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(54) **METHOD AND APPARATUS FOR ENABLING A MOTORIZED VEHICLE TO STOP AND/OR START ON ICE AND SNOW**

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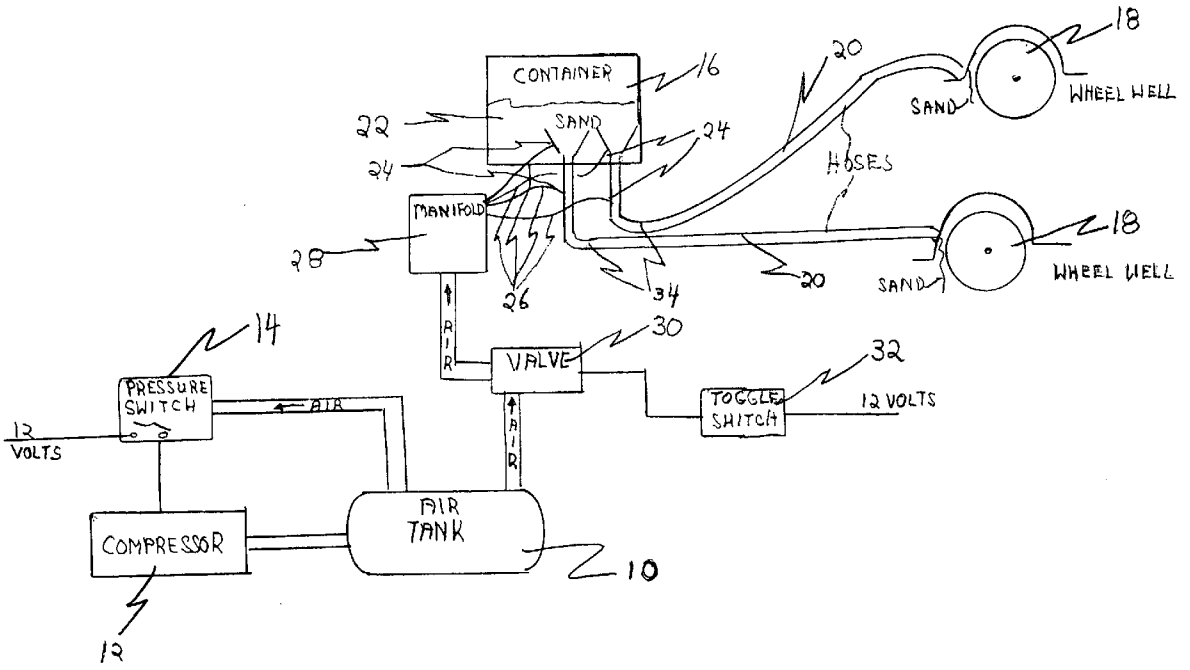
(57) **ABSTRACT**

The present invention concerns a method and apparatus for enabling a motorized vehicle to stop and/or start on ice and snow. More particularly the present invention relates to a method and apparatus which allows the driver of a motorized vehicle to safely come to a complete stop on icy/snowy roads without skidding and which also allows the driver of the motorized vehicle to move forward from a stopped position on icy and snowy roads without slippage between the wheels of the motorized vehicle and the road surface.



