from the face plate of the lid which is placed immediately above it. Air can circulate over the top of the food. In this mode, the lid heater may provide a grill or “browning” effect on the food, whilst the lower hot plate serves as a griddle.

(iii) In the third mode of operation, the multi-position griddle/grill is opened out so that both the hot plate and the face plate of the lid provide separate heated cooking surfaces positioned side by side. In the third mode of operation, the device acts as a double griddle, having two upwardly facing heated griddle surfaces.

Referring to Figure 2 herein, the connector arrangement 102 comprises a mounting in the form of a pair of substantially upright columns 200, 201 spaced apart from each other, each column comprising a pair of spaced apart upright members, connected to each other at their upper ends by a substantially semi-circular shaped connecting piece, such as to form an arch at their upper ends.

A substantially horizontally extending projecting rear portion 202 of the lid locates between the two upright columns, 200, 201 of the mounting, the rear lid portion being retained to the upright columns by a pair of rollers, wheels or rods 203, one per each upright column, which are moveable up and down in the slots between the two upright members of each column, such that the lid can raise or lower in a translational movement with respect to the base plate so as to hold the lid in a substantially horizontal position above the base plate and spaced apart therefrom. This allows the lid to be rested on top of the food in direct contact to provide a griddle effect from above, or allows the lid to be held above the lower hot plate, and above the food in a cantilevered arrangement to provide a grill effect from above.

Referring to Figure 3 herein, there is illustrated schematically the prototype griddle/grill from above. In view from above, when the lid is pressed down onto the food items, resting on top of the food items and in direct contact, a user can
view the food items directly through the transparent glass and/or plastics portions of the lid, to watch the items cooking.

In view from above, the area of the transparent window is approximately equal to the area of the underlying hot plate, and the frame extends around the window and overhangs the edges of the underlying hot plate, so that the surface area of the transparent heated window substantially fully overlays the area of the underlying hot plate, allowing full use of the hot plate area for cooking.

Referring to Figure 4 herein, when in the raised position in the second mode of operation, the lid 101 lies substantially parallel to a main surface of the base plate, such that food items placed on the lower hot plate are heated from underneath by the hot plate 107, and are also heated from above by radiation of heat from the heating elements located in the lid 101 above the food. The lid 101 is cantilevered above the hot plate 107, the rear part of lid being held by the connecting means 102. Also shown in Figure 4 are a pair of handles 400, one on each side of the base, which allows the cooking device to be picked up. The handles are thermally isolated from the hot plate, so that they remain cool to the touch, even when the hot plate is in use.

The front drip tray 104, which may be separately removable for cleaning, extends along a full width of the hot plate 107, and is formed in the shape of an elongate trough.

Also in Figure 4 are shown a plurality of air vents 400 through which air can flow into a cavity in the lid, to cool the interior of the lid.

Referring to Figure 5 herein, there is shown schematically the lid in cut away view from one side. The lid comprises an upper glass or plastics plate 111 which forms the upper surface of the lid when the lid is positioned parallel to the hot plate; an intermediate glass layer 501, spaced apart from the upper glass layer 111 by an air gap 502; and a glass heating plate 503, spaced apart from the
intermediate glass layer 2601 by a gap 504; and removable glass contact plate 113 which contacts the heating plate 503.

The heating plate 503 has a plurality of doped metal oxide resistive heating elements 505 which coat one side of the lid heating plate. The heating elements are electrically energized to produce heat, which heats up the heating plate 503. The heating plate 503 transmits heat by conduction to the detachable face plate 113 which is either physically in contact with the food, or is spaced apart in a raised position above the food as shown in Figure 4 herein.

The heating elements 505 comprise thin film doped semi-conductor elements of a metal oxide, for example tin oxide. The metal oxide may be doped with trace elements of acceptor or donor species, for example antimony, fluorine or indium. The doped semi-conductor thin film heating elements are arranged in a pattern of tracks extending across a width or length of the heated glass plate so that when an electric current is passed through the heating elements, the heating elements become hot and the heat is transferred directly to the heated glass plate. Since the heating elements are substantially see through or transparent, a user can through the heating elements from above to see the food cooking in the first and second modes of operation.

The tracks of the heating elements may be arranged in rows or columns across the width or length of the glass heating plate 503, in a regular array, or they may be patterned so as to provide a “searing” effect by differentially heating some areas or parts of the glass hotter than other areas to provide a seared grill like browning on the food.

Referring to Figure 6, there is illustrated schematically in cut away view the lid of Figure 5 from the front, showing a plurality of air vents, for permitting or inducing an air flow into cavity 502 within the lid.

Within the perimeter frame 108 of the lid are provided a plurality of passages 600, 601 which allow air to enter and leave the cavity 502 between the
upper plate 111 and the intermediate plate 501. The purpose of the air passages is to allow air flow into and out of the cavity, such that as the cavity heats up due to operation of the heating plate, hot air can be transferred out of the cavity, helping to cool the upper plate 111 to a temperature where it is acceptable to be touched by a human hand without risk of injury.

The intermediate glass layer 501 and the heating plate 503 may form a sealed unit, and the gap 504 between the two parallel glass plates 501, 503 may be filled with an inert gas, or with air.

The cavity 502 between the upper glass plate 111 and the intermediate glass plate 501 is open to the atmosphere, by a plurality of said air passages or vents 600, 601, so that as the heating plate heats up, any heat transferred to the intermediate plate 501 can be conducted away from the lid via air flowing through the cavity from side to side across the lid, or depending upon the orientation of the air vents, from rear to front or front to rear of the lid.

In various embodiments, the air passages may be positioned so as to promote a flow of air from side to side across a width of the lid, or in an alternative embodiment, the air passages may be positioned such as to allow air flow from front to rear or rear to front of the lid. In yet further embodiments, the air passages may be substantially “L” shaped and may vent either to the underside or to the top side of the lid as shown in Figure 7 herein. In yet further embodiments, combinations of these vent arrangements may be provided, with the objective of efficiently promoting flow of air current through the lid due to convection, so as to allow the heat to be dissipated from the glass heating layer 503 away from the upper face 111 and the frame 108 of the lid so that the lid is relatively cool and can be touched by the human hand, but the contact plate 113, which is in contact with the heating plate, remains hot enough to cook food, either by direct contact, or by radiation of heat.
Referring to Figure 7 herein, there is illustrated in cut away view, a part of the outer frame of the lid showing a vertically venting air passage 700 to vent air from the cooling cavity within the lid.

