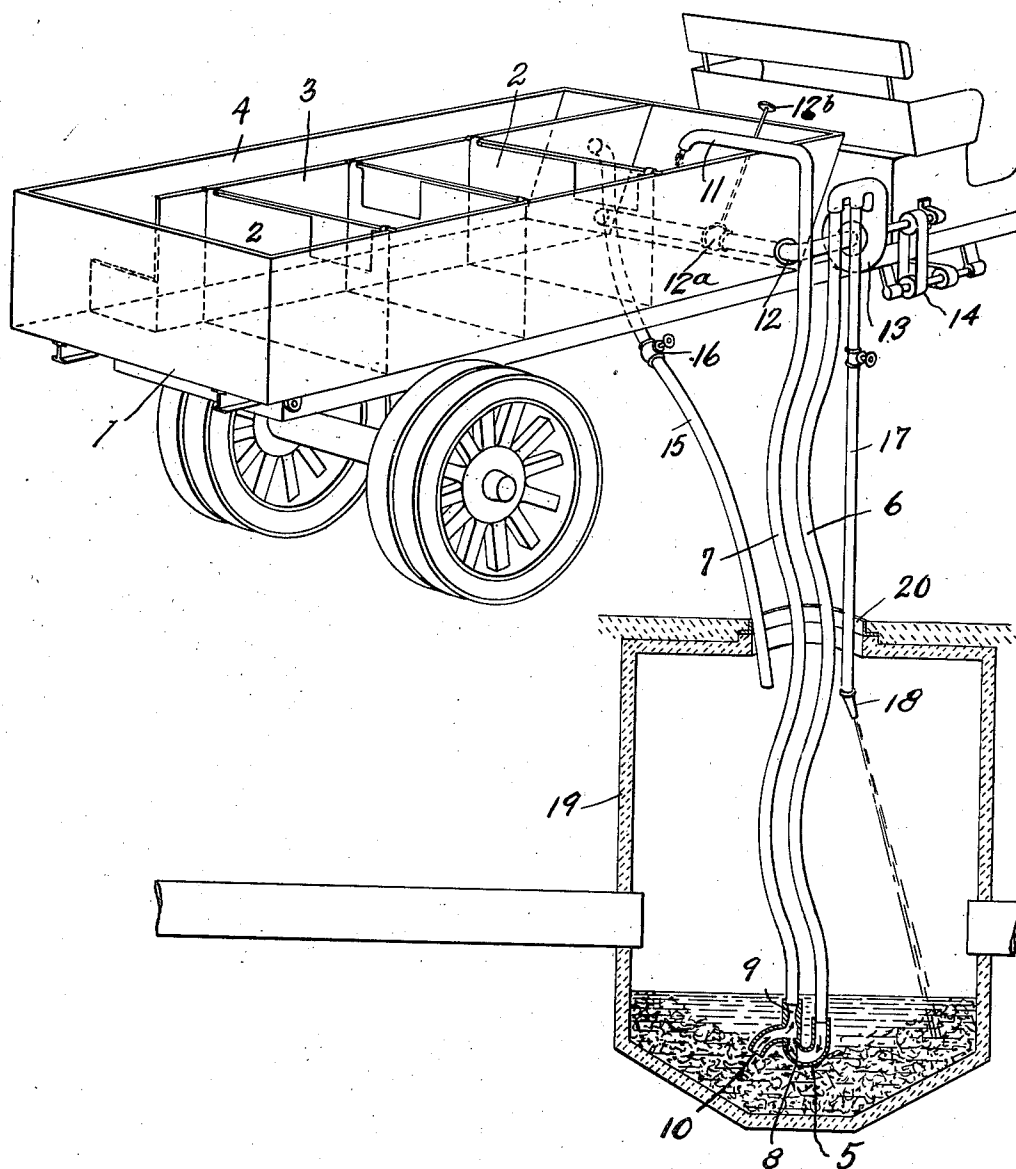


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METHOD OF CLEANING OUT CITY CATCH BASINS.
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UNITED STATES PATENT OFFICE.

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METHOD OF CLEANING OUT CITY CATCH BASINS.

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To all whom it may concern:

Be it known that I, GEORGE W. OTTERSON, a citizen of the United States, and resident of Seattle, in the county of King and State of Washington, have invented a certain new and useful Improvement in Methods of Cleaning Out City Catch Basins, of which the following is a specification.

The object of the invention is to enable the catch basins of city sewerage systems to be cleared of their accumulations in a simple, quick, cheap and cleanly manner. The methods practically universally employed,—ladling out with long-handled dip-
pers or shoveling into buckets which are hoisted to the surface,—are lengthy operations and correspondingly expensive and are unsanitary for obvious reasons. In accordance with my improvement the removal of the solids from the catch basins and their elevation to the street level is effected by means of a hydraulic ejector jet, aided by a high velocity jet playing in the basin, the water and solids thus raised being separated and the water or that portion thereof not utilized for the jet returned into the catch basin. The entraining and elevating action of hydraulic jets is known, having been used particularly in hydraulic mining, where the head available by virtue of water supplies at great heights is utilized for elevating the gravel washed down into the sumps, but, as far as I am aware, prior to my invention no one has applied the hydraulic ejector jet to the cleaning out of city catch basins or pointed out a practical method wherein it could be so employed. In accordance with the preferred manner of carrying out my invention, I proceed from point to point where catch basins are located with a supply of water, and, drawing therefrom, forcibly drive a stream of water downward into the catch basin, there delivering the same as an ejector jet and causing this jet to suck in and impel the contents of the catch basin upward to a suitable height above the street level; there I effect a separation of the water and solids, utilizing the water to replenish the supply for maintaining the ejecting and elevating jet and returning the excess into the catch basin so as to leave the same charged with water.

