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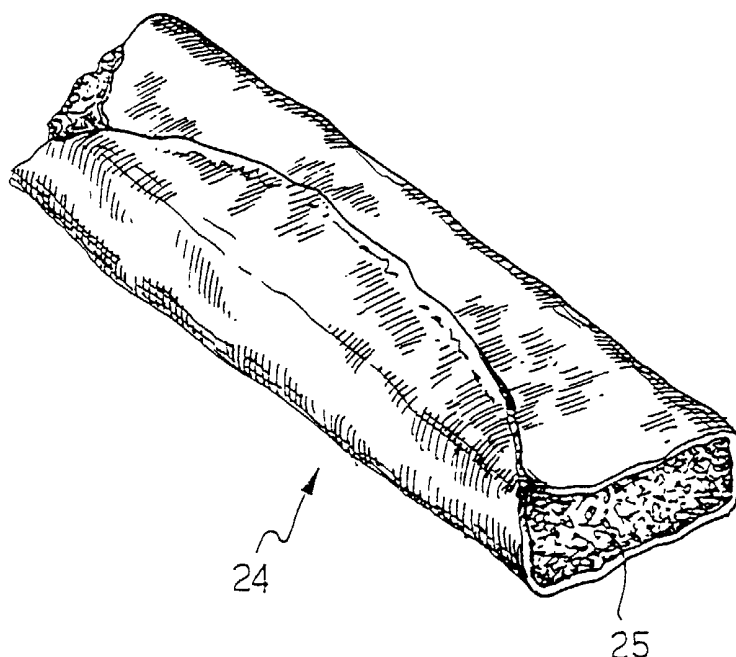
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(54) Title: A FILLED SNACK HAVING A WAFER OUTER ENVELOPE, A METHOD AND AN APPARATUS FOR THE PRODUCTION THEREOF.



(57) Abstract: A filled snack (24) comprises a substantially straight tubular wafer (14h) of substantially rectangular cross-section, having a thickness of less than 3 mm for at least 80 % of its surface area and being filled with a creamy filling, which filling is substantially anhydrous and preferably sweet; this snack article is prepared by filling an envelope formed by folding over wafer laps on an apparatus (1) that comprises a forming die (3) and a bar-shaped plug (9).



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**“A filled snack having a wafer outer envelope, a method and an apparatus for the production thereof”**

**DESCRIPTION**

Field of Application

5           The present invention broadly pertains to the food industry.

          Specifically, the invention relates to a sweet snack comprising a filled wafer, as well as to a method and an apparatus for making it.

Prior Art

10           Wafers, or waffles, are widely utilized in the food industry to produce conical and tubular envelopes, or biscuits and the like, and are obtained by either of two methods. In a first method, a wafer is prepared by flash baking, in a baking oven or under a heated press platen, a batter having a high sugar content. The hot wafer is then rolled up into a conical or a cylindrical final form.

15           This forming step must be carried out promptly, while the wafer is still hot, as on cooling the wafer becomes brittle and is easily crumbled.

          In the second method, the wafer is molded from a batter incorporating a very small amount (not exceeding 5%) of or no sugar at all. This because a large proportion of sugar would make the wafer  
20           difficult to be removed from the mold. Wafers obtained by this method tend to be spongy in texture and lack the crisp character of wafers obtained by the first method.

          The term “wafer” should be understood hereinafter to indicate exclusively a wafer of the crisp variety to be obtained by the first of the  
25           above methods.

          A description of an industrial process for making crisp rolled-up wafers can be found in US Patent 4 624 855, for example.

          Rolled-up wafers prepared by the first of the above methods are specially suitable to produce ice-cream or whipped milk cream cones, by

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reason of their crisp biscuit-like texture making a pleasant contrast to the flowing consistency of ice-cream or whipped cream.

Also known are tubular wafers, which are made by rolling up a wafer web into a spiral form about a cylindrical or prismatic core support. During the rolling operation, there occurs a partial overlapping of the web, so that the wall thickness of the tubular wafer is doubled in the region of overlap.

In an effort to produce ever new snack articles that would distinguish themselves from those currently available on the market (e.g., conventional snacks comprising sponge cake or puff pastry, or chocolate-based bars and the like), the Applicant set about to provide a snack article of adequate shelf-life at room temperature, which would duplicate the contrasting quality of the crisp/soft association that is typical of ice-cream cones incorporating a crisp wafer, and be adapted for carrying in one's pocket.

#### Summary of the Invention

The problem underlying the invention is that of providing a filled snack that would keep at room temperature for at least two months, have a creamy fill enclosed in a thin envelope of a crisp wafer, and be a suitable shape to fit in one's pocket.

