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Remarks:
Amended claims in accordance with Rule 86 (2) EPC.

(54) Size-dependent automatic meat packaging system

(57) A size-dependent automatic meat packaging system that allows the automatic cutting and distribution onto trays of slices obtained, so that all of the trays obtained have a similar and homogeneous distribution by size of the slices held in the trays; having for this purpose a number of belts (1) onto which the trays are placed; above these belts there is another belt (2) onto which the product to be sliced, using a cutting knife (5) positioned at its end, is placed; the tray support belts (1) having a forward or backward movement, whereas the other belt (2) has a transverse movement over the previous belts (1); furthermore the system has means of artifical vision (11) that quantify the surface area of the new slice to be obtained in mm^2, the system deciding onto which of the trays of each belt to place it.

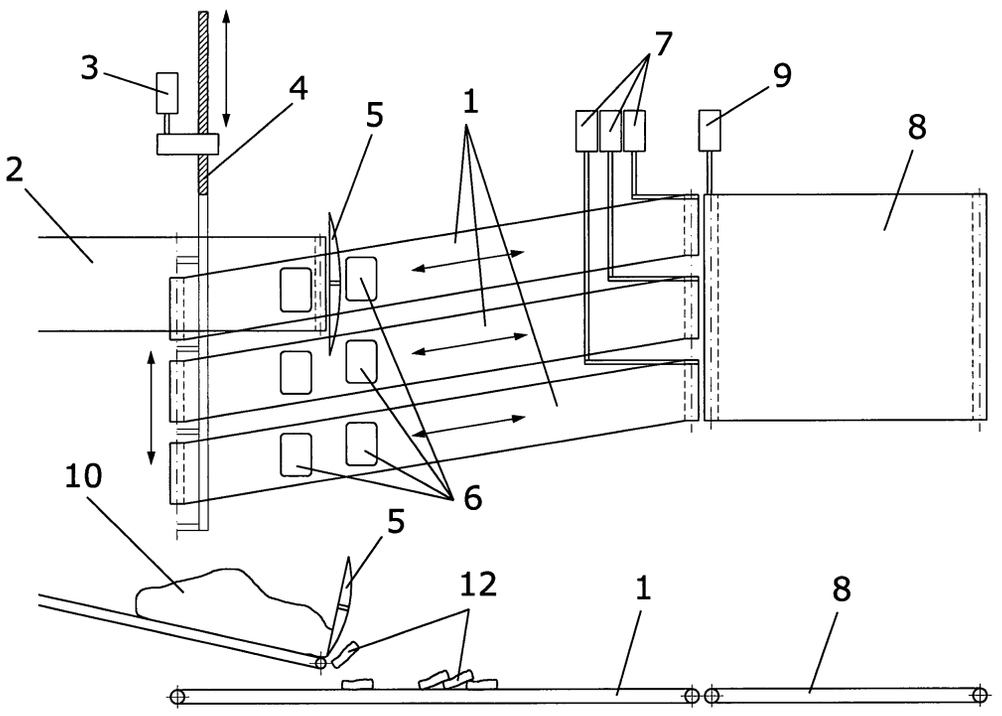

FIG. 1

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Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is a size-dependent automatic meat packaging system that allows slices of meat to be processed and placed on trays, in accordance with the size of the slices, with the object of attaining uniform trays or portions in the distribution of the size of slices that they hold.

[0002] The present invention is characterised by having a control system that allows the size of the slice that is going to be cut to be known, and its placing on the most appropriate tray in accordance with the instructions of software previously installed in the control system.

[0003] Therefore the present invention is encompassed within the ambit of automatic packaging systems, but more particularly within that of meat cutting and packaging systems, or those of products that must be cut up, prior to packaging.

BACKGROUND OF THE INVENTION

[0004] At present, in the major centres, fresh meat or similar products already come prepared in porexpan or similar containers.

[0005] Therefore the chopping or carving industries have sophisticated slicing equipment, with the aim of reducing labour to the minimum. This equipment is what is entrusted with cutting the products into slices, ranging from 2 to 25 mm, these later being automatically positioned onto the trays.

