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(54) **CLEANING MACHINE**

REINIGUNGSMASCHINE

MACHINE A NETTOYER

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US-B1- 6 343 397

• **PATENT ABSTRACTS OF JAPAN & JP 10 262 881
A (AIKAWA KIMIWAKA) 06 October 1998**

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Description

[0001] The present invention relates to cleaning machine, comprising

a cylindrical outer body provided with an excentric driving device provided within said cylinder for excentric driving of the cylinder by a battery-operated electric motor, further a band- formed adhering means for adhering dust and other soil particles provided to be continuously fed to and from the outer surface of the outer body via a feed means arranged within the cylinder.

[0002] Known art related to this area comprises JP 10262881 A, Aikawa Kimiwaka disclosing a ball with outer tack means for adhering dust etc when driven by an excentrically arranged driving means driven by a battery - operated electrical motor. Furthermore US 6343397 B1 relates to a cylindrical cleaning machine with a feed- and removably arranged tack paper, which is substantially as wide as the length of the cylinder. The driving is manual. Both of these machines provide a very limited function. The object of the present invention is thus to create a cleaning machine of the type mentioned introductorily, that is economic when used and that is functionally flexible. According to the invention such a cleaning machine is primarily characteri - sed in that the cylindrical outer body is provided with a first and a second circumferential opening for feeding from and to of the tack means, provided at a distance from each other in the axial extension of the outer body, whereas the width of the tack means is substantially minor to said distance.

[0003] Within the scope of the invention there are many embodiments, that may be combined according to choice. Thus the adhering means may be provided for pulsing roll- off extraction and releasing from a storage roll. Furthermore the cleaning machine may be provided with sensing means for controlling the force, that loads a spring means, which controls the rolling in of the adhering means. The force to the spring means is transferred by a pendulum movement, achieved by an excentric axis. The loading and storage of the spring force is made in the same way as at a clock with spring for winding. The adhering means may consist of a finite band for adhering dust and soil particles by tacking, alternatively static electric adhesion.

[0004] In one advantageous embodiment the band is provided with a tacking adhesion by double folding of these. Thus ordinary, relatively wide tape, that is double folded along the edges when rolled off. The band may be provided with elongated fibre reinforcement in order to eliminate the risk for breakage. In order to prevent the band, running along a spiral path along the cylindrical outer body, to change direction laterally, it is suitable to arrange guide means such as ground recesses. The cylindrical outer body is provided with guide means, like recesses, preventing the band from changing direction laterally.

[0005] In order to enable controlling of the cleaning machine, it is suitable that the radius of at least one seg-

ment of the cylindrical outer body may be increased in relationship to the radius of the rest of the cylindrical outer surface.

[0006] As an alternative or complement to tacking adhesion the cleaning machine may be provided with means for loading with static electricity when moving, a brush or the like. The means may be provided to act upon, that is to say rub the inside of the outer body during the movement of the cleaning machine.

[0007] For loading of the battery there is a loading unit belonging to the cleaning machine. This is provided with means for coupling with corresponding means at the cleaning machine for loading current transfer. Per se this coupling may of course be performed manually, but it is also possible to provide the loading unit with means for automatic catching and coupling when the cleaning machine is within the action area of said means. The loading goes on until an indicator shows, that the loading has reached an upper limit.

[0008] The cleaning machine may be provided with more or less advanced electric or electronic devices for controlling of its functions. In its simplest form these devices consist of a switch for starting of the movement of the cleaning machine.

[0009] The cleaning machine may also be provided with a device for controlling the time for start/stop. In one advantageous embodiment it is provided with a means arranged to turn the poles of the feed current to the drive motor in order to exchange the moving direction of the cleaning machine at an obstacle/stop. It is an advantage, if the driving device of the cleaning machine is provided to drive the cleaning machine at varying speeds. In this design, it is possible to provide the cleaning machine with means for controlling a start sequence electronically, that is to say to make the driving device give the cleaning machine, during a first period when changing the movement direction of the cleaning machine, a higher speed as compared to the regular speed which is an advantage. In one further advantageous embodiment the cleaning machine comprises a means for sensing the distance to an obstacle, and arranged to reduce the speed of the cleaning machine in the vicinity of the obstacle. Hereby impacts against furniture are avoided. Furthermore disturbing noise is eliminated.

[0010] In more advanced embodiments the cleaning machine is provided with a computer with a programmable memory, which may be programmed with instructions for the activity of the cleaning machine. In one advantageous embodiment the cleaning machine is provided with means for coordinate determination, that is to say for determination of the position of the cleaning machine within the working area in question, whereas the memory of the computer is programmed with the coordinates for same in at least two dimensions, whereas it is provided to avoid programmed obstacles or already passed areas. The position determination may be carried out in different ways, e.g be providing the cleaning machine with sensors for distance determination, measuring the distance to ref-

erence elements located within the working area according to known technique.

[0011] The transfer of said instructions to the programmable memory may be carried out in different ways. Per se it would be possible to provide the cleaning machine with a set of buttons for direct programming, but this requires a design, that may be cumbersome and impractical.

[0012] The transfer of said instructions from the control unit may be carried out via a line, connectable to the cleaning machine, or in that the control unit and the cleaning machine are provided with a transmitter and a receiver, whereas the transfer of said instruction is performed wirelessly.

[0013] The invention is disclosed more in detail in the following, reference being made to the enclosed schematic figures, of which:

Figure 1 shows a side view of a cleaning machine according to the invention,

Figure 2 shows, in perspective, the object of figure 1,

Figure 3 shows an end view of a cross section (in part) of the object of figure 1,

Figure 4 shows the idea of a cross section of the object of figure 1,

Figure 5 shows the idea of a cross section of an alternative embodiment of a cleaning machine according to the invention, whilst

Figure 6 shows the idea of a cross section of a second alternative embodiment of a cleaning machine according to the invention.

