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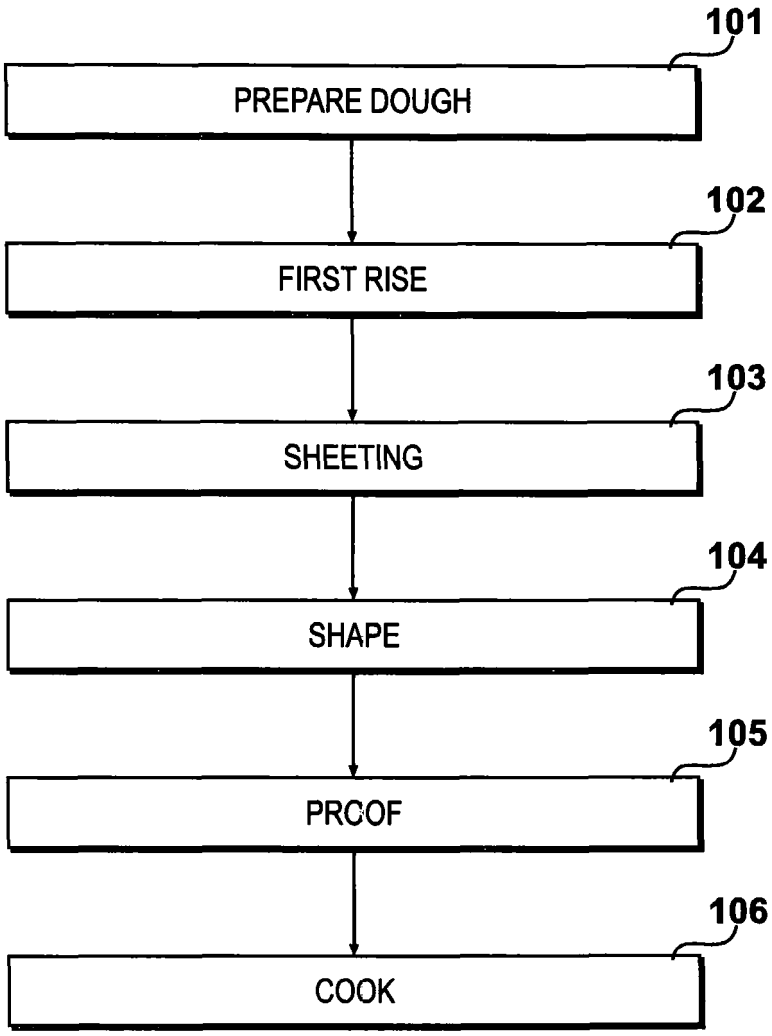

