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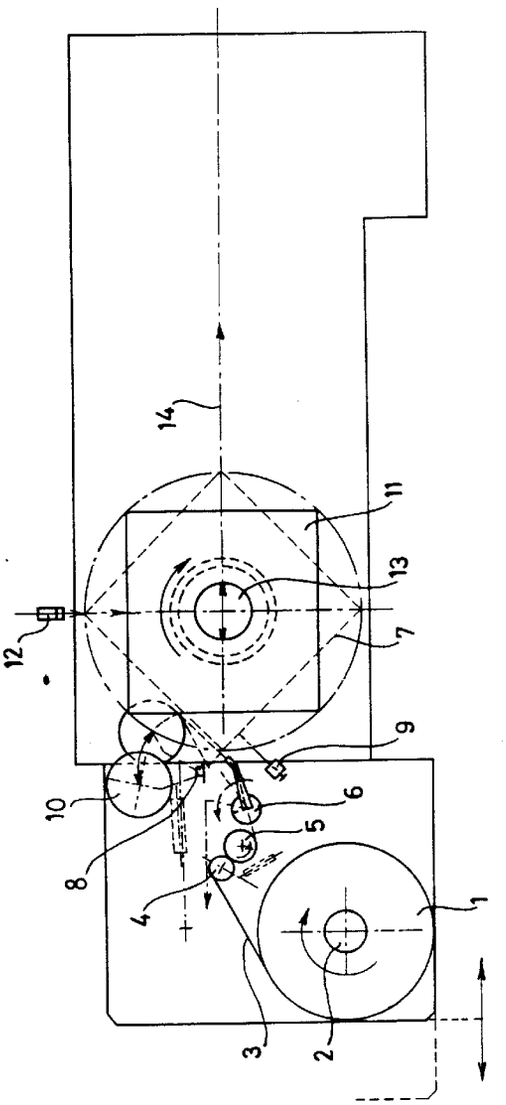
(54) Method and device for applying a banderole to shaped cheeses.

(57) The affixing of a banderole to the periphery of a rotating, shaped cheese is carried out while maintaining an essentially constant peripheral speed of the momentary position of the cheese relative to a banderole strip to be affixed, by determining the peripheral speed of the cheese at a point along the periphery of the cheese and regulating the speed of rotation of the cheese on the basis thereof. This means that uniform affixing of the banderole strip can be achieved on all shapes of cheeses, in particular polygonal cheeses.



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The invention relates to a method for affixing a banderole to the periphery of a rotating, shaped cheese.

Such a method is known from, for example, NL-A-8900177. In the case of this known method a cheese standing on its side, and laterally centred, is rotated by moving supporting rollers. During the rotation of the cheese an adhesive is applied to the periphery of the cheese on the top side thereof, and the front end of a banderole strip to be affixed thereto is subsequently fed close to the periphery of the cheese, so that it is moved along by the cheese. Through further rotation thereof, the cheese pulls the next part of the strip along around the periphery of the cheese. The material strip which has been affixed is pressed onto the cheese by the moving supporting rollers.

A disadvantage of this method is that it can be used only for applying a banderole to round cheeses of constant diameter. A banderole cannot be applied in this way to other non-round cheeses. In fact, until now there have been no known methods for applying a banderole to non-round cheeses, in particular polygonal cheeses such as square, rectangular or hexagonal cheeses. Another disadvantage of the known method is that this method is difficult to use in existing production lines for the preparation of shaped cheeses, because cheeses are generally conveyed horizontally in such lines. In that case the cheeses therefore have to be positioned vertically prior to applying the banderole. After applying the banderole, the cheeses also have to be repositioned for conveyance to subsequent processing steps. These additional operations involve a considerable risk of damage to the banderole which has been affixed and to the plastic coat of the cheese, because the surface of the cheese and the moist banderole strip are not sufficiently strong to withstand great stresses. Damage to the surface of the cheese can lead to mould formation. Damage to the banderole strip which has been affixed can likewise lead to mould formation, and it also adversely affects the appearance of the cheeses.

The object of the invention is to avoid the above-described problems and to provide a method for applying a banderole which can be used for any shape of cheese, in particular in the case of polygonal cheeses.

A further object of the invention is to provide a method in which banderole strips are affixed with great accuracy and at high speed to cheeses supplied in succession.

The method of the above-described type according to the invention is characterized in that the banderole is affixed while maintaining an essentially constant peripheral speed of the momentary position of the cheese relative to a banderole strip to be affixed, by determining the peripheral speed of the cheese at a point along the periphery of the cheese and regulating the speed of rotation of the cheese on the basis thereof.

