E. A. RIVES.

COMBINED GRAVITY AND FLUID PRESSURE SANDER FOR LOCOMOTIVES.

APPLICATION FILED APR. 13, 1915.

1,165,024.

Patented Dec. 21, 1915.

2 SHEETS—SHEET 1.

FIG. 1.

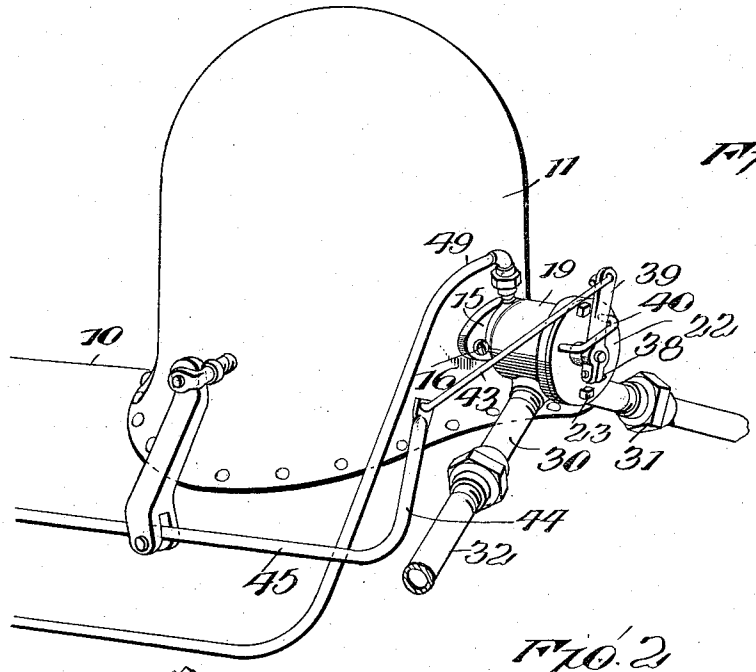
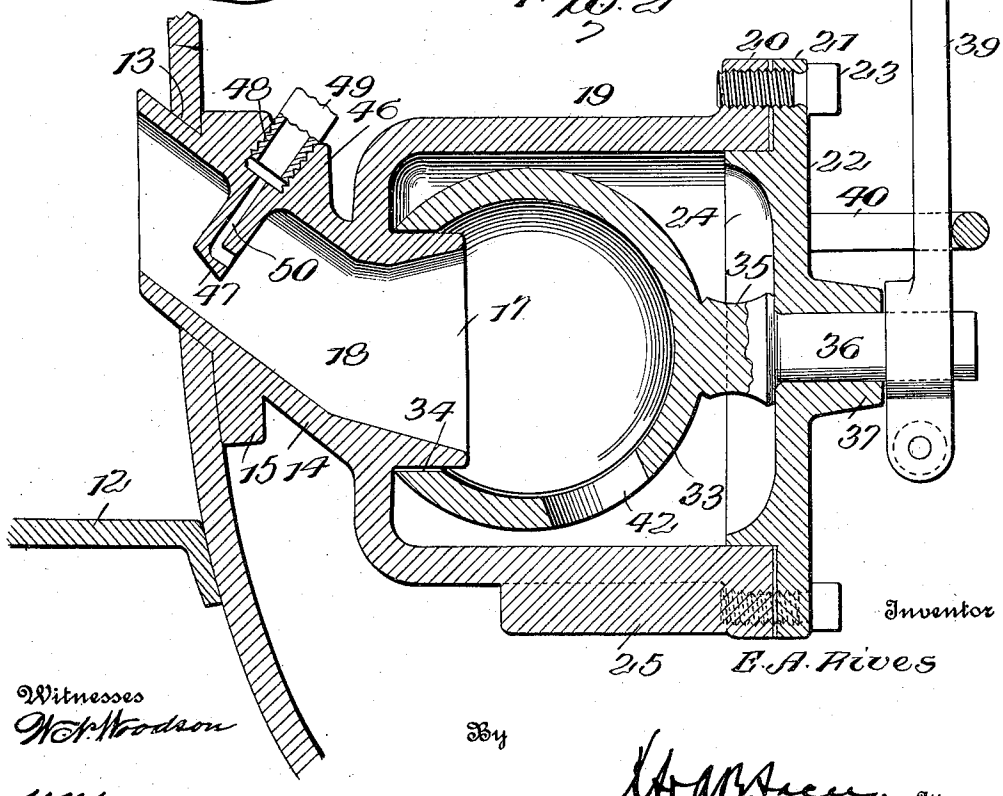