101
PREPARE DOUGH
102
FIRST RISE
103
SHEETING
104
SHAPE
105
PROOF
106
COOK

Fig. 1

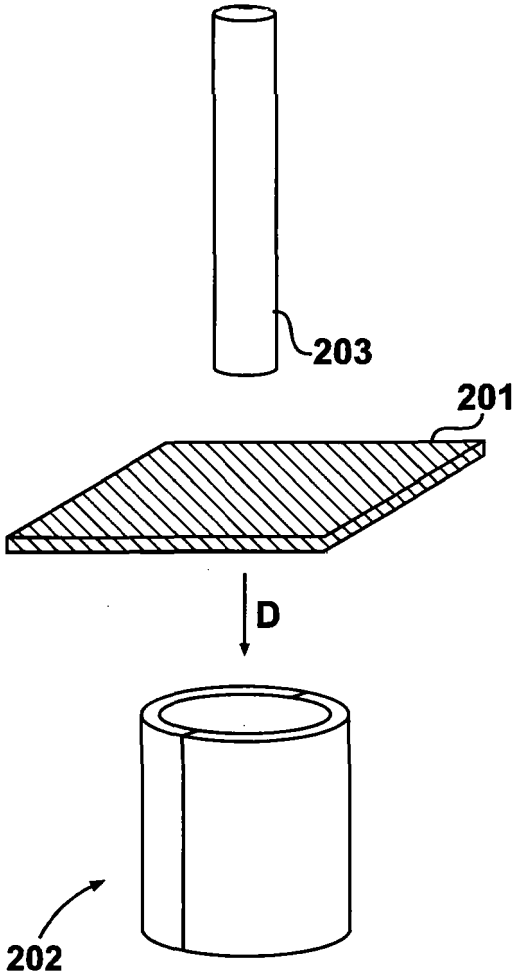


Fig. 2A

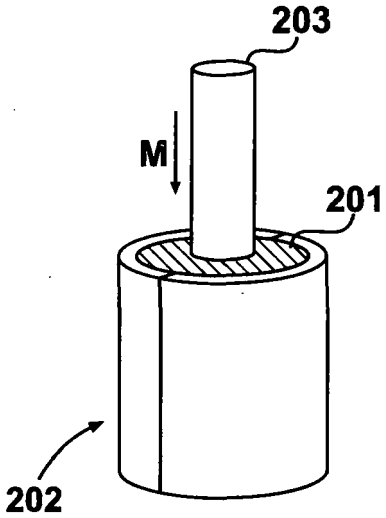


