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(54) Title: PREBUTTERED BREAD PRODUCT (57) Abstract A method of providing a marketable pack of slices, or part slices, of bread having at least one surface of each slice impregnated with an impregnating material such as butter. The method involves serial machine presentation to an impregnating zone and temperature maintenance above 20 °C to enable impregnation into the bread surface with subsequent assembly of the impregnated slices, or part slices, into the marketable form. Related apparatus and the product of the method are also claimed.		

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"PREBUTTERED BREAD PRODUCT"**TECHNICAL FIELD**

The present invention relates to a method for coating sliced bread with a butter, butter type product or any coating which is applied in liquid form then solidified and
5 includes flavoured versions thereof. The invention also comprises the product of such a method.

BACKGROUND ART

Slices and/or other pieces of bread are frequently eaten with a layer of butter, margarine or other fat containing coating applied thereto.

10 The present invention recognises advantages that can flow from the marketing of prebuttered bread pieces and relates to methods of providing such a marketable product.

DISCLOSURE OF INVENTION

In one aspect the present invention consists in a method of producing a bread product (preferably suitable for vertical toasting) comprising:

15 serially machine presenting slices or part slices of bread cut from a loaf or loaves of bread to an impregnation station or zone (hereafter "zone"); and

serially machine impregnating at said zone at least part of at least one surface of each slice or part slice presented to said zone with an impregnating material (preferably having a water content of less than about 16%^{w/w}) and while said impregnating material
20 is in a liquid or substantially liquid state as a result of being at an elevated temperature, said material being selected from one or more of the group consisting of:

- (i) butter;
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- 25 (iii) a blend of (i) with any other ingredient(s); and
- (iv) a blend of (ii) with any other ingredient(s).

Preferably said impregnating material is a high fat material with its fat matrix having a water content of less than about 16%^{w/w}.

In another preferment said impregnating material is of less than 80% by weight fat
30 and preferably has a water content of less than about 25%.

Preferably the impregnating material is impregnated in an amount within the range from 4% to 35% (preferably 15%) by weight with respect to the weight of the bread.

Preferably the surface or surfaces of each slice or part slice to be impregnated is

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preheated if necessary to be over 13°F immediately prior to and during the impregnation.

Preferably said heating is radiant heating to 13°C or above.

Preferably said elevated temperature of said impregnating material is in the range from 20°C to 99°C.

5 Preferably said preheating of said surface is to a temperature within the range of from 16°C to 205°C and said elevated temperature of said impregnating material is in the range of from 23°C to 43°C.

Preferably said impregnating is by spraying.

Preferably impregnation is sequentially to each side of a substantially parallel cut
10 slice of bread, each such impregnation having been assisted at least in part by gravity.

Preferably prior to the impregnating step the surface(s) of the bread to be impregnated is substantially free of loose crumbs.

Preferably the serially machine impregnated surfaces are rolled, vibrated or brushed or pass over a chamber containing a partial vacuum as part of and/or at the conclusion
15 of the impregnating step.

Preferably said impregnating step includes first providing the impregnating material at an elevated temperature on to the surface(s) and the maintaining of the impregnating material as it moves at least in part under gravity etc into the bread while the impregnating material is at an elevated temperature at which it remains in a liquid or
20 substantially liquid state.

Preferably said product is cooled or allowed to cool to take said impregnating material from said liquid or substantially liquid state to a state of being at least partially hardened.

Preferably a conveyor presents slices or part slices of bread cut from a loaf or
25 loaves of bread to a spray station or zone where the impregnating material is sprayed down on to the exposed surface(s) of each slice, each slice having the surface to be impregnated at a temperature over 13°C and being maintained at that temperature or higher thereafter such that the impregnating material is applied at such temperature that when applied to the bread remains sufficiently liquid to achieve a soaking impregnation
30 into the bread prior to the impregnating material/bread being cooled or allowed to cool.

Preferably a flavouring agent is added to the bread prior to, simultaneously with or subsequent to the serial impregnation of each slice or part slice of bread.

As used in here reference to the impregnating material having its "fat matrix" having

a water content is reference to that material which is butter alone or a substitute thereof (whether strictly speaking an oil or fat) but not counting any flavour enhancing inclusions therein. For example should garlic pieces be included in the fat matrix it would ordinarily raise the over all water content. This additional water is to be ignored for the purpose
5 of determining whether or not there is compliance with the requirement that the "fat matrix" have a water content of less than about 16%^{w/w}.

In another aspect the invention consists in a method of providing a marketable pack of slices or part slices of bread having at least one surface of each slice impregnated with an impregnating material selected from

- 10 (i) butter;
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- (iii) a blend of (i) with any other ingredient(s); and
- (iv) a blend of (ii) with any other ingredient(s),
- 15 **said method comprising:**
 - (a) cutting slices or part slices of bread from a loaf or loaves of bread,
 - (b) serially machine presenting such slices or part slices to an impregnation station or zone (hereafter "zone") with a cut surface uppermost that is substantially clear of loose crumbs (and which preferably is at a temperature above 13°C),
 - 20 (c) serially machine spraying, cascading, brushing or rolling onto at least part of each such surface of a slice or part slice with said impregnating material (preferably when such material has a water content of less than about 16%^{w/w}) and said material is at an elevated temperature at which it is a liquid or is substantially liquid,
 - (d) maintaining the impregnating material provided there onto at a temperature
25 or temperatures above 20°C with said material sufficiently liquid to soak into the surface,
 - (e) thereafter allowing or causing the cooling of said surface/material to set the same in and on the bread,
 - (f) optionally inverting each slice or part slice and repeating steps (d) and (e),
 - (g) forming a stack or a set (i.e two or more) of slices or part slices from steps
30 (e) and/or (f), the stack not necessarily being vertical, e.g. optionally reconstituting a form of loaf or part thereof from which said slices have been cut (optionally with separation film/sheet material between slices, or, the set preferably being of at least two,), and
 - (h) thereafter storing, supplying or providing for marketing the marketable pack

substantially in that form with or without the packaging thereof.

Preferably said impregnating material during step (c) is a high fat material (preferably greater than about 80%^{w/w}) with its fat matrix having a water content less than about 16%^{w/w}.

- 5 Preferably said impregnating material has a fat content of less than 80% by weight and preferably the fat matrix has a water content of less than about 25%^{w/w}.

Preferably said slices or part slices are impregnated from one side only.

Preferably said slices or part slices are impregnated on both sides.

Preferably said stack of slices or part slices is packaged subsequent to step (g).

- 10 Preferably step (g) includes the provision of separation film/sheet material between slices.

Preferably step (c) is conducted after and/or during a heating of the surface of each slice or part slice and said impregnating material is at a temperature greater than the melting point of butter but less than about 100°C.

- 15 Preferably step (c) is performed by spraying down onto horizontally presented slices or part slices.

Preferably prior to step (c) the cut surface uppermost of each slice or part slice has been either brushed, vacuumed or vibrated to clear loose crumbs therefrom.

- 20 In a further aspect the invention comprises a bread product produced by a method as previously defined.

In another aspect the invention consists in a marketable pack of slices or part slices of bread produced by a method in accordance with the invention.

In a further aspect the invention consists in apparatus for performing said method comprising:

- 25 means for serially presenting slices or part slices of bread cut from a loaf or loaves of bread;

- means for impregnating at least part of at least one surface of each slice or part slice with an impregnating material, said impregnating material being in a liquid or substantially liquid state as a result of being at an elevated temperature, said material
30 being selected from one or more of the group consisting of;

- i) butter;
- ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);

iii) a blend of i) with any other ingredient(s); and

iv) a blend of ii) with any other ingredient(s).

Preferably said impregnating material is a high fat material (preferably greater than about 80%^{w/w}) with its fat matrix having a water content of less than about 16%^{w/w}.

5 Preferably said impregnating material has a fat content of less than 80% by weight and preferably its fat matrix has a water content of less than about 25%^{w/w}.

Preferably the impregnating material is impregnated in an amount within the range from 4% to 35% by weight with respect to the weight of the bread.

