(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 011 426 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.01.2009 Bulletin 2009/02

(51) Int Cl.:
A47L 11/28 *(2006.01)* ***A47L 11/40*** *(2006.01)*

(21) Application number: **07425407.9**

(22) Date of filing: **04.07.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

(71) Applicant: **Comac S.p.A.**
37057 San Giovanni Lupatoto (Verona) (IT)

(72) Inventor: **Crivellaro, Allessandro**
35128 Padova (IT)

(74) Representative: **Alagem Modiano, Lara S. et al**
c/o Modiano & Associati S.r.l.
Via Meravigli 16
20123 Milano (IT)

(54) **Floor cleansing machine, particularly for industrial use**

(57) A floor cleansing machine (1), particularly for industrial use, comprising a chassis (2) which supports floor cleansing means (3) in a downward region; the chassis further defines a driver's seat (8) and is provided at the rear with at least one pair of lateral wheels (9) and at the front with a steerable central wheel (11); the chassis is provided with at least one pair of auxiliary lateral ground supports (13) which are arranged on mutually opposite sides with respect to the steerable central wheel (11).

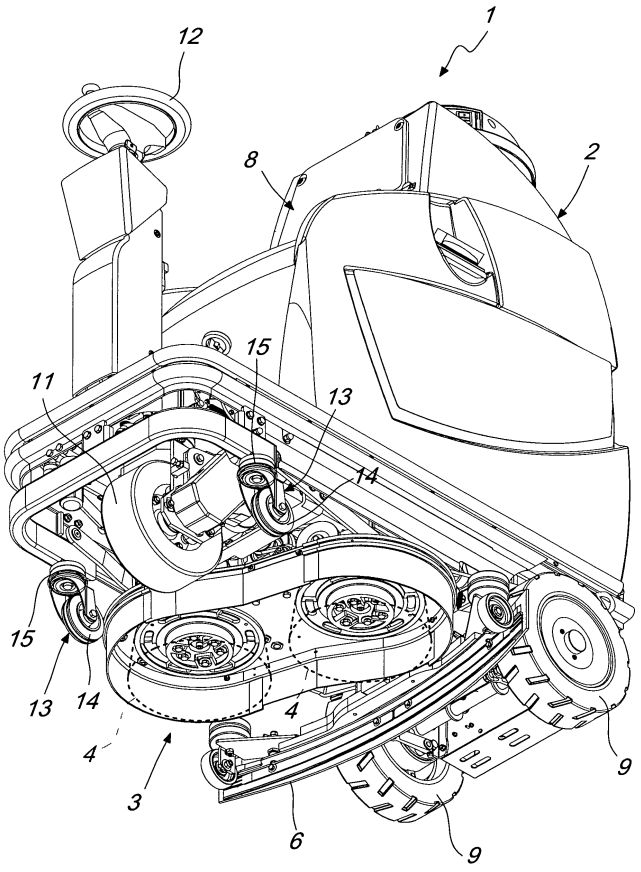

Fig. 2

EP 2 011 426 A1

Description

[0001] The present invention relates to a floor cleansing machine, particularly for industrial use.

[0002] As is known, floor cleansing and drying machines for industrial or professional use are constituted substantially by a mobile chassis which supports floor cleansing means, constituted typically by at least one brush which can be actuated so as to rotate, by a device for dispensing a washing liquid, and by a suction device which draws the washing liquid and the dirt, partially drying the floor.

[0003] In some types of floor cleansing and drying machines for industrial use, the chassis of the machine is provided, on its front portion, with a driver's seat which can be occupied by the user and is provided in a downward region with two rear lateral wheels, at least one of which is a driving wheel, and with a steerable front central wheel, which can be usually controlled by the user by means of a steering system located at the driver's seat.

[0004] Generally, in such floor cleansing and drying machines, the foot resting platform of the driver's seat is arranged at a rather high level with respect to the ground and can be accessed by the user from a lateral region of the chassis of the machine.

