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(54) Title: SPREADER UNIT FOR A DE-ICING MATERIAL AND RESPECTIVE VEHICLE

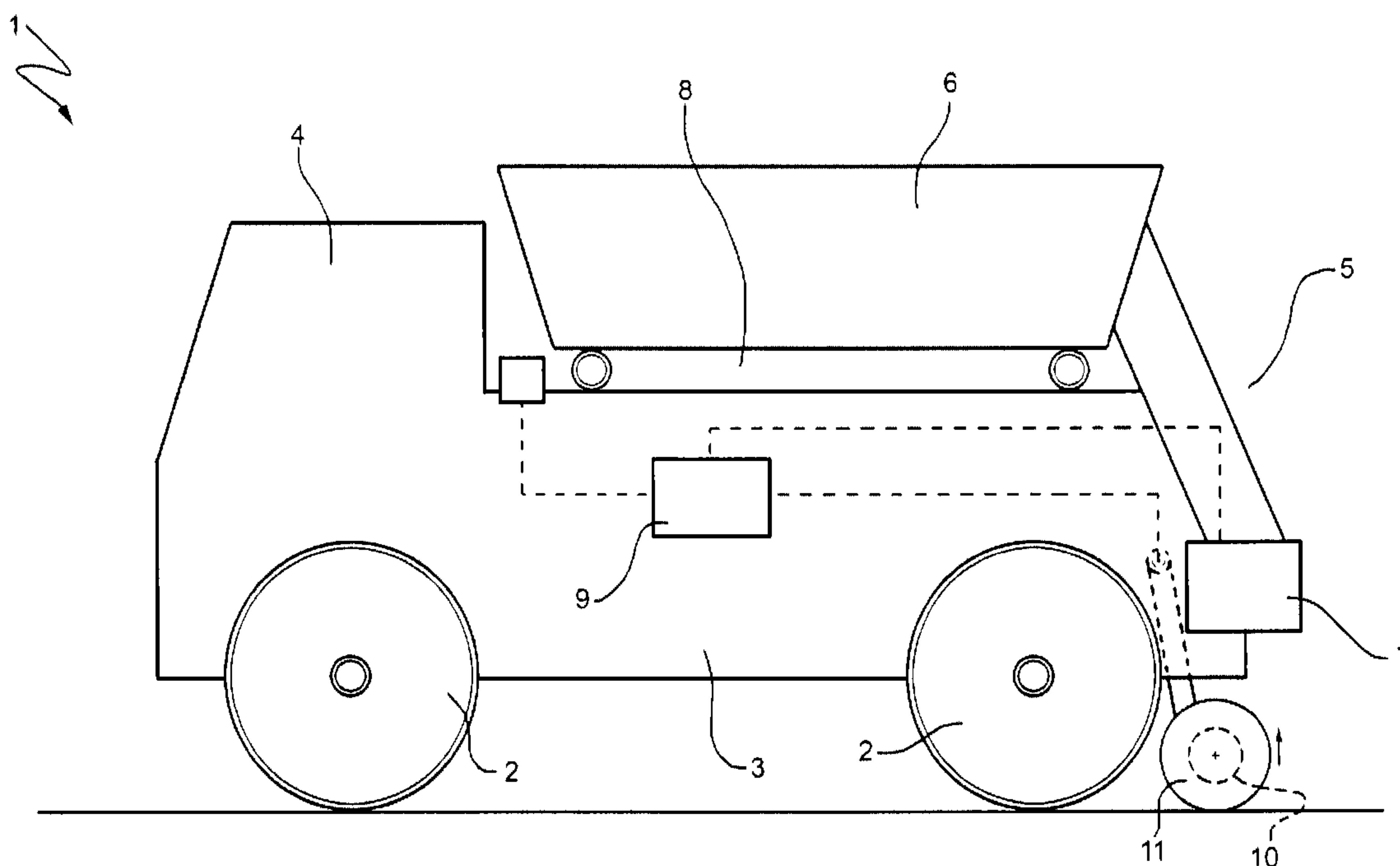


FIG. 1

(57) Abrégé/Abstract:

A spreader unit for a de-icing substance to clear a road or pedestrian surface, comprises a hopper (6) containing the de-icing substance, a spreader device (7) that receives the de-icing substance from the hopper (6) spreading the latter on the road or pedestrian surface, a carrying device (8) to convey the de-icing substance of the hopper (6) to the spreader device (7), a rechargeable battery (9) to power the carrying device (8) and an electric mechanical converter (10) for charging the rechargeable battery (9) transforming mechanical power.



