

(19)



**Octrooi Centrum
Nederland**

(11)

2027024

(12) A OCTROOIAANVRAAG

(21)

Aanvraagnummer: **2027024**

(51)

Int. Cl.:
A01B 39/18 (2021.01) A01D 34/00 (2021.01)

(22)

Aanvraag ingediend: **2 december 2020**

(30)

Vorrang:
23 oktober 2020 CN 202011148391.3

(41)

Aanvraag ingeschreven:
16 juni 2022

(43)

Aanvraag gepubliceerd:
20 juni 2022

(71)

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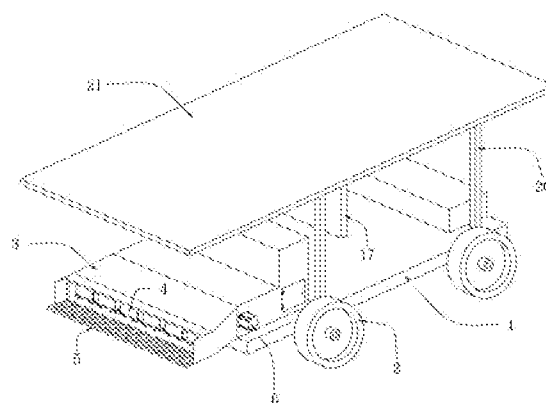
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An Economical Garden Greening & Maintenance Device

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The invention is intended for the field of landscaping, and specifically relates to an economical garden greening & maintenance device. It includes a wireless trolley of automatic obstacle recognition function, which is provided with widened wheels on the periphery, fixedly connected with a weeding device housing on the front exterior, and fixedly connected with a constant velocity mowing device at the end bottom of the housing. The constant velocity mowing device includes the lawn mowing device housing, motor fixing bracket, biaxial motor, non-slip rotating shaft I, small helical gear, large helical gear, non-slip rotating shaft II, rotating mowing head, and mowing blade. The end exterior of the mowing device housing is fixedly connected to the end bottom of the weeding device housing. The front of the weeding device is provided with oblique teeth. The device can save energy during mowing, and has certain energy recovery function during working to further improve the endurance of the device.



An Economical Garden Greening & Maintenance Device

Field of the Invention

The invention is intended for the field of landscaping, and specifically relates to an economical garden greening & maintenance device.

5 Background of the Invention

Landscaping is a way to create beautiful scenery by transforming the landform through engineering technologies and artistic means (or by adding rockery, artificial hill and water modulation), planting trees and flowers, putting in place buildings, and laying out garden paths. Gardens herein include yards, courtyards, small pleasure
 10 gardens, flower gardens, parks, botanical gardens, and zoos. With development of the landscaping disciplines, forest parks, scenic spots, visiting areas of nature reserves or national parks, and health-caring resorts may also be covered.

Existing technologies suffer from the following problems:

1. As an indispensable part of the garden, the lawn generally takes up a large area,
 15 making it difficult to clean on a regular basis. Currently, the manual cleaning with a mower is laborious;
2. For the current cleaning method that involves manpower and mowers, when the lawn is mowed with the mower, a device functioning with a turntable to bring a short and moderately thin wire to rotate speedily, the hay cut off shall be collected by
 20 special personnel;
3. Most of the traditional lawn mowers are driven by the diesel engine, an overkill configuration that consumes too much energy and makes too much noise.

To solve the above-mentioned problems, this application thus proposes an economical garden greening & maintenance device.

25 Description of the Invention

To solve the problems mentioned in the Background of the Invention, this application thus proposes an economical garden greening & maintenance device that features landscaping characteristics.

To achieve the said objectives, the invention presents the following technical solutions:
 30 an economical garden greening & maintenance device, including a wireless trolley of automatic obstacle recognition function, which is provided with widened wheels on the periphery, fixedly connected with a weeding device housing on the front exterior, and fixedly connected with a constant velocity mowing device at the end bottom of the housing. The constant velocity mowing device includes the lawn mowing device

housing, motor fixing bracket, biaxial motor, non-slip rotating shaft I, small helical gear, large helical gear, non-slip rotating shaft II, rotating mowing head, and mowing blade. The end exterior of the mowing device housing is fixedly connected to the end bottom of the weeding device housing. The front of the weeding device is provided with oblique teeth.

Preferably for the economical garden greening & maintenance device, the exterior of one end of the weeding device housing is fixedly connected to Motor I, of which the main shaft end is fixedly connected to an extended rotating shaft. The exterior of one end of the extended rotating shaft is rotarily connected to the interior of one end of the weeding device housing, and fixedly connected to the cleaning roller, of which one end is externally provided with a nylon brush. The interior of one end of the weeding device housing is fixedly connected to an inclined tooth scraper, which is contiguously connected to one end of the nylon brush.

Preferably for the economical garden greening & maintenance device, the interior of rear of the weeding device housing is fixedly connected to a metal filter and a long motor fixing plate, of which one end is internally connected to Motor II. End of main shaft of Motor II is connected to Rotating Blade I.

Preferably for the economical garden greening & maintenance device, the top of the weeding device housing is connected to exhaust holes, and interior of one end of the weeding device housing is provided with a discharge door.

Preferably for the economical garden greening & maintenance device, the top of one end of the wireless, automatic obstacle recognition trolley is fixedly connected to the Power Generator Rack I, of which the exterior of top is fixedly connected to the wind power generator that is made up of the wind power generator casing, power generator rack, power generator, Rotating Blade II. The exterior of bottom of the wind power generator casing is fixedly connected to the exterior of top of Power Generator Rack I. The top of rear of the trolley is fixedly connected to the rechargeable battery.

Preferably for the economical garden greening & maintenance device, the exterior of top of the wireless, automatic obstacle recognition trolley is fixedly connected to Power Generator Rack II, of which the exterior of top is fixedly connected to the solar power generation panel.

Preferably for the economical garden greening & maintenance device, the interior of one end of the mowing device housing is fixedly connected to the motor fixing rack, of which the interior of one end is fixedly connected to the biaxial motor. End of main

shaft of the biaxial motor is fixedly connected to Non-slip Rotating Shaft I, of which the exterior of one end is rotarily connected to the mowing device housing. Exterior of one end of the Non-slip Rotating Shaft I is fixedly connected to the small helical gear, of which the exterior of one end is connected to the large helical gear.

