

ARTIFICIALLY INTELLIGENT HARVEST AND REUSE SYSTEM FOR PLANTING VEGETABLES

BACKGROUND OF THE INVENTION

5 **1. Field of the Invention:**

The invention relates to an artificially intelligent harvest and reuse system for planting vegetables, particularly to one that has an operation loop in a U shape for automatically replanting after harvest.

2. Description of the Related Art

10 Traditionally, cultivation of vegetables is performed on the land and therefore the result of harvest depends on the weather. Then there are greenhouses to lower the impact of bad weather on the vegetables and agricultural plants. However, such greenhouses still cannot really ensure a suitable place for the vegetables to grow. And then there are vegetable
15 factories where the environment is especially designed and arranged for growing vegetables so that the production of vegetables can be maximized continuously. Such vegetable factories are usually built at a location and have shelves with multiple layers stacked and arranged for further increasing the production of the vegetables. But the vegetable factories still require
20 human resources to manually cultivate and gather the vegetables in the process.

FIG. 1 illustrated an automatic harvesting device 50P disclosed in Taiwan Patent No. M52793. The automatic harvesting device has a frame 52, a plurality of sinks 54, a track device 56, a plurality of plates 58 and a

mechanical arm system 60P. The sinks 54 are arranged along a first direction X1 on the frame 52 and the track device 56 is disposed on the frame 52 across the sinks 54. The plates 58 are disposed on the frame 52 and arranged along a second direction X2 and the mechanical arm system 60P is disposed at both
5 sides of the track device 56 for taking and placing the plates 58. However, such operation still requires human resources for cultivation and harvest, even for gathering, root cutting and packaging. And each procedure cannot be arranged efficiently with such automatic harvesting system.

SUMMARY OF THE INVENTION

10 It is a primary objective of the present invention to provide an artificially intelligent harvest and reuse system for planting vegetables that has the planting plates modularized and neatly disposed on the layers thereof for nursery vegetables and has an operation loop in a U shape for repeated operation of harvesting and planting vegetables.

15 Another objective of the present invention is to provide an artificially intelligent harvest and reuse system for planting vegetables that does not require human resources or a huge area for operation, so as to achieve better efficiency in nursery and harvesting vegetables.

In order to achieve the above objectives, the harvest and reuse system
20 includes at least one first shelf disposed along a first direction with a plurality of layers thereon for nursery vegetables, each layer including a pair of parallel rails disposed along a second direction perpendicular to the first direction and a nursery basin arranged between the pair of parallel rails with a first access opening arranged at an end thereof; at least one second shelf

disposed at an opposite side of the first shelf along the first direction with a space left in-between the first and second shelves, the second shelf having a plurality of layers for nursery vegetables, each layer including a pair of parallel rails disposed along the second direction perpendicular to the first direction and a nursery basin arranged between the pair of parallel rails with a second access opening arranged at an end thereof; at least one sliding apparatus including a base disposed on the pair of parallel rails along the first direction with a motor thereon, so as to drive the base sliding on the rails along the second direction, and at least one pair of forks arranged at a front end of the base; a plurality of planting plates disposed on the nursery basins and lining along the second direction, each planting plate having a plurality of planting holes arranged thereon and being displaceable by operation of the sliding apparatus; a first conveyor disposed along the first direction near the first access openings of the first shelf; a second conveyor disposed along the first direction near the second access openings of the second shelf; a connecting conveyor disposed along the second direction and connecting an exit end of the first conveyor and an entry end of the second conveyor, forming an operation line in U shape; a root cutting apparatus disposed at a front end of the connecting conveyor along the second direction and including at least one cutting unit, each of the cutting unit further including a pair of blades operated by a pair of pneumatic cylinders correspondingly to displace back and forth in opposite directions to cut the root of vegetables repeatedly; a packaging apparatus disposed along the second direction at a front end of the root cutting apparatus; a storage area arranged along the second direction at a rear end of the connecting conveyor; a first distributing

