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(54) **Cleaning machine**

Reinigungsmaschine

Machine de nettoyage

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Description

Object of the Invention

[0001] The present invention relates to a cleaning machine intended for urban or industrial use, allowing the conditioning of large ground or pavement surfaces.

Field of Application of the Invention

[0002] The field of application of this invention is the sector for manufacturing pavement cleaning machinery and mainly the sector for manufacturing self-driven sweeping, washing and cleaning machines in general.

Background of the Invention

[0003] Cleaning machines intended for sweeping or washing large pavement surfaces, such as roads in cities and towns, large industrial surfaces, public centers and others are currently known.

[0004] Sweeping machines are a machine of this type and they allow removing trash and solid wastes from the ground; a sweeping machine is mainly formed by a body with travelling wheels associated with, where appropriate, traction means, combustion or electric drive means, power means which are generally hydraulic pressure or electric power means, and a water tank, further comprising suction means in the lower part of the body and articulated and displaceable supports in the front part of said body for anchoring cleaning means, in this case are sweeping brushes. Thus, as the sweeping machine advances it uses the sweeping brushes to displace the trash and objects found on the pavement towards the central area which the body passes through, and said trash is absorbed by the suction means, being stored in an inner enclosure until its extraction. The sweeping machine uses water from the tank to spray it on the ground and to prevent kicking up dust. These sweeping machines allow sweeping large surfaces with great speed and needing few operators. Despite being expensive, many towns and entities dedicated to cleaning large surfaces and enclosures have at least one of them.

[0005] Another greatly used cleaning machine is the washing machine which also comprises a self-driven body and washing brushes which allow washing the pavement once it is swept, thus being cleaner. These washing machines allow a deeper cleaning, and their effect is significantly noticed when the pavement is especially smooth, such as ceramic, polished or shiny floors, whereby it is a complement of the sweeping machine to be considered in many situations.

[0006] The main problem arising with the use of the two machines is the high acquisition and maintenance cost which is doubled as they are two independent machines since their mechanisms are not compatible with one another in one and the same machine which sweeps and washes.

[0007] Document US 44 29 433 discloses a machine which is provided which employs a drum broom at a forward portion of the machine for sweeping the floor, a hopper in front of the drum broom to receive debris therefrom, a plurality of disc-type scrubbing brushes at an intermediate portion of the machine for scrubbing the floor, and a squeegee assembly there behind. A solution or supply tank and a recovery tank are located in side-by-side relationship at a forward portion of the machine, the solution tank supplying clean solution for the disc brushes and the recovery tank receiving dirty solution gathered by the squeegee assembly.

[0008] Document US 3113332 discloses a machine with the features of the preamble of claim 1, and particularly powered rotary brushes and more particularly a rotary brush wherein the drive unit for powering the brush is contained inside the brush dimensions so that no external rotating drive members are present. Presently, in general practice, cylindrical brushes and similar cylindrically shaped implements used for power driven sweeping and maintenance equipment are mounted on an axial shaft or stub shafts driven through suitable chain and sprocket or similar arrangements from a source of power remote from or external to the brush itself. This device disclosed in this document includes a completely enclosed rotating implement wherein the drive for the implement is a hydraulic motor and system, the motor being positioned partially or entirely within a tubular core member of the implement. There are no external drive parts used in connection with this device.

Description of the Invention

[0009] The cleaning machine object of this invention has technical particularities intended for reducing the necessary acquisition and maintenance costs, providing in one and the same machine the two functionalities of sweeping and washing machine in an alternative manner.

[0010] The machine is of the type of those comprising a body with travelling wheels associated with traction means, power means which are either hydraulic pressure or electric power means and a water tank being installed in the body, further having suction means in the lower part of the body and articulated and displaceable supports in the front part of said body, cleaning means being fixed in these supports.

[0011] According to the invention, the machine comprises a washing head and sweeping heads that can be detachably and interchangeably coupled to the supports and can be connected to quick connect terminals for connecting with the power means and the water tank, the cleaning machine providing a pavement washing or sweeping capacity according to the coupled head.

[0012] Thus, one and the same machine allows use thereof in two different functions, such as sweeping and washing, which up until now were not compatible, reducing the acquisition and maintenance costs as it makes

use in the same machine of all those elements having a common operation. These features have an effect on the flexible use of the machine and the possibility of interchanging heads for different uses and even for its repair and maintenance in an independent manner without the machine having to be completely shut down.

