

June 22, 1937.

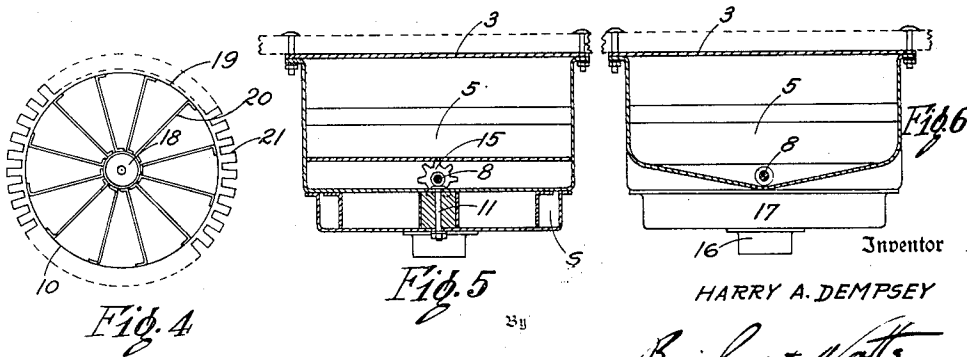
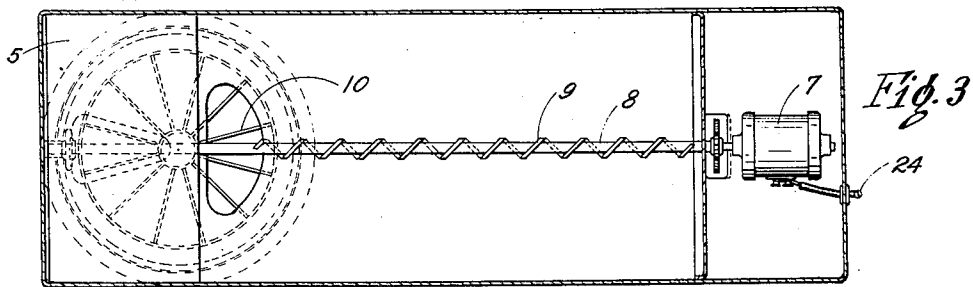
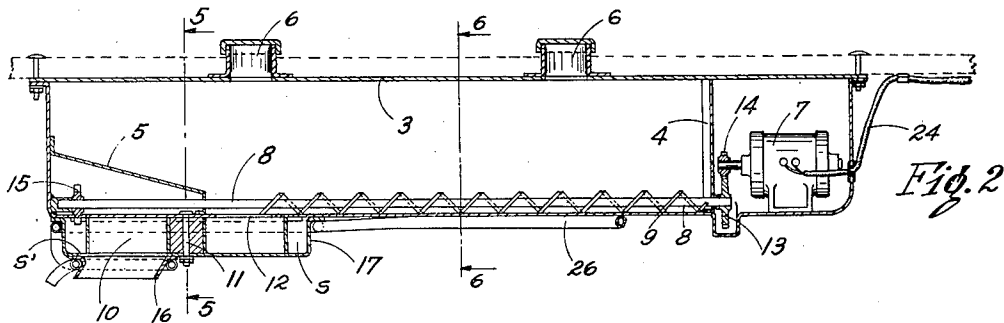
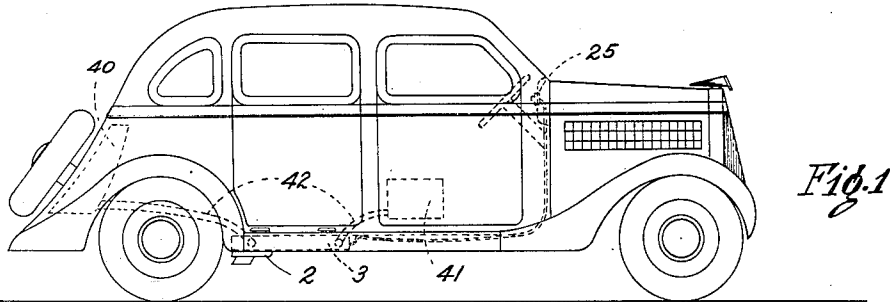
H. A. DEMPSEY

