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(56) Documents cited
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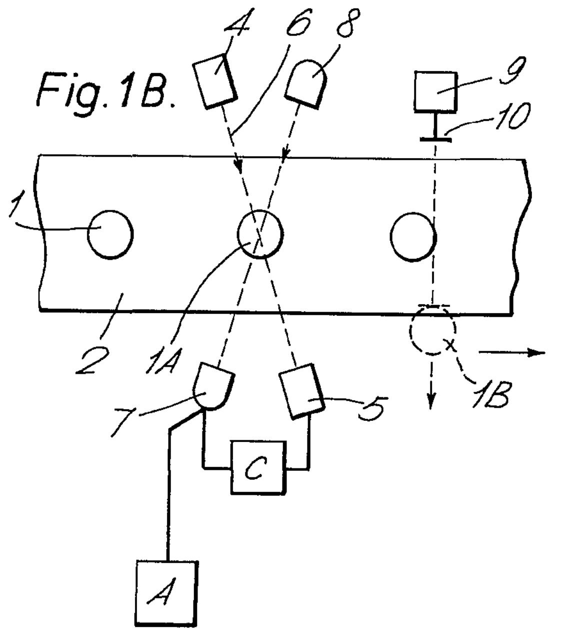
(54) **Testing confectionary products**

(57) Cream-filled cakes (1A) are tested by passing a β-ray from a β-particle source (8) to a detector (7) and checking the β-particle count to indicate if the cakes have been correctly filled with cream. The presence of a cake to be tested is sensed by an optical detector 5 and incorrectly filled cakes (1B) are removed by a plunger (10).

Fig. 1B.



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The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

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Fig. 1A.

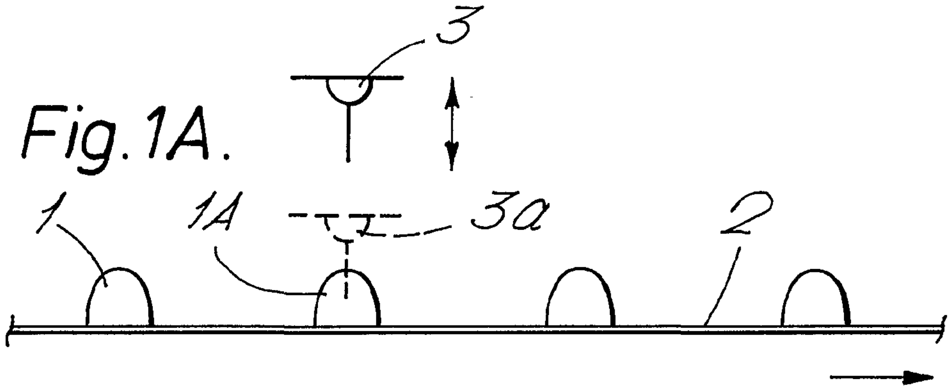


Fig. 1B.

