

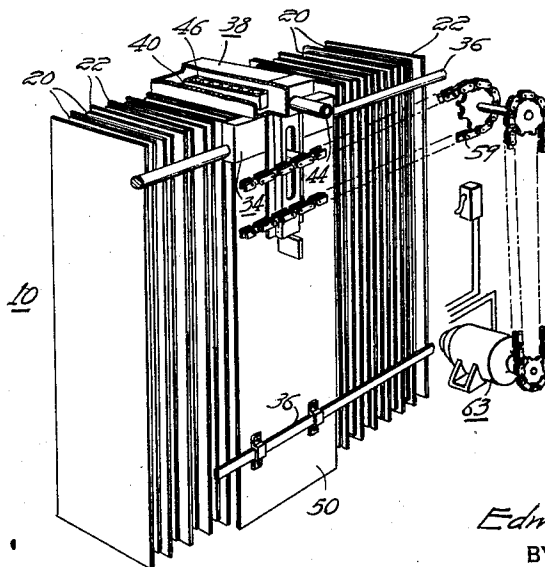
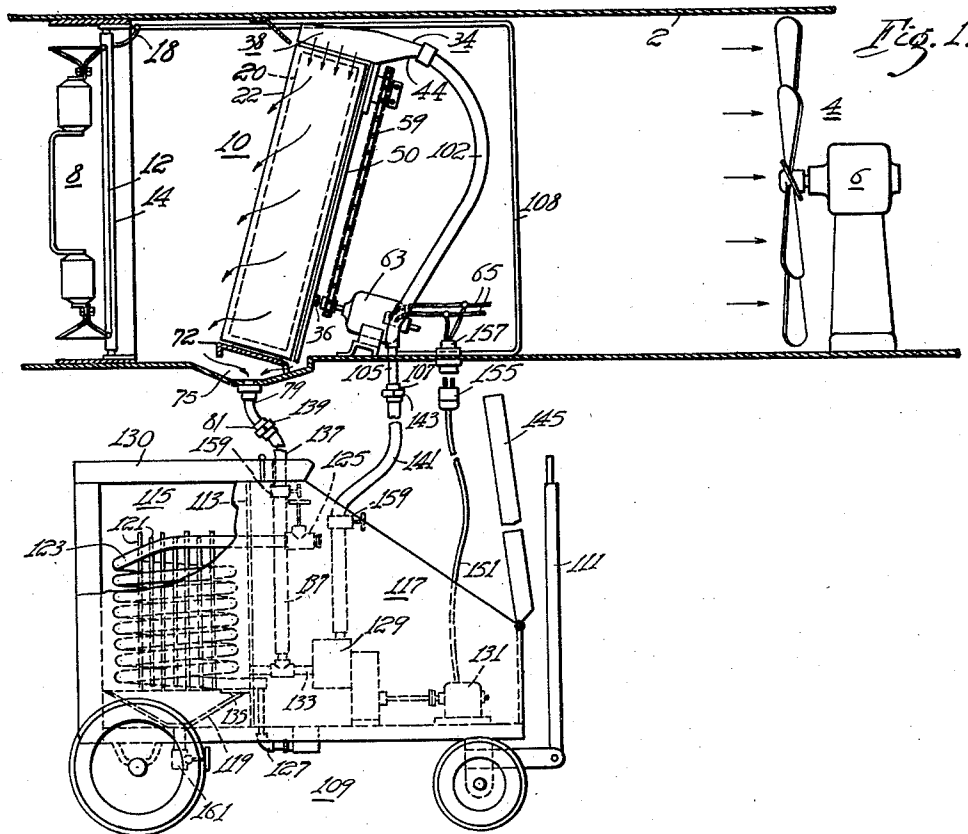
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ELECTRICAL CLEANING MEANS

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WITNESSES:

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ELECTRICAL CLEANING MEANS

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My invention relates particularly to electrostatic dust-precipitator units of a type which first charge gas-borne dust-particles and subsequently precipitate them by means of a plurality of spaced alternately oppositely-charged dust-collecting plate-electrodes, a type highly satisfactory for cleaning air.

My invention has for its primary object the application of such dust-precipitators to railroad cars where the available space is small or accessible with difficulty so that the ordinary construction of electrostatic dust-precipitators is not suitable, and a much smaller unit is demanded. Generally, in order to decrease the size of an electrical dust-precipitator while maintaining the volume of air cleaned per unit time, the velocity of the air through the unit must be increased, or the plate-electrode spacing decreased, or the surfaces of the plate-electrode coated so as to prevent "blow-off" of precipitated dirt, or a combination of these features used.

Closer spacing of the plate-electrodes is preferred. This means that the dirt-holding capacity of the plate-assembly is decreased. Consequently, an electrostatic dust-precipitator which is installed in an air-conditioning duct of a railway car must be cleaned more often and more thoroughly than a unit having larger and more widely spaced plate-electrodes. For good cleaning and in order to permit placing the electrostatic dust-precipitator in the most convenient place, it is desirable to provide an automatic plate-cleaning means which periodically removes the precipitated dust from the dust-collecting plate-electrodes. By using a suitable flushing fluid, a thin film remains on the surfaces of the plate-electrodes, after drainage, for retaining subsequently precipitated dust-particles and also to make it easier to wash precipitated dirt from the plate-electrodes the next time they are flushed.