apparatus disposed on a pair of first rail set to displace between the first and second conveyors along the first direction for operation; a first mechanic arm disposed on the first distributing apparatus to displace together with the first distributing apparatus along the first direction, the first mechanic arm having
5 a first parallel clamp installed at a free end thereof for vertical operation of clamping and releasing for taking away and putting back the planting plates via the first and second access openings; a second mechanic arm disposed between the first conveyor and the root cutting apparatus and having at least one clamp installed at a free end thereof, the clamp arranged in a V shape and
10 operated clamping and releasing horizontally for moving grown vegetables from the planting plates on the first conveyor to the root cutting apparatus; a third mechanic arm disposed at a corner formed by the second conveyor and the storage area and having a second parallel clamp installed at a free end thereof and operated clamping and releasing horizontally for picking up a
15 plurality of nursery foams in the storage area and placing each nursery foam into one of the planting holes individually on the planting plates.

The components and apparatus above are all arranged and disposed at a side of the connecting conveyor, forming an operation loop in a first nursery area, and a controller is disposed near the first nursery area and includes a
20 controlling program and an interface for controlling operation of the apparatus and components.

Whereby the controller holds control of each sliding apparatus on the corresponding layers to displace the planting plates along the second direction for operation and of the first mechanic arm to move the planting

plates around the first conveyor, the second conveyor, the first access openings and the second access openings; the planting plates with grown vegetables placed on the first conveyor one by one to be sent toward the connecting conveyor along the first direction; then the second mechanic arm
5 picking up the grown vegetables from the planting plates on the way and delivering to the root cutting apparatus for removing the roots and further sending the cut vegetables to the packaging apparatus for packaging; meanwhile, the planting plates without vegetables being sent to an exit end of the first conveyor in the second direction; the third mechanic arm placing the
10 nursery foams with sprouts onto the planting holes on the empty planting plates individually and then the planting plates further sent back to the corresponding access openings by the second conveyor and the first mechanic arm moved by the first distributing apparatus along the first rail set placing the refilled planting plates onto the corresponding shelves, the
15 refilled planting plates then displaced back onto the corresponding layers by the sliding apparatus, so as to form the artificially intelligent harvest and reuse system for vegetables.

Furthermore, the first and second access openings are slanting from an outside thereof toward an inner side thereof. The base of the sliding
20 apparatus has a pair of first wheels each arranged at a lateral side thereof for the sliding apparatus to be disposed on said pair of parallel rails, and the first wheels are driven by the motor for the base to be displaced along the rails. In a preferred embodiment, the first wheels have a gear structure, each of which has a first gear and a second gear each individually arranged on lateral side

thereof, and the parallel rails are further arranged as gear racks for meshing with the gear structure.

The root cutting apparatus includes a plurality of cutting units, each of which has a pair of operating bars engaged with the corresponding pair of
5 blades and controlled by a set of pneumatic cylinders, so that the root cutting apparatus is able to perform cutting on multiple vegetables at the same time.

The clamp of the second mechanic arm has a pneumatic cylinder operating clamping and releasing of a pair of holding pieces, each of said holding pieces has a semicircular section for the holding pieces to form a
10 circle in order to pick up the grown vegetables.

In addition, the planting plates are made of polystyrene.

The present invention further includes a second nursery area arranged at a corresponding side of the first nursery area and sharing the connecting conveyor, root cutting apparatus, the packaging apparatus and the storage
15 area with the first nursery area. The second nursery area includes at least one first shelf, at least one second shelf, at least one sliding apparatus, a plurality of planting plates, a first conveyor and a second conveyor, all of which have the same structure as the ones in the first nursery area; a second distributing apparatus disposed on a pair of second rail set to displace between the first
20 and second conveyors along the first direction for operation; a first mechanic arm disposed on the second distributing apparatus to displace together with the second distributing apparatus along the first direction, said first mechanic arm having a first parallel clamp installed at a free end of the first mechanic arm, said first parallel clamp operated clamping and releasing vertically for

taking away and putting back the planting plates via the first and second access openings; and a second mechanic arm and a third mechanic arm arranged with the same structure as the one in the first nursery area.