Also shown in Figure 7 is a slideable portion 701 of the frame, which may be resiliently biased with respect to the remainder of the frame so as to be moveable outwardly and inwardly along a direction of the plane of the glass face plate 113 so as to enable removal of the face plate from the frame for cleaning. The face plate may be retained into the frame by fitting between a retaining lip 702 on the moveable frame portion, and the underlying heated glass plate 503, thereby keeping the face plate 113 and underlying heated glass plate 503 in close thermal contact with each other.

Referring to Figure 8 herein, there is illustrated schematically in view from one side, one of the upright columns of the connecting arrangement 102. Each upright column comprises a pair of spaced apart upright members 800, 801 as previously described, connected by a semi-circular arched portion 803 at their upper ends. A slot aperture 804 is formed between the two upright columns. The rear projecting part 202 of the lid has an elongate cylindrical bar or rod 805 passed there through which extends into the slots of the two opposite the facing upright columns 800, 801. The bar can be slid upwards or downwards, always in a horizontal attitude up and down the slots. In the embodiment shown, the cylindrical arm or rod 805 is surrounded by a wheel or roller 809 which can slide or move up and down within the slot. The wheel or roller has on one end, a disk shaped flange of diameter wider than the width of the slot, to prevent the cylindrical rod or bar twisting away from the horizontal and to make sure that the cylindrical rod or bar remains substantially horizontal as it slides up and down the slot.

When positioned mid height in the slot, the horizontal rod and its rollers or pulleys may stay within the slot without sliding down to the bottom of the slot, due to the weight of the lid and by contact of the frame with an engaging surface 806 on the lid which lies at the rear of the lid and extends horizontally and
substantially parallel to the upright members. Lifting the lid to a position where
the rollers are mid way along the slots and then releasing the front of the lid
causes the bearing surfaces 806 of the lid to engage the outer surfaces 807 of
the upright columns and grip those surfaces through friction. The material of the
rear surface of the lid and the upright columns is selected so that there is enough
friction for the lid to grip the face of the column and prevent sliding of the lid down
the column, thereby keeping the lid thereby the force of gravity tending to push
down on the lower part of the engaging surface 806 at the rear of the lid.

In other embodiments, the upright outwardly facing surfaces of the columns
may comprise horizontal gradations or grooves 808, to provide extra gripping of
the rear of the lid. Similarly, the rear of the lid may be formed as a grooved
surface having horizontal grooves to engage with the corresponding horizontal
grooves on the outer faces of the upright columns.

The overall effect is that the lid can be lifted up the columns by keeping the
lid horizontal, with enough clearance between the rear surface 806 of the lid and
the outer facing surfaces of the columns to allow movement of the lid, and that at
any position up the column the lid may be released whereby the rear face of the
lid contacts and engages the outer facing surfaces of the upright columns to
retain the lid in a substantially horizontal position, without the rod or bar sliding
down the central groove 804.

In Figure 8 herein, the connecting arrangement is shown in the same
orientation as in Figure 4 herein with the grill held cantilevered above the lower
hot plate 107. There is also shown in dotted lines, how the lid is moved from the
first or second modes of operation to the third mode of operation, by flipping the
lid over to open out the grill fully. To fully open out the lid, the rod or bar is moved
to the top of the slot, and the lid is swung over the semi-circular arch shaped tops
of the columns, so that the lid can then travel up and down the slot to adopt the
third mode of operation.
In the third mode of operation, the rod or bar may be slid to the bottom of the slot, or, if gradations, grooves or the like are provided in the outer facing surfaces of the column, then a similar but mirror image position may be adopted for the second mode of operation, that is, the lid can be positioned at any height along the slots between the upper and lower extremities of the slots but with the lid on the opposite side of the connector means 102 to the base.

The glass face plate 111 of the lid is preferably removable from the frame for cleaning. By positioning a parallel flat glass plate adjacent the directly heated glass plate 503, this protects the heated glass plate from scratches due to cooking implements, and also facilitates easy cleaning of the lid, since the cooking plate 503 can be removed from the lid, and washed separately in a sink or dishwasher. The cooking plate 503 may be retained in the lid by clipping in, or by locking mechanism design, for example horizontally sliding clips designed as part of the frame, which clip over the cooking plate on either side, thereby retaining it to the frame as shown in Figure 7 herein.

Referring to Figure 9 herein, there is illustrated schematically in view from one side the grill of Figures 1 to 8 in an opened out configuration.

In the fully opened out configuration, the lid is opened out from the base similarly in the manner of opening out a ring binder type book or file. The hinged lid is inverted so that the contact face plate 113 forms a grill cooking surface onto which food items can be placed. A secondary hot plate cooking surface is formed by the transparent window alongside and adjacent to the primary griddle cooking surface formed by the cast metal hot plate 107.

As shown in Figure 9, in this case, when in the fully extended position, the rollers of the connector mechanism 102 are located at the lower end of their locating slots in the upright columns, and the flat surface of the rear most portion of the frame of the lid contacts the outer most upright portion of the columns to retain the lid in a substantially horizontal position.
In this orientation, food items may be placed on the glass face plate 113 for cooking.

When in the fully opened position, the glass face plate 113 lies on top of the heating plate 501. Underneath the heating plate, is the intermediate glass layer 501, and underneath the intermediate glass layer is the open air cavity 502. Heat which radiates downwards or is otherwise transmitted downwards towards the intermediate plate and which heats up the intermediate plate may be transferred out of the cavity by convection or through cooling air flow through the open air cavity 502 via the lateral frame vents.

The hot face plate 113 of the lid may be slightly recessed from the surrounding frame, so that when in the fully opened out position, the glass face plate is slightly sunken relative to the frame. This prevents any juices from the cooked food dripping from the side of the lid, but rather they are contained within the frame. Additionally, if a small amount of cooking oil is added to the face plate to assist in grilling or to fry items, then the cooking oil may be retained within an inner perimeter of the frame.

Preferably, the frame is manufactured from a heat resistant material, such as a combination of metal and/or plastics materials.

In a preferred embodiment, the dimensions of the outer frame 108 are selected so as to provide a maximum active cooking area, which overlays and lies parallel to the lower hot plate 107, in use. The frame of the lid may extend over hanging the hot plate when in the first or second modes of operation.

Referring to Figure 10 herein, there is illustrated schematically a second prototype combination griddle/grill device according to a second specific embodiment.