The above problem could not be solved by just filling a wafer cone with any cream that would keep at room temperature, for the conical shape is inconvenient to accommodate in an individual's pocket.

On the other hand, an attempt to overcome this by using the aforementioned tubular wafers would result in the crisp/soft contrast of the envelope to the filling being nullified by too thick a wafer.

The problem underlying this invention has been solved by a filled snack, which comprises a substantially straight tubular wafer, of substantially rectangular cross-sectional shape, having a thickness of less than 3 mm for at least 80% of its surface area and being filled with a creamy filling.

The creamy filling is substantially anhydrous, preferably sweet,

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and comprises sugars and fats. It may optionally incorporate such additional ingredients as cocoa, chocolate, hazel nuts, puffed cereals, etc..

5 The snack of this invention is obtained by a method that comprises the steps of:

- baking a batter to provide a wafer;

- laying said wafer, while still hot, onto a forming die provided with a straight groove along a predetermined axis x-x, said groove having a rectangular cross-sectional shape;

10 - driving said wafer into the groove by moving a bar-shaped plug of rectangular cross-section down into the groove, whereby two laps of the wafer are turned up from said forming die and set vertically;

15 - folding said turned-up wafer laps onto the bar-shaped plug to form a tubular wafer with a substantially rectangular cross-sectional shape;

- releasing the formed tubular wafer from said bar-shaped plug; and

- filling said tubular wafer with the filling.

20 Preferably, the tubular wafer is released by withdrawing the plug bar from the groove along the axis x-x.

Advantageously, the tubular wafer is filled as the bar-shaped plug is being withdrawn, using a filling dispenser housed within the bar-shaped plug.

25 This invention also relates to an apparatus implementing the method just described.

#### Brief Description of the Drawings

The apparatus and method of this invention will be further described with reference to the accompanying drawing figures, of which:

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- Figure 1 is a perspective view of a filled snack according to the invention;

- Figure 2 is a top view of the filled snack shown in Figure 1;

- Figure 3 is a cross-sectional view of the filled snack, taken along  
5 line III-III in Figure 1;

- Figure 4 is a top plan view of a wafer;

- Figure 5 is a schematic perspective view of an apparatus for making the snack of Figure 1;

- Figure 6 is a schematic plan view of a detail of the apparatus  
10 shown in Figure 5;

- Figure 7 is a schematic elevation view of the apparatus shown in Figure 5; and

- Figures 8 to 11 are perspective views of a wafer at successive stages of the process for making it in accordance with the inventive  
15 method.

#### Detailed Description of the Invention

Referring to the accompanying drawings, an apparatus according to this invention is shown generally at 1.

The apparatus 1 comprises a frame 2 carrying a forming die 3.  
20 The forming die 3 is comprised of a flat horizontal surface 4 and a straight groove or flute 5 having a horizontal axis x-x. The groove 5 has a rectangular cross-sectional shape with vertical short sides, so that a bottom 6 and opposed vertical walls 7, 8 are defined therein.

It should be noted that the forming die 3 is constructed as two  
25 halves 3a and 3b that can be clamped together along a midline 3c of the bottom 6 and separated from each other a distance only slightly greater than the width of the bottom 6.

A bar-shaped plug 9 has an axis a-a lying in the same direction as the axis x-x parallel to the groove 5, the bar-shaped plug 9 being guided

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on the frame 2 for movement along a vertical axis z-z. The bar-shaped plug 9 is tubular in shape with a hollow interior 9a, has a rectangular cross-sectional shape with vertical short sides, and can be shifted between an upper position above the groove 5 and a lower position into the groove 5.

The bar-shaped plug 9 has an underside 10, oppositely located sidewalls 11, 12, and a top side 13.

It should be noted that the rectangular cross-section of the bar-shaped plug 9 is slightly smaller than the rectangular cross-section of the groove 5. Accordingly, with the bar-shaped plug 9 lowered into the groove, a U-shaped gap remains between the groove bottom 6 and the plug underside 10, as well as between the groove sidewalls 7, 8 and the plug sidewalls 11, 12, the size of the gap being substantially equal to the thickness of a wafer 14. In practice, the gap will not exceed 3 mm.

A head 15 is guided for movement on the frame 2 to shift the plug 9 vertically.

Also mounted on the frame 2 are two slides 16 and 17 horizontally movable along a perpendicular axis y-y to the axis x-x. These slides locate on either sides of the groove 5 and are adapted to be moved in succession towards and over the groove 5. The slides 16 and 17 have thrust strips 18 and 19, respectively, mounted to face the groove by respective straight working edges 20 and 21 thereof.