The second nursery area is also controlled by the controller disposed
5 near the first nursery area for operation of the mentioned apparatus and components in the second nursery area, so as to form an operation loop in the second nursery area symmetrically corresponding to the operation loop in the first nursery area.

With structures disclosed above, the present invention retrieves the
10 planting plates with grown vegetables from the first and second access openings of the layers for further harvesting, root cutting and packaging. Meanwhile, the empty planting plates are sent to be placed with new nursery foams with sprouts thereon and then back to the access openings for another nursery process again. Such automatic operation substantially reduces the
15 human resources and nursery area for growing and harvesting vegetables and provides an intelligent system with a completely safe environment for such operations with better efficiency.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram of an automatic harvesting device
20 disclosed in Taiwan Patent No. M520793;

FIG. 2A is a perspective view of a nursery foam with a sprout thereon according to the present invention;

FIG. 2B is a perspective view of a planting plate with a plurality of nursery foams disposed thereon according to the present invention;

FIG. 3A is a schematic diagram illustrating grown vegetables taken out from the planting holes of the planting plate according to the present invention;

FIG. 3B is a schematic diagram illustrating a root cut from a grown
5 vegetable according to the present invention;

FIG. 4 is a top plan view of the present invention in a preferred embodiment;

FIG. 5 is an enlarged view of partial structure of FIG. 4;

FIG. 6 is a sectional view taken along line 6-6 of FIG. 4;

10 FIG. 7 is a sectional view taken along line 7-7 of FIG. 6;

FIG. 8A is a schematic diagram illustrating structure of a layer for vegetable nursery according to the present invention;

FIG. 8B is an enlarged schematic diagram of a first parallel clamp shown in FIG. 6;

15 FIG. 9A is a schematic diagram illustrating a set of clamps operated to be ready for picking up vegetables;

FIG. 9B is a schematic diagram illustrating the set of clamps operated to pick up vegetables;

20 FIG. 10A is a schematic diagram illustrating structure of a root cutting apparatus of the present invention;

FIG. 10B is a schematic diagram illustrating a root of a vegetable being cut by the root cutting apparatus;

FIG. 11 is a perspective of a third mechanic arm of the present invention;
and

25 FIG. 12 is a flow diagram showing the automatic procedures of the

present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the following embodiments, the first direction is the X direction marked in the corresponding drawings and the second direction is the Y
5 direction marked in the corresponding drawings.

With reference to FIGS. 2A-12, among which FIG 2A is a perspective view of a nursery foam **220** with a sprout **221** thereon and FIG 2B shows a plurality of the nursery foams **220** with sprouts **221** placed into corresponding planting holes **210** on a planting plate **200**. The shape of the
10 nursery foams **220** are designed to match the shape of the planting holes **210** to be fixed therein appropriately. As for the method of nursery the seeds in the nursery foams **220**, any conventional method would apply. FIG. 3A illustrated grown vegetables **230** picked up from the planting holes **210** of the planting plates **200**, and FIG. 3B illustrated one of the grown vegetables **230**
15 with its root cut out.

Basically, the present invention is an automatic operating system for harvesting vegetables and reusing the empty planting plates **200** for another nursery process. After the nursery foams **220** placed into the planting holes **210** as shown in FIG. 2B, the planting plates **200** are sent to a corresponding
20 layer **11** on a corresponding shelf **10F**, **10R** as shown in FIGS. 4 and 6. When the vegetables are well grown, the planting plates **200** are sent for gathering the grown vegetables **230** together with the nursery foams **220** from the planting plates **200** as shown in FIG. 3A. Conventionally, removing the grown vegetables **230** with the nursery foams **220** and separating the grown

vegetables **230** from the nursery foams **220** are proceeded manually; such operation is obviously inefficient. Therefore, the present invention aims to overcome the shortcomings.

