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(54) **Method and apparatus for slicing tuberous crop**

(57) The invention relates to a method and a device for cutting tuberous crops, such as potatoes, into slices by means of knives (5) which are supported by a knife carrier which rotates about an axis of rotation (3) during operation. The crops are supplied through a supply pipe (8), one end of which is positioned close to a path of movement of the knives (5) during operation, which path

extends at some distance from the axis of rotation (3). The crops are thereby transported to the knife carrier by means of a liquid flow through the supply pipe (8). The pipe is connected to a liquid container (9), whilst the device furthermore comprises a pump (10) for pumping the liquid and the tuberous crops present therein through the pipe (8).

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Description

[0001] A method and a device for cutting tuberous crops into slices.

[0002] The invention relates to a method for cutting tuberous crops, such as potatoes, into slices by means of knives which are supported by a knife carrier which rotates about an axis of rotation during operation, wherein said crops are supplied through a supply pipe, one end of which is positioned close to a path of movement of the knives during operation, which path extends at some distance from the axis of rotation.

[0003] In a similar, known device (EP 0 289 220), the potatoes are transported through the pipe towards the knife carrier under the influence of the force of gravity. In practice it has become apparent that such a method is not satisfactory, since the pressure which is exerted on the potatoes is insufficient to ensure that the potatoes are sliced in an efficient manner. The potatoes exhibit a tendency to turn upon being sliced by the successive knives, as a result of which irregularly shaped and/or small slices are cut from the potatoes.

[0004] According to the invention, the crops are transported to the knife carrier by means of a liquid flow through the supply pipe.

[0005] By supplying the crops by means of a liquid flow, a pressure force can be exerted on the crops, so that in particular the crop, for example a potato, that is in contact with the knife carrier is pressed firmly against the knife carrier, thus preventing the potato from "tilting" with respect to the knife carrier while being sliced by the successive knives. As a result of this, the successive slices are cut from the potato in question in a uniform manner, parallel to each other, as it were.

[0006] Another advantage of using the method according to the invention is the fact that, as a result of the large amount of liquid, generally water, being supplied, the slices are at the same time washed, so that a clean final product is obtained.

[0007] Another aspect of the invention relates to a device for cutting tuberous crops, which is in particular suitable for carrying out the method according to the invention, said device comprising a frame, a knife carrier supported by the frame, which is rotatable about an axis of rotation and which supports a number of cutting knives, as well as a supply pipe for the crops, one end of which is positioned some distance away from said axis of rotation, near the path of movement of the knives during rotation of the knife carrier.

[0008] According to the invention, said device is characterized in that said pipe is connected to a liquid container, whilst the device furthermore comprises a pump for pumping the liquid and the tuberous crops present therein through the pipe in the direction of the knife carrier.

[0009] By using this construction according to the invention, a device of simple construction can be obtained for cutting tuberous crops in an effective manner.

[0010] It is noted that US-A-4,498,362 discloses a device wherein bar-shaped products are moved out of a tube by means of a water jet. A holder supporting cutting blades, which is to be rotated, is disposed at some distance from the end of said tube. The cutting blades can be moved with respect to the holder, between a position in which they move through said water jet and a position in which they are positioned outside the water jet. In the position in which they move through said water jet, the cutting blades are used for cutting off parts of the products that exhibit deficiencies, if necessary. This known device is of complicated construction and it will not be suitable for slicing potatoes or similar products, since it will not be possible to keep such a comparatively large and heavy product floating in the free water jet so as to be cut into slices in the desired manner.

[0011] The invention will be explained in more detail hereafter by means of a few embodiments of the construction according to the invention, which are schematically shown in the accompanying figures.

[0012] Figure 1 schematically shows a first embodiment of a device according to the invention.

[0013] Figure 2 schematically shows a part of the device of Figure 1, seen along line A-A in Figure 1.

[0014] Figure 3 schematically shows a second embodiment of a device according to the invention.

[0015] Figure 4 schematically shows a part of the device of Figure 3, seen along the line B-B in Figure 3.