[0014] A circular cylindrical outer body or mantle is marked by 1, provided with a first and a second opening 2A, 2B in the form of slits for feeding from and to of an adhering means 3. The openings are located in the vicinity of each its end of the outer body. The adhering means has the form of a relatively narrow band, which may be wound one or more turns around the outer body depending on the width of the band and the length of the outer body. In this case it is wound two turns around the outer body, from a storage roll 12 to a drawing roll 11 at a central axis 5, that also carries the driving device. The storage roll 12 is excentrically journaled on the central axis 5 (the figure is parted in figures 4- 6 for more clear illustration), at the opposite side of the driving device at level with the opening 2A, whereas at each turning and the excentric bearing the storage roll 12 moves diametrically and together with the drawing via the drawing roll 11 a feeding of desired length of the band 3 occurs. In this case a feeding takes place, adapted to the excentricity. Thus the excentricity may be varied and thus the feeding length in dependency of the adhering need that is present. If there is much soil a larger length must be fed per time unit in order to obtain efficient adhering.

[0015] The excentric feed is simple and efficient, the feeder releases a predetermined number of mm/turn independently of the diameter of the storage roll, as the

feeding is based upon the excentricity. The roll up device is driven by an excentric, which in turn draws a spring means, preferably a spring, drawing in the same direction, independently of the drawing direction of the outer body/ the driving device. The spring means thereby accumulates the required roll up force and senses itself when the force is too high or too low and connects and releases automatically in order to store more force in the spring means.

[0016] The outer body is suitably provided with releasable gables 1A and 1B, which for instance protects an excentric driving device, that is to say with a displaced centre of gravity, with a battery-driven motor. The battery is suitably of the loadable type. The excentric driving makes the cleaning machine in principle rotate around its symmetry axis.

[0017] In figures 4 to 6 the rolls 11 and 12 have been shown outside the centre for better clearness.

[0018] In the embodiment shown in figure 5 the band 3 is a finite band with adhering surface, which band is fed from a storage roll 12 to a drawing roll 11 via the mantle surface of the outer body. Hereby the feeding is carried out by coupling a pendulum means 13 to the rotational movement of the centre axis, whereby a pendulum means 13, shown horizontally in the figure pushes the band 3 from the storage means 12, whereas the pendulum means 13 is arranged with adjustable amplitude for the feeding of a chosen length of band in dependency of the degree of soiling and the type of adhering means, gluing and/or electrostatic adhering. The roll on at the drawing roll 11 may be carried out by a constant force via the centre axis 5, in combination with the force of the pendulum means 13 overcoming the resistance of the storage roll 12 against feeding out. The movement of the pendulum causes a drawing and a releasing all the time in the band, and without this movement the band will lock itself already after one turn, and after two turns around the outer body it will stick completely. The pendulum means 13 is acted upon by an excentric coupled to the rotating axis of the driving means, whereas the pendulum means 13 is acted upon to be displaced in the direction of the band 3 at every revolution, and be returned, in one embodiment mechanically by the excentric or be drawn back via a spring to be caught during one succeeding revolution by the excentric.

[0019] The feeding speed by the band 3 may be adapted to the degree of soiling within the working area, whereas the excentricity may be varied or the size of the excentric may act upon the length of movement of the pendulum means 13. In figure 2 guide means 16 in the form of shallow milled grooves at the surface of the outer body 1 are indicated, preventing the band from changing direction laterally.

[0020] In figure 2 there are shown segments 17, that are extendable in order to enable controlling of the cleaning machine at its rotation when moving in the plane.

[0021] When working, the cleaning machine will continually be stopped by different obstacles. When this oc-

curs a sensor within the driving means will indicate the stop of the machine, whereupon the control electronics of the driving motor will change poles of the driving current and the cleaning machine will start rolling in the opposite direction.

[0022] Aided by a circuit card a number of functions may be controlled, such as start- stop, or automatic breaking the current when the cleaning machine is caught and repeats the same movement/ amperage cycle during a long time. Furthermore a sensor may be provided to sense a container with soil in order to determine the degree of filling, in that the load of the motor, that is to say the amperage then will rise constantly when the spring means is loaded, which causes automatic stop. Sensing of the battery voltage may be provided, such that a too low level of voltage causes cut off of the motor. The speed of the driving motor may be controlled from a circuit card.

[0023] Further functions are most efficiently controlled by a computer with programmable memory. For example, the coordinates for the actual working area may be programmed in at least two dimensions, but also in three in order to set the limits for the movements of the cleaning machine. If the cleaning machine is provided with means for position determination, that is to say coordinate determination, the cleaning machine may be brought to avoid programmed obstacles or already passed areas.

[0024] A separate controlling unit, possibly combined with a loading station may be arranged for the transfer of instructions like programs to be stored in the memory of the computer. The transfer can be carried out via a line, connectable to the cleaning machine. As an alternative the control unit and the cleaning machine may be provided with transmitter and receiver for wireless communication, both for programming and during the work.

Claims

1. A cleaning machine, comprising
a cylindrical outer body (1) provided with an excentric driving device provided within said cylinder for excentric driving of the cylinder by a battery-operated electric motor,
further a band- formed adhering means (3) for adhering dust and other soil particles provided to be continuously fed to and from the outer surface of the outer body via a feed means (5,11,12,13) arranged within the cylinder,
characterised in that
the cylindrical outer body (1) is provided with a first and a second circumferential opening (2A,2B) for feeding from and to of the adhering means (3), provided at a distance from each other in the axial extension of the outer body, whereas the width of the adhering means (3) is substantially minor to said distance.