The head 15 carries a heated pressure pad 22, which is movable in a guided fashion into positions, respectively removed from and closer to the groove, along the vertical axis z-z.

It should be noted that the bar-shaped plug 9 is mounted to the head 15 through the intermediary of a slide 23 that can be shifted horizontally along the axis x-x. Thus, the bar-shaped plug 9 can be moved from a position inside the groove to a position outside the groove.

A filling dispenser, not shown, is mounted in the hollow interior 9a of the bar-shaped plug 9, and is operated as the bar-shaped plug is moved from inside the groove to its position outside the groove.

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The above apparatus 1 further includes a feeder means, not shown, for feeding one wafer 3 at a time onto the flat surface 4 of the forming die 3, in a position defined by the straight working edges 20 and 21, with the slides 16 and 17 moved away from the groove.

5 Preferably, the wafer 14 has a substantially circular shape, of a diameter D (equal 110 mm in the example), less a segment 14a included between a chord 14b and an arc 14c. The wafer 14 has a width dimension C measured to the chord 14b (in the example, 90 mm). When placed on the flat surface 4, the wafer 14 has the chord 14b in contact  
10 with the straight working edge 20.

The above apparatus 1 is then completed with a transport means, not shown, which may be of the belt type and is preferably formed, beneath the die 3, with pits for easier separation of the finished snack article.

15 The apparatus of this invention further comprises a drive means, not shown because consisting of conventional pneumatic or electric motors, for driving the aforementioned movable elements.

#### Detailed Description

20 The method of this invention will be illustrated by means of the following non-limitative Example.

#### **EXAMPLE**

The preparation of a wafer to provide the envelope for the filled snack article according to the invention will be described first.

25 Such a wafer can be prepared from a batter having the following composition by weight, in percent of the overall batter weight:

O-type flour	36.4%
Water	35.6%
Granulated sugar	18.2%
Egg yolk	3.6%

	- 7 -
Milk cream	3.6%
Powdered malt extract	1.5%
Coconut oil	0.7%
Powdered soy lecithin	0.2%
5 Ammonium bicarbonate	0.1%
Sodium bicarbonate	0.1%

The above ingredients are mixed into a batter. Metered batter quantities, of about 10 ml each, are poured onto heated wafer plates that have been brought to a temperature of 200°C, and are fashioned  
10 into their final form shown in Figure 4. After a baking time of 40 seconds, a wafer is obtained of substantially circular shape, as specified hereinabove, and approximately 1,5 to 2 mm thick. The wafer is immediately transferred onto the surface 4 (Figure 8) of the forming die 3, in the space between the straight working edges 20 and 21, with the  
15 chord 14b laid along the working edge 21, the bar-shaped plug 9 and pressure pad 22 being in their raised positions.

Directly after the wafer is placed onto the surface 4, the bar-shaped plug 9 is moved down to contact the wafer and drive it into the groove, with portions 14d, 14e and 14f of the wafer filling the gap  
20 between the vertical wall 7 and the sidewall 11, between the bottom 6 and the underside 10, and between the vertical wall 8 and the sidewall 12 (Figure 9).

At this stage, the wafer is forced into a U-shape, with laps 14g, 14c thereof set to project vertically upwards from the surface 4 of the  
25 forming die 3.

Thereafter, by causing the straight working edges 20 and 21 of the slides 16 and 17 to move towards the groove, first the lap 14g is folded over the top side 13 of the bar-shaped plug 9 (Figure 10), and then the lap or lunule 14c is folded over the top side 13 of the bar-shaped plug 9  
30 (Figure 11) and sealed to the lap 14g to form a tubular wafer 14h having a substantially rectangular cross-sectional shape.

At this stage, the slides 16 and 17 are moved back into their original positions, and the pressure pad 22, heated at about 150°C, is lowered to enhance the bond between the juxtaposed wafer laps.

The bar-shaped plug 9 is withdrawn along the axis x-x while the filling dispenser is operated to dispense a predetermined amount of filling into the tubular wafer 14h. Thereafter, the bar-shaped plug 9 is raised vertically and again shifted horizontally to return it to its position above the groove, in readiness for another cycle.

A snack article 24, complete with its filling 25, is presently released by separating the die halves 3a and 3b, and dropped onto the transport means for conveyance to further processing stations.

The above cycle is repeated by laying a new wafer onto the die, now cleared of the filled wafer.