[0013] Sweeping heads conventionally comprise motors (hydraulic or electric motors, for example) associated with rotating sweeping brushes placed at the end of bars or poles allowing the arrangement thereof in front of the cleaning machine. These arms optionally comprise water spraying means which are connected with the water tank, this water projected on the pavement preventing dust from being kicked up as the rotating brushes sweep.

[0014] The washing head has specific particularities making its interconnection with the body of the machine and its interchange with the sweeping heads possible, comprising:

- a chassis with anchors for anchoring to the supports of the body, and having an oscillating attachment with a lower frame closed in the upper portion, which carries the washing means,
- washing means configured by at least one washing brush oriented downwards and associated with either a hydraulic or electric motor anchored in the frame, and washing water projectors, the motor and the projectors being provided with hoses with quick connect terminals for connection thereof with terminals of the power means and the water tank,
- a perimetric flap of flexible material prolonged in the lower portion to avoid splashing, surrounding the washing brushes and
- support and protection wheels in the perimeter of the frame.

[0015] This head is completely floating on the ground or pavement in front of the cleaning machine, adapting to the inclination thereof by means of the oscillating attachment. The head can be raised from the ground by means of the operating mechanisms of the articulated and displaceable supports, such that the brushes are not worn out by friction while the cleaning machine travels without washing.

[0016] In a preferred embodiment the chassis is V-shaped with the ends secured to the supports at the sides of the front part of the body by means of anchors, and the oscillating attachment arranged in the front vertex. In this case, the oscillating attachment is a universal joint, and the frame is approximately triangular-shaped with washing means formed by three washing brushes displaced towards the vertexes. This configuration allows effective washing covering the entire width of the cleaning machine at a reasonably fast speed as the cleaning machine advances.

[0017] It has been provided that the hydraulic or electric drive motor of each washing brush has a grooved drive shaft on which there is located an also internally

grooved, longitudinally displaceable bushing, this bushing being associated with the brush by means of a universal joint, and between the shaft and the bushing there being a displacement spring for displacing the brush downwards for pressing it correctly on the ground. The pressure of the brush against the ground is thereby always within an acceptable range. In addition, the brush is prevented from being pressed with excessive force producing a premature worn should it come across a protuberance or projection from the ground as it advances. Otherwise, if there is a pothole or recess in the ground under the brush, the brush is displaced downwards, being applied therein.

[0018] The washing head comprises a detergent or cleaning product tank arranged on the frame and associated with metering means. These metering means directly pour the detergent into the water flow towards the projectors, or directly under the frame.

[0019] The perimetric flap of the frame has a rear recess facing the suction means for the outlet and elimination of washing water and foam. The water and foam are thereby completely removed from the ground, being cleaned and washed as the cleaning machine passes when it is provided with said washing head.

[0020] To facilitate this elimination of water and foam produced, the perimetric flap has in its rear part vertical displacement means for adapting to the inclination of the pavement. These means, such as mounting holes and thrust springs, allow adapting the position of the flap in its rear part of the frame below the machine.

Description of the Drawings

[0021] To complement the description that is being made and for the purpose of aiding to better understand the features of the invention, a set of drawings is attached to the present specification in which the following has been depicted with an illustrative and non-limiting character:

- Figure 1 shows a profile view of the machine with the washing head installed and partially sectioned.
- Figure 2 shows an elevational view of the cleaning machine with the washing head installed.
- Figure 3 shows a perspective view of the body of the cleaning machine highlighting the common inner mechanisms.
- Figure 4 shows a plan view of the cleaning machine with the washing head installed.
- Figure 5 shows a simplified plan view of the cleaning machine with the sweeping heads installed.

Preferred Embodiment of the Invention

[0022] As can be seen in the aforementioned figures, the cleaning machine comprises a body (1) with travelling wheels (11) associated with traction means (not depicted), said body (1) having at both sides of its front part

articulated and displaceable supports (12) in which a washing head (2) or sweeping heads (3) can be interchangeably coupled.

[0023] The body (1) has assembled therein power means (5), in this case hydraulic pressure means, and a water tank (4) with pipes towards quick connect terminals (41, 51) arranged in the front part of said body (1) for the connection thereof to the aforementioned heads (2 and 3). Furthermore, the body (1) also comprises suction means (6) which suck in the approximately centered lower part.

