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VALVE FOR ROAD SANDING MACHINES

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Fig. 1

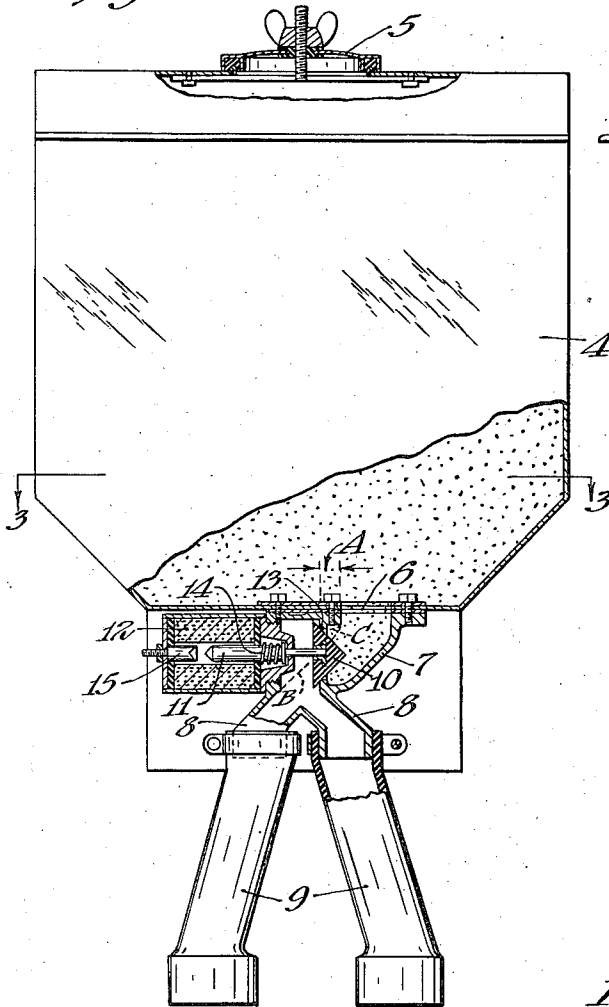


Fig. 2

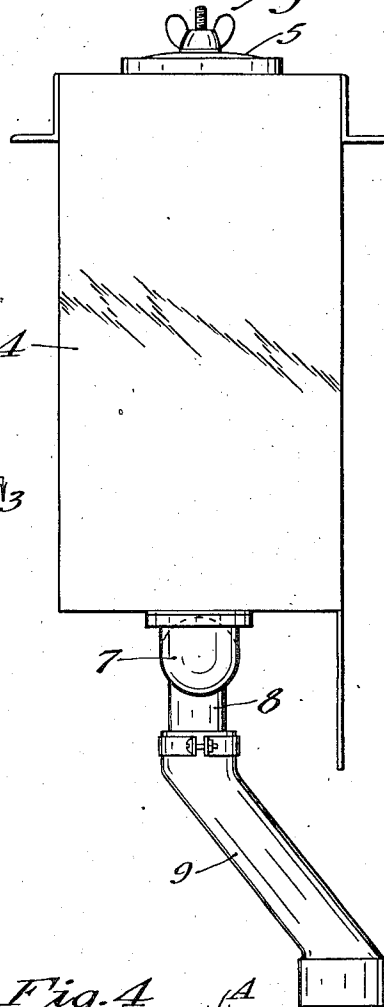


Fig. 3

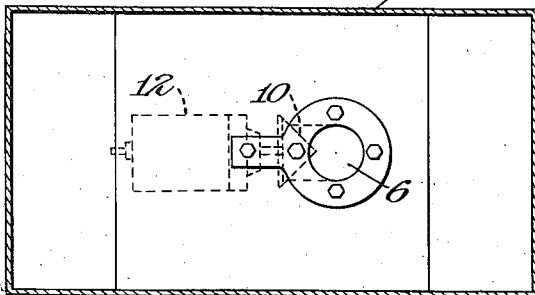
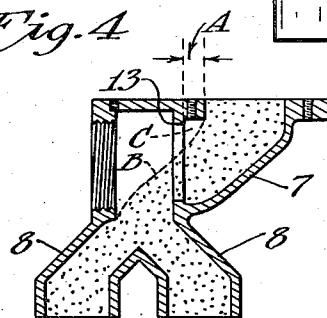


Fig. 4



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VALVE FOR ROAD SANDING MACHINES

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3 Claims. (Cl. 291—23)

This invention relates to valves for controlling the flow of sand from a hopper, the device being particularly adapted for use on vehicles to control the sanding of the road or track in front of the vehicle wheels.

It is my object to minimize the power consumed in the operation of a valve of this class and also to insure uniformity and certainty of operation of the valve against varying heads of sand in a reservoir or hopper by a novel arrangement of valve seat in a sand passage.

The invention will be best understood by reference to the accompanying drawing in which:

Figure 1 is a part central vertical section and part front elevation illustrating my improved arrangement of the valve in a sand passage extending from a hopper to the discharge spout of a road sanding machine;

Fig. 2 is a side elevation of the same;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1, and

Fig. 4 is a vertical section through the valve casing illustrating the flow of sand therethrough.