[0016] The device which is shown in Figure 1 comprises a frame 1. Said frame supports a motor 2, in such a manner that the outgoing shaft 3 of said motor extends vertically. Above motor 2, a disc-shaped knife carrier 4 is mounted on the outgoing shaft 3. As is shown more in particular in Figure 2, six knives 5 extending outwards from shaft 3 are secured to said knife carrier, which knives overlap slot-like openings 6 present in the knife carrier.

[0017] Motor 2 is covered by a guard 7.

[0018] Present near the flat upper side of the knife carrier 4 that extends perpendicularly to axis of rotation 3, is the end of a supply pipe 8. Said end of the supply pipe 8, which extends parallel to the upper surface of knife carrier 4, is positioned near the outer circumference of knife carrier 4, near the path of movement of the knives 5 upon rotation of the knife carrier by motor 2 in the direction indicated by arrow C during operation.

[0019] As is furthermore schematically indicated in Figure 1, pipe 8 is connected to a container 9, whilst a pump 10 is furthermore incorporated in pipe 8.

[0020] The motor 2, which is surrounded by a guard 7, the knife carrier 4 and the end of pipe 8 that faces towards knife carrier 4 is accommodated in a housing 11 which is supported by the frame.

[0021] During operation, container 9 will be filled with a liquid, generally water, and with crops to be cut, such as potatoes. This mixture of liquid and tuberous crops is transported by pump 10 through pipe 8 in the direction of knife carrier 4, which rotates during operation. A tu-

berous crop, such as a potato 12, which arrives at the knife carrier will be forcefully pressed against the rotating knife carrier by the liquid flow being continuously generated during operation, so that the successive knives 5 moving past the end of pipe 8 will cut off thin slices 13. Said slices will furthermore be properly washed by the large amount of liquid that is being supplied, so that a clean product is obtained. The falling slices can be caught at the bottom of housing 11 in a receptacle or a discharge element, such as a conveyor belt or the like, so as to be discharged from housing 11. Also the liquid introduced into housing 11 will be discharged from housing 11 again, and it can be recirculated to container 9 for reuse.

[0022] The device which is shown in Figures 3 and 4 largely corresponds with the device which is shown in Figures 1 and 2. Accordingly, those parts of Figures 3 and 4 that correspond with parts of the above-described device as shown in Figures 1 and 2 are indicated by the same numerals as used in Figures 1 and 2.

[0023] The embodiment of Figure 3 uses a knife carrier 14 which is built up of a circular disc 15 extending perpendicularly to the axis of rotation 3 of motor 2, to the circumference of which a circular jacket 16 extending upwards from disc 15 is secured. Passages 17 are provided in said jacket, which passages are overlapped by knives 18 mounted on the inside of jacket 16.

[0024] Pipe 8 is bent in such a manner that the free end of the pipe lies in a vertical plane close to the path of movement of knives 18 upon rotation of the cutting element 14 in the direction indicated by arrow D during operation (Figure 4).

[0025] It will be apparent that also in this embodiment the tuberous crops being pumped through pipe 8 in the above-described manner during operation will be pressed firmly against the inner surface of jacket 16, thus effecting an efficient cutting into slices of the tuberous crops.

[0026] In the above-described embodiments, the device comprises only one supply pipe 8. It will also be possible, however, to provide more than one supply pipe, whose ends will be positioned in spaced-apart relationship opposite the path of movement of cutting knives 5 and 18, respectively, during operation, so that a large capacity can be realised by means of a device of simple construction.

[0027] Another possibility is to introduce the tuberous crops directly into pipe 8, downstream of pump 10, rather than introduce them into container 9.

Claims

1. A method for cutting tuberous crops, such as potatoes, into slices by means of knives which are supported by a knife carrier which rotates about an axis of rotation during operation, wherein said crops are supplied through a supply pipe, one end of which is

positioned close to a path of movement of the knives during operation, which path extends at some distance from the axis of rotation, characterized in that the crops are transported to the knife carrier by means of a liquid flow through the supply pipe.