10 Preferably the amount of impregnating material is about 15% by weight with respect to the weight of the bread.

Preferably there is provided means for elevating or maintaining temperature of impregnating material.

Preferably there is provided means for the addition of flavouring agents to the impregnating material.

15 Preferably there is provided means to decrumble the slice or part slice simultaneously with or previous to the serial heating of each slice or part slice.

Preferably there is provided means for serially preheating the surface or surfaces of each slice or part slice to be impregnated if necessary preferably to be over 13°C immediately prior to and during impregnation.

20 Preferably said heating means is a radiant heater.

Preferably said elevated temperature of said impregnating material is in the range from 20°C to 99°C.

25 Preferably said preheating of said surface is to a temperature within the range from 16°C to 205°C and said elevated temperature of said impregnating material is in the range from 23°C to 100°C.

Preferably said impregnating means is a sprayer.

Preferably impregnation is to sequentially to each side of a substantially parallel cut slice of bread, each such impregnation having been assisted at least in part by gravity.

30 Preferably there is provided means to assist the impregnation of the serially machine impregnated surfaces at the conclusion of the impregnating step.

Preferably said means for enhancing the impregnation of the serially machine impregnated surfaces comprise rollers.

Preferably said means for enhancing the impregnation of the serially machine

impregnated surfaces comprise vibrating surfaces.

Preferably said means for enhancing the impregnation of the serially machine impregnated surfaces comprise rollers or brushes.

Preferably said means for enhancing the impregnation of the serially machine
5 impregnated surfaces comprises a partial vacuum.

Preferably there is provided means to package the impregnated slices either individually, in pairs or in loaf(ves) whether pairs of slices are impregnated surface face to face or back to back.

Preferably a conveyor presents slices or part slices of bread cut from a loaf or
10 loaves of bread to a spray station or zone where the impregnating material is sprayed down on to the exposed surface(s) of each slice, each slice having the surface to be impregnated at a temperature over 13°C and being maintained at that temperature or higher thereafter such that the impregnating material remains sufficiently liquid to achieve a soaking impregnation into the bread prior to the impregnating material and bread being
15 cooled or allowed to cool.

In yet a further aspect the invention consists in apparatus for performing said method comprising:

apparatus for providing a marketable pack of slices or part slices of bread having at least one surface of each slice impregnated with an impregnating material selected
20 from

- (i) butter
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- (iii) a blend of (i) with any other ingredient(s); and
- 25 (iv) a blend of (ii) with any other ingredient(s),

said apparatus comprising:

- (a) means for cutting slices or part slices of bread from a loaf or loaves of bread,
- (b) means for serially machine presenting such slices or part slices to an impregnation station or zone (hereafter "zone") with a cut surface uppermost that is
30 substantially clear of loose crumbs and which is preferably at a temperature above 16°C,
- (c) means for serially machine spraying, cascading, brushing or rolling onto at least part of each such surface of a slice or part slice with said impregnating material and said material is at an elevated temperature at which it is a liquid or is substantially liquid,

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(d) means for maintaining the impregnating material provided thereonto at a temperature or temperatures above 20°C with said material sufficiently liquid to soak into the surface,

(e) means for thereafter allowing or causing the cooling of said surface/material
5 to set the same in and on the bread,

(f) optionally means for inverting each slice or part slice and repeating steps (d) and (e),

(g) means for forming a stack or set (i.e. two or more) of slices or part slices from steps (e) and/or (f), the stack not necessarily being vertical, e.g. optionally reconstituting
10 a form of loaf or part thereof from which said slices have been cut (optionally with separation film/sheet material between slices, or, the set preferably being of at least two,), and

(h) thereafter storing, supplying or providing for marketing the marketable pack substantially in that form with or without the packaging thereof.

15 Preferably said impregnating material during step (c) is a high fat material with its fat matrix having a water content less than about 16%^{w/w}.

Preferably said impregnating material has a fat content of less than 80% by weight and preferably said fat matrix has a moisture content of less than 25%^{w/w}.

Preferably said slices or part slices are impregnated from one side only.

20 Preferably said slices or part slices are impregnated on both sides.

Preferably means to package stack of slices or part slices is provided subsequent to step (g).

Preferably step (g) includes the provision of separation film/sheet material between slices.

25 Preferably step (c) is conducted after and/or during a heating of the surface of each slice or part slice and said impregnating material is at a temperature greater than the melting point of butter but less than 100°C.

Preferably step (c) is performed by spraying down onto horizontally presented slices or part slices.

30 Preferably prior to step (c) the cut surface uppermost of each slice or part slice has been either brushed, vacuumed or vibrated to clear loose crumbs therefrom.

In yet another aspect the invention consists in a bread product comprising a slice or part slice of bread cut from a loaf having impregnated therein from at least one cut

surface thereof an amount of a set impregnating material selected from the group consisting of:

- (i) butter;
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- (iii) a blend of (i) with any other ingredient(s); and
- (iv) a blend of (ii) with any other ingredient(s), which material was impregnated into the bread and allowed to soak therein while at an elevated temperature at which the impregnating material was in a liquid or substantially liquid state.

10 Preferably said impregnating material is a high fat material and was applied while its fat matrix had a water content of less than about 16%^{w/w}.

Preferably said impregnating material has a fat content of less than 80% by weight and preferably with its fat matrix having a water content of less than about 25%^{w/w}.

In another aspect the invention consists in a marketable pack of slices or part slices
15 of bread where the same have been stacked (in any orientation) paired or otherwise assembled into sets so as to be assembled into a packable form (optionally simulating the loaf from which they were cut) wherein each slice or part slice a bread product comprising a slice or part slice of bread cut from a loaf having impregnated therein from at least one cut surface thereof an amount of a set impregnating material selected from
20 the group consisting of:

- (i) butter;
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- (iii) a blend of (i) with any other ingredient(s); and
- 25 (iv) a blend of (ii) with any other ingredient(s), which material was impregnated into the bread and allowed to soak therein while at an elevated temperature at which the impregnating material was in a liquid or substantially liquid state.

Preferably said impregnating material is a high fat material and was applied while its fat matrix had a water content of less than about 16%^{w/w}.

30 Preferably said impregnating material has a fat content of less than 80% by weight and its fat matrix has a water content of less than 25%^{w/w}.

As used herein unless otherwise dictated by the context, the term "butter" includes

- 1) the fatty portion of milk separating as a soft yellowish solid when milk is

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churned, consisting of at least 80% butter fat and no more than 16% water.

2) spreads and low fat spreads comprising less than 80% butter fat and more than 16% water.

3) non dairy products such as margarine having no more than 16% water, or low fat spreads or spreads having more than 16% water.

4) low moisture butter fat products or Specialty Butter Fat ("SBF") products having melting points in the range 23°C to 28°C in particular SBF27 having a melting point of 27°C.

5) mixtures of 1), 2), 3) or 4) with any other ingredient(s).

10 In its preferred form this invention relates to sliced bread with butter applied to either one side or both sides of each slice, the butter being applied in such a way as to allow the bread to be toasted without the butter substantially dripping off the bread while it is in the toaster.

It is also a part of this invention in a preferred form to package the buttered bread in such a way that the slices will not warp while being frozen and can be easily separated after freezing or chilling.

An objective of the invention in its preferred form is to toast bread which is buttered before toasting in order to release hot butter aromas that are not released when the butter is applied to the bread after toasting.

20 Another objective in a preferred form is to provide a convenience product which does not require the spreading of butter after toasting, thereby saving time and avoiding the problem of spreading cold butter.

It is the intent of this invention that preferably either butter or margarine or a mixture of the two is used in making the product.

25 BRIEF DESCRIPTION OF DRAWINGS

Preferred forms of the present invention will now be described with reference to the accompanying drawings in which;

Figure 1 shows a side elevation of an unbuttered slice of bread;

Figure 2 shows the spraying of the bread with melted butter;

30 Figure 3 shows a side elevation of the rolling of the buttered slice of bread;

Figure 4 shows a side elevation of buttered slices of bread separated by sheeting;

Figure 5 shows a side elevation of a pair of buttered slices of bread separated by sheeting, although a preferred less expensive set is such a pair not separated by sheeting,

Figure 6 shows a side elevation of one form of apparatus according to the present invention;

Figure 7 shows a flow diagram of the steps involved in the present invention; and

Figure 8 shows a side elevation of buttered slices of bread without sheeting.

