Jan. 17, 1967 A. J. PICARD 3,298,727

APPARATUS FOR DISPENSING GRIT MATERIAL

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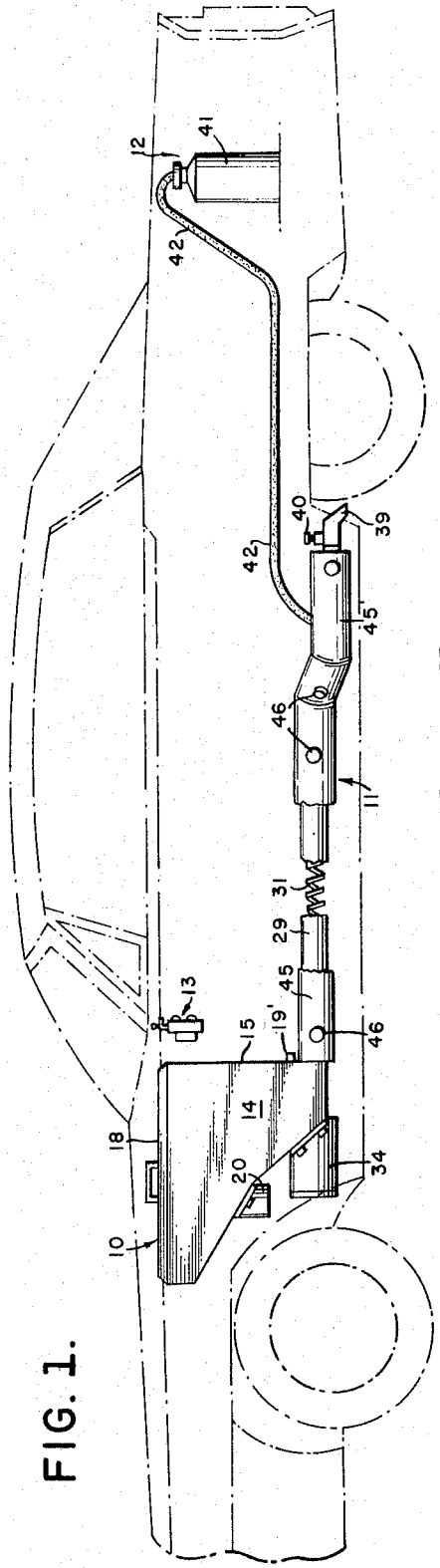


FIG. 1.

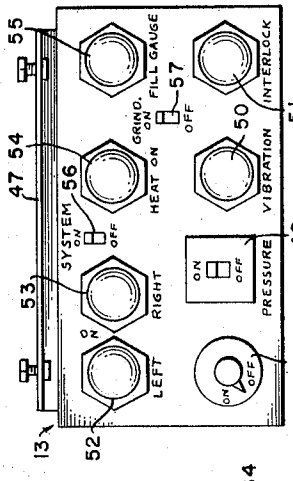


FIG. 5.