Fig. 2B

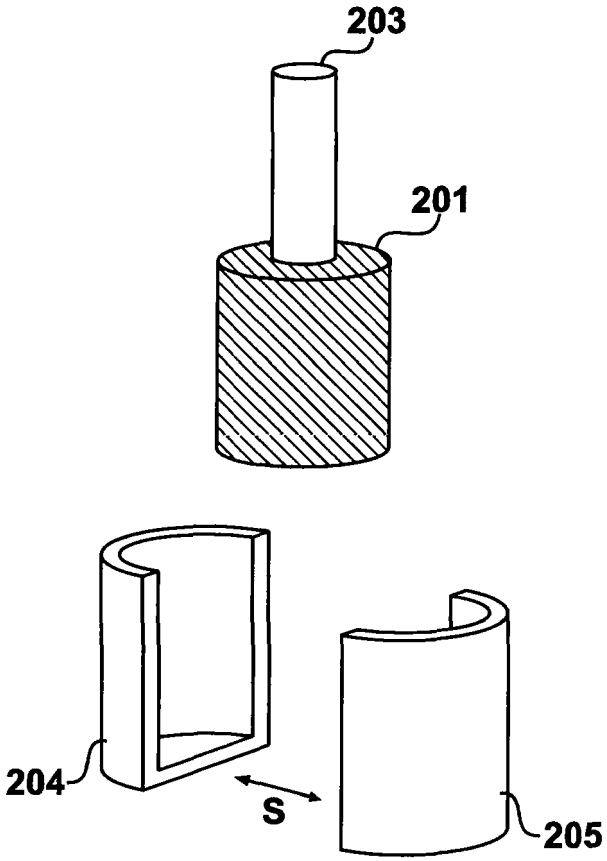


Fig. 2C

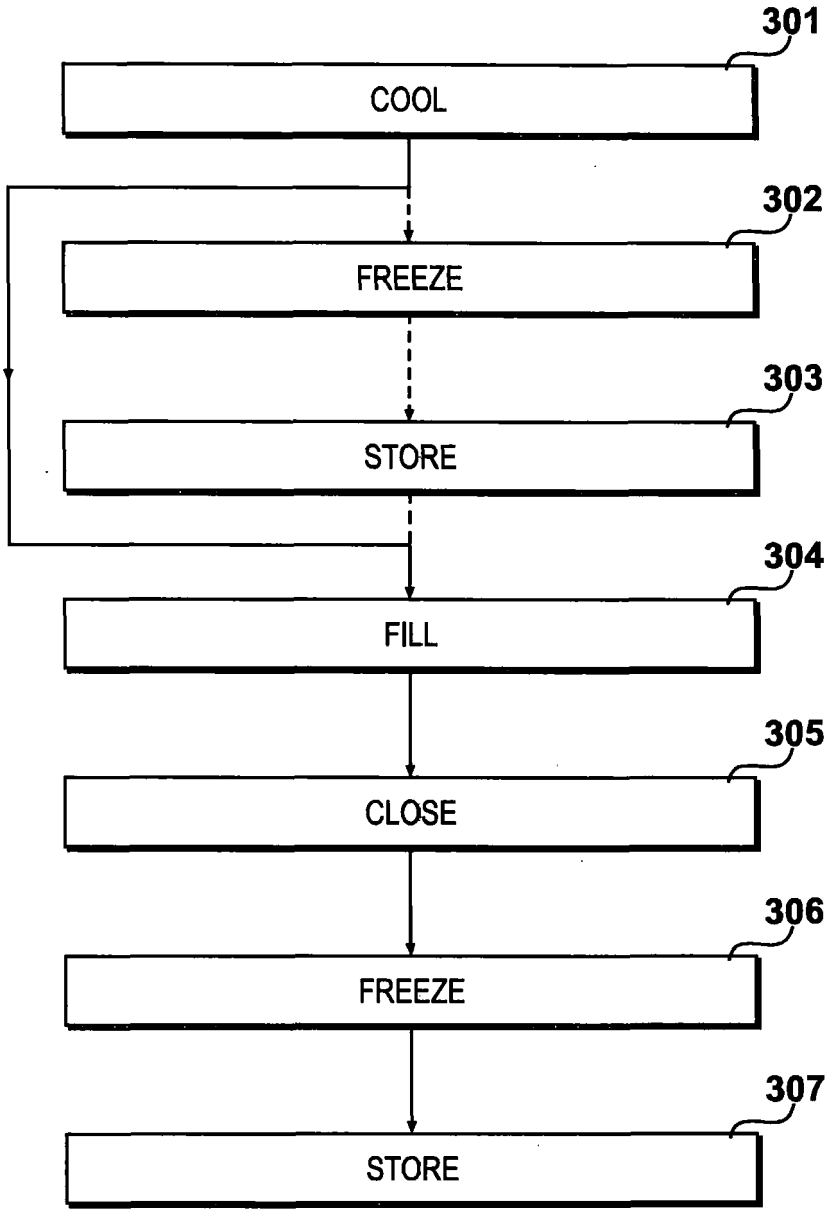
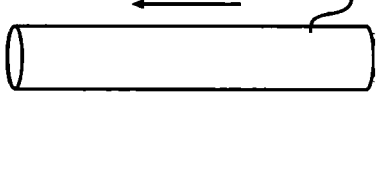