[0005] The drawback of this configuration consists mainly in that when the user climbs in or out of the driver's seat, the chassis of the machine tends to tilt sideways under the action of the weight of the user, with the risk that it might overturn, in practice falling onto the user.

[0006] Likewise, when making turns with tight turning radii and at a substantial speed, machines structured in the manner described above do not have adequate lateral stability and therefore may tip when turning, with consequent physical injury for the user.

[0007] The aim of the present invention is to provide a valid solution to the problem described above by providing a floor cleansing machine, particularly for industrial use, which has a greater lateral stability than currently known ones both when turning and when the user climbs in or out of the driver's seat.

[0008] Within this aim, an object of the present invention is to provide a floor cleansing machine which is capable of absorbing adequately the stresses which, due to unevenness of the ground, can be transmitted to its chassis during movement.

[0009] Another object of the invention is to provide a machine which can be obtained easily starting from commonly commercially available elements and materials and is further competitive from an economical standpoint.

[0010] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a floor cleansing machine, particularly for industrial use, according to the invention, which comprises a chassis which supports floor cleansing means in a downward region, said chassis defining a driver's seat and being provided at the rear with at least one pair of lateral wheels and at the front with a steerable central wheel, characterized in that said chassis is provided with at least one pair of auxiliary lateral ground supports which are arranged on mutually opposite sides with respect to said steerable central wheel.

[0011] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the machine according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a top perspective view of the machine according to the invention;
Figure 2 is a bottom perspective view of the machine according to the invention;
Figure 3 is a front elevation view of the machine according to the invention;
Figure 4 is a side elevation view of the machine according to the invention;
Figure 5 is an enlarged-scale side elevation view of a detail of the machine according to the invention.

[0012] With reference to the figures cited above, the machine according to the invention, generally designated by the reference numeral 1, comprises a chassis 2 which supports, in a downward region, floor cleansing means 3, which can be of any per se known type.

[0013] In particular, the floor cleansing means 3 can comprise for example a nozzle for dispensing a washing liquid which is directed toward the floor, at least one brush 4 which has a vertical or horizontal axis and can be turned about its own axis by motor means which are supported by the chassis 2 and are not shown for the sake of simplicity, and a suction port 5, which can be connected to a known type of suction device, which is accommodated within the chassis 2 and allows, in cooperation with a floor wiper 6, to pick up the washing liquid and the removed dirt.

[0014] As usual, the dispensing nozzle is connected, by means of a pump, to a tank for containing the washing liquid, which is preferably located at the rear part of the chassis 2.

[0015] As shown in the figures, the chassis 2 defines, in its front portion, a driver's seat 8 which can be occupied by the user in order to maneuver the machine.

[0016] On its underside, the chassis 2 is further provided at the rear with at least one pair of lateral wheels 9, at least one of which is conveniently a driving wheel, being connected to an actuation motor, typically of the electric type, which can be controlled from the driver's seat 8 by way of appropriately provided control devices 10 which are per se known.

[0017] In the front portion of the chassis 2 there is a steerable central wheel 11, which is connected to a steering device provided for example with a steering wheel 12 arranged at the driver's seat 8.

[0018] According to the invention, the chassis 2 is provided with at least one pair of auxiliary lateral supports

13, which can engage the ground so as to glide over it and are located on mutually opposite sides with respect to the steerable central wheel 11, so as to provide in practice, for the chassis 2, additional supporting points which are capable of contrasting effectively the lateral imbalance of the chassis 2 when the user climbs in or out of the driver's seat 8 or during very tight turns performed at a substantial speed.

[0019] Advantageously, the auxiliary lateral supports 13 are constituted respectively by at least one supporting wheel 14.

[0020] Preferably, each supporting wheel 14 is mounted so that it can rotate freely about a substantially vertical axis, so as to follow automatically the changes of direction of the machine during use.

[0021] Conveniently, between each supporting wheel 14 and the chassis 2 there are shock-absorbing means, which are designed to absorb the stresses transmitted by the supporting wheels 14 to the chassis 2 due to the unevenness of the ground.