The second prototype device comprises a base portion 1000 having an electrically powered hob, optionally with a removable cast metal hot plate; a
hinged lid 1001, positioned on top of the hot plate and over the hot plate, so that food items can be inserted between the hot plate and the lid; a pivoting and sliding connection mechanism 1002 for connecting the lid to the base, and a handle 1003.

5

Similarly as in the first prototype, the lid comprises a set of glass plates 1004, so that a user can see through the lid, down to the hot plate underneath and can see the food cooking underneath the lid.

10

Similarly to the first embodiment, the lid comprises an outer frame surrounding a see-through window 1004. The see-through window 1004 comprises a first side, having a transparent glass or plastics sheet, and which is designed to be cool enough to touch, when the griddle/grill is in operation; parallel to and spaced apart from the first glass/plastics sheet an intermediate see-through or transparent sheet, there being a cavity or space between the outer first transparent sheet and the intermediate sheet, to allow for thermal insulation of the first outer sheet from the intermediate sheet; parallel to the intermediate sheet, a glass heating plate on which are formed a plurality of semi-conductor thin film heating elements, the glass heating sheet being spaced apart from the intermediate sheet to allow for thermal insulation between the two sheets; and on a second side of the lid and in contact with the heated glass sheet, a see-through glass facing sheet. In operation, when the glass heating plate is activated to warm up, heat is transmitted directly to the removable glass face plate, from which the heat radiates onto the food in a second mode of operation, or which contacts the food directly in the first and third modes of operation. The glass face plate is removable for cleaning in a dishwasher or sink. The glass heating plate and the intermediate sheet may form a sealed unit, and a space there between may be filled with for example an inert gas. The outer frame surrounding the window maintains the layers of see through material in fixed relationship relative to each other.
Electrical power to the heating element in the lid is supplied via electric conductors which may pass through the handle 1003 and enter the frame at positions where the handle contacts the frame.

The second prototype has three modes of operation as follows:

(i) In a first mode of operation, the face plate of the lid is in contact with the food on the underlying hot plate, so that both the upper and lower surfaces of the food are in contact with the heated surface and cooked at the same time.

(ii) In a second mode of operation, the glass face plate of the lid is positioned above the hot plate, with a gap there between so that the lid is above and spaced apart from the food being cooked. The underside of the food is in direct contact with the lower metal hot plate of the base, and the upper face of the food receives heat from radiation from the face plate of the lid which is placed immediately above it. Air can circulate over the top of the food between the food and the lid. In this mode, the lid heater may provide a grill or “browning” effect on the food.

(iii) In the third mode of operation, the multi-position lid is opened out so that both the hot plate at the base and the face plate of the lid provide separate griddle cooking surfaces positioned side by side.

The connecting portion 1002 comprises a pair of upwardly extending slots 1005, 1006 respectively formed in a pair of protrusions 1007, 1008 respectively, and located in the slots, are respective first and second engaging rods 1009, 1010, one attached to each side of the handle 1003. The handle is rigidly attached to the lid 1001, so that as the handle is raised and lowered, pivoting on an axis of rotation about the rods, the lid may be raised or lowered from the base.

The lid can be hinged from the base, with the rods at the lower extremities of the first and second slots 1005, 1006.
Additionally, the lid may be raised relative to the base by a translational movement of the lid vertically upwards, such that the lid remains substantially parallel to the base member in the second mode of operation. The vertical slots 1105, 1006 allow the lid to be positioned spaced apart from and parallel to the underlying griddle hot plate and be raised and lowered relative to the hot plate, so that food items of different thicknesses can be accommodated during the second mode of operation.

In a third mode of operation, the griddle/grill opens out fully, so that one griddle heating surface comprises the metal hot plate of the base, and another upwardly facing heating surface comprises the glass face plate of the lid.

As described herein with reference to the elements of the first embodiments, an outer frame of the lid may have vent holes to allow air to pass into the cavity between the outer glass plate and the heated inner glass plate, to allow cooling of the outer glass plate relative to the inner heated glass plate.

Referring to Figure 11 herein, there is illustrated schematically a third glass griddle/grill cooking device according to a third specific embodiment.

The third glass griddle/grill comprises a base portion 1100; a lid portion 1101; a hinge mechanism 1102 connecting the lid and the base; a hot plate 1103 on the base portion and a see-through heated window 1104.

The metal base hot plate 1103 is electrically heated in conventional manner by an electric heating element. The lid portion 1001 comprises a glass window 1104, through which it is possible to view food being cooked on the base hot plate 1103 when the lid is closed, as shown in Figure 11. The glass window 1104 comprises a transparent metal oxide thin film heating element, for example a doped tin oxide, such as fluorine tin oxide, antimony tin oxide, or indium tin oxide, which heats the glass window 1104 so that when the lid is closed and parallel to the base 1100 in a first mode of operate, as shown in Figure 11, food can be
heated both from conducted heat from the hot plate underneath, and from radiated heat from the heated glass window 1104 above.

The lid opens out relative to the base in similar manner to opening a book or a suitcase.

In a second mode of operation, the lid 1101 is opened out 180°, so that the lid and base lie side by side connected by the rotary hinge 1102. In this configuration, food can be placed both on the metal hot plate 1103 of the base, and on the upwardly facing heated glass surface of the heated window 1104.

In the embodiments shown, the heated window 1104 may comprise a multi-layer glass structure comprising an outer glass layer on top of the lid, which in use is relatively cool to the touch, the outer glass layer separated by an air gap or cavity from a heated glass plate, on which is formed the doped metal oxide heating element.

As shown in Figure 11, the sides of the cooking device may be left open, so that air can flow between the two sides of the cooking cavity when in use in the first mode.

Referring to Figure 12 herein, there is illustrated schematically a fourth prototype cooking device according to a fourth specific embodiment.

The fourth cooking device comprises a base 1200, a lid 1201; a hinge arrangement 1202 and a handle 1203.

The base 1200 comprises a flat grill having an electrically heated metal upper surface, on which food is cooked; and one or a plurality of heating controls 1204 for controlling the temperature of the lower grill.

The lid 1201 comprises a transparent glass window 1205, the transparent glass window comprising an upper, first transparent sheet, on a face of the lid which
does not face immediately opposite the lower grill; a lower, second transparent sheet which in use faces the lower heating grill; and an intermediate transparent glass layer positioned between the first outwardly facing glass layer and the second inwardly facing glass layer, there being a space between the intermediate layer and the second lower glass layer which provides a degree of thermal insulation between the second lower glass layer and the intermediate glass layer. There is also provided a gap between the intermediate layer and the first upper glass layer to provide further thermal isolation between the intermediate glass layer and the first upper glass layer.