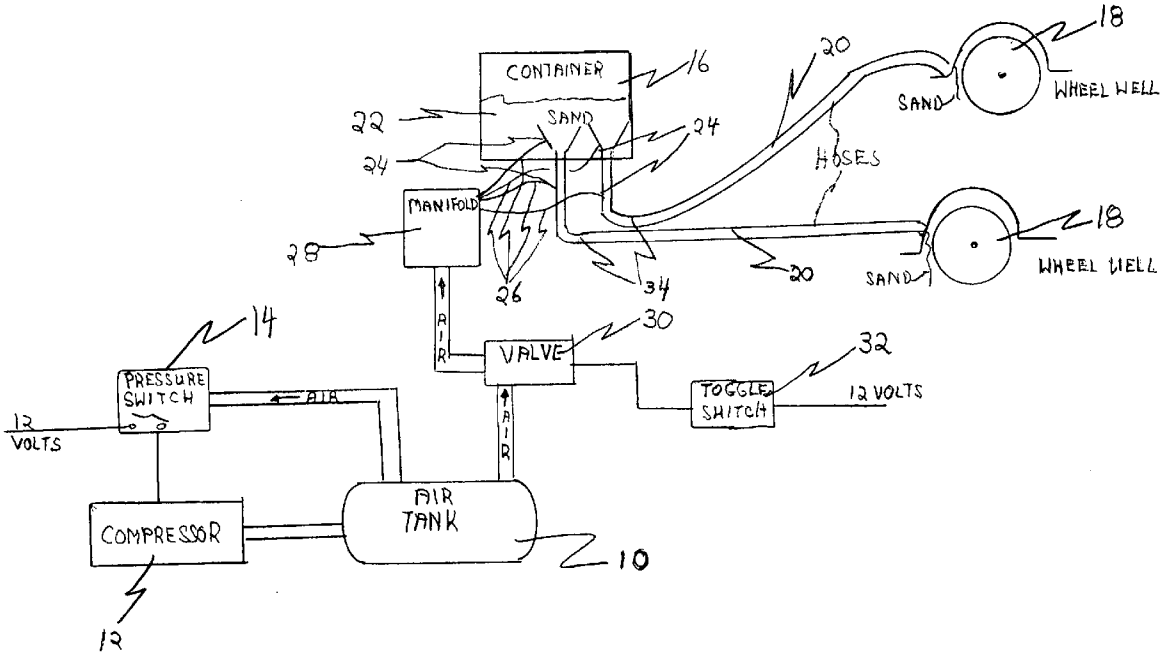

CONTAINER
16
SAND
22
24
24
MANIFOLD
28
26
34
20
20
18
SAND
WHEEL WELL
HOSES
18
SAND
WHEEL WELL
14
PRESSURE SWITCH
12 VOLTS
AIR
AIR
VALVE
30
AIR
32
TOGGLE SWITCH
12 VOLTS
COMPRESSOR
AIR TANK
10
12

Fig 1

METHOD AND APPARATUS FOR ENABLING A MOTORIZED VEHICLE TO STOP AND/OR START ON ICE AND SNOW

FIELD OF THE INVENTION

[0001] The present invention relates to a method and apparatus for enabling a motorized vehicle to stop and/or start on ice and snow. More particularly the present invention relates to a method and apparatus which allows the driver of a motorized vehicle to safely come to a complete stop on icy/snowy roads without skidding and which also allows the driver of the motorized vehicle to move forward from a stopped position on icy and snowy roads without slippage between the wheels of the motorized vehicle and the road surface.

[0002] The apparatus of the present invention involves the application of compressed air to one or more sand reservoir containers located within the motorized vehicle and delivering the sand to the leading surface of the motorized vehicle's tires and/or the road surface immediately in front of these tires.

BACKGROUND OF THE INVENTION

[0003] The problems associated with driving a motorized vehicle safely on icy/snowy roads are well known to anyone who has found it necessary to drive under such conditions. Typically one who drives on icy/snowy roads often finds the drive wheels of the motorized vehicle which they are using are slipping causing the vehicle not to move forward from a complete stop, and/or causing the vehicle to skid either when stopping or even in normal driving mode for example when the vehicle is rounding a corner or taking a turn in the road.

[0004] The method and apparatus of the present invention is designed to overcome the slippage problem associated with driving under icy/snowy road conditions and to allow the motorized vehicle to safely transact the prescribed route without skidding or being prevented from doing so due to the ice or snow on the road.

[0005] While a number of prior art references are available in the art, each of which references are directed to some specific discreet elements of the system and apparatus which is described and claimed in the present invention, the applicant is not aware of any reference which is directed to the totality of the combination, or its use and function in the manner, described and claimed herein.

OBJECTS OF THE INVENTION

[0006] It is therefore an object of the present invention to allow the driver of a motorized vehicle to safely operate the vehicle on icy/snowy roads without skidding.