[0024] The washing head (2) comprises a V-shaped chassis (21) with anchors (22) for anchoring to the supports (12) of the body (1) at the ends and having an oscillating attachment (23) attached by a universal joint to a lower frame (24) carrying washing means. Said frame (24) is closed in the upper portion and is approximately triangular-shaped, there being an anti-splash lower flap (25) surrounding it, prolonging in the rear part towards the mouth of the suction means (6). In this rear part of the flap (25) there is an outlet recess (26) for the outlet of water and foam produced in the washing, and at both sides there are vertical displacement means (27) for said flap in its rear part for adapting to changes in inclination of the pavement. At the ends of the frame (24) there are support wheels (28) for being supported on the ground and for protection against the impacts of curbs and unevenness. In the upper part of the frame (24) there is a detergent tank (29) provided with a metering device (not depicted) which is connected with a pipe (20a) for supplying water to projectors (20) in the lower part of said frame (24). These pipes have at their opposite end quick connect terminals connecting with the terminals (41) of the body (1) for supplying water from the water tank (4).

[0025] The washing means of the washing head (2) comprise three washing brushes (7) displaced towards the side and the front corners of the frame (24). Each washing brush (7) is associated with a motor (71), in this case a hydraulic motor, fixed in the frame (24), said motors (71) being connected by means of a hose (72) and quick connect terminals connecting with the terminals (51) in the body (1). Each motor (71) has a grooved drive shaft (73) on which there is located an also internally grooved, longitudinally displaceable bushing (74), this bushing (74) being associated with the washing brush (7) by means of a universal joint (75).

[0026] Between the grooved shaft (73) and the bushing (74) there is a displacement spring (76) for displacing the washing brush (7) downwards for pressing it on the ground.

[0027] The sweeping heads (3) in turn comprise arms (31) with anchors (32) for anchoring to the supports (12) of the body (1), there being at opposite ends of said arms (31) sweeping brushes (33) connected to drive motors (34) which are also hydraulic motors. These hydraulic motors (34) are connected by means of hoses (35) with quick connect terminals with the quick connect terminals (51) of the power means (5) in the body (1). The sweeping

heads (3) comprise water sprayers (36) on the arms (31) which are connected by means of hoses (37) and quick connect terminals with the quick connect terminals (41) of the water tank (4) in the body (1).

[0028] Having sufficiently described the nature of the present invention as well as a preferred embodiment thereof, it is hereby stated that the materials, shape, size and arrangement of the elements described could be modified provided that it does not involve an alteration of the essential features of the invention which are claimed below.

Claims

1. Kit comprising a cleaning machine of the type comprising a body (1) with travelling wheels (11) associated with traction means, (1) power means (5) and further having suction means (6) in the lower part of the body (1) and articulated and displaceable supports (12) in the front part of said body (1), the kit further comprising cleaning means suitable for being fixed in these supports (12), **characterized in that** the machine comprises a water tank (4) being installed in the body, the cleaning means comprise a washing head (2) comprising a frame, sweeping brushes and a detergent or cleaning product tank (29) arranged on the frame (24) and associated with metering means and said cleaning means comprising also several sweeping heads (3), each sweeping head comprises a rotating sweeping brush and a water sprayer (36) to spray water on the ground and to prevent kicking up dust, where both the washin head (2) and the sweeping head (3) are suitable for being detachably and interchangeably coupled on the supports (12) and connected by quick connect terminals (41, 51) to the power means (5) and the water tank (4).
2. Kit according to claim 1, **characterized in that** the washing head (2) comprises:
 - a chassis (21) with anchors (22) for anchoring to the supports (12) of the body (1), and having an oscillating attachment (23) with a lower frame (24) closed in the upper portion, which carries the washing means,
 - washing means configured by at least one washing brush (7) oriented downwards and associated with a motor (71) anchored in the frame (1), and washing water projectors (20), the motor (71) and the projectors (20) being provided with hoses (72, 20a) with quick connect terminals for connection thereof with the terminals (41, 51) of the power means (5) and the water tank (4),
 - a perimetric flap (25), prolonged in the lower portion to prevent splashing, surrounding the washing brushes (7) and

- support and protection wheels (28) in the perimeter and a of the frame (24).