301
COOL
302
FREEZE
303
STORE
304
FILL
305
CLOSE
306
FREEZE
307
STORE

Fig. 3



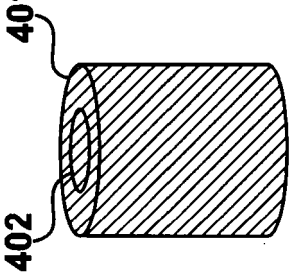


Fig. 4A

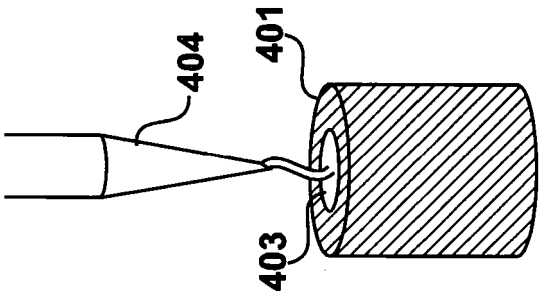


Fig. 4B

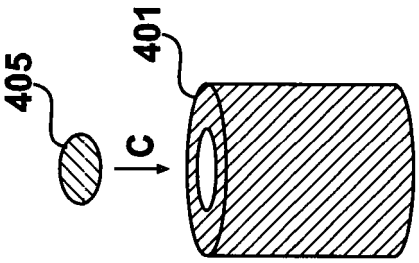


Fig. 4C

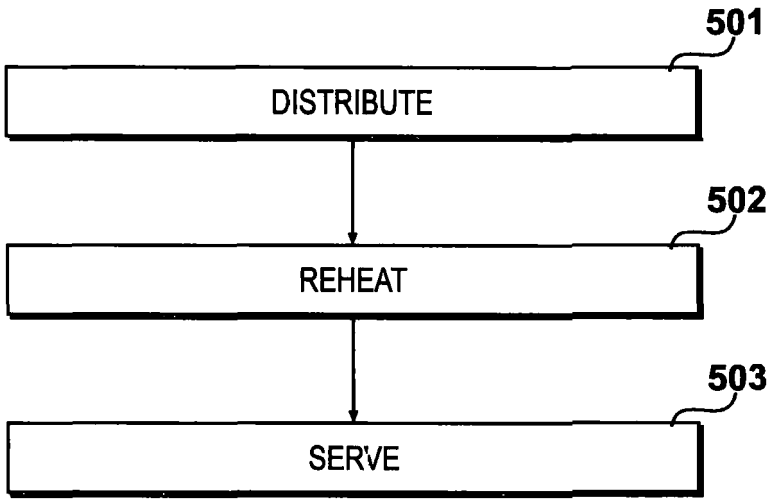


Fig. 5

Food Products

TECHNICAL FIELD

This invention relates to food products comprising a bread or pastry shell containing an edible filling.

BACKGROUND OF THE INVENTION

Bread is made essentially from a dough of flour and water and may, as is common, be leavened by microbial action, e.g. through the use of yeast, and it may be cooked by baking or steaming. Pastry is essentially made from a dough that is like bread dough, but with added fat.

There are many known recipes and processes for making filled baked breads. The filling – sweet or savoury - may be mixed into or layered within the dough, which is then allowed to rise before baking, or the dough may be folded around the filling before it is allowed to rise. Otherwise a bread shell may be cooked (possibly fried) and then injected with the filling or hollowed out to receive the filling.

Otherwise, in large parts of the world particularly in China and East Asia, the bread is commonly steamed rather than baked. The dough is leavened and typically prepared by well-known processes such as straight dough, sourdough or sponge and dough. It may be consumed as plain buns called mantou, or with savoury or sweet fillings commonly known as bao or by other names, in which case the filling is placed on a round of dough which is then closed over and its edges crimped together before steaming.

For completeness it should also be noted that pastries are commonly filled, for example pies, pasties and sausage rolls. Sausage rolls are commonly made by folding dough over the filling before baking. Pies are commonly made by pressing or stamping pastry into a mould, then adding a filling and a pastry lid before baking. Another common process is to bake the pastry shell blind (that is, with no filling) and subsequently inserting the filling, and in this case the product may be frozen or chilled for later baking by

consumers.

BRIEF SUMMARY OF THE INVENTION

According to the present invention, there is provided a method of producing a food product for reheating prior to consumption, which method comprises:

providing a mandrel;

encasing the mandrel with dough;

cooking the dough on the mandrel to form a shell of bread;

separating the shell from the mandrel to leave a cavity formed by the mandrel in the shell;

filling said cavity with an edible filling; and

closing said cavity with a closure formed of a sponge mix including a heat-activated rising agent;

wherein the dough is cooked by steaming or baking.

This permits production of the food product to be separated into sub-processes, namely production of the shell, and then addition of the filling and sealing with the closure. When the food product is reheated for consumption, the sponge mix rises and hardens so as to close off the filling.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described by way of example only with reference to the accompanying drawings, which are purely schematic and not to scale, of which:

Figure 1 shows a method of producing the bread or pastry shells for the food product of the present invention;

Figures 2A, 2B and 2C show the process of forming the shell on a mandrel for cooking;

Figure 3 shows steps carried out following cooking to finish the food product of the present invention;

Figures 4A, 4B and 4C illustrate the process of inserting the edible filling; and

Figure 5 shows steps carried out to serve the food product.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1

In the present example, the food product is bao. Traditionally, bao is made by first preparing dough comprising a mixture of flour, water and yeast (or possibly some other leavening agent) kneaded together until it is malleable, and those skilled in the art will understand that it may be prepared as straight dough, sponge and dough or sourdough. Next, the mass of dough is left in a warm place – or, at least, not a cold place – for bulk fermentation, commonly known as first rise. In a varied process known as "no time" this first rise stage is omitted.