2,084,895

SAFETY DEVICE

Filed Nov. 16, 1935

2 Sheets-Sheet 1



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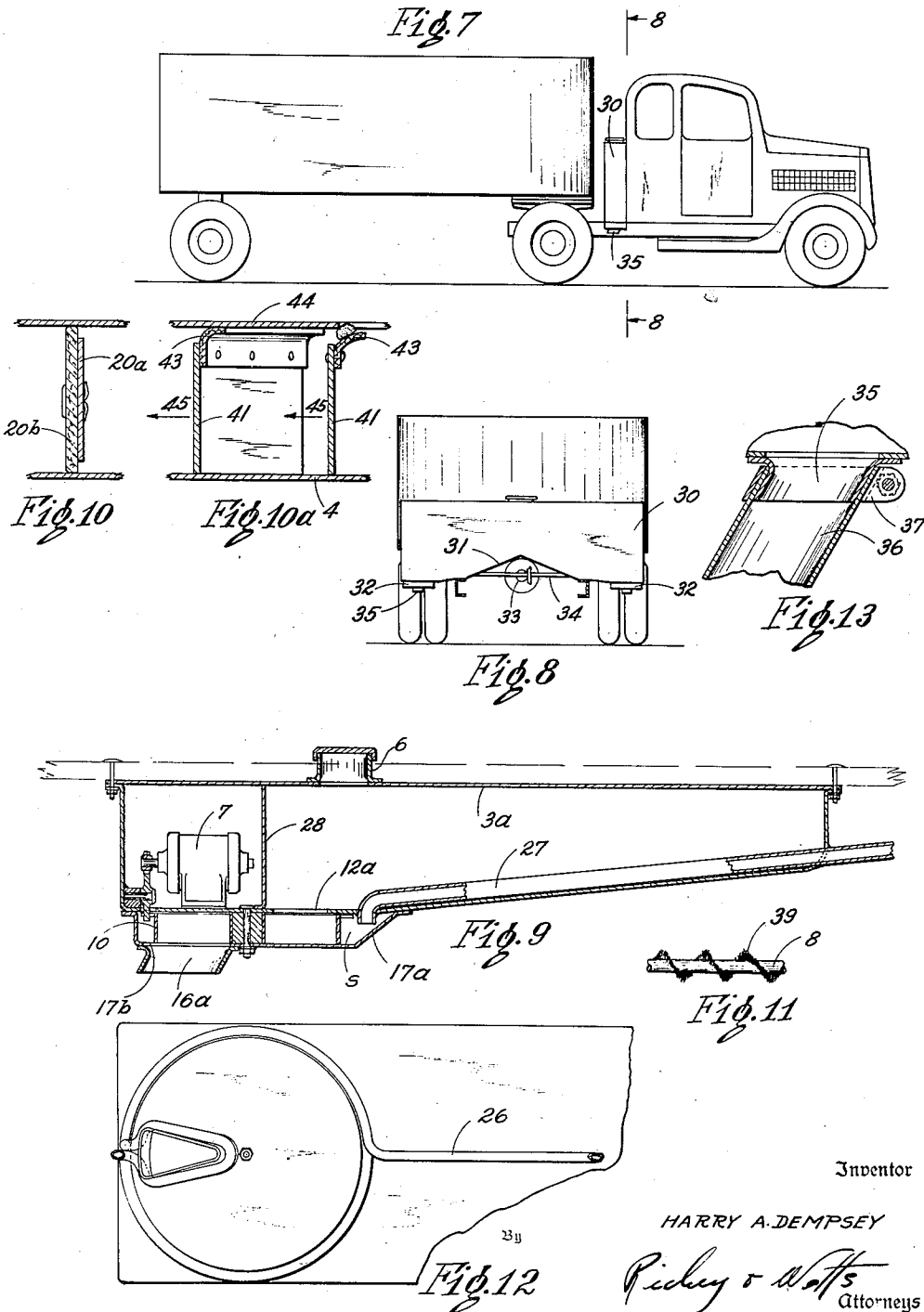
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SAFETY DEVICE