[0022] Advantageously, such shock-absorbing means are provided by elastically yielding means 15, which are designed to maintain the respective supporting wheel 14 in contact with the ground, in order to ensure higher safety against lateral overturning of the chassis 2.

[0023] Conveniently, the elastically yielding means 15 are constituted by a Belleville spring.

[0024] Operation of the machine according to the invention is evident from what has been described and illustrated above. In particular, it is evident that during use of the machine the chassis 2, thanks to the possibility of additional support provided by the auxiliary lateral supports 13, is capable of maintaining a correct position without the risk of overturning, both when the user climbs on and off the machine and during steering maneuvers of the machine.

[0025] In practice it has been found that the invention fully achieves the intended aim, since it allows a safer use of floor cleansing and drying machines thanks to the auxiliary lateral supports, and a more comfortable use thereof in steering, thanks to the shock-absorbing means which act thereon.

[0026] The individual characteristics presented with reference to general teachings or particular embodiments may all be present in other embodiments or replace characteristics in said other embodiments.

[0027] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0028] In practice it has been found that the invention has achieved its intended aim and objects in all of the embodiments.

[0029] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements.

[0030] All the details may further be replaced with other technically equivalent elements.

[0031] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A floor cleansing machine, particularly for industrial use, comprising a chassis which supports floor cleansing means in a downward region, said chassis defining a driver's seat and being provided at the rear with at least one pair of lateral wheels and at the front with a steerable central wheel, **characterized in that** said chassis is provided with at least one pair of auxiliary lateral ground supports which are arranged on mutually opposite sides with respect to said steerable central wheel.

2. The machine according to claim 1, **characterized in that** said auxiliary lateral supports comprise respectively at least one supporting wheel.

3. The machine according to one or more of the preceding claims, **characterized in that** said at least one supporting wheel can rotate freely about a substantially vertical axis.

4. The machine according to one or more of the preceding claims, **characterized in that** it comprises, between said at least one supporting wheel and said chassis, shock-absorbing means which are adapted to absorb the stresses transmitted by said at least one supporting wheel to said chassis.

5. The machine according to one or more of the preceding claims, **characterized in that** said shock-absorbing means comprise elastically yielding means which are adapted to keep said at least one supporting wheel in contact with the ground.

6. The machine according to one or more of the preceding claims, **characterized in that** said elastically yielding means comprise a Belleville spring.