2. A method according to claim 1, characterized in that tuberous crops are supplied to the knife carrier via pipes in several spaced-apart points.

3. A method according to claim 1 or 2, characterized in that said knife carrier is rotated about a vertically extending axis of rotation.

4. A device for cutting tuberous crops comprising a frame, a knife carrier supported by the frame, which is rotatable about an axis of rotation and which supports a number of cutting knives, as well as a supply pipe for the crops, one end of which is positioned some distance away from said axis of rotation, near the path of movement of the knives during rotation of the knife carrier, characterized in that said pipe is connected to a liquid container, whilst the device furthermore comprises a pump for pumping the liquid and the tuberous crops present therein through the pipe in the direction of the knife carrier.

5. A device according to claim 4, characterized in that said knife carrier is rotatable about a vertical axis of rotation during operation.

6. A device according to claim 4 or 5, characterized in that said knives are arranged in a plane which extends perpendicularly to the axis of rotation of the knife carrier.

7. A device according to claim 4 or 5, characterized in that said knives are arranged in a plane which extends concentrically about said axis of rotation.

8. A device according to any one of the preceding claims 4 - 7, characterized in that said knife carrier is mounted on the outgoing shaft of a motor disposed under said knife carrier, which motor is surrounded by a guard.

9. A device according to any one of the preceding claims 4 - 8, characterized in that said device is provided with several pipes for supplying liquid and tuberous crops to said knife carrier, wherein the ends of said supply pipes positioned near the path of movement of the knives are arranged in spaced-apart relationship.

