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(54) Sweeping aiding device for municipal street cleaning sweepers

Kehrhilfseinrichtung für Strassenkehrmaschinen

Dispositif auxiliaire de balayage pour balayeuses de rues

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a sweeping aiding device for municipal street cleaning sweepers.

[0002] As is known, street sweepers are conventionally used for cleaning municipal streets and comprise a plurality of motor driven cleaning brushes, specifically designed for sweeping the street surface and collecting dirt therefrom.

[0003] The mentioned street sweepers are adapted to operate in an optimum manner if the street being cleaned is free and not obstructed by obstacles.

[0004] However, in the presence of obstacles, chiefly constituted by parked cars and vehicles, the cleaning brushes cannot arrive at the road edge, near the sidewalk, where the most part of dirt accumulates, including that coming from the sidewalk.

[0005] In order to overcome the above mentioned drawback, a walking operator, provided with a broom or other sweeping instrument, can collect said dirt at a region which can be accessed by the sweeper brushes.

[0006] However, this operation is very fatiguing and, in each case it is not possible for the operator to remove waste materials arranged, for example, under the parked cars.

[0007] Some documents disclose a solution to that problem. The document EP-A-0 683 278 discloses a sweeping aiding device comprising a windable sheath bearing a sweeping lance.

[0008] The document EP-A-1 288 374 substantially discloses the preamble of claim 1.

SUMMARY OF THE INVENTION

[0009] Accordingly, the main object of the present invention is to provide a sweeping aiding device, specifically designed for solving the above mentioned problems, which device also allows a walking operator to easily and quickly collect dirt and waste materials to direct the latter to the sweeper cleaning brushes, without requiring any great physical effort by the operator, and which can also be used for a long period.

[0010] Yet another important object of the present invention is to provide such a sweeping aiding device which also allows to properly clean streets and sidewalks even in regions thereof occupied by parked vehicles, and this by aiding the cleaning operator by a safe, efficient and noiseless system which, in addition, can be also easily controlled.

[0011] According to the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a sweeping aiding device, to be applied to municipal street sweepers, according to claim 1..

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of the preferred, though not exclusive embodiment of the invention which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a schematic side elevation view of the sweeping aiding device according to the present invention, as shown in an extended condition thereof;
Figure 2 is a further side elevation view, on an enlarged scale, illustrating in a more detailed manner, the two articulated joints of the sweeping aiding device;
Figure 3 is a top plan view, as partially cross-sectioned, illustrating the two articulated joints of the sweeping aiding device according to the present invention;
Figure 4 is an elevation view illustrating the sweeping aiding device, applied to a street sweeper, during the use of said device;
Figure 5 is a side elevation view illustrating the sweeping aiding device, applied to a street sweeper, during the use thereof;
Figure 6 is top plan view illustrating the sweeping aiding device according to the invention applied to a street sweeper, in a closure condition thereof, for non operating shipments;
Figure 7 is a further top plan view, illustrating the sweeping aiding device according to the invention applied to a street sweeper, during the use thereof;
Figure 8 is a further top plan view, illustrating the operating range of the sweeping aiding device according to the present invention, at a right region of the street sweeper, region A being the maximum allowable working region, and region B, the joy-stick working region ;
Figure 9 is a further top plan view, illustrating the use or operating range of the sweeping aiding device, at a left region of the street sweeper, region A being the maximum allowable working region, and region B, the joy-stick working region ;
Figure 10 is a side elevation view illustrating in a more detailed manner the second segment of the articulated arm;
Figure 11 is a view, cross-sectioned according to the section plane XI-XI of figure 10, of the second segment of the articulated arm;
Figure 12 is a front view of the end portion of the second segment of the articulated arm;
Figure 13 is a side view of the end portion of the second segment; and
Figure 14 is a top plan view of the end portion of the second segment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] With reference to the number references of the above mentioned figures, the sweeping aiding device, according to the present invention, which has been generally indicated by the reference number 1, comprises a semiautomatic two articulated-joint arm, comprising a first arm segment 2 fixed at the middle region of the street sweeper 3 above the front portion of the tilting casing 4 thereof, through a first articulated joint 11.

[0014] The above mentioned arm is of a self-moving type, i.e. it can be driven in a plane parallel to the ground, and arranged at a level greater than the maximum height of the sweeper.

[0015] The sweeping operation is performed by using pressurized water delivered from the street sweeping machine and, to that end, the sweeping aiding device ends with a sheath 13 supplying and supporting a sweeping lance 5.

[0016] Said sweeping lance is driven by a walking operator 6, and allow to displace dirt and waste materials from the sidewalks 7 and from the bottom of the cars or vehicles 8 parked at the central portion of the street 9, from which said dirt and waste materials are collected by the sweeper, which in the meanwhile washes the street surface.

[0017] The articulated arm, as is shown, comprises a second segment 10 coupled to the first segment 2 by a second articulated joint 12.

[0018] The two arm segments 2 and 10, in the maximally extended condition thereof, have a length larger than six meters, but a specifically designed system for winding and automatically recovering the sheath 13 allows the operator to move away, if necessary, by other three meters from the sweeper.

[0019] The lance 5 supporting sheath 13 slides, at the end portion of the arm, in a special supporting element, of a joystick type, which automatically drives the arm segment, thereby providing an operator tracking length reserve, independently from the movement direction of the operator.

[0020] Thus, the walking operator can perform the dirt and waste material removal operation, without considering the position of the sweeper arm.

[0021] The sheath 13 ends with an electric connector and a water quick fitting, allowing, as the sweeping aiding device is in an idle condition above the sweeper, to disconnect the lance 5 for storing it at any other desired location.

[0022] The supporting sheath 13 will be automatically wound within the arm segment 10 and will be bracketed on a side of the casing or box 4.

[0023] As is clearly shown in figures 1, 10 and 11, the sheath 13 is wound, by a specifically designed winding system, inside the second segment 10 on a cable holder chain 19 coupled to the aiding shoes 20, which can slide at the top in a polyethylene guiding element 21.

[0024] Inside said second arm segment 10 which has an oval cross-section, are moreover provided, at the bottom thereof, electric cable ducts or channels 22.

[0025] As shown, the sheath 13 projects from the second arm segment 10 through the end portion 18 comprising a control system for controlling the position and movement of said sheath, said control system comprising two potentiometers 23 and 24, each of which is provided with small rollers 25, arranged in respective orthogonal planes, thereby to transmit an electric signal to the control central unit controlling the servomotors 26 and 27 which respectively drive the first and second articulated joints.

[0026] Thus, as the operator walks in any direction through the plane, he will drive or displace the sheath in a well defined direction, i.e. a direction precisely defined by the rotary movement of the two mentioned potentiometers.

[0027] Thus, said potentiometers can detect or sense the operator moving speed, so as to properly control the servomotors of the articulated arm to properly track or follow the moving operator.

[0028] A spotlight element, having a halogen lamp, mounted on the end portion 18 of the second arm segment 10, will allow the sweeper to also operate in a night period, by diffusely illuminating from the top the working region.

[0029] In their rest or idle position, shown in figure 6, the two arm segments are compasses-like closed, and are bracketed on the sweeper 3 by an automatic safety locking system.

[0030] In such an arrangement, the sweeping aiding device will be held inside the sweeper perimeter thereby meeting the maximum height values provided by the Street Code.

[0031] From the above disclosure it should be apparent that the sweeping aiding device according to the present invention is adapted to indifferently operate on both sides of the sweeper.

[0032] A selector or switch element, arranged on the cab button panel of the sweeper will allow to select the working side and then, the system controlling softer will prevent any further movements on the other side of the sweeper.

[0033] The rotary movements of the two arm segments are motor driven.

[0034] Torque limiting elements, together with damping rubber section elements, arranged on the sides of the arms, will protect the equipment from accidental impacts.

[0035] The device bearing construction 15 is coupled, by a removable coupling means, to a fixing or attachment plate 16, rigid with the sweeper casing or box 4.

[0036] More specifically, said sweeping aiding device attachment plate 16 is removably coupled, by a coupling bracket, to the front portion of the casing 4 of the sweeper 3.

[0037] By way of an indicative example, the bearing construction can be subjected to the following loads:

Static axle load: about 200 kg
Static bending moment: about 200 kg.m
(in any directions through 360° about the axle)
Overloads: the same overloads to which the sweeper is subjected in its regular street operation)

[0038] The lance gripper 17 of the lance has integrated therein an on/off joystick electric control to allow the operator to adjust, through a knob control valve, the flow rate of the water being sprayed from the lance 5.

[0039] The device further comprises an independent electric panel, meeting the related CE standards, provided for driving and controlling the sweeper; it comprises: a PLC for controlling the operating and safety logic circuits; I/O cards for managing the transmitted signals; and the electric motor drives.

