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

(11) **EP 2 082 784 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.07.2009 Bulletin 2009/31

(51) Int Cl.:
A62C 27/00 *(2006.01)*

(21) Application number: **09151107.1**

(22) Date of filing: **22.01.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA RS

(30) Priority: **25.01.2008 IT BO20080050**

(71) Applicant: **Neos Sistemi s.r.l.**
63039 San Benedetto del Tronto (AP) (IT)

(72) Inventor: **Fucetola, Gaetano**
67100 L'Aquila (IT)

(74) Representative: **Mittler, Enrico**
Mittler & C. s.r.l.
Viale Lombardia, 20
20131 Milano (IT)

(54) **Forest fire-fighting machine**

(57) A forest fire fighting machine (1), comprising a base structure (2), a gasoline or diesel engine, two pairs of tracks (3) arranged parallel to each other so as to form a double in-line track, a remote-control radio device by means of which an operator can remotely control the machine (1), water means (14, 15, 16) for putting out the fire, and a control panel (6) accommodating an acoustic warning device (7) and a visual warning device (8), both connected to a sensor accommodated inside a water tank (9), a positioning device (10) provided with GPS-GSM system, and an inclinometer (11).

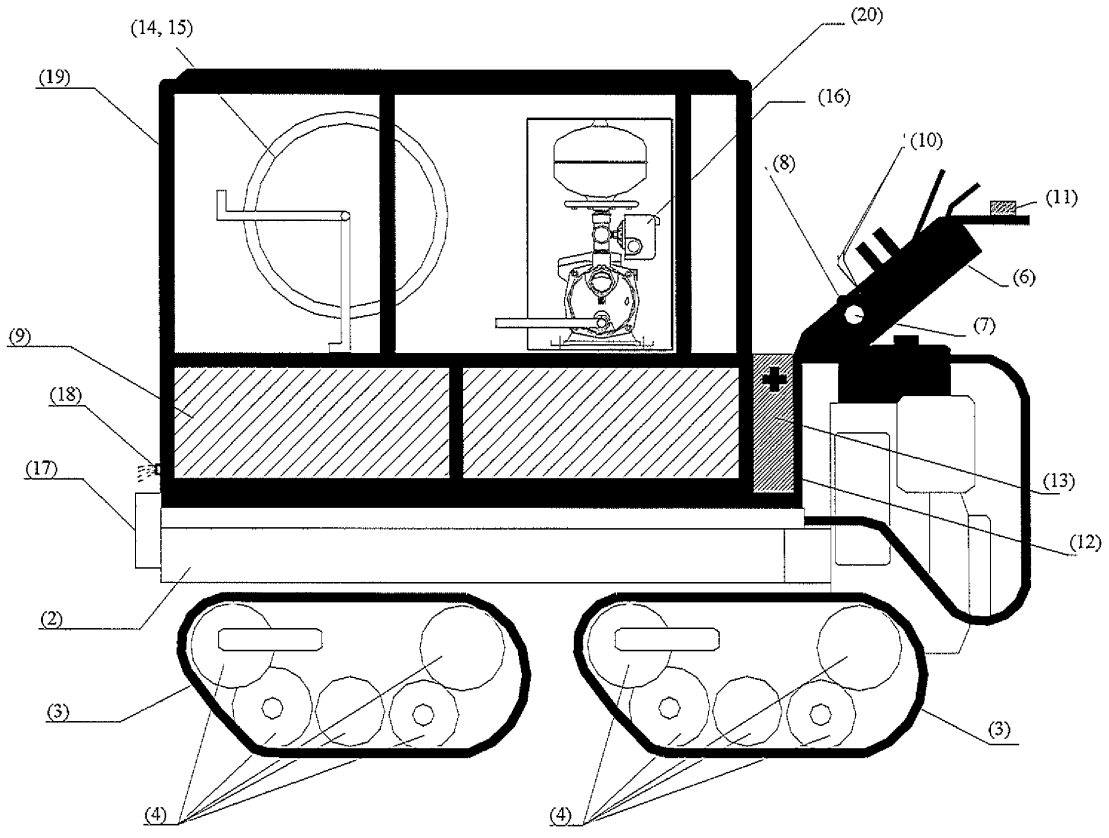

Fig. 1

EP 2 082 784 A1

Description

[0001] The present invention relates to a forest fire fighting machine.