Maintaining a virtually constant peripheral speed of the momentary position of the cheese, i.e. the peripheral speed of the peripheral part situated at that moment beside the banderole strip to be affixed, relative to the speed of the likewise advancing banderole strip ensures uniform affixing of the banderole strip to the periphery of the shaped cheese. This means that when the banderole strip is being affixed to the peripheral part of the cheese there will be no additional stresses on the strip, owing to the small differences in speed, with the result that tearing of the banderole strip and wrinkling of the banderole strip affixed to the cheese are prevented.

Maintaining a constant peripheral speed relative to the supply speed of the banding strip is achieved by continuously adapting the peripheral speed to a generally constant supply speed of the banderole strip. The angular speed of the cheese can be set to the desired value through feedback of the measured peripheral speed to the desired peripheral speed of the momentary position of the cheese. It is simpler to adjust the speed of rotation of the cheese than the supply speed of the banderole strip, because the material of the latter is not strong enough for great forces to be exerted thereon.

The banderole strip is preferably affixed by supplying the banderole strip essentially at a tangent to the momentary position of the cheese. In this way the banderole strip is affixed to the periphery of the cheese correctly and uniformly, while undesirable stresses on the banderole strip are avoided.

The method according to the invention can be carried out with any cheese shape. It is particularly advantageous to use the method for cheeses of a polygonal shape. Examples of such cheeses are triangular, square, rectangular, hexagonal and octagonal cheeses. However, elliptical or irregularly shaped cheeses can also be banded by the method according to the invention.

The invention also relates to a device for affixing a banderole to the periphery of rotating, shaped cheeses, which device comprises a frame in which conveyor means for conveying the cheeses, and rotary means for rotating the cheeses and a strip applicator for affixing a banderole strip to the periphery of the rotating cheeses are disposed, which is characterized in that the device is provided with detection means for determining the peripheral speed of the cheese and a control unit interacting therewith, which adjust the speed of rotation of the rotation means in such a way that the peripheral speed of the momentary position of the cheese relative to the strip applicator is kept constant.

In the case of the device according to the invention the detection means determine the peripheral

speed of the cheese. On the basis of the measured peripheral speed of the cheese, a control unit interacting therewith sets the speed of rotation of the rotation means at a desired value, so that the peripheral speed of the momentary position of the cheese relative to the strip applicator is kept constant.

Detection means for determining the peripheral speed are generally known. A sensor is a suitable detection means for this purpose.

The rotation means advantageously comprise a rotary table which is adjustable in height, and drive elements interacting therewith which are controlled by the control unit. Such a table is easily incorporated in existing production lines. After a cheese has been received on the table from a supply belt, the table is raised, so that the periphery of the cheese moves into the vicinity of the strip applicator, following which the application of the banderole can be carried out.

The rotary table is advantageously also provided with a freely rotatable retaining element for positioning the cheese on the table, in order to prevent the force exerted by the banderole strip on the cheese from interfering with the peripheral speed of the cheese.

The strip applicator can be of a type which is known per se. The strip applicator advantageously comprises a mobile blow nozzle disposed along the periphery of a cheese to be banded. With such a blow nozzle the banderole strip can be affixed uniformly and correctly positioned on the periphery of the cheese.

In a preferred embodiment of the device a mobile pressure element is present, which element is disposed downstream of the strip applicator, viewed in the direction of rotation of the cheese. The mobile pressure element is capable of following the shape of the cheese, and thus pressing the banderole strip onto the cheese. This can be achieved by, for example, a spring mechanism.

In a further preferred embodiment of the device according to the invention, a metering element for moistening the cheese is present, which element is disposed upstream of the strip applicator, viewed in the direction of rotation of the cheese. Moistening of the cheese will cause the plastic coat of the cheese to soften slightly, with the result that it acquires adhesive properties. These properties are sufficient to fix the banderole strip to the surface of the cheese. Of course, it is also possible to provide an adhesive on the banderole strip to be affixed, which provides the adhesive action.

The device will generally also comprise a cutting element for cutting the banderole strip affixed to the cheese. The banderole strip can be severed by moving the strip applicator past the cutting element, for example a severing knife, after the banding strip has been affixed to the cheese.

The invention also relates to a device for preparing shaped cheeses, which device is provided with a device for affixing a banderole according to the invention.

The invention will be explained in greater detail below with reference to the appended drawing, in which the sole figure is a top view of an embodiment of a banding device according to the invention.

