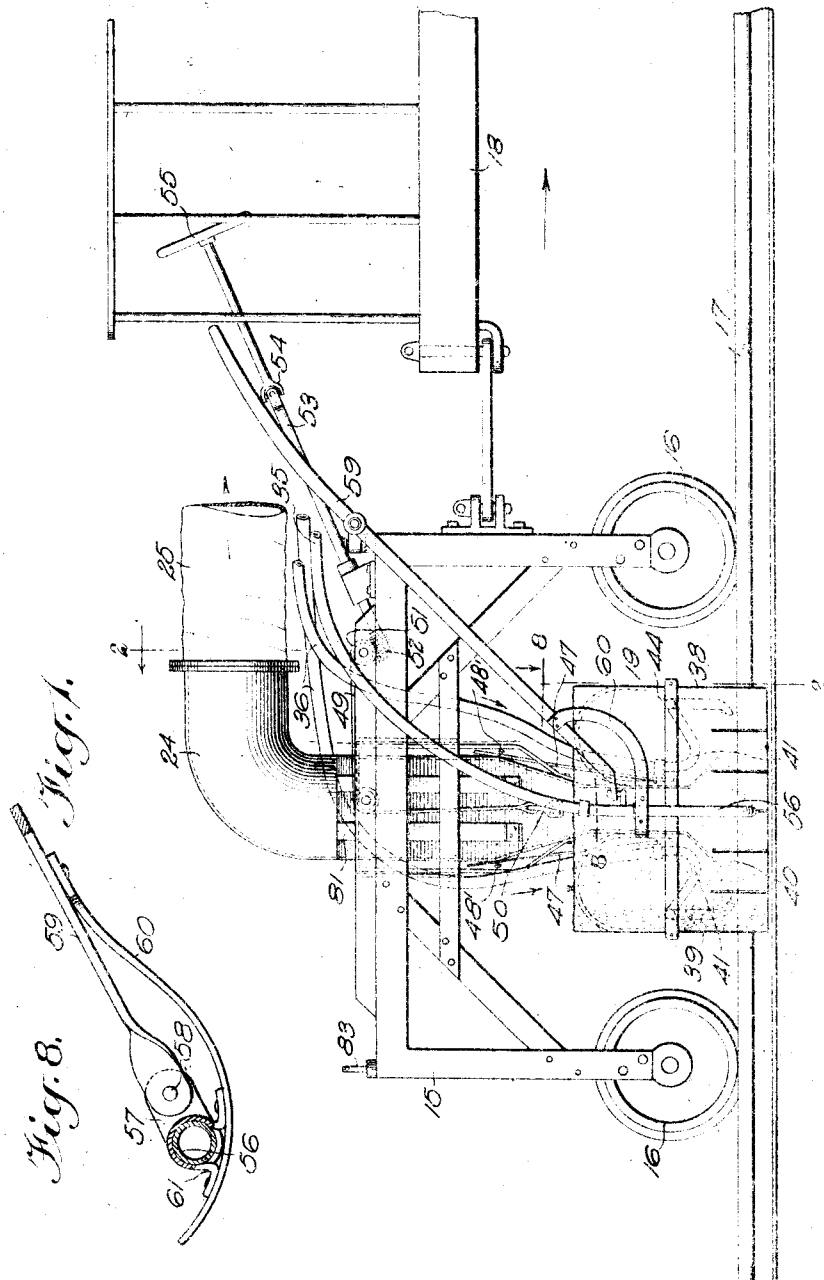


F. L. WARNER.
PNEUMATIC TRACK AND STREET CLEANER.
APPLICATION FILED SEPT. 7, 1915.

1,187,209.

Patented June 13, 1916.

4 SHEETS—SHEET 1.



WITNESSES

Geo. H. Taylor
Geo. H. Beeler

INVENTOR

F. L. Warner

BY

Wm. H. Co.
ATTORNEYS

F. L. WARNER.
PNEUMATIC TRACK AND STREET CLEANER.
APPLICATION FILED SEPT. 7, 1915.

1,187,209

Patented June 13, 1916.
4 SHEETS--SHEET 2.

Fig. 3.

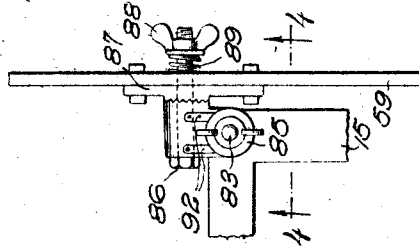


Fig. 4.

