A. T. KUEHNER.

TRACK SANDER.

APPLICATION FILED JAN. 14, 1920.

1,410,684.

Patented Mar. 28, 1922.

4 SHEETS—SHEET 1.

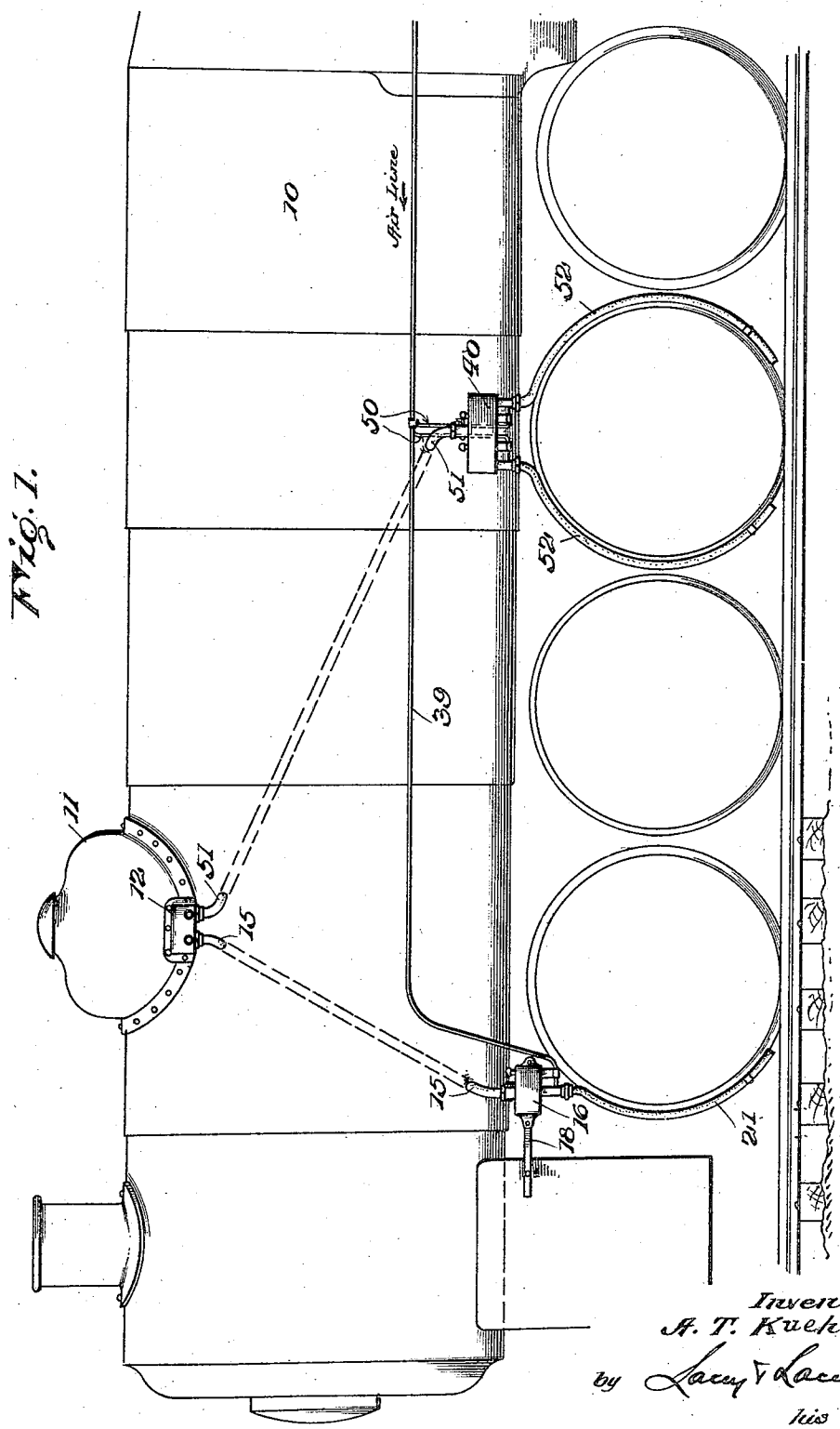


Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 2.