3. Kit according to claim 2, **characterized in that** the chassis (21) is V-shaped with the ends secured to the side supports (12) of the front part of the body (1) by anchors (22), and the oscillating attachment (23) arranged in the front vertex, configured by a universal joint, and the frame (24) is approximately triangular-shaped with three washing brushes (7) displaced towards the vertexes.
4. Kit according to any of claims 2 to 3, **characterized in that** the drive motor (71) of each washing brush (7) has a grooved drive shaft (73) on which there is located an also internally grooved, longitudinally displaceable bushing (74), this bushing (74) being associated with the washing brush (7) by means of a universal joint (75), and between the grooved shaft (73) and the bushing (74) there being a displacement spring (76) for displacing the washing brush (7) downwards for pressing it correctly on the ground.
5. Kit according to any of claims 2 to 4, **characterized in that** the perimetric flap (25) of the frame (24) has a rear recess (26) facing the suction means (6) for the outlet and elimination of washing water and foam.
6. Kit according to any of claims 2 to 5, **characterized in that** the perimetric flap (25) has in its rear part vertical displacement means (27) for adapting to the inclination of the pavement.

Patentansprüche

1. Bausatz, umfassend eine Reinigungsmaschine vom Typ, die einen Körper (1) mit Laufrädern (11), die mit Zugmitteln verbunden sind, (1) eine Leistungseinrichtung (5) umfasst, und die ferner eine Saugeinrichtung (6) im unteren Teil des Körpers (1) und gelenkige und verschiebbare Stützen (12) in dem vorderen Teil des Körpers (1) hat, wobei der Bausatz ferner eine Reinigungseinrichtung umfasst, die dafür geeignet ist, an diesen Stützen (12) befestigt zu werden, **dadurch gekennzeichnet, dass** die Maschine einen Wassertank (4), der in dem Körper installiert ist, umfasst, die Reinigungseinrichtung einen Waschkopf (2) umfasst, bestehend aus einem Rahmen, Kkehrbürsten und einem Wasch- oder Reinigungsmitteltank (29), der an dem Rahmen (24) angebracht ist und mit einer Dosiereinrichtung verbunden ist, und wobei die Reinigungseinrichtung auch mehrere Kehrköpfe (3) umfasst, wobei jeder Kehrkopf eine drehbare Kkehrbürste und einen Wassersprüher (36) umfasst, um Wasser auf den Boden zu sprühen, um zu verhindern, dass Staub aufgewirbelt wird, wo sowohl der Waschkopf (2) als auch der

Kehrkopf (3) dafür geeignet sind, lösbar und austauschbar an den Stützen (12) gekoppelt zu werden und durch Schnellanschlussklemmen (41, 51) an die Leistungseinrichtung (5) und den Wassertank (4) angeschlossen zu werden.

2. Bausatz nach Anspruch 1, **dadurch gekennzeichnet, dass** der Waschkopf (2) umfasst:

- ein Gestell (21) mit Ankern (22) zur Verankerung an den Stützen (12) des Körpers (1) und mit einer schwingenden Halterung (23) mit einem unteren Rahmen (24), der in dem oberen Abschnitt geschlossen ist, die die Wascheinrichtung trägt,
- Wascheinrichtung, durch mindestens eine Waschbürste (7) ausgebildet, nach unten ausgerichtet und verbunden mit einem Motor (71), der in dem Rahmen (1) verankert ist, und Waschwasserstrahler (20), wobei der Motor (71) und die Strahler (20) mit Schläuchen (72, 20a) mit Schnellanschlussklemmen zur Verbindung derselben mit den Anschlüssen (41, 51) der Leistungseinrichtung (5) und des Wassertanks (4) versehen sind,
- eine perimetrische Klappe (25), im unteren Abschnitt verlängert, um Spritzer zu verhindern, die Waschbürsten (7) umgebend und
- Stütz- und Schutzräder (28) in dem Umfang des Rahmens (24).

3. Bausatz nach Anspruch 2, **dadurch gekennzeichnet, dass** das Gestell (21) V-förmig ist, mit den Enden an den Seitenstützen (12) des vorderen Teils des Körpers (1) durch Anker (22) gesichert, und die schwingende Halterung (23) in dem vorderen Scheitelpunkt angeordnet, durch eine Universalkupplung ausgebildet, und der Rahmen (24) ist ungefähr dreiecksförmig mit drei Waschbürsten (7) gegenüber den Scheitelpunkten versetzt.