The main feature of the present invention is the automatic operation of
5 retrieving, gathering, root cutting and packaging the grown vegetables **230**;
meanwhile, the empty planting plates **200** are also automatically sent back
for placing a new nursery foams **220** thereon and then sent to a corresponding
layer **11** of a corresponding shelf **10F**, **10R**.

In a preferred embodiment, the present invention has at least one first
10 shelf **10F**, at least one second shelf **10R**, at least one sliding apparatus **12**, a
plurality of planting plates **200**, a first conveyor **20**, a second conveyor **30**, a
connecting conveyor **40**, a root cutting apparatus **50**, a packaging apparatus
60, a storage area **70**, a first distributing apparatus **80**, a first mechanic arm **90**,
a second mechanic arm **100**, a third mechanic arm **110** and a controller **140**.

15 The at least one first shelf **10F** is disposed along a first direction with a
plurality of layers **11** thereon for nursery vegetables, and each layer **11**
includes a pair of parallel rails **15** disposed along a second direction
perpendicular to the first direction and a nursery basin **13** arranged between
the pair of parallel rails **15** with a first access opening **14f** arranged at an end
20 thereof.

The at least one second shelf **10R** is disposed at an opposite side of the
first shelf **10F** along the first direction with a space **10S** left in-between the
first and second shelves **10F**, **10R**. The second shelf **10R** has a plurality of
layers **11** for nursery vegetables and each layer **11** includes a pair of parallel

rails **15** disposed along the second direction perpendicular to the first direction and a nursery basin **13** arranged between the pair of parallel rails with a second access opening **14r** arranged at an end thereof as shown in FIGS. 4 and 12. Referring to FIG. 6, the first and second access openings **14f**,
5 **14r** are slanting from an outside thereof toward an inner side thereof in order to prevent the liquid in the nursery basins **13** from flowing out. In this embodiment, the present invention has 12 first shelf **10F** and 12 second shelf **10R**, all arranged along the first direction to form a first nursery area **I**; the numbers of the first and second shelves **10F**, **10R** can be adjusted as needed.

10 The at least one sliding apparatus **12** includes a base **121** disposed on the pair of parallel rails **15** along the first direction with a motor **122** thereon, so as to drive the base **121** sliding on the rails **15** along the second direction, and at least one pair of forks **123** is arranged at a front end of the base **121**. In this embodiment, the base **121** has a pair of first wheels **124** each arranged at a
15 lateral side of the base **121** for the sliding apparatus **12** to be disposed on the corresponding pair of parallel rails **15**, and the first wheels **124** are driven by the motor **122** for the base **121** to be displaced along the rails **15**. Furthermore, the pair of first wheels **124** has a gear structure with each wheel having a first gear **125** and a second gear **126**, each of which individually arranged on a
20 lateral side of the corresponding first wheel **124**; and the parallel rails **15** are further arranged as gear racks for meshing with the gear structure.

Referring to FIGS. 6 and 8A, the plurality of planting plates **200** is disposed on the nursery basins **13** and lining along the second direction and each planting plate **200** is being displaceable by operation of the forks **123** of

the sliding apparatus **12** and has a plurality of planting holes **210** arranged thereon. In this embodiment, the planting plates **200** are made of polystyrene.

The first conveyor **20** is disposed along the first direction near the first access openings **14f** of the first shelf **10F**. The second conveyor **30** is
5 disposed along the first direction near the second access openings **14r** of the second shelf **10R**. In this embodiment, the first and second conveyors **20**, **30** are normal belt conveyors, or they can be conveyors having similar design with the belt conveyors for transferring the vegetables.

The connecting conveyor **40** is disposed along the second direction and
10 connecting an exit end of the first conveyor **20** and an entry end of the second conveyor **30**, forming an operation line in U shape, so that the empty planting plates **200** can be sent to the second conveyor **30** by the connecting conveyor **40** for placing new nursery foams **220** with sprouts **221** again.