[0040] The device comprises moreover an independent pushbutton panel, mounted on the sweeper cab, and including the following control pushbuttons: on/off selector; emergency pushbutton; arm extending and withdrawing selector or switch; a selector for operating either at the right or at the left of the truck; a small panel for necessary alarms; an alarm reset pushbutton; and a lighting system on/off selector or switch.

[0041] The driver and walking operator can continuously communicate through a radio-wave interphone system, with an earphone for the walking operator and in a voiced manner for the driver, thereby providing a highly synchronous cooperating of the driver and operator.

[0042] The sweeper can also comprise, onboard, the following provisions, as necessary for operating the sweeping aiding device: electricity 24 V; voltage 24+/-15% Vcc; and useful power 0.85 kW, as necessary for power supplying the arm motors, lighting system and electronic cabinet.

[0043] Pressurized water is advantageously filtered and free of suspensions and has a rated pressure from 60 to 100 bars (adjustable), a maximum pressure of 110 bars and a maximum flowrate of 900 dm^3/h, for water supplying the water spraying lance.

[0044] The sweeping aiding device according to the present invention, can also perform, by small modifications, even a cleaning function, by using an air blower, having a 24 Vcc electric motor, to be coupled to the sheath in place of the sweeping lance, and can also be electrically supplied by the sheath.

[0045] Moreover, the device can also be applied on a tank truck and can be used for washing streets and sidewalks, since it would have available great amounts of water.

[0046] Furthermore, the device according to the invention can also be applied to a salt delivery truck, thereby delivering salt on the sidewalks and under the parked vehicles, under snow and ice condition.

[0047] It has been found that the invention fully achieves the intended aim and objects.

[0048] In fact, the invention provides a sweeping aiding device allowing to sweep and wash streets and sidewalks even in regions occupied by parked vehicles, aiding the operator through the use of a safe, efficient, noiseless and easily manoeuvrable system.

[0049] In practicing the invention, the used materials, as well as the contingent size and shapes can be any, depending on requirements.

Claims

1. A sweeping aiding device (1), to be applied to municipal street sweepers, said device comprising an articulated arm (2, 10) which can be coupled to a street sweeper (3), said articulated arm (2, 10) being a semi-automatic servo controlled articulated arm comprising a first arm segment (2) to be fixed at the middle of said street sweeper (3), above a front portion of a tilting casing (4) thereof, through a first articulated joint (11), said articulated arm (2, 10) being self-movable in a plane parallel to the ground, arranged at a level greater than the maximum height of said street sweeper (3), and said articulated arm (2, 10) comprising a second arm segment (10), coupled to the first arm segment (2) by a second articulated joint (12), **characterized in that** said two arm segments (2, 10), in a maximum extension condition thereof, have a length greater than six meters and **in that** the sweeping aiding device further comprises a windable sheath (13) bearing, at one end portion thereof, a sweeping lance (5) adapted to provide pressurized water and to be gripped by a walking operator (6), an automatic winding and recovering system being provided for winding said sheath (13) to allow said operator (6) to move away from said sweeper (3) by additional three meters, said sheath (13) being slidably supported at the end portion of the arm in an element of a joystick type automatically driving the arm segments (2, 10), thereby providing a reserve length for allowing said operator (6) to easily follow said sweeper (3) according to any directions.

2. A device according to claim 1, **characterized in that** said sheath (13) ends with an electric connector and a water quick fitting thereby allowing, with said device in a rest condition on the sweeper (3), to disconnect said lance (5) and store it at any other desired locations, said sheath (13) being automatically wound in said second arm segment (10) and being then bracketed on a sidewall of the sweeper casing (4).

3. A device according to claim 1, **characterized in that** said sheath (13) is windable by said winding system inside the second arm segment (10), on a cable holder chain (19) associated with slidable shoes (20) which can slide on their top in a polyethylene guiding

element (21).

4. A device according to claim 1, **characterized in that** said second arm segment (10) has an oval cross-section, in which electric cable ducts (22) are arranged.

5. A device according to claim 1, **characterized in that** said sheath (13) projects from said second arm segment (10) through its end portion comprising a control system for controlling the position and movement of said sheath (13), said control system comprising two potentiometers (23, 24), each including rollers (25) arranged in respective orthogonal planes, to transmit an electric signal to a control central unit controlling the operation of the servomotors (26, 27) for respectively driving the first articulated joint (11) and second articulated joint (12), thereby, as said walking operator (6) moves according to any direction, he will drive said sheath (13) in an univocally defined direction, which is precisely defined by the rotary movements of said two potentiometers (23,24).

6. A device according to claim 5, **characterized in that** said potentiometers (23, 24) are adapted to detect the operator moving speed, so as to operate said servomotors (26, 27) of the articulated arm (2, 10) to follow the operator movement.

7. A device according to claim 1, **characterized in that** said device further comprises a spotlight element including a halogen lamp, mounted on the end portion of the second arm segment (10), and allowing the sweeper (3) to also be used in night time, said spotlight diffusely illuminating the working region from the top.

8. A device according to claim 1, **characterized in that,** at a rest or idle position thereof, said two articulated arm segments (2, 20) are to be compasses-like closed and bracketed on the sweeper (3) by an automatic safety locking system, so that, in this arrangement, the size of said device will be held inside the sweeper perimeter, thereby meeting the maximum height values provided by the Street Code.

9. A device according to claim 1, **characterized in that** said device is designed for indifferently working on both sides of the sweeper.

10. A device according to claim 1, **characterized in that** said device further comprises a selector, to be arranged on a drive cab pushbutton panel, allowing to select the working side, to allow the system controlling software to prevent any movements on the other side of the sweeper.

11. A device according to claim 1, **characterized in that** said arm segments (2, 10) are automatically rotatively driven, and that said device further comprises torque limiting elements which, together with damping rubber section elements, arranged on the sides of the arms, protect the device from accidental impacts.

12. A device according to one or more of the preceding claims, **characterized in that** said device comprises a bearing structure to be removably coupled to an attachment plate (16) in turn removably coupled, through a coupling bracket, to a front portion of said sweeper casing (4).

13. A device according to claim 1, **characterized in that** said lance (5) has a lance gripper (17) in which is integrated an on/off joystick electric control allowing the operator to adjust, through a knob controlling valve, the water flowrate from said lance.

14. A device according to claim 1, **characterized in that** said device further comprises an independent electric panel adapted to drive and control the sweeper (3), said panel comprising a PLC for controling the operating and safety logic circuits; I/O cards for managing the signals, and the electric motor drives.

15. A device according to claim 1, **characterized in that** said device further comprises an independent pushbutton panel, arranged in the sweeper drive cab, and including the following controls: on/off selector switch; emergency pushbutton; arm extending and withdrawing selector; a selector for allowing the device to operate either on the right or on the left of the sweeper truck; an alarm panel; an alarm reset pushbutton; a lighting on/off selector.

16. A device according to claim 1, **characterized in that** said device further comprises, to be arranged onboard of said sweeper (3), the following services for operating the sweeping aiding device: electricity 24 V; voltage 24+/-15% Vcc; and useful power 0.85 kw for power supplying the arm motors, the lighting system and electric cabinet.

17. A device according to one or more of the preceding claims, **characterized in that** the spraying lance (5) is adapted to be supplied by pressurized water which has been filtered and is free of suspensions and which has an adjustable pressure from 60 to 100 bars, a maximum pressure of 110 bars and a maximum flowrate of 900 dm^3/H.

18. A device according to one or more of the preceding claims, **characterized in that** said device is also designed for providing a cleaning function, by using an air blower, including a 24 Vcc electric motor, to

be coupled to said sheath (13) in place of said sweeping lance (5) and which is electrically power supplied by said sheath (13).

19. A device according to one or more of the preceding claims, **characterized in that** said device is adapted to be applied on a tank truck having available large amounts of water and used for washing streets and sidewalks.

20. A device according to one or more of the preceding claims, **characterized in that** said device is adapted to be applied on a salt spreading truck, to spread salt on sidewalls and under parked vehicles, in snow and ice conditions.