4. Bausatz nach einem der Ansprüche 2 bis 3, **dadurch gekennzeichnet, dass** der Antriebsmotor (71) jeder Waschbürste (7) eine genutete Antriebswelle (73) hat, auf der auch eine im Inneren genutete, längsverschiebbare Buchse (74) angeordnet ist, wobei diese Buchse (74) mit der Waschbürste (7) mittels einer Universalkupplung (75) verbunden ist, und wobei sich zwischen der Nutwelle (73) und der Buchse (74) eine Verschiebefeder (76) zum Verschieben der Waschbürste (7) nach unten befindet, um sie richtig auf den Boden zu drücken.

5. Bausatz nach einem der Ansprüche 2 bis 4, **dadurch gekennzeichnet, dass** die perimetrische Klappe (25) des Rahmens (24) eine rückseitige Ausnehmung (26), der Saugeinrichtung (6) zugewandt, für den Austritt und die Beseitigung von Waschwasser

und Schaum hat.

6. Bausatz nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet, dass** die perimetrische Klappe (25) in ihrem rückseitigen Teil eine Vertikalverschiebungseinrichtung (27) zur Anpassung an die Neigung der Fahrbahn hat.

Revendications

1. Kit comprenant une machine de nettoyage du type qui comprend un corps (1) avec des roues de déplacement (11) associées à des moyens de traction, (1) des moyens d'alimentation électrique (5) et ayant en outre des moyens d'aspiration (6) dans la partie inférieure du corps (1) et des supports articulés et déplaçables (12) dans la partie avant dudit corps (1), le kit comprenant en outre des moyens de nettoyage aptes à être fixés sur ces supports (12), **caractérisé en ce que** la machine comprend un réservoir d'eau (4) étant installé dans le corps, les moyens de nettoyage comprennent une tête de nettoyage (2) comprenant un cadre, des brosses de balayage et un détergent ou réservoir de produit de nettoyage (29) disposé sur le cadre (24) et associé aux moyens de mesure et lesdits moyens de nettoyage comprenant aussi plusieurs têtes de balayage (3), chaque tête de balayage comprend une brosse de balayage rotative et un vaporisateur d'eau (36) pour vaporiser de l'eau sur le sol et pour empêcher de soulever de la poussière, dans lequel la tête de nettoyage (2) ainsi que la tête de balayage (3) sont aptes à être de façon amovible et interchangeable accouplées sur les supports (12) et connectées par des terminaux à connexion rapide (41, 51) aux moyens d'alimentation électrique (5) et au réservoir d'eau (4).
2. Kit selon la revendication 1, **caractérisé en ce que** la tête de nettoyage (2) comprend :

- un châssis (21) avec des ancrages (22) pour s'ancrer aux supports (12) du corps (1), et ayant une attache oscillante (23) avec un cadre inférieur (24) fermé dans la portion supérieure, qui comporte les moyens de nettoyage,
- des moyens de nettoyage configurés par au moins une brosse de nettoyage (7) orientée vers le bas et associée à un moteur (71) ancré dans le cadre (1), et des injecteurs d'eau de nettoyage (20), le moteur (71) et les injecteurs (20) étant pourvus de tuyaux (72, 20a) avec des terminaux à connexion rapide pour la connexion de ces derniers avec les terminaux (41, 51) des moyens d'alimentation électrique (5) et le réservoir d'eau (4),
- un rebord périmétrique (25), prolongé dans la portion inférieure pour empêcher les éclabous-

sures, entourant les brosses de nettoyage (7) et - des roues de support et de protection (28) dans le périmètre du cadre (24).

