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Tatyanko et al.

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[54] **ROOT CLEANER**

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[51] **Int. Cl.** **B07b 13/04**

[58] **Field of Search** 15/3.11; 209/107

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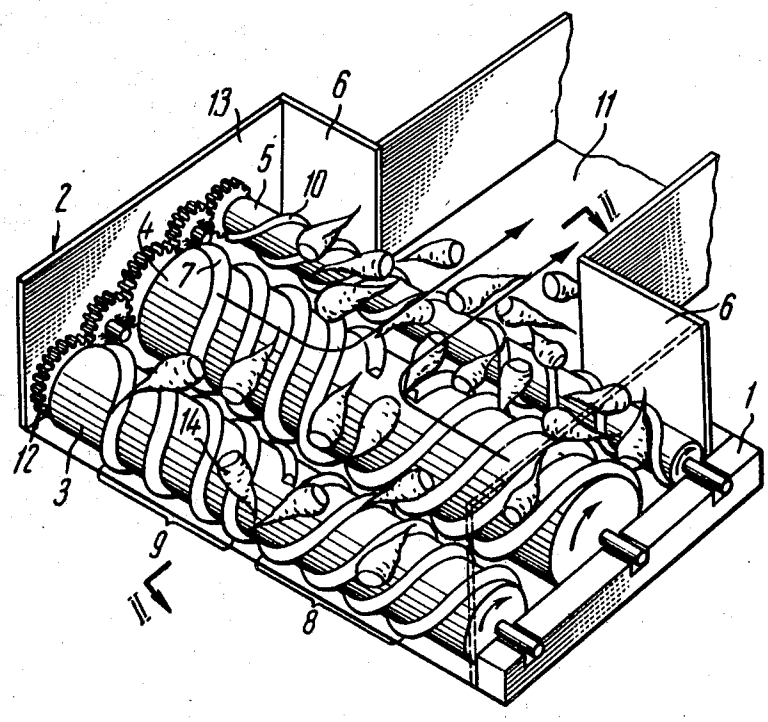
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[57] **ABSTRACT**

A root cleaner having several sections which consist of two drums, a roll and a shield. The drums are provided with helically arranged clustered webs on their outer surface. The helices of two adjacent web clusters are directed towards each other. The shield has a port located against the zone of the meeting of the web helix ends which serves to pass the roots and change the direction of their movement from axial movement lengthwise of the drums to radial movement over the drums and the roll.

3 Claims, 2 Drawing Figures



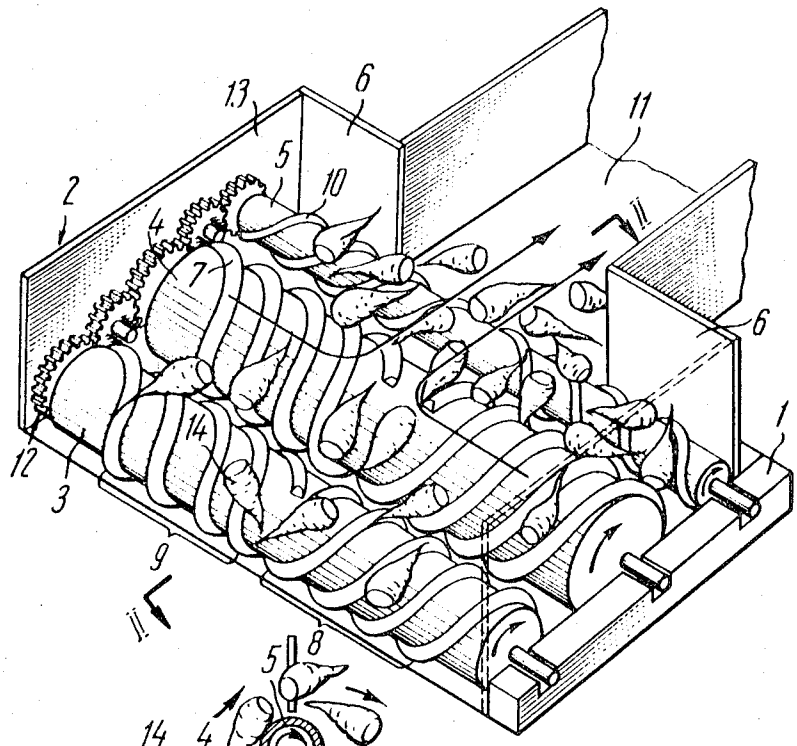


FIG. 1

FIG. 2

ROOT CLEANER

The present invention relates to root cleaners used in root harvesting and similar agricultural machinery.