FIG. 2.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 3.

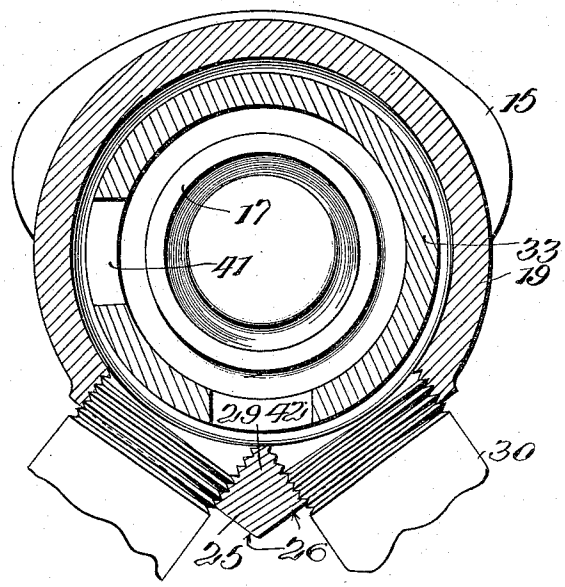


FIG. 6.

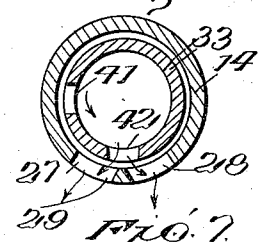


FIG. 7.

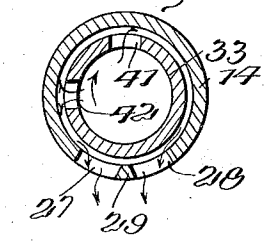
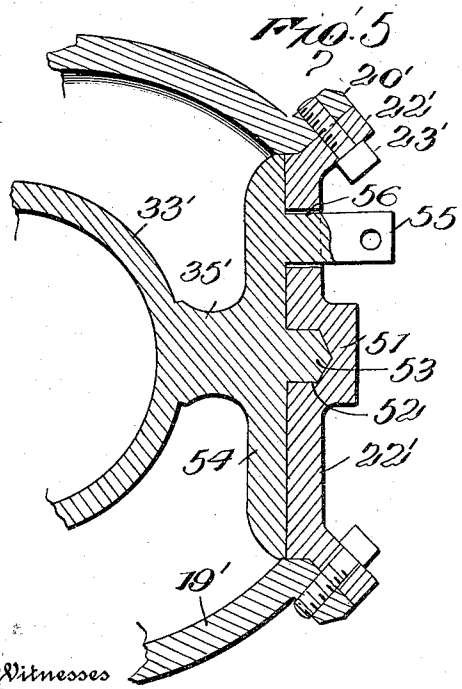


FIG. 5.



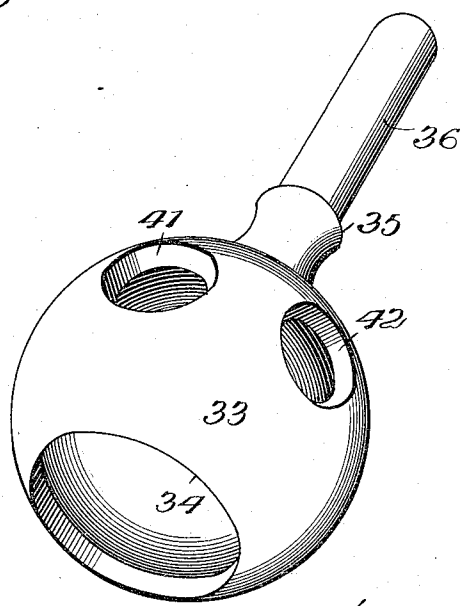


FIG. 4.

