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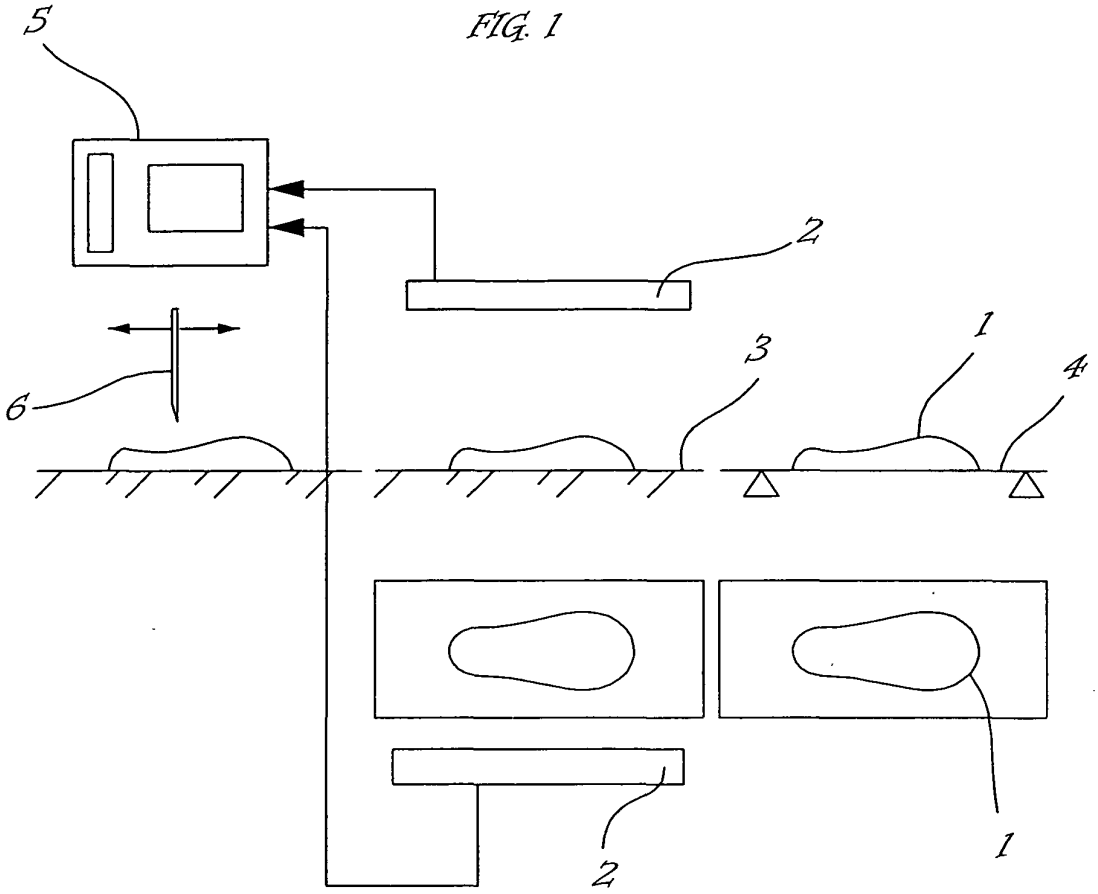
## (54) Process for cutting cheese portions having constant or predetermined weight

(57) The invention relates to cheese cutting, particularly to cheeses having irregular shape which are difficult to be cut by automatic devices adapted to produce pieces having the same weight. The process detects the surface pattern of a cheese or cheese portion by at least one surface detecting means and carries out a processing of the correct cut position by said detection, combining it with the weight of cheese or cheese portion to be cut.

FIG. 1

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## Description

**[0001]** The present invention relates to a process for forming cheese parts having fixed weight, particularly to irregular shaped cheeses which are difficult to be cut by automatic devices adapted to produce pieces having the same weight.

**[0002]** Nowadays, a cheese is cut in two parts in order to obtain a flat surface to be put on a conveyor belt, then the cut cheese is moved under one or more series of sideways located photocells (or similar devices which generate for example infrared rays) which detect a peak of the cross-section passing under a photocell in a determined instant.

**[0003]** As stated before, there is a problem with cheeses having irregular shapes, such as provolone, or having cavities such as the characteristic Swiss cheese, in that it is difficult to obtain a predetermined value because of their shape.

**[0004]** Knowing the height of the cheese, it is possible to determine the distance where the cutting blade must be located, because height determines an area and finally a volume (assuming width is already known).