After the first rise the dough is sheeted and then divided into appropriately sized pieces and shaped according to the product to be made. For plain buns (mantou) the pieces would be shaped like pillows, but for making of filled buns (bao), the dough pieces are shaped into rounds. At a fill stage, a measured amount of an edible filling – which may be savoury or sweet – is placed on each round. Each round is then, at an encrustation stage folded approximately on a diameter and its semicircular edges brought together and joined by crimping. By hand this may be done readily by finger and thumb; automated encrustation apparatus is also in widespread use, and twists the dough to seal top and bottom.

The dough components of the individual filled units are then usually subject to further fermentation, this stage being commonly known as proofing, after which the units are cooked by steaming. The cooked buns are then allowed to cool, and then frozen or chilled and (especially in the automated production of large quantities) stored for subsequent distribution. Alternatively (especially where small quantities are made by hand) the buns may be eaten immediately or after a short cooling period.

There are several problems with this established method of making bao, as will now be discussed.

First, to prevent bacterial growth, the filling needs to be kept chilled (a temperature below 5 degrees Celsius is usually recommended). But for the yeast to ferment effectively and provide the light and fluffy bun that is desirable, the proofing stage requires warmth (e.g. 32 degrees Celsius) and humidity (e.g. 85 percent). Without these conditions, the bread is likely to be hard and/or tough; but with these conditions there is a propensity for bacterial growth in the fillings which is a health hazard. The present invention addresses this problem.

It is known to shorten the proofing stage with a view to reducing bacterial growth, by accelerating expansion of the dough through the addition of a chemical rising agent such as heat-activated baking powder, but this can create further problems. Unless the additive is carefully formulated and controlled, there is a risk of premature activation making the mass of dough difficult to manage. And trying to avoid premature activation by introducing the additive immediately before filing and steaming the unit results in longer process time, to ensure thorough mixing without which the bun may be discoloured and/or its flavour tainted.

A third problem area concerns the application of the filling to the dough before steaming. The fillings need to be carefully formulated to avoid their soaking into the dough, which causes the bun to rise unevenly, or not at all if the filling is too wet. This significantly restricts production flexibility.

Fourth, automated production demands a single continuous process with tight constraints on environmental limits and timings. But this lengthens the total production cycle and, again, reduces production flexibility.

Fifth, hand-crafting and automated manufacture are both expensive. For small scale production the shaping and filling of the bun by hand is a labour-intensive process that requires much skill. Automation demands encrusting machinery that is expensive to procure and complex in operation and maintenance; and attempts to avoid this by injecting the filling are limited to substantially liquid fillings, and may even then compress the dough around the injection area unless the filling is of small volume and thereby create a

heavy layer of dough around the filling.

Sixth, conventional methods require all steps of the process to be carried out to produce finished products (i.e. filled buns). To meet customer demand for different varieties of product, then, it is necessary to have an inventory of finished products, and hence a large investment in stock.

Thus, a method of making the food product of the present invention is shown in Figure 1.

At step **101**, the desired type of dough is prepared in the known manner outlined above. At step **102**, the dough is subjected to a first rise, although this may be omitted if the no time process is employed. The dough is then sheeted at step **103** in the known manner.

The method then departs from the hereinbefore established way of producing bao in that the sheeted dough is shaped at step **104** as a shell having a cavity therein, proofed at step **105** and cooked at step **106** by steaming or baking as appropriate, and without any filling therein to produce a shell of bread or pastry depending on the type of food product being made.

As the filling is not present during the proofing step **105** and the cooking step **106**, it is not exposed to the warm and humid environment of these stages which would promote bacterial growth. It follows that the method of the present invention avoids the health risks noted above in relation to the conventional prior art method, and is a major benefit of the present invention.