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COMBINED GRAVITY AND FLUID-PRESSURE SANDER FOR LOCOMOTIVES.

1,165,024. Specification of Letters Patent. Patented Dec. 21, 1915.

Application filed April 13, 1915. Serial No. 21,084.

To all whom it may concern:

Be it known that I, EDWIN A. RIVES, a citizen of the United States, residing at Greensboro, in the county of Guilford, and State of North Carolina, have invented certain new and useful Improvements in Combined Gravity and Fluid-Pressure Sanders for Locomotives, of which the following is a specification.

My invention relates to new and useful improvements in track sanders for locomotives, the object of my invention being the provision of a device which will supply sand to both rails of a track, the sand being fed either by gravity, or by fluid pressure, or by both, as preferred.

A further object of my invention is to so construct the device that the valve controlling the discharge of sand may be mounted exteriorly of the sand dome and the sand discharged from the dome to the valve by gravity. It will be clear that this construction will permit the application of my improved sander to locomotives now in use, this being one of the primary objects of my invention.

A further object of my invention consists in providing means whereby the valve will insure a substantially equal supply of sand to both rails of the track, whether the sand is being supplied by gravity, by an air blast, or by both means.

A still further object of my invention is the provision of an oscillating valve controlling the flow of sand from the sand dome to the rails and so constructed and mounted in its casing that its oscillatory movement need be slight, and in the provision of means for limiting such movement in such a manner that the engineer may readily determine whether the valve is in one or the other of its positions, the valve being operable manually.

A further object of my invention consists in the provision of a nozzle adapted to extend at one end into the sand dome and at the opposite end into the valve to supply sand to the latter and in the introduction of means for supplying air under pressure to the nozzle intermediate its length to prevent clogging of the sand, if moist, in the nozzle and also to provide means for feeding the sand from the valve by air pressure alone, when desired.

A still further object of my invention consists in mounting the valve in a novel manner, whereby it may be readily operated and its amount of movement readily controlled, and furthermore in such a manner that the discharge end of the sand nozzle will serve as a bearing or support for the valve. And a still further object of my invention consists in providing the valve with two discharge ports, one of which is active when sand is being fed by gravity and both being active when sand is being fed by fluid pressure means.

With these and other objects in view, my invention will be more fully described, illustrated in the accompanying drawings, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawings: Figure 1 is a fragmentary perspective view, showing a sand dome and my improved sander applied thereto; Fig. 2 is a central, vertical, longitudinal sectional view taken through my sanding device; Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a perspective view of the valve removed from its casing; Fig. 5 is a fragmentary sectional view corresponding to Fig. 2 and illustrating a somewhat modified form of valve and valve casing construction; Fig. 6 is a sectional view in the nature of a diagram, illustrating the position of the valve when sand is being fed by gravity; Fig. 7 is a corresponding view, illustrating the position of the valve when sand is being fed by an air blast.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In order to insure a clear and accurate understanding of my invention I have illustrated it in connection with a conventional form of locomotive 10 upon the boiler of which is a sand dome 11 of any usual or preferred type provided adjacent its lower end with a bottom 12 which may be integral with the dome or secured in any suitable manner. All of the above described parts are conventional in construction and any further detailed description is therefore unnecessary.