[0002] Currently, in a forest fire, some sites may only be reached by aerial fire fighting means or by forest fire fighting crews on foot equipped with hand tools only, with the evident physical impossibility of carrying water tanks to be used for fire putting out and restoring operations.

[0003] Specifically, active fighting on the ground allows to create a continuous intervention line with forest fire fighting means provided with an extinguishing/retardant fluid, ranging from large tank trucks to forest fire fighting modules mounted on off-road vehicles such as pick-up trucks.

[0004] The ground fire fighting vehicles available today normally consists of large capacity tank trucks, which may only operate on either asphalted or unpaved roads with smooth surface and moderate gradient; four-wheel drive tank trucks with a capacity of 4,000 liters, which may also operate off-road providing that the ground is relatively free from obstacles and has average transversal gradients which may be passed considering the particular dimensions of the vehicle; four-wheel drive tank trucks with a capacity of 1,000 liters, which have a greater approach capacity than the previous vehicles in virtue of their smaller volume; and pick-up trucks fitting a forest fire fighting module, with a capacity of 400 liters, highly operative, which however may not gain access if the way is blocked by vegetation or other obstacles. It is worth mentioning that the aforesaid vehicles always require a suitable maneuvering space to ensure the safety of both the vehicle and the operators.

[0005] A need for a forest fire fighting means was therefore felt, the technical features of which were such to ensure its operativeness immediately after the air attack, i.e. once the flames have been lowered or partially neutralized by dropping water or retardant fluid; an operativeness in the presence of ground fire under forest trees or on particularly rough terrains; and a restoration of particularly impervious burnt-out sites and/or with smoldering litter, i.e. leaves/needles, moss, lichens, highly combustible humus at high temperatures and under drought conditions.

[0006] It is the object of the present invention a forest fire fighting machine, characterized in that it comprises a base structure, a gasoline or diesel engine, two pairs of tracks arranged parallel to each other so as to form a double in-line track (or one track on each side), a remote-control radio device, by means of which an operator can remotely control the machine, water means for putting out the fire, and a control panel accommodating an acoustic warning device and a visual warning device, both connected to a sensor accommodated inside a water tank, a positioning device provided with GPS-GSM system and an inclinometer.

[0007] The following example is provided by way of non-limiting illustration for a better understanding of the invention with the aid of the figures in the accompanying drawing, in which:

figure 1 is a side view of the fire fighting machine object of the present invention;

figure 2 shows a front view of the machine in figure 1; and

figure 3 shows a rear view of the machine in figure 1.

[0008] In figures 1-3, numeral 1 indicates as a whole a preferred embodiment of the forest fire fighting machine object of the present invention.

[0009] Machine 1 comprises a base structure 2 made of thick boxed steel sheet, and reinforced where the strain is higher. Specifically, the base structure 2 has a low centre of gravity in order to ensure a suitable stability and the safe getting over of stretches having transversal gradient.

[0010] Machine 1 comprises two pairs of tracks 3, arranged parallel to each other so as to form a double in-line track, in order to allow to pass surfacing obstacles (rocks, tree trunks, etc.). Each track 3 is engaged by five rollers 4 to allow an optimal distribution of the loads on the track 3 itself, and is made of rubber reinforced with steel plates having a low specific pressure coefficient for damage-free mobility even on delicate surfaces.

[0011] Furthermore, each track has a rolling train equipped with self-cleaning rollers which may be manually adjusted as far as the tension of each track 3 is concerned.

[0012] Alternatively, a single track 3 may be provided on each side of the machine.