5 BEST MODES FOR CARRYING OUT THE INVENTION

As shown in Figure 6 in one form apparatus for performing the present invention comprises a belt conveyor 10 which moves the sliced bread from a sliced bread production apparatus or a sliced bread loading apparatus through the various stages or zones of the invention. The belt transports the buttered bread out of the end of the 10 apparatus at which stage it can be packed or passed through further processing such as manual or automatic sandwich making.

Other forms of device to transport the bread through the apparatus are known for example powered rollers or conveyors which are non-continuous.

The sliced bread optionally first passes through a de-crumbing zone 11. In forms 15 of the invention this de-crumbing zone consists of a vacuum which vacuums off any loose crumbs on the surface of the bread. In other forms this de-crumbing zone may comprise brushes which pass over the surface of the bread either by the movement of the bread on the conveyor or the movement of the brush.

In other forms of the invention the de-crumbing zone can comprise a device to 20 vibrate or shake the loose crumbs of the upper surface of the bread. This vibrating device can take the form of a grid on which the bread moves. The grid may be angled so as to cause the crumbs to fall off the top surface. In other forms the bread may be inverted and placed on the vibrating grid which causes the loose crumbs to fall off. In other less preferred forms of the invention, the bread slices are simply inverted over a 25 grid which allows the crumbs to fall off under the force of gravity.

In other forms of the invention the crumbs are blown off the surface of the bread by means of a stream of air. The air blows over the surface of the bread removing loose crumbs.

In other forms of the invention both sides of the slices are de-crumbed on both 30 sides. Any of the aforementioned devices to de-crumb one surface of the bread can be used to de-crumb both surfaces. There may be two separate de-crumbing zones for the top and bottom surfaces or the bread may be inverted after one side is de-crumbed so as to allow the other side to be de-crumbed. The de-crumbing zone for the bottom surface

of the bread is placed immediately prior to the conveyor belt. In one form of the invention the bottom surface de-crumbing zone comprises a sloped grid down which the bread slides when entering the conveyor.

The bread optionally then is transported through a heating zone 12. This zone
5 raises the temperature of the bread in order to enhance the impregnating of the bread by the melted butter or butter substitute. In preferred forms of the invention the heating comprises infrared radiation heating. This can be achieved through the use of heat lamps, resistance wire, heaters, gas heaters or any of the other well known heating means which are available to provide relatively low temperature heating of food products. In
10 other less preferred forms of the invention the heating may comprise microwave heating or heating by conduction or convection. It is possible in one form of the invention for the de-crumbing and heating to be combined for example, blowing a stream of warmed air over the upper surface of the bread to remove the crumbs and heat the bread.

The heating zone may not be required if the bread temperature in conjunction with
15 the butter temperature is sufficient to enable the butter to penetrate easily into the surface. In some forms of the invention the sliced bread may be still sufficiently warm from the baking process to enable the heating zone to be eliminated.

In other forms of the invention the heating zone is installed but is used only if required. In forms of this invention the temperature of the bread can be sensed and the
20 surface of the bread heated by means of any of the abovementioned methods if it is insufficient.

It is preferable that the heating zone has at least some form of manual adjustment, this enables the temperature of the heating zone to be varied to suit the conditions. For example, the surface temperature required must be adjusted according to the thickness
25 moisture content and type of bread used in the apparatus. Bread with less or smaller air pockets may require a higher initial surface temperature to enable the butter to penetrate to the correct depth. Properties of the butter used, i.e. whether it is butter, butter substitute, a mixture of the two and its temperature, will also have an effect on the desired temperature and thus the temperature set in the heating zone.

30 In forms of the invention the temperature required is estimated by the operator and set by means of manual control of the heating zone. It is envisaged that in more sophisticated forms of the invention there be some form of automatic temperature sensing and adjustment. The bread may then optionally be transported through a zone where

various flavouring substances are applied 13. These flavouring substances may be powders such as garlic powder, salt, pepper or various other artificial or natural flavouring substances. Other substances such as garlic flakes, onion flakes or grated cheese may also be added at this time as may bacon or olives. In forms of the invention where low salt
5 butter is used in order to take advantage of its lower melting point, salt may be added in order to produce a finished product which has a taste similar to that produced when using a normal salt content butter.

The bread is then transported through an impregnation station or zone in which the bread is impregnated with melted butter or butter substitute. The butter or butter
10 substitute (hereafter "butter") is applied in a liquid or substantially liquid state as a result of being at an elevated temperature.

In some forms of the invention the impregnation zone consists of a series of nozzles which spray the upper surface of the bread with the melted butter. In other forms of the invention the melted butter is simply released under the action of gravity so that it falls
15 or cascades onto the bread. The nozzles may consist of long slits or slots which spray a sheet of butter onto the surface of the bread. In other forms of the invention the nozzles are arranged side by side so as to give complete coverage of the width of the bread.

In a preferred form of the invention the spraying of the butter is pulsed so that butter is not sprayed onto the conveyor in the space between the bread, but is sprayed
20 only or mainly onto the bread. The spraying of the bread may therefore be triggered by the detection of the presence of the bread by means of micro switches or optical sensors or other devices which can detect the presence of a slice of bread.

The butter may be melted and/or mixed at a different location and pumped through pipes to the nozzle or may be melted in a tank directly above the nozzle. The butter may
25 be melted by any of the means which are well known in the food industry to melt a substance such as infrared or resistance heaters.

Mixing apparatus may be used in conjunction with the heating apparatus in order to either produce a mixture of butter and other flavouring substances or vegetable fat and the other flavouring substances. The flavouring substances may include such things as
30 garlic flavouring, onion flavouring or any of the other flavouring substances which are known to either the flavour butter or butter substitutes or be applied with butter or butter substitutes.

In other forms of the invention colouring, flavour enhancing and/or preservative

substances can be added to the butter.

In other forms of the invention the butter is supplied with additives such as flavouring mixed in and thus all that is required to be done at the apparatus is melt the butter. The nozzles may be configured so as to provide non-continuous coverage of the
5 bread slice, for example, the butter may cover only one half of the bread. Other less preferred means of applying the melted butter to the bread consist of such things as rollers, wheels, devices which slide or glide over the top surface of the bread.

The buttered bread is then transported through a zone where the penetration of the butter into the bread is enhanced. In one form of the invention this consists of a brush
10 which overrides the top surface of the bread thus helping force the melted butter into the bread. The brushes may be manufactured from substances such as food grade nylon or stainless steel wire. In forms of the invention the penetration of butter is enhanced by means of reciprocating or revolving brushes.

In other forms of the invention these penetration enhancers consist of smooth or
15 textured rollers, the rollers ride over the surface of the bread piercing the surface thus enhancing the penetration of the butter into the bread. In other less preferred forms of the invention the penetration enhancers consist of plates or gliders which run over the upper surface of the bread.

The buttered bread then optionally passes through a zone 16 which allows the
20 butter to at least partially cool and allows the butter time to soak into the bread. This zone may consist simply of a length of a conveyor above which are no other zones. The buttered bread then optionally passes through a butter cooling zone which further sets the butter. In forms of the invention this butter cooling zone may simply comprise a shrouded fan which cools the butter by means of its draft. In other forms of the invention
25 there may be apparatus to refrigerate the air before it passes over the buttered bread. Other alternatives include means to refrigerate the conveyor belt or simply provide a length of conveyor belt on which the butter cools as it travels along.

The buttered bread reaches the end of at least the initial processing at zone 18. The output of this process consists of sliced bread which has butter upon one surface
30 and/or impregnated beneath that said surface. This bread may then be processed further, for example, it may enter a packing process which wraps the bread either singularly, in pairs or in the form of a loaf. The bread may be then used to create sandwiches either manually or by means of an automatic process. The bread may pass through a process

similar to the one described above in which the other side of the bread is buttered.