The filling used for filling the folded wafer may be of several different types, but is preferably anhydrous and comprised mainly of fats.

In this example, the filling has the following composition:

Powdered sugar	49.8%
Hydrogenated coconut oil	20.9%
Powdered cocoa	14.0%
Cocoa paste	11.0%
Hazel nut paste	4.0%
Powdered soy lecithin	0.3%

The filling is prepared by mixing the above ingredients to homogeneity in a planetary mixer.

Before delivering them to a packaging station, the filled wafers are finished by having minced hazel nut adhere to the filling surface not covered by the enveloping wafer.

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The resultant filled snack exhibits a degree of raggedness along the edges and at the folded wafer laps, effectively duplicating the appearance of such home-made preparations as pancakes or omelettes.

5 A major advantage of a snack article according to the invention is that the crisp/soft contrast effect sought is made inherent to an article that can fit conveniently in one's pocket.

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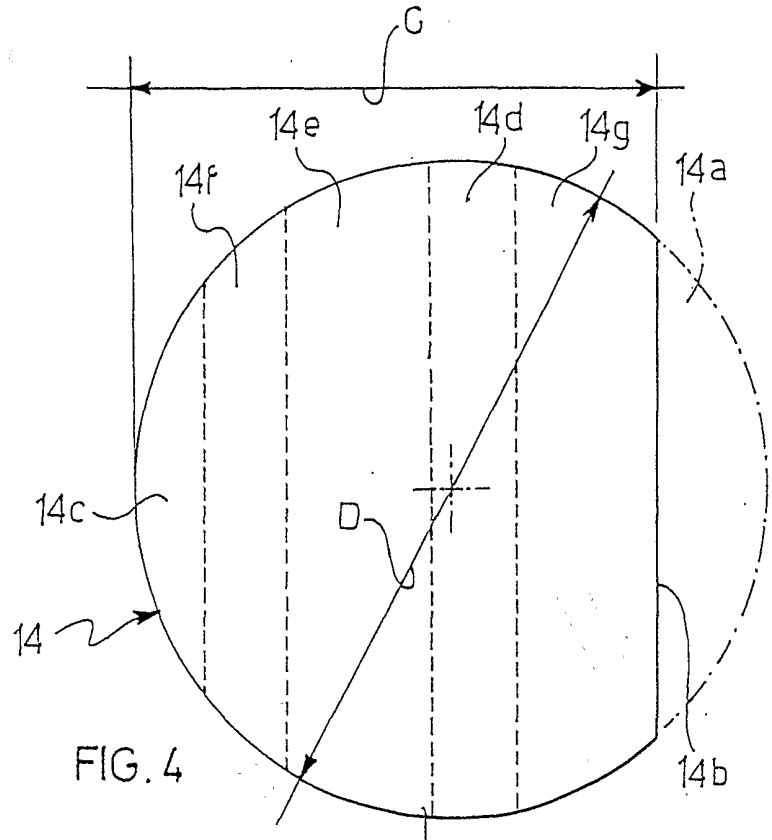
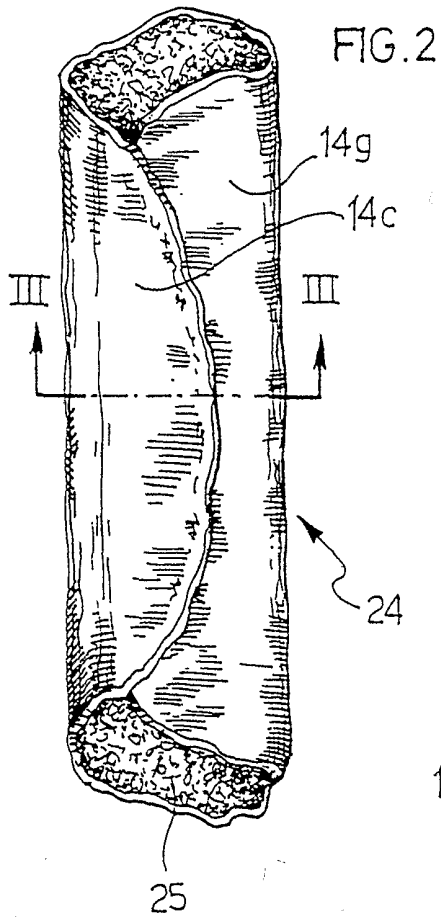
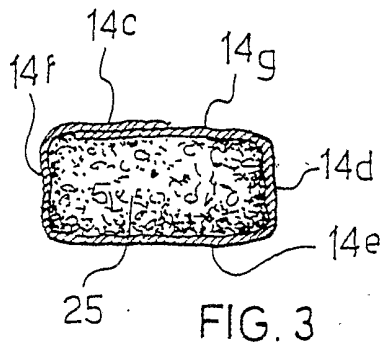
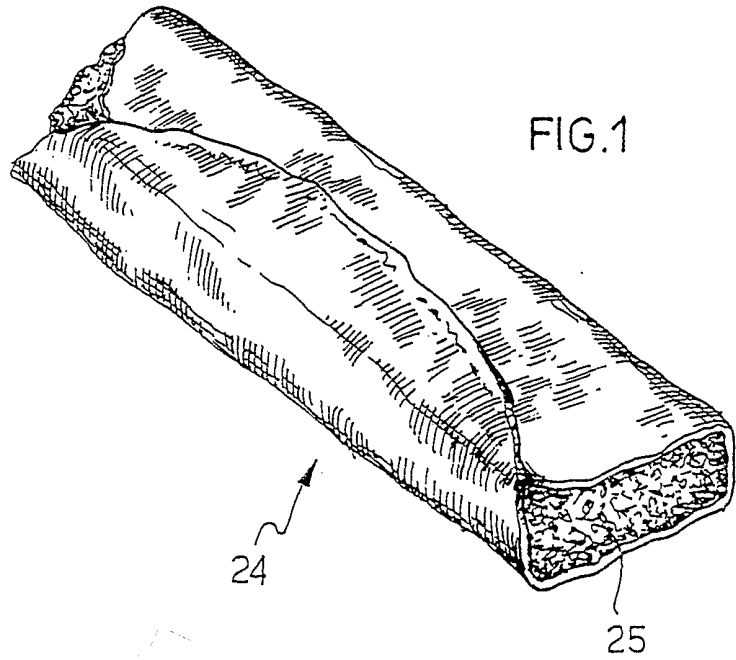
### CLAIMS