2. A cleaning machine according to claim 1,
characterised in that
the adhering means (3) is provided for pulsing roll-off extraction and releasing from a storage roll (12), which admits roll off irrespectively of rotation direction of the drive motor.
3. A cleaning machine according to claim 1 or 2,
characterised in that
the cleaning machine is provided with sensing means for controlling the force, that loads a spring means, which controls the rolling in of the adhering means (3).
4. A cleaning machine according to claim 3,
characterised in that
the force for loading of the spring means is obtained from an excentric axis, which admits force to be transferred irrespectively of the rotation direction of the drive motor.
5. A cleaning machine according to claim 1 to 4,
characterised in that
the adhering means (3) consists of a finite band for adhering dust and soil particles by tacking, alternatively static electric adhesion.
6. A cleaning machine according to claim 5,
characterised in that
the band (3) is provided with a tacking adhesion substance except for relatively narrow areas along the edges, e g by double folding of these.
7. A cleaning machine according to claim 1 to 6,
characterised in that
the band is provided with elongated fibre reinforcement in order to eliminate the risk for breakage.
8. A cleaning machine according to claim 1 to 7,
characterised in that
the cylindrical outer body is provided with guide means, like recesses (16), preventing the band from changing direction laterally.
9. A cleaning machine according to claim 1 to 8,
characterised in that
it is arranged to be guided **in that** the radius of at least one segment (17) of the cylindrical outer body may be increased in relationship to the radius of the rest of the cylindrical outer surface.
10. A cleaning machine according to claim 1 to 9,
characterised in that
it is provided with means for loading with static electricity when moving.
11. A cleaning machine according to claim 1 to 10,
characterised in that

there belongs to same a first unit for loading of the battery, whereas the cleaning machine and the unit are provided with means for coupling together for loading current transfer.

12. A cleaning machine according to claim 1 to 11, **characterised in that** the cleaning machine is provided with a device for controlling the time for start/stop.
13. A cleaning machine according to claim 1 to 12, **characterised in that** it is provided with a means arranged to turn the poles of the feed current to the drive motor in order to exchange the moving direction of the cleaning machine at an obstacle/ stop.
14. A cleaning machine according to claim 1 to 13, **characterised in that** the driving device of the cleaning machine is provided to drive the cleaning machine at varying speeds.
15. A cleaning machine according to claim 14, **characterised in that** the cleaning machine is provided with means for controlling a start sequence electronically, that is to say to make the drive device give the cleaning machine, during a first period when changing the movement direction of the cleaning machine, a higher speed as compared to the regular speed.
16. A cleaning machine according to claim 14, **characterised in that** it comprises a means for sensing the distance to an obstacle, and that it is arranged to reduce the speed of the cleaning machine in the vicinity of the obstacle.
17. A cleaning machine according to claim 1 to 16, **characterised in that** it is provided with a computer with a programmable memory, which may be programmed with instructions for the activity of the cleaning machine.
18. A cleaning machine according to claim 17, **characterised in that** it is provided with means for coordinate determination, that is to say for determination of the position of the cleaning machine within the working area in question, whereas the memory of the computer is programmed with the coordinates for same in at least two dimensions, whereas it is provided to avoid programmed obstacles or already passed areas.
19. A cleaning machine according to claim 17 or 18, **characterised in that** the same belongs a control unit for transferring said instructions to the programmable memory.

20. A cleaning machine according to claim 19, **characterised in that** the transfer of said instructions is carried out from said control unit via a line, that may be connected to the cleaning machine.

21. A cleaning machine according to claim 19, **characterised in that** the control unit and the cleaning machine are provided with a transmitter and a receiver, whereas the transfer of said instruction is performed wirelessly.

Patentansprüche

1. Eine Reinigungsmaschine, bestehend aus einem zylindrischen Außenkörper (1), ausgestattet mit einer exzentrischen Antriebsvorrichtung, angebracht in besagtem Zylinder, für den exzentrischen Antrieb des Zylinders durch einen batteriebetriebenen Elektromotor, des Weiteren ein bandförmiges Haftmittel (3) zum Auffangen von Staub und anderen Schmutzpartikeln, das mit innerhalb des Zylinders angebrachten Transportvorrichtungen (5,11,12,13) kontinuierlich an die äußere Oberfläche des Außenkörpers und von ihr weg transportiert wird, **dadurch charakterisiert, dass** der zylindrische Außenkörper (1) mit einer ersten und zweiten umlaufenden Öffnung (2A, 2B) für die Zuführung und den Abtransport des Haftmittels (3) ausgestattet ist, angebracht in einem Abstand voneinander in der axialen Verlängerung des Außenkörpers, während die Breite des Haftmittels (3) erheblich geringer als der besagte Abstand ist.
2. Eine Reinigungsmaschine entsprechend Anspruch 1, **charakterisiert dadurch, dass** das Haftmittel (3) für ein pulsierendes Abrollen eingerichtet ist und von einer Vorratsrolle (12) kommt, die ein Abrollen unabhängig von der Drehrichtung des Antriebsmotors erlaubt.
3. Eine Reinigungsmaschine entsprechend Anspruch 1 oder 2, **charakterisiert dadurch, dass** die Reinigungsmaschine mit einer Sensorvorrichtung ausgestattet ist, die die Kraft regelt, mit der die Federvorrichtung gespannt wird, die das Einrollen des Haftmittels (3) steuert.
4. Eine Reinigungsmaschine entsprechend Anspruch 3, **charakterisiert dadurch, dass** die Kraft zur Spannung der Feder von einer exzentrischen Achse kommt, die eine Übertragung der Kraft unabhängig von der Drehrichtung des Antriebsmotors zulässt.

5. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 4,
charakterisiert dadurch, dass
das Haftmittel (3) aus einem endlichen Band für das Anhaften von Staub und Schmutzpartikeln durch Aufnehmen oder statisches elektrisches Anhaften besteht. 5
6. Eine Reinigungsmaschine entsprechend Anspruch 5,
charakterisiert dadurch, dass
das Band (3) mit einer aufnehmenden Substanz versehen ist, abgesehen von den verhältnismäßig engen Bereichen entlang der Kanten, z. B. durch doppeltes Falten derselben. 10 15
7. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 6,
charakterisiert dadurch, dass
das Band mit einer verlängerten Faserverstärkung ausgestattet ist, um die Gefahr des Reißens auszu-schließen. 20
8. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 7,
charakterisiert dadurch, dass
der zylindrische Außenkörper mit Führungen, wie Vertiefungen (16), ausgestattet ist, die das Band daran hindern, die Richtung zur Seite hin zu ändern. 25 30
9. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 8,
charakterisiert dadurch, dass
Führungen vorgesehen sind, mit denen der Radius mindestens eines Segments (17) des zylindrischen Außenkörper im Verhältnis zum Radius der restlichen zylindrischen Außenfläche vergrößert werden kann. 35
10. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 9,
charakterisiert dadurch, dass
sie mit Vorrichtungen ausgestattet ist, die sie mit statischer Elektrizität aufladen, wenn sie sich bewegt. 40
11. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 10,
charakterisiert dadurch, dass
eine erste Einheit zur Ladung der Batterie dazugehört, während die Reinigungsmaschine und die Einheit mit Vorrichtungen zum Zusammenschluss für die Stromübertragung ausgestattet sind. 45 50
12. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 11,
charakterisiert dadurch, dass
die Reinigungsmaschine mit einer Vorrichtung zur Steuerung der Zeit für Start/Stopp ausgestattet ist. 55
13. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 12,
charakterisiert dadurch, dass
sie mit einer Vorrichtung zur Umkehr der Pole des Versorgungsstroms zum Antriebsmotor ausgestattet ist, um die Bewegungsrichtung der Reinigungsmaschine bei einem Hindernis/Stopp zu ändern.
14. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 13,
charakterisiert dadurch, dass
die Antriebsvorrichtung der Reinigungsmaschine so eingerichtet ist, dass sie die Reinigungsmaschine mit verschiedenen Geschwindigkeiten antreiben kann.
15. Eine Reinigungsmaschine entsprechend Anspruch 14,
charakterisiert dadurch, dass
die Reinigungsmaschine mit Vorrichtungen zur elektronischen Steuerung der Startsequenz ausgestattet ist, d. h. dass die Antriebsvorrichtung der Reinigungsmaschine während einer Anfangszeit, während der sich die Bewegungsrichtung der Maschine ändert, eine höhere Geschwindigkeit als die reguläre Geschwindigkeit gibt.
16. Eine Reinigungsmaschine entsprechend Anspruch 14,
charakterisiert dadurch, dass
sie eine Vorrichtung enthält, die den Abstand zu einem Hindernis erkennt, und dass die Geschwindigkeit der Reinigungsmaschine in der Nähe eines Hindernisses verringert wird.
17. Eine Reinigungsmaschine entsprechend Anspruch 1 bis 16,
charakterisiert dadurch, dass
sie mit einem Computer mit programmierbarem Speicher ausgestattet ist, der mit Anweisungen zur Aktivität der Reinigungsmaschine programmiert werden kann.
18. Eine Reinigungsmaschine entsprechend Anspruch 17,
charakterisiert dadurch, dass
sie mit einer Vorrichtung zur Positionsbestimmung ausgestattet ist, mit der die Position der Reinigungsmaschine innerhalb des fraglichen Arbeitsbereichs bestimmt werden kann, während der Speicher des Computers mit den Koordinaten dieses Bereichs in mindestens zwei Dimensionen programmiert ist, wobei er dazu in der Lage ist, einprogrammierte Hindernisse oder bereits durchlaufene Bereiche zu vermeiden.
19. Eine Reinigungsmaschine entsprechend Anspruch

17 oder 18,

caractérisiert dadurch, dass

sie über eine Steuereinheit verfügt, die die erwähnten Anweisungen an den programmierbaren Speicher überträgt.

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20. Eine Reinigungsmaschine entsprechend Anspruch 19,

caractérisiert dadurch, dass

die Übertragung der erwähnten Anweisungen von der besagten. Steuereinheit über eine Leistung ausgerührt wird, die an die Reinigungsmaschine angeschlossen werden kann.

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21. Eine Reinigungsmaschine entsprechend Anspruch 19,

caractérisiert dadurch, dass

die Steuereinheit und die Reinigungsmaschine mit einem Sender und einem Empfänger ausgestattet sind, so dass die Übertragung der erwähnten Anweisungen drahtlos erfolgt.

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Revendications

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1. Une machine de nettoyage, **caractérisée en ce qu'elle** emploie la combinaison

d'un corps cylindrique extérieur (1) muni d'un dispositif d'entraînement excentrique implanté dans le dit cylindre pour l'entraînement excentrique du cylindre moyennant un moteur électrique fonctionnant sur batterie, en outre des surfaces d'adhérence sous forme d'une bande (3) pour l'adhérence de poussières et d'autres particules de sol, alimentée en continu vers et à partir de la surface externe du corps extérieur par des moyens d'alimentation (5, 11, 12, 13) disposés à l'intérieur du cylindre, **caractérisés en ce que** le corps cylindrique (1) est doté d'une première et d'une deuxième ouverture périphérique (2A, 2B) pour l'alimentation à partir de et vers la bande adhérente (3), placées à une certaine distance l'une de l'autre dans le prolongement axial du corps extérieur, tandis que la largeur de la bande adhérente (3) est sensiblement mineure par rapport à ladite distance.

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2. Machine selon la revendication 1, **caractérisée en ce que :**

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la bande adhérente (3) est conçue pour pouvoir être déroulée par pulsation à partir d'une bobine de stockage (12) qui autorise le déroulement de bande, quel que soit le sens de rotation du moteur d'entraînement.

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3. Machine selon les revendications 1 ou 2,

caractérisée en ce que :

la machine de nettoyage est dotée de moyens de détection pour contrôler la force, laquelle applique une charge sur des moyens formant ressort qui contrôlent l'enroulement de la bande adhérente (3).

4. Machine selon la revendication 3.

caractérisée en ce que :

la force qui applique une charge aux moyens formant ressort est obtenue à partir d'un axe excentrique, lequel permet à la force d'être transmise, quel que soit le sens de rotation du moteur d'entraînement.

