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DEVICE FOR CLEANING ROADWAYS AND SIMILAR SURFACES

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Fig. 1

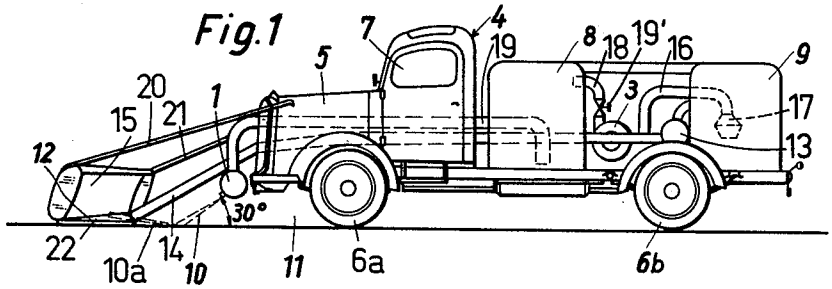



Fig. 3

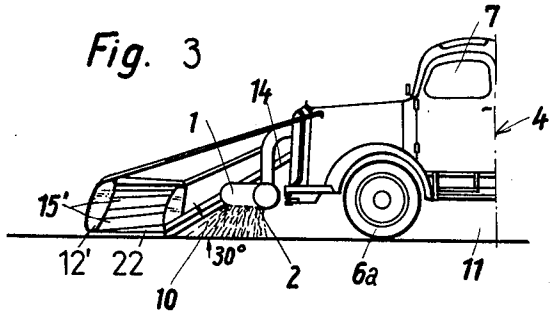
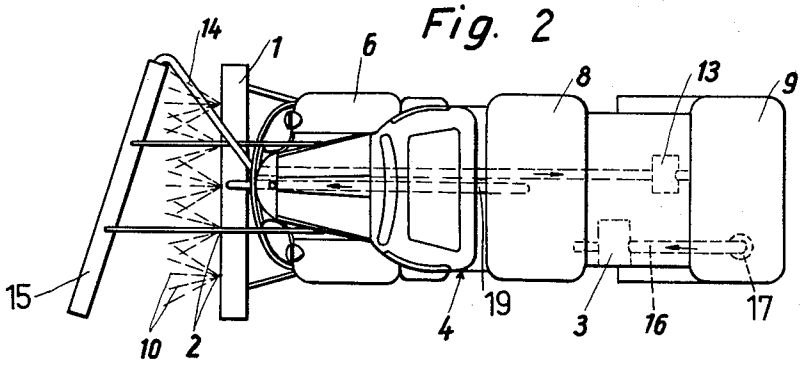



Fig. 2




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# DEVICE FOR CLEANING ROADWAYS AND SIMILAR SURFACES

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The present invention relates to the cleaning of roadways (e.g. prior to final surfacing), factory floors and similar surfaces.

In road construction it is customary to provide a packed substrate of crushed rock and to cover it with a ballast layer of sand and coarse gravel impregnated with a preferably bituminous filler. This roadbed, after having been compacted by suitable means such as rollers, is generally allowed to set for several months under traffic conditions and is subsequently covered by a surface coating of, for example, fine gravel and a bituminous binder. A careful cleansing of the roadbed is required prior to application of the surface coating if a satisfactory bonding between the layers is to be insured; this requirement also applies to the resurfacing of damaged roadways. The foreign matter is usually picked out between the rocks by pointed sticks, in a laborious and imperfect manner, and is blown out of the way by compressed air. A similar procedure is also followed prior to be filling of cracks between cobblestones with tar or asphalt.

The use of street-cleaning machines with rotating brushes and suction heads for removing street dirt by vacuum action has been found ineffectual, the same being true of sprinklers in combination with oblique brush rollers designed to sweep the dirt toward the gutter. Attempts to flush the roadbed with water have failed since in such process the liquid only carries the dirt deeper into the substrate.

It is, therefore, the general object of my present invention to provide an improved system for cleaning roadways to be surfaced, as well as large, heavily soiled floor areas of industrial buildings or the like, in an efficient manner avoiding the inconveniences set forth above.

I have found, in accordance with the instant invention, that this object may be realized by means of a water spray directed at high pressure, suitably of the order of 50–100 atmospheres, onto the surface to be cleaned at an angle of attack which should be between about 25–40° preferably near 30°.

In an advantageous arrangement the water spray reflected from the surface to be cleaned is caught and recirculated after the entrained dust and dirt particles have settled out. The power needed for recirculating the water so purified may be obtained, in a preferred embodiment, from the engine of an automotive vehicle to which the spray and catch means have been attached. These spray and catch means may include a battery of nozzles and a generally horizontal collector comprising a trough and a hood, the latter being open toward the array of nozzles and so positioned as to intercept the reflected streams from these nozzles. The hood may be of progressively increasing height, the narrow end of the hood being positioned relatively close to the sprayer while its wider end is relatively remote therefrom. The collector is then advantageously positioned at an acute angle to the direction of vehicular motion and may conveniently be equipped with a surface-contacting blade adapted to sweep aside any larger objects in the path of the machine. The sprayer itself may extend at right angles to the direction of motion or, if desired, may be arranged substantially mirror-symmetrically to the collector with reference to a vertical plane perpendicular to that direction.



The above and other features of my invention will be more fully apparent from the following detailed description of certain embodiments, reference being made to the accompanying drawing in which:

FIG. 1 is a side-elevational view of an automotive vehicle equipped with a street-cleaning attachment according to the invention;

FIG. 2 is a top-plan view of the vehicle of FIG. 1; and

FIG. 3 is an elevational view of the front portion of a vehicle with a slightly modified attachment.