Patentansprüche

1. Kehrhilfsvorrichtung (1) zur Anwendung auf Straßenkehrmaschinen, wobei die Vorrichtung einen Gelenkarm (2, 10) umfasst, der mit einer Straßenkehrmaschine (3) verbunden werden kann, wobei der Gelenkarm (2, 10) ein halbautomatischer servogesteuerter Gelenkarm ist, der ein erstes Armsegment (2) umfasst, das an der Mitte der Straßenkehrmaschine (3) über einem Vorderabschnitt eines Kippgehäuses (4) davon durch eine erste Gelenkverbindung (11) befestigt ist, wobei sich der Gelenkarm (2, 10) in einer zum Boden parallelen Ebene selbst bewegen kann, die auf einer Ebene angeordnet ist, die größer als die maximale Höhe der Straßenkehrmaschine (3) ist, und wobei der Gelenkarm (2, 10) ein zweites Armsegment (10) umfasst, das mit dem ersten Armsegment (2) durch eine zweite Gelenkverbindung (12) verbunden ist, **dadurch gekennzeichnet, dass** die zwei Armsegmente (2, 10) in einem Zustand der maximalen Ausdehnung davon eine Länge aufweisen, die größer als sechs Meter ist, und **dadurch**, dass die Kehrhilfsvorrichtung ferner einen wickelbaren Mantel (13) umfasst, der an einem Endabschnitt davon eine Kehrlanze (5) aufweist, die ausgelegt ist, um Druckwasser bereitzustellen und von einem gehenden Maschinenbediener (6) gefasst zu werden, wobei ein automatisches Wickel- und Wiederherstellungssystem zum Wickeln des Mantels (13) bereitgestellt ist, so dass sich der Maschinenbediener (6) von der Kehrmaschine (3) um zusätzliche drei Meter weg bewegen kann, wobei der Mantel (13) an dem Endabschnitt des Arms in einem Element einer Steuerknüppelart, das die Armsegmente (2, 10) automatisch antreibt, verschiebbar gestützt ist, wodurch eine Reservelänge bereitgestellt wird, so dass der Maschinenbediener (6) der Kehrmaschine (3) in jeder beliebigen Richtung ohne weiteres folgen kann.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass**: der Mantel (13) mit einem elektrischen Verbinder und einer Wasserschnellkupplung endet, wodurch das Abschalten der Lanze (5) in einem Ruhezustand der Vorrichtung auf der Kehrmaschine (3) und das Lagern davon an beliebigen anderen gewünschten Orten ermöglicht wird, wobei der Mantel (13) automatisch in das zweiten Armsegment (10) gewickelt und dann an einer Seitenwand des Kehrmaschinengehäuses (4) festgeklemmt wird.

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Mantel (13) von dem Wickelsystem in das Innere des zweiten Armsegments (10) auf einer Kabelhalterkette (19) gewickelt werden kann, die mit verschiebbaren Schuhen (20) verbunden ist, die darauf in einem Polyethylyen-Führungselement (21) gleiten können.

4. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Armsegment (10) einen ovalen Querschnitt aufweist, in dem elektrische Kabelrohre (22) angeordnet sind.

5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Mantel (13) von dem zweiten Armsegment (10) durch seinen Endabschnitt hervorsteht, der ein Steuersystem zum Steuern der Position und Bewegung des Mantel (13) umfasst, wobei das Steuersystem zwei Potentiometer (23, 24) umfasst, die jeweils Walzen (25) aufweisen, die in jeweiligen orthogonalen Ebenen angeordnet sind, um ein elektrisches Signal an eine zentrale Steuereinheit zu übertragen, welche die Betriebsweise der Servomotoren (26, 27) zum Antreiben jeweils der ersten Gelenkverbindung (11) und der zweiten Gelenkverbindung (12) steuert, wodurch der Maschinenbediener (6), während er sich in irgendeine Richtung bewegt, den Mantel (13) in eine eindeutig definierte Richtung lenkt, die von den Drehbewegungen der zwei Potentiometer (23, 24) genau definiert ist.

6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die Potentiometer (23, 24) ausgelegt sind, um die Bewegungsgeschwindigkeit des Maschinenbedieners zu erkennen, um so die Servomotoren (26, 27) des Gelenkarms (2, 10) zu betreiben, um der Bewegung des Maschinenbedieners zu folgen.

7. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung ferner ein Scheinwerferelement umfasst, das eine Halogenlampe aufweist, die auf dem Endabschnitt des zweiten Armsegments (10) befestigt ist, und ermöglicht, dass die Kehrmaschine (3) auch nachts benutzt werden kann, wobei der Scheinwerfer den Arbeitsbereich von oben diffus beleuchtet.

8. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die zwei Gelenkarmsegmente (2, 20) in zirkelähnlicher Weise geschlossen werden und von einem automatischen Sicherheitsverriegelungssystem auf der Kehrmaschine (3) festgeklemmt werden, so das die Größe der Vorrichtung in dieser Anordnung innerhalb des Umfangs der Kehrmaschine gehalten wird, wodurch die gesetzlich vorgeschriebenen maximalen Höhenwerte eingehalten werden.

9. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung dafür ausgelegt ist, auf beiden Seiten der Kehrmaschine gleichermaßen zu arbeiten.

10. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung ferner einen Wahlschalter umfasst, der auf einer Führerhaus-Drucktastentafel angeordnet ist und das Auswählen der Arbeitsseite ermöglicht, so dass die Systemsteuerungssoftware sämtliche Bewegungen auf der anderen Seite der Kehrmaschine verhindern kann.

11. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Armsegmente (2, 10) automatisch drehbar angetrieben werden, und dass die Vorrichtung ferner Drehmoment einschränkende Elemente umfasst, die zusammen mit dämpfenden Gummiabschnittselementen, die auf den anderen Seiten der Arme angeordnet sind, die Vorrichtung vor versehentlichen Stößen schützen.

12. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrichtung eine Lagerstruktur umfasst, die mit einer Befestigungsplatte (16) lösbar verbunden ist, die wiederum durch eine Verbindungsklammer mit einem Vorderabschnitt des Kehrmaschinengehäuses (4) lösbar verbunden ist.

13. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Lanze (5) einen Lanzengreifer (17) aufweist, in dem eine elektrische Steuerung mit On/Off-Steuerknüppel integriert ist, die dem Maschinenbediener ermöglicht, durch ein Knopfsteuerventil die Wasserdurchflussrate aus der Lanze einzustellen.

14. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung ferner eine unabhängige elektrische Tafel umfasst, die ausgelegt ist, um die Kehrmaschine (3) anzutreiben und zu steuern, wobei die Tafel eine PLC zum Steuern der Betriebs- und Sicherheitslogikschaltungen, I/O-Karten zum Verwalten der Signale und die elektrischen Motorantriebe umfasst.

15. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung ferner eine unabhängige Drucktastentafel umfasst, die in dem Führerhaus der Kehrmaschine angeordnet ist und die folgenden Steuerungen aufweist: On/Off-Wahlschalter; Notdrucktasten; Armausfahr- und Armeinfahr-Wahlschalter; einen Wahlschalter, um zu ermöglichen, dass die Vorrichtung entweder auf der rechten oder auf der linken Seite des Kehrmaschinen-Lastwagens arbeitet; eine Alarmtafel; eine Alarmrückstell-Drucktaste; einen On/Off-Beleuchtungswahlschalter.

16. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung ferner die folgenden Dienste zum Betreiben der Kehrhilfsvorrichtung umfasst, die bordeigen in der Kehrmaschine (3) angeordnet sind: Elektrizität 24 V; Spannung 24 +/- 15 % Vcc; und Nutzleistung 0,85 kW zur Energieversorgung der Armmotoren, des Beleuchtungssystems und des Elektrizitätsschranks.

17. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Sprühlanze (5) ausgelegt ist, um mit Druckwasser versorgt zu werden, das gefiltert worden ist und frei von Suspensionen ist und das einen einstellbaren Druck von 60 bis 100 Bar, einen maximalen Druck von 110 Bar und eine maximale Durchflussrate von 900 dm^3/H aufweist.

18. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrichtung auch zum Bereitstellen einer Reinigungsfunktion gestaltet ist, mit Hilfe eines Gebläses, das einen elektrischen Motor von 24 Vcc aufweist, der mit dem Mantel (13) anstatt mit der Kehrlanze (5) verbunden ist und elektrisch von dem Mantel (13) mit Energie versorgt wird.

19. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrichtung ausgelegt ist, um auf einem Tanklastwagen angewendet zu werden, der große Wassermengen verfügbar hat und zum Reinigen von Straßen und Gehsteigen benutzt wird.

20. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Vorrichtung ausgelegt ist, um auf einem Salzstreu-Lastwagen angewendet zu werden, um bei Schnee- und Eisbedingungen Salz auf Gehsteigen und unter geparkten Fahrzeugen zu streuen.