[0007] It is a further object of the present invention to provide the driver of a motorized vehicle to safely come to a complete stop on icy/snowy roads without encountering loss of control of the vehicle due to skidding.

[0008] It is a further object of the present invention to provide the driver of a motorized vehicle to initiate forward motion on icy/snowy roads without encountering slippage of the vehicle's drive wheels.

[0009] Lastly, it is an object of the present invention to provide an apparatus which permits a safe and convenient means of dispensing sand or an equivalent material to or near the drive wheels or braked wheels of a motorized vehicle such that the vehicle may be operated on icy/snowy roads without skidding or slippage.

[0010] These and other objects of the present invention will become apparent from the following discussion of the invention.

SUMMARY OF THE INVENTION

[0011] The present invention provides for a method and apparatus for enabling a motorized vehicle to stop and/or start on ice and snow. More particularly the present invention relates to a method and apparatus which allows the driver of a motorized vehicle to safely come to a complete stop on icy/snowy roads without skidding and which also allows the driver of the motorized vehicle to move forward from a stopped position on icy and snowy roads without slippage between the wheels of the motorized vehicle and the road surface.

[0012] The construction and obvious advantages of the system provided for by the present invention will be more clearly understood from the following description of the various specific embodiments when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] **FIG. 1** is a schematic representation of the apparatus of the present invention showing the critical components necessary to carry out the method claimed.

DETAILED DESCRIPTION OF THE INVENTION

[0014] The present invention is directed to a method and apparatus for enabling a motorized vehicle to stop and/or start on ice and snow. More particularly the present invention relates to a method and apparatus which allows the driver of a motorized vehicle to safely come to a complete stop on icy/snowy roads without skidding and which also allows the driver of the motorized vehicle to move forward from a stopped position on icy and snowy roads without slippage between the wheels of the motorized vehicle and the road surface.

[0015] The apparatus of the present invention incorporates a device to move sand through a flexible hose in a vehicle. This device is intended to move sand from a container down through a hose for a distance of up to seven feet and then deposit the sand where the tire meets the road. The motive force used to transport the sand preferably will be compressed air. A small 12 volt compressor fills a 5-7 gallon compressed air tank to a pressure of approximately 100 psi. The pressure in the tank is controlled by a pressure switch that has a hysteresis of approximately 30 psi. That is, the compressor will stay on until the air is at 100 psi. As the compressed air is used and the pressure falls below 70 psi, the pressure switch will turn the compressor back on until it again reaches 100 psi again. In one embodiment of the present invention compressed air is released manually using a toggle switch that is easily accessible to the driver. When toggled, a valve opens permitting the compressed air to escape through the hose.

[0016] The actual size of the compressor is not critical and may vary from about a 12 volt to about a 48 volt compressor.

[0017] It is well known that sand likes to clump, and while it will roll off one's open hand, in a closed container it will act quite like a solid. At the point where the sand leaves the container it is necessary to prevent clumping. Therefore, compressed air is injected at the point where the hose is attached to the container. However, further along the hose, approximately 8 to 12 inches we do want the sand to clump. If the sand does not block the passageway in the hose the compressed air will simply escape the hose leaving the sand behind. In order to force the sand to clump and block the passageway, a slight trap is created. This is accomplished by having the hose, which is positioned vertically as it exits the container, make a turn in excess of 90 degrees creating a bend similar to the trap under a kitchen sink. The sand, by force of gravity will find its way into the trap and block the passageway. When the compressed air is released into the hose it will efficiently blow the sand through the remaining six feet of hose and out the end, depositing it at or near the point where the tire meets the road surface.

[0018] Between the anti-clumping air injection and the trap area where the sand clumps are generally up to three (3) additional air injection points for a total of four. That is, when the toggle switch is activated air is injected at up to four locations.

[0019] At this point, if the compressed air is allowed to continue to escape, the compressed air will prevent the sand from leaving the container. To prevent this condition, the compressed air must be shut off momentarily allowing more sand to drop into the trap. Then by releasing compressed air again, new sand will be discharged through the hose and so on. In the preferred embodiment of the invention the metering of the sand is accomplished by toggling the switch. However, it is contemplated that when the toggle switch is held in the ON position a secondary circuit will control the actuation of the valve and accomplish the metering of sand automatically. This will cause the discharge of sand to be more repeatable and quicker.