Machine 1 comprises an engine (not shown in the figures), which may be either of the aspirated type fed by gasoline or diesel and with an electric starter, or a two-cylinder 20/22 HP heat engine. Specifically, the engine delivers a minimum power of 14 HP to ensure a full-load operating speed of over 5 km/h so as to cover the distance of 1 km in 12 minutes.

[0013] The included transmission is of the variable, integral hydrostatic type for independently operating the hydraulic motors of each track 3. In this manner, reversing is possible while the vehicle is moving by using the same control used for forward traveling.

[0014] Furthermore, machine 1 comprises a mechanical block type handbrake system with a lever control acting on a drive wheel, a counter-rotation of the tracks so that the machine may turn on itself to work in very restricted spaces, a hydraulic lever-controlled steering by means of the selective rotation of the tracks 3, and a hydraulic system comprising a gear pump and a 3"/8" auxiliary outlet with quick couplings.

The controls are of the hydraulic lever-operated type having an automatic neutral position for avoiding non-desired actuations. The controls are actuated by the operator on the ground.

[0015] Machine 1 comprises a button-operated emergency stop system of the engine as the safety device.

[0016] Machine 1 further comprises a control panel 6, in which the instruments required for a safe, efficient use of the machine 1 itself are accommodated. An acoustic warning device 7 and a visual warning device 8 are accommodated inside the control panel 6, both connected to a sensor accommodated inside a water tank 9, which is made of stainless steel and has a volume of 300-350 liters. Specifically, a siren and an amber blinker inform the operators that the water in the tank is finishing. The warning allows to retrieve the equipment in good time and possibly move away from the hazard zone or organize refilling with water and proceed with this operation. Furthermore, a positioning device 10 provided with GPS-GSM system is accommodated in the control panel 6, comprising a satellite receiver, a position and speed detector, a GSM antenna, and an active GPS antenna to allow the vehicle and its operators to be positioned. This information is indispensable for the fire putting out supervisors and control rooms for optimizing fire control and management operations and, not least, for coordinating possible rescue operations with accuracy and timeliness.

[0017] Furthermore, the control panel 6 accommodates an inclinometer 11, which allows the operator to measure gradients, both lateral and in the travel direction. This information will allow to immediately evaluate the modes for getting over particular rough terrain conditions.

[0018] Furthermore, machine 1 comprises a remote-control radio device (not shown), by means of which an operator can remotely control the machine so as to safely deal with difficult, dangerous conditions related to the morphology of the terrain or to the presence of impending fire.

[0019] Machine 1 further comprises a sealing device 12 for the emergency kit contained in a fireproof bag 13.

[0020] Machine 1 further comprises a hose reel structure 14 for 1/2" x 50 meter hoses fixed to the upper portion of the tank 9. The hose reel structure 14 is made of steel and comprises a steel spool, a pivoting steel joint and has a manual winding provided with an aluminium handwheel and a high-strength lock pin made of metal alloy.

[0021] Machine 1 further comprises a hydrant hose 15 having a 11/2" diameter and being 50 meters long, which comprises an external portion made of natural rubber, or equivalent synthetic material with similar or higher strength index, a high-load, steel braid reinforcement for protecting from abrasion, ozone and weather elements, an internal portion made of natural rubber or equivalent synthetic material with a similar or higher strength index, one or more fittings made of brass or other strong metal alloys. The performance of the hose 15 relate to a working temperature in the range of 0 and +70° C, a storage temperature in the range of -20 and +30°C, a minimum working pressure in the range of 160-180 bar and a minimum bursting pressure of 640 bar.

[0022] Machine 1 further comprises a long range jet-pipe (known and not shown for simplicity) commonly used by the fire fighting and civilian protection service, having a weight of 1.6 kg and being 670 mm long. The long range jet-pipe comprises an ergonomic grip, a full/atomized jet adjusting by means of a front handle, a safety retainer to avoid accidental opening and a nozzle protected from shocks. The long range jet-pipe has a maximum working pressure of 60 bar.