Revendications

1. Dispositif d'aide au nettoyage (1) devant être appli-

qué aux nettoyeuses municipales, ledit dispositif comprenant un bras articulé (2, 10), qui peut être couplé à une nettoyeuse (3), ledit bras articulé (2, 10) étant un bras articulé servocontrôlé semi-automatique comprenant un premier segment de bras (2) devant être fixé au milieu de ladite nettoyeuse (3), au-dessus d'une portion avant d'une carrosserie basculante (4) de celle-ci, par l'intermédiaire d'une première rotule articulée (11), ledit bras articulé (2, 10) étant auto-mobile dans un plan parallèle au sol, agencé à un niveau supérieur à la hauteur maximum de ladite nettoyeuse (3), ledit bras articulé (2, 10) comprenant un second segment de bras (10) couplé au premier segment de bras (10), par l'intermédiaire d'une seconde rotule articulée (12), **caractérisé en ce que** lesdits deux segments de bras (2, 10) dans un état d'extension maximum, ont une longueur supérieure à six mètres, et **en ce que** le dispositif d'aide au nettoyage comprend en outre un tuyau enroulable (13) portant, au niveau d'une portion de son extrémité, une lance de nettoyage (5) conçue pour fournir de l'eau sous pression et pour être tenue par un opérateur à pied (6), un système de rangement et d'enroulage automatique étant fourni pour enrouler ledit tuyau (13) pour permettre audit opérateur (6) de s'éloigner ladite nettoyeuse (3) de trois mètres supplémentaires, ledit tuyau (13) étant supporté, de manière coulissante, au niveau de la portion d'extrémité du bras dans un élément de type joystick entraînant automatiquement les segments de bras (2, 10), en fournissant ainsi une longueur de réserve pour permettre audit opérateur (6) de suivre facilement ladite nettoyeuse (3) selon n'importe quelle direction.

2. Dispositif selon la revendication 1, **caractérisé en ce que** ledit tuyau (13) se termine par un connecteur électrique et un raccord rapide sur les conduites d'eau, ce qui permet, lorsque ledit dispositif est dans un état de repos sur la nettoyeuse (3), de déconnecter ladite lance (5) et de la stocker dans n'importe quel autre emplacement souhaité, ledit tuyau (13) étant automatiquement enroulé dans ledit second segment de bras (10) et étant ensuite placé sur un crochet sur une paroi latérale de la carrosserie de la nettoyeuse (4).

3. Dispositif selon la revendication 1, **caractérisé en ce que** ledit tuyau (13) est enroulable par ledit système d'enroulage à l'intérieur du second segment de bras (10), sur une chaîne de tenue de câble (19) associée à des patins coulissants 20 qui peuvent coulisser sur leur partie supérieure dans un élément de guidage en polyéthylène (21).

4. Dispositif selon la revendication 1, **caractérisé en ce que** ledit second segment de bras (10), a une section ovale, dans laquelle des conduites de câbles électriques (22) sont agencées.

5. Dispositif selon la revendication 1 **caractérisé en ce que** ledit tuyau (13) fait saillie à partir dudit second segment de bras (10), à travers sa portion d'extrémité comprenant un système de commande permettant de commander la position et le mouvement dudit tuyau (13), ledit système de commande comprenant deux potentiomètres (23, 24), chacun incluant des rouleaux (25) agencés dans des plans respectivement orthogonaux, pour transmettre un signal électrique à une unité centrale de commande commandant le fonctionnement des servomoteurs (26, 27), afin d'entraîner respectivement la première rotule articulée (11) et la seconde rotule articulée (12), et grâce à quoi, alors que ledit opérateur à pieds (6) se déplace dans n'importe quelle direction, il entraîne ledit tuyau (13) dans une direction définie de manière non équivoque, qui est précisément définie par les mouvements rotatifs des deux dits potentiomètres (23, 24).

6. Dispositif selon la revendication 5, **caractérisé en ce que** lesdits potentiomètres (23, 24) sont conçus pour détecter la vitesse de déplacement de l'opérateur, de façon à faire fonctionner lesdits servomoteurs (26, 27) du bras articulé (2, 10) pour suivre le mouvement de l'opérateur.

7. Dispositif selon la revendication 1, **caractérisé en ce que** ledit dispositif comprend, en outre, un élément d'éclairage incluant une lampe halogène, montée sur la portion d'extrémité du second segment de bras (10), et permettant que la nettoyeuse (3) soit utilisée également la nuit, ledit éclairage illuminant de manière diffuse la région de travail depuis le haut.

8. Dispositif selon la revendication 1, **caractérisé en ce que**, dans leur position de repos ou d'attente, lesdits deux segments de bras articulés (2, 20) doivent être refermés comme des compas et placés sur un crochet sur la nettoyeuse (3), grâce à un système de blocage de sécurité automatique, de telle sorte que, dans cet agencement, la taille dudit dispositif est maintenue à l'intérieur du périmètre de la nettoyeuse, ce qui répond aux valeurs de hauteur maximum indiquées par le Code de la route.

9. Dispositif selon la revendication 1, **caractérisé en ce que** ledit dispositif est conçu pour travailler indifféremment des deux côtés de la nettoyeuse.

10. Dispositif selon la revendication 1, **caractérisé en ce que** ledit dispositif comprend en outre un sélecteur qui doit être agencé sur un tableau à boutons-poussoirs dans la cabine de pilotage, en permettant de sélectionner le côté du travail, pour permettre au logiciel commandant le système d'empêcher tout mouvement de l'autre côté de la nettoyeuse.

11. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits segments de bras (2, 10) sont entraînés en rotation automatiquement, et **en ce que** ledit dispositif comprend en outre des éléments limitant le couple qui, avec des éléments à section en caoutchouc d'amortissement agencés sur les côtés des bras, protègent le dispositif contre des chocs accidentels.

12. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit dispositif comprend une structure porteuse qui peut être couplée de manière amovible à une plaque de fixation 16 à son tour couplée de manière amovible, par l'intermédiaire d'une console de couplage, à une portion avant de ladite carrosserie de la nettoyeuse (4).

13. Dispositif selon la revendication 1, **caractérisé en ce que** ladite lance (5) a un système de poignée de lance (17) dans lequel est intégrée une commande électrique de joystick de marche/arrêt permettant à l'opérateur d'ajuster par l'intermédiaire d'un pommeau contrôlant une soupape, le débit d'eau à partir de ladite lance.

14. Dispositif selon la revendication 1, **caractérisé en ce que** ledit dispositif comprend en outre un tableau électrique indépendant conçu pour piloter et commander la nettoyeuse (3), ledit tableau comprenant un PLC pour commander le circuit de logique de sécurité et de fonctionnement ; des cartes E/S pour la gestion des signaux et les manettes de commande du moteur électrique.

15. Dispositif selon la revendication 1, **caractérisé en ce que** ledit dispositif comprend, en outre, un tableau à boutons-poussoirs indépendant, agencé dans la cabine de pilotage de la nettoyeuse et incluant les commandes suivantes : interrupteur de sélection marche/arrêt ; bouton-poussoir d'arrêt d'urgence ; sélecteur d'extension et de retrait du bras ; sélecteur permettant au dispositif de fonctionner soit sur la droite soit sur la gauche du camion de nettoyage ; tableau d'alarme ; bouton-poussoir de réinitialisation de l'alarme ; sélecteur de marche/arrêt de l'éclairage.

16. Dispositif selon la revendication 1, **caractérisé en ce que** ledit dispositif comprend, en outre, comme devant être agencé à bord de ladite nettoyeuse (3), les services suivants permettant de faire fonctionner le dispositif d'aide au nettoyage : électricité 24 V ; tension 24 +/- 15 % en Vcc ; puissance utile 0,85 kW pour une alimentation électrique des moteurs du bras, le système d'éclairage et de l'armoire électrique.

17. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** la lance de pulvérisation (5) est conçue pour être alimentée par de l'eau sous pression qui a été filtrée et qui est exempte de suspensions et qui a une pression réglable entre 60 et 100 bars, une pression maximum de 110 bars et un débit maximum de 900 dm^3/H.

18. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit dispositif est également conçu pour fournir une fonction de nettoyage en utilisant une soufflante d'air, incluant un moteur électrique de 24 Vcc devant être couplé audit tuyau (13), à la place de ladite lance de nettoyage (5), et qui est alimenté en électricité par ledit tuyau (13).

19. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit dispositif est conçu pour être appliqué sur un camion-citerne ayant de grandes quantités d'eau disponibles, et utilisé pour laver les rues et les trottoirs.

20. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit dispositif est conçu pour être appliqué sur un camion épandeur de sel, pour épandre du sel sur les trottoirs et sous les véhicules en stationnement, dans des conditions climatiques de neige et de glace.