1. A filled snack (24), comprising a substantially straight tubular wafer (14h), said wafer having a substantially rectangular cross-sectional shape and a thickness dimension of less than 3 mm for at least 80% of its surface area and being filled with a creamy filling (25).  
5
2. A filled snack article according to Claim 1, wherein said creamy filling (25) is substantially anhydrous and mainly comprises sugars and fats.
3. A method of making a snack (24) comprising a tubular wafer (14h)  
10 having a substantially rectangular cross-sectional shape and filled with a creamy filling (25), said method comprising the steps of:
  - baking a batter to provide a wafer (14);
  - laying said wafer (14), while still hot, onto a forming die (3) provided with a groove (5) extending along a predetermined axis (x-x), said groove  
15 having a rectangular cross-sectional shape;
  - driving said wafer (14) into the groove (5) by moving a bar-shaped plug (9) of rectangular cross-section down into the groove, whereby two laps (14c,14g) of the wafer are turned up from said forming die (3) and set vertically;
  - 20 - folding said turned-up wafer laps (14c,14g) onto the bar-shaped plug (9) to form a tubular wafer (14h) with a substantially rectangular cross-sectional shape;
  - releasing the formed tubular wafer (14h) from said bar-shaped plug (9); and
  - 25 - filling said tubular wafer (14h) with the filling (25).
4. A method according to Claim 3, wherein said tubular wafer (14h) is released by withdrawing the bar-shaped plug (9) from the groove (5) along said predetermined axis (x-x).
5. A method according to Claim 4, wherein said tubular wafer is

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filled with the filling (25) while withdrawing the bar-shaped plug (9), by means of a filling dispenser housed within the bar-shaped plug (9).

6. An apparatus (1) implementing the method of Claim 3, comprising a frame (2) carrying a forming die (3) provided with a groove (5), said groove extending along a predetermined axis (x-x) and having a rectangular cross-sectional shape, a bar-shaped plug (9) having a parallel axis (a-a) to said predetermined axis (x-x) and a rectangular cross-sectional shape, said bar-shaped plug being movable along a vertical axis (z-z) perpendicularly to said predetermined axis (x-x) between an upper position above the groove (5) and a lower position into the groove (5).
7. An apparatus (1) according to Claim 6, further comprising two slides (16,17) guided for movement in the frame (2) along a perpendicular axis (y-y) to said axes (x-x, z-z) and shiftable in succession towards the groove (5) from respective positions removed from said groove.
8. An apparatus (1) according to Claim 7, further comprising a pressure pad (22) guided for movement in the frame (2) and shiftable towards the groove (5) along a vertical axis (z-z).
9. An apparatus (1) according to Claim 8, wherein said bar-shaped plug (9) is adapted to be shifted along said axis (x-x) for withdrawal from the groove (5).
10. An apparatus (1) according to Claim 9, wherein said bar-shaped plug (9) is of a tubular construction defining a hollow interior (9a).
11. An apparatus (1) according to Claim 10, comprising a filling dispenser located in said hollow interior (9a) and fixed to said bar-shaped plug (9).
12. A filled snack (24) according to Claim 1 and obtainable by the method of any of Claims 3 to 5.