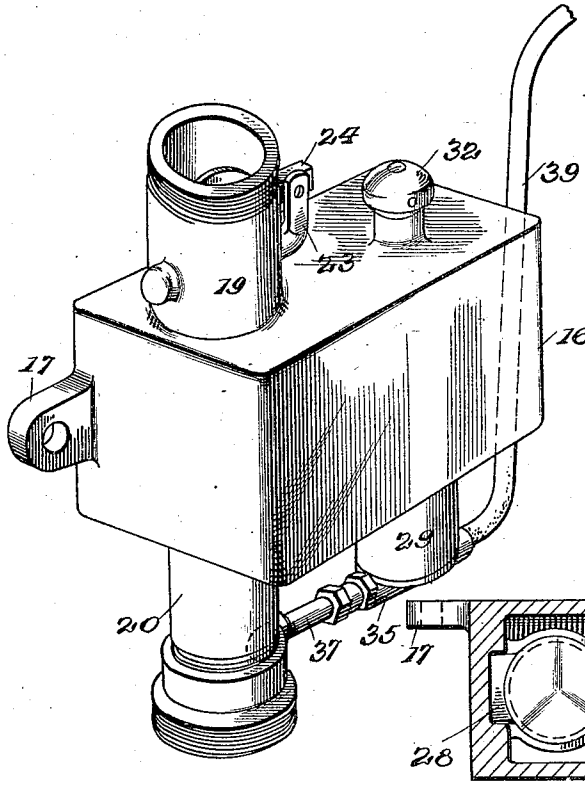


Fig. 4.

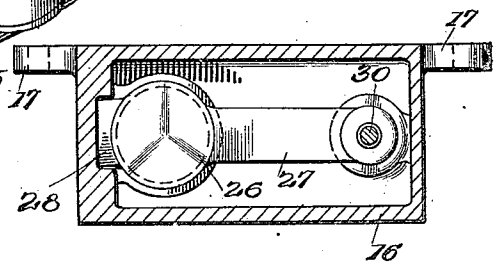
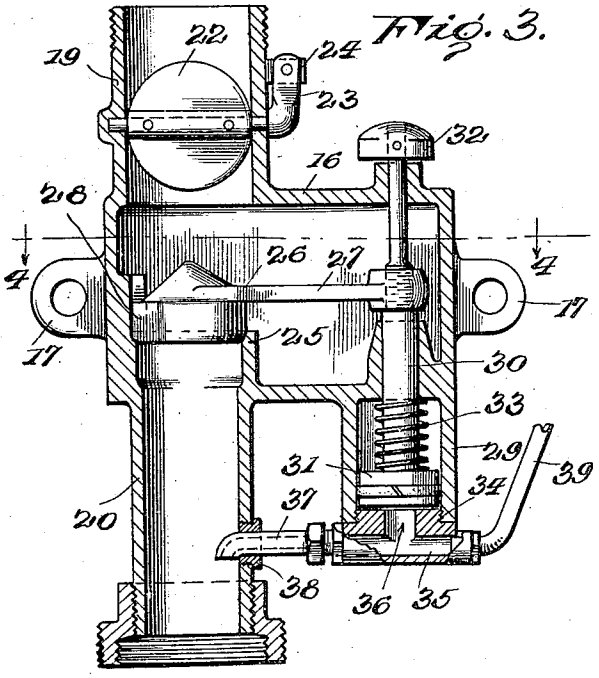


Fig. 3.



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4 SHEETS—SHEET 3.