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10 Claims. (Cl. 291—33)

This invention relates to improvements in safety devices for preventing skidding of motor vehicles on slippery surfaces and more particularly to an accessory designed to place gritty material such as finely crushed stone, sand, cinders or the like on the road-way adjacent the wheels of a motor vehicle to improve the traction of same. For convenience all such materials will be referred to generally as sand and similarly the device may conveniently be referred to as a sanding device.

It is among the objects of this invention to provide a sanding device for motor vehicles which will definitely maintain a quantity of sand immediately adjacent to the vehicle wheels and which will quickly and positively discharge sand upon demand of the vehicle operator. A further object of the invention is to provide a sanding device having means to positively move a quantity of sand from a storage supply to a discharge port and automatically seal the storage supply with respect to the discharge port subsequent to movement of said means. A further object of the invention is to provide a sanding device which will upon actuation by the operator successively move quantities of sand from a storage supply to a discharge port immediately adjacent the vehicle wheels and which will close the storage supply with respect to the discharge port in absence of operator actuation. A further object of the invention is to provide a sanding device in which a pair of moving elements successively move sand or the like from a storage supply to a discharge port and one of said devices is arranged to automatically seal the discharge port with respect to the other device and the storage supply. A further object of the invention is to provide a sanding device in which a storage supply container is formed with a laterally offset outlet and discharge openings and in which a member successively moves quantities of sand or the like from said outlet to said discharge opening. A further object of the invention is to provide a sanding device according to the foregoing objects that is simple in construction, reliable in operation, inexpensive to manufacture and that may be readily applied to various types of motor vehicles. Further objects and advantages will appear from the following description and the accompanying drawings wherein:

Figure 1 illustrates a sanding device as applied to a conventional passenger automobile;

Figure 2 is a median longitudinal vertical section of a preferred form of sanding device;

Figure 3 is a horizontal section of the same;

Figure 4 is a detailed showing of a sand impeller wheel;

Figure 5 is a sectional view taken on line 5—5 of Figure 2;

Figure 6 is a sectional view taken on line 6—6 of Figure 2;

Figure 7 illustrates my invention as applied to a tractor-trailer type of motor vehicle;

Figure 8 is an elevation taken along line 8—8 of Figure 7;

Figure 9 is a longitudinal sectional view of a modified form of my invention;

Figures 10 and 10a are sectional views illustrating modified forms of impeller wheel blades;

Figure 11 is a detailed showing of a modified form of spiral conveyor which may be employed in conjunction with the species illustrated in Figures 1 to 8;

Figure 12 is a bottom view of the device shown in Figures 2 and 3;

Figure 13 is a detailed showing of a sanding device having an auxiliary discharge pipe which may be employed in conjunction therewith whenever desired.

Referring to the drawings the sanding device identified generally at 2 in Figure 1 preferably comprises a rectangular container 3 formed of sheet metal or the like and proportioned to fit beneath the running board of a conventional motor vehicle. The container is provided with a partition as at 4 adjacent one end to form a housing thereat for a motor 7 and is partitioned as at 5 at the other end to form a gear housing for a sand impeller mechanism. Said last named partition is preferably inclined somewhat with respect to the bottom wall of the container and the bottom wall is preferably formed with co-operating inclined surfaces to facilitate the movement of the sand downwardly and longitudinally of the container during operation of the sanding device. The container may be provided with one or more filling spouts such as 6 which project upwardly through the running board of the vehicle in a position conveniently accessible for filling. The lower wall or bottom of the container 3 is provided with an outlet 12 arranged centrally and rearwardly of the container and exposing a portion of the impeller 10. Passing over said outlet and extending longitudinally of the bottom of the container 3 is a screw or spiral conveyor shaft 8. The forward end of the shaft projects through the partition 4 and is preferably provided thereat with reduction gearing 13—14 connected to the driving motor 7. The other end of said shaft projects through the inclined partition 5 and is