Root cleaners are wildly known and consist of a number of parallel rolls carrying guide webs attached to the surface thereof.

The rolls are coplanar with a minimum radial clearance left therebetween. Two of the adjacent rolls rotate towards each other and are provided with auxiliary side rolls located above which are fixed shields which form the working duct of the cleaner through which the roots travel while being cleaned.

Such root cleaners are used in beet harvesters.

The root cleaners discussed above are capable of cleaning the beet from vegetable impurities and tops but fail to separate earth therefrom. Due to the small cleaning area and low working speed of said root cleaners they are utilizable only in three- or four-row beet harvesters as auxiliary separating means.

Root cleaners having, aside from the similar rolls with guide webs, a provision for webless rolls which are arranged above the former ones and articulated to the frame through a spring-cushioned suspension in order to protect the cleaner against breakdown when the root harvesters are operated on stony soils are also known in the prior art.

However, these rool cleaners also fail to rid the roots of earth and are therefore applicable only as an auxiliary cleaning device to remove vegetable impurities.

Additionally, known in the prior art are root cleaners comprising a frame section each of which consists of at least two drums rotatable in the same direction and having the external helically arranged guide webs with a roll located above the drums and a shield located lengthwise of said roll.

The aforesaid root cleaners are capable of good separation of the earth from the heap of roots but are less capable of cleaning the roots from the weed and residual tops, since only part of the roots travelling along the drums get in touch with the rolls that separate said impurities.

It is an object of the present invention to provide a root cleaner that would be capable of cleaning roots both from earth and vegetable impurities.

It is another object of the present invention to provide a root cleaner such that would feature compact design and high throughput capacity.

It is still another object of the present invention to provide a root cleaner such that may be suitably used in a wide variety of root harvesters.

According to the above said and other objects, of the invention a root cleaner comprising frame-mounted sections having at least two drums rotatable in the same direction therein which have helically arranged external guide webs thereon, a roll located higher than said drums and a shield arranged lengthwide said roll. According to the invention the webs on the drums are arranged in clusters so that the helices of the two adjacent web clusters are directed towards each other, and wherein the shield has a port located against the meeting zone of the ends of web helices said port serving to pass the roots therethrough and to change their movement from axial movement lengthwise of the drums to movement radial over the drums and rolls.

Thus, an increased throughput capacity of the root cleaner and a much higher quality of cleaning of the roots from impurities are attained due to the fact that the webs are arranged in clusters whose helices are directed towards each other and because the roots travel both lengthwise and crosswise over the drums.

A still higher cleaning effect is attainable when the drums of the herein proposed root cleaner are of different diameters, with the larger one being located behind the smaller one with respect to the direction of the root movement. Thus, the root separation process becomes more intensive due to dispersed flow of the mass being cleaned and its undulatory movement.

Furthermore, it is expediant for the roll rotating in the same direction as the drums and located above the larger-diameter drum, to have helically arranged webs. This causes a more rapid change in the direction of the mass of roots being cleaned from the axial to the radial, i.e., towards the port in the shield, said port being arranged parallel to the roll and within the zone in which the most intensive separation of vegetable impurities and soil residues occurs.

A description of the specific embodiments of the present invention to a root cleaner is exemplified below with due reference to the accompanying drawings, wherein:

FIG. 1 is a schematic diagram of a root cleaner, according to the invention; and

FIG. 2 is a section taken along line II—II in FIG. 1.

Referring to FIG. 1, the root cleaner comprises a frame 1 on which there are mounted sections 2 embracing the drums and rolls that clean the roots from earth and vegetable impurities.