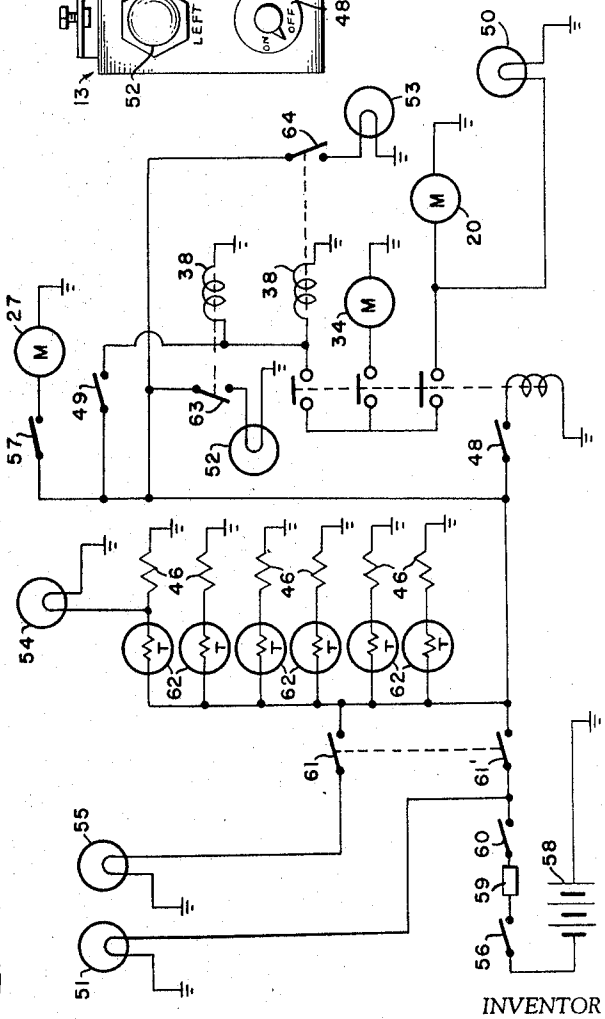


FIG. 7.

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FIG. 2.

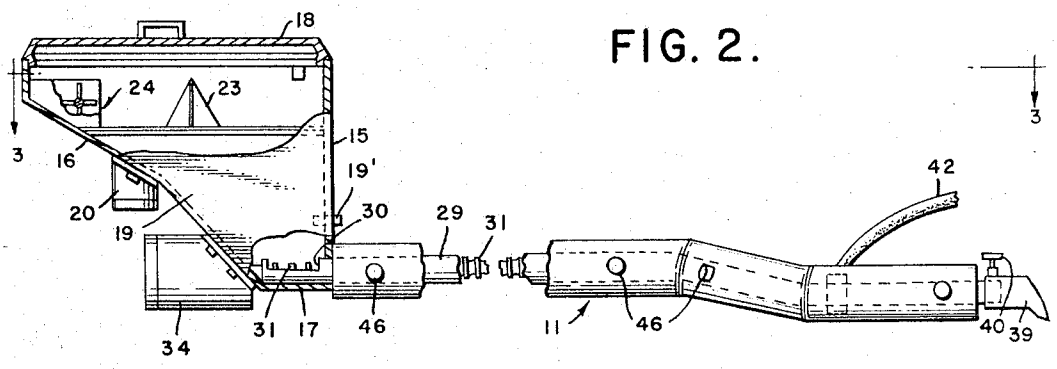


FIG. 3.

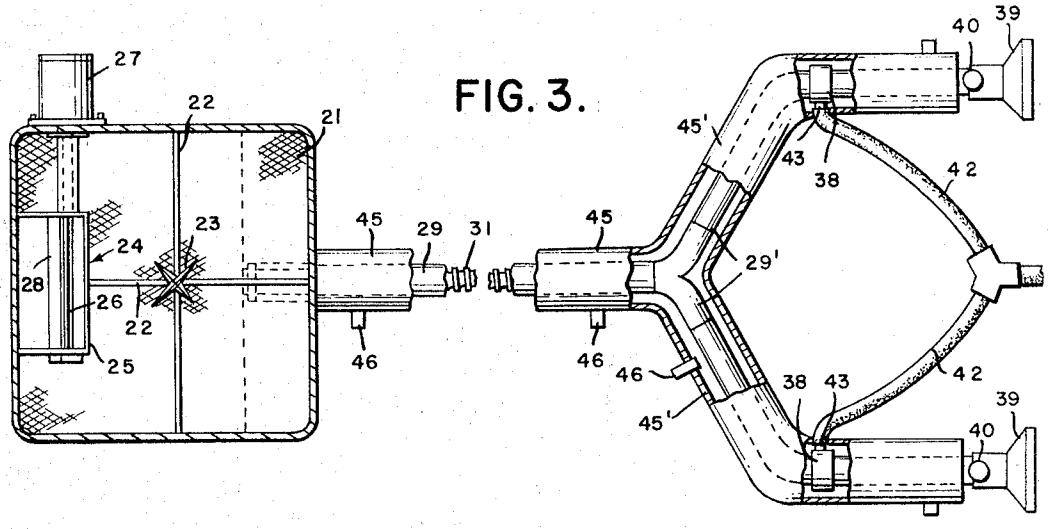
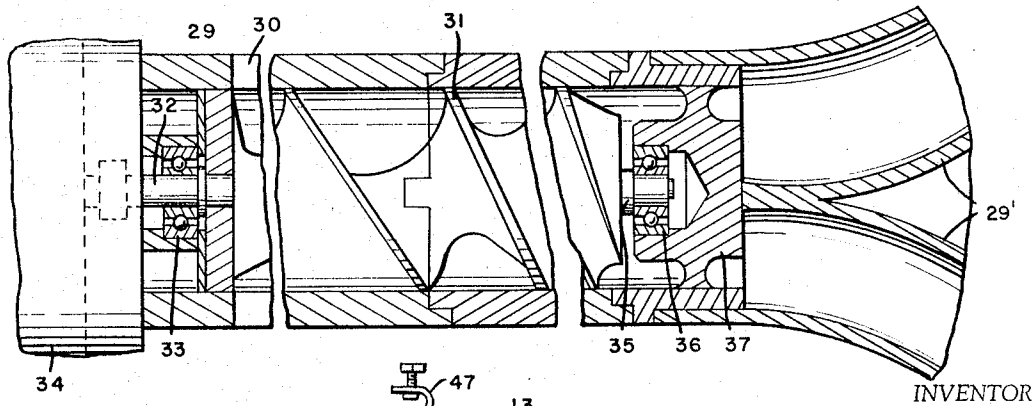


