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(54) **DEVICE FOR CLEANING, SIEVING AND (PRE)SORTING OF BULBOUS PLANTS, TUBEROUS PLANTS AND ROOT CROP**

(57) The invention relates to a device (1) for cleaning and sieving bulbous plants, tuberous plants and root crops, the device comprising:
- a frame (3,4);
- a number of rollers (2) arranged parallel to each other and at a distance from each other in the frame; and
- drive means (5,6) for rotatingly driving at least one of the rollers;

wherein at least one roller comprises a continuous shaft (7) and a spiral (10) arranged around the continuous shaft,
wherein the spiral (10) is rotatable around the continuous shaft (7), wherein the spiral is driven rotatingly by the drive means (5,6) and the spiral has a rotation speed differing from that of the continuous shaft.

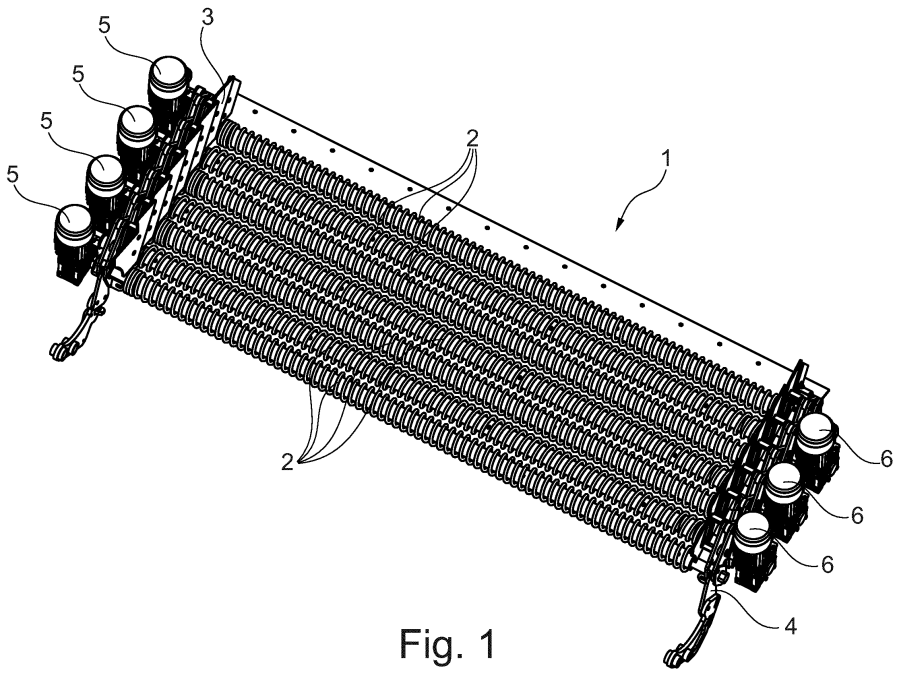

Fig. 1

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Description

[0001] The invention relates to a device for cleaning, sieving and (pre-)sorting bulbous plants, tuberous plants and root crops, the device comprising:

- a frame;
- a number of rollers arranged parallel to each other and at a distance from each other in the frame; and
- drive means for rotatingly driving at least one of the rollers;

wherein at least one roller comprises a continuous shaft and a spiral arranged around the continuous shaft.

[0002] Such a device is known from EP 0673593. In this publication the rollers are embodied as spirals which are arranged around a thin shaft. The shafts are driven, whereby the spirals will likewise rotate.

[0003] During use of this device for cleaning and sieving bulbous plants, tuberous plants and root crops the space between the spiral and the associated continuous shaft will fill up with soil and/or clay. EP 0673593 for this reason proposes to arrange under the rollers free-running fingers which can be inserted between two turns of the spiral and can thus travel therewith when the spiral is driven. The free-running fingers can thus scrape the spirals clean.

[0004] Since it is necessary in such a device, which is also referred to as soil sieve, to adjust the spacing between the rollers, the rollers of EP 0673593 are arranged on the arms of a multi-scissor construction. Adjustment of the spacing between the rollers is necessary in order to sieve stones and the like, but also to pre-sort undersized crops.

