A method and apparatus for the cleaning of catch basins and sewer pipes including a single vehicle equipped to convey debris from the catch basin or manhole by means of the carrying power of air into a sealed dump body from which air is continuously pulled, to water jet propel a hose with a nozzle on the leading end thereof through a sewer pipe opening into the catch basin or manhole area and to retract the hose and nozzle for backwashing the sewer pipe debris into the catch basin. The vehicle carries a variable flow high pressure tandem piston pump reciprocated by pressurized oil from a vehicle engine driven hydraulic pump to surge water at high pressure from a vehicle tank or other source through the hose and nozzle to create a jumping action or jack-hammer driving of the nozzle forcing it through and around obstructions in the sewer pipe and also preventing snagging during the backwashing operation. Liquids sucked from the catch basin are drained from the sealed dump body back to the catch basin and the solid debris is hauled away by the vehicle to be discharged at a dumping area.

8 Claims, 11 Drawing Figures

Western Union Cablegrams, one addressed to Adolf Ries, Bruchsal, Germany, and the other addressed to O'Brien Mfg. Co., Chicago.

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CATCH BASIN AND SEWER PIPE CLEANER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the art of cleaning sewer pipes and catch basins by the use of water pressure and the carrying power of moving air. Particularly, the invention deals with a combined catch basin and sewer pipe cleaning vehicle equipped with a large debris collecting dump body from which air is continuously pulled by an engine driven fan on the vehicle and easily opened for dumping. The vehicle also has a separate water tank, a reciprocating water pump driven by pressurized oil from a vehicle driven hydraulic pump and a metal high pressure hose with a self-propelling jet nozzle receiving surges of high pressure water from the water pump.

2. Description of the Prior Art

Heretofore vacuum cleaning of catch basins and flushing of sewer pipes has required the use of at least two separate vehicles. A first vehicle with a hose reel mounted on the rear of thereof was positioned at the manhole and a high pressure hose fitted with a jet nozzle was introduced into the sewer. Water from a tank on the vehicle was pumped through the hose at pressures at about 1,000 pounds per square inch to drive the hose through the pipe against the water flow. Pressure drops along the hose length were considerable and at 400 feet, available pressures were only about 600 to 800 pounds per square inch. Debris flushed from the sewer pipe was then sucked out of the catch basin by a second follow-up vehicle. This multiple vehicle system duplicated personnel and the rear mounted hose reel exposed the personnel to traffic hazards.

SUMMARY OF THE INVENTION

This invention now combines sewer pipe cleaning and catch basin cleaning procedures and services both of them from a single vehicle which requires only a single operator and which protects this operator against traffic hazards. In addition, the invention provides a water jet propelled pipe cleaner which has a jack-hammer pulsating drive that will ram the nozzle through and around obstructions in the sewer pipe and will maintain a high pressure jet discharge regardless of the length of pipe being cleaned. The invention includes a tandem pump on the vehicle which has a first piston reciprocated by pressurized oil from a hydraulic pump conveniently driven through a conventional power take-off from the vehicle engine. This first piston reciprocates a second piston to force water from the vehicle tank through a hose which is reeled on the front of the vehicle and carries a self-propelling nozzle on its leading end. The hose reel is mounted on the front of the vehicle and in operation the reel is positioned over the manhole so that the hose may be fed through the catch basin or the like into the sewer pipe which is to be cleaned.

The tandem piston water pump forces water through the hose at pressures of 2,000 to 3,000 pounds per square inch, but as the pumping piston reaches the end of its stroke and is reversed, there is a momentary lull in the water flow without a substantial pressure drop, thus creating the pulsing action which causes the hose to jump and moves the nozzle to seek its way around and through obstructions in the manner of a jackhammer.

The air flow or suction equipment on the vehicle includes an intake pipe lowered into the catch basin also at the front of the truck to receive the debris from the catch basin and the backwash from the sewer pipe.

Thus, at all times the operator is protected against traffic by the vehicle since he will be stationed in front of the vehicle.

Since the tandem piston pump is hydraulically driven it can be conveniently located anywhere on the vehicle close to or remote from an engine driven oil pump and driven at any rate controlled by pressure of the hydraulic fluid.