fitted thereat with a spur gear 15 operatively connected to the impeller 10 of the discharge mechanism. When the container 3 is provided with a supply of sand, crushed rock or the like and the motor 7 operated, the spiral ribs or blade portions 9 of the shaft 8 function to move the sand disposed about the shaft 8 toward the rear end of the container and toward and above the aperture 12.

To insure that the supply of sand will be conserved when the sanding device is inoperative and to insure that a part of said supply will be immediately discharged to the vehicle wheels upon actuation, I provide a positively driven impeller wheel 10 disposed between the aperture 12 and the discharge outlet or spout 16. A pan or casing 17 having a generally circular shape is secured to the lower surface of the container by spot-welding or other suitable means and is provided centrally with a pin or shaft 11 which serves as a pivot pin for the sand impeller wheel 10. The impeller wheel 10, see Fig. 4, preferably comprises a hub portion 18 and an outer rim portion 19 joined to each other by radially extending blades 20. The hub portion 18 is mounted for free rotation upon the pin 11 and the blades 20 are arranged between and preferably substantially normal to the flat bottom surface of the pan 17 and the flat overlying bottom surface of the container 3, see Fig. 5. The outer rim 19 of the impeller wheel 10 is provided with notches or gear teeth 21 proportioned to cooperate with the gear 15 on the rear end of the shaft 8.

The sand impeller wheel 10 is preferably arranged as shown in Figure 2 wherein the center of the wheel is off-set rearwardly with respect to the outlet 12 of the container 3 whereby the sand conveyed longitudinally of the container 3 will drop into the pan 17 between the spokes or blades 20 of the impeller wheel 10. Rotation of the impeller wheel carries the sand so positioned around and discharges same through the discharge port 16 in the lower rearward wall of the pan 17. The opening 12 is preferably proportioned to have a semi-circular outline at its forward edge in which the radius is somewhat less than the radius of the impeller wheel and with its rear edge spaced away from the hub ends of the impeller blades and with its side edges spaced about 120° apart. This proportion provides that the compartments between the blades 20 are each greater in area than the intercepted area of the outlet 12. This arrangement provides a little extra space in each compartment to accommodate coarse particles which might otherwise tend to retard or interfere with the free rotation of the impeller. Preferably the diameter of the casing 17 exceeds the diameter of the ring 19 of the impeller 10 to enclose the toothed flange 21 and thereby provides an enclosed annular space S around the impeller wheel. I prefer to provide at least a small communication between this space and the discharge spout 16 as at S' to permit the discharge of any solid material that might inadvertently enter the space S. I also contemplate as shown in Fig. 9 that hot exhaust gases may be led into the space S at the forward side thereof and discharged through the opening S' to heat the adjacent parts and contents.

Wires 24 leading from the motor 7 may be connected to the storage battery or other electrical power source of the vehicle through a switch or switches 25 arranged upon the instrument panel or in any position conveniently accessible to the operator. In this connection it is pointed out

that the sanding device may be applied to all four

wheels of the vehicle and be independently controlled by the switch or switches 25, or may be applied to any one wheel or any pair of wheels or the rear wheels only as illustrated in Figure 1. Where trailers are drawn by a motor tractor, one or more sanding devices may be carried by the trailers and electrically controlled by the driver of the tractor.

To insure that the discharge port or spout 16 and the sand impeller device arranged thereabove will not be rendered inoperative by cold or by freezing of material thrown or splashed thereupon, I prefer to conduct hot exhaust gases from the engine exhaust through conduit 26 arranged under the container 3 and about the side of the casing 17 in which the sand loaded impeller compartments are disposed, and around the discharge port 16. The conduit 26 being arranged beneath the main body of the container 3 also heats said container and maintains the storage supply therein in a dry usable condition at all times.