[0005] Because the spacing between the rollers can be adjusted in this known device, it will be necessary to also be able to adjust the spacing between the scraping fingers, or the distance between the rollers will first have to be set to a fixed position before the scraping fingers can be used. This will however in both cases complicate the construction and the convenience of use.

[0006] It is therefore an object of the invention to reduce or even obviate the above stated drawbacks.

[0007] This object is achieved according to the invention with a device according to the preamble which is characterized in that the spiral is rotatable around the continuous shaft, wherein the spiral is driven rotatingly by the drive means and the spiral has a rotation speed differing from that of the continuous shaft.

[0008] Because the spiral in the device according to the invention has a rotation speed differing from that of the continuous shaft, soil and clay entering between the spiral and the continuous shaft will be dislodged and crushed into smaller pieces which can then drop out of the spiral.

[0009] The peripheral surface formed by the spiral is in addition a wave-shaped or ridged surface, whereby the crops are shaken on the rollers and soil and clay are removed from the crops.

[0010] In a preferred embodiment of the device according to the invention the continuous shaft of the at least one roller is arranged stationary on the frame.

[0011] A simple construction is obtained by arranging the continuous shaft fixedly on the frame. However, for a better controllability of throughfeed speed of the crops over the rollers of the device in combination with the cleaning action due to the difference in rotation speed between the spiral and the continuous shaft, it can be advantageous to also drive the continuous shaft rotatably. The rotation speed of the rotating shaft must however differ here from the rotation speed of the spiral.

[0012] In a further embodiment of the device according to the invention the spiral of the at least one roller is helical, preferably with a fixed pitch so that there are no differences in the cleaning action of the roller along its length.

[0013] In a preferred embodiment of the device according to the invention the at least one roller comprises at least one spacer arranged between the continuous shaft and the spiral.

[0014] Using the spacer it is possible to obtain space between the spiral and the continuous shaft, this contributing toward the self-cleaning capacity of the roller. Spacers moreover ensure that the spiral cannot be pressed aside when the diameter of the continuous shaft is considerably smaller than the inner diameter of the spiral. This being pressed aside could result in crops which are sufficiently large still being sieved out by the device.

[0015] In a further preferred embodiment of the device according to the invention the at least one spacer is a sheath arranged around the continuous shaft. This sheath can be used as slide bearing for the spiral so that the spiral and continuous shaft are not damaged by sliding over each other.

[0016] In yet another embodiment of the device according to the invention the at least one spacer comprises a number of strips extending in axial direction on the periphery of the continuous shaft.

[0017] Through the use of strips a space can be created between spiral and continuous shaft on the one hand and on the other the strips can as slide bearing support the spiral along the whole length.

[0018] The contact surface of the at least one spacer with the spiral preferably comprises a wear-resistant material. This wear-resistant material can for instance be a suitable plastic, such as for instance High-Molecular Polyethylene (HMPE).

[0019] In yet another embodiment of the device according to the invention the continuous shaft comprises at least one narrowed portion along the length of the spiral. With such a narrowed portion a greater distance can be obtained between the continuous shaft and the spiral.

[0020] In yet another preferred embodiment of the device according to the invention the device comprises a number of rollers with spirals rotatable around a continuous shaft, and the rollers are arranged adjacently and

successively of each other.

[0021] By providing multiple rollers with rotating spirals in the device the crops can be exposed to the cleaning and sieving action along a greater length.

[0022] The rollers are preferably arranged slidably transversely of the axial direction of the rollers for the purpose of adjusting the spacing of the rollers. It is thus possible to adjust the sieving function of the device to for instance the type of crop.

[0023] In a highly preferred embodiment of the device according to the invention the frame comprises a multi-scissor construction, and each roller is arranged on an arm of the multi-scissor construction.

[0024] Using the multi-scissor construction it is possible by means of a single movement to decrease or increase the distance between each pair of rollers by an equal amount. This enables rapid adjustment of the device.

[0025] In yet another embodiment of the device according to the invention the spirals of two adjacent rollers have an opposite direction of rotation. Because of the opposite direction the crops are trapped better between two rollers, whereby they remain there longer and are exposed more to the cleaning action of the rollers.

[0026] As already known from the prior art, the direction of transport of the crops over the rollers can be in longitudinal direction of the rollers as well as transversely thereof.

[0027] These and other features of the invention are further elucidated with reference to the accompanying drawings.