3. Kit selon la revendication 2, **caractérisé en ce que** le châssis (21) a une forme en V avec les extrémités fixées aux supports latéraux (12) de la partie avant du corps (1) par des ancrages (22), et l'attache oscillante (23) disposée au sommet avant, formée par un joint de Cardan, et le cadre (24) a approximativement une forme triangulaire avec trois brosses de nettoyages (7) déplacées vers les sommets.
4. Kit selon l'une quelconque des revendications 2 à 3, **caractérisé en ce que** le moteur d'entraînement (71) de chaque brosse de nettoyage (7) a un arbre d'entraînement cannelé (73) sur lequel est logée une douille (74) longitudinalement déplaçable, aussi intérieurement cannelée, cette douille (74) étant associée à la brosse de nettoyage (7) au moyen d'un joint de Cardan (75), et un ressort de déplacement se trouvant entre l'arbre cannelé (73) et la douille (74) pour déplacer la brosse de nettoyage (7) vers le bas pour la presser correctement sur le sol.
5. Kit selon l'une quelconque des revendications 2 à 4, **caractérisé en ce que** le rebord périmétrique (25) du cadre (24) a un enfoncement arrière (26) en regard des moyens d'aspiration (6) pour l'évacuation et l'élimination de l'eau de nettoyage et du savon.
6. Kit selon l'une quelconque des revendications 2 à 5, **caractérisé en ce que** le rebord périmétrique (25) a dans sa partie arrière des moyens de déplacement verticaux (27) pour s'adapter à l'inclination de la chaussée.

