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NL-5600 AP Eindhoven (NL)(54) **A device for sorting tuberos crops according to size.**

(57) The invention relates to a device for sorting tuberos crops, such as potatoes, according to size, said device being provided with a frame (1) and with a plurality of rollers (5) journaled in said frame (1), which are rotatable about at least substantially parallel axes of rotation. The rollers (5) are provided with projecting ribs (9) on their circumference. Furthermore means (2) are provided for supplying the crops to be sorted to the rollers (5) near one end of said rollers. Near the supply end the pitch between the successive ribs (9) is smaller than near the other end of the rollers (5). The ribs (9) have an at least substantially rectangular section. The construction is thereby such that an opening defined by opposite windings of a pair of rollers (5) lying side by side is at least substantially square.

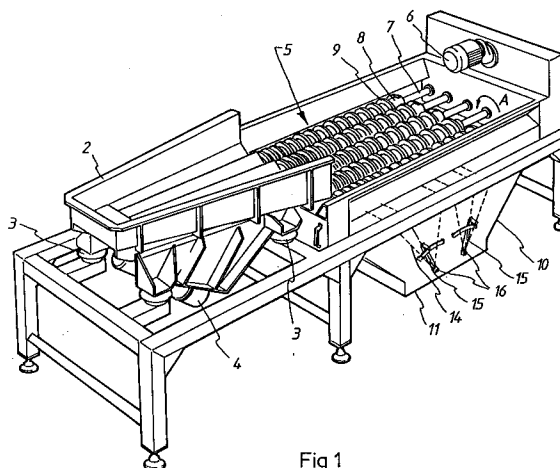


Fig 1

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The invention relates to a device for sorting tuberous crops, such as potatoes, according to size, said device being provided with a frame and with a plurality of rollers journaled in said frame, which can be rotated by driving means about at least substantially parallel axes of rotation, said rollers on their circumference being provided with projecting ribs, whilst means are provided for supplying the crops to be sorted to the rollers near one end of said rollers, whilst near the supply end the pitch between the successive ribs is smaller than near the other end of the rollers.

Such a device is known from Dutch Patent Application No. 7412616. In this known device two rollers lying side by side rotate in opposite directions and the ribs of said rollers lying side by side have opposite pitch. Each group of two rollers is spaced from a further group of two rollers, since no more than two rollers lying side by side can co-operate at any time. In the illustrated embodiment the rollers lying side by side define circular openings. Indeed the description of the above application states that the rollers may also define square openings, but this seems difficult to realise with rollers lying side by side, whose windings have opposite pitch.

With the device according to the invention at least two rollers to be rotated in the same direction by the driving means are provided in side-by-side relationship and the ribs are at least substantially of rectangular section, whilst the construction is such that an opening defined by opposite ribs of two rollers lying side by side is at least substantially square.

When using the construction according to the invention more than two coaxing rollers can be arranged in side-by-side relationship while defining sorting openings, so that when a comparatively small number of rollers is used, it is still possible to obtain a large capacity of the device. All rollers may be of identical design thereby, which will reduce the manufacturing and maintenance costs in comparison with the rollers of the known device. It can thereby be realised in a simple manner that the openings defined by the ribs, utilizing ribs of rectangular section, which are easy to produce, define square openings for allowing the tuberous crops to pass therethrough. In practice it has become apparent that, also in view of the irregular forms of for example potatoes, the sorting effect achieved will be most accurate when square openings are used.

The device can be used particularly well for sorting peeled potatoes, since it has become apparent in practice that in that case, also when rollers are used which all rotate in the same direction, the rollers can move under the potatoes without a transporting effect of the potatoes in a direc-

tion transversely to the longitudinal direction of the rollers being produced.

The invention will be explained in more detail hereafter with reference to a few possible embodiments of the device according to the invention diagrammatically illustrated in the accompanying Figures.

Figure 1 is a diagrammatic, perspective view of a sorting device according to the invention.

Figure 2 is a side view of the device shown in Figure 1.

Figure 3 shows a second embodiment of a roller to be used in the sorting device.