In the machine illustrated in the drawing, a sand reservoir or hopper 4 is provided at the top with a removable filling cap 5 and at the bottom with an outlet opening 6. From the opening 6 sand flows by gravity into a conduit formed by a casting 7 having branch passages 8 communicating with flexible rubber outlet nozzles 9. The machine is so located on the motor vehicle that the sand discharged from the nozzles 9 is delivered to the road directly in front of the vehicle traction or driving wheels. When used on vehicles having double tires, as on large trucks, busses and trailers, a pair of the nozzles 9 are provided, as illustrated, otherwise a single discharge nozzle is provided for each valve.

The flow of sand from the opening 6 into the branch passages 8 is controlled by a valve having a head 10 of conical shape mounted on a horizontally disposed plunger 11. This plunger is movable axially in a solenoid coil 12 for which power is supplied from the vehicle battery through an electric circuit under control of an electric switch (not shown). An annular seat 13 for the valve head 10 is formed in the casting 7 and extends in a vertical plane which is offset horizontally from the opening 6, as shown in Figs. 1 and 4. As further shown in the drawing, the passage for sand extending from the opening 6 to the valve seat makes a right angle turn and is substantially larger in cross sectional area at its end adjoining the valve seat than at its upper end portion, the latter being in reg-

istry with and equal in size to the opening 6. This has the effect of limiting the flow of sand to the horizontally offset valve seat. The horizontal offset of the seat, indicated by the dimension A, from the opening 6 and the restricted passage above the seat is an important feature of my invention as it minimizes the pressure exerted by the sand in opposing the closing of the valve and also allows free flow of the sand to discharge. I have found that for the best results the dimension A should not be large. It is, preferably, about one-half inch for most installations.

A helical spring 14 is mounted on the plunger 11 or valve stem and is confined between an end of the solenoid and a collar on the valve stem so that the spring actuates the valve to closed position. When the solenoid is energized, the plunger 11 is drawn against an adjustable stop 15 to open the valve.

When the valve is opened against the action of the spring 14 the sand flows from the opening 6 obliquely downward and horizontally over the valve seat so that the upper surface of the sand extends approximately along the dotted line B, leaving a small empty space C near the top of the valve seat, and beneath the overhanging edge of the hopper. When the circuit to the solenoid 12 is broken, the spring 14 quickly closes the valve. In this operation it is unnecessary to lift an appreciable quantity of sand back into the hopper and it is only necessary to displace a small amount of it into the empty space C immediately adjacent to the valve seat.

Conservation of electric power is particularly important in motor vehicles where increasing demands for electrical accessories have a tendency to overload the vehicle batteries. As the power required to open the valve head 10 need be only sufficient to compress the spring 14, it has been found in practice that my horizontally movable valve requires but a small fraction of the power necessary to close a similar valve operating vertically against a head of sand. It has also been found that the power required to operate my improved valve is substantially uniform irrespective of the head of sand in the hopper and that more positive, reliable and uniform action of the valve is insured.

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

1. In a sanding machine of the class described, the combination of a sand reservoir having an outlet opening communicating with the bottom thereof, a conduit having a discharge passage

communicating with said opening and extending downward therefrom to allow flow of sand by gravity therefrom, a substantially vertically disposed valve seat in said passage, the horizontal cross sectional area of a vertical portion of said passage above said seat being not larger than the area of the same at said seat and said seat being offset substantially from said reservoir opening in the direction of flow of sand in said passage to exclude sand from the upper portion of said seat, a substantially horizontally movable valve head adapted to be moved counter to the flow of sand in said passage to engage said seat and electrical means for operating said valve head substantially horizontally to control the flow of sand through said passage.

2. In a sanding machine of the class described, the combination of a sand reservoir having an outlet opening in the bottom thereof, a conduit having a discharge passage communicating with said opening and extending horizontally and downward therefrom, a substantially vertically disposed valve seat in said passage, the horizontal cross sectional area of said passage at its upper end being not larger than the cross sectional area thereof adjacent to said seat, said seat being offset horizontally from said outlet opening in

the direction of flow of sand in said passage, an annular valve head movable substantially horizontally and counter to the flow of sand in said passage to engage said seat and electrical means for operating said head substantially horizontally to control the flow of sand through said passage.

3. In a sanding machine of the class described, the combination of a sand reservoir having an outlet opening, a conduit having a discharge passage communicating with said opening and extending horizontally and downward therefrom, an annular, substantially vertically disposed valve seat in said passage, said passage being restricted above said seat to limit the flow of sand to said seat and said seat being offset substantially from said reservoir opening in the direction of flow of sand in said passage to exclude sand from the upper portion of said seat, a conical valve head movable substantially horizontally to engage said seat at the effluent side thereof, the apex of said head projecting in a direction counter to the flow of sand in said passage beyond said seat, a spring normally tending to close said head against said seat and electrical means for operating said head substantially horizontally to open the valve.

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