In installing my improved sanding device upon the locomotive, the sand dome, at a point slightly above the bottom 12, is provided with an opening 13, the usual opening

in the bottom 12 being closed. A discharge nozzle 14 extends at one end inwardly and upwardly through the opening 13 with its opposite end inclined downwardly in the manner best shown in Fig. 2. This sand nozzle is provided intermediate its length with a peripheral flange 15 which engages against the outer face of the sand dome and which is perforated to receive bolts 16 or other suitable fastening devices by means of which it is secured to the sand dome. The nozzle, which is preferably circular in cross section, has its free outer end directed outwardly in a substantially horizontal plane, as shown at 17 and the passage 18 through the nozzle is enlarged or flared at such end, as clearly shown in Fig. 2, the outer surface of the free end of the nozzle being in the form of a horizontally disposed cylinder, for a purpose which will be later explained.

Preferably formed integrally with the nozzle 14, is a valve casing 19 which is generally cylindrical in shape and which is formed with its axis in alinement with the axis of the flared end portion 17 of the nozzle 14, such end portion of the nozzle extending axially within the casing 19. This casing is open at that end most remote from the nozzle and such end is provided with a peripheral flange 20 to receive the corresponding flange 21 formed upon a cap plate or closure 22 which is circular in shape and which is secured to the casing to close the latter by means of bolts 23 or other suitable fastening devices. As shown, this cap plate is provided with an inwardly directed, centrally thickened portion 24 which seats within the open end of the valve casing and properly centers the cap plate in order that it may form a bearing for the valve stem, as will be later pointed out. The lower side of the body portion of the valve casing 19 is thickened, as shown at 25, to provide flattened faces 26 disposed substantially at right angles to each other and the valve casing is formed with threaded discharge ports 27 and 28 through the central portion of these faces and, consequently, at substantially right angles to each other, the inner ends of the ports or passages intersecting at the interior of the casing to provide a wedge-shaped partition wall 29 between them. These ports and this partition wall are best shown in Figs. 3, 6 and 7 of the drawings. Straight pipe sections 30 are threaded into the ports 27 and 28 to extend toward opposite sides of the boiler and are provided with couplings 31 by means of which they may be connected with the usual sand pipes 32 leading to points adjacent the rails of the track and immediately in advance of the driving wheels.

Mounted interiorly of the valve casing 19 is the valve proper 33 in the form of a hollow sphere provided with a circular opening 34 to receive the discharge terminal of the spout 14 which, therefore, forms a bearing for such end of the valve, the spout fitting reasonably snugly within the opening 34. At its opposite side, the valve is formed with a radially extending boss 35 and projecting from this boss is the cylindrical valve stem 36. When the valve is in place and the cap plate or closure 22 applied to the valve casing, one end of the valve bears against the closed end of the valve casing and the boss 35 bears against the inner face of the cap plate to absolutely hold the valve against any longitudinal movement while leaving it free for turning movement. The valve stem 36 is journaled in the central portion of the cap plate 22 which is thickened at this point, as shown at 37, to provide an elongated bearing for the stem and adjustably secured by means of a nut 38 upon the free end of the stem is a lever 39 by means of which the valve 33 may be oscillated. A U-shaped guide loop 40 has its ends embedded in or otherwise secured to the cap plate 22 and surrounds the lever 39 to support it and also to limit the extent of swinging movement of the lever and, consequently, the extent of movement of the valve. This guide loop is so positioned and proportioned as to allow turning movement of the valve of substantially 90°.

The valve proper 33, is provided with a pair of spaced discharge ports 41 and 42 formed at substantially 90° from each other and in such a position with respect to the valve casing as, in all positions of the valve, to both lie in a vertical plane through the discharge ports 27 and 28 of the valve casing. The operating lever 39 of the valve is so set upon the valve stem 36 that at one extreme limit of its movement, the port 42 of the valve will be lowermost and directly above the wedge-shaped partition wall 29 of the valve casing between the discharge ports or passages 27 and 28 thereof, while in the opposite extreme limit of movement of the lever, the ports 41 and 42 will occupy the position shown in Fig. 7, the former being at the top of the valve casing or diametrically opposite the partition wall 29 and the latter midway between such partition wall and the former port 41.

Any suitable mechanism may be provided by means of which the engineer or fireman may operate the lever 39 from the cab of the locomotive. One such mechanism includes a link 43 connecting the free end of the lever 39 with the laterally directed terminal 44 of a rod 45 which extends to the cab of the locomotive and which, by turning movement, may be caused to oscillate the lever 35 and, consequently, the valve 33.