[0020] In another preferred embodiment of the present invention the user actuates a momentary start switch which results in a preset number and quantity of sand deposits being made. Therefore, one may 1) continuously hold down a switch while sand is automatically metered, or 2) momentarily push on a switch resulting in a preset amount of sand being deposited.

[0021] It has also been found that the container must have a cover which while not necessarily air tight must certainly be very snug. Nature likes the path of least resistance. The compressed air will find its way through the sand in the container and out the top if there is no snug fitting cover. In other words the easiest way out must be through the discharge hose.

[0022] It should be understood that the apparatus of the present invention comprises two independent systems, both tied to the air tank. One system is used to fill the tank with compressed air, the other to dispense the air into the discharge hose(s).

[0023] There are three components needed to fill the tank. The compressor, the tank and the pressure switch. This system is automatic and requires no operator assistance. The pressure switch is air actuated. When the air pressure is below 70 psi the switch will be closed (ON) and the voltage will be applied to the compressor, turning it on and pumping up the air in the tank. When the pressure reaches 100 psi the switch will open and the compressor will shut off.

[0024] The dispensing system requires six components. The pressurized tank; the electrical switch (or electronic circuit); the valve; the manifold; the sand container(s) and the hose(s) to distribute the air. This system is activated by the vehicle driver. In one embodiment of the invention the driver will manually toggle the switch. With the switch ON the valve which controls the release of air will open allowing the compressed air to flow through the hoses by way of the manifold and blow the sand out the two discharge hose(s). The manifold is used to distribute the air at up to four air injection sites on each hose. The valve must be opened and closed at approximately one second intervals, in order to accomplish the efficient discharge of sand through the discharge hoses onto the tire surfaces, where the tire meets the road.

[0025] In another preferred embodiment of the invention, a device paralleling the toggle switch such as a relay, will be electronically activated by another circuit which senses the slippage in the vehicle's drive wheels and/or braking wheels and reacts by initiating the discharge of sand by intermittently turning on the relay. In such an arrangement there would also be provided an override switch which would also allow the vehicle driver to disable the sand dispensing system, such as when the driver is aware that there is no sand in the system, or when no icy or snowy road condition exists.

[0026] With reference to **FIG. 1**, shown are the compressed air tank **10**, the compressor **12**, actuated by pressure switch **14**. Also shown are the closed container **16**, connected to the wheels **18** of the motorized vehicle, by means of hoses **20**. The closed container **16** has a quantity of sand **22** which is transported by means of hoses **20** to wheels **18** by means of compressed air injected into hoses **20** at various points **24** along hoses **20** through injection tubes **26**. Injection tubes **26** are connected at one end to manifold **28** which is supplied with compressed air through valve **30** from compressed air tank **10**. Valve **30** is actuated using toggle switch **32**. Transport hoses **20** are provided with a trap **34** to prevent bypass of the compressed air without moving sand to the discharge point of hoses **20** at wheels **18**.

[0027] Typically, there may be three or four different injection points for the compressed air to enter into the hose. These injection points are always upstream from the trap and downstream from the container exit. The air hose from the compressed air tank has a ¼ inch inner diameter. The air is divided into six or eight smaller hoses through the use of a manifold depending on how many injection points one employs. There are two hoses, one for each tire. The total cross sectional area of the small injection hoses should be on the order of the 1/16 th square inch. The injection points are equally spaced between the container and the trap and each injection site is offset 90 degrees from the adjacent injection site. A typical portable compressor that is designed for pumping up tires will take 20 to 30 minutes to fill a 7 gallon tank to 100 psi. All these parameters can be varied by using a bigger/smaller tank, higher pressures, or a more powerful compressor.