The sorting device shown in Figures 1 and 2 comprises a frame 1, near one end of which a box-shaped means 2 supported by the frame 1 is disposed, with the interpositions of spring buffers 3. Furthermore a vibrator 4 is provided on the box-shaped means 2, by means of which said box-shaped means 2 can be set vibrating.

The crops to be sorted, such as for example potatoes, will be introduced into the box-shaped means 2 and be gradually discharged, under the influence of the vibrating motion of said box-shaped means 2, along the downward slope to the right of said box-shaped means 2, seen in Figure 2, in the direction of sorting rollers 5 rotatably supported by the frame. In the illustrated embodiment five sorting rollers 5 extending parallel to each other and being arranged in side-by-side relationship are provided, which rollers can be rotated, using a driving mechanism (not shown), by means of a motor 6 mounted on the frame 1.

All sorting rollers 5 have identically oriented threads and they are all driven in the same direction according to arrow A by the motor 6.

As is furthermore apparent from Figures 1 and 2, each sorting roller is provided with a steel shaft 7, on which a shell 8 made of plastic material is provided, a spiral rib 9 being integral with said shell 8 extending around said shell. As will be apparent from Figure 2, the diameter of the outer circumference of the shell 8 gradually decreases thereby in a direction away from the box 2. Furthermore the pitch between two adjacent windings of the helically extending rib 9 gradually increases in a direction away from the box 2. The construction is thereby such that, seen in plan view, the ribs of rollers lying side by side are in contact with each other in a plane through the axes of rotation of the rollers, whilst the openings between the ribs have an at least substantially square section when seen in plan view. This has an advantageous effect on the sorting process, since this reduces the influence which the position of elongated products relative to the rollers has on the fact whether the products in question will fall through the openings between the rollers or not.

Furthermore it has become apparent that because the rollers are made of plastic material and have a very smooth surface, all rollers can be driven in one and the same direction, without any risk of all products being pushed to one side of the device.

A chute 10 is provided under the rollers, said chute having a discharge end 11, which is subdivided into three discharge compartments 13 by means of two partitions 12.

Inside the chute 10 there are furthermore disposed flaps 14, which extend over the entire width of the chute 10, said flaps being pivotable about pins 16 located near the bottom side of the flaps, by means of manually operated levers 15 disposed at the outside of the chute, and being adjustable in desired positions, as indicated in Figure 2.

By adjusting the flaps 14 various mixtures of crops having certain sizes, such as potatoes, can be supplied to the various compartments 13, this in dependence on the requirements which are made with regard to the further processing of the potatoes supplied to the various compartments 13.

It will be apparent that the compartments 13 do not need to be closed compartments, from which the sorted tuberos crops are discharged at regular intervals, but that the compartments 13 may also constitute passages, to which further discharge means for discharging the sorted potatoes are connected.

Figure 3 shows an embodiment of a rotatable roller, whereby a number of shell sections 8a-8e, together forming the shell 8, are slid on the shaft 7.

Each shell section is provided with a helically extending rib 9a-9c, whereby the ribs 9a-9c of the successive shell sections 8a-8e evenly abut each other, as will be apparent from the drawing.

Each of the shell sections 8a-8e has a constant diameter, whilst also the pitch of each rib 9a-9e on a respective shell section 8a-8e remains constant. With such a construction of the sorting rollers the size of the passages between the sorting rollers for the crops to be sorted, which are at least substantially of square section, increases in steps, so that the crops are always in contact with parts of the rollers for some time, during which the size of the passages does not change. This may have an advantageous effect on the sorting efficiency.

Of course modifications and/or additions to the above embodiments are conceivable within the spirit and scope of the invention.

Thus more than two flaps 14, or possibly only one flap 14, may be provided inside the chute 10, with a number of compartments 13 adapted thereto.