The flow diagram of the process is as shown in Figure 7. Sliced bread is the initial input to the process the bread passes through an optional zone which de-crums one or both sides of the bread and the crumbs are outputted either as waste or used in further processes. The de-crumbed bread passes then through an optional heat zone in which surface temperature is raised if it is insufficient. The warmed de-crumbed bread then optionally passes through a zone where powdered flavouring substances are added. The next step in the flow diagram is the spray zone where butter is applied to at least one surface of the bread. The butter enters the zone either in a solid or semi solid form in which case it is melted or partially melted, flavouring substances can be added to the butter at this stage also. The butter is applied to the bread by means of spray nozzles or other abovementioned means. The buttered bread then optionally enters an impregnation zone in which the impregnation of the melted butter into the bread is enhanced by means of brushes, rollers or other suitable means which are known in the trade. The buttered bread is then passed through a zone which either allows the melted butter to cool naturally or to some extent forces the cooling of the said melted butter by means of, for example, fans.

The buttered bread has then reached an optional end zone 18 and in alternative forms of the invention the slices are paired and packaged.

In the preferred product, butter is applied to only one side of the slices of bread. The objective is to apply as much butter as possible but to avoid dripping of butter from the slice of bread when toasted in the usual vertical position.

In the process invention the percentage of butter to bread is in the range of about 4% to 35% butter by weight, the preferred percentage is about 15%. The process invention allows the percentage of butter to be held as high as possible considering the bread texture and slice thickness.

In one form the method for producing toast with the butter applied before toasting, consists of the following steps:

1. Bake and slice a loaf of bread.
2. Place the slices of bread on a conveying device in a flat position.
3. If the bread temperature is too cold for rapid penetration of bread, apply heat to raise the bread temperature of the slice surface to the required temperature for impregnating. This is done as the slices move on the conveyor and can consist of

heat lamps mounted over the conveyor. The heat lamps are controlled either manually or in conjunction with a temperature sensing device which measures the bread temperature and turns the lights on and off as required.

4. When the slices are the correct temperature, or above, the slices move under a butter spraying device which uniformly sprays butter on the slices. The butter is melted in a mixing tank and pumped to the spray device. The butter temperature is controlled by a thermostat and held at a level preferably not more than 10 F. higher than the melting point of butter, but may in some cases be higher to compensate for lower bread temperature.
5. After applying the butter, the slices may be rolled or brushed as they pass under rollers or brushes located above the conveyor. Bread of a denser texture may not absorb the butter as readily as very porous bread. Rolling forces the butter into the bread further and reduces the amount on the slice surface. Without the penetration of the butter, which is provided by melting, there may be too much on the surface resulting in dripping when placed in the toaster. In effect, heating the bread and rolling the buttered slices allows for applying butter in higher percentages than would otherwise be possible. It is to be noted that this forced penetration is not a necessary step in all cases but is to be used as required, depending on bread and butter temperatures and time allowed for penetration.
6. A delay of about one to three minutes is desirable to allow the butter to soak into or penetrate the bread before cooling. This may be done in the package after the slices are recombined to make a loaf in which case no delay is allowed on the conveyor in which case dividers are required between slices or sets of two. But in the preferred method, the slices remain on the conveyor for a period of time to obtain adequate penetration of the butter into the slice and for the butter to harden. This time period will vary as to the bread texture and % of butter to bread and temperatures but would usually be about 1 - 3 minutes.
7. If the process does not include sufficient cooling to eliminate the need for dividers, the next step is to apply a non-stick paper or plastic sheet to the slices to avoid sticking together when frozen or chilled. Although sheets may be placed on each slice and the slices stacked with the buttered side facing the same direction when assembled into a loaf, in a preferred method the loaf is assembled with the buttered sides of each two slices facing each other, i.e. to provide a plurality of sets. This

results in the loaf being made up of sets of two slices with buttered sides facing and a sheet placed between them. It is the object of this arrangement also to avoid slice warping when frozen. By placing the buttered sides face to face the tendency for the slices to form a cup shape is eliminated. If the slices are not arranged in this manner, one side of each slice shrinks more than the other side making every slice take a cup shape when stored or frozen. By placing the buttered sides or plain sides face to face the slices remain straight and only half as many divider sheets are required.

8. In a most preferred form such sets (pairs) are assembled after butter hardening (e.g. chilled by refrigerated air blown onto conveyor) and then packaged thereby obviating the need for separator sheets. In the final step of the method, the assembled loaves or part loaves (e.g. sets) are distributed to the user who performs the final step of placing the slices in a toasting or heating device to crisp the surface and release the hot butter aromas.

15 An alternative method produces a sliced bread product which is prebuttered on both sides of the slices. The objective of this method is to allow more butter to be applied to each slice and to avoid the distortion caused by freezing. This method includes the steps described in the preferred method but with the following differences:

1. The slices are sprayed on one side then inverted and sprayed with butter a second time.
2. Sheets separating the slices may or may not be placed between each slice - not required if butter hardened prior to assembly.
3. The range of percentage of butter to bread can be from about 4% to 35%^{w/w}.
4. In this method all other steps remain the same.

25 It is the subject of this invention to include the addition of flavourings such as garlic. Flavourings can be in the butter or applied separately as the bread slices move along the conveyor. As in the addition of garlic, either a garlic juice may be added to the butter or a powered garlic dusted onto the bread before the butter is applied.

It is also the object of this invention to use the buttered bread slices in the making of toasted (or grilled) sandwiches and it is not intended that the method of producing prebuttered, packaged bread be limited to the making of toast nor is it intended that the product itself which is a group of slices of bread, prebuttered with or without separating sheets, be limited in any way as to usage.

It is the intent of the invention that there be two basic products. One product is a slice of bread which has been coated with butter and toasted. The second product is a package of sliced bread in which each slice has been coated with butter and the slices placed in a package of one or more slices.

- 5 It is also the intent of this method invention that the butter coating process may be an extension of a continuous bread baking process or transported from a bakery to the coating process thereby breaking the continuous system into two separate continuous operations.

An alternative method consists of the steps of slicing a loaf of bread, removing loose
10 crumbs by gravity and/or vacuuming adjusting the temperature of the slices to a higher temperature if desired, adding a flavouring if desired, applying butter or a butter/margarine mixture or a mixture of butter and clarified butter into the slices, roll or brush the surface to cause the butter to penetrate the surface of the bread, chill the bread to solidify the butter, folding the slices into pairs with the buttered surfaces facing
15 or the plain surfaces facing (to prevent warping in the package), placing the sets of two slices in a package of one or more sets or part of sets.

In an optional extension of the method, the sets of two slices are placed in an oven with buttered slides facing and the plain sides toasted without the buttered sides being toasted or vice versa. An alternative extension of the method is to place the buttered
20 slices in a bread toaster individually whereby the slices are toasted on both sides.

In either method extension, the slices are removed from the packaging and toasted or prepared and toasted in a location where the packaging operation is not necessary.

In one form of the invention a loaf of bread is sliced to produce individual slices 1. In other forms of the invention the bread may be pre-sliced or consist of bread which is
25 produced in a flat condition, i.e. pizza or pita bread. In forms of the present invention the slices of bread are de-crumbed by the use of vacuum, brushes or gravity. In other forms of the invention the crumbs are shaken or blown off.

In one form of the invention the slice 1 is then moved towards and under a spray nozzle. In other forms of the invention the nozzle itself is moved towards the bread or
30 lowered over the bread. In forms of the invention the slices are moved by means of powered rollers or conveyor belts or the slices may move down slides or chutes under the force of gravity.

The nozzle 2 sprays a spray of melted butter 3 onto the slice surface. In one form

of the invention the slice 1 is moved under the nozzle 2 by a conveyor belt thus covering the length of the slice. In other forms of the invention the nozzle 2 is moved over the surface of the slice 1 in order to cover the length of the slice. In some forms of the invention a row of nozzles across the width of the slice are provided thus covering the entire width of the slice with melted butter. The spray may be continuous if slices are not bumper to bumper on conveyor or intermittent, with a device to sense and coat individual slices. In other less preferred forms of the invention the nozzle and the slice are moved relative to each other so that the nozzle makes multiple passes over the slice length at different width positions, thus covering the entire width of the slice.