[0023] Machine 1 further comprises a membrane power pump 16 of the highpressure, self-priming type, fixed to the upper portion of the tank 9. The power pump is provided with a maximum pressure and setting drain valve and has a capacity of 50 liters/second at 40 bar. The power pump 16 comprises a UNI 45 intake mouth with cap or on demand STORZ 52, UNI 25/Stortz D/1/2 Gas fittings, a 9 HP gasoline engine with electric starter and automatic battery recharging alternator, or a hydraulic motor (lighter and less cumbersome), and an encircling frame made of painted steel tubes.

[0024] The hose reel structure 14 and the power pump 16 are arranged inside a protective roll bar 19 formed by a steel tube structure anchored to the carriage 2.

[0025] Fasteners 20 for possibly heli-lifting the machine are arranged at the four corners of the roll bar 19.

[0026] The pump 16, the hose reel 14, the hose 15, the jet-pipe and the tank 9 form a fire fighting module which may be completely removed from the base 2 so as to be able to use the machine for any other activities all year round. It is thus possible to use loading platforms and/or tools and equipment of various type for the most disparate uses.

[0027] Machine 1 comprises a winch 17 formed by an aluminium/steel alloy structure, a galvanized steel cable-guide and an irreversible worm-gear drive train. Reversibility is obtained only when the operator operates the appropriate control, thus without the need for brakes. The winch 17 has a ratio 1/38 and direct line pull capacity on the first rope layer equal to 1000 kg (empty drum).

[0028] Finally, machine 1 comprises a ground sprinkling device comprising four nozzles 18 arranged on the front part of the water tank 9, and adapted to dampen the ground in front, if required, in order to allow the vehicle and the operators to proceed safely. Such an operation further allows more mobility, because the specific equipments (hydrant hose and pressure jet-pipe) may not be used.

[0029] Hydraulic fittings 21 may be provided and used to connect various tools and equipments, such as a 5 kVA power generator.

[0030] As apparent from the above description, the machine object of the present invention is provided with high operativeness, and comprising appropriate instruments and equipments may ensure operator safety to the greatest possible extent. Indeed, since the machine object of the present invention is the last link of a forest fire fighting operation chain, the operators are greatly exposed to intervention risks, in situations which are very dangerous per se.

[0031] Finally, the modest dimensions and the advancement capacity of the machine object of the present

invention allow it to reach sites at which other currently available vehicles may not arrive, thus not being able to operate.

Claims

1. A forest fire fighting machine (1), **characterized in that** it comprises a base structure (2), a gasoline or diesel engine, two tracks (3) or two pairs of tracks (3) arranged parallel to each other so as to form a double in-line track, a remote-control radio device, by means of which an operator can remotely control the machine (1), water means (14, 15, 16) for putting out the fire, and a control panel (6) accommodating an acoustic warning device (7) and a visual warning device (8), both connected to a sensor accommodated inside a water tank (9), a positioning device (10) provided with GPS-GSM system, and an inclinometer (11).

2. A forest fire fighting machine (1) according to claim 1, **characterized in that** it comprises a ground sprinkling device comprising four nozzles (18) arranged on the front part of said water tank 9, and adapted to dampen the ground in front.

3. A forest fire fighting machine (1) according to claim 1 or 2, **characterized in that** said water means (14, 15, 16) for putting out the fire comprise a hose reel structure (14), a hydrant hose (15), a long range jet-pipe and a membrane power pump (16).

4. A forest fire fighting machine (1) according to claim 3, **characterized in that** said water putting out means (14, 15, 16) and said tank (9) form a fire fighting module which may be detached from said base structure (2).

5. A forest fire fighting machine (1) according to claim 3 or 4, **characterized in that** said water putting out means (14, 15, 16) are provided with a protective roll bar (19).

6. A forest fire fighting machine (1) according to claim 5, **characterized in that** said protective roll bar (19) is provided with hooks (20) for heli-lifting.