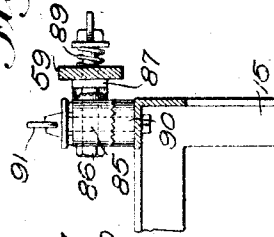
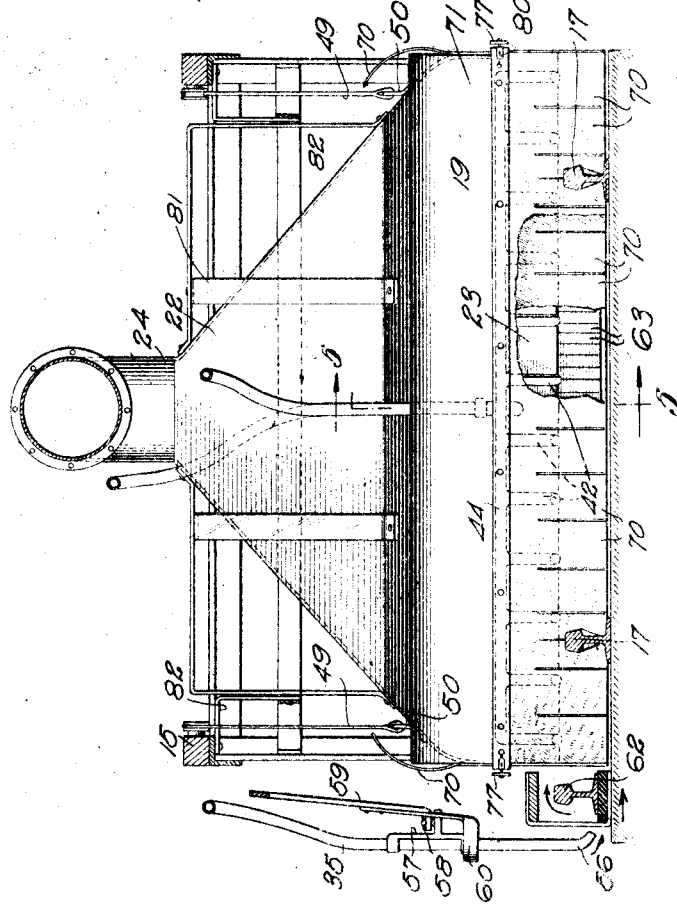


Fig. 2.

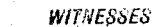


WITNESSES
Geo. W. Taylor
Geo. L. Beelen

INVENTOR
F. L. Warner
BY *Mumford*
ATTORNEYS

1,187,209.

4 SHEETS--SHEET 3;



Geo W. Maylor
G. H. Beeler

INVENTOR
F. L. Warner
BY *Mund Co*
ATTORNEYS

F. L. WARNER.
PNEUMATIC TRACK AND STREET CLEANER.
APPLICATION FILED SEPT. 7, 1915.

1,187,209.

Patented June 13, 1916.