In the drawing I have shown a sanitation truck **4** with engine **5**, front wheels **6***a*, rear wheels **6***b* and driver's cab **7**. The truck **4** carries a water reservoir **8**, a settling tank **9** and means, including a high-pressure pump **3** and a suction pump **13**, for circulating water from the reservoir **8** to a manifold tube **1** and returning it from a collecting trough **12** to the settling tank **9**. Manifold **1** is provided with a series of horizontally arrayed nozzles **2** adapted to create flat, fan-shaped sprays **10**; these sprays are directed at an angle of approximately 30° toward the ground surface **11** and are reflected therefrom at a somewhat lesser angle, the trough **12** with its hood **15** being so positioned as to intercept the reflected sprays **10***a*.

The pump **3** generates a pressure of approximately 50 to 100 atmospheres and has an inlet pipe **16** terminating at a screened intake **17** within the tank **9**, this intake being advantageously provided with suitable filter means not shown. The discharge pipe **18** of pump **3** includes a valve **19''** and opens into the tank **8** from which a conduit **19** leads into manifold **1**. A return pipe **14** extends from the bottom of trough **12** toward the pump **13** which delivers the collected spray water to the tank **9**. Pumps **3** and **13** may be driven from the engine **5** via suitable transmission means not shown.

The collector **12**, **15** is suspended from the hood of the engine by a pair of braces **20**, **21** and is shown provided at its bottom with a blade **22** which scrapes the roadway **11** to turn aside large pebbles and other matter liable to obstruct the water circulation if swept up by the spray. In FIGS. 1 and 2 the manifold **1** with its nozzles **2** extends transversely across the path of the vehicle **4**, at substantially the level of the wheel hubs which may be approximately 40 to 50 cm. above ground, whereas in FIG. 3 it has been illustrated in an oblique horizontal position substantially mirror-symmetrical to that of the collector. In FIG. 3, furthermore, the hood overlying the trough **12'** has been shown composed of a plurality of generally horizontal metal strips **15'**.

Although both the trough **12** or **12'** and the manifold tube **1** have been depicted as substantially horizontal, they could also be slightly inclined so long as their relative position is such as to insure the interception of most of the reflected spray water by the hood of the collector. I have found that, with the arrangement herein disclosed, substantially all the water can be returned to the system for recirculation and no puddles are left on the surface and that only 1 to 2.5 liters of water are needed for each square meter of surface to be cleaned. The apparatus described is, therefore, also well suited for the scrubbing of factory floors, large patios and similar areas. Naturally, the attachment comprising the sprayer **1** and the collector **12**, **15** or **12'**, **15'** may also be secured to the rear end of the truck **4** or to either end of some other type of vehicle, e.g. a trailer or a handcart without engine. Thus, the invention admits of various modifications without departing from the scope and spirit of the appended claims.

I claim:

1. A street-cleaning attachment for a vehicle having an engine, comprising nozzle means above the ground, said

nozzle means being trained at an angle of attack of about 25 to 45° toward the ground, a source of water connected to said nozzle means, said source having an outlet pressure sufficient to cause reflection of a spray from said nozzle means from the ground, collector means forwardly of said nozzle means for intercepting at least part of the reflected spray water, and a recirculation system for purifying the intercepted water and returning it to said source, said nozzle means comprising a generally horizontal manifold tube with an array of spray nozzles longitudinally disposed thereon, said collector means having one end relatively close to said tube and another end relatively remote from said tube.

2. An attachment according to claim 1 wherein said collector means comprises a generally horizontal trough provided with a hood open toward said manifold tube, said hood increasing progressively in height from said one end to said other end.

3. An attachment according to claim 1 wherein said trough is provided with a dependent scraper blade positioned to contact the ground.

4. A street-cleaning attachment for a vehicle having an engine, comprising horizontally extending, elongated nozzle means above the ground transverse to the direction of movement of the vehicle, said nozzle means being trained at an angle of attack of about 25 to 45° toward the ground, a source of water connected to said nozzle means, said source having an output pressure sufficient to cause reflection of a spray from said nozzle means from the ground, linearly extending generally elongated collector means transverse to said direction forwardly of said nozzle means for intercepting at least part of the reflected spray water, and a recirculation system for purifying the intercepted water and returning it to said source, said system including pump means coupled with said engine.

5. A street-cleaning attachment for a vehicle having an engine, comprising nozzle means above the ground, said nozzle means being trained at an angle of attack of about 25 to 45° toward the ground, a source of water connected to said nozzle means, said source having an output pressure sufficient to cause reflection of a spray from said nozzle means from the ground, collector means forwardly of said nozzle means for intercepting at least part of the reflected spray water, and a recirculation system for purifying the intercepted water and returning it to said source, said system including pump means coupled with said engine, said collector means comprising a generally horizontal trough with a depending ground-contacting scraper blade inclined at an acute angle to the direction of motion of the vehicle.



6. An attachment according to claim 5 wherein said nozzle means forms a substantially horizontal array of nozzles extending generally transversely to said direction of motion, said trough having one end relatively close to said array and another end relatively remote therefrom.

7. An attachment according to claim 6 wherein said collector means further comprises a hood above said trough open toward said collector means.

8. An attachment according to claim 7 wherein said hood progressively increases in height from said one end to said other end.

9. A street-cleaning attachment for a vehicle, comprising nozzle means above the ground, said nozzle means being trained at an angle of attack of about 25 to 45° toward the ground, a source of water connected to said nozzle means, said source having an output pressure sufficient to cause reflection of a spray from said nozzle means from the ground, collector means for intercepting at least part of the reflected spray water, and a recirculation system including pump means for purifying the intercepted water, and returning it to said source, said collector means comprising a generally horizontal trough with a depending ground-contacting scraper blade inclined at an acute angle to the direction of motion of the vehicle.


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