The root cutting apparatus **50** is disposed at a front end of the connecting
15 conveyor **40** along the second direction. In this embodiment, the root cutting apparatus **50** includes at least one cutting unit **51** as shown in FIG. 10A. Each cutting unit **51** includes a pair of blades **52L**, **52R** operated by a pair set of pneumatic cylinders or cylinders with the same function **53L**, **53R** correspondingly to displace back and forth in opposite directions for cutting
20 the roots **223** of vegetables repeatedly as shown in FIG 10B. In the embodiment, the root cutting apparatus **50** includes 3 cutting units **51** as a set, each of which has a pair of operating bars **54L**, **54R** engaged with the corresponding pair of blades **52L**, **52R** and controlled by the corresponding pneumatic cylinders **53L**, **53R**, so that the root cutting apparatus **50** is able to

perform cutting on multiple vegetables at the same time.

The packaging apparatus **60** is disposed along the second direction at a front end of the root cutting apparatus **50** for further packaging the cut vegetables **222**.

5 The storage area **70** is arranged along the second direction at a rear end of the connecting conveyor **40**. In the storage area **70** a plurality of nursery foams **220** are neatly arranged for short-term storage, each of which has a sprout **221** therein as shown in FIG. 2A.

10 The first distributing apparatus **80** is disposed on a pair of first rail set **81** to displace between the first and second conveyors **20**, **30** along the first direction for operation. In this embodiment, the first distributing apparatus **80** is driven by a motor (not shown) for displacing along the first rail set **81** as shown in FIG. 7.

15 The first mechanic arm **90** is disposed on the first distributing apparatus **80** to displace together with the first distributing apparatus **80** along the first direction. With reference to FIG. 8B, the first mechanic arm **90** has a first parallel clamp **91** installed at a free end of the first mechanic arm **90** for vertical operation in taking away and putting back the planting plates **200** via the first and second access openings **14f**, **14r**; the first parallel clamp **91** has a
20 set of holding pieces **912** to be operated by a pneumatic cylinder **911** or other cylinders with similar function. The operation area of the first mechanic arm **90** is illustrated as an area **A** in FIGS. 4 and 5. Within the area **A**, the first parallel clamp **91** of the first mechanic arm **90** is operated to take away the planting plates **200** from the first access openings **14f** and to send them back

via the second access openings **14r**.

Referring to FIGS. 5 and 12, the second mechanic arm **100** is disposed between the first conveyor **20** and the root cutting apparatus **50** and has a structure illustrated in FIG. 11. A free end of the second mechanic arm **100**
5 has at least one clamp **101** installed thereon, and the clamp **101** is arranged in a V shape and operated clamping and releasing horizontally for moving grown vegetables **230** from the planting plates **200** on the first conveyor **20** to the root cutting apparatus **50** for cutting the roots **223** from the grown vegetables **230** as illustrated in FIGS. 9A and 9B. In the embodiment, the
10 clamp **101** has a pneumatic cylinder **102** operating clamping and releasing of a pair of holding pieces **102**, **103** as each of the holding pieces **102**, **103** has a semicircular section to form a circle in order to pick up the grown vegetables **230**.

Referring to FIGS. 5, 11 and 12, the third mechanic arm **110** is disposed
15 at a corner formed by the second conveyor **30** and the storage area **70** and has a second parallel clamp **111** installed at a free end thereof. The second parallel clamp **111** has a pair of holding rods **113** operated by a pneumatic cylinder **112** for clamping and releasing horizontally, so as to pick up the nursery foams **220** in the storage area and place each nursery foam **220** into
20 one of the planting holes **210** individually on the planting plates **200** as shown in FIG. 2B.

The components and apparatus mentioned above are all arranged and disposed at a side of the connecting conveyor **50**, forming an operation loop in a first nursery area **I** as shown in FIGS. 4 and 12. And a controller **140** is

disposed near the first nursery area **I** and includes a controlling program **141** and an interface **142** for controlling the operation of the apparatus and components. In this embodiment, the controller **140** is electrically connected to the components and apparatus by cables or via wireless internet.