A modified form of my invention is illustrated in Figure 9 in which the lower wall or bottom of the container 3a is inclined rearwardly to insure movement of sand rearwardly therealong toward an outlet 12a, similar to the outlet 12, the jarring movement of the vehicle in motion facilitating the movement of the sand. The motor 7 in this embodiment is preferably geared directly to the impeller wheel 10. The motor is separated from the storage part of the container by a partition 28 and the sanding device operates in other respects as in the preferred embodiment of Figures 2 and 3 heretofore described. In this embodiment I have shown an exhaust gas conduit 27 leading through the container 3a adjacent its lower wall and into the annular space between the impeller wheel 10 and the side walls of the casing 17a, thence to the discharge spout 16a through the opening 17b.

A sanding device constructed according to my invention may be economically adapted to tractor-trailer combinations as shown in Figures 7 and 8 wherein a relatively large sand storage container 30 is arranged immediately behind the cab of the tractor part of the unit and an impeller device 32 of the type such as shown in Figures 2, 3 and 9 is mounted at each side of said container 30. The intermediate portion of the lower wall of the container 30 is preferably formed with oppositely inclined portions 31 which facilitate the movement of the sand toward the sand impellers 32 and cooperate to form a housing for a motor 33 which may be provided with oppositely extending shafts 34 arranged to move the sand toward the impellers and drive the sand impellers in a manner heretofore described. In some instances it may be found desirable to provide the discharge ports 35 of the tractor sanding device with a tail pipe 36 such as shown in Figure 13. Such a tail pipe should preferably extend substantially vertical and offer substantially no resistance or delay in delivery of sand from the impeller to the road surface. I prefer to use the tail pipe principally to prevent wind from diverting the sand from its intended placement on the road surface relative to the vehicle wheels.

Although the shaft 8 in the preferred embodiment is provided with integrally formed ribs or blades 9, an alternative type of screw conveyor adapted to my invention is shown in Figure 11 wherein the shaft 8 is fitted with brush or bristle elements having a spiral configuration.

While I prefer that the impeller blades 20 be

straight, thick enough to be substantially rigid, and be normal to and have a scraping contact with the surfaces above and below between which they are confined in their movement, I contemplate that the handling of a wide range of shapes and sizes of material may be facilitated with blades of other designs and constructions. An alternative form of impeller blade is illustrated in Figure 10 wherein the metallic portion of the blade 20a is fitted with a more or less resilient face 20b made of felt, rubber or similar material. The latter type of impeller blade may be suited to certain types of sand or crushed rock used in the sander. In this connection I have found that sand or crushed stone having particles about $\frac{1}{4}$ " in size are well suited for trucks and material about the size of buck-shot operates efficiently in connection with lighter vehicles, such as passenger automobiles.

In Figure 10a I have illustrated an alternative form of impeller blade construction wherein the upper edge of the blade 41 is provided with a resilient or flexible member 43 which may flex with respect to the blade and the edge of the outlet formed in the lower wall 44 of the container 3. The direction of the movement of the impeller wheel and blade 41 with respect to the outlet in the wall 44 is indicated by the arrow 45 and the member 43 is preferably secured to the trailing or rear face of the blade 41, the forward face being for the purpose of description on the side of the arrow 45. The flexing of the member 43 will permit the metallic part of the blade to move with respect to sand particles which happen to be positioned at the upper edge of the blade as the blade passes beneath the edge of the outlet in the container wall 44 and such particles will merely be forced over the edge of the member 43 into the next compartment between the blades. When discharging movement of the wheel ceases or during movement of the blades from the container outlet to the discharge port the member 43 will be positioned against the underside of the wall 44 and effectively seal the sand therein at least against movement toward the discharge port. The spacing of the upper edge of the metallic blade 41 from the wall 44 or the vertical extent of the flexible member 43 may be governed by the size of the material being handled and would probably not greatly exceed the maximum diameter of the stone or sand particles being moved.