[0006] One of the main difficulties which the carving industry confronts is the fact that the pieces of meat don't tend to have a uniform shape, and that if the slices or fillets obtained are directly placed onto the trays, it will be found that some of the trays will have slices of meat or fillets all of small size, whereas in other trays all of the slices will be large sized. That is, there isn't any uniformity in the distribution of the slices onto the trays in accordance with their size.

[0007] The lack of uniformity in the distribution of the slices onto the trays in accordance with their size would produce automatic rejection by the clients, due to their being too big or too small, these trays not being selected, and therefore not saleable, as a directly result of which said unsold trays would imply losses.

[0008] With the object of avoiding this latter situation the slices are mixed in the trays, each of which has big and small slices, strategically placed so that the final presentation is attractive. This work is manually carried out at present, with the consequent disadvantages of hygiene and labour costs.

[0009] Therefore, the object of the present invention is to overcome the disadvantages previously set out, developing a size-dependent automatic meat packaging system, achieving trays that are all uniform as regards the size of the slices that they hold.

DESCRIPTION OF THE INVENTION

[0010] The size-dependent automatic meat packaging system consists of a system that effects the slicing of the meat, placing it onto different trays. The layout of the slices on each of the trays is not correlated with the slices cut from the original piece.

[0011] For this purpose the system has one or several belts onto which trays are placed on which the different portions are positioned; on another side the piece of meat, that is going to be sliced by a cutting knife, is placed onto a belt set up above the previous belts, each of the slices obtained falling onto one of the trays.

[0012] With the object that all of the trays achieve a homogeneous or similar distribution, regarding the size of the slices placed onto them, the belts assigned to have trays placed on them have forward or backwards means of drive, whereas the belt onto which the piece of meat to be sliced is placed has the possibility of moving in a transverse direction to the belts, by means of a worm screw, so that it is positioned just above the belt that has the tray onto which it is required to drop the slice.

[0013] In addition, prior to cutting the new slice, the surface area of the new slice is detected using an artificial vision device, said surface area being converted into mm^2. Depending on the surface area of the slice the control equipment decides onto which of the trays of each line to drop the slice.

[0014] The system finally attempts to achieve a similar amount of surface area in mm^2 of the slices that there are in each tray.

DESCRIPTION OF THE DRAWINGS

[0015] To supplement the following description, and with the aim of leading to a better understanding of its characteristics, this descriptive report is accompanied by a set of drawings in whose figures, in an illustrative and non-limiting way, the most important details of the invention have been represented.

[0016] Figure 1.- Shows a plan schematic plan and elevation representation of the size-dependent automatic meat packaging system.

[0017] Figure 2.- Shows a detailed representation of the means used for examination of the surface area of the next slice to be obtained.

PREFERRED EMBODIMENT OF THE INVENTION

[0018] In the light of the figures a preferable means of embodiment of the proposed invention is described below.

[0019] In Figure 1 we see that it has a series of belts (1), that in this form of embodiment three have been shown, several being possible. A series of tray sets (6)

are arranged on said belts, for the placing onto them of the pieces of meat obtained or cut.

[0020] The packaging system can simultaneously operate with one or several rows of trays, since increasing the number of rows of trays increases the probability of greater homogeneous surface distribution in each of the trays.

[0021] Over the assembly of belts (1) another belt (2) is placed above them, onto which the product or piece (10) to be cut into slices is placed. At the end of said belt (2) there is a cutting knife (5) entrusted with making the slices in accordance with a pre-established thickness.

[0022] The belts (1) are activated by motors (7) so that forwards and backwards motion can be achieved, with the aim of positioning the trays (6) of each of the belts in the correct position. In addition the tray (2) has a motor (3) that, by means of a worm screw (4) allows it to move over the belts (1) so that it is positioned just above the belt that has the tray onto which it is required to place the new piece or slice of meat (12).

[0023] In the case that the slices or pieces of cut meat (12) fall directly onto the trays (6), the system has sensors for positioning the trays in a position so that the slice falls directly onto the trays.

