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VALVE FOR SAND DISTRIBUTING MECHANISM

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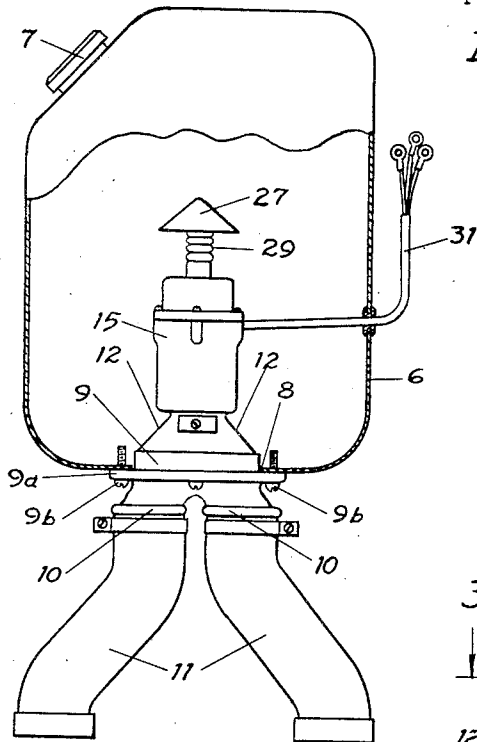


Fig. 1

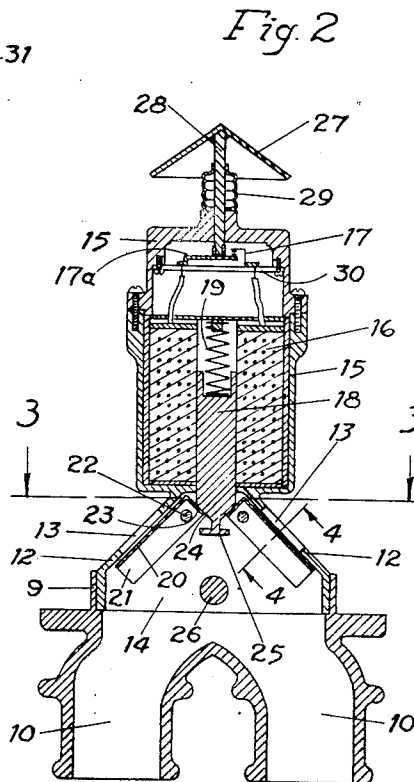


Fig. 2

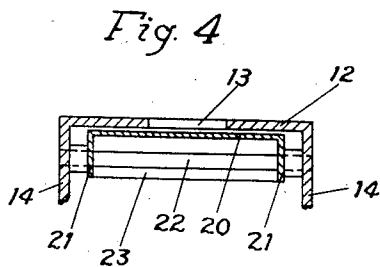


Fig. 4

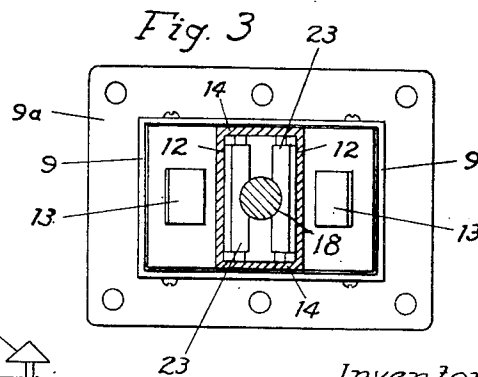


Fig. 3

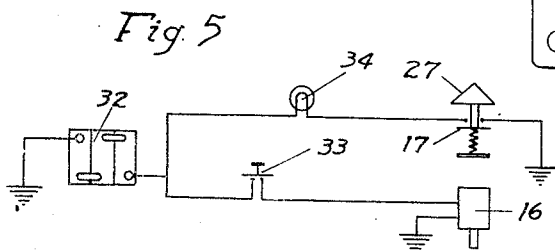


Fig. 5

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VALVE FOR SAND DISTRIBUTING MECHANISM

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3 Claims. (Cl. 291—23)

This invention relates to improvements in sand distributing mechanism having a reservoir, an outlet conduit and a valve for controlling the flow of sand from the reservoir through the outlet conduit and is particularly adapted for use on vehicles for distributing sand in front of the supporting wheels to thereby improve traction and avoid skidding.

It is an object of my invention to provide a novel and efficient sand flow control valve adapted to be mounted within the lower portion of a sand reservoir and having actuating means whereby sand may be caused to flow by gravity through a plurality of outlet ports to a discharge conduit under remote control.

A further object is to provide sand distributing mechanism with a reliable signal adapted to indicate to the operator when additional sand is needed in the reservoir or when a predetermined reserve supply remains to be distributed.

My invention also includes certain other novel features of construction which will be more fully pointed out in the following specification and claims.

In the accompanying drawing which illustrates a preferred embodiment of my invention, by way of example and not for the purpose of limitation:

Figure 1 is a part elevational view and part vertical sectional view showing my improved valve and signal device assembled in a sand reservoir for a vehicle;

Fig. 2 is a vertical sectional view through the valve and signal device;

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary section taken on the line 4—4 of Fig. 2, and

Fig. 5 is a wiring diagram showing the signal and connections for the valve operating mechanism with a source of power, e. g., the vehicle battery.

In the drawing the numeral 6 indicates a sand reservoir of common type having a filling opening which is normally closed by a cap 7 and a bottom opening 8. Removably secured to the tank at the margins of the opening 8 is an outlet conduit indicated generally by the numeral 9. This conduit has branches 10 projecting downward from the tank and supporting flexible outlet spouts 11 which are arranged to deliver streams of sand to the roadway or track directly in front of a pair of traction wheels of the dual type. The conduit 9 projects upward within the tank 6 and is formed with oppositely disposed upwardly converging walls 12 formed with ports 13 for the passage of sand from the reservoir into the conduit. Side walls 14 of the conduit 9 extend substantially vertically. Horizontally projecting flanges 9a are formed on the conduit 9 to overlie the bottom surface of the reservoir 6 and are removably secured to the reservoir by screws 9b so that my device may be removed as a unit from the reservoir.