Claims

1. A device for sorting tuberos crops, such as potatoes, according to size, said device being provided with a frame and with a plurality of rollers journaled in said frame, which can be rotated, using driving means, about at least substantially parallel axes of rotation, said rollers on their circumference being provided with projecting ribs, whilst means are provided for supplying the crops to be sorted to the rollers near one end of said rollers, whilst near the supply end the pitch between the successive ribs is smaller than near the other end of the rollers, characterized in that at least two rollers to be rotated in the same direction by the driving means are provided in side-by-side relationship and that the ribs are at least substantially of rectangular section, whilst the construction is such that an opening defined by opposite ribs of three rollers lying side by side is at least substantially square.
2. A device in particular according to claim 1, characterized in that adjustable flaps are disposed under the rollers lying side by side, by means of which flaps, dependent on their setting, the sorted crops can be guided in the direction of predetermined compartments.
3. A device according to claim 1 or 2, characterized in that the pitch between the successive ribs increases evenly from the supply end towards the other end of the rollers, whilst the diameter of the core of the rollers around which the ribs extend decreases evenly in a corresponding direction.
4. A device according to claim 1 or 2, characterized in that a roller is provided with a plurality of abutting sections, whereby the pitch between the successive ribs on each section remains constant, as does the diameter of the core around which the ribs are provided.
5. A device according to any one of the preceding claims, characterized in that said ribs are made of plastic material.
6. A device according to any one of the preceding claims, characterized in that said ribs are provided on a shell being integral with said ribs, said shell being slid over a shaft journaled in the frame.