The second, lower glass layer has a transparent semi-conductor thin film resistive element, which heats up on application of electrical current, so as to transfer heat directly to the lower, second plate.

Provided around a periphery of the lid are a plurality of vent apertures 1206, which enable air to pass into the cavity between the intermediate transparent glass layer and the first upper transparent glass layer to assist in cooling the upper glass layer, and / or into the lower gap between the lower glass layer and the intermediate layer to assist in cooling of the intermediate layer.

The hinge arrangement 1202 is capable of holding the lid in three separate positions relative to the base, such that in a first mode of operation as shown in Figure 12, the lid is above and immediately adjacent to the base, so that food placed on the grill is sandwiched between the lower metal grill plate and the second transparent heated glass plate in the lid. In this mode, both the lower grill surface and a heated surface of the lid may be in contact with the food, so the food is cooked by direct conduction of heat into the food.

Referring to Figure 13 herein, there is illustrated schematically the fourth embodiment cooking device in view from one side in a second mode of operation.
In the second mode of operation, the lid is held above and spaced apart from the base, so that food items placed on the lower grill surface are cooked by direct conduction of heat from the grill to the food, and are cooked from above by the heated glass plate by radiation of heat from the heated transparent glass plate.

The hinge arrangement 1202 is arranged to hold the lid in parallel spaced apart relationship from the base. The hinge arrangement comprises a pair of upright members 1300, 1301, spaced apart from each other one on each side of the base unit, each upright member having an elongate slot 1302, along a length of which a transverse cylindrical rod or bar can slide. The bar is locked into position in the slots by a resiliently biased locking arrangement 1303, which engages the slots in a direction transverse to the main length of the slot, and along a main direction of the rod or bar, so as to lock the lid in fixed spaced apart relationship above the base.

The three layer window structure having at least three transparent layers, with gaps between each layer may provide an acceptable temperature gradient between the directly heated layer which has the thin film heating elements formed on it, and the upper most transparent layer on the outside of the lid which is exposed to the user in use, in the first and second modes of operation. In use the heated glass layer having the electric heating elements may raise to a temperature of the region 100°C to 200°C depending on the type of food being cooked, with an optimum temperature for cooking being of the order 180°C for many food types, and the temperature of the outer surface layer on the other side of the lid may be of the order 100°C, giving a steady state maximum temperature difference of the order of 80°C to 100°C between the hottest and coolest transparent or translucent layers. When heating up to the selected temperature, the temperature of the heated plate may transiently overshoot the selected temperature, so that for a short duration, the electrically heated plate may reach temperatures of up to 240°C.
The function of the intermediate layer (third layer) is primarily to serve as an insulator layer between the upper (second) layer and the directly heated first layer, to reduce the temperature at the upper (second) layer to an acceptable touch temperature, which will not injure a person if a person inadvertently touches the third layer for a short time. However, the intermediate second layer also provides electrical insulation of the transparent/translucent thin film heating elements from the cavity or gap between the second and third layers.

In the prototypes, the overall thickness of the layered assembly of the lid is of the order of 20 mm to 35mm. The further apart the transparent layers are from each other, the greater the temperature difference between the hottest (first) layer and the coolest (second) layer, however increasing this distance also gives a thicker and bulkier lid. There is therefore a trade off to be made between overall lid thickness and lowering the touch temperature of outer layer (second layer) of the lid.

In the prototype embodiments, it has been found experimentally that the electrically heated glass layer heats up more quickly than the metal grill on the base, and so the power rating of the thin film heating elements should be selected to give a rate of heating of the glass layer which is similar to that of the lower metal grill, to avoid one side of the food cooking faster than the other side.

Referring to Figure 14 herein, there is illustrated schematically in view from above the fourth cooking device in a third mode of operation. In the third mode of operation, the device is fully opened out so that both the lower grill surface and the underside of the lid are both upwardly facing, allowing for two adjacent cooking surfaces to be used simultaneously. In the third mode of operation, the hinge arrangement is opened out to 180°, allowing the two heating surfaces to lie side by side. Both the lid and the metal grill are orientated substantially horizontally to be used as grill or griddle surfaces.

As shown in Figure 14, the lid may further comprise a protective transparent glass plate 1400, which is retained to the lid by a plurality of retaining means 1401 positioned around an aperture in a frame 1400 of the base which surrounds
the transparent window. The protective glass plate is in direct contact with the second lower heated transparent plate, so that heat from the heated plate transfers heat directly by conduction to the protective plate. The protective plate is removable, and can be placed in a dishwasher or washing up bowl for cleaning and then replaced in the recess in the frame in contact with the transparent glass plate. This avoids the transparent heated glass plate having to be cleaned directly from food or grease, which may accumulate on the protective glass plate instead of on the heated glass plate.

Additionally shown in Figure 14 are a plurality of thermal sensors 1402 which are placed near the edge of the heated glass plate and immediately adjacent the surrounding frame 1400. The temperature sensors are positioned around the edge of the plate, since the temperature at the edge of the plate tends in use to be, the highest temperature part of the plate. In use, food is placed adjacent to or on the central portion of the plate, and therefore heat is absorbed from the centre of the plate at a higher rate compared to the region around the edge of the plate. Hence, the edges of the glass plate tend to have the highest temperature and are therefore the optimum position for placing the temperature sensors. The function of the temperature sensors is to provide a signal to electric or electronic controls to cut the power to the heated plate in the event of overheating of the glass plate, as a safety feature.

In some variants the temperature of the griddle plate on the base and the temperature of the food contacting heated plate on the lid in the opened out mode may be set to be approximately equal. However, in other variants the temperature of the lid cooking surface and the base cooking surface may be independently variable, so that in the third mode of operation the user is provided with two adjacent cooking surfaces side by side which can be set to different temperatures to each other.

Referring to Figure 15 herein, there is illustrated schematically in view form above the fourth cooking device in transition between the first or second modes
or operation, and the third mode of operation. The lid can be swung upwardly relative to the base about the hinge arrangement 1202. In this embodiment, the lid itself is hinged relative to the handle, so that the lid can adopt a plurality of orientations relative to the handle and relative to the base.