7. A forest fire fighting machine (1) according to any one of the preceding claims, **characterized in that** each track (3) is engaged by five rollers (4).

8. A forest fire fighting machine (1) according to any one of the preceding claims, **characterized in that** each track (3) is made of rubber reinforced with steel plates having a low specific pressure coefficient.

9. A forest fire fighting machine (1) according to any one of the preceding claims, **characterized in that** it comprises a variable integral transmission of the hydrostatic type for independently actuating the hydraulic motors of each track (3).

10. A forest fire fighting machine (1) according to any one of the preceding claims, **characterized in that** said base structure (2) has a low centre of gravity.

11. A forest fire fighting machine (1) according to any one of the preceding claims, **characterized in that** it comprises a winch (17).

12. A forest fire fighting machine (1) according to any one of the preceding claims, **characterized in that** it comprises hydraulic fittings (21) for connecting various tools and equipments.

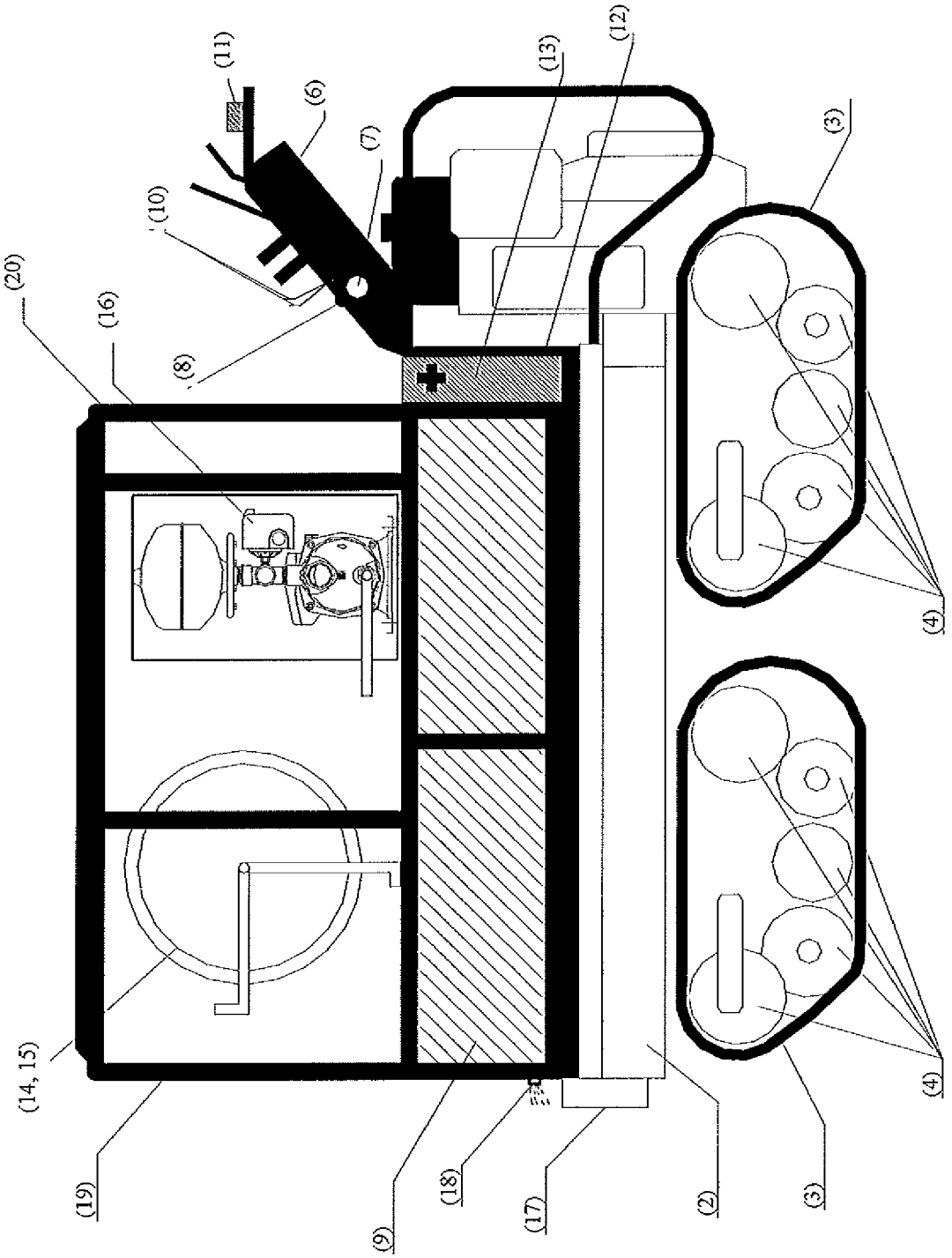

Fig. 1

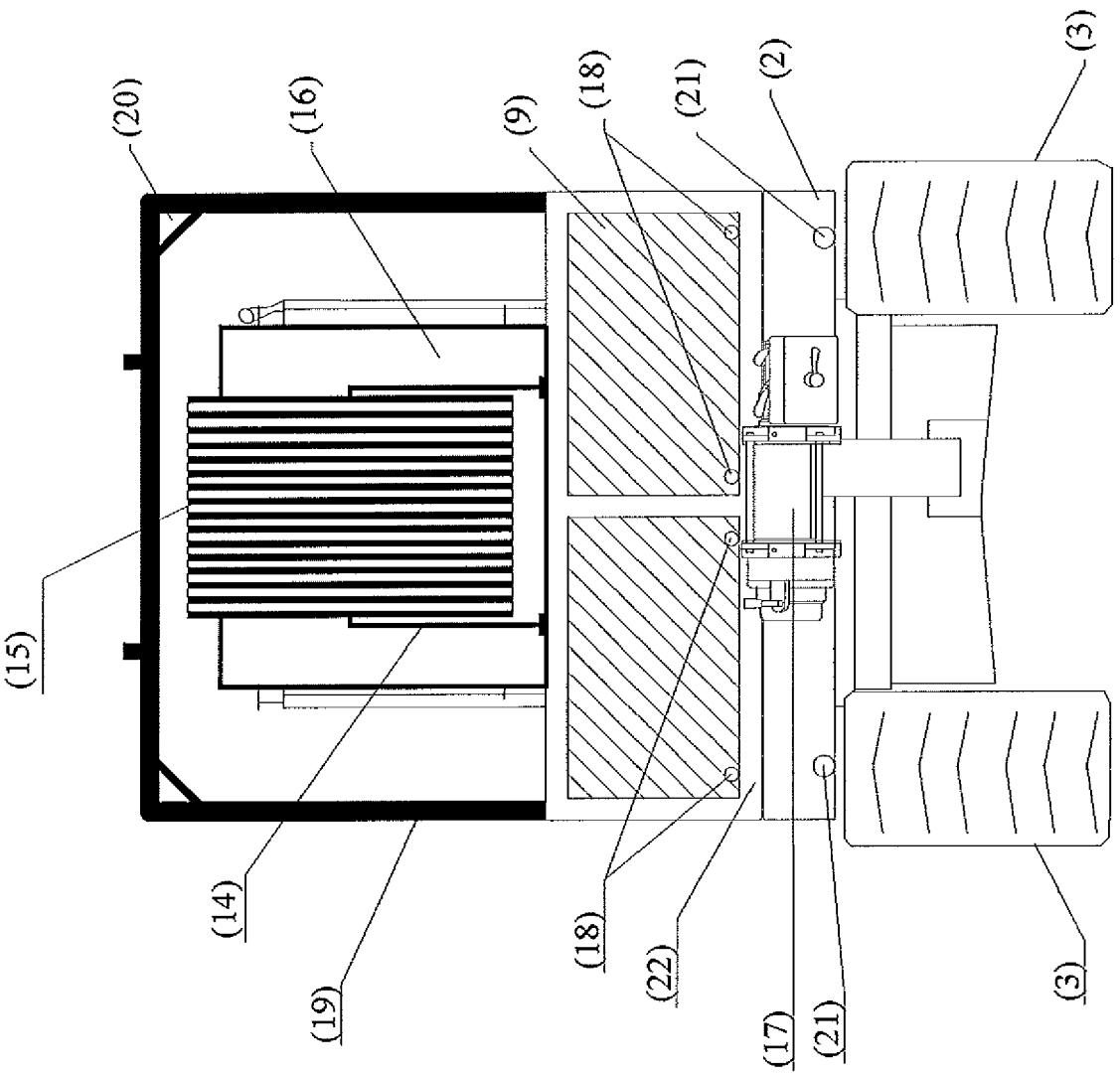

Fig. 2

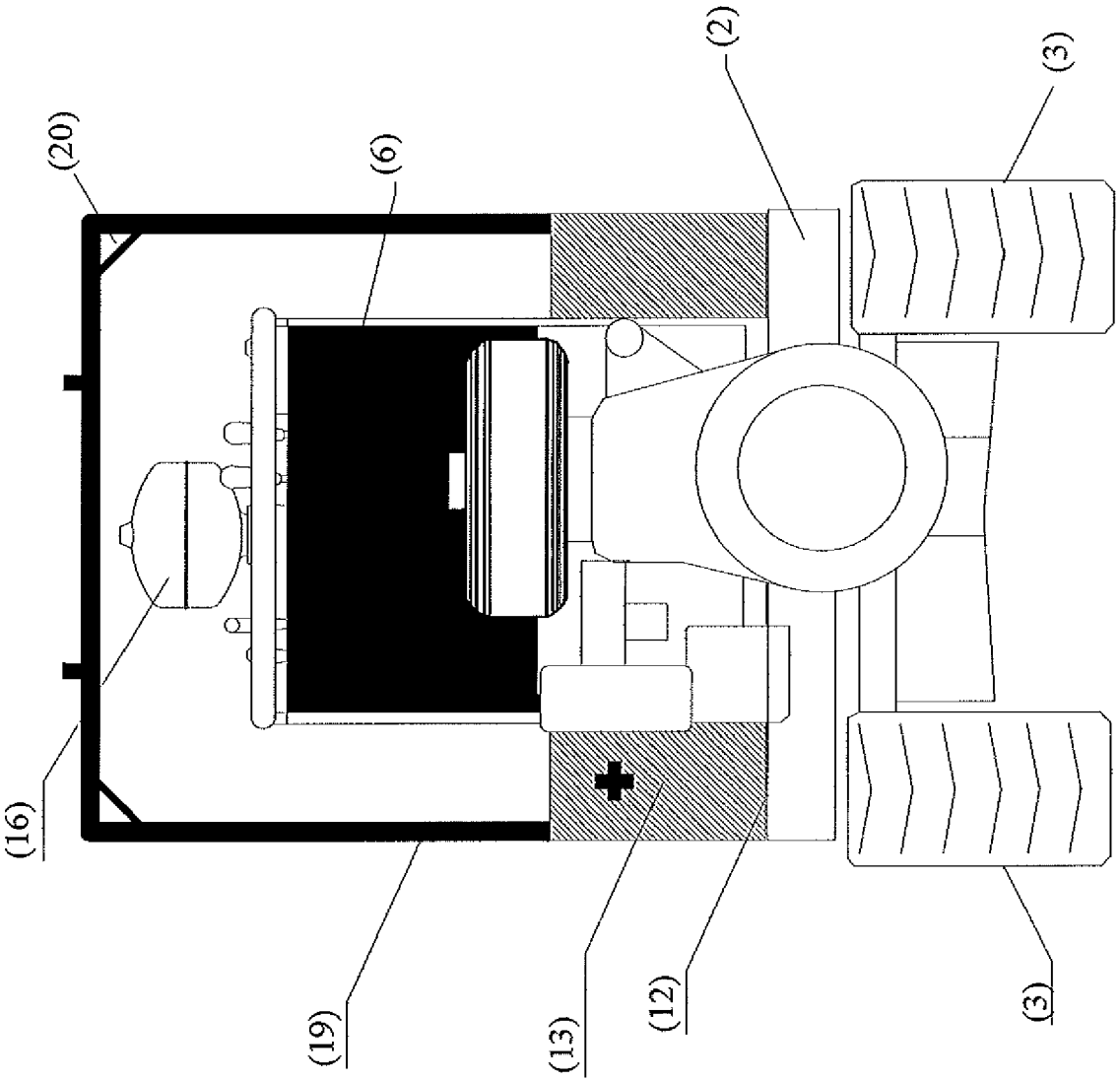

Fig. 3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 09 15 1107

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	WO 98/44991 A (MIDLANDS) 15 October 1998 (1998-10-15) * page 2, lines 19-23 * * page 6, lines 3,7-12 * * page 7, lines 4,5,8,15-18 * * page 8, lines 19,20 * * page 11, lines 12,13 * * figures 1-10 * -----	1-12	INV. A62C27/00
Y	FR 2 691 366 A (CAVALLERA) 26 November 1993 (1993-11-26) * page 3, lines 10-14 * * page 4, lines 16,17,22-30 * * figures 1,2 * -----	1-12	
Y	US 4 189 005 A (MCLOUGHLIN) 19 February 1980 (1980-02-19) * column 2, lines 37,38 * * column 5, lines 44-47 * * figure 17 * -----	1-12	