10 In other forms of the invention the nozzle 2 comprises a slot or slots which substantially cover the width of the bread slice with a sheet spray of melted butter. Sprays can be full width of belt or spaced to cover only the rows of bread.

In preferred forms of the invention the melted butter 3 is pumped through the nozzle 2 under pressure. In other less preferred forms of the invention the melted butter 3 is fed through the nozzle 2 by means of gravity. In some forms of the invention the nozzle 2 is mounted so that its outlet is on or very near the upper surface of the slice of bread 1. The coverage of the slice 1 with melted butter 3 need not be continuous, the spray of melted butter may be pulsed so that the entire length of the slice is not covered and there may be gaps in the coverage widthwise achieved by spacing of the nozzles.

20 This non-continuous coverage of the slice surface by melted butter may form a strip pattern of buttered and unbuttered bread or may take the form of having one half either widthwise or lengthwise covered with butter and one half not covered with butter. Spray volume or conveyor speed may be variable to obtain correct applied amount of butter.

In some forms of the present invention the butter is melted in a mixing tank and pumped to the nozzle. In other forms of the invention the butter is mixed with flavouring substances such as garlic powder, garlic juice, herbs or cheese. Preferably the butter used is butter of reduced moisture content, i.e. the moisture content of the butter is preferably less than the usual 16% by weight moisture content. The butter may be of the low salt variety and may consist of a mixture of melted butter and melted margarine or in some forms consist entirely of margarine. In some forms of the invention melted ghee or other dairy fat substances or substitutes are used in place of the melted butter. When using very low water content butter salt is dusted on as butter fat won't dissolve it.

The sliced bread with melted butter is then moved under a roller 5. The roller 5

is rolled over the upper surface of the buttered slice, thus enhancing the penetration of the melted butter. In other forms of the invention the roller itself is moved towards and over the upper surface of the slice. The roller 5 may consist of a cylinder which is continuous over the width of the slice or two or more rows of slices or may take the form of a series of wheels which cover all or part of the width of the slice.

In forms of the invention where the slice is only partially covered with melted butter, the roller need only cover that portion so covered with butter. The roller 5 may be idle and simply run over the surface of the bread or it may be driven and draw the bread along. In other forms of the invention there are a series of rollers arranged adjacent to one another lengthwise thus enhancing the penetration of the bread surface by the melted butter. In other less preferred forms in the invention the bread may make multiple passes under the roller to enhance the penetration of melted butter.

In other forms of the invention the surface of the roller may have a series of spikes thereon which pierce the upper surface of the bread and thus further enhance the penetration of the butter into the bread the bread may also be heated to enhance the penetration of butter.

The roller can have the added affect of reducing the thickness of the bread. Figure 4 shows one form of packing the slices in which the slices 1 are separated by means of a sheet 7. The sheet 7 can consist of nonstick paper such as waxed paper or a plastics sheet. Other less preferred materials for the sheet 7 are foil and laminated materials.

In the preferred form of the invention the slices are first frozen or chilled and are then stacked and wrapped without separating sheeting.

In one form of packing the slices as shown in Figure 4 several slices are packed adjacent to each other with the buttered side facing the same direction with the slices are separated by means of the sheeting 7.

In one form of the invention a package comprising an entire sliced loaf or multiple loaves of buttered bread is produced and wrapped. In other forms of the invention there may be a lesser number of slices of bread.

A preferred form of packing the slices is as shown in Figure 5 with a pair of slices packed so that the buttered sides are adjacent to each other and separated by a sheet 7. These pairs of slices may be individually wrapped or several pairs may be placed together and held together by wrapping. The packing together of pairs of buttered slices of bread is preferred when the slices are chilled or frozen as the arrangement counteracts at least

-20-

in part the tendency of the slices to warp when frozen. The arrangement also requires only half as many divider sheets as are required when packing slices adjacent to each other separated by a plastic sheet as in other forms of the invention the pairs are not separated by divider sheets as they are sufficiently chilled as not to stick.

- 5 In one form of the invention the buttered slices are provided to the user in pairs separated by sheeting. The user removes the slices from packaging and toasts them in a toaster or oven. The use of low moisture butter results in low boil of the butter and hence reduces the amount of butter dripping off the toast.

In yet another alternative form of the invention butter is first sprayed onto at least
10 one surface of a bread product. A slice of the bread product is then cut, said slice including at least part of the buttered surface. The surface exposed by the cutting of the bread forms at least in part the new surface to be buttered. The slice cut off the bread can then be rolled and packed as per previously mentioned form of the invention.

In another less preferred form of the invention, butter is first sprayed onto at least
15 one surface of a bread product, the said buttered surface of the bread product is then rolled and/or brushed as per previously mentioned forms of the invention. A slice of the bread product is then cut, said slice including at least part of the buttered and rolled surface. The said cut slice is then packed as per previously mentioned forms of the invention. The surface exposed by the cutting of the bread forms at least in part the new
20 surface to be buttered.

In other forms of the invention the toast is covered with garlic powder or cheese powder before being buttered. The buttered bread can be used to make sandwiches or be toasted.

CLAIMS:

1. A method of producing a bread product suitable for vertical toasting comprising:
serially machine presenting slices or part slices of bread cut from a loaf or loaves
of bread to an impregnation station or zone (hereafter "zone"); and
- 5 serially machine impregnating at said zone at least part of at least one surface of
each slice or part slice presented to said zone with an impregnating material and while
said impregnating material is in a liquid or substantially liquid state as a result of being
at an elevated temperature, said material being selected from one or more of the group
consisting of:
 - 10 (i) butter;
 - (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil
based product);
 - (iii) a blend of (i) with any other ingredient(s); and
 - (iv) a blend of (ii) with any other ingredient(s).
- 15 2. A method of claim 1 wherein said impregnating material is a high fat material with
its fat matrix having a water content of less than about 16%^{w/w}.
3. A method of claim 1 wherein said impregnating material is of less than 80% by
weight fat.
4. A method of any one of claims 1 to 3 wherein the impregnating material is
- 20 impregnated in an amount within the range from 4% to 35% by weight with respect to
the weight of the bread.
5. A method as claimed in claim 4 wherein the amount of impregnating material is
about 15% by weight with respect to the weight of the bread.
6. A method as claimed in any one of the preceding claims wherein the surface or
- 25 surfaces of each slice or part slice to be impregnated is preheated if necessary to be over
13°C immediately prior to and during the impregnation.
7. A method as claimed in claim 6 wherein said heating is radiant heating to 13°C or
above.
8. A method as claimed in any one of the preceding claims wherein said elevated
- 30 temperature of said impregnating material is in the range from 20°C to 99°C.
9. A method as claimed in claim 6 and 7 wherein said preheating of said surface is to
a temperature within the range of from 16°C to 205°C by and said elevated temperature
of said impregnating material is in the range of from 23°C to 43°C.