5. Machine selon les revendications 1 à 4,

caractérisée en ce que :

les surfaces d'adhérence (3) se composent d'une bande limitée assurant l'adhérence des poussières et des particules de sol soit par contact direct, soit par adhérence statique électrique.

6. Machine selon la revendication 5,

caractérisée en ce que :

la bande (3) comporte une substance adhérente à picots, à l'exception de zones relativement étroites le long des bords, p.ex. par repliage.

7. Machine selon les revendications 1 à 6,

caractérisée en ce que :

la bande est dotée de renforts en fibres allongées afin d'éliminer le risque de rupture.

8. Machine selon les revendications 1 à 7, **caractérisée en ce que :**

le corps cylindrique extérieur est pourvu de moyens de guidage, de type évidements (16), empêchant la bande de s'écarter dans le sens latéral.

9. Machine selon les revendications 1 à 8,

caractérisée en ce que :

il est conçu pour être guidé de sorte que le rayon d'au moins un segment (17) du corps cylindrique extérieur puisse être augmenté par rapport au rayon du reste de la surface extérieure cylindrique.

10. Machine selon les revendications 1 à 9,

caractérisée en ce que :

Il est doté de moyens permettant le chargement en électricité statique lors de déplacement.

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11. Machine selon les revendications 1 à 10,
caractérisée en ce que :

on trouve une première unité de chargement de la batterie, tandis que la machine de nettoyage et l'unité sont dotées de moyens permettant d'être accouplées pour le transfert de courant de charge.

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12. Machine selon les revendications 1 à 11,
caractérisée en ce que :

la machine est dotée d'un dispositif de contrôle du temps de marche/arrêt.

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13. Machine selon les revendications 1 à 12,
caractérisée en ce que :

elle est munie d'un moyen conçu pour inverser les pôles d'alimentation du moteur d'entraînement, en vue d'inverser le sens de déplacement de la machine de nettoyage en cas d'obstacle/d'arrêt.

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14. Machine selon les revendications 1 à 13,
caractérisée en ce que :

le dispositif d'entraînement de la machine de nettoyage est préau pour entraîner ladite machine à des vitesses variables.

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15. Machine selon la revendication 14,
caractérisée en ce que :

la machine de nettoyage est dotée de moyens pour commander une séquence de démarrage par voie électronique, autrement dit pour permettre au dispositif d'entraînement d'assurer à la machine de nettoyage, durant une courte période suivant le changement de déplacement de la machine, une vitesse plus élevée par rapport à la vitesse régulière.

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16. Machine selon la revendication 14,
caractérisée en ce que :

elle comprend un moyen pour détecteur la distance par rapport à un obstacle, et qu'elle est prévue pour réduire la vitesse de ladite machine à proximité de l'obstacle.

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17. Machine selon les revendications 1 à 16,
caractérisée en ce que :

elle est munie d'un ordinateur à mémoire programmable, qui peut être programmé avec des instructions relatives aux opérations de la machine de nettoyage.

18. Machine selon la revendication 17,
caractérisée en ce que :

elle est fournie avec des moyens pour la détermination de coordonnées, c'est-à-dire pour la détermination de la position de la machine de nettoyage dans la zone de travail en question, tandis que la mémoire de l'ordinateur est programmée avec les mêmes coordonnées dans au moins deux dimensions, considérant qu'elle est conçue pour éviter les obstacles programmés ou les zones déjà nettoyées.

19. Machine selon les revendications 17 ou 18,
caractérisée en ce que :

ladite machine possède une unité de command pour le transfert desdites instructions à la mémoire programmable.

20. Machine selon la revendication 19,
caractérisée en ce que :

le transfert desdites instructions est réalisé à partir de ladite unité de commande via une ligne, qui peut être connectée à la machine de nettoyage.

21. Machine selon la revendication 19,
caractérisée en ce que :

l'unité de commande et la machine de nettoyage sont équipées d'un émetteur et d'un récepteur, alors que le transfert desdites instructions est assuré par une connexion sans fil.