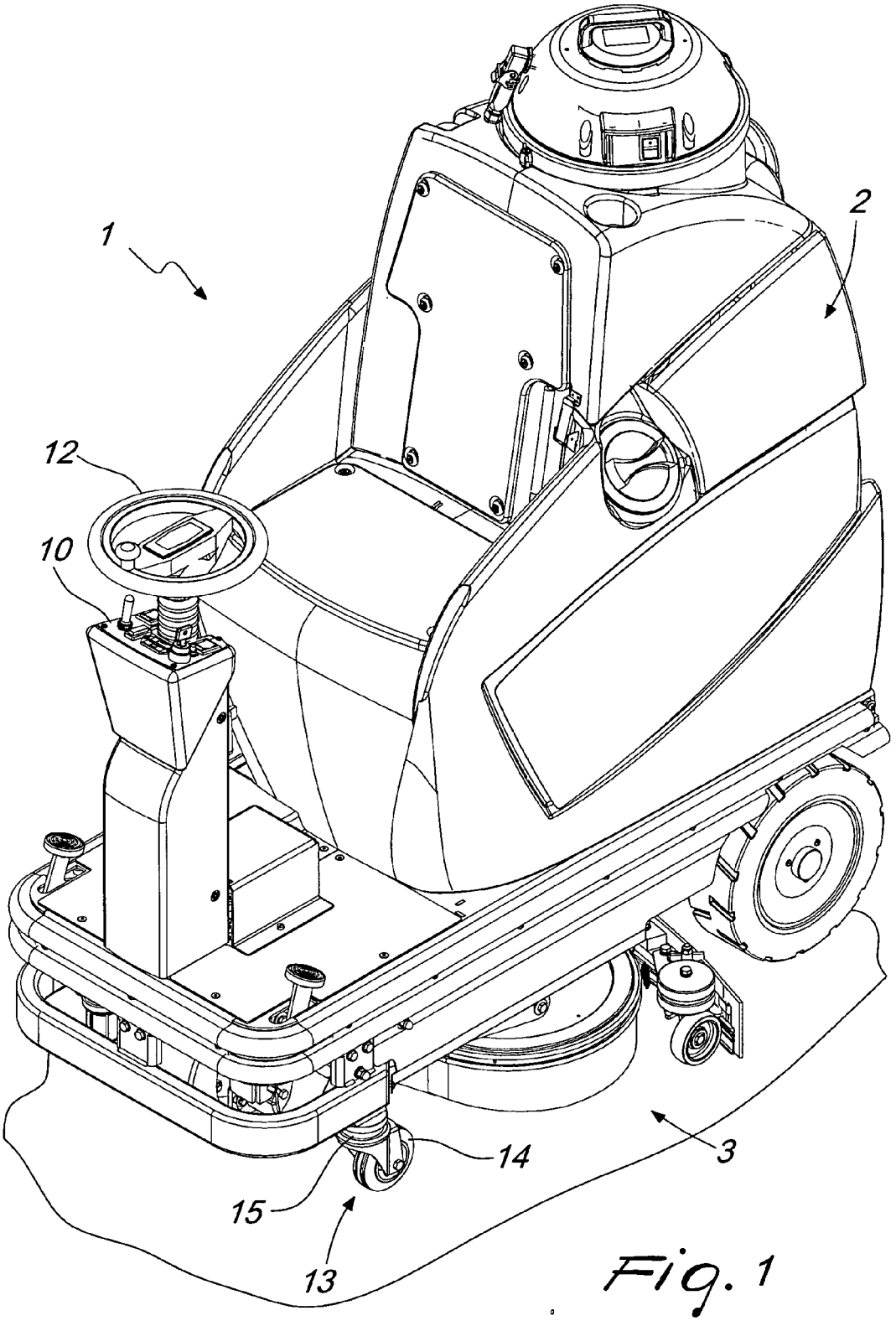

Fig. 1

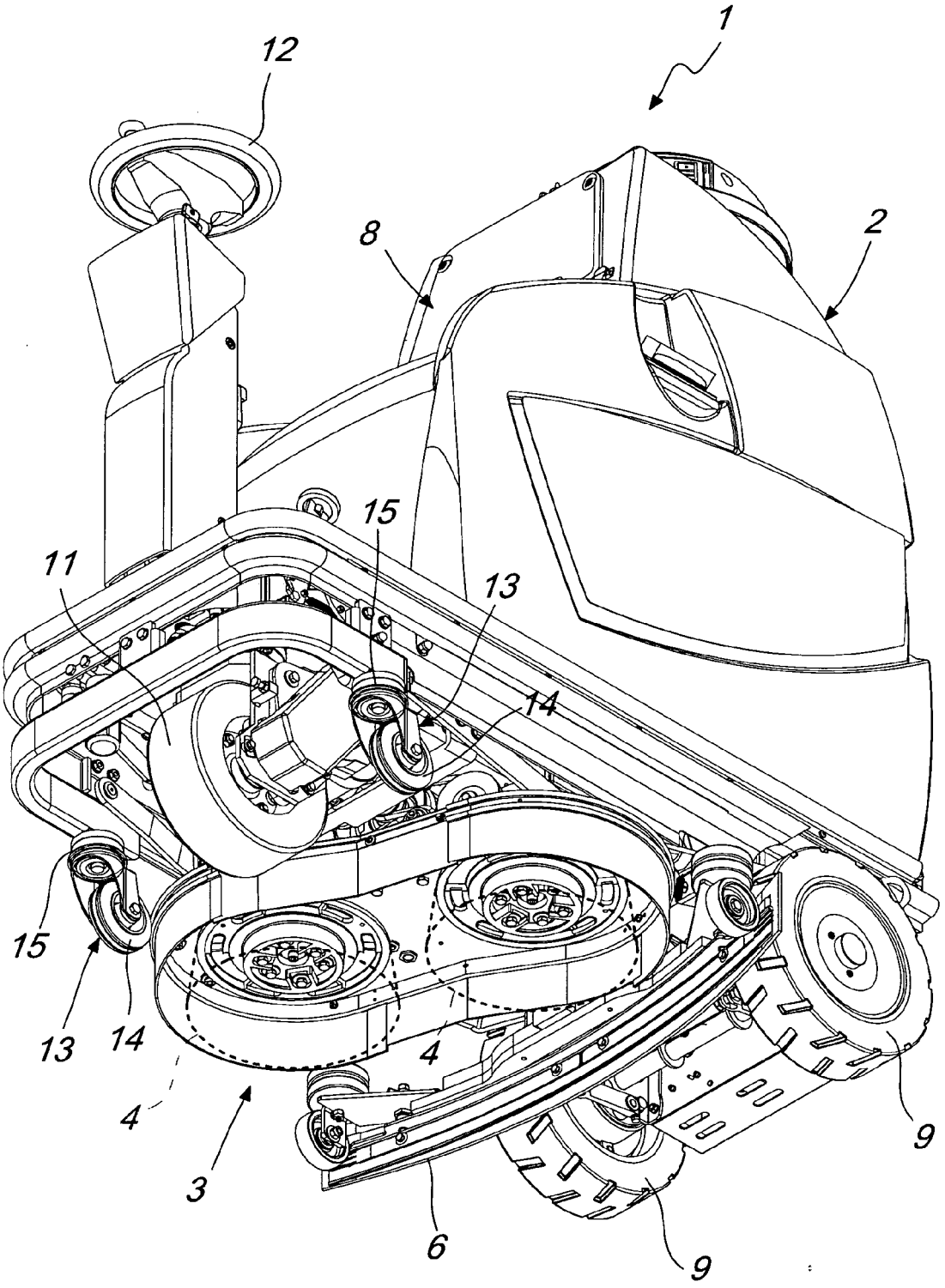

Fig. 2

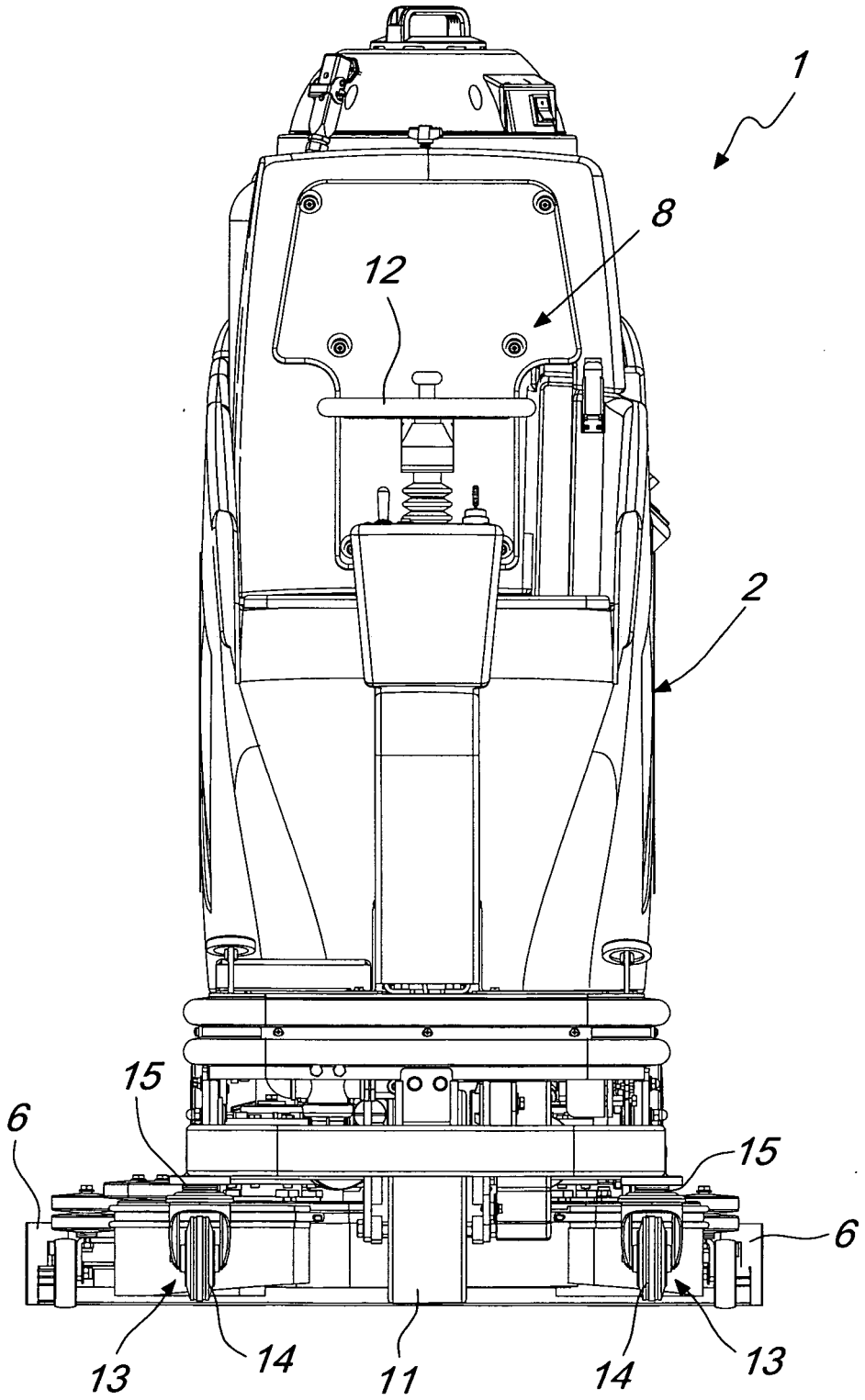

Fig. 3

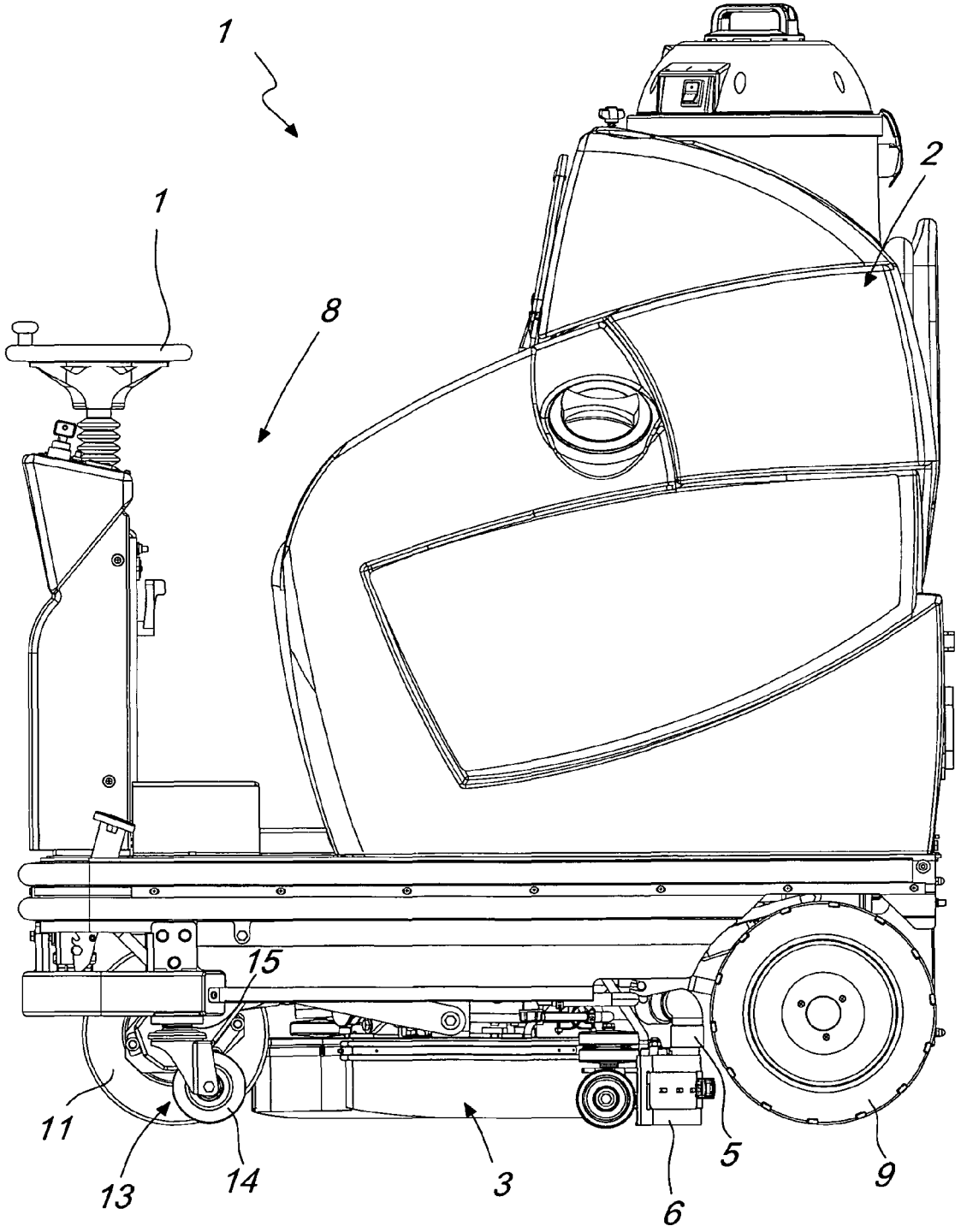

Fig. 4

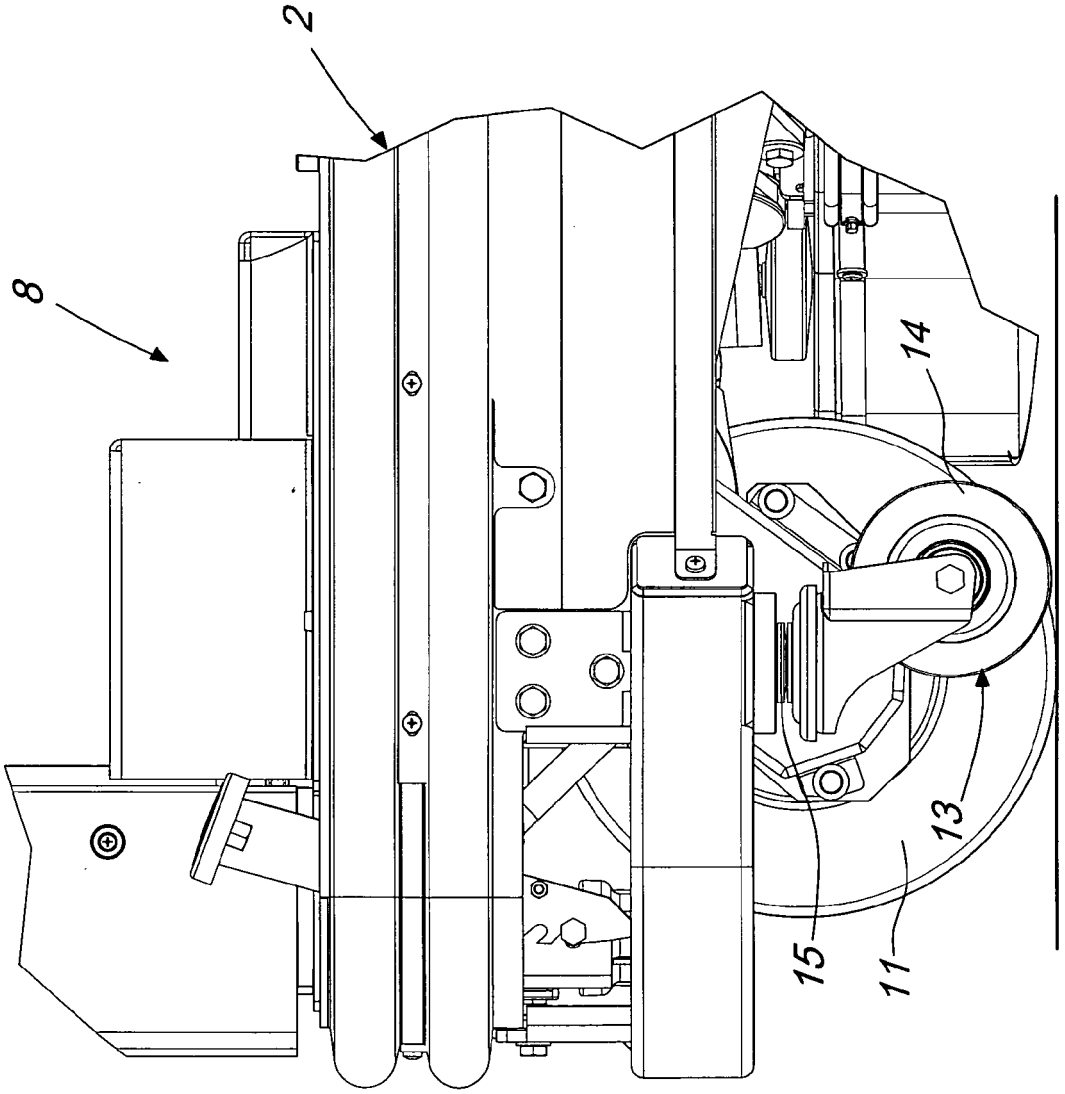

Fig. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5407