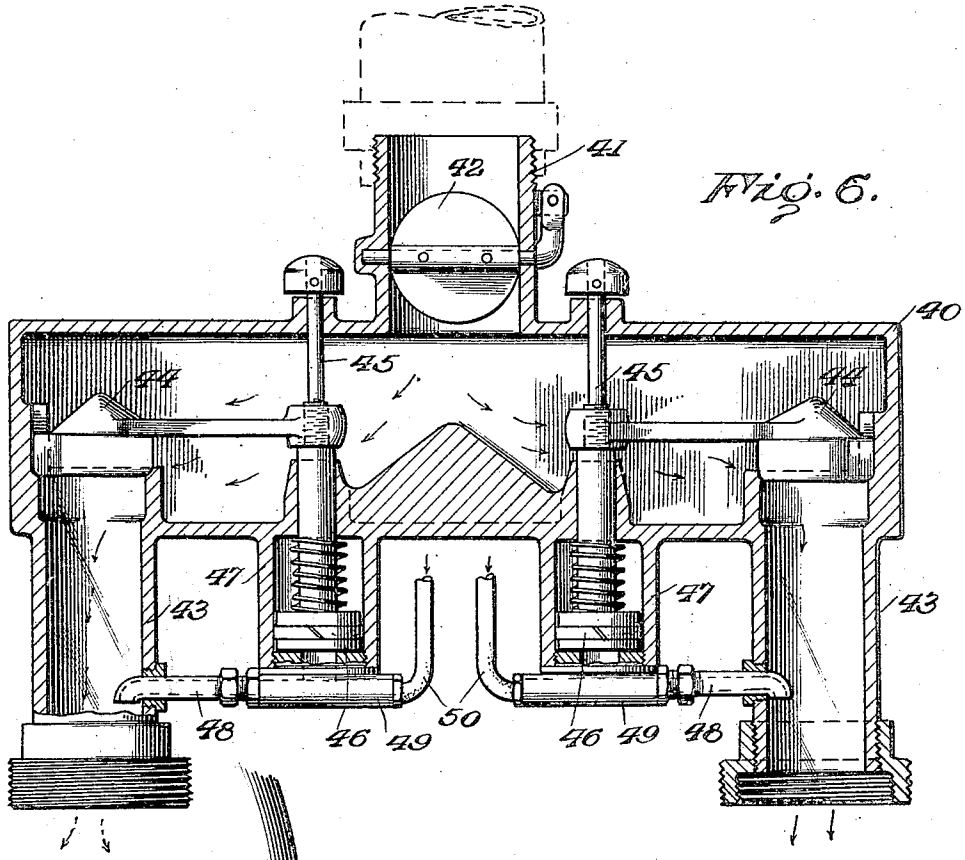


Fig. 6.

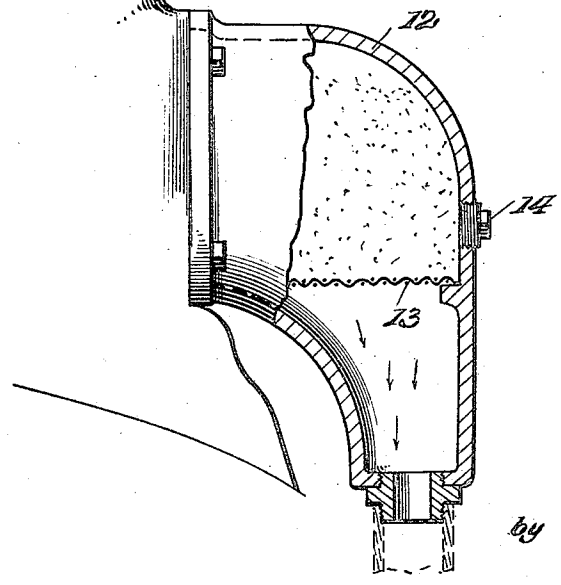


Fig. 5.

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4 SHEETS—SHEET 4.

Fig. 8.