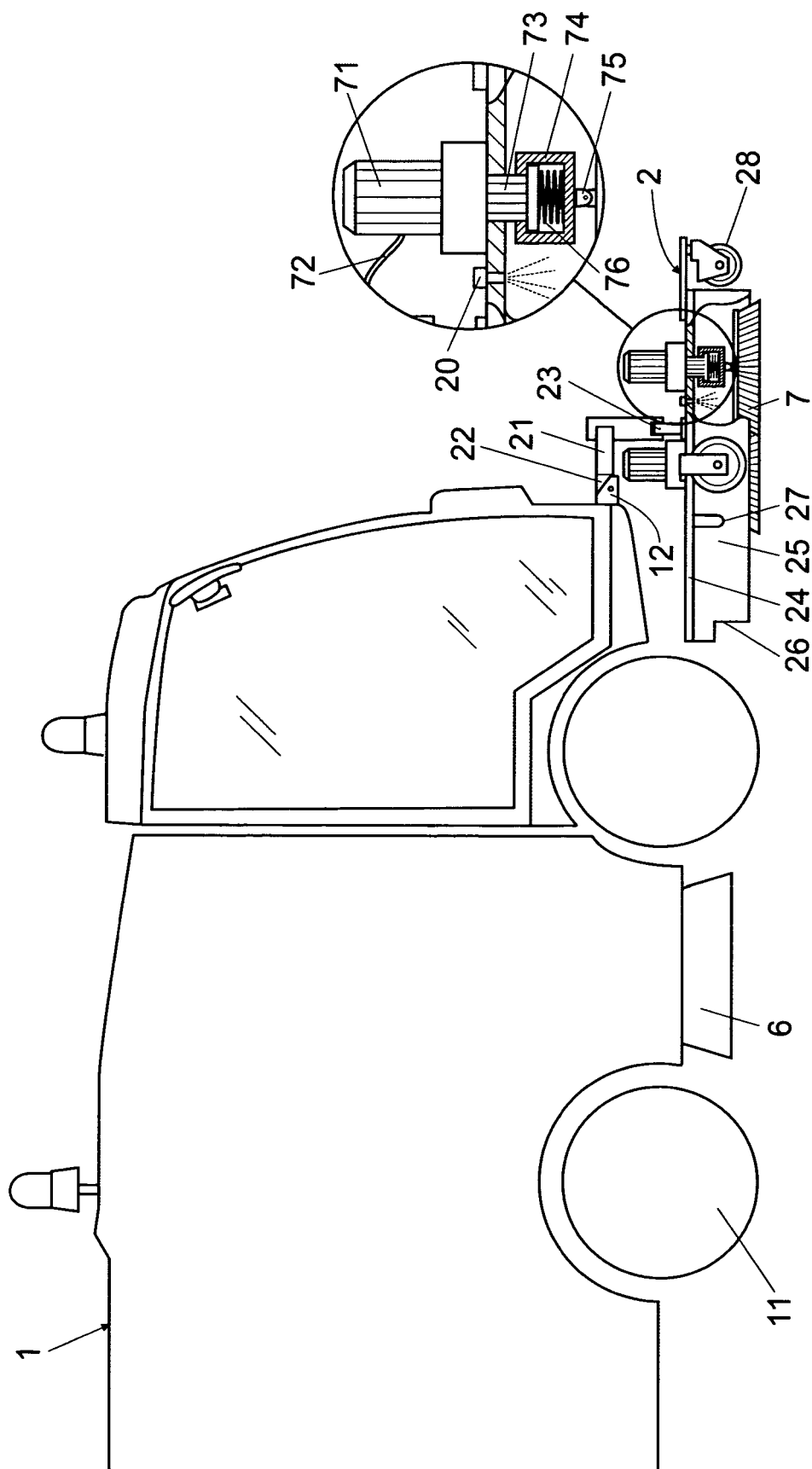


Fig. 1

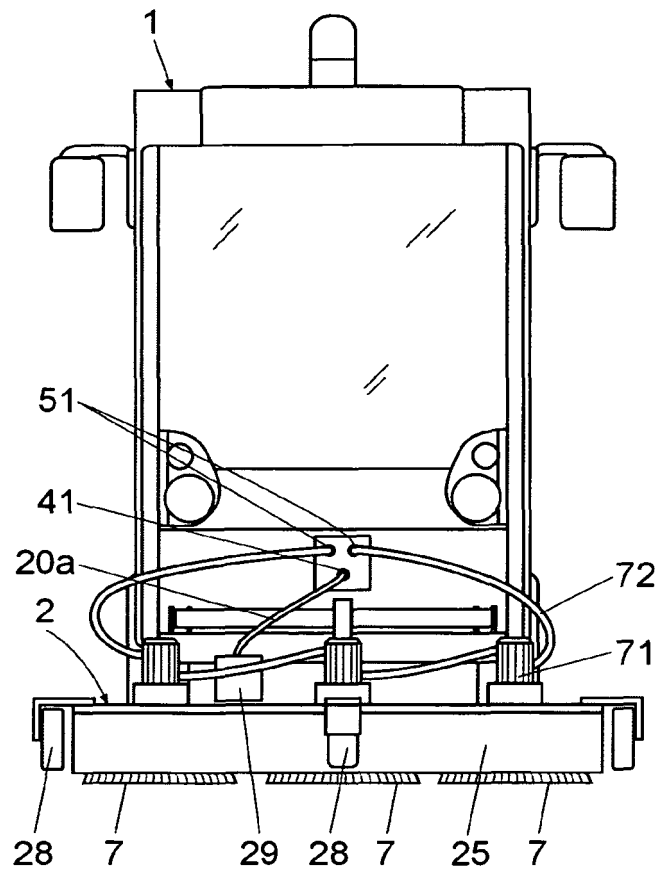


Fig. 2

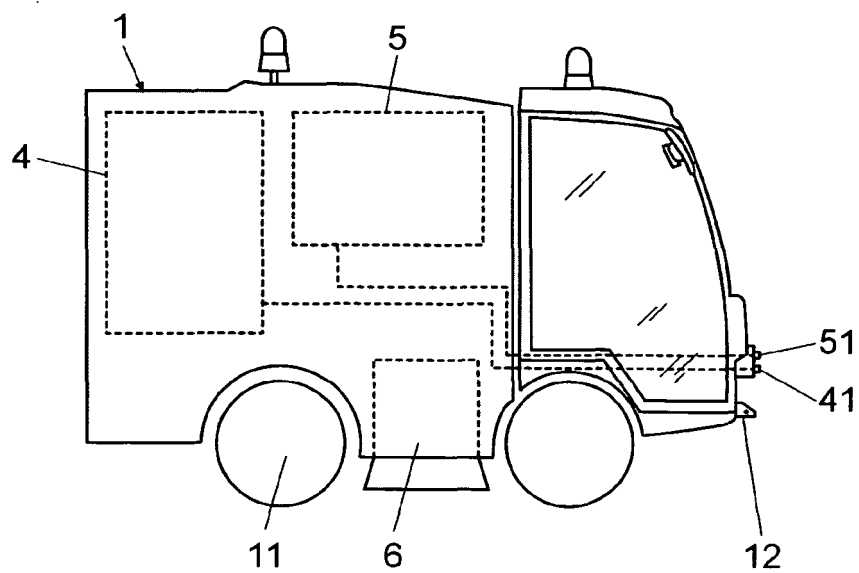


Fig. 3

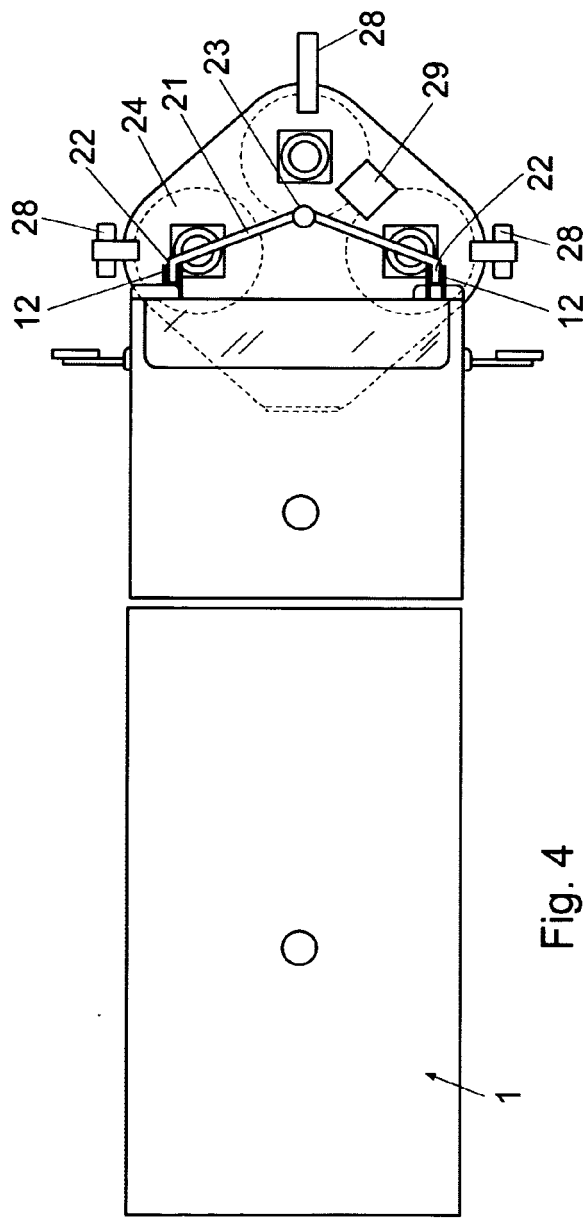