In order to provide means for supplying air, under pressure, to the valve to feed the sand under certain conditions or to assist

in more rapidly feeding the sand when the latter is being supplied by gravity, I form the upper wall of the nozzle 14 with a thickened portion 46 in the shape of an exterior boss and with an interiorly depending nozzle 47 which projects into the passageway 18 and toward the sand dome. The boss 46 is formed with a tapped bore 48 to receive the threaded end of an air supply pipe 49 and the wall of the sand nozzle 14, together with the wall of the air blast nozzle 47 is provided with a duct or passage 50 which extends longitudinally through the greater portion of the length of the nozzle 47 and which then opens outwardly through the side wall of such nozzle toward the discharge terminal 17 of the sand nozzle 14. It will, therefore, be clear that air admitted through the pipe 49, under pressure, will be directed toward the discharge terminal 17 of the sand nozzle 14 and will, therefore, not only serve to prevent clogging of sand in the nozzle 14, but also to force sand from the nozzle into the valve 33, and, as will be later explained, from the valve 33 to the pipe sections 30 and so to the pipes 32 and the rails of the track.

Before describing the operation of my improved sanding device, I wish to direct attention to a somewhat modified form of valve and valve casing illustrated in Fig. 5. In this form of my device, the valve casing 19′ is preferably cylindrical in shape and is provided opposite the sand discharge nozzle with a circular opening having a radially extending peripheral flange 20′ adapted to receive an angularly disposed peripheral flange 21′ formed upon the cap plate 22′ which closes the opening. This cap plate is secured in place by bolts 23′ and is exteriorly thickened centrally to provide a boss 51 formed interiorly with a bearing 52 to receive the stud 53 of the base portion 54 of the sand valve 33′. In this form of my invention, the sand valve 33′ is somewhat smaller in proportion to the size of the casing and its boss 35′, instead of being reduced to form a valve stem, is provided with a circular base portion 54 which fits snugly within the inner portion of the opening of the valve casing 19′ and which, therefore, together with the cylindrical extension 53, serves to centralize and form a bearing for the valve 33′. This base 54 is provided with an ear 55 which extends through an arcuate slot 56 formed in the cap plate or closure 22′ and which is perforated to receive one end of the link 43 when the valve is in place. It will of course be clear that the arcuate slot 56 should extend only through 90° in order to properly limit the turning movement of the valve 33, due to swinging of the ear 55 from one end to the other of the slot. With the exception of these distinctions, this form of my invention is identical with that previously described and it is for this reason that the entire valve structure is not illustrated in Fig. 5.

In operation, the sand dome is filled in the usual manner and upon such filling, sand will flow into the valve which, under normal circumstances, occupies the position shown in Fig. 7, the sand, under these circumstances, partially filling the hollow valve 33, but not escaping through either of its discharge ports 41 or 42. If it becomes necessary to supply sand to the rails of the track, the engineer or fireman may swing the rod 46 to active position through the link 43 and lever 39 to oscillate the valve through an angle of 90° to the position shown in Fig. 6. Under these circumstances, sand will be discharged from the valve through the port 42 and, striking against the wedge-shaped partition wall 29, will be deflected equally through the discharge ports 27 and 28 of the valve casing and, consequently, will pass in equal quantities through the pipes 32 to the rails. Should the sand become clogged either in the valve or the sand nozzle 14, a slight application of air through the pipe 49 will serve to break it up and insure proper feeding of sand to the rails. In case an extreme amount of sand is required, the air blast may be utilized even though the sand is not clogged and it will therefore be seen that practically any desired amount of sand may be supplied to the rails, the quantity supplied being controllable from the cab of the locomotive.