Figure 1 is a perspective view of an embodiment of the device according to the invention.

Figure 2 is a perspective view with exploded parts of a roller of the device according to figure 1.

Figure 3 is a detail view of the device according to figure 1.

[0028] Figure 1 is a perspective view of an embodiment of the device 1 according to the invention. This device 1 has a number of rollers 2 which are mounted on either side in a multi-scissor construction 3, 4 of the frame.

[0029] Provided on the outer side of these scissor constructions 3, 4 on either side of rollers 2 are electric motors 5, 6 which alternately drive a spiral of a roller 2.

[0030] Figure 2 is a perspective view with exploded parts of a roller 2 of device 1 according to figure 1. Each roller 2 has a continuous shaft 7 having therearound a two-part sheath 8, 9 of a wear-resistant material. This sheath 8, 9 provides for guiding of spiral 10 which is arranged round sheath 8, 9.

[0031] Continuous shaft 7 is provided at one end with flattened parts 11 with which the continuous shaft 7 is arranged fixedly in frame 3, 4.

[0032] Provided among other parts on the other side of continuous shaft 7 are three ball bearings 12 on which a bush 13 with a shaft end 14 is mounted. In mounted situation the outer end of spiral 10 engages on bush 13. By rotating the shaft end 14 the spiral 10 will rotate while continuous shaft 7 is arranged stationary in frame 3, 4.

[0033] Figure 3 is a detail view of device 1 according to figure 1. This figure shows particularly the multi-scissor construction 4 in more detail. This scissor construction 4 consists of a first chain of first arms 15 pivotally connected to each other at the outer ends and a second chain of second arms 16 pivotally connected to each other at the outer ends and passing through the first chain. First arms 15 are further pivotally connected here in the centre to the centre of the second arms 16. This construction of chains 15, 16 provides a multi-scissor construction 4.

[0034] Rollers 2 are mounted alternately here in the outer ends of first arms 15 and the outer ends of second arms 16 so that, when the scissor construction 4 pivots, the distance between rollers 2 becomes uniformly greater or smaller. In this embodiment spirals 10 are moreover provided alternately with a right and left-hand lead. This has the advantage that the crop is distributed more easily over the width of the rollers.

[0035] It will be further apparent from figure 3 that the outer end of continuous shaft 7 is locked against rotation with the flattened parts 11 in an end cap 17. Electric motors 6 are arranged on shaft ends 14 of rollers 2 for the purpose of driving spiral 10. Other drives can also be used instead of electric motors 6, such as for instance hydraulic motors.

[0036] In the shown embodiment an electric motor 5, 6 is provided per roller 2. Each spiral 10 can hereby be controlled individually. It is however also possible to replace motors 5 with a transmission and a single motor so that half the rollers 2 are driven with a single motor. Motors 6 can thus also be replaced with a transmission and single motor in order to drive the other rollers 2. Using such a construction it remains in any case possible to drive adjacent rollers 2 in opposite directions of rotation.

Claims

1. Device for cleaning, sieving and (pre-)sorting bulbous plants, tuberous plants and root crops, the device comprising:

- a frame;
- a number of rollers arranged parallel to each other and at a distance from each other in the frame; and
- drive means for rotatingly driving at least one of the rollers;

wherein at least one roller comprises a continuous shaft and a spiral arranged around the continuous shaft,

characterized in that the spiral is rotatable around the continuous shaft, wherein the spiral is driven rotatingly by the drive means and the spiral has a ro-

tation speed differing from that of the continuous shaft.

2. Device as claimed in claim 1, wherein the continuous shaft of the at least one roller is arranged stationary on the frame.

3. Device as claimed in claim 1 or 2, wherein the spiral of the at least one roller is helical.

4. Device as claimed in any of the foregoing claims, wherein the at least one roller comprises at least one spacer arranged between the continuous shaft and the spiral.

5. Device as claimed in claim 4, wherein the at least one spacer is a sheath arranged around the continuous shaft.

6. Device as claimed in claim 4, wherein the at least one spacer comprises a number of strips extending in axial direction on the periphery of the continuous shaft.

7. Device as claimed in any of the claims 4-6, wherein the contact surface of the at least one spacer with the spiral comprises a wear-resistant material.