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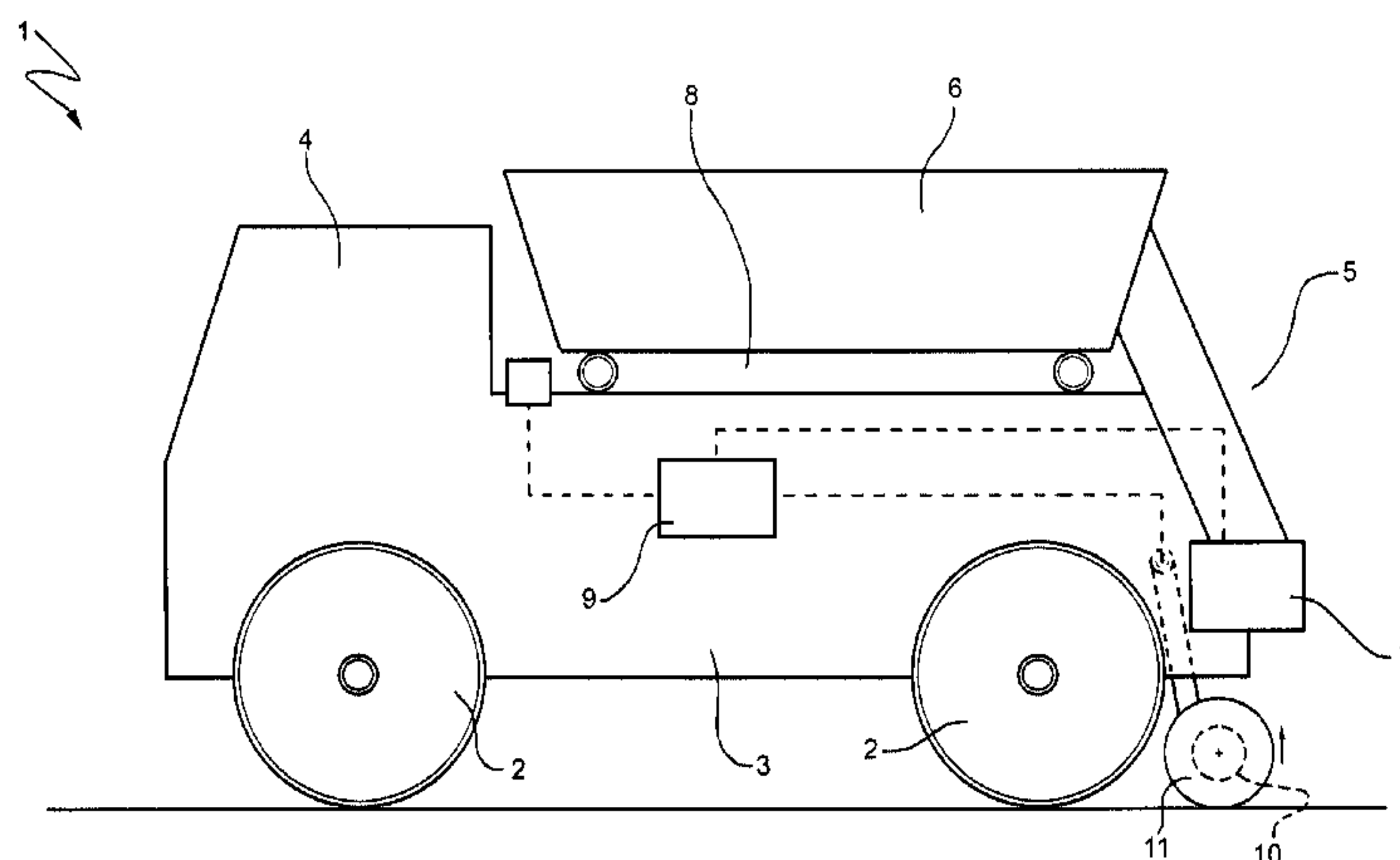


FIG. 1

(57) Abstract: A spreader unit for a de-icing substance to clear a road or pedestrian surface, comprises a hopper (6) containing the de-icing substance, a spreader device (7) that receives the de-icing substance from the hopper (6) spreading the latter on the road or pedestrian surface, a carrying device (8) to convey the de-icing substance of the hopper (6) to the spreader device (7), a rechargeable battery (9) to power the carrying device (8) and an electric mechanical converter (10) for charging the rechargeable battery (9) transforming mechanical power.