- 5 Preferably for the economical garden greening & maintenance device, the center of interior of one end of the large helical gear is fixedly connected to the Non-slip Rotating Shaft II, of which the exterior of one end is rotarily connected to the interior of one end of the weeding device housing. Exterior at bottom of the Non-slip Rotating Shaft II is fixedly connected to the rotary mowing head, of which one end is fixedly
10 connected to the mowing blade at exterior.

Preferably for the economical garden greening & maintenance device, both ends of the wind generator casing are fixedly connected at interior to the power generator track, of which one end is fixedly connected to the power generator at interior center. End of main shaft of the power generator is fixedly connected to the Rotating Blade
15 II.

Preferably for the economical garden greening & maintenance device, the long motor fixing plate is located at top of the metal filter that is set at top of the discharging door. Compared with the prior art, the beneficial effects of the present invention are:

1. This device makes the automatic weeding available. By pre-loading the map of the
20 lawn into the wireless, automatic obstacle recognition trolley, the trolley can sweep the lawn inch by inch.
2. This device can collect the weeds as soon as they're cut off, eliminating the tedious work of manually cleaning the lawn.
3. This device can save energy during the mowing work, and has a certain energy
25 recovery function to further improve the endurance of the device.

Brief Introduction of the Drawings

The drawings are attached to provide a further illustration of the present invention. As a part of the specification, it's used together with the embodiments to explain the present invention. It does not constitute a limitation to the present invention. In the
30 attached drawings:

Figure 1 is a schematic diagram of the overall structure of the present invention;

Figure 2 is a schematic diagram of the installation structure of the wind power generator of the present invention;

Figure 3 is a schematic diagram of the internal structure of the weeding device

housing of the present invention;

Figure 4 is a schematic diagram of the internal structure of the medium-speed mowing device of the present invention;

Figure 5 is a schematic diagram of the internal structure of the metal filter in the present invention;

Figure 6 is a schematic diagram of the internal structure of the wind power generator of the present invention;

Figure 7 is a schematic diagram of the structure at A in Figure 2 in the present invention;

Figure 8 is a schematic diagram of the structure at B of Figure 4 in the present invention;

Figure 9 is a schematic diagram of the structure at C of Figure 5 in the present invention.

In the figures: 1. Wireless, automatic obstacle recognition trolley; 2. Widened wheels; 3. Weeding device housing; 4. Constant velocity mowing device; 401. Mowing device housing; 402. Motor fixing bracket; 403. Biaxial motor; 404. Non-slip Rotating Shaft I; 405. Small helical gear; 406. Large helical gear; 407. Non-slip Rotating Shaft II; 408. Rotary mowing head; 409. Mowing blade; 5. Helical teeth; 6. Motor I; 7. Extended rotating shaft; 8. Cleaning roller; 9. Nylon brush; 10. Oblique tooth scraper; 11. Metal filter screen; 12. Long motor fixing plate; 13. Motor II; 14. Rotating Fan Blade I; 15. Exhaust hole; 16. Discharging door; 17. Power Generator Rack I; 18. Wind power generator; 1801. Wind power generator casing; 1802. Power generator fixing rack; 1803. Power generator; 1804. Rotating Blade II; 19. Rechargeable battery; 20. Power Generator Rack II; 21. Solar power generation panel.

Detailed Description of the Preferred Embodiments

The technical solutions in the embodiments of the present invention will be clearly and completely described below in conjunction with the drawings attached in the embodiments of the present invention. Obviously, the described embodiments are only a part of the embodiments of the present invention, rather than all the embodiments. Based on the embodiments of the present invention, all other embodiments obtained by those of ordinary skill in the art without creative work shall fall within the protection scope of the present invention.

As shown in Figure 1, Figure 2, Figure 3, and Figure 7, it is an economical garden greening & maintenance device comprising the wireless, automatic obstacle

recognition trolley 1, wherein widened wheels 2 are set around its peripheral and fixedly connected to the weeding device housing 3 at its front exterior. Lower part of top of the weeding device housing 3 is connected to the constant velocity mowing device 4 that consists of mowing device housing 401, motor fixing bracket 402, 5 biaxial motor 403, Non-slip Rotating Shaft I 404, small helical gear 405, large helical gear 406, Non-slip Rotating Shaft II 407, rotary mowing head 408, and mowing blade 409. Top of mowing device housing 401 is fixedly connected at exterior to lower part of top of weeding device housing 3, wherein helical teeth 5 are set at the front.

10 In this embodiment, the wireless, automatic obstacle recognition trolley 1 can recognize foreign objects higher than the grass, but barely recognize foreign objects lower than the grass. With the helical teeth 5 provided, they first contact large objects encountered during movement of the trolley, preventing their contacting with and causing damage to mowing blade 9.

As shown in Figures 1-3, in an alternative embodiment, one end of weeding device 15 housing 3 is fixedly connected at exterior to Motor I 6, wherein end of main shaft is connected to the extended rotating shaft 7. The exterior of one end of the extended rotating shaft 7 is rotarily connected to the interior of one end of weeding device housing 3 and fixedly connected to cleaning roller 8, wherein exterior of one end is provided with nylon brush 9. Interior of one end of weeding device housing 3 is 20 fixedly connected to oblique tooth scraper 10, and teeth of the oblique tooth scraper 10 are connected in contact with exterior of one end of nylon brush 9. Oblique tooth scraper 10 can scrape off the grass on top of nylon brush 9.

As shown in Figures 5 and 9, in an alternative embodiment, the interior of rear end of weeding device housing 3 is connected to the metal filter 11 and to the long motor 25 fixing plate 12, wherein interior of one end is fixedly connected to Motor II 13. End of main shaft of Motor II 13 is connected to Rotating Fan Blade I 14. Motor II 13 can drive Rotating Fan Blade I 14 to rotate to generate wind.

As shown in Figure 2, in an alternative embodiment, the upper side of the top end of the weeding device housing 3 is connected and fixed with exhaust holes 15, and 30 interior of one end of weeding device housing 3 is provided with the discharging door 16, through which grass could be drawn out from interior of weeding device housing 3.