8. Device as claimed in any of the foregoing claims, wherein the continuous shaft comprises at least one narrowed portion along the length of the spiral.

9. Device as claimed in any of the foregoing claims, wherein the device comprises a number of rollers with spirals rotatable around a continuous shaft, and wherein the rollers are arranged adjacently and successively of each other.

10. Device as claimed in any of the foregoing claims, wherein the rollers are arranged slidably transversely of the axial direction of the rollers for the purpose of adjusting the spacing of the rollers.

11. Device as claimed in claim 10, wherein the frame comprises a multi-scissor construction, and wherein each roller is arranged on an arm of the multi-scissor construction.

12. Device as claimed in any of the claims 9-11, wherein the spirals of two adjacent rollers have an opposite direction of rotation.

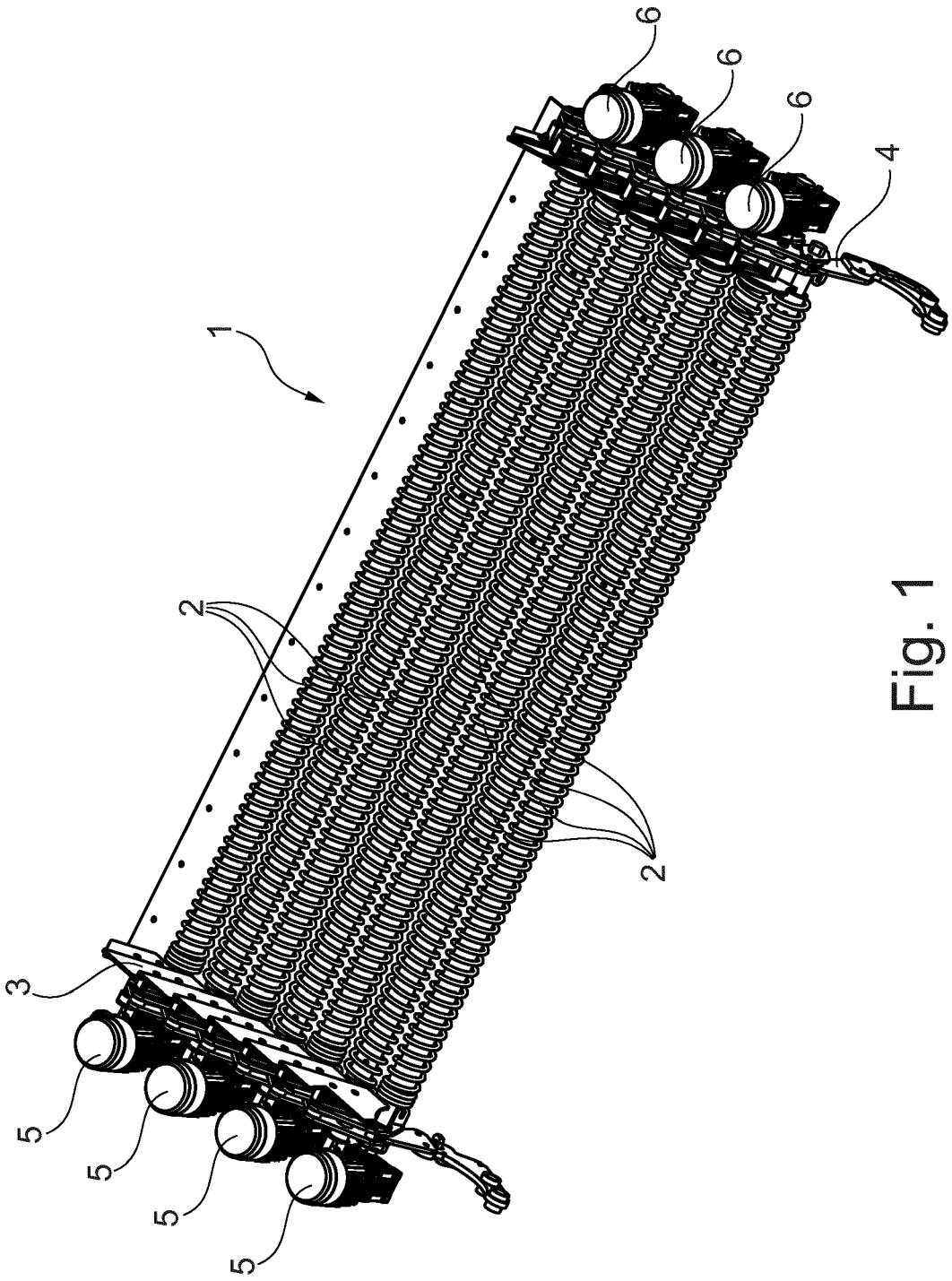

Fig. 1

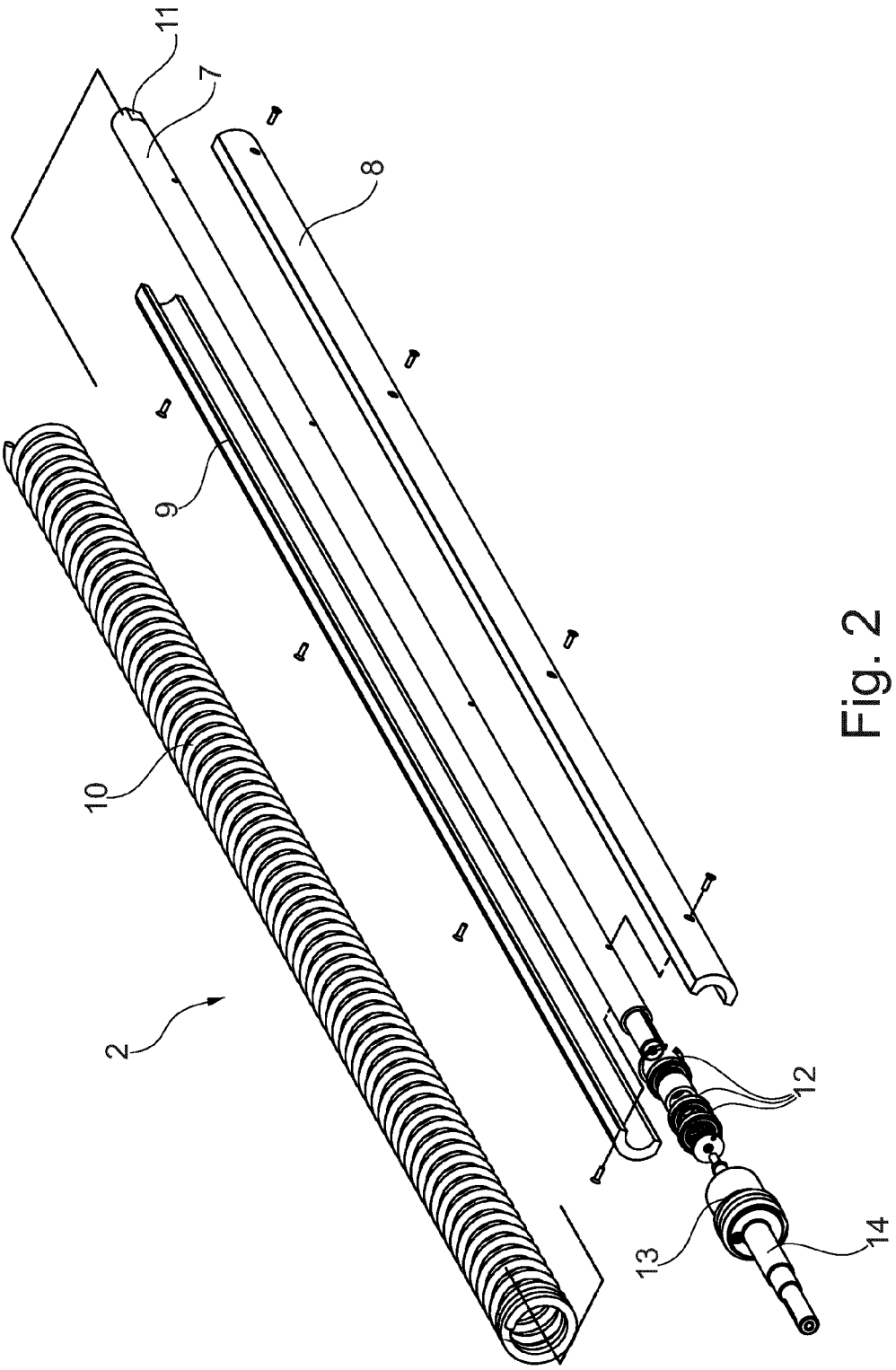

Fig. 2