[0024] In addition, if the slices simply fall onto one of the belts and not onto the trays, they are later manually placed in the trays, the use of trays or means of positioning the trays below the upper belt, from which the newly cut slice falls, being unnecessary.

[0025] Finally at the output there is an output belt (8) activated by a motor (9), that is entrusted with moving out the trays once the slices to be placed on them have been so arranged.

[0026] In Figure 2 we see how just opposite the product or piece to be cut (10) there are means of artificial vision (11) that are entrusted with converting the surface area of the new slice (12), that is going to be cut, into mm^2, so that the surface area of the new slice is known prior to cutting; the belt continues to move towards the belt onto which it is required to drop it, the piece is cut and the system decides if the belt must advance or not.

[0027] Variations in materials, form, size and disposition of the component parts, described in a non-limiting way, do not alter the essential nature of this invention, this sufficing for its reproduction to be undertaken by an expert.

Claims

1. A size-dependent automatic meat packaging system, **characterised in that** it allows the automatic cutting and homogeneous distribution of fillets or slices of meat onto trays; that is, that all the trays have a similar size distribution of the slices; having for this purpose one or several belts arranged in parallel; above said belts there is another belt onto which the product or piece to be sliced, using a cutting knife positioned at the end, is placed; the previous belts having motors that allow their forward or backward movement, whereas for the belt onto which the product to be sliced is placed, using some means of activation the displacement of said belt above the belts onto which the trays are placed is achieved; in addition the system has means of artificial vision that prior to cutting detects the surface area of the new slice and converts it into mm2, the system deciding onto which of the tray transport belts it has to be positioned after the cutting of the piece.

2. A size-dependent automatic meat packaging system according to claim 1, **characterised in that** the cutting and distribution of the fillets or slices of meat in trays is carried out by making the slices fall directly onto the trays placed directly on the belts, in which case the system has sensors for correct positioning of the trays so that they receive the newly cut slices.

3. A size-dependent automatic meat packaging system according to claim 1, **characterised in that** the cutting and distribution of the meat fillets or slices in trays is carried out by making the slices fall directly onto the corresponding belt, the placing of the slices being onto the trays being manually performed.

4. A size-dependent automatic meat packaging system according to claim 1, **characterised in that** the means of activation of the support belt of the product or piece to be cut consists of a motor that, by means of a worm screw, moves said belt.

5. A size-dependent automatic meat packaging system according to claim 1, **characterised in that** as well as the belts previously indicated, the system has an output belt activated by a motor.

Amended claims in accordance with Rule 86(2) EPC.

1. A size-dependent automatic meat packaging system comprising

- A first belt (2) onto which the product or piece (10) to be sliced is to be placed
- A cutting knife (5) positioned at the end of said first belt (2)

Characterized in that if further comprises:

- Several slice collections belts (1) arranged in parallel underneath said first belt (2) and having motors (7) that allow their forward and backward movement.

- Means (3,4) for activating said first belt and for displacing it above the selected slice collection belt (1).
- Means for artificial vision (11) so configured to detect the surface area of the new slice prior to cutting it, to convert it into mm^2 and to select above which one the several slice collection belts (1) said first belt (2) has to be positioned once the piece has been cut, thereby allowing automatic cutting and homogeneous distribution of fillets or slices (12) of the meat onto trays so that all the trays have similar size distribution of the slices.

2. A size-dependent automatic meat packaging system according to claim 1, **characterized that** the system is provided with sensors for correct positioning of the trays placed directly on the belts.

3. A size-dependent automatic meat packaging system according to claim 1, **characterized in that** the means of activation of the first belt (2) consists of a motor that, by means of a worm screw moves said belt.

4. A size-dependent automatic meat packaging system according to claim 1, **characterized in that** the means of activation of the collection belts are motors.