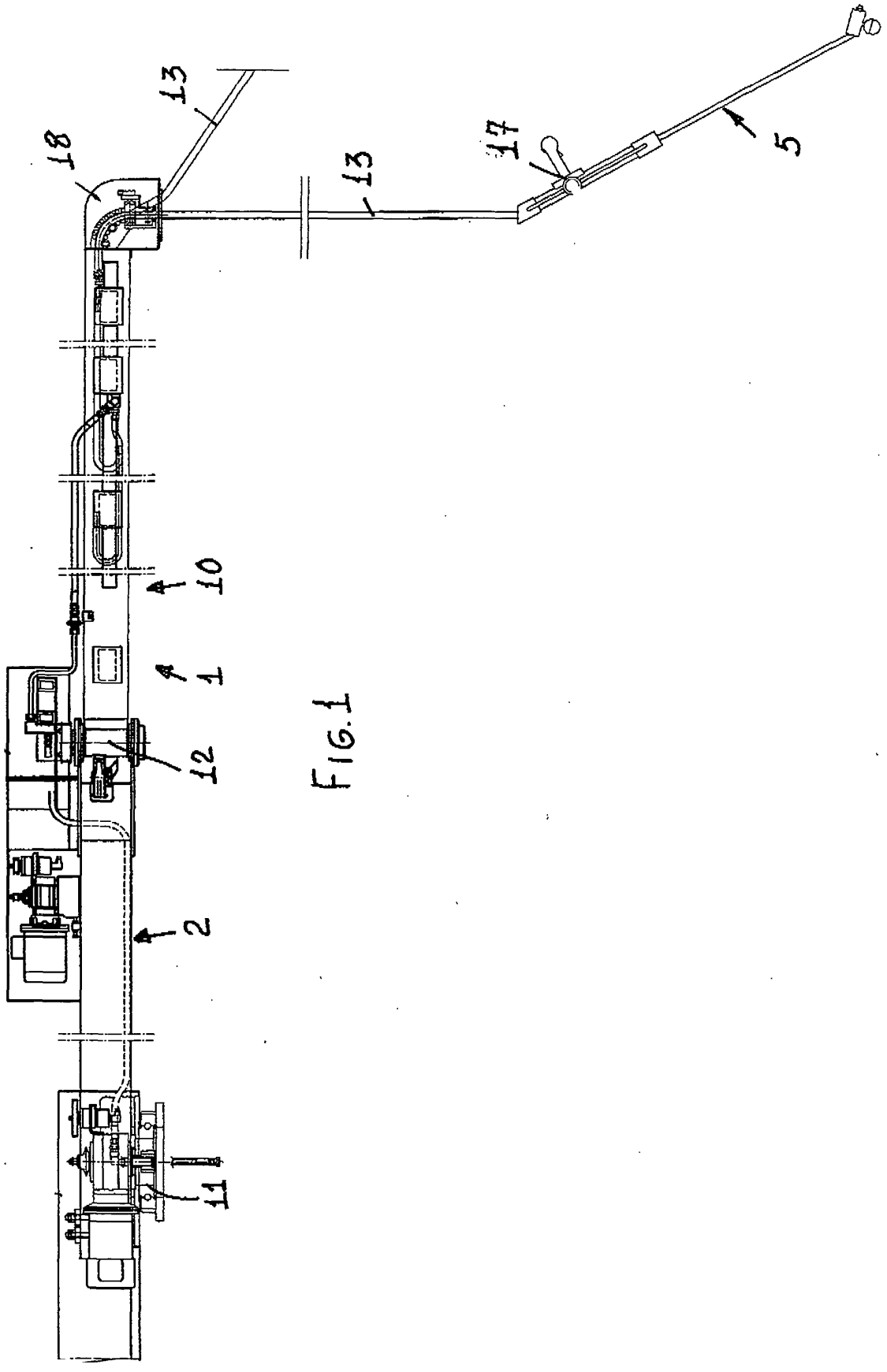

FIG. 1

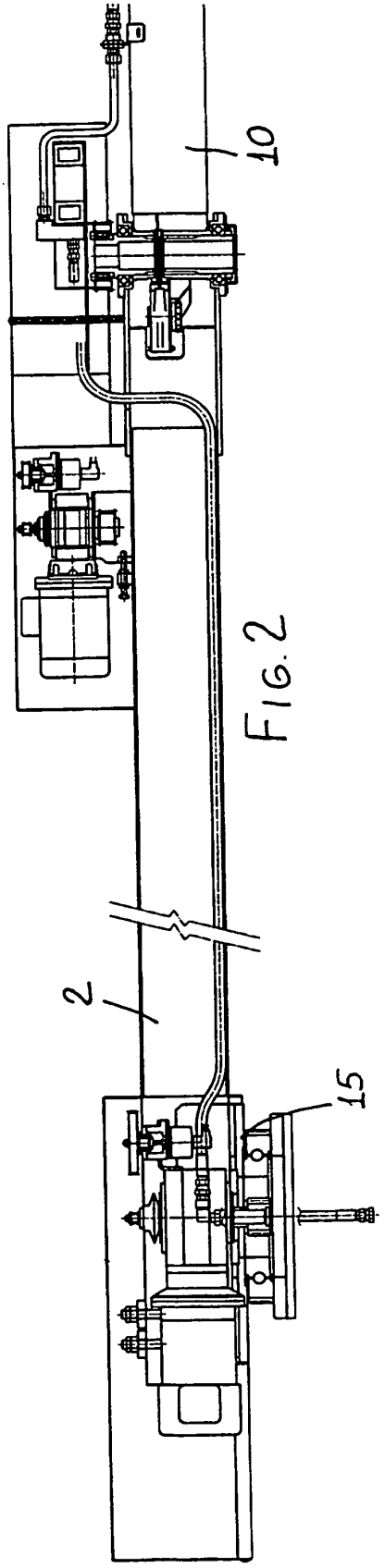

FIG. 2

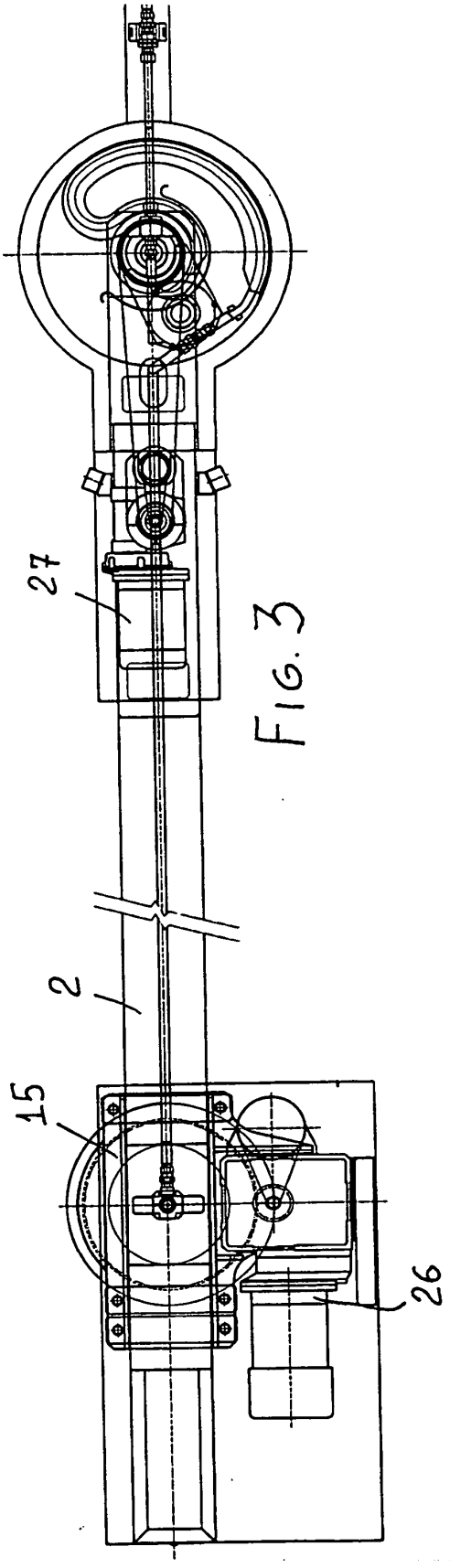

FIG. 3

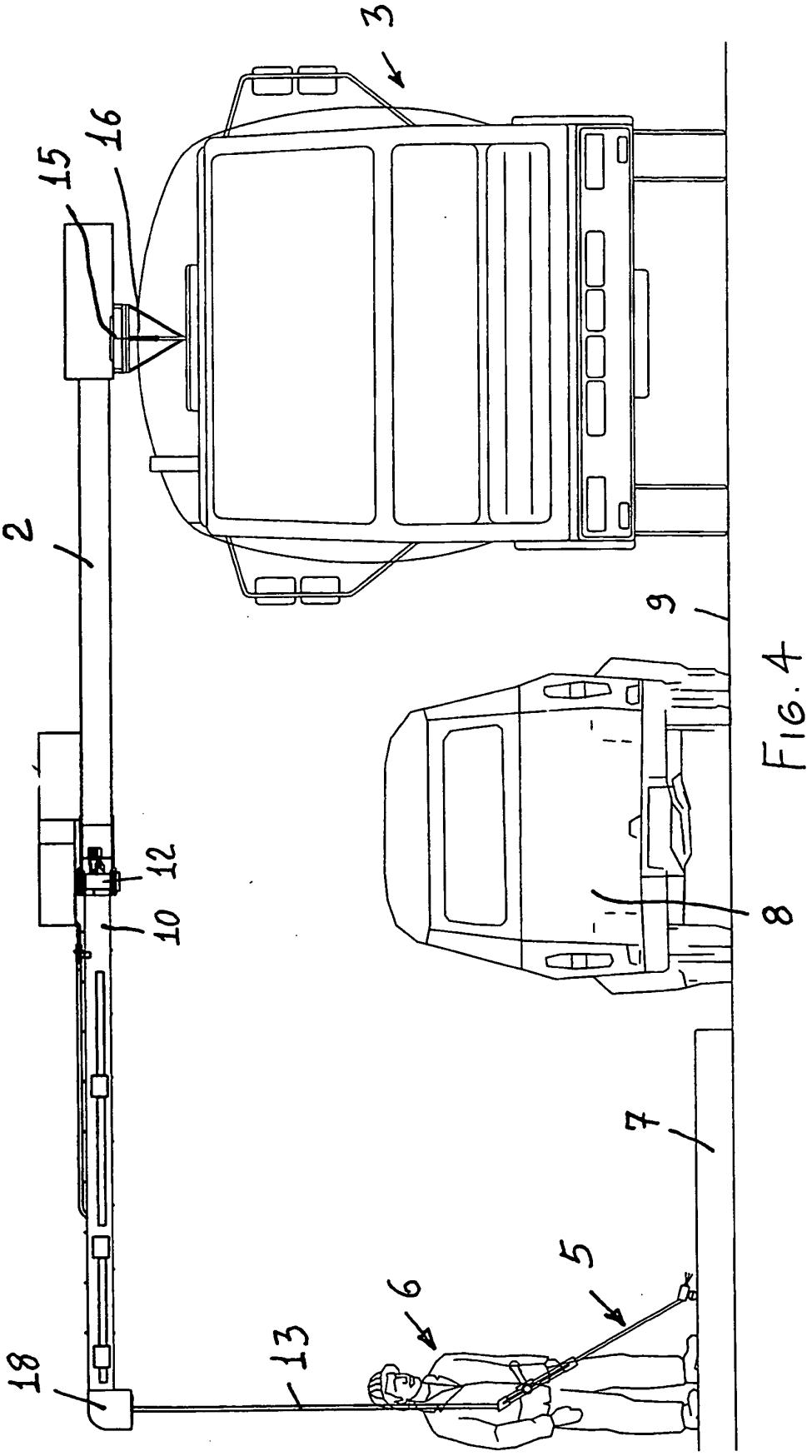

FIG. 4