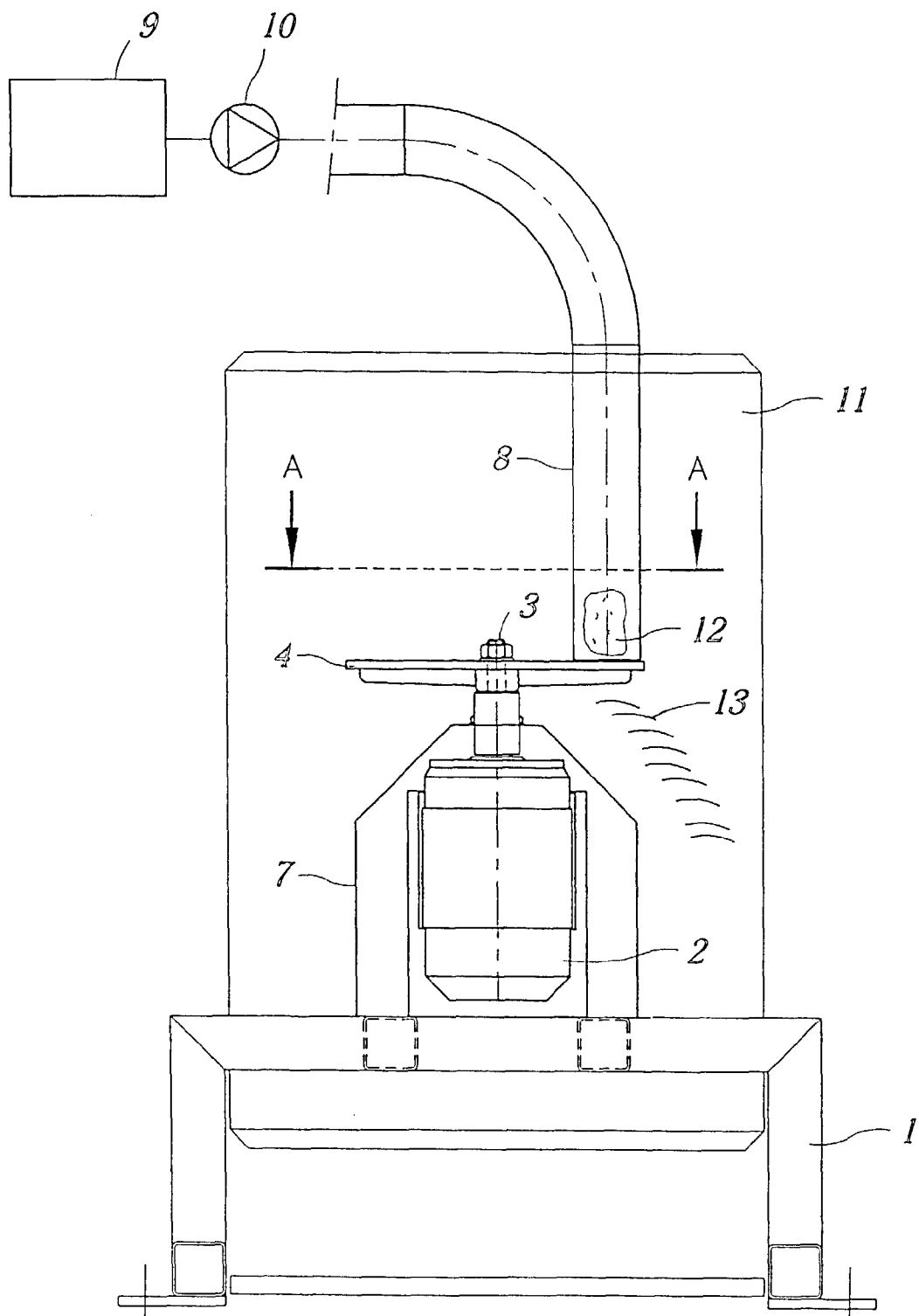


Fig. 1

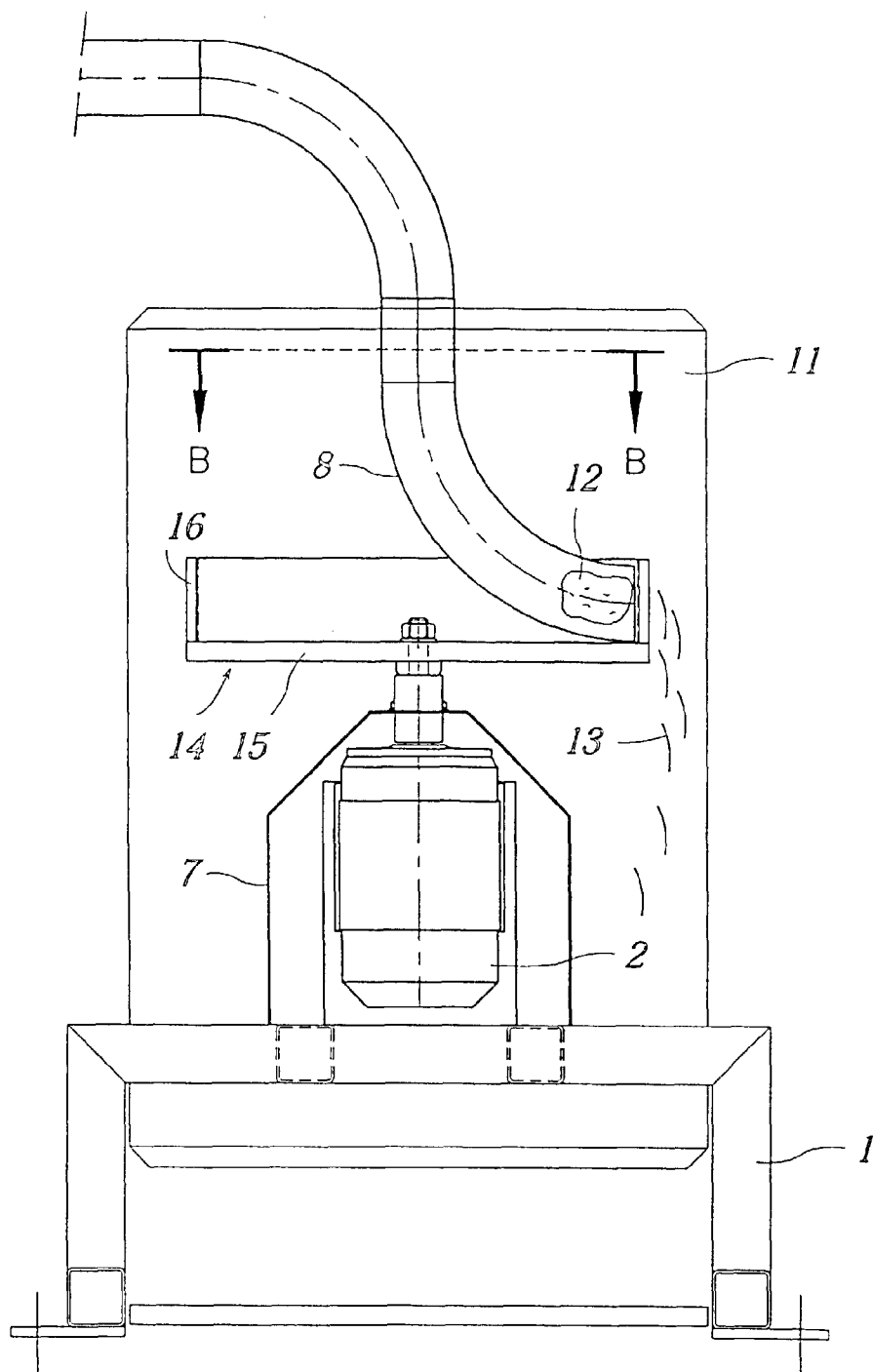


Fig. 3

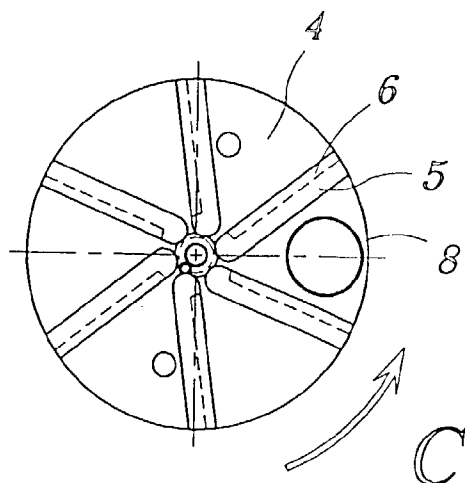


Fig. 2

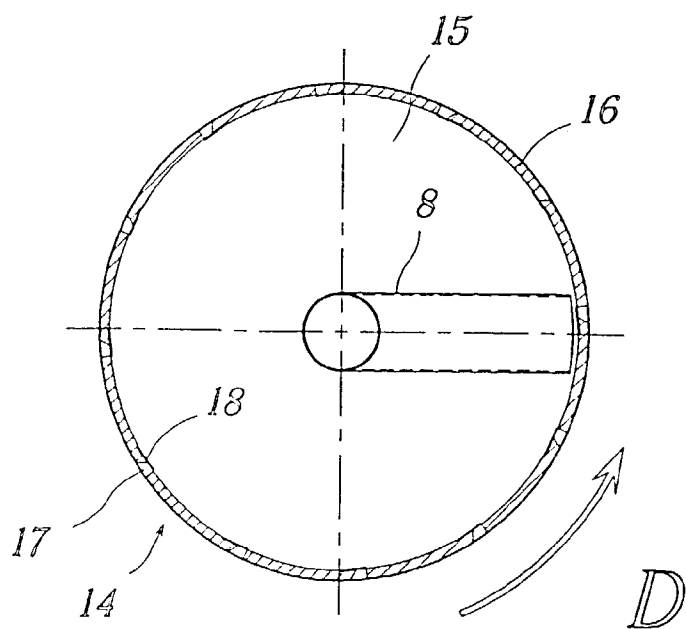


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 0706

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Y	EP 0 377 451 A (LAMB WESTON INC) 11 July 1990	3,5	
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A	EP 0 289 220 A (URSCHEL LAB INC) 2 November 1988 * abstract; figures *	7	
A	DE 39 34 143 A (WIENEKE FRANZ) 18 April 1991 * claim 6; figure 5 *	7	
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A	US 5 343 790 A (KUERT DARWIN H) 6 September 1994		B26D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 June 1999	Examiner Vaglianti, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 20 0706

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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