Although I do not intend to ordinarily operate the device by fluid pressure means alone, it will of course be apparent that such may be accomplished, as with the valve in the position shown in Fig. 7 if air is supplied under pressure through the pipe 49 it will force sand through both of the valve ports 41 and 42 and through the space between the valve and valve casing surrounding the valve and so to the discharge ports 27 and 28 of the valve casing. Because of the high pressure of the air and the relatively contracted space between the valve and valve casing, the sand will be supplied in practically equal quantities to both the valve casing ports 27 and 28.

It should be noted that by positioning the air blast nozzle 47 in the sand nozzle 18, immediately adjacent the sand dome, any clogging of sand in the nozzle 18 is prevented which would not be the case if the air blast nozzle was positioned in the valve casing proper or in the outer end of the sand nozzle 18.

From the foregoing description, it will be apparent that I have provided an effective form of combined gravity and fluid pressure sander, the operation of which may be readily controlled by the engineer or fireman in his cab.

Although the device is primarily intended to operate by gravity, in order to avoid undue use of air from the air brake system of the train, an air blast may be employed as a supplemental means or the device may be operated wholly by means of the air blast, as preferred.

The device is simple in its construction, readily assembled, efficient in its operation and especially durable, due to the fact that little, if any, air need be employed in its operation and all scouring of the parts therefore avoided. Furthermore, the efficiency of the device, when used as a gravity sander, is far greater than that of the fluid actuated sanders, as the latter, due to the air blast, scatter the sand over the track, in effect forcing it from the rails, while with a gravity feed, the sand is applied evenly upon the treads of the rails.

I do not wish, however, to be limited to the specific details of construction illustrated and described, as various minor changes may be made at any time, within the scope of the appended claims, without in the slightest degree departing from the spirit of my invention. For instance, the sanding device, with slight structural changes, may be employed on street or railway cars with equally beneficial results.

Having thus described the invention, what is claimed as new is:

1. A sander including a sand discharging nozzle adapted for communicative attachment with the sand dome of a locomotive, a valve casing carried by the discharge end of the nozzle, and an oscillatory valve mounted in the casing with the discharge end of the nozzle extending into the valve, the valve casing being formed with diverging discharge passages in its lower wall arranged to provide an intermediate partition wall and the valve being formed with a discharge port adapted, in one position of the valve, to be disposed directly above the partition wall.

2. A sander including a sand discharging nozzle adapted for communicative attachment with the sand dome of a locomotive, a valve casing carried by the discharge end of the nozzle, and an oscillatory valve mounted in the casing with the discharge end of the nozzle extending into the valve, the valve casing being formed with diverging discharge passages in its lower wall arranged to provide an intermediate partition wall and the valve being formed with a discharge port adapted, in one position of the valve, to be disposed directly above the partition wall, said valve also being provided with a second discharge port disposed in the plane of the passages and first port and at substantially right angles to the first port.

3. A sander including a sand discharging nozzle adapted for communicative attachment with the sand dome of a locomotive, a valve casing carried by the discharge end of the nozzle, and an oscillatory valve mounted in the casing with the discharge end of the nozzle extending into the valve, the valve casing being formed with diverging discharge passages in its lower wall arranged to provide an intermediate partition wall and the valve being formed with a discharge port adapted, in one position of the valve, to be disposed directly above the partition wall, said valve also being provided with a second discharge port disposed in the plane of the passages and first port and at substantially right angles to the first port, and means for supplying an air blast to the intermediate portion of the discharge nozzle.

4. A sander including a sand discharging nozzle adapted for communicative attachment with the sand dome of a locomotive, a valve casing carried by the discharge end of the nozzle, and an oscillatory valve mounted in the casing with the discharge end of the nozzle extending into the valve, the valve casing being formed with diverging discharge passages in its lower wall arranged to provide an intermediate partition wall and the valve being formed with a discharge port adapted, in one position of the valve, to be disposed directly above the partition wall, said valve also being provided with a second discharge port disposed in the plane of the passages and first port and at substantially right angles to the first port, and means for supplying an air blast to the intermediate portion of the discharge nozzle and in the direction of the discharge terminal thereof.