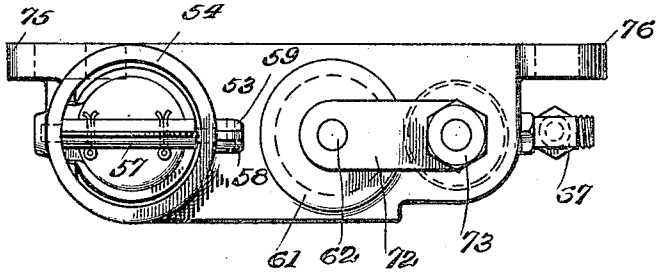


Fig. 9.

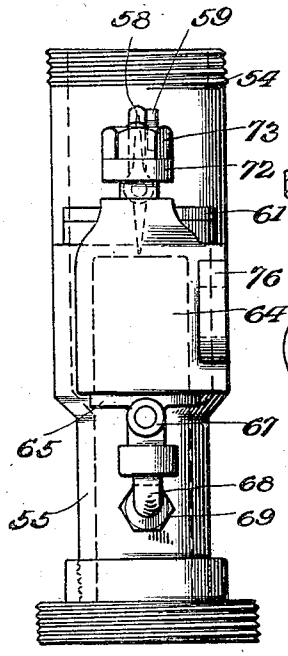
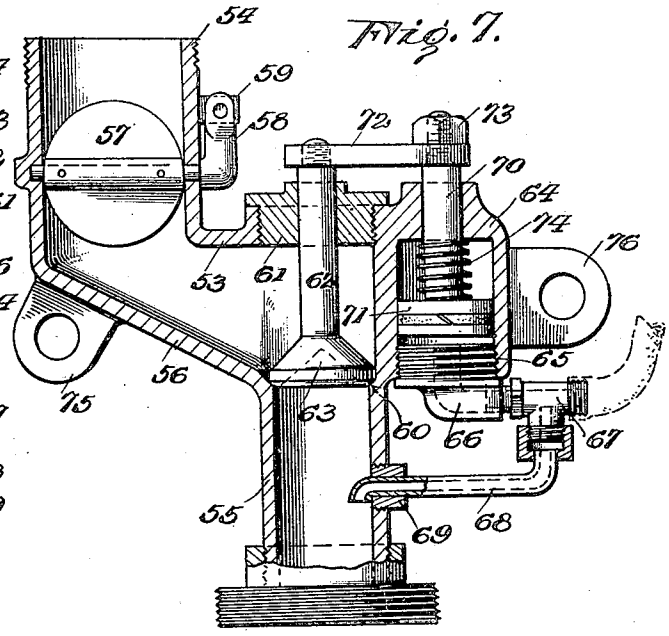


Fig. 7.



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UNITED STATES PATENT OFFICE.

ARTHUR T. KUEHNER, OF ELKRIDGE, MARYLAND.

TRACK SANDER.

1,410,684. Specification of Letters Patent. Patented Mar. 28, 1922.

Application filed January 14, 1920. Serial No. 351,343.

To all whom it may concern:

Be it known that I, ARTHUR T. KUEHNER, citizen of the United States, residing at Elkridge, in the county of Howard and State of Maryland, have invented certain new and useful Improvements in Track Sanders, of which the following is a specification.

This invention relates to an improved track sander, being particularly designed for use upon locomotives and has as one of its principal objects to provide a device wherein, under all weather conditions, delivery of sand to the rails will be positively insured.

The invention has as a further object to provide a construction employing a sand ejector, wherein the ejector will be located adjacent the point of discharge of the sand so that air flowing through the ejector nozzle will act to positively feed the sand and wherein the ejector will also be located in such position upon the locomotive as to be conveniently accessible from the ground or floor, this feature eliminating necessity of climbing upon the locomotive to reach the ejector as is now necessary in connection with sanders of conventional type.

A further object of the invention is to provide a device wherein the sand ejector will be valve controlled and wherein air flow to the ejector nozzle will serve to automatically open said valve.

The invention has as a further object to provide a device wherein the ejector valve may also be manually opened so that flow of sand may be readily tested at the ejector.