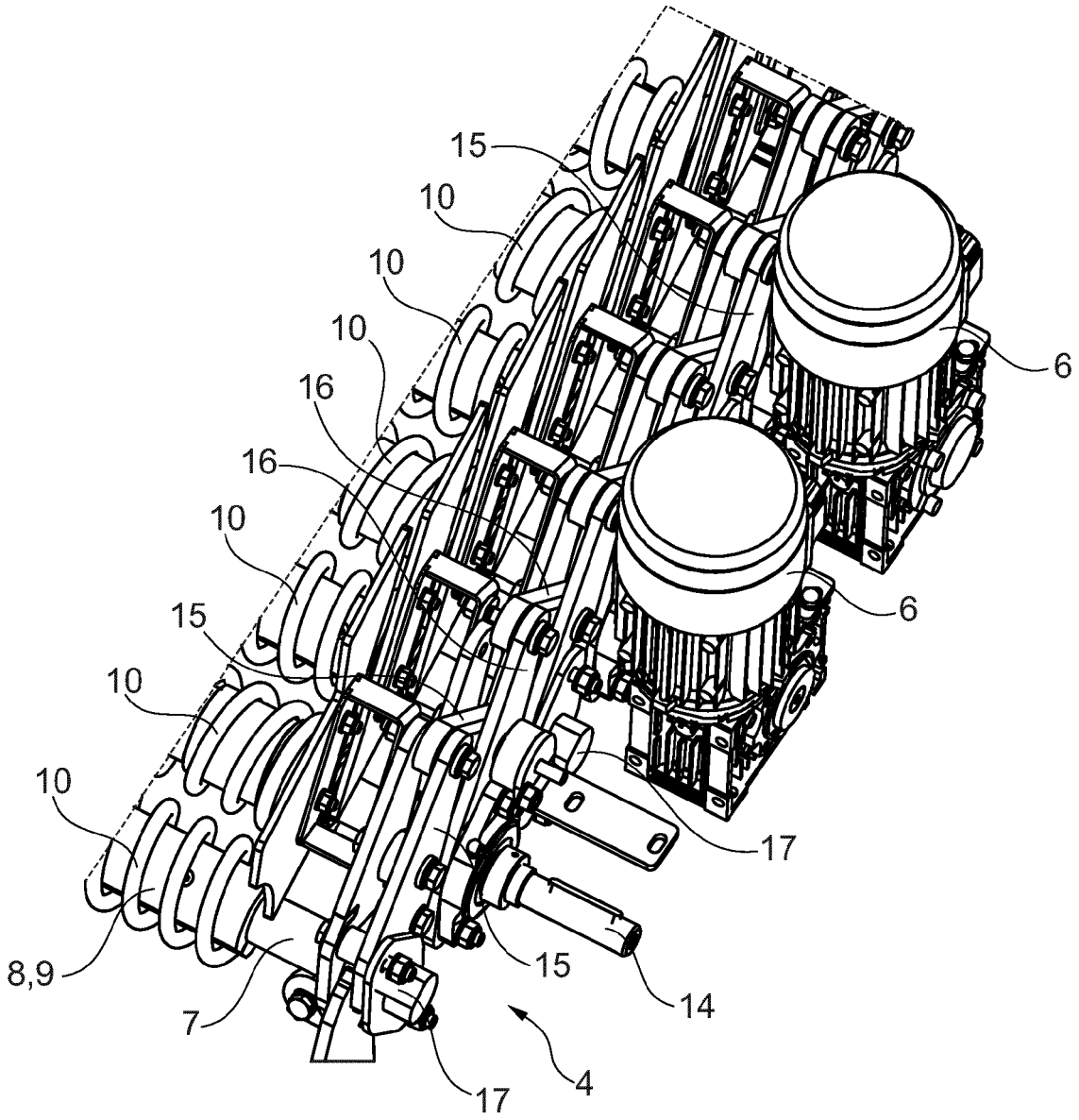

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 3626

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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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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 February 2016	Reininghaus, F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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08-02-2016

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