FIG. 4.



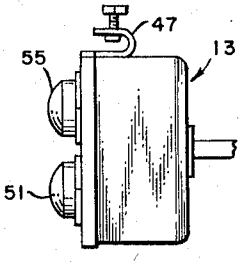


FIG. 6.

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APPARATUS FOR DISPENSING GRIT MATERIAL

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8 Claims. (Cl. 291—3)

This invention relates to a device for dispensing grit material in the path of movement of a land vehicle, to increase wheel traction and facilitate movement thereof over slipper roads, the material being automatically dispensed as needed at the discretion of the vehicle operator.

It is an object of this invention to provide a grit material dispensing device adapted for facile attachment to a conventional land vehicle for depositing grit material in the path of the drive wheels thereof, the device including means for assuring the expulsion of the grit material in granular form for optimum results.

Another object is to provide a grit material dispensing device of the character described, which is completely self-enclosed, and includes a hopper, feed means for delivering the grit material from the hopper to the loci of the drive wheels, means for preventing freezing and clogging of the grit material in the dispensing device, and pressure means to effect a forced expulsion of grit material into the path of the vehicle drive wheels.

Other objects are to provide a grit material dispensing device including hopper-vibrating means for facilitating gravitation of the grit material to the feed means; to provide a separator for preventing foreign objects from becoming lodged in the feed means in conjunction with which is a member for cutting or crushing the foreign objects to a size that can be fed through the separator to the feed means; to provide means for heating the grit material to prevent freezing or clogging thereof; and to provide a control panel for the dispensing device, located within the vehicle, to facilitate operation of the various components of the device and to indicate workability of the various parts.

Other objects of the invention will be manifest from the following description of the present preferred form of the invention, taken in connection with the accompanying drawings, wherein:

FIG. 1 is a side elevational view of the apparatus of the present invention, illustrating its application;

FIG. 2 is an enlarged side elevational view of the apparatus of the present invention per se, portions thereof being broken away to disclose details;

FIG. 3 is a sectional view taken along the lines 3—3 of FIG. 2, looking in the direction of the arrows;

FIG. 4 is an enlarged fragmentary sectional view of the feed means forming a part of the present invention;

FIG. 5 is a front plan view of a control panel forming a part of the present invention;

FIG. 6 is an end elevational view of the same; and

FIG. 7 is an electrical schematic diagram of the circuitry of the present invention.

Referring now in greater detail to the drawings, there is illustrated in FIG. 1, a conventional automobile which is equipped with the device of the present invention. The device generally includes a grit material reservoir **10**, a feed assembly **11**, a pressure unit **12**, and a control panel **13**.