Each of the sections 2 embraces the two drums 3 and 4, a roll 5 and a shield 6.

Arranged helically on the outer surface of the drums 3 and 4 are guide webs 7. The latter are arranged in clusters 8 and 9 so that the helices of the two adjacent clusters 8 and 9 on each drum are directed towards each other.

To provide higher-quality root cleaning the number of the drums 3 and 4 per section 2 can be increased to suit the particular environmental conditions and type of the root harvester.

One of the drums, viz., 4 is of larger diameter than the drum 3 and is located closely therebehind if viewed along the direction of root travel. Besides, drums 3 and 4 rotate in the same direction, viz., in the direction of harvester travel as shown by the arrows in FIG. 1.

The roll 5 is located above the drum 4 (FIG. 2), i.e., above the larger-diameter drum and rotates in the same direction as said drum 4. Also for better root cleaning the roll 5 has guide webs 10 arranged helically.

In order to isolate the sections 2 (FIG. 1) from each other shields 6 are provided with ports 11 located against the meeting zone at the ends of helical webs 7. The ports 11 serve to pass the roots therethrough and change their direction of root movement from axial movement lengthwise across the drums 3 and 4 to radial movement over the drums 3 and 4 and the roll 5.

A drive unit 12 is fixed on the frame 1 at the end faces of the drums 3 and 4 and the roll 5 to impart rotation in the same direction thereto. Spur gearing and chain drive may be employed as a drive unit.

Also, side shields 13 are provided at the end faces of the drum 3 and 4 and the roll 5, fixed to the frame 1 to prevent the mass being cleaned from axial discharge.

The root cleaner of the invention operates as follows.

A mixture of roots 14, earth and vegetable residues is fed onto the surface of the drums 3 and 4. Under the effect of the webs 7 the roots 14 move lengthwise along the drum axes till reaching the port 11 area in the shield 6, whereupon the roots change their movement to the radial direction over drums 3 and 4 and the roll 5. As a result the lumps of earth get bent over the drums and are crumbled under the forces of inertia and the jerking of the webs, and while the roots are rotating around the drums, the earth once stuck thereto then passes out through the intercylinder gaps.

Upon reaching the meeting zone of the ends of the webs 7 helices, the roots 14 change their direction of movement abruptly, i.e., from axial to radial and then thrown over the roll 5 and directed to the port 11. The resultant forces of inertia cause the earth separation process, and the vegetable impurities and residual tops are dragged into the gaps between the rolls and the drum 4, as well as into the gaps between the webs 10 of the roll 5 and the side shield 6. The earth separation process proceeds continuously as the drums continue to rotate.

The cleaned roots can subsequently be collected on the harverster elevators and loaded onto transportation facilities upon discharge of same through parts 11, of shield 6.

In case the root cleaner incorporates more than two sections 2, it would be reasonable to arrange the ports 11 in the side shield 6 checkerwise which would make the root-cleaning route longer due to a more complete utilization of the overall length of the drums 3, 4 and the roll 5.

What is claimed is:

1. A root cleaner, comprising a plurality of sections each of which incorporates: a frame; at least two adjacent substantially parallel drums rotating in the same direction and mounted in said frame; helically arranged clustered webs located on the outer surface of each of said drums, the helices of the two adjacent web clusters on each drum being directed towards each other providing a zone of meeting of the web helix ends; a roll located adjacent and above the level of arrangement of said drums parallel to said drums said roll being positioned from said drums in the direction of root movement; a shield positioned lengthwise of said roll; a port in said shield located against the zone of meeting of the web helix ends and serving for the roots to pass and change the direction of their movement from axial movement lengthwise of said drums to radial movement over said drums and said roll.

2. A root cleaner as claimed in claim 1, wherein the drums are made different in diameter and are so mounted on the frame that the larger drum is located behind the smaller one if viewed in the direction of roots movement.

3. A root cleaner as claimed in claim 2, wherein the roll rotates in the same direction as the drums and is located above the larger-diameter drum, and has helically arranged webs.

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