10. A method as claimed in any one of the preceding claims wherein said impregnating is by spraying.
11. A method as claimed in any one of the preceding claims wherein impregnation is sequentially to each side of a substantially parallel cut slice of bread, each such
5 impregnation having been assisted at least in part by gravity.
12. A method as claimed in any one of the preceding claims wherein prior to the impregnating step the surface(s) of the bread to be impregnated is substantially free of loose crumbs.
13. A method as claimed in any one of the preceding claims wherein the serially
10 machine impregnated surfaces are rolled, vibrated or brushed or pass over a chamber containing a partial vacuum as part of and/or at the conclusion of the impregnating step.
14. A method as claimed in any one of the preceding claims wherein said impregnating step includes first providing the impregnating material at an elevated temperature on to the surface(s) and the maintaining of the impregnating material as it moves at least in
15 part under gravity etc into the bread while the impregnating material is at an elevated temperature at which it remains in a liquid or substantially liquid state.
15. A method as claimed in Claim 14 wherein said product is cooled or allowed to cool to take said impregnating material from said liquid or substantially liquid state to a state of being at least partially hardened.
- 20 16. A method as claimed in any one of the preceding claims wherein a conveyor presents slices or part slices of bread cut from a loaf or loaves of bread to a spray station or zone where the impregnating material is sprayed down on to the exposed surface(s) of each slice, each slice having the surface to be impregnated at a temperature over 13°C and being maintained at that temperature or higher thereafter such that the impregnating
25 material is applied at such temperature that when applied to the bread remains sufficiently liquid to achieve a soaking impregnation into the bread prior to the impregnating material/bread being cooled or allowed to cool.
17. A method as claimed in any one of the preceding claims wherein a flavouring agent is added to the bread prior to, simultaneously with or subsequent to the serial
30 impregnation of each slice or part slice of bread.
18. A method of providing a marketable pack of slices or part slices of bread having at least one surface of each slice impregnated with an impregnating material selected from

- (i) butter;
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- (iii) a blend of (i) with any other ingredient(s); and
- 5 (iv) a blend of (ii) with any other ingredient(s),
said method comprising:
 - (a) cutting slices or part slices of bread from a loaf or loaves of bread,
 - (b) serially machine presenting such slices or part slices to an impregnation station or zone (hereafter "zone") with a cut surface uppermost that is substantially clear of loose
 - 10 crumbs and which is at a temperature above 13°C,
 - (c) serially machine spraying, cascading, brushing or rolling onto at least part of each such surface of a slice or part slice with said impregnating material and said material is at an elevated temperature at which it is a liquid or is substantially liquid,
 - (d) maintaining the surface and the impregnating material provided thereonto at
 - 15 a temperature or temperatures above 20°C with said material sufficiently liquid to soak into the surface,
 - (e) thereafter allowing or causing the cooling of said surface/material to set the same in and on the bread,
 - (f) optionally inverting each slice or part slice and repeating steps (d) and (e),
 - 20 (g) forming a stack, set (i.e. two or more) or sets of slices or part slices from steps (e) and/or (f), and
 - (h) thereafter storing, supplying or providing for marketing the marketable pack substantially in that form with or without the packaging thereof.
- 19. A method of claim 18 wherein said impregnating material during step (c) is a high
- 25 fat material with its fat matrix having a water content less than about 16%^{w/w}.
- 20. A method of claim 18 wherein said impregnating material has a fat content of less than 80% by weight.
- 21. A method as claimed in any one of claims 18 to 20 wherein said slices or part slices are impregnated from one side only.
- 30 22. A method as claimed in any one of claims 18 to 20 wherein said slices or part slices are impregnated on both sides.
- 23. A method of any one of claims 18 to 22 wherein said stack of slices or part slices is packaged subsequent to step (g).

24. A method as claimed in any one of claims 18 to 23 wherein step (g) includes the provision of separation film/sheet material between slices.
25. A method as claimed in any one of claims 18 to 24 wherein step (c) is conducted after and/or during a heating of the surface of each slice or part slice and said
5 impregnating material is at a temperature greater than the melting point of butter but less than about 100°C.
26. A method of any one of claims 18 to 25 wherein step (c) is performed by spraying down onto horizontally presented slices or part slices.
27. A method as claimed in any one of claims 18 to 26 wherein prior to step (c) the cut
10 surface uppermost of each slice or part slice has been either brushed, vacuumed or vibrated to clear loose crumbs therefrom.
28. A bread product produced by a method as claimed in any one of the claims 1 to 17.
29. A marketable pack of slices or part slices of bread produced by a method as
15 claimed in any one of claims 18 to 27.
30. Apparatus for performing a method as claimed in any one of claims 1 to 25 comprising:
means for serially presenting slices or part slices of bread cut from a loaf or loaves of bread;
- 20 means for impregnating at least part of at least one surface of each slice or part slice with an impregnating material, said impregnating material being in a liquid or substantially liquid state as a result of being at an elevated temperature, said material being selected from one or more of the group consisting of;
- i) butter;
 - 25 ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
 - iii) a blend of i) with any other ingredient(s); and
 - iv) a blend of ii) with any other ingredient(s).
31. Apparatus of claim 30 wherein said impregnating material is a high fat material with
30 its fat matrix having a water content of less than about 16%^{w/w}.
32. Apparatus of claim 30 wherein said impregnating material has a fat content of less than 80% by weight.
33. Apparatus of any one of claims 30 to 32 wherein the impregnating material is

impregnated in an amount within the range from 4% to 35% by weight with respect to the weight of the bread.

34. Apparatus as claimed in any one of claims 30 to 33 wherein the amount of impregnating material is about 15% by weight with respect to the weight of the bread.

5 35. Apparatus as claimed in any one of claims 30 to 34 wherein there is provided means for elevating or maintaining temperature of impregnating material.

36. Apparatus as claimed in any one of claims 30 to 35 wherein there is provided means for the addition of flavouring agents to the impregnating material.

37. Apparatus as claimed in any one of claims 30 to 36 wherein there is provided means
10 to decrumble the slice or part slice simultaneously with or previous to the serial heating of each slice or part slice.

38. Apparatus as claimed in any one of claims 30 to 37 wherein there is provided means for serially preheating the surface or surfaces of each slice or part slice to be impregnated if necessary to be over 13°C immediately prior to and during impregnation.

15 39. Apparatus as claimed in claim 38 wherein said heating means is a radiant heater.

40. Apparatus as claimed in any one of claims 30 to 39 wherein said elevated temperature of said impregnating material is in the range from 20°C to 99°C.

41. Apparatus as claimed in claim 40 wherein said preheating of said surface is to a temperature within the range from 16°C to 205°C and said elevated temperature of said
20 impregnating material is in the range from 23°C to 100°C.

42. Apparatus as claimed in any one of the claims 30 to 41 wherein said impregnating means is a sprayer.

43. Apparatus as claimed in any one of the claims 30 to 42 wherein impregnation is to sequentially to each side of a substantially parallel cut slice of bread, each such
25 impregnation having been assisted at least in part by gravity.

44. Apparatus as claimed in any one of the claims 30 to 43 wherein there is provided means to assist the impregnation of the serially machine impregnated surfaces at the conclusion of the impregnating step.

45. Apparatus as claimed in claim 44 wherein the said means for enhancing the
30 impregnation of the serially machine impregnated surfaces comprise rollers.

46. Apparatus as claimed in claim 44 wherein said means for enhancing the impregnation of the serially machine impregnated surfaces comprise vibrating surfaces.

47. Apparatus as claimed in claim 44 wherein the said means for enhancing the

impregnation of the serially machine impregnated surfaces comprise rollers or brushes.

48. Apparatus as claimed in claim 44 wherein said means for enhancing the impregnation of the serially machine impregnated surfaces comprises a partial vacuum.

49. Apparatus as claimed in any of the claims 30 to 48 wherein there is provided means
5 to package the impregnated slices either individually, in pairs or in loaf(ves) whether pairs of slices are impregnated surface face to face or back to back.

50. Apparatus as claimed in any one of the claims 30 to 49 wherein a conveyor presents slices or part slices of bread cut from a loaf or loaves of bread to a spray station or zone where the impregnating material is sprayed down on to the exposed surface(s) of each
10 slice, each slice having the surface to be impregnated at a temperature over 13°C and being maintained at that temperature or higher thereafter such that the impregnating material remains sufficiently liquid to achieve a soaking impregnation into the bread prior to the impregnating material.bread being cooled or allowed to cool.