Fig.1

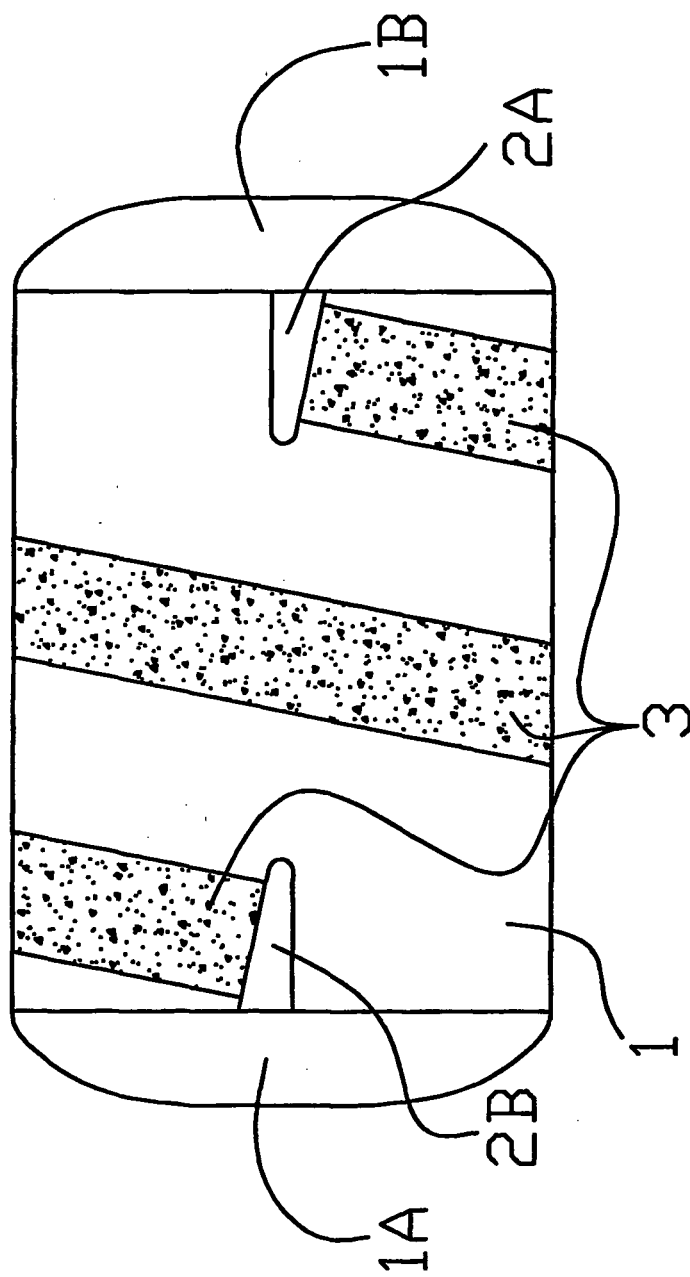
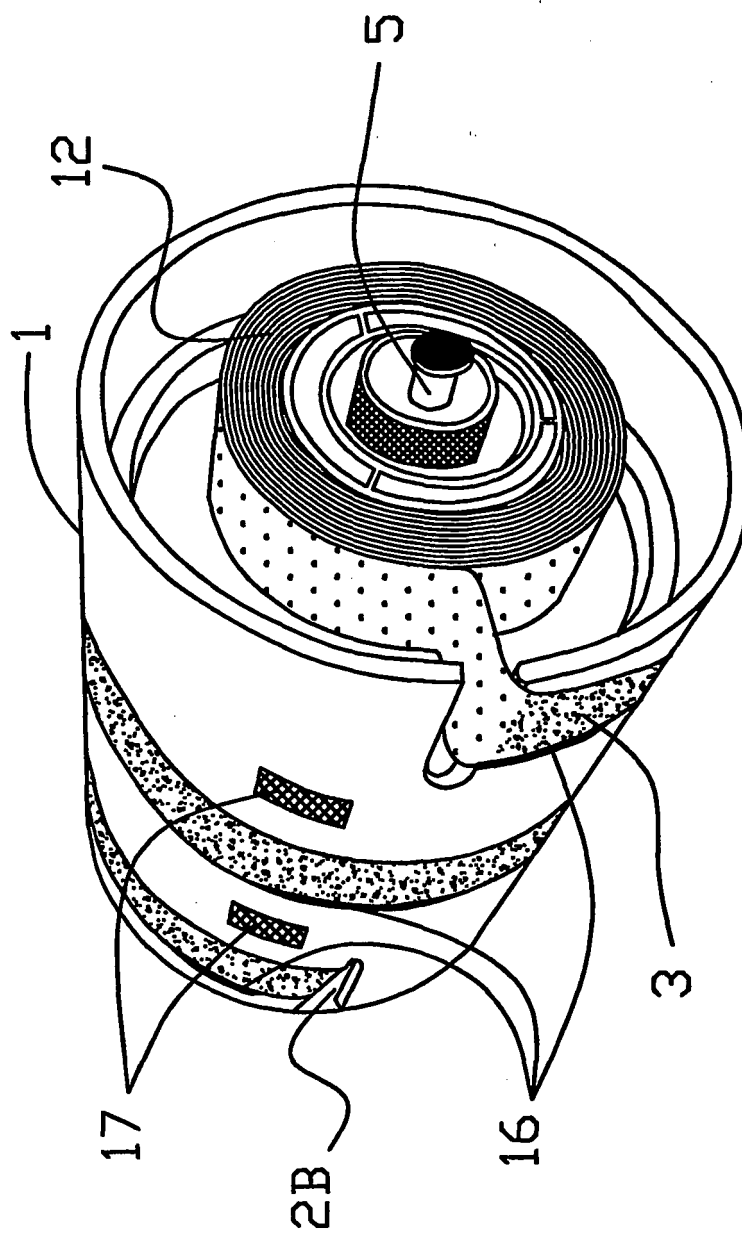