4 SHEETS—SHEET 4.

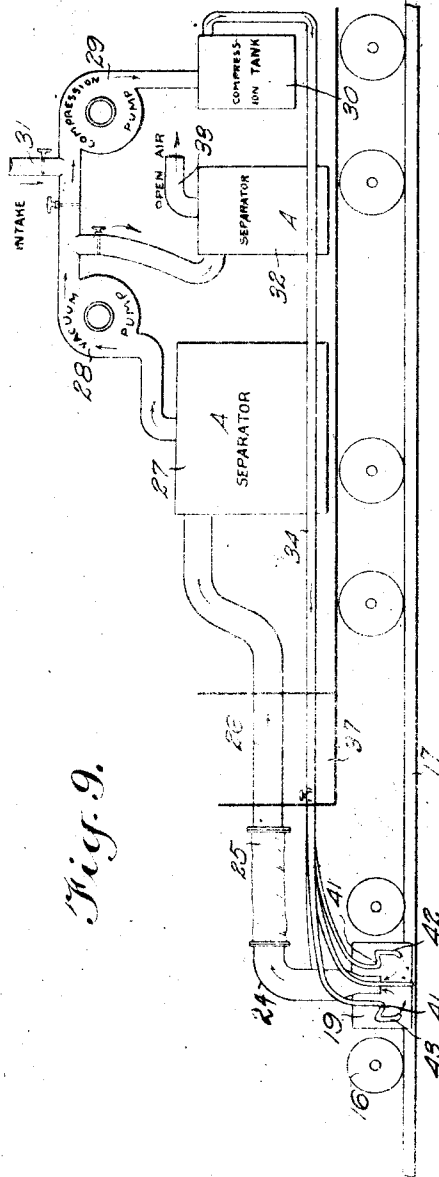
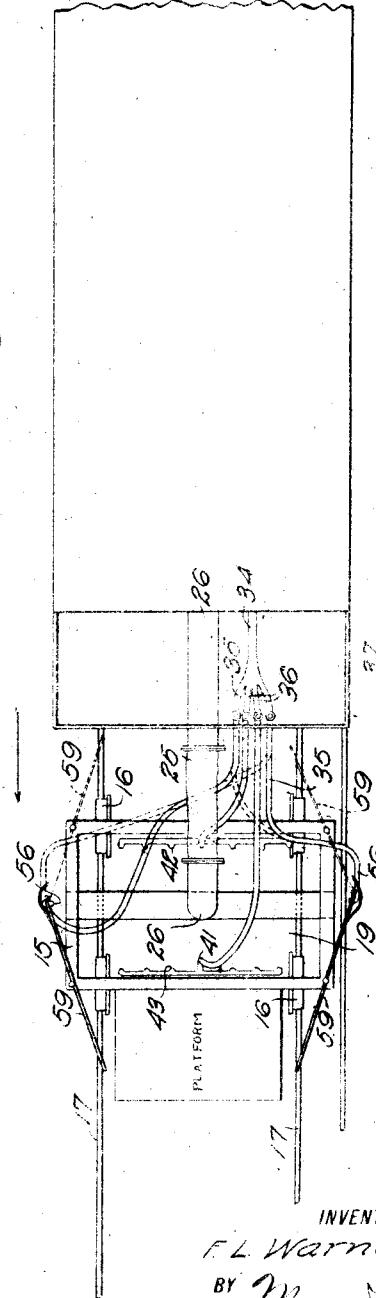


Fig. 9.

Fig. 10.



WITNESSES

Geo. Maylor
Geo. H. Beeler

INVENTOR

F. L. Warner
BY *Mumford & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

FRANK L. WARNER, OF ROCKAWAY BEACH, NEW YORK.

PNEUMATIC TRACK AND STREET CLEANER.

1,187,209.

Specification of Letters Patent.

Patented June 13, 1916.

Application filed September 7, 1915. Serial No. 49,379.

To all whom it may concern:

Be it known that I, FRANK L. WARNER, a citizen of the United States, and a resident of Rockaway Beach, in the county of Queens and State of New York; have invented a new and Improved Pneumatic Track and Street Cleaner, of which the following is a full, clear, and exact description.

This invention relates to apparatus for collecting dirt or dust and has particular reference to machines for drawing dust and dirt from the surface of streets, road-ways, railway tracks or the like.

Among the objects of the invention is to provide a machine made functional either by a blast of air, air suction, or a combination of suction and blast for the purpose of drawing or blowing dirt or dust from or through the rough ballast of railway road beds, or along places ordinarily inaccessible by the usual sweeping apparatus.

Another object of the invention is to provide a machine for cleaning railway tracks, such machine being mounted upon a truck and adapted to roll upon the railway rails, either by its own power or by being pushed ahead of or being trailed in the rear of any other suitable car or vehicle on such rails.

A still further object is to provide an intake for the dust or dirt conveying apparatus that will accommodate itself to all roughness and unevenness of the surface being cleaned, the nature of the intake being such that the manipulation of the dirt or dust will be confined to the intake thus preventing the spread of dirt or disease germs as a result of the operation of the machine.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a side elevation of the preferred embodiment of the invention shown as being trailed at the rear of another car; Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1; Fig. 3 is a plan view of one of the lever supporting devices at a corner of the portable frame of the machine; Fig. 4 is a vertical sectional detail on the

line 4—4 of Fig. 3; Fig. 5 is a vertical sectional view substantially on the line 5—5 of Fig. 2; Fig. 6 is a vertical transverse section on the line 6—6 of Fig. 5; Fig. 7 is a horizontal section on line 7—7 of Fig. 5; Fig. 8 is a detail sectional view on the broken line 8—8 of Fig. 1; Fig. 9 is a side elevation in diagram indicating a complete cleaning apparatus with means for manipulating the air and disposing of the product; and Fig. 10 is a plan view of the same but indicating the operator's platform at the rear of the cleaning device.