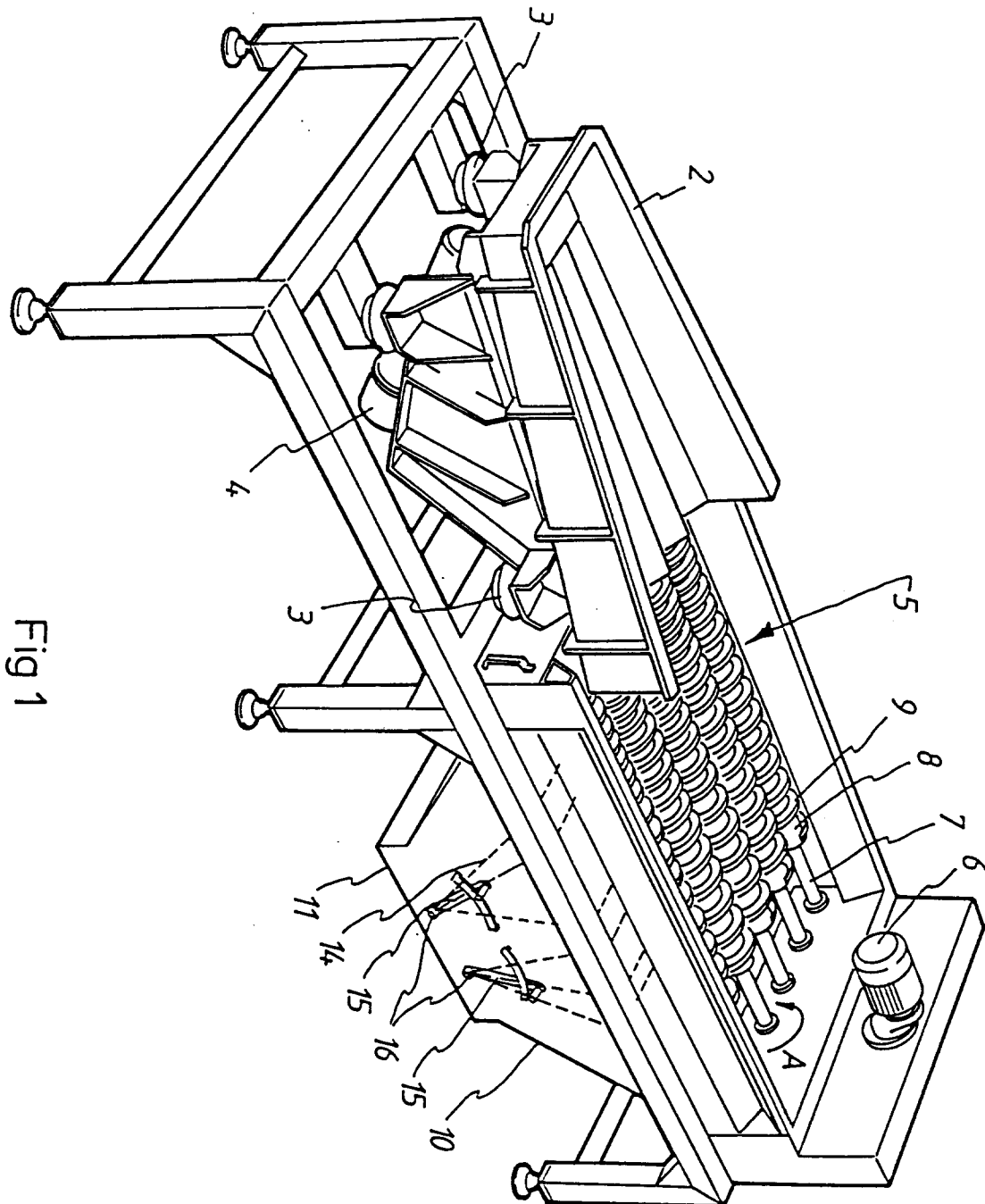


Fig 1

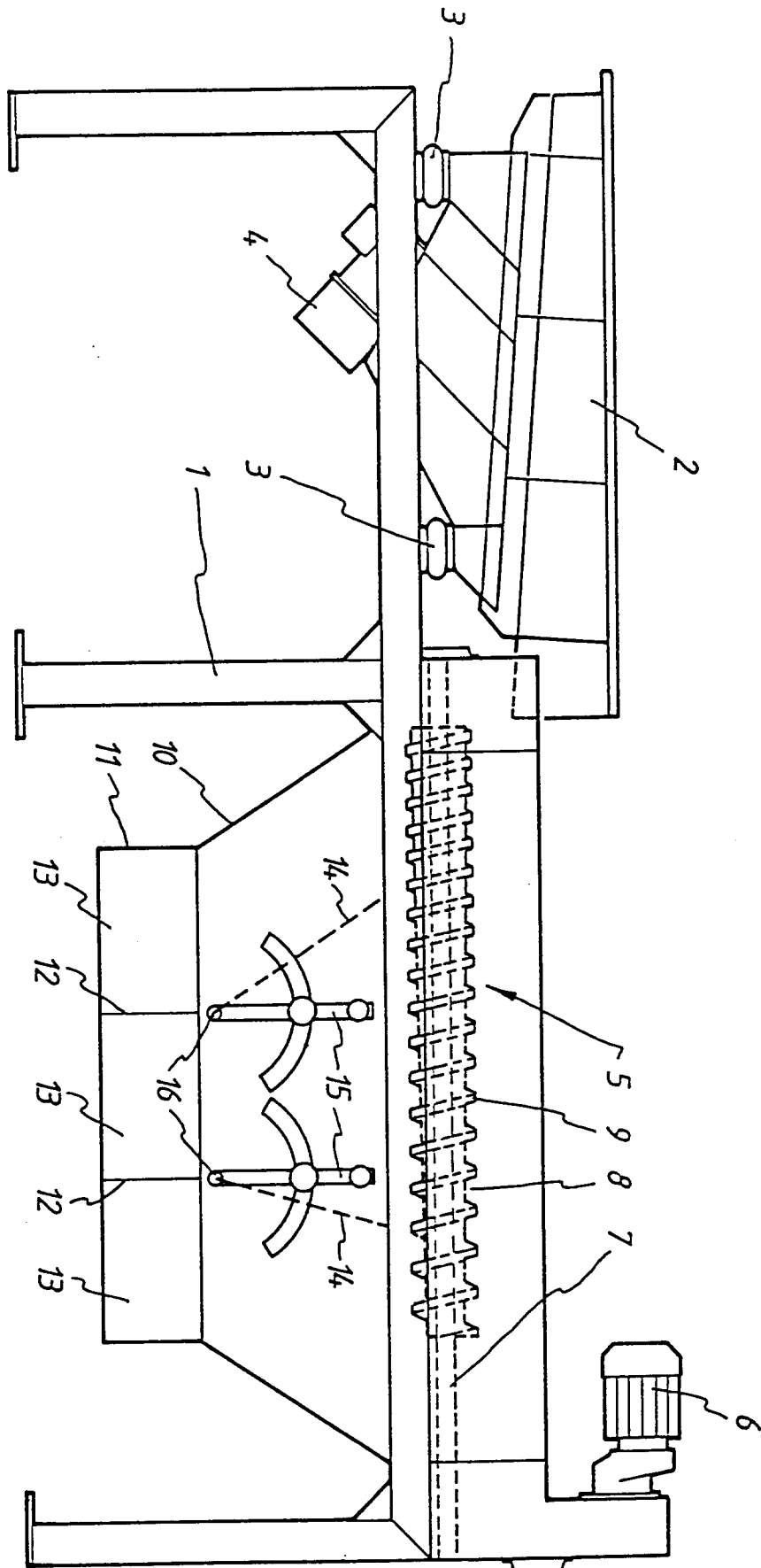


Fig 2

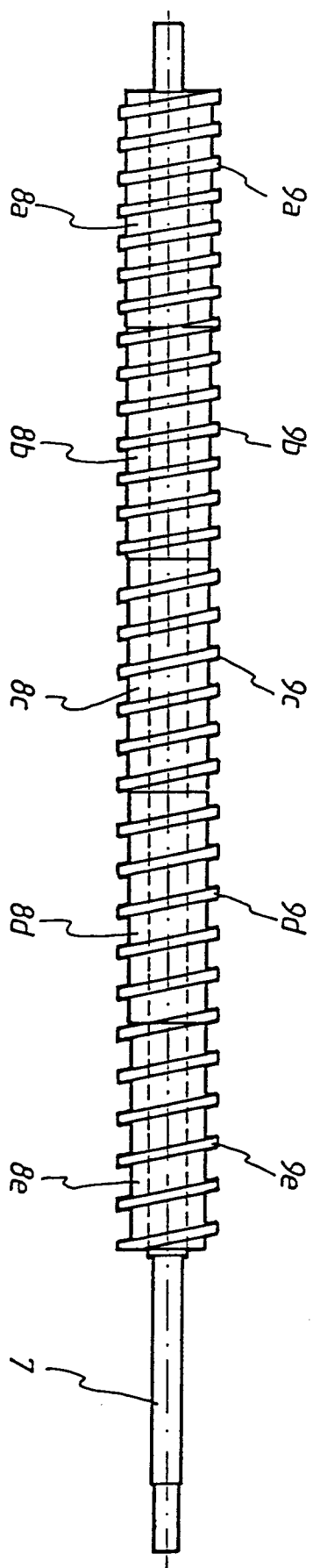


Fig 3



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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0843

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.5)
Y	GB-A-374 897 (STODDART) * page 2, line 67 - page 3, line 35; figures *	1,4,6	B07B13/07 B07B1/15
A	---	3	
Y	DE-A-3 116 699 (NIKO KONSERVEN - MASCHINENFABRIK HINSBECK GMBH & CO. KG) * page 8, line 31 - page 10, line 8 * * page 12, line 20 - page 13, line 3; figures *	1,4,6	
A	---	3	
A	DE-C-69 525 (LAMPITT) * page 1, left column, line 1 - line 10; figures *	1	
A	---	2	
A	NL-C-20 068 (RINCK) * page 2, line 107 - page 3, line 5; figure 1 *		
D,A	---	1,3-6	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	NL-A-7 412 616 (DE GREEF'S WAGEN-, CARROSSERIE- EN MACHINEBOUW BV) * the whole document *		B07B
A	---	1,3-6	
A	NL-C-64 806 (FIRMA P. NOTENBOOM & ZONEN) * the whole document *		
A	---	1,3-6	
A	GB-A-404 924 (BENSEMANN) * page 1, line 82 - page 2, line 67; figures *		
A	---	1,3,4	
A	DE-C-148 818 (STEPHAN) * the whole document *		
A	---	1,2,5	
A	US-A-2 983 376 (TROYER) * column 2, line 18 - line 48; figure 1 *		

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 JUNE 1993	Examiner VAN DER ZEE W.T.
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			