Figures 2A, 2B & 2C

Apparatus for shaping the sheeting dough at step **104** and its operation is shown in Figures 2A to 2C.

The shaping step **104** first comprises draping the sheeted dough **201** over a folding mould **202**, after which a mandrel **203** is applied to press the sheeted dough **201** into the mould **202**. In the present embodiment, the mandrel **202** is axially extending and of circular cross-section and the folding mould **202** is a two-part mould in the form of a hollow cylinder, closed at one

end.

Thus at the start of an encasing process the mandrel **202** is raised from the mould **204** as shown in Figure 2A and a metered amount of sheeted dough **201** is delivered into the mould **202** as indicated by arrow **D**.

Next, as shown in Figure 2B, the mandrel **203** is advanced in the direction of arrow **M** so that its lower end presses into the dough **201** in the mould **202**, which is thereby caused to fill the mould.

To complete the encasing cycle the two parts **204** and **205** of the mould **202** separate as shown by **S** in Figure 2C, allowing the mandrel **203** to be retracted with its lower end covered in the dough **201**. In the present example, the mandrel and the mould are coated with an oil or a hydrophobic coating or the like to facilitate release. The two parts **204** and **205** of the mould **202** then re-join for the start of another encasing cycle.

The mandrel **202** may have a range of shapes, but for preference it is axially extending generally in the form of a bar which may be of circular, square or some other cross-section. Further, the dough may be pressed into, draped over or wrapped around the mandrel.

The mandrel may be made of any appropriate food-grade material that will accommodate the cooking temperature. For steaming, because they are subject to alternate heating and cooling, it is preferred to use a material of low latent heat such as synthetic plastics material. For baking, stainless steel is preferred. Also, for speed of production, a plurality of mandrels may be mounted on a common support and used simultaneously, for example.

In the present example, the shell is removed from the mandrel after cooking but before freezing. This is because the shell is more easily removed from its mandrel before freezing and then more easily handled and filled when frozen. However, it is perfectly possible for the shell to be left on the mandrel whilst it is frozen.

In tests satisfactory result have been obtained with circular cross-section mandrels between 50 and 150 millimetres long receiving a 3 to 5 millimetre covering of dough, which after proofing and steaming and removal

of the mandrel results in a bread shell about 10 millimetres thick around an open-ended hollow cavity of substantially the same diameter as the mandrel to receive an edible filling.

Figure 3

Referring now to Figure 3, following the cooking at step **106**, the shell is allowed to cool at step **301**. Optionally, the shell may be frozen at step **302** and stored at step **303** for later retrieval, which may be convenient for production schedules. Otherwise, or after retrieval, the frozen shells are filled with an edible filling at step **304** using an appropriate depositor of conventional form, and then closed at step **305**. After the filling has been inserted and the shell closed, in the present example the completed food product is frozen at step **306** and stored at step **307**. Alternatively the food product may be served immediately.

The shells are closed to prevent leakage during reheating and consumption. The food products produced by the method of the present invention are closed using a closure made of a sponge mix that contains a heat-activated rising agent. In the present example, a heat-activated baking powder comprising disodium pyrophosphate is used, also known as sodium acid pyrophosphate (SAPP), although other heat-activated rising agents may be used instead.

Thus, the sponge mix is deposited into the open end of the shell at step **305** and then frozen with the rest of the filled product at step **306**. When the filled food product is reheated for use, the sponge mix rises and hardens so as to close off the filling. This provides a low cost closure, and those skilled in the art will appreciate that the sponge can be formulated to blend with the steamed bread in taste, colour and texture.

Figures 4A, 4B & 4C

An illustration of the process of filling and closing the food product is shown in Figures 4A to 4C.

A shell **401** with a cavity **402** is formed following cooking at step **106**, from which the mandrel **203** is removed as shown by arrow **R** in Figure 4A.