Referring to Figure 16 herein, there is illustrated schematically in view from the rear, the fourth cooking device. Shown in Figure 16 is a detail of the hinge arrangement, and also details of a plurality of apertures 1600 provided in the frame of the lid, which allow passage of air into a cavity between the first upwardly facing transparent plate, and the intermediate glass plate thereby allowing for a cooling airflow in the cavity to remove heat from the intermediate plate and the first outwardly facing upper glass plate. The air vents may also connect with the cavity between the lower, second glass plate and the intermediate plate layer, so allow for additional thermal isolation between the lower heated glass plate and the intermediate layer.

However, in a modification to the fourth embodiment, the cavity between the lower, second glass plate and the intermediate layer may be hermetically sealed so provide electrical and physical isolation for the heating elements which are formed directly on the surface of the lower glass plate.

The hinge arrangement operates by the horizontal cylindrical rod sliding horizontally in a direction transverse to a main length of the upright slots, to a position where a reduced diameter section 1601 of the rod engages the slot, so that the reduced diameter section of the rod can pass through a narrowed section of the slot 1602 formed by a protrusion in the side wall of the slot at an upper end of the slot. Once the rod has been raised through the narrowed pinched section of the slot, the rod is moved in a horizontal direction so that the relatively larger diameter of the main rod length occupies an upper position of the slot and is prevented from dropping down the slot by the protrusion in the slot. Since the cylindrical rod is resiliently biased, there is no risk of the cylindrical rod slipping through the pinched narrowed section of the slot, without positive operation by a user.
Referring to Figure 17 herein, there is illustrated schematically in view from above a fifth prototype cooking device according to a fifth specific embodiment.

The fifth cooking device comprises a base portion 1700 and a lid portion 1701 connected by a hinge arrangement 1702.

The base portion has an electrically heated metal grill plate 1703 comprising a plurality of parallel horizontal ridges, interleaved with a plurality of inclined troughs, which incline downwardly towards the rear of the device, so that grease, fat or cooking fluids can drain from the grill to a collection tray at the rear of the device.

The lid 1701 comprises a transparent window having a transparent thin film heating element, for example a metal oxide semi-conductor heating element. The lid 1701 comprises an outer frame 1704 surrounding an aperture, into which a transparent window is fitted. The transparent window comprises an upper transparent glass or plastics sheet; an intermediate transparent glass sheet separated and spaced apart from the upper transparent glass sheet separated and spaced apart from the upper transparent glass sheet; a lower electrically heated glass sheet separated from the intermediate sheet with a cavity there between; and a removable glass face plate 1705. The removal glass face plate 1705 may come in contact with the food, and is therefore removable for cleaning. The glass face plate is retained to the frame 1704 by a hinged retaining portion 1706. The frame has a protruding pin 1707 which engages with a resiliently biased push button lock 1708 in the frame, when in the closed position, thereby sandwiching the edge of the glass face plate 1705 between the retaining member 1706 and the frame portion 1704.

In other details, the fifth embodiment cooking device has similar features to the fourth embodiment, including the hinge arrangement 1702 which operates in a similar fashion and permits three separate modes of orientation of the lid.
relative to the base, as herein before described with reference to the fourth embodiment.

Referring to Figure 18 herein, there is shown in perspective view from above, the removable face plate 1705 of the fifth embodiment cooking device. The face plate is formed of molded glass, having a central recessed portion and a peripheral rim portion 1801 surrounding the central portion.

In use, in the third mode of operation where the cooking device is fully opened out, the face plate provides a flat heating surface onto which food is placed. At the rear of the face plate there is a drainage channel 1802 arranged to allow cooking fluids or juices to drain from the face plate to a position in the centre of the device in the opened out position (corresponding to the rear of the device in the first or second modes of operation).

The face plate is removable from the lid of the device and can be placed in a dishwasher, or can be washed manually in a washing up bowl.

Referring to figure 19 herein, there is illustrated schematically an alternative face plate 1900, having an undulating, or ribbed glass surface on one side, which is intended in use to contact the food, and on a reverse side a flat glass surface which is intended to abut closely the heated first glass plate.

The food facing surface is undulated to reduce the likelihood of food sticking the surface during use. This may help to prevent tearing of the food when the lid is opened from the base to remove food cooked in the first mode of operation, and to prevent food sticking to the plate in the opened out third mode of operation. Various patterns of undulation may be used to provide a surface which gives optimum least amount of sticking.

Referring to figure 20 herein, there is illustrated schematically a prototype of the lid of the above embodiments, showing an arrangement of transparent/translucent plates, used to investigate the optimum plate thickness and spacing
between the plates. The plate thicknesses and the spacing between the transparent plates may be as follows:

Gap A between the electrically heated first layer 2000 and the outermost transparent / translucent: 20mm to 35 mm and preferably around 28mm.

Gap B between the intermediate layer and the outermost transparent/ translucent layer: 10mm to 20mm and preferably around 15mm.

Gap C between the intermediate layer and the directly electrically heated plate 2000; 5mm to 15 mm and preferably around 8mm.

Thickness of directly electrically heated glass layer 2000; 3mm to 8 mm and preferably around 5mm.

Thickness of intermediate transparent/ translucent layer 2002: 3mm to 8mm and preferably around 5mm.

Thickness of the outer layer 2001 furthest away from the directly electrically heated layer: 3mm to 8mm and preferably around 5mm.

Thickness of the facing plate (contact plate) 2004 which contacts the directly electrically heated glass layer: 3mm to 8mm and preferably around 5mm.

Whilst a four layer structure is shown in figure 20, including the contact plate which contacts the food, it will be appreciated by the skilled person that the lid may be provided with or without the optional contact plate. Further, in some embodiments, the three layer lid structure may be reduced to a two layer structure comprising an electrically directly heated plate and an outer plate on the other side of the lid, the two plates separated by a gap.

It will be appreciated that the outermost layer need not be strictly planar, but rather can be formed in slight convex or concave shape to fit the outer profile of
the lid. Similarly, the outer layer is not restricted to a glass material, but may be formed from a heat resistant transparent plastics material in some embodiments.

In yet a further embodiment, the directly electrically heated plate may contact the food itself, and may have undulations or ribs formed in the glass at the surface which contacts the food.

In the above described embodiments, various features are shown as specific to each separate embodiment. However it will be understood by the skilled person that specific features described with reference to one embodiment may be transportable or transferable to other embodiments described herein, and individual features such as the air vents in a frame of a cooking device may be optional features which can be either present or absent in any embodiment. Similarly, features such as the temperature sensors in the fourth embodiment may also be provided in the other embodiments.