**[0005]** However, since a cross-section passing under a photocell can have substantially different heights because of its irregular shape, the obtained value will be probably incorrect and consequently cheese pieces of different weight will be obtained.

**[0006]** Even though other detectors are located at right angles with former ones in order to detect the profile in the orthogonal direction so that two profiles are known, the measurement is still uncertain because the same cross-section can have points at different heights.

**[0007]** The object of the present invention is to solve said disadvantage so that pieces having the same weight can be produced which by one or more detecting means can determine a priori the volume crossing a predetermined cut cross-section and consequently its weight, or can move the cutting blade to a position adapted to form a piece having the desired weight.

**[0008]** Said objects and advantages are fulfilled by the process of the present invention which is characterized by the following claims.

**[0009]** This and other characteristics will be better understood by the following description of some preferred embodiments shown as non limiting examples in the attached drawing, wherein:

Fig. 1 schematically shows the process for cutting portions having constant or predetermined weight,
Fig. 2 shows an embodiment of the same process.

**[0010]** Referring to Fig. 1 , it shows the outline of a process for cutting cheese portions having constant or predetermined weight, 1 is part of a cheese having an irregular shape, such as provolone cheese, that is put on a conveyor belt 3 which, initially, dynamically weighs cheese portion 1 by a load cell conveyor belt 4.

**[0011]** Then, belt 3 moves cheese portion 1 to an area where surface detecting means 2 detect the surface pattern of cheese portion 1.

**[0012]** Detecting allows to determine the correct cut position in order to obtain cheese parts having the same weight.

**[0013]** Entered data are fed to a collecting and processing apparatus 5, which, after processing, moves a cutting blade 6 having the size to obtain a slice having the predetermined weight, alternatively, said apparatus 5 could move cheese conveyor belt 3 of the cheese or cheese portion 1 to be cut, if cutting blade (6) were stationary.

**[0014]** Obviously, determining cutting position, cutting blade 6 acceleration and conveyor belt 3 speed are taken into consideration if cutting step occurs simultaneously with the operation of the above elements.

**[0015]** Note that detecting means detection 2 could be done by a three-dimensional scanning.

**[0016]** In the same way, determining cheese portion 1 can be done statically by a scale located aside which can also communicate detected data to processing apparatus 5.

**[0017]** Moreover, weight can be calculated during processing of detected surface, in other words, of occupied volume allowing for specific weight of cheese to be cut.

**[0018]** With reference to fig. 2, note that surface detecting means 2 can be rotated around the cheese or cheese portion 1 determining the entire occupied volume.

## Claims

1. Process for cutting cheese portions of predetermined or constant weight **characterized by** the fact that it detects the surface pattern of a cheese or part of it (1) by at least one surface detecting means (2) and by this detection, it determines the cutting correct position in order to obtain portions having the same weight.

2. Process according to claim 1, **characterized by** the fact that detection is performed by three-dimensional scanning.

3. Process according to claim 1, **characterized by** the fact that the cutting position is determined by taking the weight of cheese or part of it (1) in consideration

4. Process according to claim 3, **characterized by** the fact that weight is statically determined by a scale.

5. Process according to claim 3, **characterized by** the fact that weight is dynamically determined by a conveyor (3) and load cells (4).

6. Process according to claim 3, **characterized by** the

fact that weight is determined during the detected surface processing, or rather the occupied volume or specific weight of cheese to be cut.

**7.** Process according to claim 1 or 2, **characterized by** the fact that input data are sent to a data collecting and processing apparatus (5) that after the processing, moves a cutting blade (6) having the size adapted to cut a slice having the predetermined weight.

**8.** Process according to claim 6, **characterized by** the fact that it moves a conveyor belt (3) for the cheese or part of it to be cut when blade (6) is fixed.

**9.** Process according to claim 1 or 2, **characterized by** the fact that cutting position is determined by taking cutting blade (6) speed and acceleration and conveyor belt (3) speed in consideration when the cut occurs on the operation of said two elements.

**10.** Process according to claim 1 or 2, **characterized by** the fact that surface detecting means (2) is capable of rotating around the cheese or part of it (1) to determine the overall occupied volume.