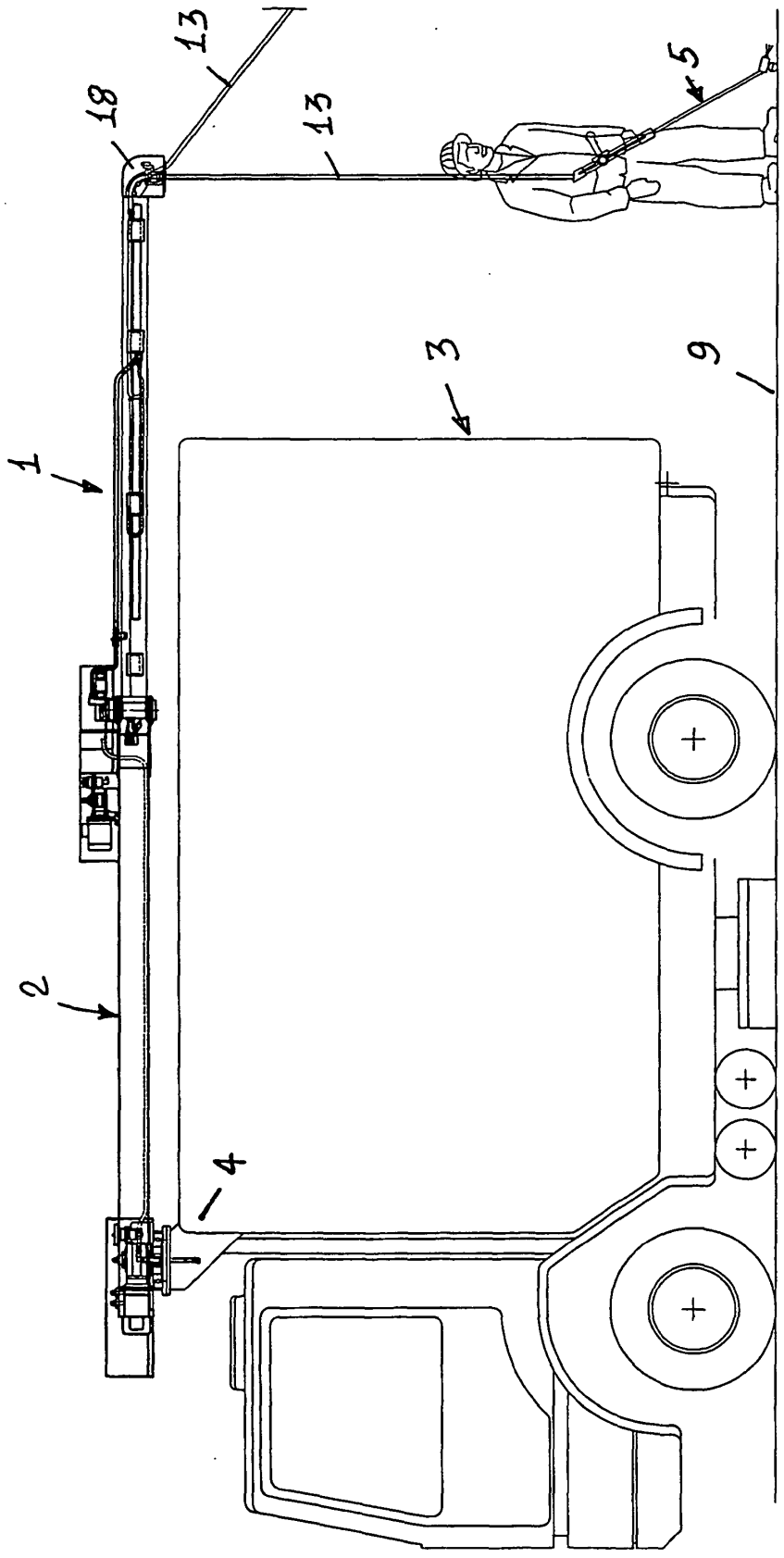

FIG. 5

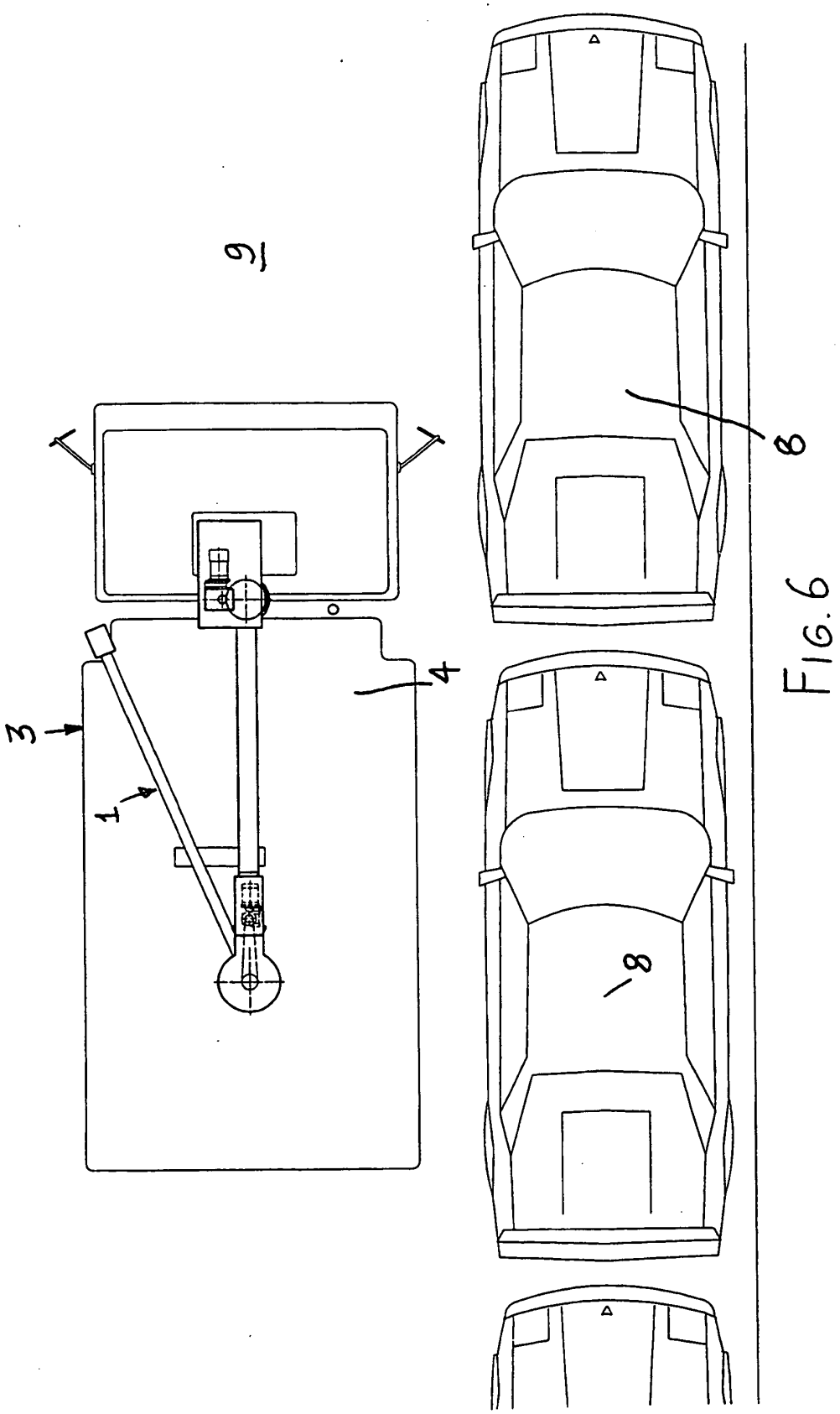

FIG. 6

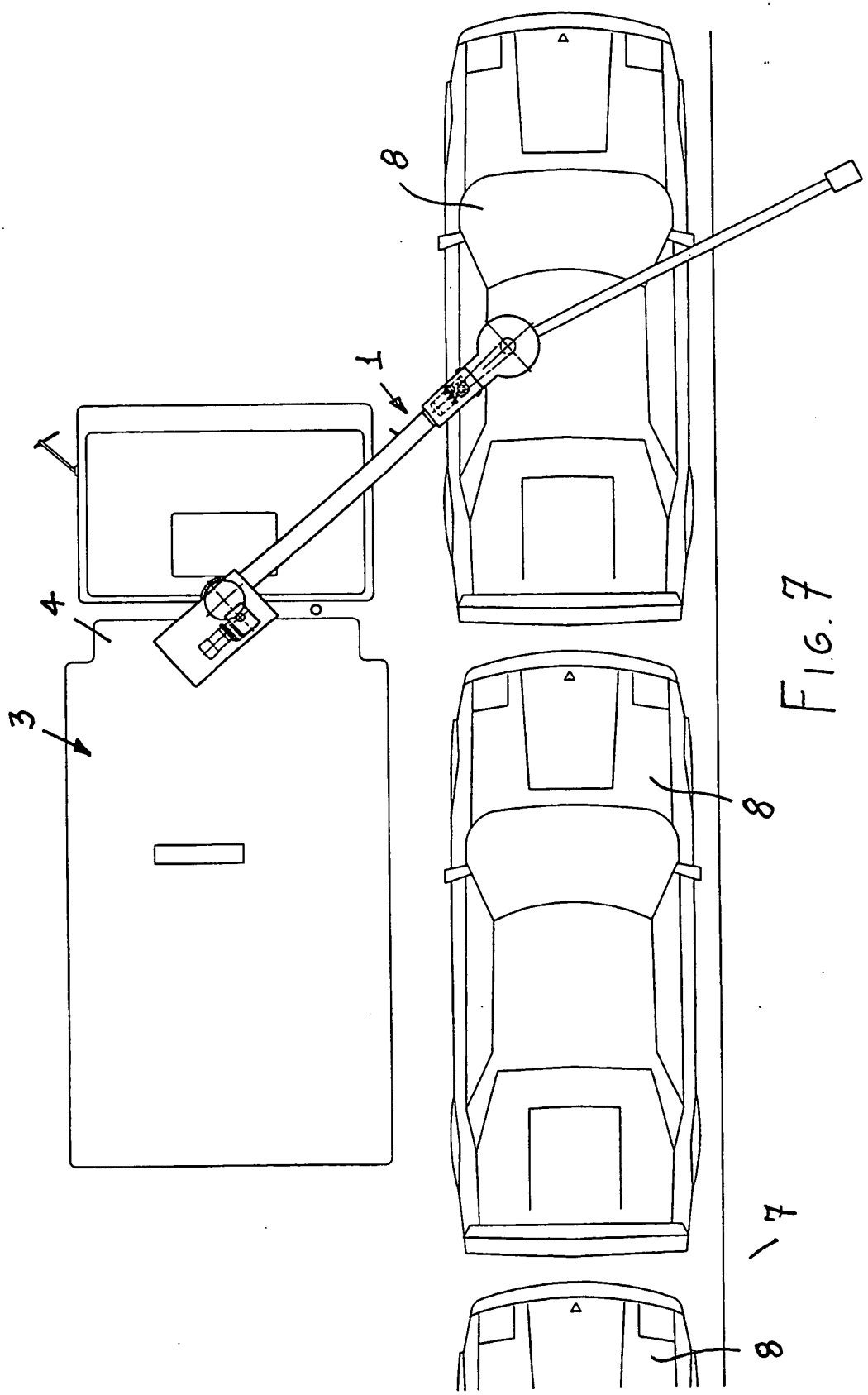

FIG. 7

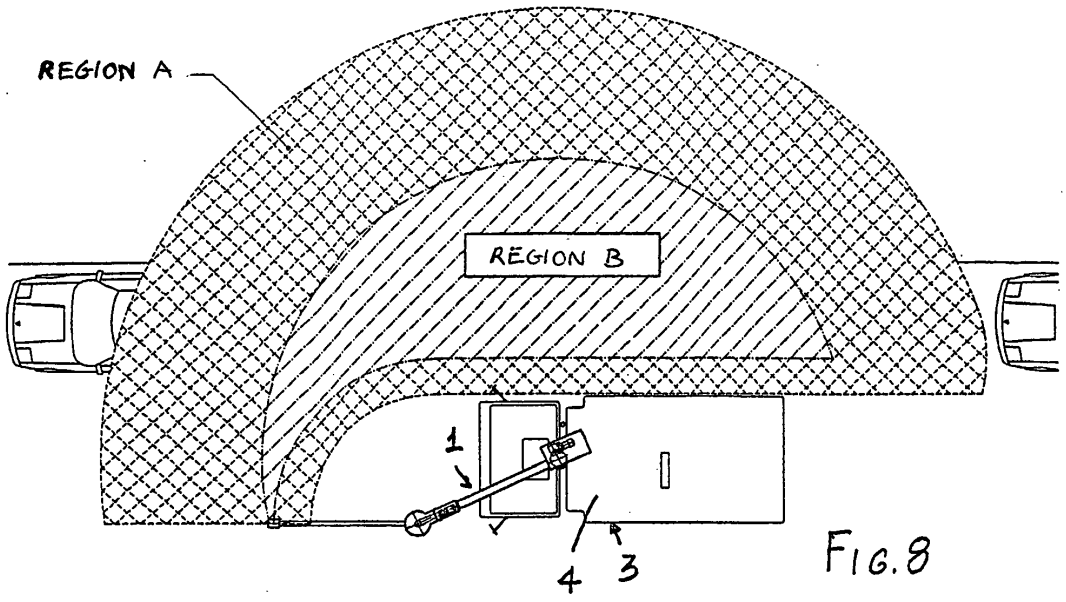