[0028] The transfer hose is a critical component of the apparatus of the present invention since it has to meet contradictory requirements. It must have a substantial wall

thickness sufficient to support the injection tubes or even the implant of the injection tubes in the tube wall. It must be flexible enough to make a curve with a diameter of no more than **4** inches and it must do so without closing off the tube. In addition, the transfer hose must function in the same temperature environment that a vehicle does.

[**0029**] The sand should be on the road within a second of toggling the switch. Successive amounts of sand will be metered out in about one second intervals. The ability to move the sand is compromised when the air pressure drops below 35 psi.

[**0030**] It is contemplated that the sand, or sand like material, which is useful in carrying out the method of the present invention will encompass a variety of materials varying from commonly available sand materials presently used on road surfaces to reduce skidding to more refined and specifically designed crystalline aggregates which may become available in the future. The use of a particular type of sand, or sand like material, may require varying one or more of the parameters, such as the pressure used, in order to effectively distribute the sand, or sand like material, in the manner taught herein.

[**0031**] It will be further apparent to one skilled in this art that the improvements provided for in the present invention, while described with relation to certain specific physical embodiments also lend themselves to being applied in other physical arrangements not specifically provided for herein, which are nonetheless within the spirit and scope of the invention taught here.

I claim:

1. A method for enabling a motorized vehicle to stop and/or start on ice and snow comprising intermittently distributing a quantity of sand, or equivalent sand like material, to the surface of the vehicle's drive wheels by means of a self-contained on-board apparatus.

2. A method according to claim 1 for allowing a motorized vehicle to safely come to a complete stop on icy/snowy roads without skidding comprising intermittently distributing a quantity of sand, or equivalent sand like material, to the surface of the vehicle's braked wheels where the wheels meet the road surface by means of a self-contained on-board apparatus.

3. A method according to claim 1 for allowing a motorized vehicle to move forward from a stopped position on icy/snowy roads without slippage between the wheels of the motorized vehicle and the road surface comprising intermittently distributing a quantity of sand, or equivalent sand like material, to the surface of the vehicle's drive wheels where the wheels meet the road surface by means of a self-contained on-board apparatus.

4. The method according to claim 1, wherein the quantity of sand is intermittently distributed by means of a self-contained on-board apparatus which is manually actuated by the user.

5. The method according to claim 1, wherein the quantity of sand is intermittently distributed by means of a self-contained on-board apparatus which is automatically actuated by a means for sensing the slippage in the vehicles wheels.

6. The method according to claim 2, wherein the quantity of sand is intermittently distributed by means of a self-contained on-board apparatus which is manually actuated by the user.

7. The method according to claim 2, wherein the quantity of sand is intermittently distributed by means of a self-contained on-board apparatus which is automatically actuated by a means for sensing the slippage in the vehicles wheels.

8. The method according to claim 3, wherein the quantity of sand is intermittently distributed by means of a self-contained on-board apparatus which is manually actuated by the user.

9. The method according to claim 3, wherein the quantity of sand is intermittently distributed by means of a self-contained on-board apparatus which is automatically actuated by a means for sensing the slippage in the vehicles wheels.

10. An apparatus for intermittently distributing a quantity of sand, or equivalent sand like material, to the surface of a motorized vehicle's drive wheels where the wheels meet the road surface comprising an air tank for holding compressed air, a compressor to pressurize the air supplied to the air tank, a pressure switch to maintain the pressure in the compressed air tank above a minimum level, one or more distribution hoses, each of which is connected to a closed sand reservoir container, said distribution hoses terminating at a point in proximity to the surface of the drive wheels of the motorized vehicle, each of said transfer hoses also being provided with one or more injection tubes to supply compressed air to the transfer hoses, said injection tubes being connected at one end to a manifold and at the other end to various points along the length of the transfer hoses, said manifold connected to the compressed air tank by means of a compressed air transfer line having a valve, said valve actuated by a toggle switch.

11. The apparatus according to claim 10, wherein the actuation toggle switch is manual.

12. The apparatus according to claim 10, wherein the actuation toggle switch is replaced by a means for sensing the slippage in the vehicle's drive wheels and/or braking wheels and automatically initiating the discharge of sand by means of a relay switch.

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