A still further object of the invention in this connection is to provide a device wherein the ejector will be equipped with a shut off valve for cutting off the flow of sand from the dome in case any repairs are necessary or removal of parts desired.

And the invention has as a still further object to provide a device wherein clogging of the sand pipes will be eliminated.

Other and incidental objects will appear hereinafter.

In the drawings:

Figure 1 is a side elevation of my improved sanding device applied to a conventional type of locomotive, the locomotive being more or less diagrammatically illustrated,

Figure 2 is a perspective view of the sand ejector employed,

Figure 3 is a vertical sectional view taken centrally through the ejector,

Figure 4 is a horizontal section taken on the line 4—4 of Figure 3 and looking in the direction of the arrows,

Figure 5 is a fragmentary sectional view showing the sand hopper employed,

Figure 6 is a sectional view showing another form of the invention,

Figure 7 is a sectional view showing another form of the invention,

Figure 8 is a plan view of the structure shown in Figure 7, and

Figure 9 is an end elevation of the latter form of the invention.

In order to facilitate an accurate understanding of the present invention, I have, in the drawings, shown the device in connection with a conventional type of locomotive 10. This locomotive is provided with the usual sand dome 11. In carrying the invention into effect, I employ a supply hopper 12. As particularly shown in Figure 5, this hopper is bolted or otherwise secured to the base of the sand dome 11 to overlie the valve holes as at present provided in the dome so that sand will flow by gravity from the dome into the hopper. Fitted in the hopper is a sand screen 13 designed to remove all foreign matter from the sand as it passes through the screen and above the screen the hopper is provided with one or more clean-out plugs 14.

Leading from the bottom of the hopper is a supply pipe 15 and, as will be particularly observed upon reference to Figure 1, this pipe enters the locomotive jacket and is disposed for the major portion of its length between the jacket and boiler of the locomotive, the pipe emerging at the lower side of the jacket. Thus, the pipe will not only be housed and thus protected from accidental injury but will also be kept heated so that sand flowing through the pipe will be maintained warm and dry. As will be appreciated, this heating and drying of the sand will insure a free flow thereof under all weather conditions.

At its lower end, the pipe 15 is connected to a sand ejector. As particularly shown in Figures 2, 3 and 4 of the drawings, this ejector includes an oblong casing 16 from the end walls of which project lateral lugs 17. These lugs may be secured to a suitable bracket 18 connected to any convenient adjacent part of the locomotive for supporting the ejector thereon, it being observed that the ejector is located in a plane touching the

upper sides of the locomotive drive wheels. Consequently, the ejector may be readily reached from the floor or ground. Upstanding from the top wall of the casing 16 adjacent one end thereof is an inlet pipe 19 and, as shown in Figure 1, the supply pipe 15 is suitably connected to this inlet pipe. Depending from the bottom wall of the casing in alinement with the inlet pipe is an outlet pipe 20 to the lower end of which is suitably connected a discharge pipe 21. In the present instance this discharge pipe is shown as arranged to extend in front of one of the forward drive wheels of the locomotive to a point near the adjacent track rail. Mounted within the inlet pipe 19 is a shut off valve 22 which may, if desired, be of the butterfly type and, at its outer end, the stem of this valve is provided with a short crank 23. This crank is movable to abut a lug 24 extending radially from the inlet pipe and is provided with a suitable opening in the free end thereof for receiving any approved fastening device to engage the lug for holding the valve open.