Grit material reservoir **10** may be resiliently mounted on the firewall of an automobile or any other convenient spot, and includes a hopper-like receptacle having side walls **14**, a vertical end wall **15**, an end wall **16** slanting in the direction of wall **15**, and a bottom wall **17**. The top of the receptacle is normally closed by a cover **18** which is removable to permit grit material **19**, such as sand, to be poured into the receptacle. A fill gauge lever **19'**, of any suitable construction, is mounted in wall **15** in the lower portion of the receptacle, for indicating when additional grit material should be added, in a manner which will be hereinafter more fully set out.

A standard vibrator **20** is mounted on the outside of slanting end wall **16** to insure gravitation of grit material **19** into engagement with feed means **11**. Vibrator **20** may be operated by any suitable power means.

Referring now to FIGS. 2 and 3, it will be seen that a screen **21** of predetermined mesh is positioned within the hopper-like receptacle, in the upper portion thereof, to prevent foreign objects or oversized lumps of grit material from passing into and clogging the feed means. Superadjacent screen **21** are cross bars **22**, the terminals of which are suitably fixed to the walls of the hopper-like receptacle. A bag cutter **23** is fixed to the cross bars at their point of intersection, for piercing sand bags or other containers for grit material, to facilitate pouring thereof into the hopper-like receptacle. As shown in FIGS. 2 and 3, bag cutter **23** preferably includes a pair of cross blade members at right angles to each other, the upper terminals of which terminate in a point which effects initial piercing of the bag.

Adjacent the bag cutter there is provided mechanism **24** for grinding or crushing foreign objects and oversized particles of grit material, which is suitably mounted in a support assembly **25**. Mechanism **24** includes a shaft **26**, one end of which is journaled in support assembly **25** and the other end of which extends to suitable power means **27**. A plurality of cutting blades **28** are fixed to shaft **26** and are rotatable therewith for engaging and cutting up the foreign objects and oversized particles, prior to permitting the gravitation thereof into that portion of the hopper-like receptacle below screen **21**.

Feed means **11** includes a screw conveyor housing **29**, extending from a point within the lower terminal of reservoir **10** rearwardly for a substantial distance, at which point, the housing issues into a manifold **29'** which extends laterally and rearwardly to a point adjacent the locus of the drive wheels of the vehicle. That portion of housing **29** within reservoir **10** is open, as indicated at **30** to permit gravitation of grit material **19** therein for engagement and conduction by a screw conveyor **31**. A drive shaft **32** extends from screw conveyor **31** through a ball bearing assembly **33** to a motor **34** suitably mounted on wall **16** of reservoir **10**. The opposite end of screw conveyor **31** is similarly provided with a shaft **35** rotatably mounted in a ball bearing assembly **36** which is centrally supported within housing **29** by mounting means **37**. As shown to advantage in FIG. 4, housing **29** and screw conveyor **31** are preferably of sectional construction, the sections being readily connected together to form a unit of the desired length, depending upon the particular vehicle to which the apparatus is attached.

Manifold sections **29'** are provided with solenoid valves, **38** at points in spaced relation to the terminals of the manifold sections for controlling the pressure of the grit material emitted by the apparatus. The terminals of manifold sections **29'** are fitted with grit material deflectors, or discharge nozzles **39**, secured to the manifold terminals by lock pins **40**.

It is also with the contemplation of the present invention to provide means for discharging the grit material under pressure from discharge nozzle **39** by means of pressure unit **12**. This unit includes a tank **41** preferably containing a pressurized gas or air which is connected by conduit means **42** to an inlet opening **43** located adjacent the terminals of manifold sections **29'**. Solenoid valves **38** control the admission of air or gas to the feed means.

In accordance with the present invention, feed means **11** further includes a waterproof jacket or housing **45** and manifold sections **45'** placed over housing **29** and

manifold sections 29', the manifold sections extending rearwardly to a point adjacent nozzles 39. Jacket 45 and manifold sections 45' are in spaced relation to housing 29 and manifold sections 29' to provide an air space. Thermostatic heat control points and heating coils 46 are located at predetermined intervals along the length of jacket 45 and manifold sections 45' for heating air in the air space between the jacket 45 and housing 29 and between jacket manifold sections 45' and housing manifold sections 29', the heat being transmitted through the housing to the grit material for maintaining the latter in a dry, unfrozen condition during its passage through the feed means and thereby preventing packing or jamming from occurring. To further obviate such an occurrence screw conveyor 31 is preferably constructed of a flexible material.