The vehicle has a dump body carrying the closed tank or chamber from which air is pulled by a separate engine driven fan carried by the vehicle to create an air stream sucking debris into the chamber. The rear end of the body can be opened to allow the debris to slide from the tank. Liquids that are received in the tank can be drained back to the sewer upon completion of the suction cleaning.

It is then an object of this invention to provide a combined catch basin and sewer pipe cleaning vehicle.

Another object of this invention is to provide a method of cleaning catch basins and sewer pipes leading from the catch basin in which a water jet propelled nozzle pulls a hose through the sewer pipe for a desired distance whereupon the hose and nozzle are retracted to backwash the debris from the pipe into a catch basin which is then suction cleaned.

Another object of the invention is to provide a combined catch basin and sewer pipe cleaning vehicle which will water jet propel a nozzle and hose through a sewer pipe with a jackhammer action to cut roots in the pipe and feed the nozzle through debris.

Another object of this invention is to provide a tandem piston pump having a driving piston actuated hydraulically from a rotary pump and a driven piston delivering high pressure water at surging flow rates.

Another object of this invention is to provide a single vehicle which will propel a hose through a sewer pipe, backwash the pipe into a catch basin and vacuum clean the catch basin.

A still further object of the invention is to provide a method of cleaning sewer pipe with a surging jet spray which will propel a nozzle through and around debris in the pipe and backwash the debris from the pipe.

A still further object of the invention is to provide a sewer cleaning vehicle which is serviced entirely from the front end thereof to protect the operating personnel.

Other and further objects, features and advantages of this invention will be apparent from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view, with parts in vertical section, of a combined catch basin and sewer pipe cleaning vehicle having its front end positioned over a catch basin and illustrating the start of a sewer pipe cleaning operation;

FIG. 2 is a view similar to FIG. 1 but illustrating the propelling of the sewer pipe cleaning nozzle and hose through the pipe;

FIG. 3 is a view similar to FIG. 2 but illustrating the backwashing of debris from the sewer pipe into the catch basin and the vacuum cleaning of the catch basin;

FIG. 4 is a view similar to FIG. 3 but illustrating the return of liquids from the debris receiving tank of the vehicle back to the catch basin;

FIG. 5 is a view of the vehicle in its dumping position;

FIG. 6 is a diagrammatic view of the water and oil circuits for the tandem piston pump which is illustrated in longitudinal cross section;

FIG. 7 is a broken longitudinal cross-sectional view of the tandem piston pump;

FIG. 8 is a view similar to FIG. 7 but on a section line 90° therefrom and showing the pistons at the opposite ends of their stroke;

FIG. 9 is a diagrammatic view of the vacuum cleaning circuit of the vehicle;

FIG. 10 is an elevational view of the self-propelling nozzle for pulling the hose through the sewer pipe and for backwashing the sewer pipe; and

FIG. 11 is a schematic view illustrating the manner in which the nozzle seeks its way through and around debris in a sewer pipe.
DESCRIPTION OF THE PREFERRED EMBODIMENT

The vehicle 10 of FIGS. 1 to 5 is an internal combustion engine propelled truck with a driver's cab 11, a large water tank 12 rearwardly of the cab and extending between and over the rear wheels of the truck, and a large sealable tank, container or closed body 13 over the tank 12 and pivotally mounted on the truck chassis so as to be raised to a dumping position, shown in FIG. 5, a hydraulic jack 14 operated in the conventional manner with pressurized oil from a hydraulic system on the truck. The rear wall 15 of the body 13 is swingable from a top hinge 16 to the open position of FIG. 5 so that the contents of the body 13 can be easily discharged or dumped when the jack 14 lifts the body. This rear wall 15 is sealedly clamped in the body in its closed position by means of latches 17 and the like so that the interior of the body will maintain a vacuum.

An auxiliary engine 18 is mounted crosswise on the vehicle behind the cab 11 and drives an exhaust fan 19 pulling air out of the closed body 13 through a duct 19c to create a reduced pressure or vacuum in the body. It will be understood that in the diagrammatic view of FIG. 9, there will be a screen or separator between the interior of the body 13 and the fan 19 to prevent debris in the body from entering the fan as will be hereinafter shown.