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2004/237247 A1 (NOWAK HARALD [DE] ET AL) 2 December 2004 (2004-12-02) * paragraphs [0001], [0018] * * figure 1 *	1-3	INV. A47L11/28 A47L11/40
Y	DE 43 23 332 A1 (ENGLER HARTMUT [DE]) 12 January 1995 (1995-01-12) * column 1, line 67 - column 2, line 4 * * column 3, lines 38,39,53-57 * * column 4, lines 11-17 * * figures 1,2 *	1-3	
A	EP 0 452 980 A (MORNINGFIELD LTD [GB]) 23 October 1991 (1991-10-23) * column 3, lines 17-23 * * column 3, line 55 - column 4, line 4 * * figures 1,3 *	4,5	
A	EP 0 931 502 A (TENNANT CO [US]) 28 July 1999 (1999-07-28) * column 1, line 5 * * column 2, lines 15-18,27,28 * * figure 1 *	1	TECHNICAL FIELDS SEARCHED (IPC) A47L
A	US 2 749 996 A (PARKER RICHARD W ET AL) 12 June 1956 (1956-06-12) * column 1, lines 14,15 * * column 2, lines 40-52 * * figures 1-4 *	1,2	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 January 2008	Cescutti, Gabriel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 42 5407

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-01-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004237247 A1	02-12-2004	DE 10324825 A1	30-12-2004
DE 4323332 A1	12-01-1995	NONE	
EP 0452980 A	23-10-1991	AT 71164 T	15-01-1992
		EP 0457363 A2	21-11-1991
		EP 0452979 A2	23-10-1991
EP 0931502 A	28-07-1999	US 5943730 A	31-08-1999
US 2749996 A	12-06-1956	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82