5. A sander including a sand discharging nozzle adapted for communicative attachment to the sand dome of a locomotive, a valve casing carried by the discharge end of the nozzle and provided in its lower face with diverging discharge passages arranged to form a V-shaped partition wall between them, a hollow substantially spherical valve positioned in the valve casing and formed with an opening in one side to surround the free end of the sand nozzle and with an opening adapted, in one position of the valve, to lie directly above the partition wall, and a valve stem extending from that side of the valve opposite the first opening through the casing for operative connection with a controlling lever.

6. A sander including a sand discharging nozzle adapted for communicative attachment to the said dome of a locomotive to extend outwardly and downwardly therefrom, a valve casing carried by the nozzle and surrounding the free end thereof, said end being cylindrical exteriorly and such valve casing being open at its opposite end, a cap plate closing the opposite end of the

valve casing, a hollow, substantially spherical valve mounted in the valve casing and provided with an opening to closely receive the cylindrical end of the nozzle, said valve being provided with a discharge opening and said valve casing with spaced discharge openings, and means projecting from the valve and extending through the cap plate to provide for oscillating the valve.

7. A sander including a sand discharging nozzle adapted for communicative attachment to the sand dome of a locomotive to extend outwardly and downwardly therefrom, a valve casing carried by the nozzle and surrounding the free end thereof, said end being cylindrical exteriorly and such valve casing being open at its opposite end, a cap plate closing the opposite end of the valve casing, a hollow, substantially spherical valve mounted in the valve casing and provided with an opening to closely receive the cylindrical end of the nozzle, said valve being provided with a discharge opening and said valve casing with spaced discharge openings, and means projecting from the valve and extending through the cap plate to provide for oscillating the valve, said means including a base portion bearing against the inner face of the cap plate and having a stud seating in a recess formed in the cap plate, and an ear extending from the base through an arcuate slot in the cap plate, the slot limiting the movement of the ear and consequently of the valve.

8. A sander including a sand discharging nozzle adapted for communicative attachment to the sand dome of a locomotive, a valve casing mounted upon the discharge end of said nozzle and provided in its lower wall with spaced discharge ports, a hollow, substantially spherical valve mounted in the valve casing and having an opening surrounding the free end of the discharge nozzle, said valve being provided with discharge ports in the vertical plane of the ports of the valve casing and spaced from each other substantially ninety degrees, means for oscillating the valve to bring one of its ports directly above the space between the discharge ports of the valve casing and for reversely oscillating the valve to bring such port at one side of the valve casing at the port at the upper side of the valve casing, and means for limiting the oscillation of the valve to prevent movement beyond either of these positions.

9. A sander including a sand discharging nozzle adapted for communicative attachment to the sand dome of a locomotive, a valve casing surrounding one end of the nozzle, a hollow substantially spherical valve mounted for oscillation in the valve casing and adapted, in all positions, to receive sand discharged from the nozzle, said casing being provided with spaced discharge ports, and said valve with a discharge port capable of discharging sand uniformly to the ports of the casing.

10. A sander including a sand discharging nozzle adapted for communicative attachment to the sand dome of a locomotive, a valve casing carried by the discharge end of the nozzle, a valve mounted for oscillation in the casing, said nozzle, valve casing and valve being arranged to, in one position of the valve, permit passage of sand from the nozzle through the valve and from the casing and in another position to normally cut off flow of sand from the valve, and fluid pressure means projecting into the nozzle for forcing sand from the valve to the casing in said latter position of the valve, said means being located within the nozzle at a point directly outside of the sand dome.

11. A sander including a sand discharging nozzle adapted for communicative attachment to the sand dome of a locomotive, a valve casing surrounding one end of the nozzle, and a hollow valve mounted for oscillation in the valve casing and formed with an opening to snugly receive the nozzle, whereby the nozzle forms a bearing for the valve, the casing and valve being arranged to control flow of sand from the valve casing by movement of the valve to active and inactive positions.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN A. RIVES. [L. S.]

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."