An inlet duct 20 at the top front end of the body 13 has an inclined front end face 21 which mates with a similar face 22 on the end of a flexible pipe 23 extending forwardly over the cab 11 to an arcurate pipe section 24 which is supported from a swinging boom 25 carried by the truck body. This boom can swing horizontally and vertically to position a flexible tube 26 depending from the curved pipe section 24 over a catch basin.

A hose reel 27 is mounted on the front end of the cab 11 and a high pressure flexible hose 28 is wound on this reel 27. The hose 28 has a high pressure self-propelling spray nozzle 29 on its front or leading end.

As shown in FIG. 10, the nozzle 29 has a hollow head 30 with a rounded dome-like nose 31 converging to a pointed end. The rear of the head has a radial shoulder around a reduced neck portion 33 with a conical rear end 33a which diverges to a rigid cylindrical body or tail 34 that is internally threaded to receive a rigid pipe 35 about 1 3/4 to 2 feet in length. The rear end of this pipe 35 is coupled to the leading end of the hose 28. Circumferentially spaced holes 36 are drilled at an angle from the shoulder 32 forwardly toward the interior of the head 31 to provide orifices discharging around the neck 33 and in the conical portion 33a. About 6 holes are provided in the head and the angle of the holes is controlled to provide jet propelling streams 37 (FIG. 11) best suited for the diameter of the sewer pipe and the optimum water pressure maintained in the system. Thus, wide angle jet streams 37 may be desired under some conditions while narrow jet stream angles may be better suited under other conditions. The jet streams 37 provide a rocket-like propulsion of the nozzle advancing the hose through the sewer pipe and forcing the head 31 through and around the debris in the pipe.

As shown in FIG. 1, at the start of a sewer cleaning operation the vehicle 10 is moved over a street or road 38 to position its reel 27 and flexible vacuum conduit 26 over or closely adjacent the open manhole top 39 of a catch basin 40 having sewer pipes 41 radiating generally horizontally therefrom. The hose 28 is unwound from the reel 27 to lower the nozzle 29 into the bottom area of the catch basin 37. The reel 27 is preferably driven by a hydraulic winch from a power take-off of the vehicle 10.

A guiding tool 42 is lowered into the catch basin 40 to direct the nozzle 29 into one of the sewer pipes 41. This tool 42 has an elongated rigid rod body 43 with a manipulating handle 43c on the top thereof and a curved shoe 44 on the bottom end of which has a ring guide 45 on its under face for receive the body of the nozzle 29 therewith. A horizontal foot 46 projects forwardly from the rod 43 above the guide shoe 44.
are carried in grooves in the piston 67 and sealingly engage the cylinder wall 62. Similar piston rings 70 are carried in grooves in the piston 68 and engage the cylinder wall 63. These piston rings include a plastic ring body with a groove in the end wall thereof facing the cylinder chamber receiving an O-ring which sealingly connects the end face of the ring with the piston ring groove and which causes an expansion of the ring body against the cylinder wall under the influence of pressure in the cylinder.

In the illustrated form of the pump 60 the piston 67 is the driving piston and is actuated by oil under pressure from an engine-driven hydraulic pump. Oil is selectively circulated to and from opposite faces of the piston 67 through a first port 71 in the central body 61 and a second port 72 in the end head 64. The piston 68 is the water pumping piston, and the cylinder 63 receives water into the opposite ends thereof from a common manifold 73 through a port 74 in the central body 61 and a port 75 in the end head 65. Water pumped by the piston 68 is discharged from opposite ends of the cylinder 63 into a common outlet 76 from a first port 77 in the central body 61 and a second port 78 in the end head 65.

Packings 79 and 80 in the central body 61 sealingly engage the piston rod 66 to prevent leakage between the oil and water sides of the pump.

As shown in FIG. 6, the inlet manifold 73 for the water side of the pump receives water from the supply tank 12 of the vehicle through a conduit 81 and the water is discharged through the manifold 76 and hose 28 to the nozzle 29.

Check valves 82 are provided in each of the ports 74, 75, 77 and 78. These valves are spring-loaded to closed positions, and are arranged in the ports so that the valve 82 in the port 74 will be closed as the piston is moved to the left-hand end of its stroke, while the valve in the port 77 will be open to discharge the water being pumped into the manifold 76.