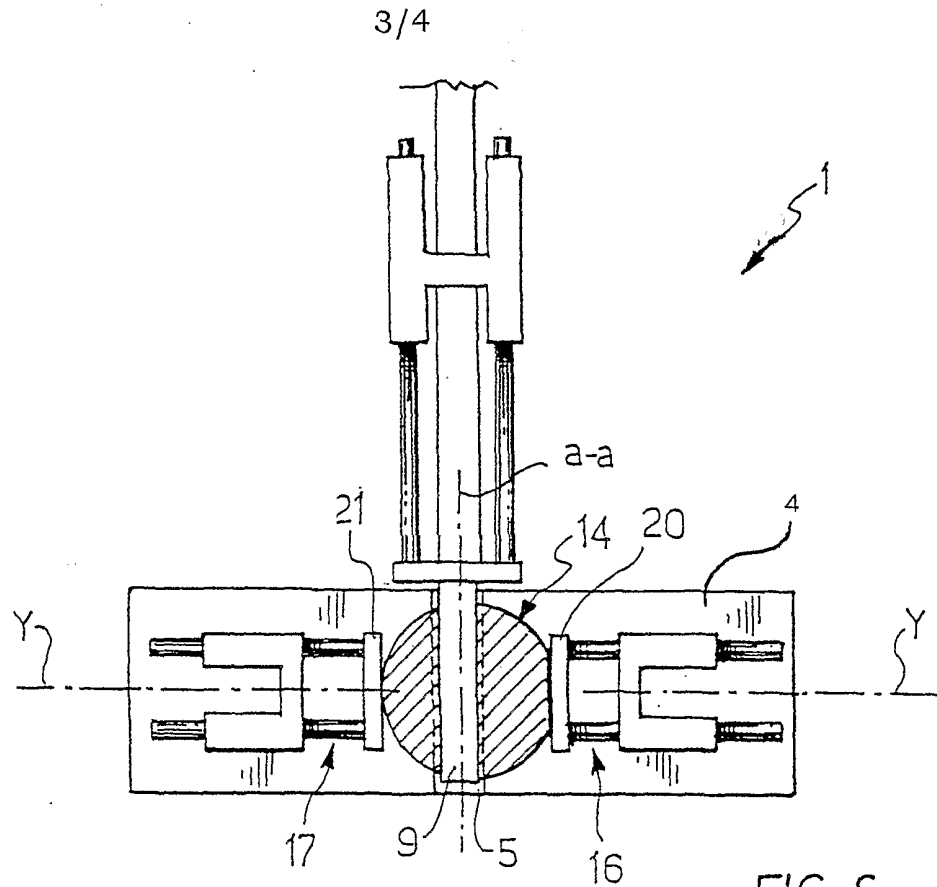


FIG. 6

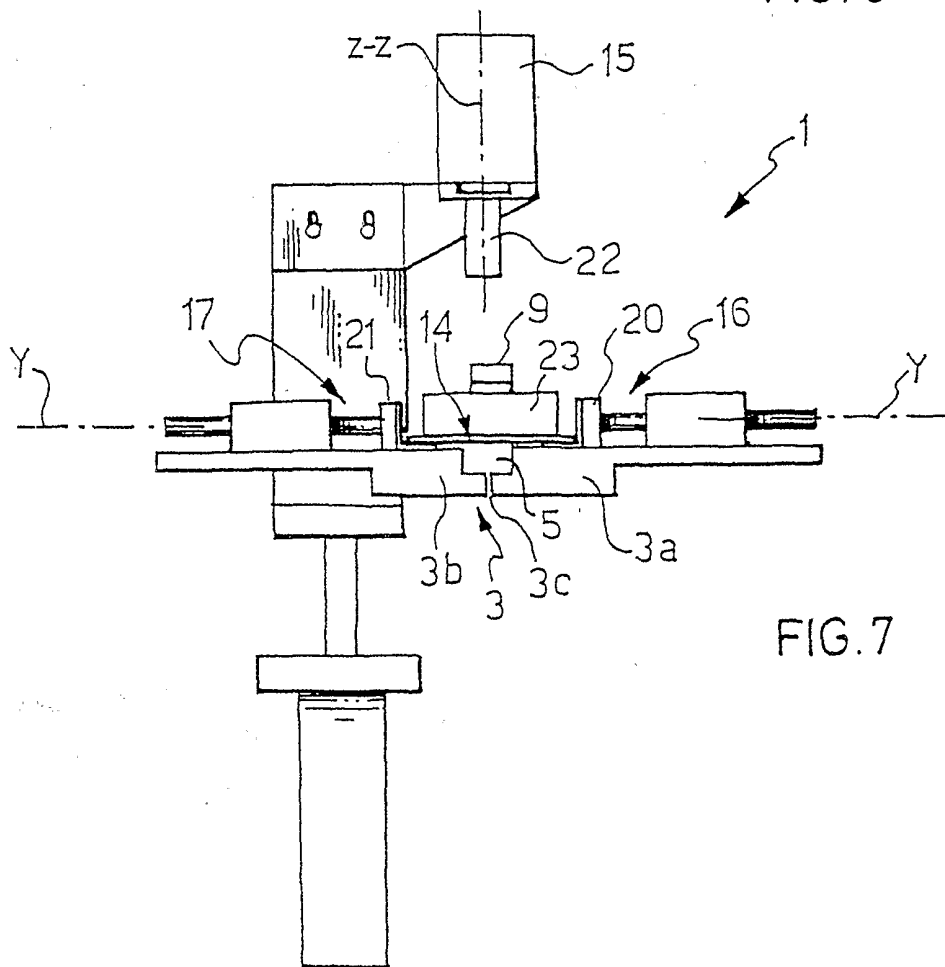
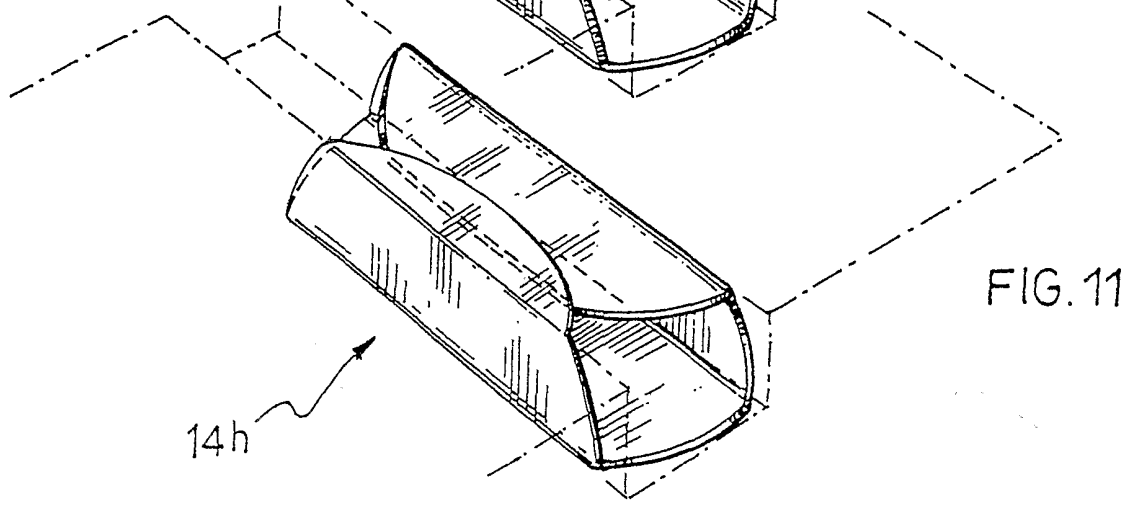
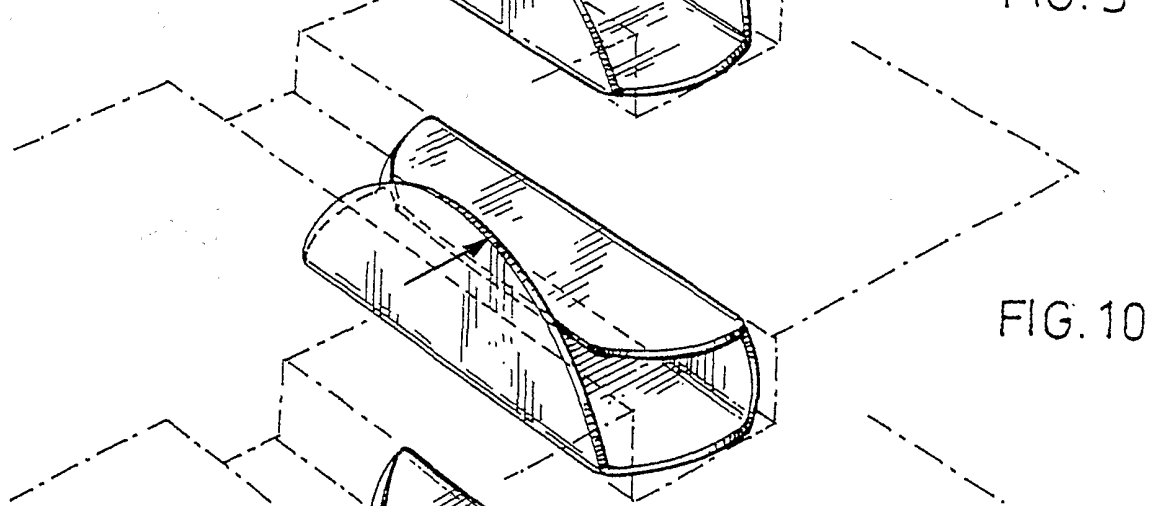
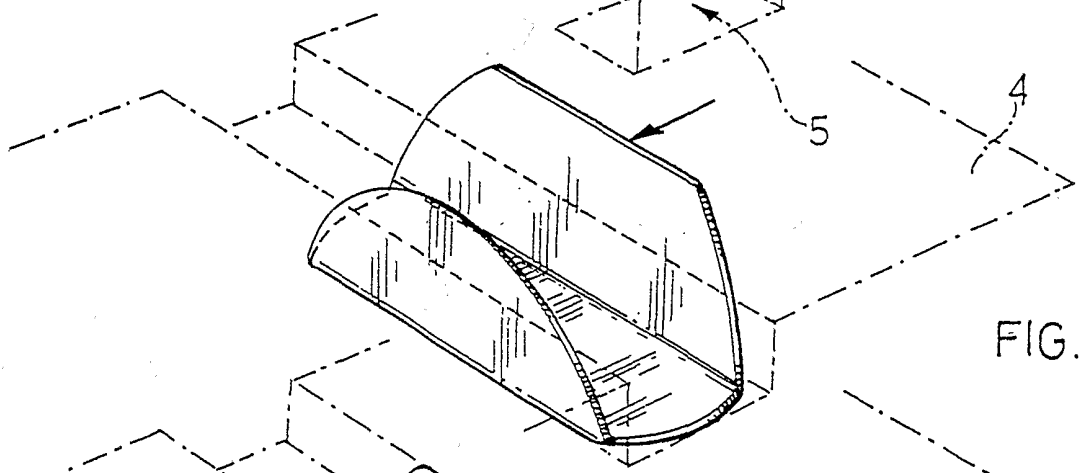
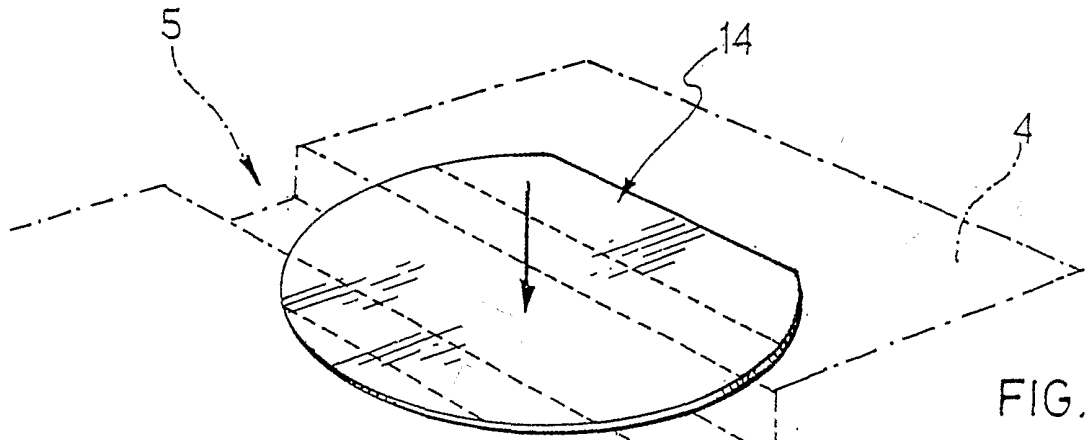


FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No  
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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A21D13/08 A23P1/08 A21C9/06 A21D8/02 A23G3/00

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 7 A21D A23P A21C A23G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A		3
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

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- \*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
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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 01/06018

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Information on patent family members

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