51. Apparatus for providing a marketable pack of slices or part slices of bread having
15 at least one surface of each slice impregnated with an impregnating material selected from

- (i) butter
- (ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);
- 20 (iii) a blend of (i) with any other ingredient(s); and
- (iv) a blend of (ii) with any other ingredient(s),

said apparatus comprising:

- (a) means for cutting slices or part slices of bread from a loaf or loaves of bread,
- (b) means for serially machine presenting such slices or part slices to an
25 impregnation station or zone (hereafter "zone") with a cut surface uppermost that is substantially clear of loose crumbs and which is at a temperature above 13°C,
- (c) means for serially machine spraying, cascading, brushing or rolling onto at least part of each such surface of a slice or part slice with said impregnating material and said material is at an elevated temperature at which it is a liquid or is substantially liquid,
- 30 (d) means for maintaining the surface and the impregnating material provided thereonto at a temperature or temperatures above 20°C with said material sufficiently liquid to soak into the surface,
- (e) means for thereafter allowing or causing the cooling of said surface/material

to set the same in and on the bread,

(f) optionally means for inverting each slice or part slice and repeating steps (d) and (e),

(g) means for forming a stack or set (i.e. two or more) or sets of slices or part
5 slices from steps (e) and/or (f), and

(h) thereafter storing, supplying or providing for marketing the marketable pack substantially in that form with or without the packaging thereof.

52. Apparatus of claim 51 wherein said impregnating material during step (c) is a high fat material with its fat matrix having a water content less than about 16%^{w/w}.

10 53. Apparatus of claim 51 wherein said impregnating material has a fat content of less than 80% by weight.

54. Apparatus as claimed in any one of claims 51 or 53 wherein said slices or part slices are impregnated from one side only.

55. Apparatus as claimed in any one of claims 51 to 54 wherein said slices or part slices
15 are impregnated on both sides.

56. Apparatus of any one of claims 51 to 55 wherein means to package stack of slices or part slices is provided subsequent to step (g).

57. Apparatus as claimed in any one of claims 51 to 56 wherein step (g) includes the provision of separation film/sheet material between slices.

20 58. Apparatus as claimed in any one of claims 51 to 57 wherein step (c) is conducted after and/or during a heating of the surface of each slice or part slice and said impregnating material is at a temperature greater than the melting point of butter but less than 100°C.

59. Apparatus of any one of claims 51 to 58 wherein step (c) is performed by spraying
25 down onto horizontally presented slices or part slices.

60. Apparatus as claimed in any one of claims 51 to 59 wherein prior to step (c) the cut surface uppermost of each slice or part slice has been either brushed, vacuumed or vibrated to clear loose crumbs therefrom.

61. A bread product comprising a slice or part slice of bread cut from a loaf having
30 impregnated therein from at least one cut surface thereof an amount of a set impregnating material selected from the group consisting of:

(i) butter;

(ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil

based product);

(iii) a blend of (i) with any other ingredient(s); and

(iv) a blend of (ii) with any other ingredient(s),

which material was impregnated into the bread and allowed to soak therein while at an elevated temperature at which the impregnating material was in a liquid or substantially liquid state.

62. A product of claim 61 wherein said impregnating material is a high fat material and was applied while its fat matrix had a water content of less than about 16%^{w/w}.

63. A product as claimed in claim 61 wherein said impregnating material has a fat content of less than 80% by weight.

64. A marketable pack of slices or part slices of bread where the same have been stacked (in any orientation), paired or otherwise assembled into sets so as to be assembled into a packable form which has subsequently been packaged, each slice or part slice a bread product comprising a slice or part slice of bread cut from a loaf having impregnated therein from at least one cut surface thereof an amount of a set impregnating material selected from the group consisting of:

(i) butter;

(ii) a butter substitute (e.g. margarine or a similar animal fat or vegetable oil based product);

(iii) a blend of (i) with any other ingredient(s); and

(iv) a blend of (ii) with any other ingredient(s),

which material was impregnated into the bread and allowed to soak therein while at an elevated temperature at which the impregnating material was in a liquid or substantially liquid state.

65. A pack of claim 64 wherein said impregnating material is a high fat material and was applied while its fat matrix had a water content of less than about 16%^{w/w}.

66. A pack of claim 64 wherein said impregnating material has a fat content of less than 80% by weight and its fat matrix has a water content of less than 25%^{w/w}.