Auxiliary storage tanks may be arranged in the luggage compartment as at 40 or under the vehicle seat as at 41 or elsewhere, said auxiliary tanks connected by means of a flexible tubing 42 or the like with the container 3. I prefer that the container 3 in its relation to any reserve or auxiliary storage tank be large enough to supply the impeller 10 with sufficient material for any emergency without any delay incident to movement of the material from the storage tanks to the main container 3. Among the advantages flowing from the construction shown wherein the mechanism which positively moves the sand is arranged immediately adjacent the wheels, is that the assembly is operative to immediately respond to the operator's actuation to place a quantity of sand between the wheels and roadway regardless of the time which may be required for sand to move from large supply tanks which of necessity are remote from the wheels.

From the foregoing it will be seen that I have provided a sanding device which is positive in its sanding action and is constructed to con-

serve the sand supply when the device is not in operation. While I have described in considerable detail preferred embodiments of my invention, it is obvious that others skilled in the art to which this appertains may make various changes without departing from the spirit and scope of the invention as defined by the claims.

I claim:

1. In a sanding device for motor vehicles, a storage container having an outlet in its lower wall, means within said container to move sand toward said outlet, a discharge port offset with respect to said outlet, means comprising a wheel having impeller blades rotatively mounted with respect to said outlet and port to successively move quantities of sand from said outlet to said port, said last named means being actuated by said first named means.

2. In a sanding device for motor vehicles, a storage container having an outlet in its lower wall, means within said container to move sand toward said outlet, a discharge port offset with respect to said outlet, means comprising a wheel having impeller blades rotatively mounted with respect to said outlet and port to successively move quantities of sand from said outlet to said port, said last named means being actuated by said first named means, and driving means for said first named means arranged to be controlled by the vehicle operator.

3. In a sanding device for motor vehicles, a longitudinal storage compartment having an outlet adjacent one end, a screw conveyor arranged adjacent the bottom wall of said container in a position to move sand to said outlet upon actuation, a discharge port offset with respect to said outlet and an impeller wheel interposed between said outlet and said discharge port, said impeller wheel comprising spaced blades defining compartments which are successively aligned with said outlet and said discharge port by wheel rotation, an operative connection between said screw conveyor and impeller wheel, and driving means controlled by the vehicle operator operatively connected to said screw conveyor.

4. In a sanding device for motor vehicles, a container having an outlet in its lower wall, a conveyor arranged longitudinally within said container to move sand contained therein toward said outlet, means to conduct sand from said outlet comprising a casing secured beneath said outlet provided with a discharge port offset with respect to said outlet, a wheel arranged within said last named compartment having blades arranged normal to the bottom wall of said casing and said compartment and bearing against said last named surfaces, a hub portion connecting the inner ends of said blades adjacent the center of the wheel and a rim portion connecting the outer ends of said blades thereby forming a series of pockets which have their upper sides open to said outlet and their lower sides open to said discharge port whereby upon wheel rotation said pockets move quantities of sand from said outlet to said discharge port, said wheel rim portion operatively connected to said conveyor means to transmit conveyor motion to said wheel, a driving mechanism operatively connected to said conveyor and a control for said driving means arranged within the motor vehicle in a position conveniently accessible to the operator.

5. In a sanding device for motor vehicles, a storage container having an outlet in its lower wall, a housing member arranged beneath said container having a discharge port offset with re-

spect to said outlet, means rotatably mounted with respect to said outlet and said port to successively move quantities of sand from said outlet to said port comprising a hub portion having a series of radially extending rigid blades arranged substantially normal to said lower wall, adjacent blades of said series forming sand receiving pockets, at least one edge of each of said blades being spaced with respect to said lower wall, resilient means extending upwardly from said spaced edge and closing the space between the rigid portion of the blade and said lower wall whereby said sand receiving pockets are sealed with respect to each other and with respect to said container outlet.