FIG. 1

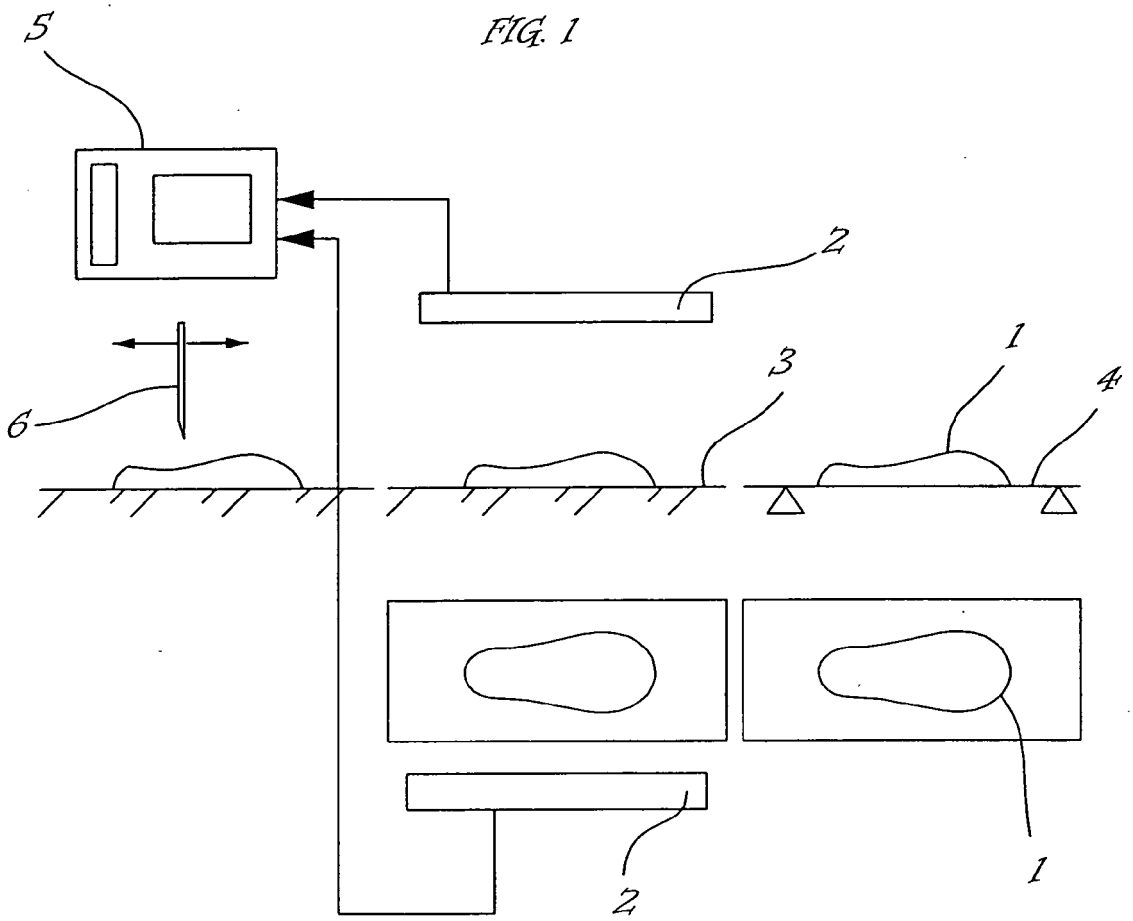
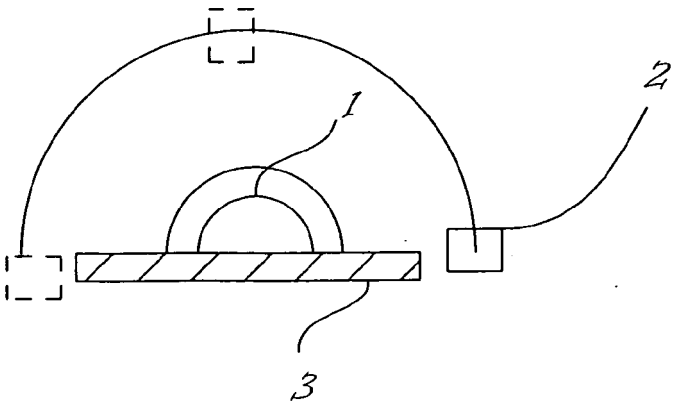



FIG. 2



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# EUROPEAN SEARCH REPORT

Application Number
EP 06 01 0150

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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TECHNICAL FIELDS SEARCHED (IPC)

B26D

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 26 July 2006 | Canelas, R.F. |

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 01 0150

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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