Referring more particularly to the drawings, I show a portable frame 15 mounted upon wheels 16 adapted to run upon the usual railway rails 17 either in front or at the rear of a car 18.

As premised above, however, the complete cleaning apparatus may be self-contained and self-propelled or the equivalent of the frame 15 may be found in any conventional form of railway car with the floor thereof adapted for the manipulation of the intake and parts associated directly therewith. It is also to be understood that the structure and operation of the cleaning apparatus are not necessarily confined to railway tracks, the same being well adapted for operation over other road-ways or floors.

The intake as a whole is indicated at 19 and comprises a substantially rigid hood 20 including a horizontal top and downwardly projecting rim or flange 21. At the center of the hood is provided a funnel 22 having a downwardly flaring mouth 23 the lower edges of which are spaced upwardly a number of inches from the surface to be cleaned. The upper portion of the funnel converges upwardly and leads into an elbow pipe 24, to which is connected a flexible joint 25 of tubing, to which is connected an air pipe 26 of any suitable size or character communicating with the air manipulating apparatus. As shown in Fig. 9 such apparatus may include one or more pumps and suitable separators with a plurality of valves for controlling the movement of the currents of air as may be found desirable at various times. The illustration covers a separator 27, which may be of a well-known gravity type and into which the pipe 26 leads.

28 is a vacuum pump connected to the top of the separator 27 and serves to draw the more or less purified air from the separator and tends to create a vacuum not only in the

separator but throughout the system of piping above described.

29 is another pump which may be employed to store compressed air into a compressed air tank 30. The air may be drawn through an intake 31 from the outside atmosphere or may in part be received from the vacuum pump 28. If, however, the air passing through the vacuum pump is charged with fine particles of dust not removed by the gravity separator 27 such air may be caused to pass through the auxiliary separator 32, which may be of a well-known gravity type or may be provided with spraying means to collect such dust. From this separator the air may be discharged at 33. A compressed air trunk 34 leads from the compression tank 30 to points adjacent the intake 19. From this trunk there leads a series of pipes 35 and 36 each having a valve to control the blast therethrough, such valves being within reach of the operator upon a platform 37.

The intake structure comprises front and rear walls 38 and 39 and end walls 40. The compressed air blast pipes 36 lead downwardly toward the top of the hood 20 where they are connected with the goose necks 41, of nozzles 42 and 43, adjacent the front and rear walls 38 and 39. Each of these nozzles comprises a horizontal tubular shaft 44 journaled in brackets 45 on the inside of the hood. Each goose neck 41 is curved on arc of the circle whose center coincides with the axis of the pipe 44 and is slidable through a substantial airtight collar 46 in the top of the hood. The pipe 44 extends transversely of the apparatus substantially the full length of the intake and carries a plurality of nozzle jets, the free ends of which are bent inwardly toward the funnel 23.

At 47 I provide rods connected by rings 48 to the upper ends of the goose necks, said rods being arranged to be adjusted vertically and hooked over studs 48' to determine the angular adjustment of the nozzle devices around the axes of the pipes 44. The intake 19 as a whole is adapted to be elevated so as to swing more or less off the road way by any suitable means under the control of the operator, such means being shown herein as flexible connections 49 secured to eyes 50 at the top of the hood, such connections 49 leading over any suitable number or position of direction pulleys to a drum 51 and adapted to be manipulated by means of worm gearing 52 at the rear end of a shaft 53, provided with a universal joint 54 and a hand wheel 55 adjacent the platform 37.

The compressed air blast pipes 35 lead to nozzles 56 opposite the ends 40 of the intake. As shown in Figs. 2 and 8 each nozzle 56 is held by a bridle 57 and pivoted on a vertical pivot 58 with respect to the controlling lever 59. A guard 60 is secured to the lever

59 and passes around the outside of the bridle guarding the same from damage from any obstruction along the line of movement of the apparatus. A stirrup 61 is connected to the inner face of the guard 60 and embraces the nozzle 56. These end blast nozzles 56 are intended especially for driving the dust and dirt from the sides of the roadway beneath the ends 40 of the intake, especially is the nozzle 56 useful in connection with the cleansing of the third rail 62 and the parts associated therewith. The blast is preferably directed so as to blow beneath the rail thereby causing the dust and dirt to be loosened and started toward the intake where the suction augmented by the blast from the nozzles 42 and 43 gathers the dust and dirt and disposes of it as above set forth.