In this figure reference number 1 indicates a stock roll of a banderole, which is disposed on a driven mandrel 2. The banderole material can be selected from the usual materials used for this purpose, such as tissue paper and teabag paper or plastic, which can be printed with, for example, information on the origin, type and quality. A banderole strip 3 unwound from this stock roll is guided by way of a pressure roll 4 and a supply roll 5 at constant speed to a blow nozzle 6. The supply roll 5 is electronically controlled, so that the length of overlap of the material strip 3 can be set. By means of the blow nozzle 6, the banderole strip 3 is pressed at a tangent to the peripheral part against a square cheese 7. The blow nozzle 6 is disposed in such a way that it can be moved past a severing knife 8, for severing the material strip 3. Reference number 9 indicates a spray head for moistening the cheese 7. The moisture to be applied to the cheese may be tap water, to which an adhesive has been added if desired. An example of a solution which can be used is a starch emulsion. A pressure roll 10 ensures that the banderole strip 3 affixed to a cheese 7 is pressed down. Said pressure roll 10 can make such a movement that the pressure roll 10 always follows the shapes of cheeses 7, and consequently presses the banderole strip 3 correctly onto the cheese 7. A rotary table 11, which is adjustable in height and is provided with a special speed regulator and drive elements (neither shown), is controlled by detection means 12 for measuring the peripheral speed of the cheese 7, so that the peripheral speed of the momentary position of the cheese 7 remains constant relative to the blow nozzle 6 (and consequently also relative to the banderole strip 3 supplied at constant speed). The table 11 also keeps the cheese 7 at a uniform height relative to the blow nozzle 6. The cheese 7 is positioned on the table 11 by means of a freely rotatable retaining element 13. After applying the banderole, the cheeses 7 are conveyed further by means of a discharge belt 14 to working stations situated downstream.

Instead of a banderole strip unwound from a stock roll, as represented in the drawing, banderole strips having a fixed length can be fed to the strip applicator. In such a case the cutting element can be omitted.

The above-described method and device for applying a banderole are particularly advantageous for affixing a banderole to polygonal cheeses, such as square or rectangular cheeses or cheese products of these shapes.

The device can be set up in a fixed position, but can also be a mobile type. This means that the banding device according to the invention can be used at several places in the preparation process of cheeses. Not only decorative banderoles, but also supporting sleeves can be affixed to the shaped cheese by means of the method and device according to the invention.

Claims

1. Method for affixing a banderole to the periphery of a rotating, shaped cheese, **characterized in that** the banderole (3) is affixed while maintaining an essentially constant peripheral speed of the momentary position of the cheese (7) relative to a banderole strip (3) to be affixed, by determining the peripheral speed of the cheese (7) at a point along the periphery of the cheese (7) and regulating the speed of rotation of the cheese (7) on the basis thereof.

2. Method according to claim 1, **characterized in that** the banderole strip (3) is affixed by supplying the banderole strip (3) essentially at a tangent to the momentary position of the cheese (7).

3. Method according to claim 1 or 2, **characterized in that** the cheeses (7) are polygonal in shape.

4. Method according to claim 1 or 2, **characterized in that** the cheeses (7) are elliptical in shape.

5. Banding device for affixing a banderole to the periphery of rotating, shaped cheeses (7), which device comprises a frame in which conveyor means (14) for conveying the cheeses (7), and rotary means (11) for rotating the cheeses (7) and a strip applicator (6) for affixing a banderole strip (3) to the periphery of the rotating cheeses (7) are disposed, **characterized in that** the device is provided with detection means (12) for determining the peripheral speed of the cheese (7) and a control unit interacting therewith, which adjust the speed of rotation of the rotation means (11) in such a way that the peripheral speed of the momentary position of the cheese (7) relative to the strip applicator (6) is kept constant.

6. Banding device according to claim 5, **characterized in that** the rotation means comprise a rotary table (11) which is adjustable in height, and drive elements interacting therewith which are controlled by the control unit.

7. Banding device according to claim 6, **characterized in that** the table (11) is also provided with a freely rotatable retaining element (13) for positioning the cheese (7) on the table (11).