5 Whereby the controller **140** holds control of each sliding apparatus **12** on the corresponding layers **11** to displace the planting plates **200** along the second direction for operation and of the first mechanic arm **90** to move the planting plates **200** around the first conveyor **20**, the second conveyor **30**, the first access openings **14f** and the second access openings **14r**. The planting
10 plates **200** with grown vegetables **230** are placed on the first conveyor **20** one by one to be sent toward the connecting conveyor **40** along the first direction; then the second mechanic arm **100** picks up the grown vegetables **230** from the planting plates **200** on the way and delivers to the root cutting apparatus **50** for removing the roots **223**, and further sends the cut vegetables **222** to the
15 packaging apparatus **60** for packaging.

Meanwhile, the planting plates **200** without vegetables are sent to an exit end of the first conveyor **20** in the second direction. The third mechanic arm **110** places the nursery foams **220** with sprouts **221** onto the planting holes **200** on the empty planting plates **200** individually and then the planting
20 plates **200** are further sent back to the corresponding access openings **14f**, **14r** by the second conveyor **30** and the first mechanic arm **90** moved by the first distributing apparatus **80** along the first rail set **81** places the refilled planting plates **200** onto the corresponding shelves **10F**, **10R**. The refilled planting plates **200** are then displaced back onto the corresponding layers **11**

by the sliding apparatus **12**, so as to form the artificially intelligent harvest and reuse system for vegetables as shown in FIG. 8.

In this embodiment, the connecting conveyor **40** further includes a cleansing apparatus **130** for cleansing the empty planting plates **200** before
5 placing new nursery foams **220** thereon as shown in FIG. 12.

In another applicable embodiment, the present invention further includes a second nursery area **II** arranged at a corresponding side of the first nursery area **I** and sharing the connecting conveyor **40**, the root cutting apparatus **50**, the packaging apparatus **60** and the storage area **70** with the
10 first nursery area **I**.

Moreover, the second nursery area **II** has exactly the same structure and apparatus as the first nursery area **I**, except that a second distributing apparatus **80'** is disposed on a pair of second rail set **81'** to displace between the first and second conveyors **20'**, **30'** along the first direction for operation,
15 that a first mechanic arm **90'** is disposed on the second distributing apparatus **80'** to displace together with the second distributing apparatus **80'** along the first direction; the first mechanic arm **90'** has a first parallel clamp **91** installed at a free end thereof for vertical operation in taking away and putting back the planting plates **200** via the first and second access openings
20 **14f**, **14r**; the first parallel clamp **91** has a set of holding pieces **912** to be operated by a pneumatic cylinder **911** or other cylinders with similar function.

The second nursery area **II** is further controlled by the controller **140** disposed near the first nursery area **I** for operation of the apparatus and

components in the second nursery area II, so as to form an operation loop within the second nursery area II symmetrically corresponding to the operation loop in the first nursery area I. Such arrangement is able to further increase the efficiency of the harvest and reuse system in view of both space
5 and the equipment.

To sum up, the present invention retrieves grown vegetables from the layers of the first and second shelves, and then gathers the vegetables for sending to further root cutting and packaging process. Meanwhile, the empty planting plates are sent for refilling new nursery foams with sprouts again
10 and the refilled planting plates are further sent back to the layers of the first and second shelves. Such operation is completely automatic for harvesting and restarting the vegetables nursery process, featuring less human resources, less operation area, more flexibility in 3-dimensional operations, intelligent operations and highly secure environment for growing vegetables.