As shown in Figures 1 and 2, in an alternative embodiment, the upper part of one end of the wireless, automatic obstacle recognition trolley 1 is fixedly connected to the

Power Generator Rack I 17, wherein exterior of top end is fixedly connected to the wind power generator 18 that consists of the wind power generator casing 1801, power generator fixing rack 1802, power generator 1803, and Rotating Blade II 1804. Exterior of bottom end of the wind power generator casing 1801 is fixedly connected
 5 to exterior of top end of Power Generator Rack I 17. Top of rear end of wireless, automatic obstacle recognition trolley 1 is fixedly connected to recharging battery 19. Wind power generator 18 uses air flow exhausted from the device for power generation.

As shown in Figure 1, in an alternative embodiment, the exterior of top end of the
 10 wireless, automatic obstacle recognition trolley 1 is fixedly connected to the Power Generator Rack II 20, wherein exterior of the top end is fixedly connected to the solar power generation panel 21 that is fixed and installed through Power Generator Rack II 20.

As shown in Figures 4 and 8, in an alternative embodiment, the interior of one end of
 15 the mowing device housing 401 is fixedly connected to the Motor fixing bracket 402, wherein the interior of one end is fixedly connected to the biaxial motor 403. End of main shaft of biaxial motor 403 is fixedly connected to Non-slip Rotating Shaft I 404, wherein exterior of one end is rotarily connected to the interior of one end of the mowing device housing 401. One end of the Non-slip Rotating Shaft I 404 is fixedly
 20 connected to the small helical gear 405, wherein exterior of one end is connected to the large helical gear 406.

In this embodiment, two Non-slip Rotating Shaft I 404 are driven to rotate through the biaxial motor 403, making the mowing blade 409 basically rotate in identical speed. Two small helical gears 405 are driven to rotate through one Non-slip Rotating Shaft I
 25 404, averting collision of two sets of mowing blade 409.

As shown in Figures 4 and 8, in an alternative embodiment, the center of interior of one end of the large helical gear 406 is fixedly connected to the Non-slip Rotating Shaft II 407, wherein the exterior of one end is rotarily connected to the weeding device housing 3. Exterior of bottom end of the Non-slip Rotating Shaft II 407 is
 30 fixedly connected to the rotary mowing head 408, wherein the exterior of one end is fixedly connected to the mowing blade 409. The large helical gear 406 will drive the Non-slip Rotating Shaft II 407 to rotate, and the Non-slip Rotating Shaft II 407 will drive the rotary mowing head 408 to further rotate the mowing blade 409 to mow.

As shown in Figure 6, in an alternative embodiment, both ends of the wind power

generator casing 1801 are fixedly connected at interior to the power generator fixing rack 1802, wherein the center of interior of one end is fixedly connected to the power generator 1803. End of main shaft of the power generator 1803 is fixedly connected to the Rotating Blade II 1804. The Rotating Blade II 1804 will rotate to drive the power generator 1803 to rotate.

As shown in Figures 1, 2 and 5, in an alternative embodiment, the long motor fixing plate 12 is located on the upper side of the metal filter screen 11 that is set at top of the discharging door 16. This setting allows the metal filter screen 11 to protect the long motor fixing plate 12.

The working principle and use process of the present invention: The sun irradiates the solar power panel 21, the solar power panel 21 generates electricity and stores the electric energy in the rechargeable battery 19. By preloading the map of the lawn to the wireless, automatic obstacle recognition trolley 1, the trolley can sweep the lawn inch by inch. With the helical teeth 5 set, they first contact large, hard objects encountered during movement of the device to prevent the objects from contacting with and causing damage to the mowing blade 409. When the oblique teeth 5 hit a foreign object that disables the wireless, automatic obstacle recognition trolley 1 to move, the trolley will automatically bypass. When working, the device will simultaneously energize the biaxial motor 403, the Motor I 6, and the Motor II 13.

The biaxial motor 403 will drive the Non-slip Rotating Shaft I 404 to drive the small helical gear 405 to rotate, and the small helical gear 405 will drive the large helical gear 406 to further drive the Non-slip Rotating Shaft II 407 to rotate. The Non-slip Rotating Shaft II 407 drives the rotation of the rotary mowing head 408 to drive the mowing blade 409 to rotate to mow the grass. The grass mowed will follow the rotation direction of the mowing blade 409 to enter the interior of the weeding device housing 3. The Motor I 6 drives the extended rotating shaft 7 to drive the cleaning roller 8 and the nylon brush 9 to rotate, so that the nylon brush 9 sweeps the grass into the inside of the weeding device housing 3, and scrapes off the grass on the upper side of the nylon brush 9 through the oblique teeth scraper 10. Meanwhile, the Motor II 13 drives the Rotating Fan Blade I 14 to rotate to generate wind, let outside air enter the mowing part of the weeding device housing 3, and blow up the air inside the weeding device housing 3 to discharge from the exhaust holes 15. The air flow can make the grass cut down from the front end of the weeding device housing 3 more easily enter the inside of the weeding device housing 3 under the influence of the air flow and air

pressure, thus improving the mowing stability. The air flow from the exhaust holes 15 will blow the Rotating Fan Blade II 1804 to drive the power generator 1803 to rotate, so that the power generator 1803 generates electricity to realize energy recovery of the device during the working time.