Integral with the walls 12 and 14 and projecting upward therefrom is a substantially cylindrical casing 15 for a solenoid coil 16 and an electric switch 17. A sole-

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noid plunger 18 is movable axially in the coil 16 and a coaxial spring 19 is arranged to bias the plunger 18 downward. The lower end portion of the plunger 18 is operatively connected to a pair of valve members 20 adapted to close the ports 13 and each of these valve members has a flat surface adapted to overlie the inner surface of one of the walls 12. As best shown in Fig. 4, parallel flanges 21 are formed on each of the valve members 20 and are perforated to receive a pin 22 having bearings in the walls 14. Another flange 23 is formed on each of the valve members 20 adjacent to the pin 22 for operative engagement with the plunger 18.

An inclined annular shoulder 24 is formed on the plunger 18 for engagement with the upper surfaces of the flanges 23 and a head 25 projects from the plunger below the shoulder 24 for engagement with the lower edges of the flanges 23 when the solenoid is energized. The valve members 20 are biased toward closed position in relation to the ports 13 by the spring 19 acting through the plunger 18 having the shoulder 24 engaging the upper surfaces of the flanges 23. When the solenoid is energized the head 25 engages and lifts the lower edges of the flanges 23 and thereby causes the members 20 to pivot on the pins 22 to open position. A stop pin 26 extends between the walls 14 of the outlet conduit to limit oscillating movement of the valve members 20 when actuated by the solenoid plunger.

My improved signal device is mounted on the upper end of the casing 15 and comprises a hollow conical head 27 fixed on an axial rod 28. This rod is slidable vertically in a bearing in the casing 15 and its lower end rests on a spring contact 17a of the switch 17 so that the switch is normally held in open position by the weight of sand resting on the head 27 when this head is submerged in the sand. When the level of sand has been reduced to an elevation below the head 27 the switch 17 springs to closed position to thereby close a signal circuit. A flexible bellows 29 is arranged to seal the connection between the rod 28 and casing 15 against the entry of sand into the switch casing and bearing surface. The switch 17 is supported on a base 30 of insulating material and the conductors for the switch and solenoid 16 are carried to the exterior of the casing 15 and tank 6 in a suitably durable flexible conduit 31. The slope of the head 27 is sufficient to cause the unloading of sand from the head, by gravity, when the level of the sand in the reservoir is reduced to or below the elevation of the lower periphery of the head. By reason of the hollow form and thin periphery of the head 27 there is a minimum of resistance to the opening of the switch when the head is loaded by overlying sand.

As shown in Fig. 5, the solenoid coil 16 may be supplied with current from a vehicle battery 32 through a circuit which includes a manually operable switch 33 positioned within convenient reach of the driver of the vehicle. A branch of this circuit may include a signal lamp 34 and the switch 17 which is normally held in open position by sand overlying the conical head 27. The lamp 34 or other signal is so located as to warn the operator of the vehicle when the supply of sand in the reservoir reaches a predetermined low level.

Maintenance and repair of my improved valve and signal mechanism is facilitated as a result of the construction which permits it to be removed as a unit, quickly and easily, together with the conduit 9 and spouts 11 after removing the bolts or screws fastening the flange 9a to the bottom of the reservoir 6.

When the condition of a road surface is such that sand is needed to obtain the required traction and/or to avoid skidding, the operator merely closes the switch 33 thereby energizing the solenoid coil 16 and causing the plunger 18 to actuate the valve members 20 to open position. This

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allows sand to flow by gravity through the ports 13 to conduit 9 and thence through the branches 10 and spouts 11 to the road surface in front of the traction wheels. It will be evident that the unit described, including the reservoir, valve, signal and distributing mechanism is duplicated for each traction wheel or pair of dual wheels and that the solenoid 16 for the respective mechanisms may be arranged in parallel circuits under control of a common control switch 33.

My improved valve and signal is reliable and efficient in operation as well as unusually rugged and durable. Inherent difficulties caused by condensation of moisture in the reservoir and resulting failure of the sand to flow freely through the valve passages are minimized by my provision of a plurality of outlet ports formed in sloping conduit walls.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In sand distributing mechanism having a reservoir, the improvements which comprise, an outlet conduit connected to the bottom of said reservoir and having sloping walls at opposite sides disposed within the reservoir to support an overlying load of sand therein and each formed with an outlet port communicating with the interior of said reservoir, downwardly opening closures for said ports disposed so that overlying sand tends to open them and means for actuating said closures simultaneously to allow sand to flow to said outlet conduit from both of said ports.

2. Sand distributing mechanism in accordance with

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claim 1 wherein said closures comprise laterally spaced flat members disposed to overlie the inner surfaces of said walls respectively and pivotally supported within said outlet conduit.

3. In sand distributing mechanism having a reservoir, the improvements which comprise, an outlet conduit connected to the bottom of said reservoir and having upwardly converging walls at opposite sides disposed within the reservoir to support an overlying load of sand therein and each formed with an outlet port communicating with the interior of said reservoir, upwardly converging, downwardly opening closures for said ports adapted to overlie the interior surfaces of said walls and pivotally supported on said conduit to oscillate to and from said ports, said closures being subject to the pressure of overlying sand in said reservoir tending to open them, a plunger projecting between said closures and operatively connected thereto, electro-magnetic means for actuating said plunger to open said closures in relation to said ports and spring means for biasing said closures toward closed position in relation to said ports.

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