Fig.2



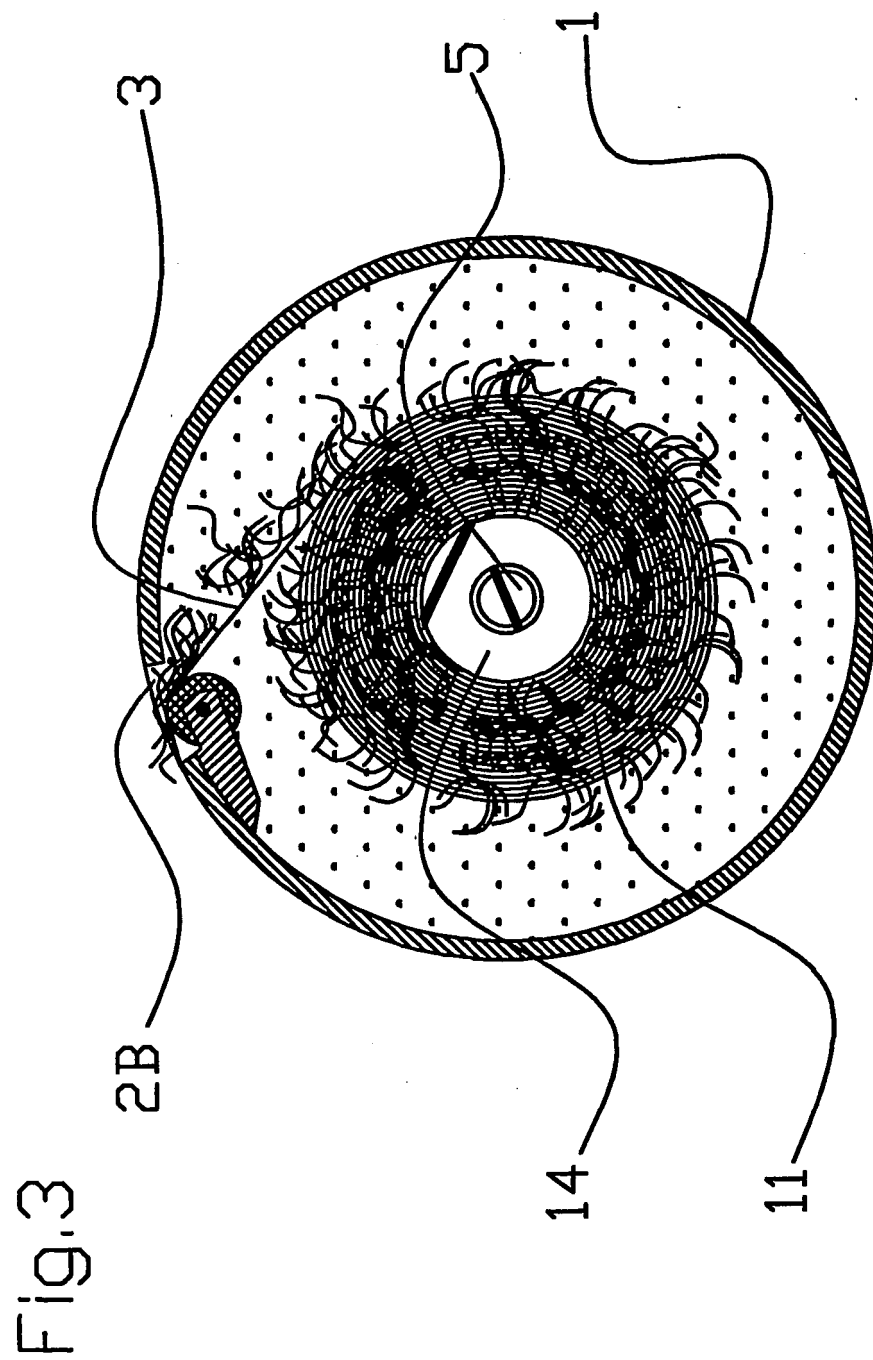
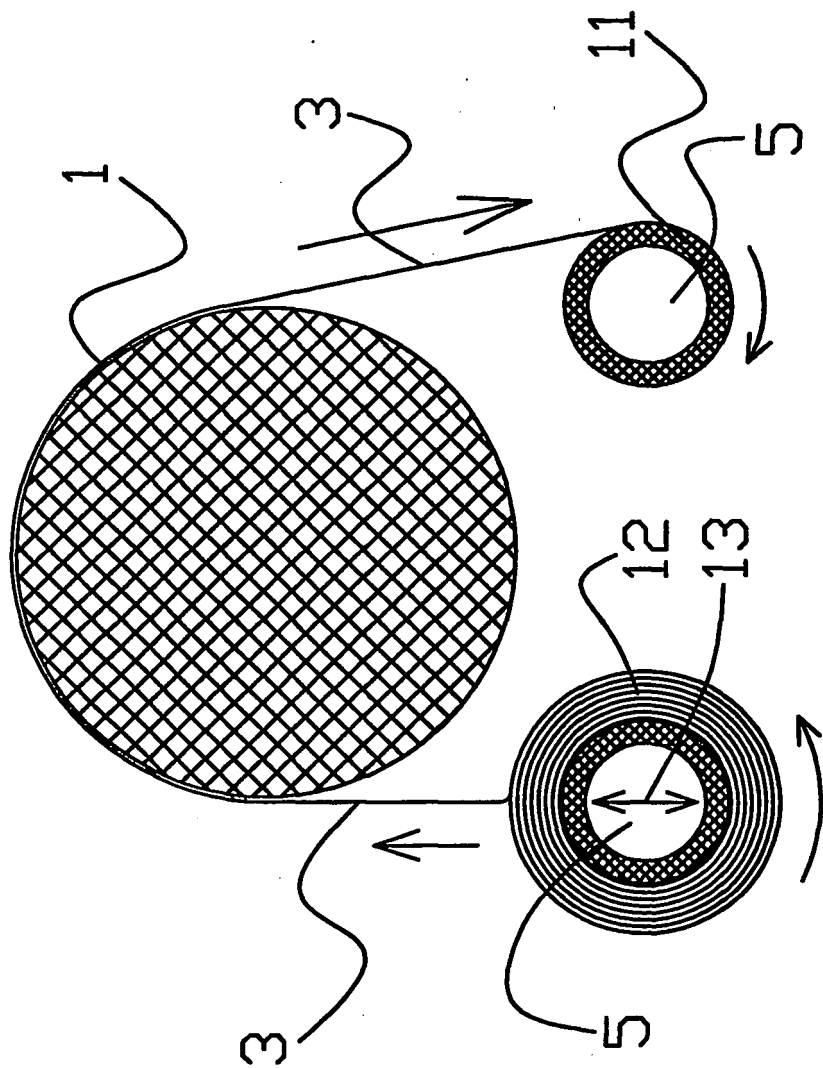