Y	US 6 798 343 B2 (CARRIER) 28 September 2004 (2004-09-28) * column 4, lines 40,41 * * column 7, lines 6,7 * * column 9, lines 57-61 * * figures 1-8 * -----	1-12	TECHNICAL FIELDS SEARCHED (IPC) A62C
Y	DE 12 92 497 B (RUHNKE) 10 April 1969 (1969-04-10) * column 2, lines 53-57 * * figure 1 * -----	1-12	
Y	US 6 289 995 B1 (FULLER HOMER M [US]) 18 September 2001 (2001-09-18) * figures 1-4,7,12 * * column 3, lines 45-47 * * column 8, lines 50,51 * -----	2,12	
	-/--		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 May 2009	Paul, Adeline

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

1

EPO FORM 1503 03.82 (P04C01)

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 09 15 1107

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 2002/096339 A1 (YEN PING-LI [US]) 25 July 2002 (2002-07-25) * page 1, paragraph 14 * * figures 8-11 *	3-6	
Y	WO 2005/007453 A (GORMAN STANLEY M JR [US]) 27 January 2005 (2005-01-27) * figure 13 * * page 13, lines 29-31 *	5,6	
Y	DE 299 14 831 U1 (BEHRENDT RUDI [DE]) 2 March 2000 (2000-03-02) * figure 1 *	7	
Y	US 5 860 479 A (LAFOLLETTE DAVID A [US]) 19 January 1999 (1999-01-19) * column 1, lines 27-29 * * column 1, lines 63-66 *	9,10	
			TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 May 2009	Paul, Adeline

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

1 EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 15 1107

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.

13-05-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9844991 A	15-10-1998	AU 6892598 A	30-10-1998
		CA 2294358 A1	15-10-1998
FR 2691366 A	26-11-1993	AU 4076093 A	13-12-1993
		WO 9323116 A1	25-11-1993
US 4189005 A	19-02-1980	NONE	
US 6798343 B2	28-09-2004	NONE	
DE 1292497 B	10-04-1969	NONE	
US 6289995 B1	18-09-2001	NONE	
US 2002096339 A1	25-07-2002	NONE	
WO 2005007453 A	27-01-2005	US 2005126631 A1	16-06-2005
DE 29914831 U1	02-03-2000	NONE	
US 5860479 A	19-01-1999	NONE	

EPO FORM P0459

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