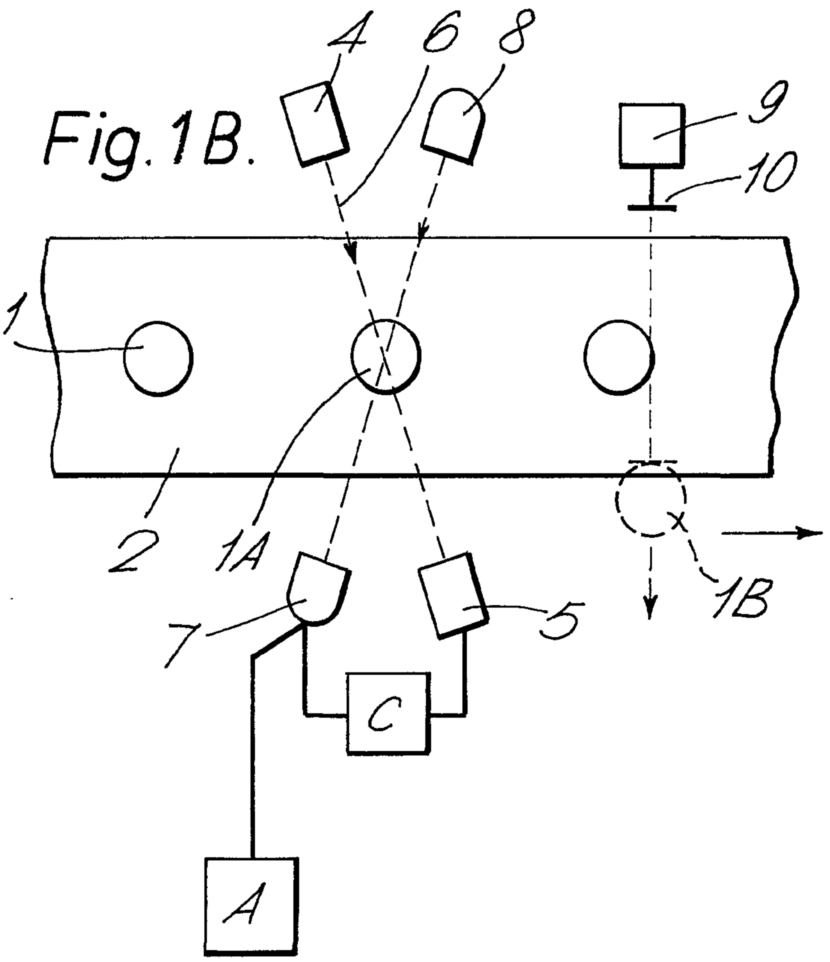
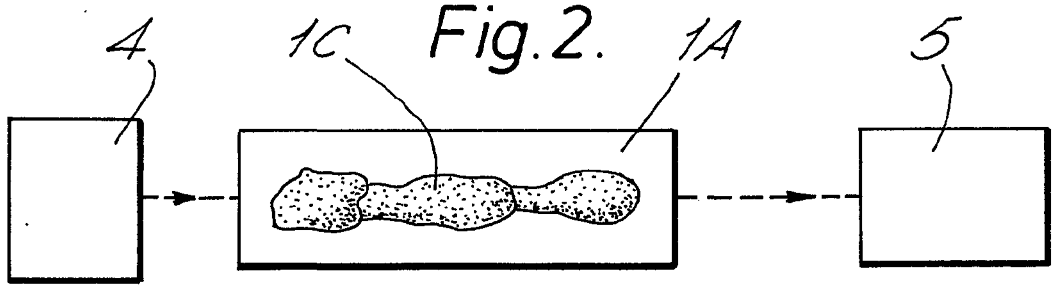


Fig. 2.



SPECIFICATION

Testing confectionery products

This invention relates to testing confectionery products, particularly but not exclusively testing cakes to check if they have been filled with cream, jam or the like.

When cakes are produced on a mass production basis it is known to fill the cake by means of a syringe which is lowered into the sponge and the cream is injected. Occasionally blockages in the syringe cause unfilled cakes to be produced which are not readily detectable.

It is an object of the present invention to provide a practical technique for detecting these unfilled cakes.

According to the present invention there is provided a method of testing a food product comprising directing a β-ray through the product, detecting the β-particles which pass through the product and indicating if the absorption of β-particles by the product is greater and/or less than a predetermined value, representative that the product has been incorrectly prepared.

In order that the invention can be clearly understood reference will now be made to the accompanying drawings, in which:-

f2Figure 1a shows schematically inside elevation part of a cake-making production line according to an embodiment of the invention and

Figure 1b shows a plan view of another part of the cake-making line.

Referring to Figure 1a sponge cakes such as 1 are carried on a conveyor 2 beneath a cream-filling assembly 3 in a direction from left to right as shown in the drawing. When the cake (herein as shown as cake 1A) is directly beneath the syringe assembly 3, the assembly 3 is lowered so that the syringe penetrates the sponge and automatically injects a predetermined quantity of cream into the sponge. The syringe-assembly 3 is then raised again and the conveyor moves the cream-filled cake 1A forward.