15 Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

20

What Is Claimed Is:

1. An artificially intelligent harvest and reuse system for planting vegetables, comprising:

at least one first shelf (10F) disposed along a first direction with a plurality of layers (11) thereon for nursery vegetables, each layer (11) including a pair of parallel rails (15) disposed along a second direction perpendicular to said first direction and a nursery basin (13) arranged between said pair of parallel rails (15) with a first access opening (14f) arranged at an end thereof;

at least one second shelf (10R) disposed at an opposite side of said first shelf (10F) along said first direction with a space left in-between said first and second shelves (10F), (10R), said second shelf (10R) having a plurality of layers (11) for nursery vegetables, each layer (11) including a pair of parallel rails (15) disposed along said second direction perpendicular to said first direction and a nursery basin (13) arranged between said pair of parallel rails (15) with a second access opening (14r) arranged at an end thereof;

at least one sliding apparatus (12) including a base (121) disposed on said pair of parallel rails (15) along the first direction with a motor (122) thereon, so as to drive said base (121) sliding on said rails (15) along the second direction, and at least one pair of forks (123) arranged at a front end of said base (121);

a plurality of planting plates (200) disposed on said nursery basins (13) and lining along the second direction, each planting plate (200) having a plurality of planting holes (210) arranged thereon and being displaceable by operation of the sliding apparatus (12);

a first conveyor (20) disposed along the first direction near the first access openings (14f) of the first shelf (10F);

a second conveyor (30) disposed along the first direction near the second access openings (14r) of the second shelf (10R);

5 a connecting conveyor (40) disposed along the second direction and connecting an exit end of the first conveyor (20) and an entry end of the second conveyor (30), forming an operation line in U shape;

a root cutting apparatus (50) disposed at a front end of the connecting conveyor (40) along the second direction and including at least one cutting
10 unit (51), each of said cutting unit (51) further including a pair of blades (52L), (52R) operated by a pair of pneumatic cylinders (53L), (53R) correspondingly to displace back and forth in opposite directions to cut the root (223) of vegetables repeatedly;

a packaging apparatus (60) disposed along the second direction at a
15 front end of the root cutting apparatus (50);

a storage area (70) arranged along the second direction at a rear end of the connecting conveyor (40);

a first distributing apparatus (80) disposed on a pair of first rail set (81) to displace between the first and second conveyors (20), (30) along the first
20 direction for operation;

a first mechanic arm (90) disposed on the first distributing apparatus (80) to displace together with the first distributing apparatus (80) along the first direction, said first mechanic arm (90) having a first parallel clamp (91) installed at a free end thereof for vertical operation of clamping and releasing
25 for taking away and putting back the planting plates (200) via the first and

second access openings (14f), (14r);

a second mechanic arm (100) disposed between the first conveyor (20) and the root cutting apparatus (50) and having at least one clamp (101) installed at a free end thereof, said clamp (101) arranged in a V shape and operated clamping and releasing horizontally for moving grown vegetables (230) from the planting plates (200) on the first conveyor (20) to the root cutting apparatus (50);

a third mechanic arm (110) disposed at a corner formed by the second conveyor (30) and the storage area (70) and having a second parallel clamp (111) installed at a free end thereof and operated clamping and releasing horizontally for picking up a plurality of nursery foams (220) in the storage area (70) and placing each nursery foam (220) into one of the planting holes (210) individually on the planting plates (200);

said components and apparatus being arranged and disposed at a side of the connecting conveyor (40), forming an operation loop in a first nursery area (I); and

a controller (140) disposed near the first nursery area (I) and including a controlling program (141) and an interface (142) for controlling operation of said apparatus and components;

whereby the controller (140) holds control of each sliding apparatus (12) on the corresponding layers (11) to displace the planting plates (200) along the second direction for operation and of the first mechanic arm (90) to move the planting plates (200) around the first conveyor (20), the second conveyor (30), the first access openings (14f) and the second access openings (14r); the planting plates (200) with grown vegetables (230) placed on the first