"SPREADER UNIT FOR A DE-ICING MATERIAL AND RESPECTIVE VEHICLE"

TECHNICAL FIELD

The present invention relates to a spreader unit of a de-icing material configured to be mounted on a heavy vehicle. The spreader units are used for example for cleaning streets, highways, walkways, landing and take-off runways and parking areas e.g. of logistics platforms for heavy wheeled transport vehicles.

BACKGROUND ART

It is known to provide a heavy a vehicle with a spreader unit of a de-icing material comprising a hopper, one or more rotating spreaders related to the hopper/s and one or more transport devices to gravitationally convey the material from the hopper to the de-icing spreader. The spreader also comprises a motor for driving a rotating disk that runs the spreading of the de-icing material. Normally, the carrying device and the motor of the spreader are connected to a pressurized hydraulic circuit for controlling the movable elements that process the de-icing material.

However, the hydraulic supply poses disadvantages connected to the use of the hydraulic fluid at very low temperatures with the risks of partial or total solidification of the fluid in the conduits in case of, for example, long stops. In addition, the disposal of the hydraulic fluid has a significant impact on the environment and the conduits are subject to corrosion and impact and can be damaged with high repair costs. Finally, the hydraulic system requires expensive drive systems such as power plugs from the vehicle or auxiliary engines or other similar systems.

In addition, a hydraulic circuit is usually sized based on the maximum load. In use, when the load is not at the maximum, the excess hydraulic power is dissipated resulting in wasted energy.

DISCLOSURE OF INVENTION

The purpose of the present invention is to provide a spreader unit of a de-icing material free from the above specified drawbacks.

5

The purpose of the present invention is achieved by a spreader unit of a de-icing material according to claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

10 The invention will now be described with reference to the annexed drawings, which illustrate non-limiting examples of embodiments, in which the figure is a schematic side view of a heavy vehicle, comprising a spreader unit of a de-icing material according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

15 Indicated with 1 in the figure, as a whole, a heavy vehicle, comprising at least four tyres 2 on two axes and a frame 3 on which the wheels 2 are mounted. An internal combustion engine or also electric (not shown) drives the tyres 2 and is mounted on the frame 3.

20

The frame 3 also has a compartment laterally defined by the body of a driving cab 4 and inferiorly towards the tyres 2 by support means (not shown in detail) defining the respective releasable connections and arranged on a load surface P.

25

On the vehicle 1 can be mounted with suitable support means a spreader unit of a de-icing or abrasive material 5 comprising a hopper 6 fixed to the frame 3 by way of support means, one or more spreaders 7 for the de-icing material and one or more
30 carrying devices 8 to convey the de-icing material from the hopper 6 to the spreader 7. Preferably, the carrying assembly 8 is electrically powered and comprises either a belt or chain conveyor or a dosing screw or similar systems and a rotating electric motor (not shown) to drive a rotating disc of the
35 spreader 7 if the de-icing material is granular or partially granular. Alternatively, when the de-icing material is

substantially fluid, the carrying assembly 8 comprises a fluidic electric pump and a plurality of conduits directed towards the spreader 7, which in turn comprises at least one spreading disk and/or nozzle.

5 The spreader unit of a de-icing material 5 also comprises an electrical power unit to drive the carrying device 8. In particular, the electrical power unit comprises a rechargeable battery 9 connected to the carrying device 8 and a mechanical-
10 electrical converter 10, such as a dynamo, connected to the rechargeable battery 9. In particular, according to the present invention, the dynamo 10 is driven, preferably by way of a transmission, by a movable friction wheel 11 to selectively contact one of the tyres 2. Preferably, the
15 friction wheel 11 is moved by an actuator (not shown) to perform a trajectory between two end-run positions, the first ensures that the friction wheel 11 is connected to transfer torque with the tyre 2 and the second is such that the friction wheel 11 is disconnected from the tyre 2. Electric
20 drives and controls can also be provided to check and eventually convert the voltage between the dynamo 10, the batteries 9 and the carrying assembly 8.

According to a further embodiment, the friction wheel 11 is
25 configured to directly contact the road surface. Conveniently, also the actuator is designed for this operation mode.