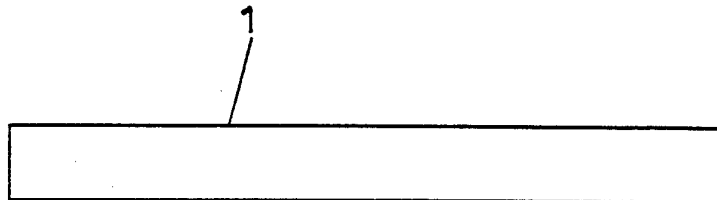


FIG 1

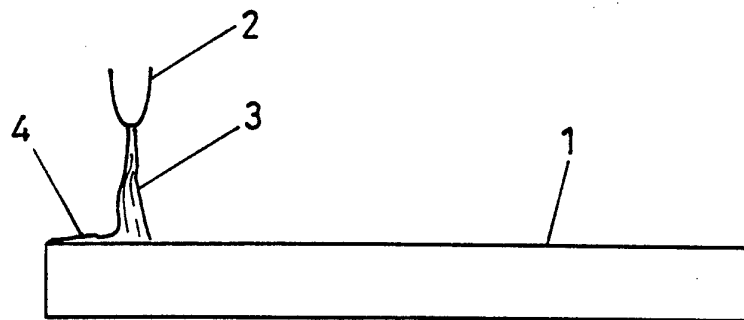


FIG 2

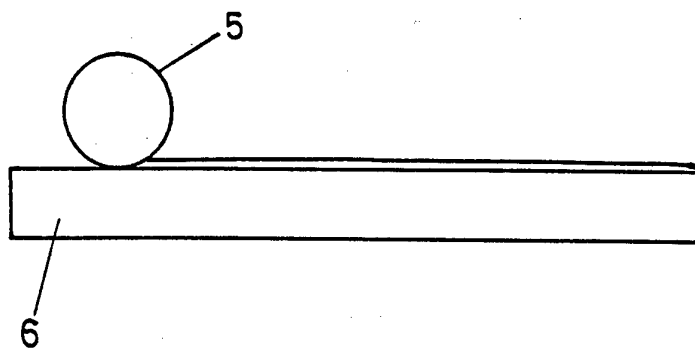


FIG 3

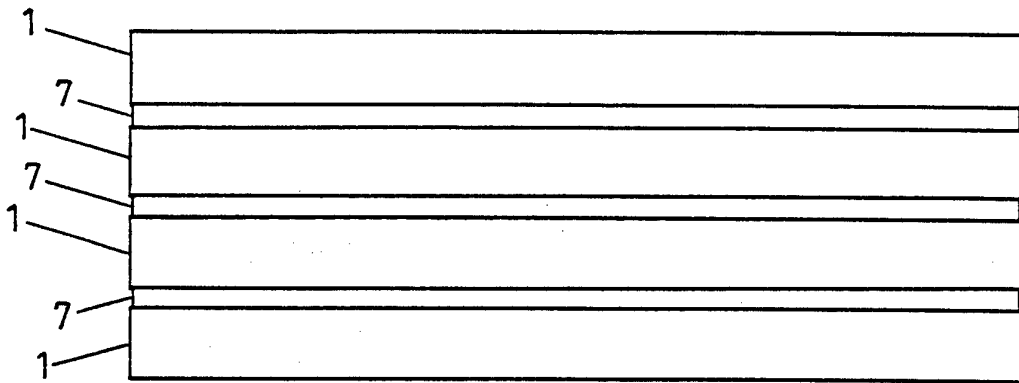


FIG 4

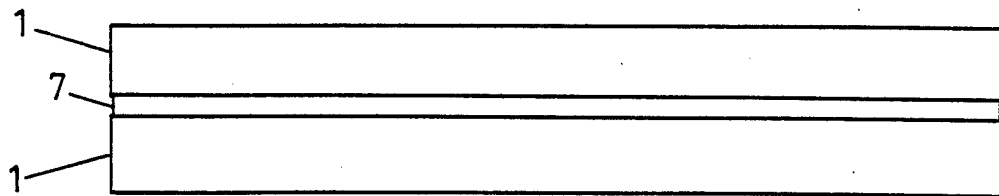


FIG 5

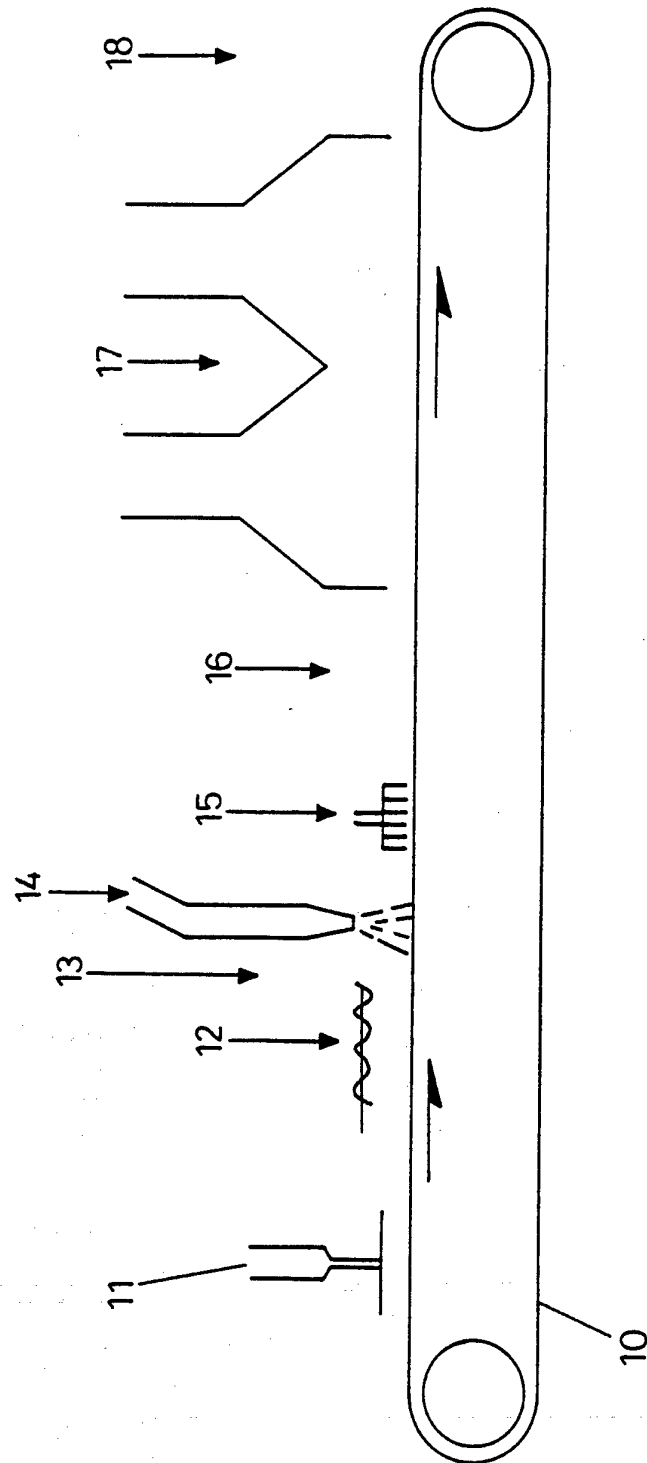


FIG 6

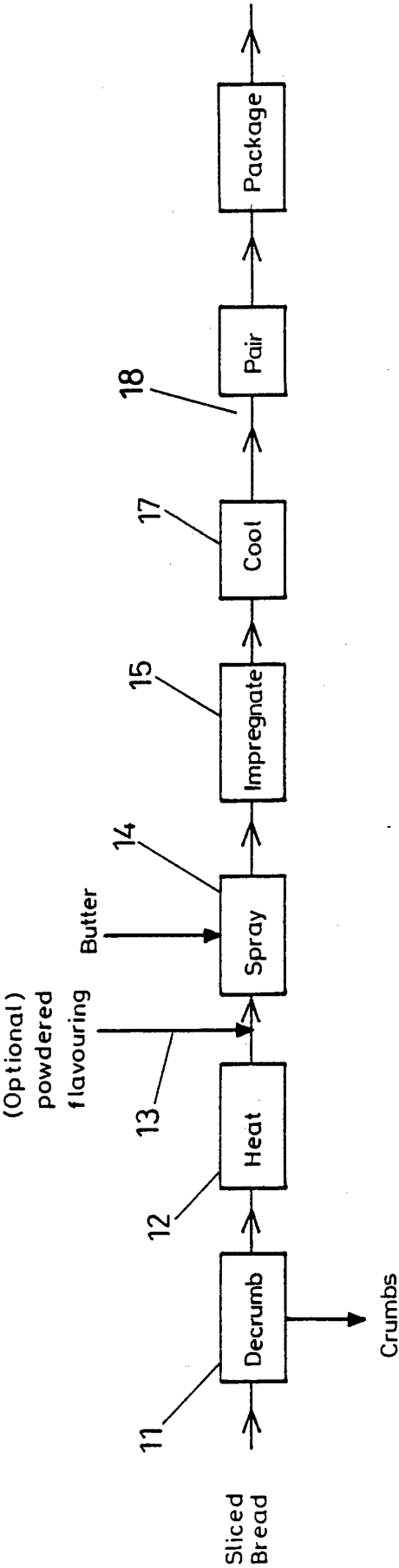


FIG 7

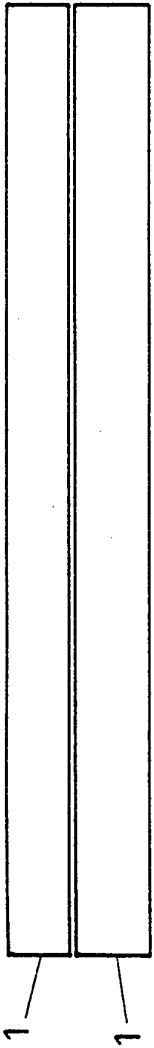
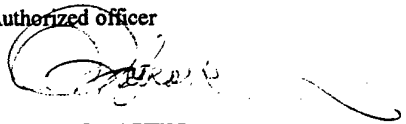


FIG 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ 93/00078

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁵ B26D 7/34 A21D 15/08 According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC A23P 1/08 A21C 15/00 B26D 4/78 7/34 A21D 13/00 13/02 13/04 13/06 15/00 15/08 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU:IPC as above Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) SLICE AND BREAD AND BUTTER CHEM ABS: SLICE AND BREAD AND MARGARINE SLICE AND BREAD AND FAT					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.			
X	US,A,1633391 (BESKIN) 21 June 1927 (21.06.27) Page 1 lines 1-10, claim 1	61-62			
X	US, A,1831763 (DICKERSON) 10 November 1931 (10.11.31) Page 1 lines 1-19, claims 1 and 5	61-62			
X	GB,A,292160 (DEHN) 18 April 1929 (18.04.29) Page 1 lines 48-63, page 3 lines 12-14	1,2,8,30,31,61,62			
X	US,A,2072663 (BEDFORD) 2 March 1937 (02.03.37) Page 1 lines 5-13, Page 2 lines 4-6 and 22-34	1,2,8,30,31,61,62			
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.					
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> * Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 33%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> <td style="width: 33%;"></td> </tr> </table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family				
Date of the actual completion of the international search 3 November 1993 (03.11.93)		Date of mailing of the international search report 15 NOV 1993 (15.11.93)			
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer  J BODEGRAVEN Telephone No. (06) 2832281			

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ 93/00078

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X	GB,A,2126241 (FERRERO SpA) 21 March 1984 (21.03.84) Page 2 lines 30-51	1,2,4,8,10, 14-17,30,31,33,36, 40,42,50,61,62
Y	Page 2 lines 30-51	18,19,51,52,54,56,64, 65
Y	EP,A2,363816 (FABBRICA BISCOTTI P GENTILINI S.r.l.) 18 April 1990 (18.04.90) column 3 line 35 to column 4 line 11	18,19,51,52,54,56,64, 65

Information on patent family members

PCT/NZ 93/00078

Patent Document Cited in Search Report				Patent Family Member			
GB	2126241	DE	3330567	DK	4031/83	IT	1156509
EP	363816	DK	4998/89	FI	894683	IT	1224767
		NO	893997	US	5137137		
END OF ANNEX							