At the same time the valve in the port 75 will be opened to admit water to the right-hand side of the piston 68, while the valve in the port 78 will be closed. The valves are operated by pressure differentials, with the water inlet valves opening on the suction stroke, closing on the pressure stroke, and with the outlet valves closing on the suction stroke and opening on the pressure stroke. These valves, therefore, alternately admit water from the supply tank to opposite sides of the piston and alternately discharge the water on the pressure stroke of the piston, with one inlet valve being opened on one side of the piston and one discharge valve being opened on the opposite side of the piston at the same time, while the other two valves are closed.

The driving piston 67 alternately receives oil on opposite sides thereof through the ports 71 and 72, which act both as inlet and outlet ports.

As shown in FIG. 6, oil from a tank 83 on the vehicle is fed through an intake tube 84 to the inlet side of an engine-driven oil pump 85. This pump discharges through a tube 86 into a four-port spring-centered spool valve diagrammatically illustrated at 87. This valve 87 is hydraulically actuated from a solenoid operated pilot valve 88. The solenoid valve 88 is controlled from a master switch 89 supplying actuating current to a reversing micro-switch 90 having one pole 91 actuating a solenoid 92 on one side of the valve spool in the pilot valve 88 and a second pole 93 actuating a second solenoid 94 on the opposite side of the spool valve.

The oil from the tube 86 passes through the valve 87 to a tube 95, discharging to a pressure regulating valve 96 which dumps into a return tube 97 back to the tank 83. The valve 96 maintains a predetermined pressure differential between the tubes 95 and 97.

The spool in the valve 87 is shifted by oil under pressure from chambers 98 and 99 at opposite ends of the spool. These chambers selectively receive oil at the pressure maintained by the valve 96 under the control of the pilot valve 88. This pilot valve 88 has an inlet oil tube 100 in the oil line 95 ahead of the valve 96 and an outlet oil tube 101 downstream of the valve 96 so that the pilot valve only receives oil under the pressure maintained by the valve 96. This oil is selectively fed under control of the pilot valve 88 through a tube 102 to the chamber 98 and through a tube 103 to the chamber 99. With the leaf 90a of the micro-switch in the position shown in FIG. 6, current flows through the wire 91 to energize the solenoid 92, thus shifting the spool in the valve 88 so that oil from the tube 100 will flow to the tube 102 and chamber 98 for forcing the spool in the valve 97 to the right. At the same time oil in the chamber 99 will be drained back through the tube 103, through the valve 88 to the return line 101 back to the tank 83. Oil under the full pressure of the pump 85 will thereby be introduced to the left-hand side of the cylinder 62, forcing the piston 67 to the right. When the piston reaches the right-hand end of its stroke, as shown in FIG. 8, the leaf 90a of the micro-switch 90 returns to its opposite pole and energizes the line 93, which activates the solenoid 94 and reverses the pilot valve 88 so that oil from the pressure line 100 will flow to the line 103 and to the chamber 99, while oil from the chamber 98 will flow through the tube 102 into the line 101 back to the tank. The valve 87 will thereupon be shifted so that oil is fed under pressure to the port 71 and drained from the port 72.

The micro-switch activating means is shown in FIGS. 7 and 8, and includes a control rod 104 freely mounted in an axial recess 105 in the left-hand end of the piston rod 66. The rod 104 slides freely through a cap 106 which is threaded in the end of the piston rod 66 and is adapted to allow high pressure oil from the port 72 to flow into the recess 105. The rod 104 has a head 107 on its inner end adapted to bottom at opposite ends of the piston rod stroke respectively on the cap 106 and on the end wall 105 of the recess 105. A reduced diameter integral rod portion 108 slides through a gland 109 in the end head 64 and provides a shoulder 110 in the port 72. The gland 109 has a recess 111 exposed to the port 72 and confronting the shoulder 110.