For controlling operation of the present apparatus, it is within the contemplation of the present invention to provide a control panel 13, which is preferably mounted by clip means 47 on the dashboard or the like, proximate the vehicle operator. Control panel 13 includes a feed switch 48, and a pressure switch 49. Additionally, there are provided lamps for indicating operation of the various components of the present system, including a vibrator indicator lamp 50, an interlock indicator lamp 51, a lamp 52 for indicating proper operation of the mechanism for delivering grit material in the path of the left rear wheel, a lamp 53 for indicating proper operation of the mechanism for delivering grit material in the path of the right rear wheel, a heat indicator lamp 54 and a fill gauge indicating lamp 55. A system shut-down switch is indicated at 56 and a grinder control switch at 57.

The electrical circuitry of the present invention illustrated in FIG. 7, is a by-passed heater control circuit with a time delay relay to provide a cycling effect and manually set to operate, once the circuit is activated. For operating the mechanism in accordance with the present invention, battery 58 of the vehicle may be employed as a source of electrical power and is connected through system shut-down switch 56 and a fuse 59 to a functional interlock switch 60. Interlock switch 60 is closed upon placement of cover 18 on the reservoir receptacle and when shut-down switch 56 is also closed, lamp 51 is activated.

Fill gauge lever 19' controls synchronously operated switches 61 and 61' which are also in circuit with battery 58, shut-down switch 56 and interlock switch 60, the switches being normally closed under pressure of the grit material in reservoir 10, but opened when the grit material is below the level of the lever, to deactivate fill gauge indicating lamp 55. The opening of switch 61' deenergizes all other components of the system with the exception of interlock lamp 51. Thus, operation of heaters 46 and parts actuated by motors 27, 34 and 20 ceases, until the supply of grit material in the receptacle reservoir is replenished.

In parallel circuit with battery 58 and the ground are a plruality of heating coils 46 controlled by conventional thermistors 62 and operable when switches 56, 60 and 61' are closed.

Operating switch 48 is preferably an adjustable time delay relay in circuit with battery 58 and operable to activate screw feed motor 34, vibrator motor 20 and vibrator indicating lamp 50. Additionally, time delay relay 48 actuates solenoid valves 38 which activate movable contacts 63 and 64 to illuminate left and right function lights 52 and 53 respectively, thereby indicating solenoid valves 38 are open for depositing sand in the path of the left and right rear wheels of the vehicle.

A by-pass circuit on the battery side of time delay relay 48 permits opening of valves 38 and illumination of lights 52 and 53 independently of the operation of time delay relay switch 48. This permits particles of grit material to be removed from the locus of the solenoid valves, by the pressurized gas in tank 41.

Grinder control switch 57 is also located in the by-pass circuit on the battery side of switch 48 for controlling operation of motor 27, which actuates mechanism 24 for grinding or crushing foreign objects or oversized particles of grit material. Thus mechanism is also operable independently of switch 48 and parts controlled thereby.

In use, bagged grit material is dropped into reservoir 10, engaging bag cutter 23 to permit egress of the grit material therefrom. Cover 18 is then placed on the receptacle to close interlock switch 57. The grit material passes through screen 21 to the lower part of the hopper-like receptacle. Any foreign objects or grit material particles which are too large to be passed through screen 21 may then be directed into grinding and crushing mechanism 24. Upon actuation of motor 27 by control panel switch 27', these particles are ground up and permitted to pass downwardly into the hopper-like receptacle.

When hazardous driving conditions dictate the application of grit material in the path of the drive wheels of the vehicle, it is only necessary that the vehicle operator turn on switches 48 and 56 to initiate immediate operation. Vibrator 20 is thereby actuated to facilitate gravitation of the grit material 19 into that portion of housing 29 which is open at 30. Operation of switch 48 also actuates flexible screw conveyor 31 for conveying the grit material in a well known manner, through housing 29, following which it is directed into manifold sections 29'. Simultaneously, heating elements 46 heat the air between jacket 45 and housing 29 and between jacket sections 45' and housing sections 29' to effect thawing and drying of the grit material to prevent clogging and lumping thereof. This further maintains the grit material in the desirable granular form for use in accordance with the objects of the present invention.