At its inner end the outlet pipe 20 of the ejector is provided with a valve seat 25 and arranged to cooperate with this seat is a sand valve 26. At one side the valve is provided with a lateral arm 27 and projecting from the opposite side of the valve is a guide lug 28. As particularly shown in Figure 4, the adjacent end wall of the casing is thickened throughout the major portion of its height and formed in the thickened portion of said wall is a vertical groove slidably receiving said lug so that the lug will thus serve to direct the valve in its vertical movement and center the valve with respect to its seat. Depending from the bottom wall of the casing at the end thereof opposite the outlet pipe 20 is a cylinder 29 and slidably fitted through the casing axially of said cylinder is the rod 30 of an operating piston for the valve, the rod being equipped at its lower end with a head 31 reciprocable in said cylinder. The piston rod is provided with a reduced upper end portion threaded through a suitable eye at the free end of the valve arm so that the valve is thus coupled to the piston and upon the upper end of the reduced portion of the rod at the upper side of the casing is a knob 32. Normally holding the sand valve closed is a spring 33 surrounding the piston rod and bearing between the upper end wall of the cylinder and the piston head. Closing the cylinder 29 at its lower end is an end plug 34 provided with a transverse duct 35 and leading from this duct into the cylinder is an air passage 36. Leading from the inner end of the duct 35 into the lower end portion of the outlet pipe 20 is a nozzle 37 received through a nut 38 threaded into the pipe wall and suitably connected to the outer end of said duct is an air pipe 39. As suggested in Figure 1, this air pipe leads from the cab of the locomotive and, in a position convenient to the engineer, is provided with any approved type of three-way valve, the valve controlling, of course, flow of compressed air through the pipe. When the valve is opened, air will flow through the pipe 39 and into the duct 35 to rise through the passage 36 against the piston head 31 when the piston will be lifted for lifting and consequently opening the valve 26. Coincidently air will flow through the nozzle 37 to issue downwardly therefrom within the outlet pipe 20. When the supply of air is cut off the piston and valve will, of course return by gravity.

As will now be readily understood in view of the preceding description, sand in the dome 11 will, by gravity, flow into the hopper 12 and thence through the pipe 15 into the ejector so that the casing of the ejector will always be filled with sand. Consequently, when air is admitted through the pipe 39 and the valve 26 is opened, the sand will tend to gravitate through the outlet pipe and through the discharge pipe 31 to the track rail. Coincidently, the air issuing from the nozzle 37 will tend to create a partial vacuum in the outlet pipe above the nozzle for drawing sand downwardly into the outlet pipe while below the nozzle, the air will act to positively blow the sand from the outlet pipe and through the discharge pipe to the rail. A positive feeding of the sand will thus be insured. In this connection it will be observed that when the valve 26 is opened, a direct passage for the sand is established from the hopper 12 to the mouth of the discharge pipe so that the flow of sand will be unhampered. Furthermore, since the discharge pipe below the ejector is relatively short, it will be impossible for the sand to clog in this pipe in such degree as to withstand the force of the air jet issuing from the nozzle. When the flow of air through the pipe 39 is cut off, the weight of the sand upon the valve 26 will, of course, tend to accelerate closing of the valve. To test the flow of sand through the ejector, it is simply necessary to lift upwardly upon the knob 32 for raising the sand valve. Further, attention is directed to the fact that tests may be made at the ejector where the flow of sand may be readily observed. In sanders of conventional type it is necessary for one person to operate the air valve of the sander while another person must observe the flow of sand. In any instance where a single person attempts to thus test the conventional sander, the sand is grossly wasted. In the present construction, these disadvantages are overcome.

In Figure 6 of the drawings, I have, in detail, illustrated another form of the invention, this form of the invention constituting

a double sand ejector and being shown in Figure 1 in position upon the locomotive. The double ejector of Figure 6 includes an elongated casing 40 from the top wall of which upstands an inlet pipe 41 corresponding to the pipe 19 of the form of the invention previously described and equipped with a similar shut-off valve 42. Depending from the casing are outlet pipes 43 at the inner ends of which are arranged sand valves 44 corresponding to the valve 26 and the valves 44 are connected with piston rods 45 at the lower ends of which are piston heads 46 operating in cylinders 47 depending from the casing, these parts also corresponding to similar parts of the form of the invention previously described. Leading into the outlet pipes are nozzles 48 extending from ducts 49 having air passages leading therefrom into the cylinders. Air pipes 50 are connected to said ducts and, as will be observed upon referring to Figure 1, the pipes 50 are connected to an air supply pipe common to both thereof. This air supply pipe may be the same pipe that leads to the single ejector previously described. Extending from the hopper 12 to the inlet pipe 41 is a sand pipe 51. Thus, when air is admitted through the air supply pipe, the valves 44 will, of course, be simultaneously opened. Leading from the outlets 43 are discharge pipes 52 extending at the front and rear respectively of an adjacent drive wheel of the locomotive for discharging sand onto the adjacent track rail.