The reduced diameter portion 106 of the control rod 104 projects beyond the end head 64 and has an enlarged head 112 thereon slidably mounted in an open-ended cylinder 113 which is secured to the outer face of the end head 64. In the position illustrated in FIG. 7 the end wall 105a of the recess has just pushed the control rod 104 to move this head 112 to its extended position projecting beyond the cylinder 113. In this extended position the head 112 has tripped the switch leaf 90a allowing oil to the port 72, thus starting the piston on its stroke to the right. Since the head end 107 of the rod 104 is exposed to the high pressure in this port 72 while the other head end 112 of the rod 104 is exposed to the atmosphere, the rod 104 is driven further outwardly, moving the shoulder 110 into the recess 111, where trapped oil in this recess will prevent the shoulder from impacting against the gland 109. The rod will remain in its extended position, with its head 112 against the switch lead 90a until the cap 106 engages the head 107 at the inboard end of the piston stroke, as shown in FIG. 8.

Then the head 112 of the control rod 104 will be pulled into the cylinder 113 to a position where a peripheral groove 114 in the head is aligned with a spring-loaded ball-bearing 115 carried by the cylinder. These spring-loaded ball bearings or detents will snap into this groove 114 for holding the control rod 104 in a contracted or inward position, as shown in FIG. 8.

In the position of FIG. 8 the head 112 has been withdrawn into the cylinder 113 sufficiently to allow the spring-loaded leaf 90a of the micro-switch to move to the right and change the pole position of the switch. The control rod 104 will be in the position of FIG. 8, held by the detents 115 until it is again pushed by the recessed end wall 105a, returning the rod to the position of FIG. 7 for the next stroke.

In the position of FIG. 8, fluid is just beginning to enter the port 71 to start the piston on its stroke to the left.
In the position of the leaf 90a, shown in FIGS. 6 and 7, the solenoid-actuated pilot valve 88 feeds oil under the differential pressure maintained across the valve 96 to position the main valve 87 so that oil will flow into the port 72 and out of the port 71. This, of course, will drive the piston 67 to the right-hand end of the cylinder 62, whereupon, as shown in FIG. 8, the cap 106 will engage the control rod head 107, retracting the head 112 into the cylinder 113 to a position where it is retained by the spring pressed detents 115. Of course, upon reversal of the pole position of the micro-switch to that of position of FIG. 8, the pilot valve 88 will again be energized to reverse the main valve 87 and introduce pressurized oil into the port 71 and out of the port 72, thereby moving the piston 67 to the left.

It will be appreciated that while the stroke of the piston rod 66 may be quite long, the control rod 104 is only shifted a short distance, just sufficient to throw the leaf 90a of the micro-switch 90b between its poles. Thus, when the piston rod 66 moves to the right from the position of FIG. 7, the rod 104 will remain stationary, being retained in its extended position by oil pressure in the port 72. When then the piston rod 66 moves to be inboard end of its stroke, as shown in FIG. 8, the head 107 will be engaged by the cap 106, pulling the rod 104 therewith only until the head 112 is moved into the cylinder 113 sufficiently to align the groove 114 with the spring-pressured detents 115. For example, the control rod 104 may only be shifted one inch or so in installations where the piston rod 66 is shifted 15 inches or more.

As illustrated, the cylinders 62 and 63 are of the same diameter, but if it is desired to increase the flow capacity of the water pump, the cylinder 63 and piston 68 can be of a larger diameter than the cylinder 62 and piston 67. Conversely, if it is desired to obtain a higher maximum water pressure, the cylinder 62 and piston 67 can be larger than the cylinder 63 and piston 68.

From the above descriptions it will therefore be understood that this invention provides a combined catch basin and sewer pipe cleaning vehicle which can be operated by a single operator, and which protects the operator against traffic hazards. It will also be understood that the vehicle is equipped with a tandem piston oil-driven water pump which surges high-pressure water through a self-propelling nozzle, dragging a hose therewith and causing the hose and nozzle to jump for seeking a path through a sewer pipe and for cleaning debris and obstructions within the pipe. It will also be understood that the pump delivers water under such high pressure that the propelling jets from the nozzle are powerful enough to drive the nozzle and drag the hose therewith through any desired length of sewer pipe, thus making possible the cleaning of longer lengths of pipe than was heretofore possible. In a typical installation, the hose and nozzle will jump back from six to eight inches each four-and-a-half seconds. It will also be appreciated that one end of the delivery manifold 76 of the pump can be connected to a separate hose line for feeding spray jets to flush a street or to deliver high pressure water to another hose for fighting brush fires and the like. The high pressure surging water delivery is extremely effective for such additional usage.