According to a preferred embodiment of the present invention, the spreader unit of a de-icing material 5 is configured as a
30 kit to be mounted/dismounted on a heavy vehicle 1 also already on the market. In particular, the unit 5 comprises a rigid structure to which the hopper 6, the spreader 5, the carrying device 8, the batteries 9 and the dynamo 10 are attached with the friction wheel 11. The rigid structure is mounted and
35 dismounted from the loading surface P of the vehicle 1.

Alternatively, the friction wheel 11 and the respective actuator can be directly mounted onto the spreader structure, or on the frame 3. In this case power cables are provided with fast electrical connections to connect-disconnect the dynamo 10 and the spreader 7.

In use, the spreader unit 5 is fixed on the vehicle 1 by way of fastening means comprising flexible elements such as belts and/or chains, so that the friction wheel 11 is in torque transfer contact to drive the dynamo 10 when it is in the first position. In particular, the dynamo 10 is mounted on the actuator and is also mobile as the wheel 11. Preferably the dynamo 10 and the wheel 11 are in a relative fixed position upon the actuator.

During vehicle movement, the user can automatically control the position of the friction wheel 11, i.e. the first or the second position, in order to charge the battery 9 or to disconnect the dynamo 10 from the wheels or from the road. In particular, position control of the wheel 11 can be manually operated by the driver that can activate the movement of the actuator directly from the cab, or be directly controlled by an electronic control unit that controls the activation of the actuator to charge the battery 9 when the charge level of the latter falls below a preset value.

Benefits of the spreader unit 5 are the following.

Through the use of friction wheel 11 connected to the dynamo 10 it is possible to charge the battery 9 to drive the carrying device 8 and therefore allow the spreading of the de-icing and abrasive materials. In addition, a carrying device 8 and relative batteries 9 are sized to provide a power as to be sufficient for the complete operation of the spreader unit 5 with no impact on the autonomy of the vehicle 1. In particular, the electric power required to operate the

carrying device 8 is such that the batteries 9 are dedicated to the same carrying device. The batteries of the vehicle 1 that feed the starter motor, the internal and external light circuit of the vehicle, the dashboard and the electronic devices for the operation of the internal combustion engine would not be able to provide such power.

By way of the electronic power supply, it is possible to increase the reliability of the spreader unit 5, as it ensures the work torque in all conditions and operating temperatures. A low-noise spreader unit can be also mounted on electric or silenced vehicles for the night shift in populated centers.

Finally, it appears clear that to the unit 1 described and shown herein changes and variations can be made without extending beyond the protective scope as defined by the attached claims.

According to a further embodiment, the dynamo 10 is connected directly to a power plug of the vehicle 1. For example, the power plug is arranged in the vicinity of the combustion engine at the end of the platform facing the rear of the drive cab 4.

It is also possible that the controls and electric drives comprise a plug for connecting the rechargeable batteries 9 directly to the electric network so that the batteries are recharged when the vehicle 1 is parked in a garage.

In addition, the batteries 9 are mounted in a dismountable way and preferably by means of a quick coupling. In this way, it is possible to perform a replacement of the dead batteries with charged batteries by the network without stopping the vehicle 1 for too long.

CLAIMS

1. A spreader unit for a de-icing material for cleaning a road or pedestrian surface, comprising a hopper (6) for containing said de-icing material, a spreader device (7) that receives
5 the de-icing material from said hopper (6) and spreads the latter on the road or pedestrian surface, and a carrying device (8) for conveying the de-icing material from said hopper (6) to said spreader device (7), characterised by comprising one or more rechargeable batteries (9) for
10 supplying said carrying device (8) and an electric mechanical converter (10) for charging said rechargeable battery (9) by an inputted mechanical power.
2. The spreader unit according to claim 1, characterised by comprising a mobile actuator between a first position and a
15 second position and a wheel (11) carried by said mobile actuator and connected to transfer power to said electric mechanical converter (10).
3. The spreader unit according to claim 2, characterised by comprising a rigid structure on which at least said hopper
20 (6), said spreader device (7), said carrying device (8) and said rechargeable battery (9) are rigidly fixed.
4. The spreader unit according to any of claims 2 to 3, characterised in that said electric mechanical converter (10) is mobile together with said wheel (11).
- 25 5. The spreader unit according to any of the preceding claims, characterised in that said rechargeable battery (9) is rapidly disconnectable to receive a charged battery when it is discharged.
6. The spreader unit according to any of the preceding claims,
30 characterised by comprising a power plug connected to said rechargeable battery (9) for allowing the charging of said rechargeable battery (9) by means of the electric network.
7. The unit according to any of the preceding claims, characterised by comprising an electronic control unit
35 programmed to measure a charge level of said rechargeable battery (9) and to enable the charging of said batteries (9)

by means of said electric mechanical converter (10) when said charge level falls below a preset value.