In Figures 7, 8 and 9 of the drawings, is shown another form of sand ejector. In this form of the invention a casing 53 is employed. Leading into the casing at one end thereof is an inlet pipe 54 and leading from the casing at its other end is an outlet pipe 55, these pipes being offset laterally with respect to each other. As particularly shown in Figure 7, the casing is formed with an inclined bottom wall 56 sloping downwardly from beneath the inlet pipe to the upper end of the outlet pipe. Interposed in the inlet pipe is a shut off valve 57 which may be of the butterfly type and the stem of this valve carries, at one end, a crank 58. This crank is movable to abut a stop lug 59 projecting from the inlet pipe and is normally secured at its free end to said lug for holding the valve open. At its inner end the outlet pipe is provided with a valve seat 60 and threaded upon the top wall of the casing in alinement with the pipe is a bonnet 61. Slidable through this bonnet is the stem 62 of a sand valve 63 normally engaging the seat 60 in closed position.

Formed on the casing at the end thereof adjacent the sand valve is a cylinder 64 closed at its lower end by a plug 65 threaded into the cylinder. Through this plug is formed an air passage 66 entering the cylinder at its lower end and in communication with said passage is a T-coupling 67 carried by the plug. The T-coupling is, as suggested in dotted lines in Figure 7, designed to receive the adjacent end of an air supply pipe and connected to said coupling is a nozzle 68 entering the outlet pipe 55 through a nut 69 threaded into the wall of the pipe. Slidable through the upper end of the cylinder 64 is the rod 70 of a piston for operating the sand valve. At its lower end this rod carries a piston head 71 and extending between the upper end of the stem 62 of the valve and the upper end of the piston rod is an arm 72 coupling the piston and valve together. The arm is preferably fixed to the valve stem and adjacent its free end is provided with an opening freely receiving a reduced extension upon the upper end of the piston rod, this extension carrying a nut 73 detachably connecting the arm to the piston rod. Bearing between the upper end wall of the cylinder and the piston head 71 is a helical spring 74 surrounding the piston rod and, as will be at once appreciated, normally acting to hold the sand valve closed. Extending from the sloping bottom wall 56 of the casing is a lug 75 and extending from the cylinder 64 is a similar lug 76, these lugs corresponding to the lugs 17 of the form of the invention first described and being designed to serve a similar function. The inlet pipe 54 is, of course, designed for connection to a sand supply pipe such as illustrated at 15 in Figure 1, while the outlet pipe 55 is designed to carry a discharge pipe such as previously indicated at 21. Thus, sand will be constantly supplied within the casing through the inlet pipe while sand will be discharged through the outlet pipe 55 to the track rail.

For opening the sand valve air is admitted through the passage 66 of the plug 55 when the air will act against the piston head 71 for raising the piston and consequently raising the valve 63. Coincidently, air will, of course, flow through the nozzle 68 into the outlet pipe 55. When the valve 63 is thus opened sand in the inlet pipe will, as will be appreciated, flow downwardly over the sloping bottom wall 56 of the casing and thus tend to gravitate through the casing, the blast of air from the nozzle 68 providing, however, a positive feed for the sand. When the sand valve is closed the sand will, of course, collect above the sand valve but since the inlet pipe is offset laterally with respect to the outlet pipe the sand cannot form solidly above the valve to prevent opening thereof. Further, in thus arranging the inlet and outlet pipes with respect to each other, the major portion of the weight of the column of sand flowing into the inlet pipe will be sustained by the sloping bottom wall 56 of the casing so that the sand valve will be relieved of this downward pressure. Ac-

cordingly, the valve may be readily opened. Also, it is to be observed that the cylinder 64 is closed with respect to the casing, a coupling between the sand valve and its operating piston being effected exteriorly of the casing and the cylinder. Accordingly, sand cannot find its way into the cylinder to clog the piston or hamper the movement thereof. Flow of sand through the casing may, of course, be manually tested by simply lifting upwardly upon the arm 72 for raising the sand valve.