conveyor (20) one by one to be sent toward the connecting conveyor (40) along the first direction; then the second mechanic arm (100) picking up the grown vegetables (230) from the planting plates (200) on the way and delivering to the root cutting apparatus (50) for removing the roots (223) and
5 further sending the cut vegetables (222) to the packaging apparatus (60) for packaging; meanwhile, the planting plates (200) without vegetables being sent to an exit end of the first conveyor (20) in the second direction; the third mechanic arm (110) placing the nursery foams (220) with sprouts (221) onto the planting holes (210) on the empty planting plates (200) individually and
10 then the planting plates (200) further sent back to the corresponding access openings (14f), (14r) by the second conveyor and the first mechanic arm (90) moved by the first distributing apparatus (80) along the first rail (81) set placing the refilled planting plates (200) onto the corresponding shelves (10F), (10R), the refilled planting plates (200) then displaced back onto the
15 corresponding layers (11) by the sliding apparatus (12), so as to form the artificially intelligent harvest and reuse system for vegetables.

2. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 1, wherein the first and second access openings (14f), (14r) are slanting from an outside thereof toward an inner
20 side thereof.

3. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 1, wherein the base (121) of the sliding apparatus (12) has a pair of first wheels (124) each arranged at a lateral side thereof for the sliding apparatus (12) to be disposed on said pair of parallel
25 rails (15), said first wheels (124) driven by the motor (122) for the base (121)

to be displaced along the rails (15).

4. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 3, wherein the pair of first wheels (124) has a gear structure with each wheel having a first gear (125) and a second gear (126), each individually arranged on a lateral side of said corresponding first wheel (124) and the parallel rails (15) are further arranged as gear racks for meshing with the gear structure.

5. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 1, wherein the root cutting apparatus (50) includes a plurality of cutting units (51), each of which has a pair of operating bars (54L), (54R) engaged with the corresponding pair of blades (52L), (52R) and controlled by a set of pneumatic cylinders (53L), (53R), so that the root cutting apparatus (50) is able to perform cutting on multiple vegetables at the same time.

6. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 1, wherein the clamp (101) of the second mechanic arm (100) has a pneumatic cylinder (102) operating clamping and releasing of a pair of holding pieces (103), each of said holding pieces (103) has a semicircular section (104) for the holding pieces (103) to form a circle in order to pick up the grown vegetables (230).

7. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 1, wherein the planting plates (200) are made of polystyrene.

8. The artificially intelligent harvest and reuse system for planting vegetables as claimed in claim 1, wherein the present invention further

includes a second nursery area (II) arranged at a corresponding side of the first nursery area (I) and sharing the connecting conveyor (40), root cutting apparatus (50), the packaging apparatus (60) and the storage area (70) with the first nursery area (I), said second nursery area (II) including:

5 at least one first shelf (10F) arranged with the same structure as the one in the first nursery area (I);

 at least one second shelf (10R) arranged with the same structure as the one in the first nursery area (I);

 at least one sliding apparatus (12) arranged with the same structure as
10 the one in the first nursery area (I);

 a plurality of planting plates (200) arranged with the same structure as the one in the first nursery area (I);

 a first conveyor (20') arranged with the same structure as the one in the first nursery area (I);

15 a second conveyor (30') arranged with the same structure as the one in the first nursery area (I);

 a second distributing apparatus (80') disposed on a pair of second rail set (81') to displace between the first and second conveyors (20'), (30') along the first direction for operation;

20 a first mechanic arm (90') disposed on the second distributing apparatus (80') to displace together with the second distributing apparatus (80') along the first direction, said first mechanic arm (90') having a first parallel clamp (91) installed at a free end of the first mechanic arm (90'), said first parallel clamp (91) operated clamping and releasing vertically for taking away and
25 putting back the planting plates (200) via the first and second access

openings (14f), (14r);

a second mechanic arm (100') arranged with the same structure as the one in the first nursery area (I); and

a third mechanic arm (110') arranged with the same structure as the one
5 in the first nursery area (I);

said second nursery area (II) further controlled by said controller (140) disposed near the first nursery area (I) for operation of said apparatus and components in said second nursery area (II), so as to form an operation loop in said second nursery area (II) symmetrically corresponding to the operation
10 loop in the first nursery area (I).

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