FIG. 8

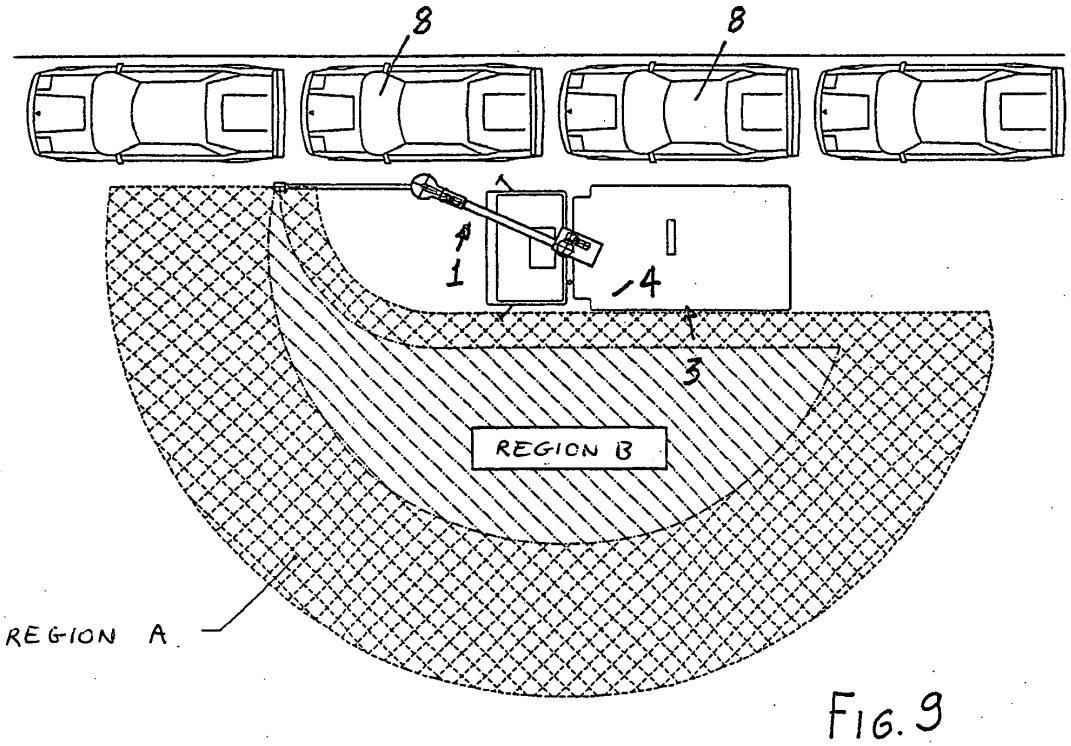

FIG. 9

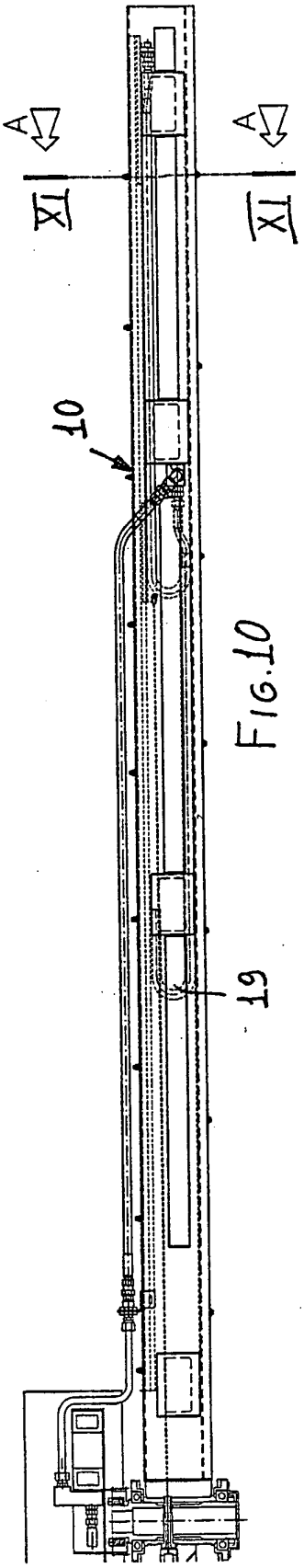

FIG. 10

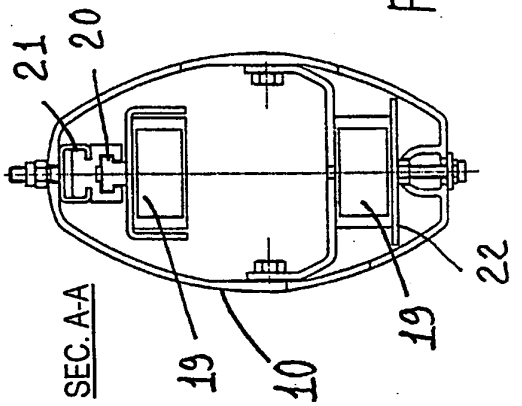

FIG. 11

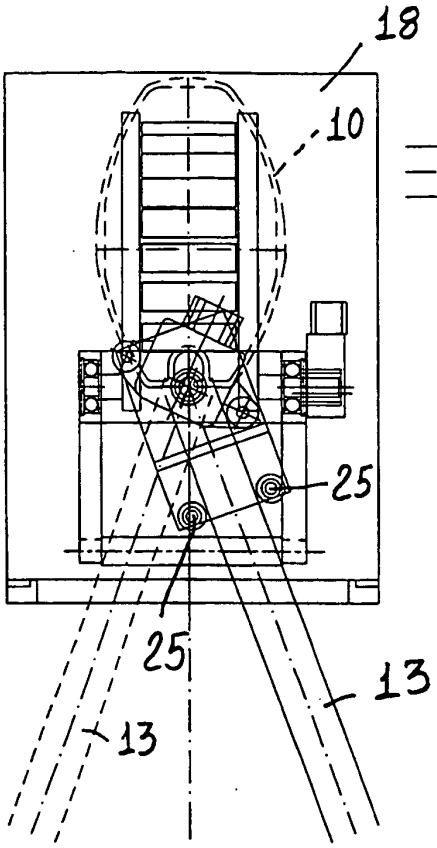