It will also be understood that the nozzle, together with its tailpipe 35, is of sufficient length so that it cannot assume an angle in the sewer pipe 41 which is sufficiently acute to permit the nozzle to enter a branch drain line communicating with the sewer pipe. This rigid length of pipe and nozzle on the leading end of the hose also prevents the hose from doubling back on itself.

It will be further understood that the term "catch basin" in the claims is used in a generic sense to include catch basins, man holes, and the like wells or sumps in accordance with the teachings of this specification.

I claim:

1. A single vehicle for cleaning sewer pipes and removing debris from catch basins which comprises a motor driven truck having a debris receiving container with a conduit extending from the container, said conduit being adapted to be lowered into a catch basin, means on said truck for continuously pulling air through said container and conduit to convey debris through the conduit by the carrying power of the moving air into the container, said container having a tailgate adapted to be closed for sealing the container and adapted to be opened to discharge debris from the container, means on the truck for tilting the container to slide debris therefrom out of the opened tailgate, a water tank on the vehicle, a hose reel on the vehicle carrying a hose with a self-propelling nozzle on the leading end thereof and a water removal conduit, and a pump on the vehicle forcing water from said water tank at high pressure through said hose and nozzle to propel the nozzle through a sewer pipe leading from the catch basin for flowing debris from the pipe into the catch basin to be transferred into the container through the conduit.

2. A wheeled vehicle unit for removing and transporting debris from a catch basin and for cleaning sewer pipes leading from the catch basin which comprises a truck having a water tank, a large debris collecting container, a swingable conduit leading from the front end of said container over the vehicle, a tailgate on the rear of said container adapted to be opened to discharge debris from the container and adapted to be closed to seal the container, a hose reel on the front of the vehicle having a hose wound thereon with a nozzle on the leading end thereof for receiving water from the water tank, an auxiliary motor driven fan continuously pulling air from said container and through the conduit for conveying debris from the catch basin by the carrying power of the moving air through the conduit into the container, a truck engine driven pump for surging high pressure water from the water tank at high pressure into the hose and nozzle, means for actuating said pump to propel the hose and nozzle into a sewer pipe and to wash debris from the sewer pipe into the catch basin for said removal through the conduit into the container, and a valved drain pipe communicating with the container for draining
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9 liquids from the debris into the container back into the catch basin.

3. A single vehicle for cleaning sewer pipes and removing debris from catch basins which comprises a motor driven truck having an evacuated debris receiving container with a conduit extending from the front thereof adapted to be lowered into a catch basin for sucking debris therefrom into the container, said container having a tailgate adapted to be closed for sealing the container and adapted to be opened to discharge debris from the container, means on the truck for tilting the container to slide debris therefrom out of the opened tailgate, a water tank on the vehicle, a hose reel on the front of the vehicle carrying a hose with a self-propelling nozzle on the leading end thereof and receiving water from said water tank, and a pump on the vehicle forcing water from said water tank at high pressures through said hose and nozzle to propel the nozzle through a sewer pipe leading from a catch basin for flowing debris from the pipe into the catch basin to be transferred into the container through the conduit.

4. A wheeled vehicle unit for removing and transporting debris from a catch basin and for cleaning sewer pipes leading from a catch basin which comprises a truck having a water tank, a large debris collecting container, a swingable conduit leading from the front end of said container over the vehicle, a hose reel on the front end of the vehicle having a hose wound thereon with a nozzle on the leading end thereof for receiving water from the water tank, an auxiliary motor driven fan evacuating said container, a truck engine driven pump for surging high pressure water from the water tank through the hose to propel the hose and nozzle into a sewer pipe and to wash debris from the sewer pipe into the catch basin for removal through the conduit into the container, and a valve drain pipe communicating with the container adapted to drain liquids from the debris in the container back into the catch basin whereby the operator works at the front end of the vehicle and is protected from oncoming traffic by the truck.