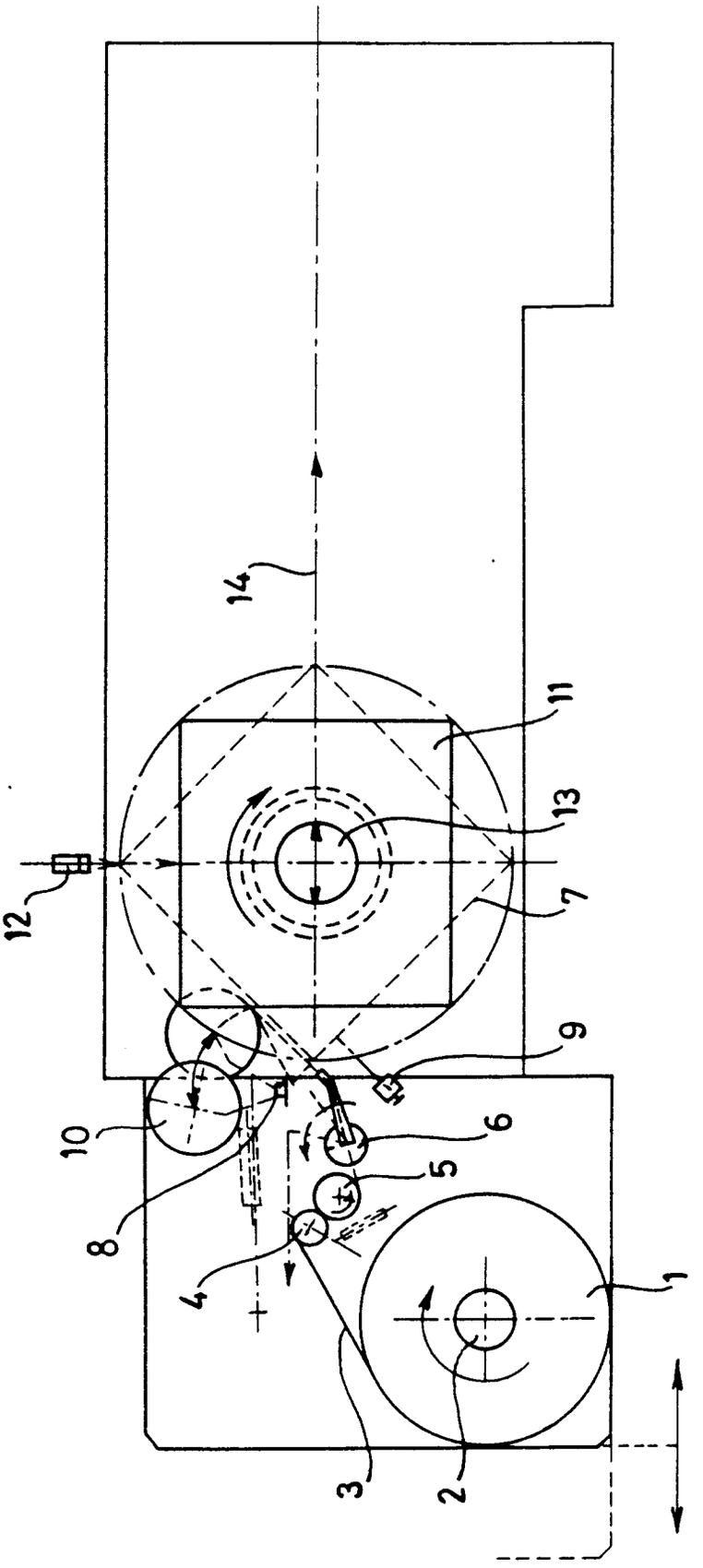
8. Banding device according to one of claims 5 - 7, **characterized in that** the strip applicator comprises a mobile blow nozzle (6) disposed along the periphery of cheese (7) to be banded.

9. Banding device according to one of claims 5 - 8, **characterized in that** a mobile pressure element (10) is present, which element is disposed downstream of the strip applicator (6), viewed in the direction of rotation of he cheese (7).

10. Banding device according to one of claims 5 - 9, **characterized in that** a metering element (9) for moistening the cheese (7) is present, which element is disposed upstream of the strip applicator (6), viewed in the direction of rotation of the cheese (7).

11. Banding device according to one of claims 5 - 10, **characterized in that** the device also comprises a cutting element (8) for severing the banderole strip (3) affixed to the cheese (7).

12. Device for preparing shaped cheeses, which device is provided with a device for affixing a banderole according to one of claims 5 - 11.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EUROPEAN SEARCH REPORT

Application Number
EP 95 20 1092

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,A	NL-A-8 900 177 (POMAC BV) 16 August 1990 ---	1,5,12	B65C9/04 B65C1/04
A	EP-A-0 132 862 (ORDELMANS) 13 February 1985 ---		
A	US-A-4 162 182 (WESLEY) 24 July 1979 -----		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
B65C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31 July 1995	J.-P. Deutsch

CATEGORY OF CITED DOCUMENTS

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