Further, in some embodiments a drip tray at the front of the cooking devices is shown. In other embodiments, a drip tray at the rear of the device is shown, which is positioned such that when the device is opened out, the drip tray is centrally placed between the base and the lid.

Whilst in the above embodiments, a three glass layer lid structure is described, the embodiments are not to be viewed by the skilled person as being restricted to a three layer structure. In other embodiments, provided an acceptable touch temperature can be achieved on the outer layer, a two glass layer structure may be used, having a gap between two transparent layers. In other embodiments, a the addition of a further parallel layer may be incorporated to yet further improve the thermal insulation between the directly heated glass layer and the outermost lid surface which present to the user.

A further design objective is to reduce the bulk and weight of the frame around the upper layers to a minimum, and ideally to dispense with the frame member altogether. In variations of the embodiments herein, the frame may be
reduced in size and weight, and need not necessarily extend around the whole perimeter of the see through layers.

Additionally the external handle around the lid may be incorporated to be connected directly to the frame or one of the transparent layers in a production version of the cooking apparatus. Similarly, the outer most transparent layer on the opposite side of the lid to the heated food cooking surface of the lid may extend all the way across the lid in a production version.
Claims

1. An electrically operated cooking apparatus comprising:

   a base having a first heating surface upon which food may be placed; and

   a lid having a substantially see through second heating surface,

   said lid comprising a first substantially transparent or translucent layer

   having a heating element for heating said layer; and

   a second substantially transparent or translucent layer spaced apart from

   said first layer.

2. The cooking device as claimed in claim 1, further comprising a third

   substantially transparent or translucent layer spaced apart from said second

   layer.

3. The cooking apparatus as claimed in claim 2, wherein said third

   substantially transparent / translucent layer is positioned between said first and

   second layers.

4. The cooking apparatus as claimed in claim 1, wherein the

   substantially see through second heating surface can be used as a griddle or as

   a grill.

5. The cooking apparatus as claimed in any one of the preceding

   claims, wherein said second heating surface is moveable relative to said first

   heating surface, such that said first and second heating surfaces can be opened

   and closed relative to each other.
6. The cooking apparatus as claimed in any one of the preceding claims, comprising a connection means for connecting the lid to the base such that said lid and said base are moveable relative to each other.

7. The cooking apparatus as claimed in any one of the preceding claims, wherein said lid is connected to said base by a connection means which permits movement of the respective heating surfaces of the base and the lid in a rotational movement relative to each other.

8. The cooking apparatus as claimed in any one of the preceding claims, wherein said base is connected to said lid by a connection means which permits movement of the respective heating surfaces of the base and the lid in a translational movement relative to each other.

9. The cooking apparatus as claimed in claim 5, 6 or 7, wherein said connection means comprises:

   at least one member having an elongate slot aperture; and

   at least one elongate member which locates in said slot and is capable of moving along said slot.

10. The cooking apparatus as claimed in any one of claims 5 to 8, wherein said connection means comprises:

   a pair of spaced apart upright mounting members, each having a corresponding respective elongate slot;

   one or more elongate members, which pass through said slots; and

   a pair of bearing surfaces arranged to cooperate with an outer surface of said pair of upright mountings, to allow said lid to be held by said mounting members at a range of positions along a length of said mounting members.
11. The cooking apparatus as claimed in any one of claims 9, 10 or 11, wherein said connection means is operable to connect said lid to said base in a cantilevered manner wherein said lid is positioned substantially parallel to and spaced apart from said base, there being a cooking space there between.

12. The cooking apparatus as claimed in any one of claims 9 to 12, wherein said connection means connects said lid to said base such that said lid may move relative to said base:

   in a translational movement in which said lid and said base remain substantially parallel to each other; and

   in a rotational movement in which a main plane of said lid rotates relative to a main plane of said base.

13. The cooking apparatus as claimed in any one of the preceding claims, capable of adopting

   a mode of operation in which said lid lies above and opposite said base, with said lid and said base in contact with a food item, so as to griddle said food item from upper and lower sides.

14. The cooking apparatus as claimed in any one of the preceding claims, capable of adopting a mode of operation in which said base and said lid lay side by side, and wherein a food item placed on said base is heated by conduction of heat from underneath said food, and wherein a food item placed on said see-through heating surface of said lid is heated by conduction of heat from underneath said food item.

15. The cooking apparatus as claimed in any one of the preceding claims, capable of adopting a mode of operation in which said lid lies above and space apart from said base, such that there is a gap between a food item placed
on said base, and said see-through heating surface, such that an underside of said food is heated by conducted heat from said base, and an upper side of said food is heated by radiation of heat from said see-through heating surface.

16. The cooking apparatus as claimed in any one of the preceding claims, wherein said second heating surface is located in a peripheral outer frame member.

17. The cooking apparatus as claimed in claim 14, wherein said frame member holds said layers in fixed spaced apart relationship to each other.

18. The cooking apparatus as claimed in any one of the preceding claims, wherein:

said upper heating surface is located within a peripheral frame; and

said upper heating surface is substantially transparent, and/or see-through;

said second transparent layer, lays parallel to said first substantially transparent or translucent first heating layer, there being provided a thermally isolating cavity between said second layer and said first layer.

19. The cooking apparatus as claimed in claim 16, further comprising a thermally isolating gap between said second layer and said third layer.

20. The cooking apparatus as claimed in claim 17, further comprising a plurality of air vents in said frame, to allow air to pass into and out of said gap.

21. The cooking apparatus as claimed in claim 18, wherein said plurality of air vents are positioned opposite each other and on first and second sides of said frame.
22. The cooking apparatus as claimed in claim any one of the preceding claims, further comprising a removable substantially transparent glass plate configured to lie adjacent to said electrically heated transparent/see-through first layer.

23. The cooking apparatus as claimed in claim 21, wherein said removable glass plate is robust enough to be cleanable in a dishwasher, or washing up bowl.

24. The cooking apparatus as claimed in claim 21 or 22, wherein a said transparent or translucent plate or layer which can in use directly contact the food comprises an undulating or ribbed surface on a side of said plate or layer which in use faces said food to be cooked.

25. The cooking apparatus as claimed in any one of claims 22 to 24, wherein a thickness of the removable plate is in the range 3mm to 8mm.

26. The cooking apparatus as claimed in any one of claims claim 21 to 23, wherein said lid comprises a hand operable retaining means that can be operated to retain or release said removable transparent glass plate from said lid.