Following this, or optionally following freezing of the shell **401**, an edible filling **403** is inserted into the cavity **402** at step **304** as shown in Figure 4B using an appropriate depositor **404** for the filling selected for the food product. Such processes will be understood by those skilled in the art as requiring different types of apparatus to facilitate the edible filling **403** in dependence upon its properties.

Then at step **305**, a closure **405** as hereinbefore described is inserted into the end of the cavity **402** as shown by arrow **C** to close off said cavity and seal the shell **401**. As previously described, in the present example the final food product is then subjected to freezing at step **306** for storage at step **307**.

Figure 5

Finally, after storing the frozen food products at step **307**, as detailed in Figure 5 they are distributed at step **501** to serving locations, e.g. catering stands at sporting events, where they may be reheated at step **502** on demand and served at step **503** to customers.

Thus it will be seen that the overall manufacturing process of the food product of the present invention is split into two essentially separate sub-processes.

The first sub-process, in which the shells are made, is relatively time-consuming but involves only low-cost ingredients, allowing substantial stocks of the bread shells to be built up over time at relatively low cost.

The second sub-process, in which the shells are filled, uses relatively costly ingredients (the fillings) but can be completed very quickly using any one of a large variety of fillings, which can be procured on a just-in-time basis. The shell may then be sealed using the sponge mix as hereinbefore described. Thus customer demand can be met without the need for large stocks of (expensive) fillings or filled products. Those skilled in the art will see

that this is another major benefit of the present invention.

Those skilled in the art will perceive that the invention affords the following benefits:

(i) the bread shells can be made in advance of filling, and independent of the choice of filling, which significantly reduces inventory cost and shortens customer response times;

(ii) the filling can be deposited chilled into frozen shells, without on the one hand the risk of bacterial growth and without on the other hand any need to shorten the proofing time to a point at which the quality of the bun deteriorates;

(iii) the hollow bread shells can be cooled, safely, without the cost of blast chilling equipment needed to cool filled products quickly;

(iv) the products can be shaped in a way that makes them (in comparison with e.g. conventional round buns) easy to handle in processing and efficient in shipping and storage; and

(v) the insertion of chilled fillings after the bread or pastry has been cooked and frozen allows more flexibility in the choice of filling, and in particular moist fillings can be inserted without adversely affecting the proofing and cooking processes.

Various modifications and adaptations are possible within the scope of the invention. For example, a different apparatus may be utilised to make the bread or pastry shells, so long as it takes sheeted dough and encases a mandrel with the dough, whereupon it may be proofed and cooked. In accordance with the present invention, the shells may then be cooled and frozen prior to an edible filling being inserted and closed using a sponge mix including a heat-activated rising agent.

Those skilled in the art will also appreciate that whilst the invention has been particularly described in relation to the making of steamed and baked bread products the concept of cooking on a mandrel could possibly be used, e.g. with different doughs and/or cooking processes, to make other products such as doughnuts and sausage rolls.

CLAIMS

1. A method of producing a filled bread food product for reheating prior to consumption, which method comprises:

providing a mandrel;

encasing the mandrel with dough;

cooking the dough on the mandrel to form a shell of bread;

separating the shell from the mandrel to leave a cavity formed by the mandrel in the shell;

filling said cavity with an edible filling; and

closing the cavity with a closure formed of a sponge mix including a heat-activated rising agent;

wherein the dough is cooked by steaming or baking.

2. The method of claim 1 wherein the dough is cooked by steaming and the mandrel is formed of synthetic plastics material.

3. The method of claim 1 wherein the dough is cooked by baking and the mandrel is formed of stainless steel.

4. The method of any of claims 1 to 3, in which the heat-activated rising agent is heat-activated baking powder comprising disodium pyrophosphate.

5. The method of any of claims 1 to 4, in which the dough contains a leavening agent and is proofed on the mandrel before being cooked.

6. The method of any preceding claim, in which the cooked dough is cooled on the mandrel and the cavity then filled with the edible filling, chilled.

7. The method of claim 6, further comprising freezing the food product after the cavity has been closed by the closure.