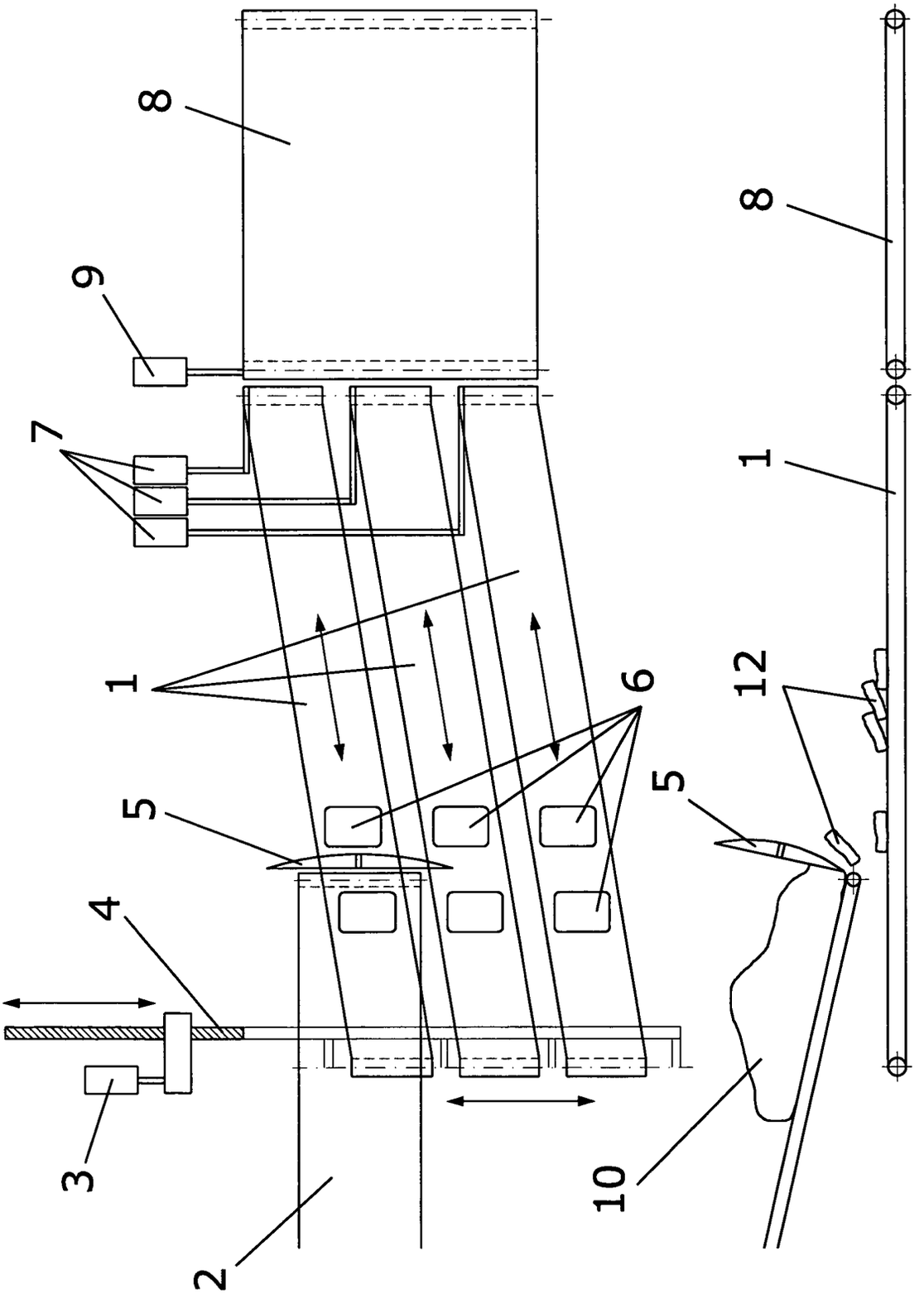

FIG. 1

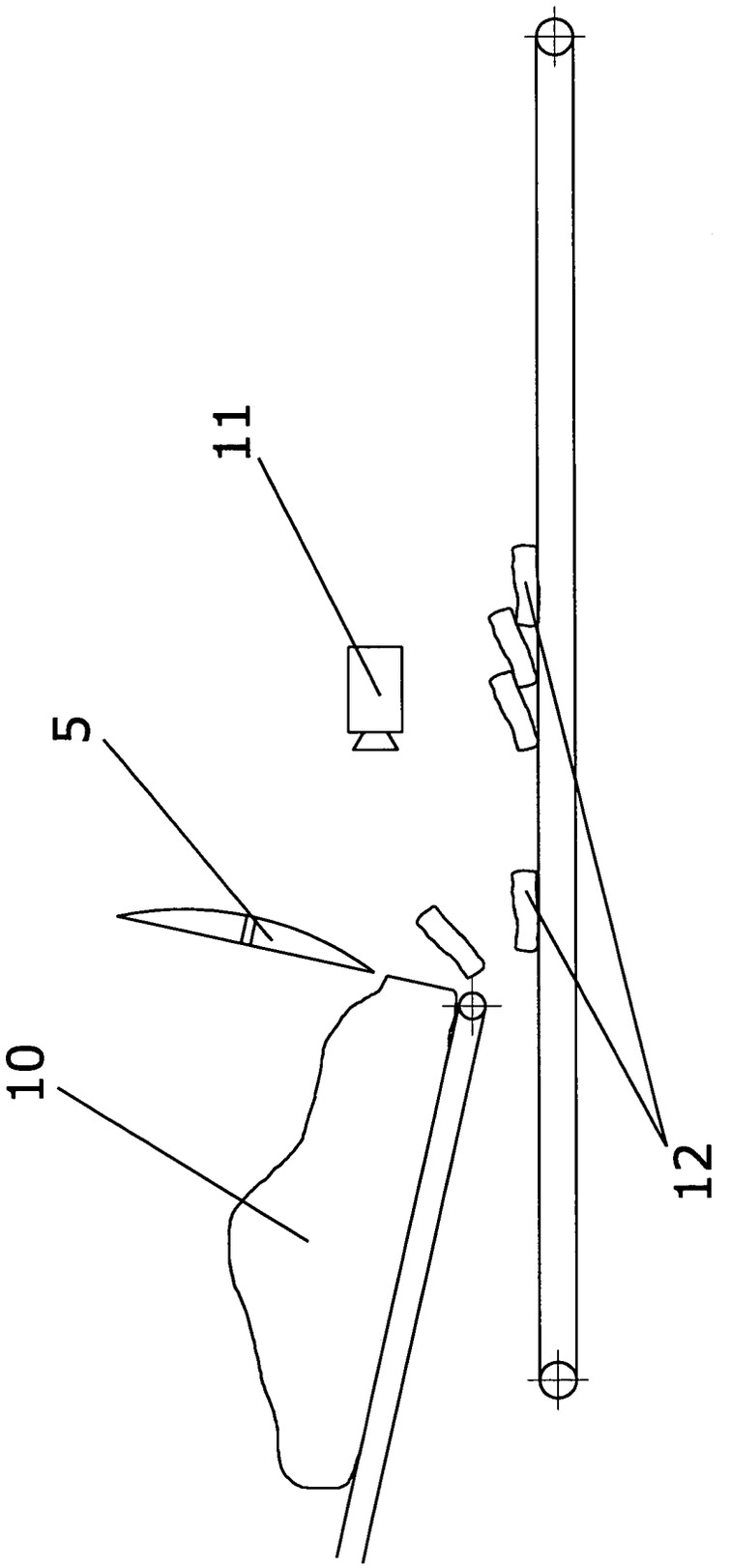

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 03 38 0268

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.7)
A	EP 1 243 386 A (KRAFT FOODS HOLDINGS INC) 25 September 2002 (2002-09-25) * abstract; figures 1-3 * ---	1-5	B65B25/06 B65B5/12
A	WO 02/16210 A (SEALED AIR NZ LTD ;STEELE CLIFFORD BRUCE (NZ); KOKE JOHN PAUL (NZ)) 28 February 2002 (2002-02-28) * the whole document * ---	1-5	
A	US 2003/167738 A1 (WEBER GUNTHER) 11 September 2003 (2003-09-11) * abstract; figures 1-3 * ---	1-5	
A	US 4 693 378 A (AZEGAMI OSAMU ET AL) 15 September 1987 (1987-09-15) * column 2, line 56 - column 3, line 30 * -----	1-5	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	21 April 2004	Damiani, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 38 0268

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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82