FIG.12

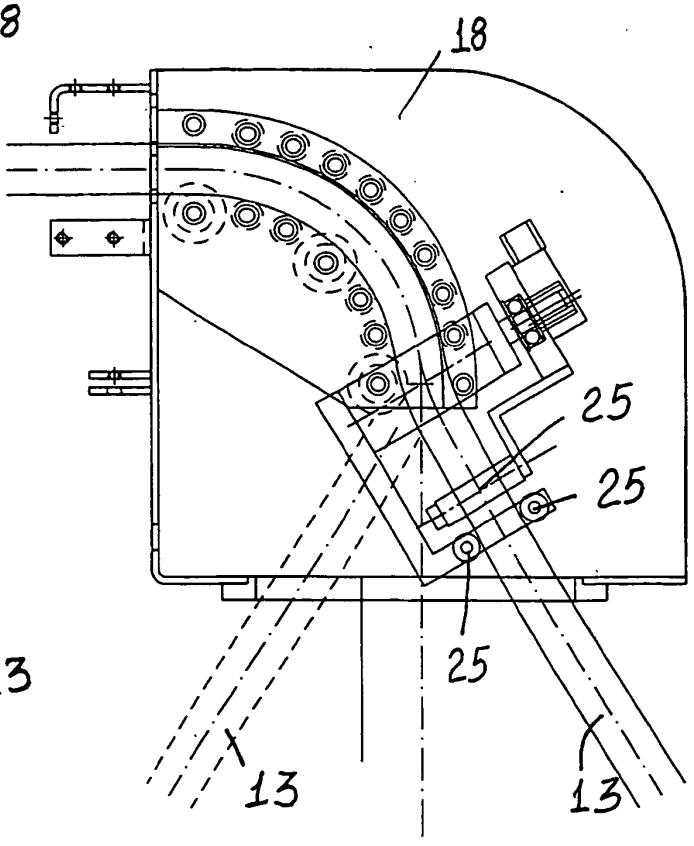

FIG.13

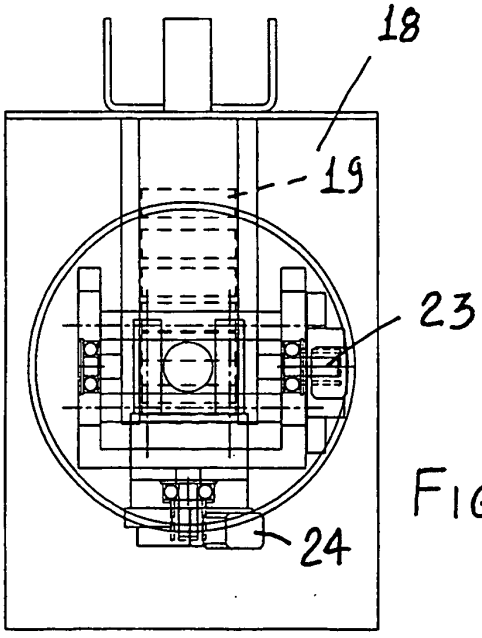

FIG.14

REFERENCES CITED IN THE DESCRIPTION

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