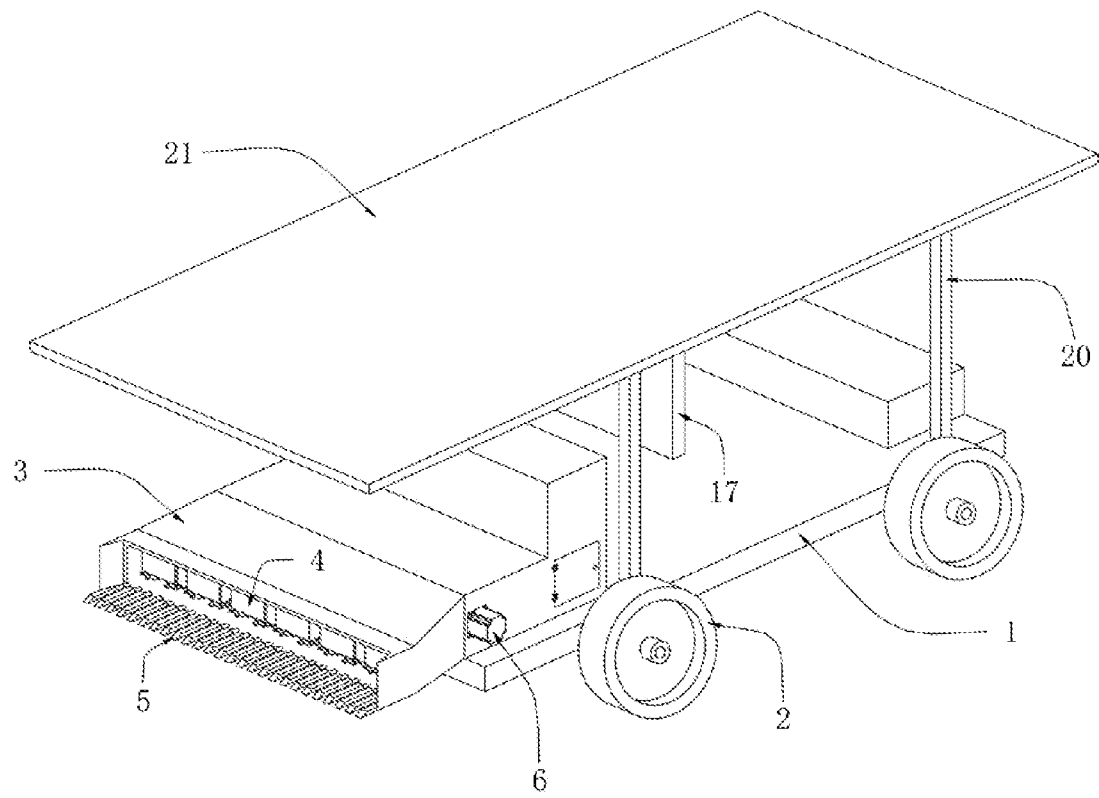
- 5 Finally, it should be noted that the above descriptions are only preferred embodiments of the present invention and are not intended to limit the present invention. Although the present invention has been described in details with reference to the foregoing embodiments, technicians for this art may still modify the technical solutions mentioned above or make equivalent replacement of some technical features. As long
10 as within the spirits and principles of the present invention, any modifications, equivalent replacement and improvement shall be included in the protection scope of the present invention.

Conclusies

1. Economische tuingroenverzorgings- en -onderhoudsinrichting, omvattend een draadloze trolley met automatische obstakelherkenningsfunctie, die is voorzien van verbrede wielen aan de omtrek, die vast is verbonden met een wiedinrichtingbehuizing op de voorste buitenzijde, en vast is verbonden met een constante-snelheid-maai-inrichting aan de eind-onderkant van de behuizing. De constante-snelheid-maai-inrichting omvat grasmaai-inrichtingbehuizing, motorbevestigingsbeugel, biaxiale motor, antislip-draaias I, klein schroeftandwiel, groot schroeftandwiel, antislip-draaias II, roterende maaikop, en maaimes. De eind-buitenzijde van de maai-inrichtingbehuizing is vast verbonden met de eind-onderkant van de wiedinrichtingbehuizing. De voorkant van de wiedinrichting is voorzien van schuine tanden.
2. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en -onderhoudsinrichting de volgende kenmerken: de buitenzijde van één einde van de wiedinrichtingbehuizing is vast verbonden met Motor I, waarvan het hoofdas-einde vast is verbonden met een gestrekte draaias. De buitenzijde van één einde van de gestrekte draaias is roterend verbonden met de binnenzijde van één einde van de wiedinrichtingbehuizing, en is vast verbonden met de reinigingsrol, waarvan één einde extern is voorzien van een nylon borstel. De binnenzijde van één einde van de wiedinrichtingbehuizing is vast verbonden met een gehelde tandschraper, die aanliggend is verbonden met één einde van de nylon borstel.
3. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en -onderhoudsinrichting de volgende kenmerken: de binnenzijde van de achterkant van de wiedinrichtingbehuizing is vast verbonden met een metalen filter en een lange motorbevestigingsplaat, waarvan één einde intern is verbonden met Motor II. Het einde van de hoofdas van Motor II is verbonden met Roterend Mes I.
4. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en -onderhoudsinrichting de volgende kenmerken: de bovenkant van de wiedinrichtingbehuizing is verbonden met uitlaatgaten, en de binnenzijde van één einde van de wiedinrichtingbehuizing is voorzien van een afvoerdeur.
5. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en -onderhoudsinrichting de volgende kenmerken: de bovenkant van één einde van de draadloze, automatische obstakelherkenningstrolley is vast verbonden met het Energiegeneratorrek I, waarvan de buitenzijde van de bovenkant vast is verbonden met de windenergiegenerator die is opgebouwd uit de windenergiegenerator-omkasting, het energiegeneratorrek, de energiegenerator, het Roterende Mes II. De buitenzijde van de onderkant van de windenergiegenerator-omkasting is vast verbonden met de buitenzijde van de bovenkant van

Energiegeneratorrek I. De bovenkant van de achterzijde van de trolley is vast verbonden met de heroplaadbare batterij.

6. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en
 5 -onderhoudsinrichting de volgende kenmerken: de buitenzijde van de bovenkant van de draadloze, automatische obstakelherkenningstrolley is vast verbonden met Energiegeneratorrek II, waarvan de buitenzijde van de bovenkant vast is verbonden met het zonne-energie-opwekkingspaneel.
- 10 7. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en
 -onderhoudsinrichting de volgende kenmerken: de binnenzijde van één einde van de maai-inrichtingbehuizing is vast verbonden met het motorbevestigingsrek, waarvan de binnenzijde van één einde vast is verbonden met de biaxiale motor. Het einde van de hoofdas van de biaxiale motor is vast verbonden met Antislip-draaias I, waarvan de buitenzijde van één einde roterend is
 15 verbonden met de maai-inrichtingbehuizing. De buitenzijde van één einde van de Antislip-draaias I is vast verbonden met het kleine schroeftandwiel, waarvan de buitenzijde van één einde is verbonden met het grote schroeftandwiel.
- 20 8. Volgens conclusie 1 heeft een economische tuingroenverzorgings- en
 -onderhoudsinrichting de volgende kenmerken: het midden van de binnenzijde van één einde van het grote schroeftandwiel is vast verbonden met de Antislip-draaias II, waarvan de buitenzijde van één einde roterend is verbonden met de binnenzijde van één einde van de wiedenrichtingbehuizing. De buitenzijde aan de onderkant van de Antislip-draaias II is vast
 25 verbonden met de roterende maaikop, waarvan één einde vast is verbonden met het maaimes aan de buitenzijde.
9. Volgens conclusie 5 heeft een economische tuingroenverzorgings- en
 -onderhoudsinrichting de volgende kenmerken: beide einden van de windgenerator-omkasting zijn aan de binnenzijde vast verbonden met de energiegeneratortrack, waarvan één einde vast is
 30 verbonden met de energiegenerator aan het binnenste middelpunt. Het einde van de hoofdas van de energiegenerator is vast verbonden met het Roterende mes II.
10. Volgens conclusie 3 heeft een economische tuingroenverzorgings- en
 -onderhoudsinrichting de volgende kenmerken: de lange motorbevestigingsplaat bevindt zich
 35 bovenop het metalen filter dat is aangebracht bovenop de afvoerdeur.