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

1. The combination with a locomotive, of a sander including a supply pipe in communication with the sand dome of the locomotive and extending between the locomotive jacket and boiler, a valve controlled sand ejector connected to said pipe, and means for opening the valve of the ejector.

2. In a track sander, a sand ejector including a casing provided with an inlet and an outlet, a valve for controlling flow of sand through the casing, a shut off valve for controlling flow of sand into the casing, and fluid pressure operated means for opening the first valve.

3. In a track sander, a casing provided with an inlet and an outlet, a valve controlling flow of sand through the casing, and a fluid pressure operated piston located in a plane at one side of the valve and rigidly coupled therewith for opening the valve.

4. In a track sander, a casing provided with an inlet and an outlet and having a cylinder thereon, a valve controlling flow of sand through the casing, a fluid pressure operated piston reciprocable in said cylinder at one side of the plane of the valve, and an arm rigidly coupling the valve and piston.

5. In a track sander, a casing provided with an inlet and an outlet laterally offset with respect to each other, a valve controlling flow of sand through the casing, and fluid pressure operated means for opening the valve.

6. In a track sander, a sand ejector including a casing provided with an inlet and an outlet laterally offset with respect to each other, the casing being formed with an inclined bottom wall sloping from beneath the inlet to the outlet, a valve closing the outlet at its inner end, and fluid pressure operated means for opening said valve.

7. In a track sander, a sand ejector including a casing provided with an inlet and an outlet laterally offset with respect to each other, there being a cylinder formed on the casing adjacent said outlet, a valve closing the outlet at its inner end and having a stem rising through the casing, a fluid pressure operated piston reciprocable in said cylinder and having a piston rod rising through the cylinder, and means coupling the piston rod and valve stem.

8. In a track sander, a sand ejector having a manually operable valve controlling flow of sand through the ejector, and fluid pressure operated means for opening said valve.

9. The combination with a locomotive boiler and sand dome, of a track sander including a sand discharge pipe leading from the dome and housed between the boiler and its casing for heating the sand and conducting it from the dome.

10. In a track sander, a casing provided with an inlet and an outlet and having an opening opposite the outlet, a plug closing the opening, a reciprocable valve controlling flow of sand through the casing and removable through said opening, the valve having a stem slidable through said plug, and means for operating the valve.

11. In a track sander, a casing provided with an inlet and an outlet and having a cylinder thereon, a valve controlling flow of sand through the casing and having a stem rising through a wall of the casing, a piston reciprocable in said cylinder at one side of the plane of the valve, and an arm coupling the piston and valve stem exteriorly of the casing.

12. In a track sander, a casing provided with an inlet and an outlet laterally offset with respect to each other, a shut-off valve in the inlet, and a valve for closing the outlet and operable independently of the first valve.

13. In a track sander, a casing having an inlet and an outlet and provided with a cylinder, a valve controlling flow of sand through the casing, a piston reciprocable in said cylinder and coupled with the valve, a plug closing the cylinder, and a nozzle connected with said plug and entering the outlet.

14. The combination with a locomotive having a sand dome, of a hopper secured to the dome to be fed therefrom, and a sand pipe leading from the hopper.

15. In a track sander, a casing having an inlet and an outlet, a valve controlling flow of sand through the casing, fluid pressure operated means for opening said valve, and a nozzle mounted to discharge in said outlet and in communication with a fluid passage leading to said means.

In testimony whereof I affix my signature.

ARTHUR T. KUEHNER. [L. S.]