8. A vehicle comprising a unit according to one of the preceding claims when dependent on claim 2, wherein said wheel
5 (11) comes into contact in said first position either with the road surface or with a tyre (2) of said vehicle.

9. The vehicle according to claim 8, characterised in that said actuator and said electric mechanical converter (10) are fixed on a frame (3) of said vehicle and in that said electric
10 mechanical converter (10) is connected by fast electrical connections to said rechargeable battery (9).

10. The vehicle according to claim 8 when dependent on claim 3, characterised in that said electric mechanical converter (10) and said wheel (11) are fixed to said rigid structure.

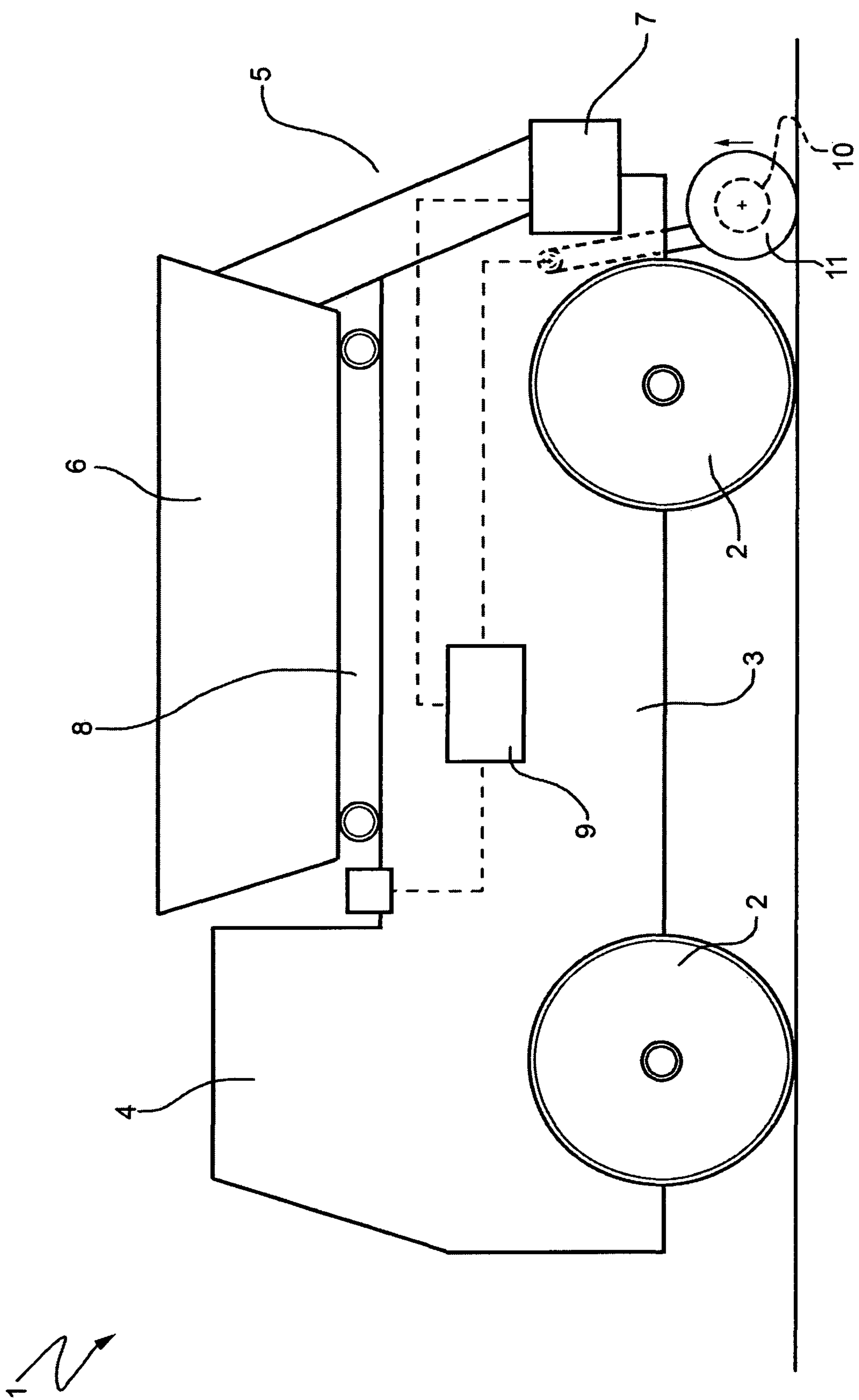


FIG. 1

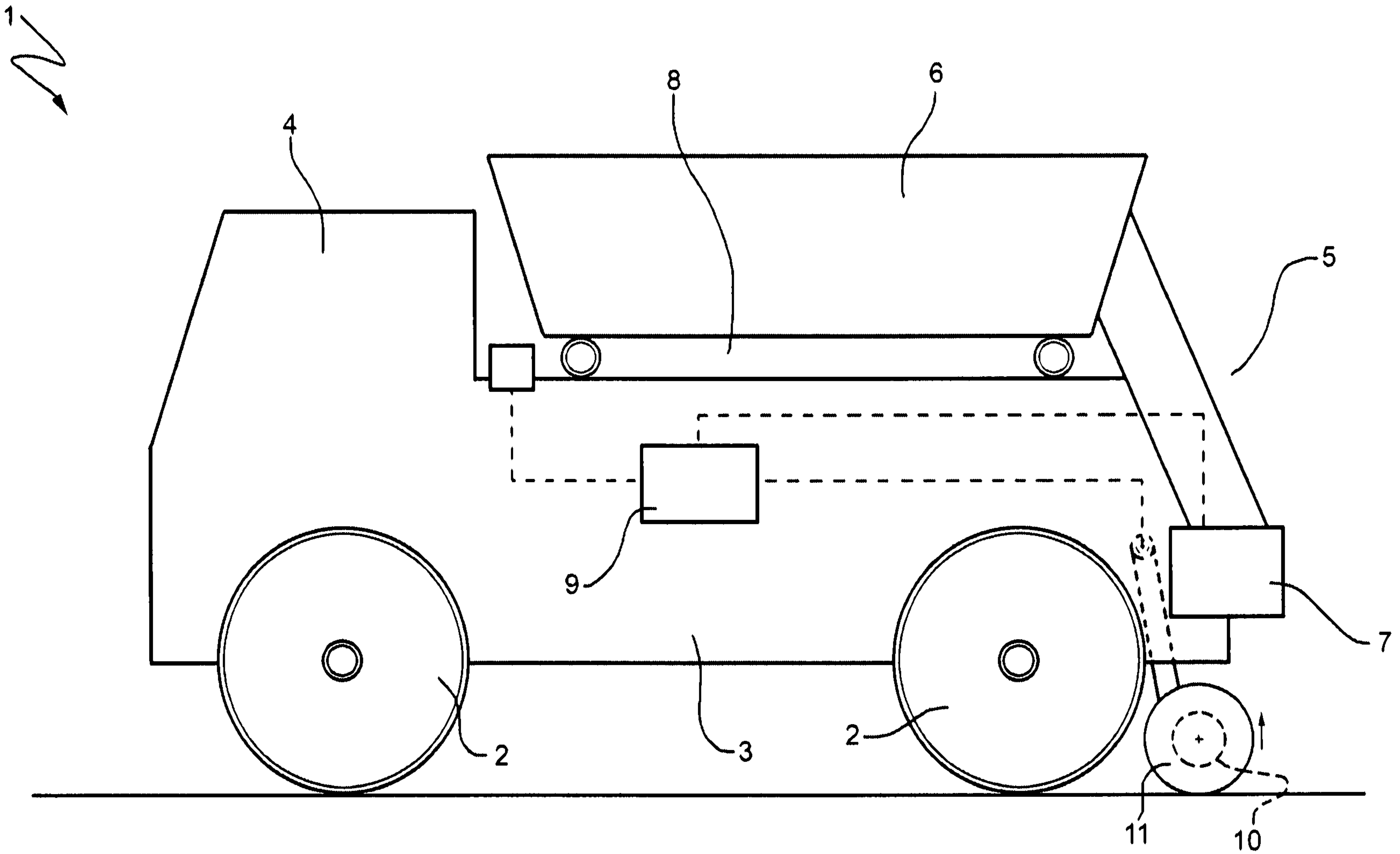


FIG. 1