In the embodiment described the filling assembly 3 has one syringe but if the product is elongate, i.e. finger-like, then it may be convenient for the syringe-assembly say to have two or even three spaced apart locations along the finger so that the finger becomes substantially completely filled internally aong its length.

The conveyor moves in a step-wise fashion, so that the cake 1A pauses beneath the syringe-assembly 3 for a time sufficient to allow the assembly to be lowered, inject the cream and be raised again.

Referring now to Figure 1b at a position along the line downstream from the filling syringe-assembly 3 there is a testing station comprising a detector arrangement for detecting the presence of a cake. In this instance cake 1A is shown in position in the line of the detector comprising an optical transmitter 4 and an optical detector 5. The detector 5 recognises the existance of a cake when a beam of light 6, shown in dotted line, is prevented from reaching the detector 5 by the presence of the cake 1A.

When this happens the detector 5 initiates a second detector 7 which receives condinuously a stream of β-particles from a radio-active source 8. The impedance which the cake 1A presents to the stream of β-particles is dependent upon the density of the cake, in particular upon the moisture content of the cake. Thus if the cake has not been filled with cream, the detector 7 will pick up a much higher β-particle count than if the cake has been correctly filled with cream. The detector 7 can be set to initiate an alarm A if an unfilled cake is detected and in practice this would involve setting the β-particle detector to initiate the alarm above a predetermined count representative of a cake with less than a minimum required amount of cream in it.

Instead of, or as well as, initiating an alarm A, the detector 7 could also be used to initate a diverter mechanism 9 which with a plunger 10 could be used to divert the defective cake off the conveyor 2. This is represented by the cake 1B shown in dotted lines.

Referring to Figure 2 there is shown the cake 1A located between a β-particle source 4 and a β-particle detector 5. The particular cake has a length of 6″ and a width of 2″ and has a cream-filled hollow inner region 1C, the cream in this particular example having been injected by three syringes with a gap of 2″ between the syringes.

In this embodiment the β-source is Sr-90 having an energy of 2.274 Mev and is spaced from the detector by distance of 4 cm. The detector comprises a Geiger or scintillation counter. With no cake present in the β-ray the number of counts per second was approximately 1500 β-ray, the counts per second were approximately 800. With a incorrectly filled cake that is to say a cake with no cream filling, the β-particle count was approximately 1000/sec. The main cause of a cake not being filled or being incorrectly filled is a blockage in the syringes.

As an alternative to Sr-90 the source could be Ruthenium 106 with β-particle energy of 3.54, or another β or α emitter.

The arrangement described has the advantage that even partially filled cakes can be detected. For example, a cake filled by two of the three syringes, the third one having been blocked, could be expected to give a particle count between 800 and 900 per second.

The technique also has the advantage that the cake does not need to be disturbed during its transit in manufacture to a packing station (not shown). Thus the test can be carried out on line.

One can conceive of a technique of weighing the cakes to check if a minimum quantity of cream had been injected, but this involves difficult mechanical contrivances which need to be on the one hand rugged and on the other hand extremely sensitive since this type of confectionery is very light in weight.

It would be possible to set the counter to detect over-filling of the product, i.e. a particle count of less than a predetermined value, instead of or as well as underfilling.

CLAIMS

1. A method of testing a food product comprising directing a -ray through the product, detecting the β-particles which pass through the product and indicating if the absorption of β-particles by the product is greater and/or less than a predetermined value, representative that the product has been incorrectly prepared.

2. A method as claimed in claim 1, wherein the product comprises a casing and a filling in the casing, and wherein said predetermined value is indicative of the product having been filled with at least a minimum quantity of filling.

3. A method as claimed in claim 2, wherein the product is a cream-filled confectionery product.

4. A method as claimed in claim 1, claim 2, or claim 3, further including the step of preventing the food product being packaged in the event that incorrect preparation is indicated.

5. A method as claimed in claim 4, wherein the indication includes an alarm signal.

6. A method of testing a food product substantially as hereinbefore described with reference to the accompanying drawing.

7. A food product tested by a method according to any preceding claims.

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