Fig. 4

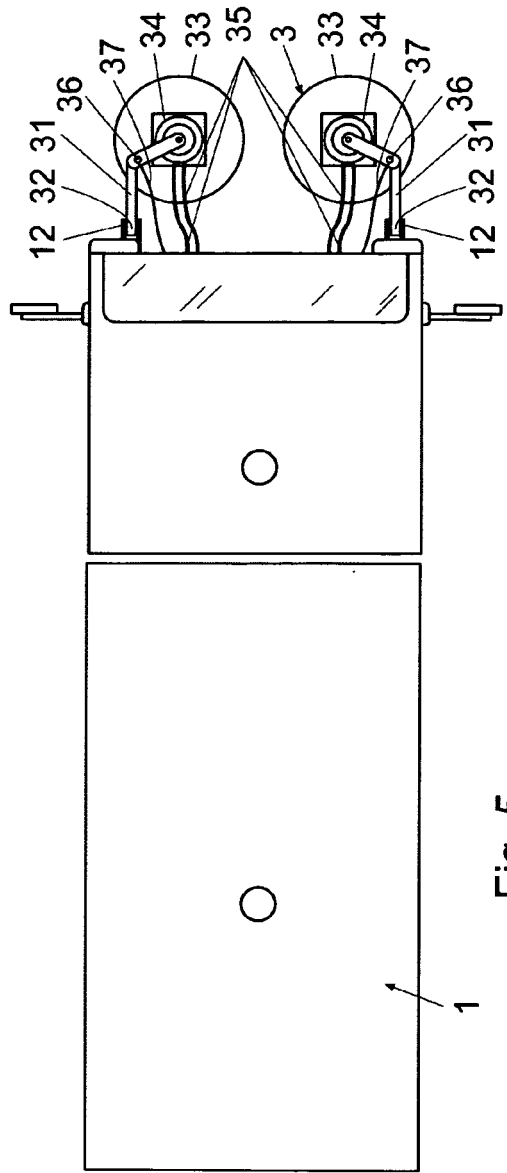


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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