The grit material is carried to a point adjacent to solenoid valves 38 at which time, the gas in tank 41 forces the grit material under pressure onto the ground in the path of the rear wheels of the vehicle.

The present device may be turned off and on as needed, at the discretion of the operator, to immediately supply the grit material.

While there has been herein shown and described the presently preferred form of the present invention, it is to be understood that such has been done for purposes of illustration only, and that various changes may be made therein within the scope of the claims hereto appended.

What is claimed is:

1. In an attachment for a land vehicle having traction drive members, apparatus for dispensing grit material, the apparatus including a reservoir for grit material mounted on the vehicle, a cylindrical housing extending from said reservoir, a horizontal screw conveyor within said cylindrical housing, a portion of said screw conveyor extending into said reservoir, power means connected to said screw conveyor for actuating the latter and moving the grit material longitudinally through said housing, a manifold issuing from the terminal of said housing remote from said reservoir for delivering grit material to the locus of the traction drive members, the screw conveyor extending within said cylindrical housing to a point proximate said manifold, discharge nozzles connected to the manifold terminals, gas pressure means in communication with said manifold adjacent said discharge nozzles for facilitating emission of the grit material, solenoid valves in spaced relation to the terminals of the manifold for controlling the pressure of the grit material emitted through the discharge nozzles, and means for actuating said solenoid valves.

2. The attachment of claim 1, with the addition of a jacket in spaced relation to said housing and manifold, and spaced heating elements connected to said jacket at intervals for heating the air space between the jacket and housing and the jacket and manifold, the heat being trans-

ferred to the grit material for maintaining the latter in a dry, unfrozen condition during its passage through the housing and manifold.

3. The attachment of claim 1, with the addition of means within said reservoir for grinding the grit material to particles of predetermined size, and means for actuating said grinding means.

4. The attachment of claim 1, wherein said reservoir comprises a hopper-like receptacle, and a vibrator engaged with said hopper-like receptacle to insure gravitation of the grit material into engagement with the screw conveyor.

5. The apparatus of claim 1, with the addition of incising means mounted in the top of said reservoir for perforating grit material containers.

6. In an attachment for a land vehicle having traction wheels, apparatus for dispensing grit material, the apparatus including a hopper-like receptacle for grit material, a bag cutter mounted in the upper portion of said receptacle for piercing grit material containers, mechanism for grinding and cutting foreign objects and oversized particles to a predetermined size, means for actuating said mechanism, feed means for the grit material including a screw conveyor housing extending from a point within the lower terminal of said receptacle to a point remote therefrom, a horizontal screw conveyor within the screw conveyor housing, a portion of said screw conveyor extending into the lower portion of said receptacle, power means connected to said screw conveyor for actuating the latter and moving the grit material longitudinally through said housing, a manifold issuing from the terminal of said screw conveyor housing remote from said receptacle, for delivering grit material to the locus of the traction wheels, the screw conveyor extending within said screw conveyor housing to a point proximate said manifold, a jacket over, and in spaced relation to, said screw conveyor housing and manifold, spaced heating elements connected to said jacket for heating the air space between

the jacket, the screw conveyor housing and manifold, discharge nozzles connected to the manifold terminals, gas pressure means in communication with said manifold adjacent said discharge nozzles for facilitating emission of the grit material, solenoid valves in spaced relation to the terminals of the manifold for controlling the pressure of the grit material emitted through the discharge nozzles, and means for actuating said solenoid valves.

7. The apparatus of claim 6, with the addition of a control panel, switches on said control panel in electrical circuit with the component parts of said apparatus for selectively activating and deactivating the same, and indicating means on said control panel for indicating the proper functioning of the component parts.

8. The apparatus of claim 6, with the addition of a vibrator mounted on said receptacle, and means for actuating said vibrator to insure gravitation of grit material into engagement with said feed means.

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