27. The cooking apparatus as claimed in any one of the preceding claims, wherein said first and second heating surfaces are independently electrically operable.

28. The cooking apparatus as claimed in any one of the preceding clams, comprising a handle attached to said lid, for raising or lowering said lid relative to said base and/or for swinging said lid away from and towards said base.
29. The cooking apparatus as claimed in any one of the preceding claims, wherein said base comprises a pair of handles on either side of said base, for lifting said cooking apparatus.

30. The cooking apparatus as claimed in any one of the preceding claims, wherein in use, said first heating surface is arranged to be tilted relative to the horizontal, to allow cooking fluids to drain from said first heating surface.

31. The cooking apparatus as claimed in any one of the preceding claims, comprising a drip tray positioned at a front edge of said base for collecting fluid draining from said first heating surface.

32. The cooking apparatus as claimed in any one of claims 1 to 29, comprising a drip tray positioned at a rear edge of said base for collecting fluid draining from said first heating surface, and/ or for collecting fluid draining from said second heating surface.

33. The cooking apparatus as claimed in any one of the preceding claims, wherein said substantially see-through first layer comprises a thin film semi-conducting heating element.

34. The cooking apparatus as claimed in claim 32, wherein said thin film semi-conductor heating element is patterned so as to heat different areas of said see-through first layer surfaces to different temperatures, for providing a seared effect on cooked food.

35. The cooking apparatus as claimed in any one of the preceding claims, comprising one or more temperature sensors positioned at a peripheral region of said first layer for measuring a temperature of said first layer.

36. The cooking apparatus as claimed in any one of the preceding claims, wherein a distance between the first substantially transparent or
translucent layer and an outermost said substantially transparent or translucent layer on an opposite side of the lid is in the range 20 mm to 35 mm.

37. The cooking apparatus as claimed in any one of the preceding claims, wherein a gap between the first layer and the second layer is in the range 20 mm to 35 mm.

38. The cooking apparatus according to any preceding claim as appendant to claim 3, wherein a gap between the intermediate layer and the outermost transparent/ translucent layer is in the range 10 mm to 20 mm.

39. The cooking apparatus as claimed in any one of the preceding claims as appendant to claim 3, wherein a gap between the intermediate (third) layer and the first layer is in the range 5 mm to 15 mm.

40. The cooking apparatus as claimed in any one of the preceding claims, wherein a thickness of the first layer is in the range 3mm to 8 mm.

41. The cooking apparatus as claimed in any one of the preceding claims wherein a thickness of the second layer is in the range 3mm to 8mm.

42. The cooking apparatus as claimed in any one of the preceding claims as appendant to claim 2, wherein a thickness of the third layer is in the range 3mm to 8mm.
Amendments to the claims have been filed as follows:

Claims

1. An electrically operated cooking apparatus comprising:

   a base having a first heating surface upon which food may be placed; and

   a lid having a substantially see through second heating surface,

   said lid comprising:

   a first substantially transparent or translucent layer having a heating
   element for heating said layer;

   a second substantially transparent or translucent layer spaced apart from
   said first layer; and

   a third substantially transparent or translucent layer spaced apart from said
   second layer;

   wherein said second substantially transparent or translucent layer is
   positioned between said first and third layers.

2. The cooking apparatus as claimed in claim 1, wherein the
   substantially see through second heating surface can be used as a griddle or as
   a grill.

3. The cooking apparatus as claimed in any one of the preceding
   claims, wherein said second heating surface is moveable relative to said first
   heating surface, such that said first and second heating surfaces can be opened
   and closed relative to each other.
4. The cooking apparatus as claimed in any one of the preceding claims, comprising a connection means for connecting the lid to the base such that said lid and said base are moveable relative to each other.

5. The cooking apparatus as claimed in any one of the preceding claims, wherein said lid is connected to said base by a connection means which permits movement of the respective heating surfaces of the base and the lid in a rotational movement relative to each other.

6. The cooking apparatus as claimed in any one of the preceding claims, wherein said base is connected to said lid by a connection means which permits movement of the respective heating surfaces of the base and the lid in a translational movement relative to each other.

7. The cooking apparatus as claimed in claim 4, 5 or 6, wherein said connection means comprises:

   at least one member having an elongate slot aperture; and

   at least one elongate member which locates in said slot and is capable of moving along said slot.

8. The cooking apparatus as claimed in any one of claims 4 to 7, wherein said connection means comprises:

   a pair of spaced apart upright mounting members, each having a corresponding respective elongate slot;

   one or more elongate members, which pass through said slots; and
a pair of bearing surfaces arranged to cooperate with an outer surface of
said pair of upright mountings, to allow said lid to be held by said mounting
members at a range of positions along a length of said mounting members.

9. The cooking apparatus as claimed in any one of claims 4 to 8,
wherein said connection means is operable to connect said lid to said base in a
cantilevered manner wherein said lid is positioned substantially parallel to and
spaced apart from said base, there being a cooking space there between.

10. The cooking apparatus as claimed in any one of claims 9 to 12,
wherein said connection means connects said lid to said base such that said lid
may move relative to said base:

in a translational movement in which said lid and said base remain
substantially parallel to each other; and

in a rotational movement in which a main plane of said lid rotates relative to
a main plane of said base.

11. The cooking apparatus as claimed in any one of the preceding
claims, capable of adopting a mode of operation in which said lid lies above and
opposite said base, with said lid and said base in contact with a food item, so as
to griddle said food item from upper and lower sides.

12. The cooking apparatus as claimed in any one of the preceding
claims, capable of adopting a mode of operation in which said base and said lid
lay side by side, and wherein a food item placed on said base is heated by
conduction of heat from underneath said food, and wherein a food item placed on
said see-through heating surface of said lid is heated by conduction of heat from
underneath said food item.
13. The cooking apparatus as claimed in any one of the preceding claims, capable of adopting a mode of operation in which said lid lies above and spaced apart from said base, such that there is a gap between a food item placed on said base, and said second see-through heating surface, such that an underside of said food is heated by conducted heat from said base, and an upper side of said food is heated by radiation of heat from said second see-through heating surface.

14. The cooking apparatus as claimed in any one of the preceding claims, wherein said second heating surface is located in a peripheral outer frame member.

15. The cooking apparatus as claimed in claim 14, wherein said frame member holds said layers in fixed spaced apart relationship to each other.