At 63 I provide a series of strong but flexible tongues arranged along the front and rear walls 38 and 39 of the intake. These tongues may be formed by slitting a sheet or strip of steel or the like clamped between a pair of plates 64 within the flange 21 of the hood and secured to such flange by rivets 65 or other equivalent. Similar tongues or guards may be employed at the ends of the intake but I prefer for such purposes a row of ratan 66 shown best in Fig. 6, the same being clamped at the upper ends between strips of wood 67 clamped between steel plates 68 and secured by screws 69. The upper ends of the ratan are preferably corrugated to prevent displacement in connection with the clamping devices.

Outside of the guard or tongue devices 63 and 66, I provide an apron 70 made of any suitable strong, tough, flexible fabric or composition adapted to hang flatly against the guard or tongue means and close to the surface to be cleansed, the function of the apron being to direct the air so as to cause it to pass closely over or through the structure of the roadbed, it being understood that at least a portion of the air set in motion by the apparatus will be drawn in fresh from the outside of the intake. As shown in Fig. 5 each apron may consist of a downwardly projecting end of a roll carried within a rigid casing 71, a portion of which casing constitutes a part of the top of the hood. A tongue 72 may be struck out of the casing 71 to provide an opening 73 for the pipe 36 and rod 47, and also to form a means for additionally connecting the casing to the funnel. The desired length of apron is held by a clamping bar 74 by means of set screws 75 acting through the outer and lower portion of the casing 71 against the outer face of the bar 74. I also employ an apron 70 at each end lying against the ratan 66, there being less wear upon the aprons at the ends short lengths only may be relied upon at these parts. These aprons 70 at the ends

are held in place by clamping means shown best in Fig. 7 as comprising a plate 76 of wood or the like against the outer face of which is a bowed spring clamp 77. With one end of this clamp 77 fixed and the apron in place the other end thereof would be sprung inwardly and locked by means of a bolt 78 cooperating with a stud 79, a turn buckle 80 being used to adjust the length of the bolt. The upper portion of the end aprons may be tied up temporarily, if desired.

A skeleton frame 81 is secured to the top of the hood and funnel stiffening and reinforcing the same and constituting a guide means cooperating with a guide frame 82 connected to the main frame 15. At each corner of the frame 15 is a vertical stud 83 and the two studs 83 at the side of the frame adjacent the operator constitute supports for knuckles 85 upon which the levers 59 are adjustably mounted. Each knuckle 85 in addition to the bore for the stud 83 has a transverse bore for a horizontal bolt 86 extending through the lever. A toothed plate 87 is secured to the lever and cooperates with teeth on the side of the knuckle, the lever being held in engagement by means of a nut 88, acting through a coil spring 89. The knuckle also has toothed engagement with a washer 90, surrounding the bolt 83, and a nut 91 acts through flat springs 92 to cause the knuckle to be held in position in connection with the washer 90 around the bolt or stud 83. The serrated or toothed joints in the knuckle construction and between the knuckle and the lever plate 87 provides a means whereby the levers may be adjusted or shifted in any desired direction and then left to be automatically held in such position by virtue of the springs and special construction of the joints. It may be stated also that the leaf springs 92 have the advantage over the coil spring at the place indicated that by being permanently connected at one end to the knuckle, there is no likelihood of the springs becoming displaced and lost during the interchange of the knuckle mechanisms.

As indicated in Figs. 2, 5 and 6, each apron is preferably composed of several plies lying flatly against each other, the free edge of each ply being vertically slitted, and the tongues thus formed along the edge of one ply break joints with the slits in the adjacent ply whereby a more perfect airtight result is produced. Any suitable means may be employed in the casings 71 to control the position and manipulation of the aprons.

I claim:—

1. In a cleaning device, the combination of a wheel supported frame, an intake extending transversely of the frame, a funnel extending upwardly from the intake and

vertically adjustable along the frame, means supported on the frame to control the adjustments of the intake, and air blast devices cooperating with the intake and comprising a plurality of jet nozzles directed toward the center line of the intake.