**Fig 1**

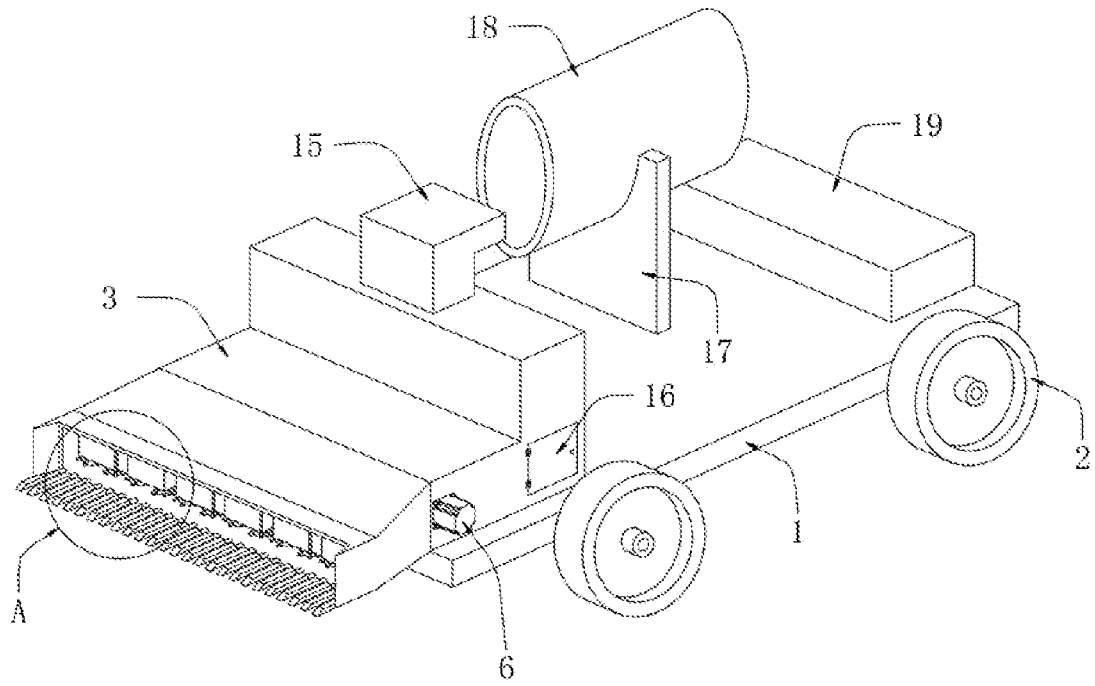


Fig 2

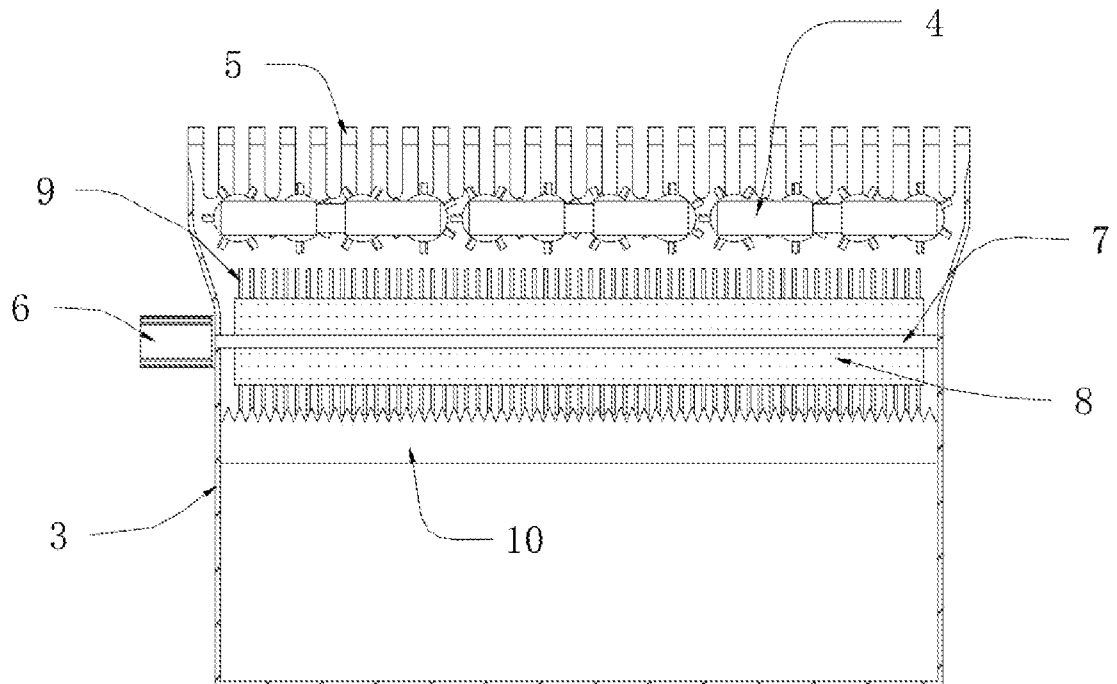
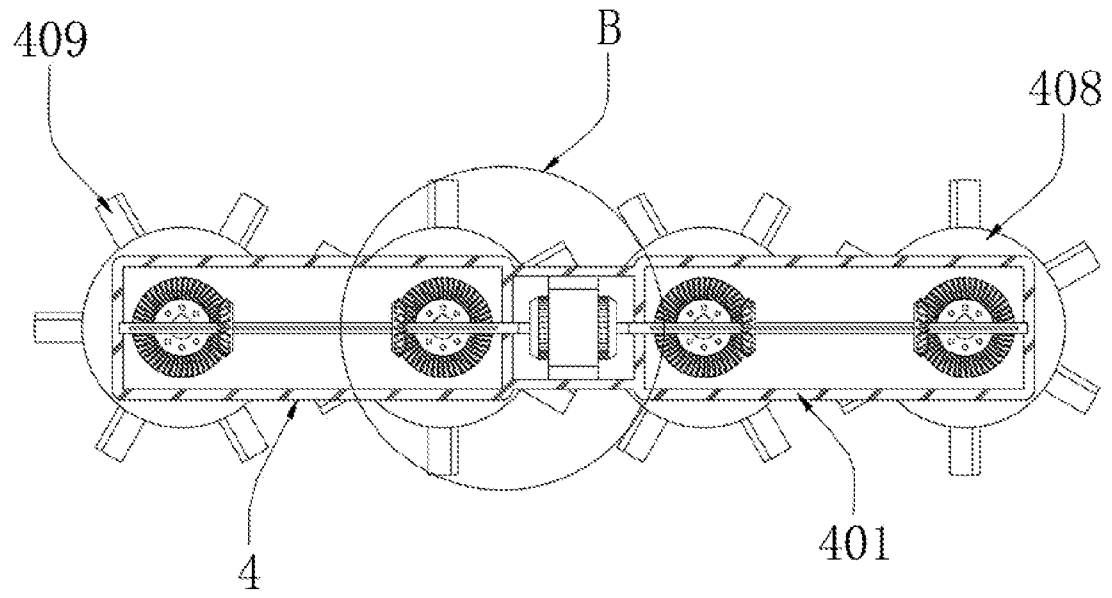