16. The cooking apparatus as claimed in claim 15, comprising a thermally isolating gap between said second layer and said first layer.

17. The cooking apparatus as claimed in any claim 15 or 16, further comprising a thermally isolating gap between said second layer and said third layer.

18. The cooking apparatus as claimed in any one of claims 14 to 17, further comprising a plurality of air vents in said frame, to allow air to pass between said transparent or translucent layers.

19. The cooking apparatus as claimed in claim 18, wherein said plurality of air vents are positioned opposite each other and on first and second sides of said frame.
20. The cooking apparatus as claimed in any one of the preceding claims, further comprising a removable substantially transparent glass plate configured to lie adjacent to said electrically heated transparent or translucent first layer.

21. The cooking apparatus as claimed in claim 20, wherein said removable glass plate is robust enough to be cleanable in a dishwasher, or washing up bowl.

22. The cooking apparatus as claimed in claim 20 or 21, wherein a said transparent or translucent plate or layer which can in use directly contact the food comprises an undulating or ribbed surface on a side of said plate or layer which in use faces said food to be cooked.

23. The cooking apparatus as claimed in any one of claims 20 to 22, wherein a thickness of the removable plate is in the range 3mm to 8mm.

24. The cooking apparatus as claimed in any one of claims 20 to 23, wherein said lid comprises a hand operable retaining means that can be operated to retain or release said removable transparent glass plate from said lid.

25. The cooking apparatus as claimed in any one of the preceding claims, wherein said first and second heating surfaces are independently electrically operable.

26. The cooking apparatus as claimed in any one of the preceding claims, comprising a handle attached to said lid, for raising or lowering said lid relative to said base and/or for swinging said lid away from and towards said base.
27. The cooking apparatus as claimed in any one of the preceding claims, wherein said base comprises a pair of handles on either side of said base, for lifting said cooking apparatus.

28. The cooking apparatus as claimed in any one of the preceding claims, wherein in use, said first heating surface is arranged to be tilted relative to the horizontal, to allow cooking fluids to drain from said first heating surface.

29. The cooking apparatus as claimed in any one of the preceding claims, comprising a drip tray positioned at a front edge of said base for collecting fluid draining from said first heating surface.

30. The cooking apparatus as claimed in any one of the preceding claims, comprising a drip tray positioned at a rear edge of said base for collecting fluid draining from said first heating surface, and/or for collecting fluid draining from said second heating surface.

31. The cooking apparatus as claimed in any one of the preceding claims, wherein said first substantially transparent or translucent layer comprises a thin film semi-conducting heating element.

32. The cooking apparatus as claimed in claim 31, wherein said thin film semi-conductor heating element is patterned so as to heat different areas of said first layer surfaces to different temperatures, for providing a seared effect on cooked food.

33. The cooking apparatus as claimed in any one of the preceding claims, comprising one or more temperature sensors positioned at a peripheral region of said first substantially transparent or translucent layer for measuring a temperature of said first layer.
34. The cooking apparatus as claimed in any one of the preceding claims, wherein a distance between the first substantially transparent or translucent layer and said third substantially transparent or translucent layer on an opposite side of the lid is in the range 20 mm to 35 mm.

35. The cooking apparatus according to any one of the preceding claims, wherein a gap between said second substantially transparent or translucent layer and said third substantially transparent or translucent layer is in the range 10 mm to 20 mm.

36. The cooking apparatus as claimed in any one of the preceding claims, wherein a gap between the second substantially transparent or translucent layer and the first substantially transparent or translucent layer is in the range 5 mm to 15 mm.

37. The cooking apparatus as claimed in any one of the preceding claims, wherein a thickness of the first substantially transparent or translucent layer is in the range 3mm to 8 mm.

38. The cooking apparatus as claimed in any one of the preceding claims wherein a thickness of the third substantially transparent or translucent layer is in the range 3mm to 8mm.

39. The cooking apparatus as claimed in any one of the preceding claims, wherein a thickness of the second substantially transparent of translucent layer is in the range 3mm to 8mm.
**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant to claims</th>
<th>Identity of document and passage or figure of particular relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>X</strong></td>
<td>1, 4 - 19, 27 - 32 &amp; 35 - 41</td>
<td>FR 2783689 A1 (SEB SA) See whole document, especially Fig 1 and abstract</td>
</tr>
<tr>
<td><strong>X</strong></td>
<td>1, 4 - 15, 27 - 32 &amp; 35 - 41</td>
<td>EP 0487257 A1 (BREVILLE) See whole document, especially Fig 2</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>-</td>
<td>AU3169684 A (BREVILLE)</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>-</td>
<td>GB 2470292 A (SAGENTIA LTD)</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>-</td>
<td>US 2003/0075052 A1 (SAUNDERS et al)</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>-</td>
<td>US 6016741 A (TSAI et al)</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>-</td>
<td>US 6170389 B1 (BRADY)</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>-</td>
<td>US 2007/0277678 A1 (MANGANO)</td>
</tr>
</tbody>
</table>

**Categories:**

<table>
<thead>
<tr>
<th>X</th>
<th>Document indicating lack of novelty or inventive step</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Document indicating lack of inventive step if combined with one or more other documents of same category.</td>
</tr>
<tr>
<td>&amp;</td>
<td>Member of the same patent family</td>
</tr>
<tr>
<td>A</td>
<td>Document indicating technological background and/or state of the art.</td>
</tr>
<tr>
<td>P</td>
<td>Document published on or after the declared priority date but before the filing date of this invention.</td>
</tr>
<tr>
<td>E</td>
<td>Patent document published on or after, but with priority date earlier than, the filing date of this application.</td>
</tr>
</tbody>
</table>

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :
Worldwide search of patent documents classified in the following areas of the IPC

**A47J**

The following online and other databases have been used in the preparation of this search report

**Online: WPI, EPODOC**

**International Classification:**

<table>
<thead>
<tr>
<th>Subclass</th>
<th>Subgroup</th>
<th>Valid From</th>
</tr>
</thead>
<tbody>
<tr>
<td>A47J</td>
<td>0037/06</td>
<td>01/01/2006</td>
</tr>
<tr>
<td>A47J</td>
<td>0027/00</td>
<td>01/01/2006</td>
</tr>
<tr>
<td>A47J</td>
<td>0036/02</td>
<td>01/01/2006</td>
</tr>
<tr>
<td>A47J</td>
<td>0036/06</td>
<td>01/01/2006</td>
</tr>
</tbody>
</table>