2. In a device of the character set forth, the combination of a supporting frame having vertical guides therein, an intake comprising a hood, and a funnel connected to the hood and guided vertically in said frame guides, means pivoted to the frame for manipulating the intake laterally of the line of motion of the device, and means journaled upon the frame for determining the vertical adjustment of the intake with respect to the frame.

3. In a device of the character set forth, the combination of a rectangular supporting frame, means to traverse the frame along the line of operation, an intake supported in said frame, means to manipulate the intake vertically and laterally during the operation thereof, said intake being adapted to operate close to the surface to be cleaned and including a plurality of aprons adjacent the edges thereof next to the surface to be cleaned, and means to cause currents of air to pass beneath said aprons and into the intake.

4. In a device of the character set forth, the combination with pneumatic appliances for causing currents or blasts of air, of an intake, means for supporting the intake for movement along and over the surface to be cleaned, said intake comprising a hood, downwardly projecting flexible devices, and a plurality of aprons extending along said flexible devices on the outside thereof and terminating just above the surface to be cleaned.

5. In a device of the nature set forth, an intake comprising a hollow casing, a funnel extending upwardly at the center thereof and having a downwardly flaring mouth spaced upwardly from the surface being cleaned, and a series of air blast devices, a portion of which terminate within the casing of the intake and another portion of which are carried on the outside of the intake, all of the blast devices having nozzles directed toward the space below the funnel.

6. The combination, in an intake for pneumatic cleaners, of a dome having a substantially horizontal top and a downwardly projecting flange extending therearound, a funnel having a downwardly flaring mouth beneath the dome and extending thence upwardly therethrough, a series of flexible elastic tongue devices secured within said flange and extending downwardly around the funnel mouth, and air blast devices operating through said dome and terminating in a series of jet devices between the elastic tongues and the funnel.

7. In a cleaning device, an intake com-

prising a dome having a downwardly projecting peripheral flange, a funnel extending upwardly through the center of the dome, guard means secured to the dome flange and extending downwardly adjacent the surface to be cleaned, and air blast devices carried by the intake comprising a plurality of nozzles journaled transversely within the dome and having a series of jet nozzles directed toward the space beneath the funnel, said last mentioned devices including a goose neck curved on an arc of a circle from the axis of rotation of the nozzle and movable upwardly through the dome.

8. In a track cleaning device, the combination of an intake comprising a dome having a downwardly projecting peripheral flange, a funnel extending through the dome and having a downwardly flaring receiving mouth spaced upwardly from the surface to be cleaned, flexible elastic tongues secured to the flange and extending downwardly, terminating adjacent the surface aforesaid, a flexible guard apron secured on the outside of the dome and adapted to lie at the lower end thereof against said tongues, and air blast devices cooperating with the intake to cause a current of air to sweep between the apron and the surface being cleaned.

9. In a track cleaner, the combination of an intake comprising a rigid portion including a downwardly projecting flange, a funnel extending upwardly through the center of the rigid portion, a series of flexible elastic tongues secured to the said flange and projecting downwardly close to the surface to be cleaned, a flexible apron of tough, fibrous material secured to the outside of the intake and having a free end having vertical slits adapted to lie against the tongues

aforesaid, a casing carried by the rigid portion of the intake constituting a housing for the main portion of the apron, and air blast devices acting in and around the intake to cause air to sweep beneath the apron and tongues to cause the air and dust to pass upwardly through the funnel.

10. In a machine of the class set forth, the combination of a trolley, a portable platform, connections between the trolley and the platform, pneumatic power devices carried upon the platform, a dust-gathering mouthpiece carried beneath the trolley in proximity to the surface to be cleaned, and independent air blast and air suction connections between the mouthpiece and said pneumatic power devices, whereby a constant circulation of air may be maintained into and through the mouthpiece for loosening and carrying away the dust.

11. In a machine of the character set forth, the combination of a portable platform, a trolley connected to the platform and movable therewith, a dust-gathering mouthpiece attached to the trolley and movable therewith along the surface to be cleaned, an air blast pipe leading from the platform to the interior of the mouthpiece, an air suction pipe leading from the interior of the mouthpiece independently of the air blast pipe, and pneumatic power devices carried upon the platform and connecting the suction and blast pipes whereby a constant circulation of air may be caused through the interior of the mouthpiece for loosening and conveying away the dust.

FRANK L. WARNER.

Witnesses:

GEO. L. BEELER.

PHILIP D. ROLLHAUS.