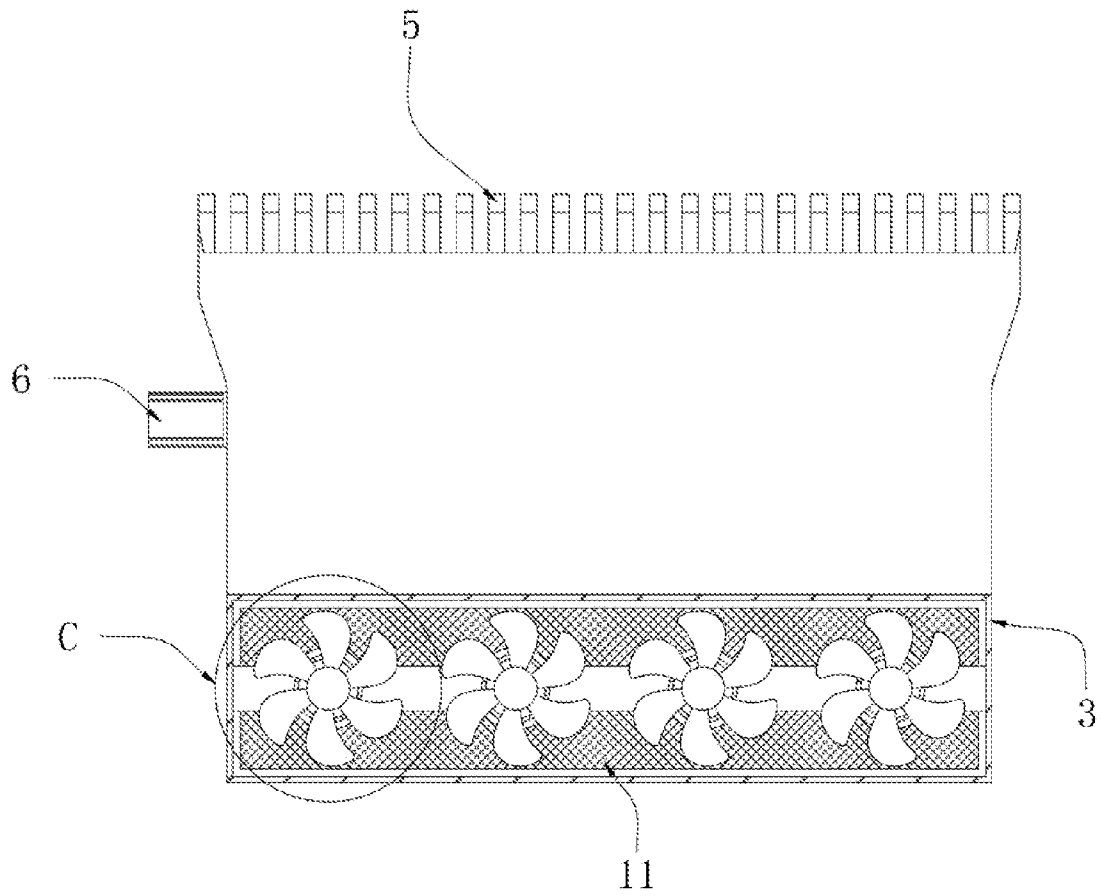
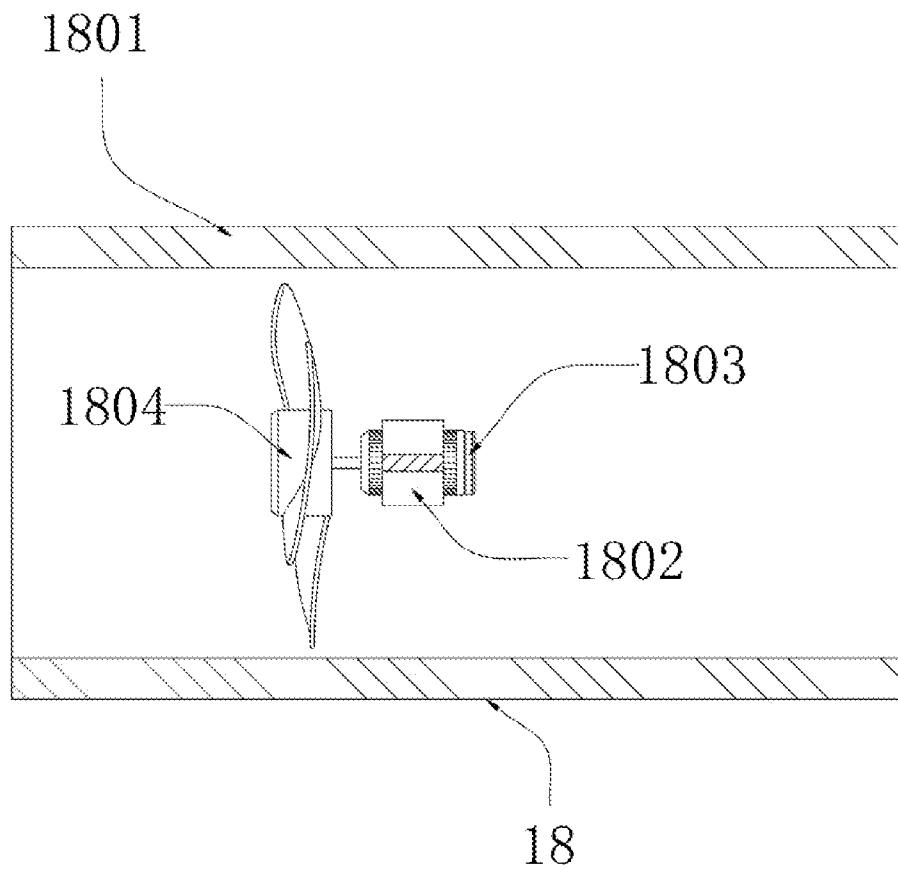
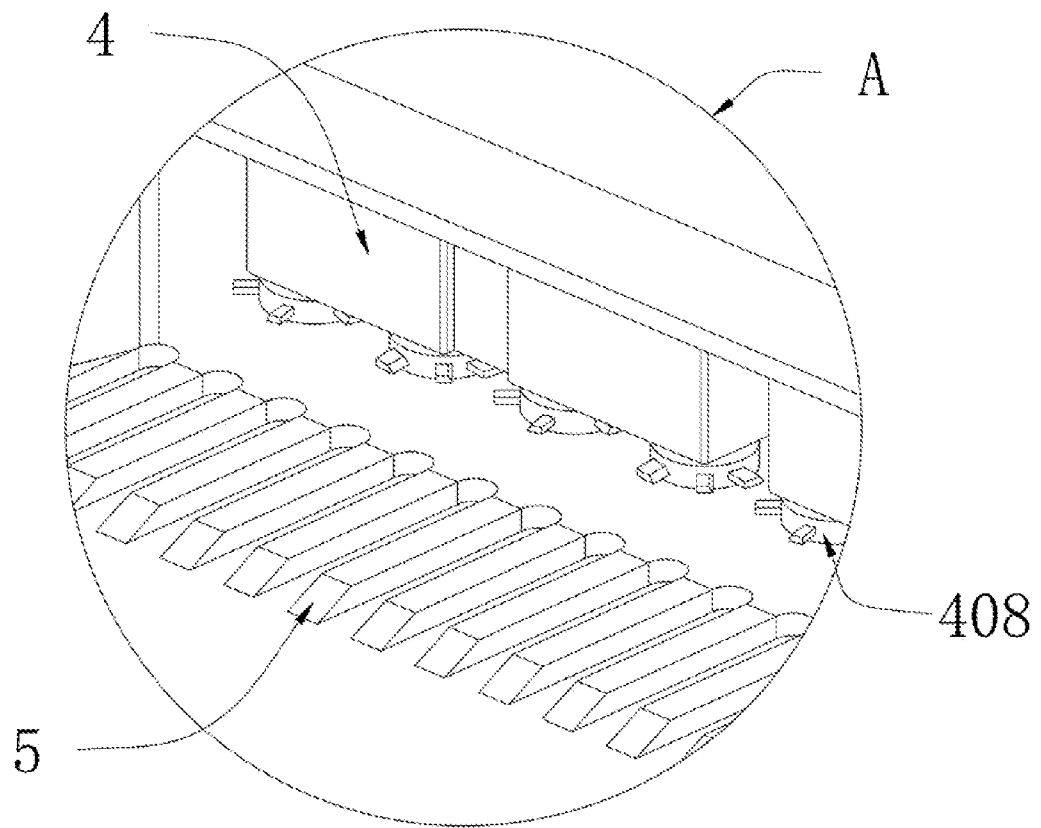