An automatic system for periodically washing dust-collecting plate-electrodes of an electrostatic dust-precipitator with clean liquid is disclosed and claimed in the joint application of G. W. Penney and G. W. Hewitt, Serial No. 544,581, filed July 12, 1944. Another system of the same general type is disclosed and claimed with varying specificity in another application by the same inventors, Serial No. 603,503, filed concurrently herewith.

The last-mentioned application describes a system which comprises a tank or reservoir adapted to hold a body of liquid, and a loop-circuit in which liquid from the tank is recirculated

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during spaced intervals and then returned to the tank. The loop-circuit is completely external to the tank and extends above it. The loop-circuit includes a pump, upstanding dust-collecting plate-electrodes of an electrostatic dust-precipitator, and a plate-cleaning means comprising a nozzle-device which can be moved across the top of the dust-collecting plate-electrodes when the pump is recirculating plate-cleaning liquid in the loop-circuit. The arrangement is such that when the pump is started, it withdraws liquid from the tank and recirculates it in the loop-circuit, the system automatically controlling the amount of liquid withdrawn. The recirculating liquid flushes the surfaces of the dust-collecting plate-electrodes, removing dust collected on them. When the pump is stopped, the liquid of the loop-circuit flows back into the tank with a very minor part of the liquid remaining in the bottom of the loop-circuit. Between the intervals of plate-electrode cleaning, the liquid in the tank is itself cleaned. The system is so arranged that only cleaned liquid is withdrawn from the tank for recirculation in the loop-circuit during the next plate-cleaning operation.

An object of my invention is to provide a system of the type described having parts which are detachably associated for forming the loop-circuit but separable so that some of them can be separated from the others when the system is not being used for cleaning the plate-electrodes. That part of the system including the dust-collecting plate-electrodes is carried on a railroad car or a similar place of limited space, while the other part can be manually attached thereto for completing the system whenever desired. Consequently, fewer parts need be carried by the railway car, and these parts do not have any liquid accumulations. In accordance with this aspect of my invention, the part placed in the railway car consists essentially of the air-cleaning electrostatic dust-precipitator and the upper portion of the loop-circuit comprising the nozzle-device and associated parts travelable over the dust-collecting plate-electrodes of the dust-precipitator. The remaining parts of the apparatus, comprising the liquid-holding tank and the lower portion of the loop-circuit, are contained in a portable wheeled vehicle. The two portions of the loop-circuit can be detachably connected so as to result in a more complete system such as described hereinbefore. A big advantage of subdividing the system in accordance with my invention resides in the

The first of these is the fact that the
 government has been unable to
 maintain a stable currency. This
 has led to a loss of confidence
 in the government and a
 consequent loss of support
 from the people. The second
 is the fact that the government
 has been unable to maintain
 a stable economy. This has
 led to a loss of confidence
 in the government and a
 consequent loss of support
 from the people. The third
 is the fact that the government
 has been unable to maintain
 a stable society. This has
 led to a loss of confidence
 in the government and a
 consequent loss of support
 from the people.

communication with liquid therein. The pipe 133 preferably is above the sloped bottom 119 in which sludge is deposited, and a horizontal baffle-plate 135 may extend across the tank-compartment for further preventing disturbance of the sludge when the pump is operating. The intake of the pump is also connected to a piping means comprising a hose 137 which terminates in a detachable connector 139 that fits the connector 81 of the drain pipe 79. A hose 141 has one end connected to the outlet of the pump 129, and the other end terminating in a detachable connector 143 which fits the connector 107 on the pipe 105. The hoses 139 and 141 are of some length but can be conveniently coiled inside the compartment 117 which is closed by a cover 145. The motor 131 is provided with power-conveying cord 151 which terminates in a plug 155 adapted to be plugged into a conveniently-located receiving plug 157 parallelly connected to conductors 65. The cord 151 can also be conveniently coiled in the compartment 117.

In operation of the system, the vehicle 109 can be brought up to a railway car having an electrical dust-precipitator which is to be cleaned. The closing caps on the ends of the pipes 79 and 105 can be removed, and the hoses 137 and 141, respectively, connected thereto. The plug 155 may be plugged into the receiving plug 157 so that the motor 131 will be energized whenever the motor 63 is energized. When both motors are energized, the pump draws liquid out of the tank compartment 115 and recirculates it in a loop-circuit including the pump, the hoses 141 and 102, the nozzle-device 34, the dust-collecting electrodes, the pipe 79, and the hose 137; the liquid recirculating in this path and washing the dust-collecting electrodes. When the pump stops operating, the liquid drains from the parts in the railway car into the tank compartment 115. Valves 159 may be provided for closing off the hoses 137 and 141 when liquid is not being recirculated in the loop-circuit.