6. A sanding device for motor vehicles comprising a storage container having a lower wall provided with an outlet, a member connected to said container having a wall parallel to said lower wall, a discharge port formed in said member wall offset with respect to said outlet, means arranged intermediate said walls adjacent said outlet to positively move quantities of sand from said outlet to said discharge port comprising an impeller wheel mounted for pivotal movement on said container, said wheel having radially extending blades arranged substantially normal to said walls to define sand receiving compartments therebetween, the edges of the blades adjacent said outlet being spaced with respect to said outlet and provided with a flexible sealing member having portions extending at an angle with respect to each other, one of said portions disposed substantially parallel with respect to said lower wall and the other portion extending substantially parallel to the blade supporting same whereby said sealing member may flex with respect to said lower wall to accommodate particles of sand positioned between the blade edge and the edge of said outlet as the blade moves with respect thereto.

7. In a sanding device for motor vehicles, a container having an outlet in its lower wall, a conveyor arranged longitudinally within said container to move sand contained therein toward said outlet, means to conduct sand from said outlet comprising a casing secured beneath said outlet provided with a discharge port offset with respect to said outlet, a wheel arranged within said last named compartment provided with blades having resilient edge portions arranged normal to the bottom wall of said casing and said compartment, a hub portion connecting the inner ends of said blades adjacent the center of the wheel and a rim portion connecting the outer ends of said blades thereby forming a series of pockets which have their upper sides open to said outlet and their lower sides open to said discharge port whereby upon wheel rotation said pockets move quantities of sand from said outlet to said discharge port, said wheel rim portion operatively connected to said conveyor means to transmit conveyor motion to said wheel, a driving mechanism operatively connected to said conveyor and a control for said driving means arranged within the motor vehicle in a position conveniently accessible to the operator.

8. In a sanding device for motor vehicles, a storage container having an outlet in a lower portion thereof, a housing member carried by said container provided with upper and lower walls, said lower wall having a discharge port therein offset with respect to said outlet, means rotatably mounted with respect to said outlet and said port to successively move quantities of sand from said outlet to said port comprising a hub portion having a series of radially extending blades arranged substantially normal to said walls, adjacent blades of said series forming sand receiving pockets, the edges of each of said blades being spaced slightly with respect to said walls, flexible means extending from at least the lower edges and closing the space between the spaced edge portion of the blade and the adjacent wall whereby said sand receiving pockets are sealed with respect to each other.

9. A sanding device for motor vehicles comprising a storage container having a lower wall provided with an outlet, a member connected to said container having a wall parallel to said lower wall, a discharge port formed in said member wall offset with respect to said outlet, means arranged intermediate said walls adjacent said outlet to positively move quantities of sand from said outlet to said discharge port comprising an impeller wheel mounted for pivotal movement with respect to said container, said wheel having radially extending blades arranged substantially normal to said walls to define sand receiving pockets therebetween, the edges of the blades being spaced with respect to said walls and provided with flexible sealing means to accommodate particles of sand positioned at the blade edge as the blade moves with respect to said walls and discharge port.

10. In a sand device for motor vehicles, a container having an outlet in its lower wall, means within said container to move sand contained therein toward said outlet, means to conduct sand from said outlet comprising a casing secured beneath said outlet provided with a discharge port offset with respect to said outlet, a wheel arranged within said last named casing provided with blades having resilient edge portions arranged normal to the bottom wall of the casing and bearing thereagainst, a hub portion connecting the inner ends of said blades adjacent the center of the wheel and a rim portion connecting the outer ends of the blades, said blades thereby forming a series of pockets open upwardly to said outlet and open downwardly to said discharge port, whereby upon wheel rotation said pockets move quantities of sand from said outlet to said discharge port, said wheel rim portion arranged to be engaged by driving mechanism, a driving motor provided with reduction gearing operatively connected to said wheel rim and a control for said driving motor arranged within the motor vehicle in a position conveniently accessible to the operator.

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