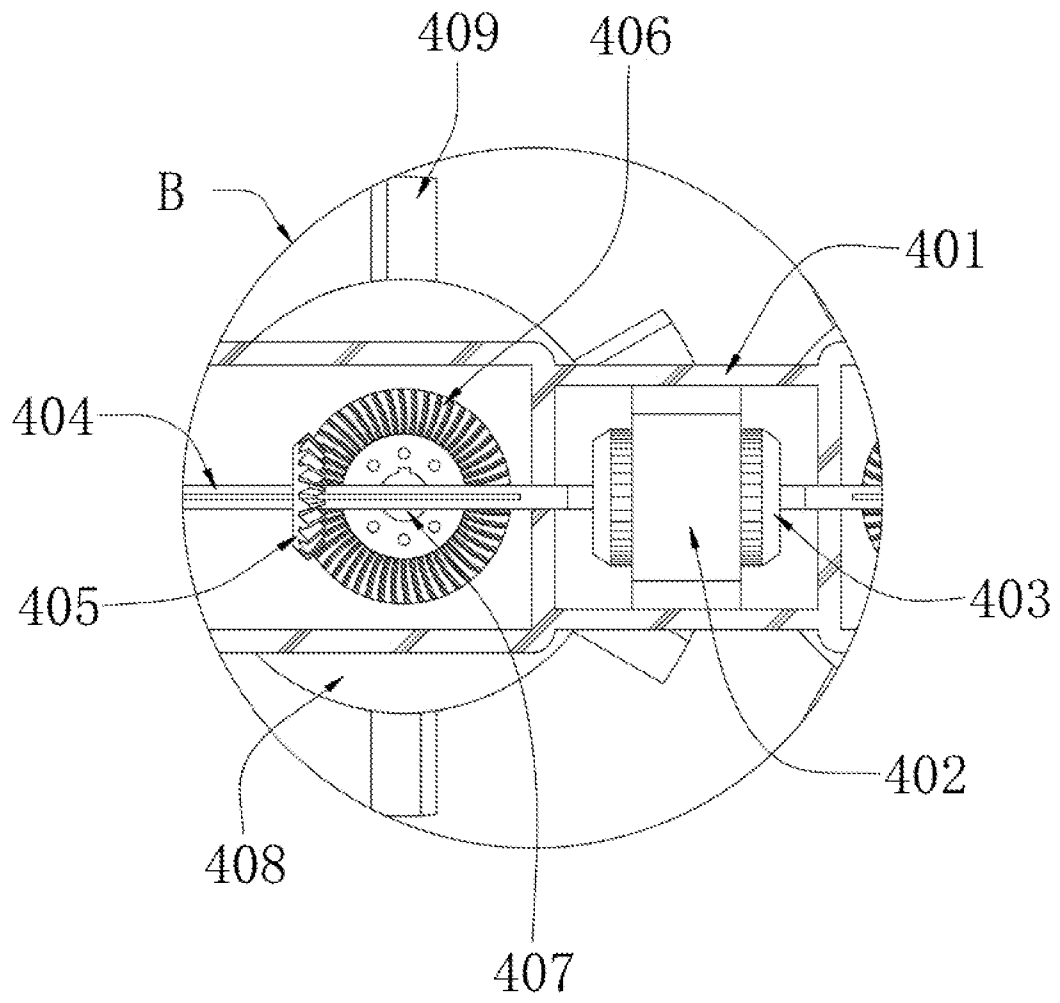
Fig 3

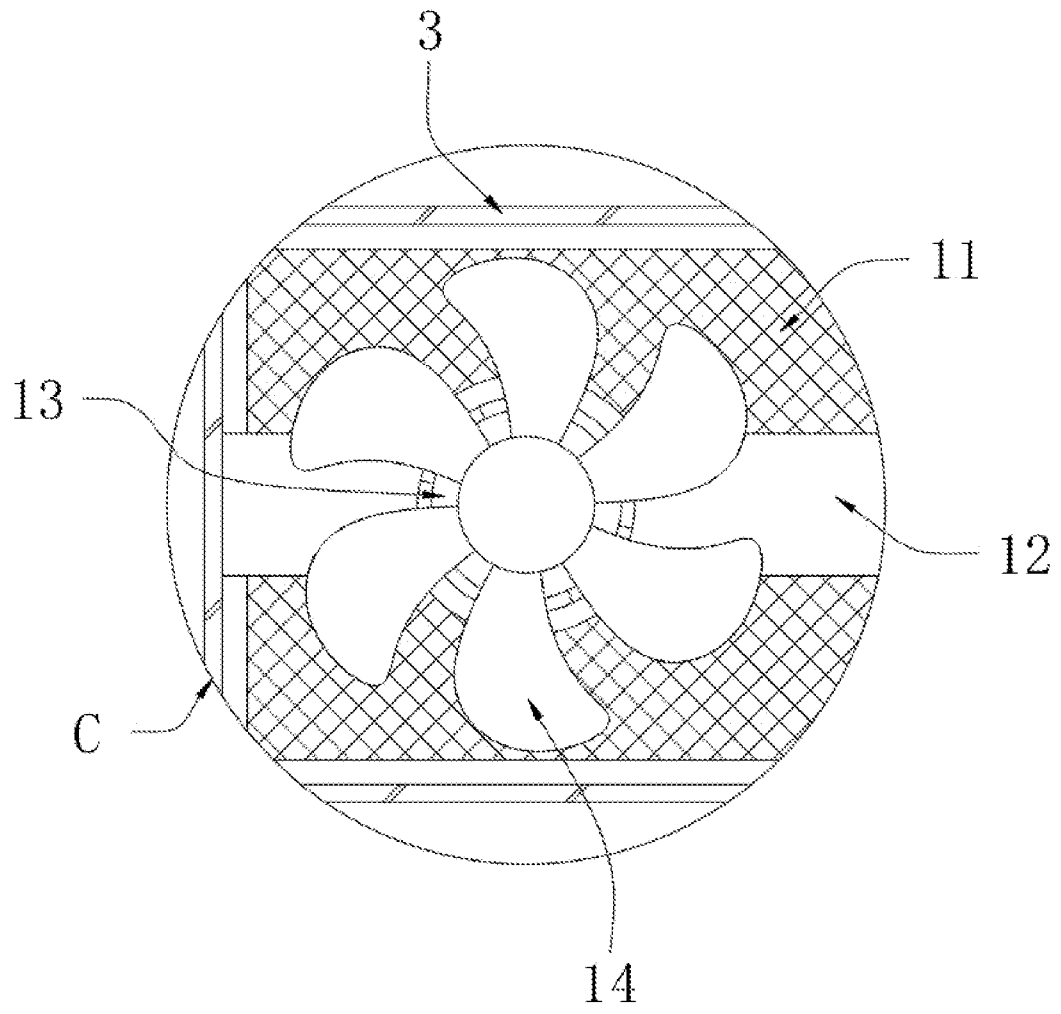
**Fig 4**

**Fig 5**

**Fig 6**

**Fig 7**

**Fig 8**

**Fig 9**