Fig.4



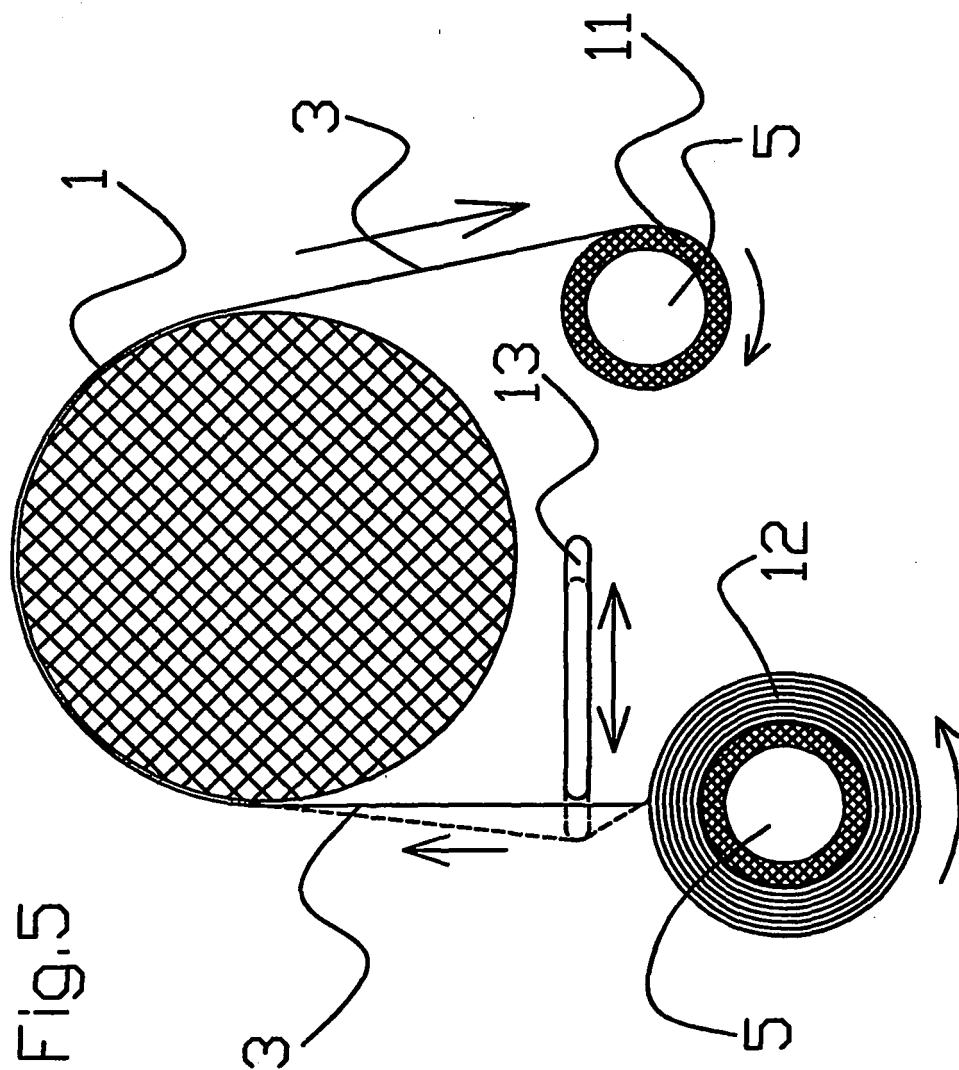
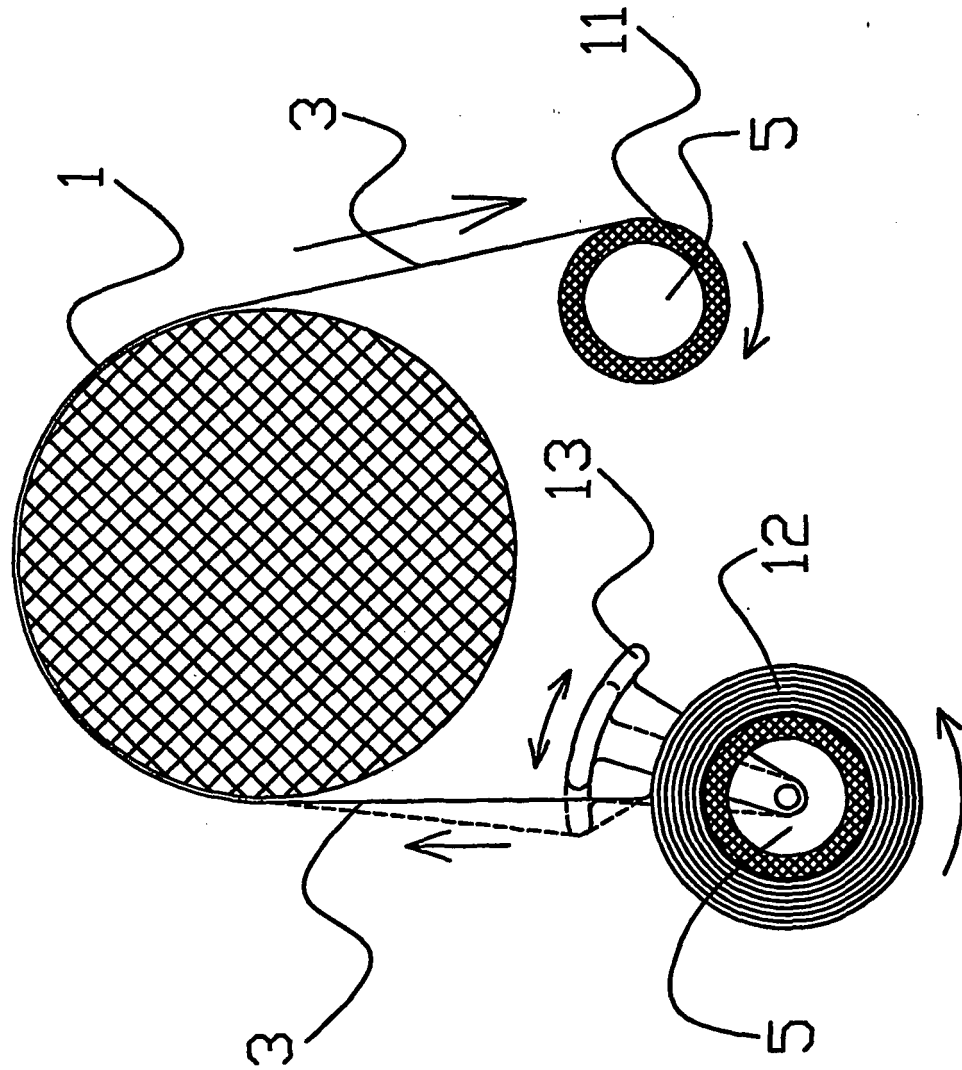


Fig.6



REFERENCES CITED IN THE DESCRIPTION

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