5. The method of cleaning catch basins and sewer pipes with a single vehicle equipped with a closed debris chamber having a tailgate, means for exhausting air from the chamber, a conduit leading from the front end of the chamber and adapted to be lowered into a catch basin at the front of the vehicle, a water tank on the vehicle, a hose on the front end of the vehicle having a water jet propelled nozzle on the leading end thereof, and a pump on the vehicle for pumping water from the water tank through the hose which comprises driving the vehicle to position the front end thereof adjacent a catch basin, lowering the hose from the front end of the vehicle into the catch basin, directing the nozzle on the hose into a sewer pipe leading from the catch basin, pumping water from the tank through the hose and nozzle at pressures from about 2,000 to about 3,000 pounds per square inch to propel the hose and nozzle into the sewer pipe for a desired distance, pulling the hose and nozzle out of the sewer pipe to the front end of the vehicle to backwash the debris into the catch basin, continuously pulling air through the chamber and conduit, conveying debris through the conduit by the carrying power of the moving air into the front end of the closed debris container, terminating said pulling of air, draining liquids from the debris chamber back into the catch basin, driving the truck to a dumping area, opening the tailgate of the debris chamber, and discharging the debris from the chamber out of the open back end thereof.

6. The method of simultaneously cleaning catch basins and sewer pipes leading therefrom with a single vehicle which protects workmen against oncoming traffic on a road containing the catch basin, said vehicle having a water tank and a scalable debris tank with a conduit depending from the upper front end thereof and a hose reel on the front end thereof carrying a hose with a water jet propelling nozzle on the leading end of the hose which comprises unreeling the hose from the front end of the vehicle into a catch basin, directing the nozzle on the hose into a sewer pipe leading from the catch basin, surging water at high pressure from the water tank through the hose and nozzle to propel the hose and nozzle through the sewer pipe, reeling the hose back onto the front end of the vehicle while pumping water through the nozzle to backwash debris from the sewer pipe into the catch basin, lowering the conduit into the debris, continuously pulling air from the debris tank through the conduit to convey debris from the catch basin through the conduit into the front end of the debris tank, draining liquid from the debris in the container back to the catch basin, driving the vehicle to a dumping area, and dumping debris from the rear end of the container.

7. The method of cleaning catch basins and pipes radiating therefrom with a single vehicle which comprises driving the vehicle into position adjacent the catch basin, unreeling from the vehicle a hose having a self-propelling water jet nozzle on the leading end thereof, directing the nozzle through the catch basin into the pipe to be cleaned, surging water from a tank on the vehicle through the hose and nozzle at high pressures and variable flow rates causing the hose and nozzle to jump and move around obstacles as it is propelled through the pipe, reeling the hose back onto the vehicle while flowing water from the tank through the nozzle in the pipe to backwash debris from the pipe into the catch basin, continuously pulling air from a tank on the vehicle and through a conduit depending from the top of said tank, lowering the conduit into the catch basin to suck debris therefrom into the tank, terminating the air pulling, raising the conduit out of the catch basin, driving the vehicle to a dump area, and discharging the debris from the vehicle, whereby the area surrounding the catch basin is not contacted by the debris.

8. A combined catch basin and sewer pipe cleaning apparatus which comprises a motor driven single vehicle having a driver's cab on the front end thereof and a dump body on the rear end thereof, a hose reel mounted on the vehicle in front of the driver's cab, a scalable container mounted on the dump body having a tailgate adapted to be opened for discharging the contents of the container, means for tilting the container on the vehicle to slide the contents thereof out of the rear end of the vehicle, a fan pulling air from the container, an auxiliary motor on the vehicle driving the fan, a water tank mounted under the dump body on the vehicle, a swingable boom carried by the vehicle at the front end thereof, a conduit supported by the boom extending from the front end of the container and adapted to be lowered into the bottom of a catch basin to suck debris therefrom into the container, a hose wound on said reel having a self-propelling nozzle on the leading end thereof adapted to be introduced into a sewer pipe leading from a catch basin, a pump on the vehicle surging water at pressures from about 2,000 to about 3,000 pounds per square inch from the water tank through the hose and nozzle for driving the nozzle and hose with a pulsing jumping action into a sewer pipe to wash debris from the pipe back into the catch basin with water ejected from the nozzle, and a valved drain pipe communicating with said container to remove liquids from the debris sucked into the container through said conduit whereby solids in the container may be conveyed by the vehicle to a dumping area and ejected from the container by opening the tail-gate and tilting the container.

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