After the plate-electrodes of the dust-precipitating means 10 have been cleaned, the hoses 137 and 141 may be disconnected and replaced by caps which close the pipes 79 and 105. It is obvious that the pipes 79 and 105 should be conveniently located on a railway car.

When the vehicle 109 is not in use, it may be transported to any convenient power supply for energizing the spaced electrodes of the liquid-cleaning means 121 for cleaning the liquid in the tank compartment 115. Sludge may be periodically removed through drains 161.

While I have described my invention in the form which is now preferred, it is obvious that it is subject to wide modification, and that the basic concepts and teachings of the invention can be different applied to systems disclosed in the applications mentioned herein or in equivalent or other systems.

I claim as my invention:

1. A system of a type described comprising two separable parts at least one of which is portable independently of the other, a first of said parts comprising an electrostatic dust-precipitator for cleaning a gas-flow, comprising a plurality of spaced dust-collecting electrodes, means for discharging a liquid into the spaces between said dust-collecting electrodes, a liquid supply pipe to said liquid discharging means, having a first mateable connector, and a liquid collecting means below said dust-collecting electrodes, hav-

ing a second mateable connector; a second of said parts comprising a tank, a pump having an inlet and an outlet, pipe means extending to said pump inlet and to a lower part of said tank, said pipe means also comprising a return hose, pipe means connected to said pump outlet, comprising a supply hose, said supply and return hoses having detachable connectors respectively detachably attached to said first and second mateable connectors in the first of said parts.

2. The invention of claim 1 in which said second part comprising a manually-portable wheeled vehicle.

3. A system of a type described comprising two separable parts, a first of said parts comprising an electrostatic dust-precipitator for cleaning a gas-flow, comprising a plurality of spaced dust-collecting electrodes, a nozzle-device spanning a minor fraction of the spaces between said dust-collecting electrodes, means comprising an electric motor, for moving said nozzle device across said plurality of dust-collecting electrodes, an energizing circuit for said motor, comprising a plug, a supply pipe connection for said nozzle-device, having a first mateable connector, and liquid-collecting means below said dust-collecting means, having a second mateable connector; a second of said parts comprising a wheeled vehicle which is portable independently of the first of said parts, said vehicle carrying a tank, a pump having an inlet and an outlet, an electric motor for said pump, pipe means extending to a lower part of said tank and to said pump inlet, said pipe means also comprising a return hose, pipe means connected to said pump outlet and comprising a supply hose, said supply and return hoses having detachable connectors respectively detachably attached to said first and second mateable connectors in the first of said parts, said pump motor having a plurality of power-feeding conductors terminating in a plug mated with the plug of said energizing circuit in the first of said parts.

4. A system of a type described comprising two separable parts, a first of said parts comprising means for removing dust from a flowing gas, said means comprising washable dust-collecting means, means for discharging a liquid onto said dust-collecting means for washing said dust-collecting means, a liquid supply pipe to said liquid discharging means, having a first mateable connector, a liquid collecting means below said dust-collecting means, having a second mateable connector; a second of said parts comprising a tank, a pump having an inlet and an outlet, pipe means extending to said pump inlet and to a lower part of said tank, said pipe means comprising a return pipe, pipe means connected to said pump outlet, comprising a supply pipe, said supply and return pipes having detachable connectors respectively detachably connected to said first and second mateable connectors in the first of said parts, said parts being movable independently when said connectors are separated.

5. A system of a type described comprising two separable parts, a first of said parts comprising an electrostatic dust-precipitator for cleaning a gas-flow, comprising a washable dust-collecting means, means for discharging a liquid onto said dust-collecting means for washing said dust-collecting means, a liquid supply pipe to said liquid discharging means, having a first mateable connector, a liquid collecting means below said dust-collecting means, having a second mateable connector; a second of said parts being a vehicle

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portable independently of said first part, and comprising a tank, a pump having an inlet and an outlet, pipe means extending to said pump inlet and to a lower part of said tank, said pipe means comprising a return pipe, pipe means connected to said pump outlet, comprising a supply pipe, said supply and return pipes having detachable connectors respectively detachably attached to said first and second mateable connectors in the first of said parts, said tank having means for cleaning liquid stored therein.

6. A system of a type described comprising two separable parts, a first of said parts comprising means for removing dust from a flowing gas, comprising washable dust-collecting means, traveling means for progressively discharging a liquid into said dust-collecting means, means comprising said dust-collecting means, means comprising an electric motor for operating said traveling means, power supply conductors for said electric motor, a separate electric plug means connected to said power supply conductors, a liquid supply pipe to said traveling means, having a first mateable connector, and a liquid collecting means below said dust-collecting means, having a second mateable connector; a second of said parts being a portable vehicle and comprising a tank, a pump

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having an inlet connected to said tank and an outlet, an electric motor for operating said pump, conductors connected to said electric motor having a plug means detachably connected to the first 5 said plug means, pipe means having a portion directed to convey liquid into a part of said tank, said pipe means comprising a return pipe, pipe means connected to said pump outlet, comprising a supply pipe, said supply and return pipes having detachable connectors respectively detachably 10 connected to said first and second mateable connectors in the first of said parts.

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