The accompanying drawing illustrates schematically a preferred form of apparatus

for carrying the invention into effect, the invention, however, not being limited to the particular apparatus.

The said apparatus comprises a motor truck or other vehicle having a tank body 1, provided with transverse partitions or baffles 2, constituting it a settling bed, and with a longitudinal partition 3 adjacent one of its side walls, forming with this wall a return gutter 4 for the water. The vehicle carries a hydraulic ejector elevator, which is let down into the several catch basins, the said elevator consisting in the illustrative case of a casting 5 connected with the lower ends of pressure and discharge lines 6 and 7, the said casting having a nozzle 8 connected with the pressure line and arranged to deliver its jet in line with a throat 9, below which the material from the catch basin is admitted through a suction intake 10, to be seized by the jet and hurled upward through the discharge line, from which the water and solids are delivered through a spout 11 into the forward compartment of the settling bed. Thence the liquid makes its way rearward in a circuitous course through and over the baffles, until freed of sufficient of its solids to be utilized for maintaining the jet. From the last of the settling compartments the water enters the rear end of the gutter 4, from the forward end of which it passes through a pipe 12 to the inlet of a centrifugal pump 13, which may be driven from the engine of the motor vehicle by connections, such as indicated at 14, and the delivery side of which is connected with the pressure line 6. By means of another line 15 connected with the forward end of the gutter 4, the excess water not required for starting the jet is returned to the catch basin before the equipment proceeds to the next location. This line is provided with a valve 16, in order that, except in event of danger of the tank becoming overfull, the return of liquid to the catch basin may be delayed until the cleaning operation has been completed, since the ejector jet acts most efficiently with only a moderate amount of water in the basin.

From the foregoing it will be understood that the vehicle starts upon its rounds with a supply of water sufficient to prime the pump. At each of the catch basins, one of which is represented at 19, the elevator, or its suction intake, is lowered through the

man-hole 20 as far as it will go, a valve 12^a in the line 12 is opened by means of a hand-wheel shaft 12^b, and the pump 13 is started, drawing water from the supply and forcing it through the pressure line 6 and through the nozzle 8, so as to entrain and elevate the contents of the basin in the manner that will be well understood. The combined stream of liquid and solids is delivered into the settling bed, where a separation is effected. The liquid thus separated is used to maintain the ejector jet, being continuously withdrawn by the pump and forced down through the pressure line 6. The stream driven upward by the ejector through the discharge line 7 consists of the water of the jet itself, water drawn in from the basin, and the solids likewise drawn in. Consequently more water is delivered into the settling bed than is withdrawn from it for the jet, and in addition the bed receives and retains all the solids from the basin. This is possible because the settling bed, that is to say the region of separation and withdrawal, whether covered over or not, is open to the atmosphere. The step of separating the liquid and solids raised from the catch basin has a number of purposes. These are to maintain the ejector and elevator jet; to provide water for agitation, and for addition to the basin contents during cleaning; to provide a supply which will serve to start the ejector jet to the next basin operated upon; to provide a charge of liquid to be returned to the basin, so as to leave the same wet after it has been cleaned; and to conserve the holding capacity of the apparatus which may be used.

In order to loosen the solidified accumulations and to bring them within the range of action of the ejector jet, one or more disintegrating streams are employed, delivered through an additional line 17 branched off from the outlet of the pump and terminating in a suitable nozzle 18, which may be moved about within the interior of the catch basin. As the accumulations disappear the ejector is lowered further, until it finally rests upon the bottom of the catch basin, and when everything is removed the pump is stopped, the elevator raised out of the man-hole, and the valve 16 opened to permit the water, except that needed to prime the pump for the next operation, to flow back into the catch basin. The settling bed with its solids is then transported to another catch basin and the same process repeated, and when the settling bed is as full of solids as is thought desirable, the vehicle proceeds to an appropriate spot and its contents are dumped.

This method enables sewer basins and the like to be cleaned very expeditiously and effectively, without muss or stench and without unsanitary labor. The power required is small. The method is not dependent upon

the pre-existence of a body of water in the basin, since it starts the ejector jet from an external water supply. Thus, the process is operative whether the basins encountered contain much or little water, and as heretofore stated it is particularly effective when there is only a slight depth of water around the ejector, the operation being especially satisfactory when the ejector draws in some air through its intake. As the operation removes water from the basin, it quickly arrives at the most favorable condition, assuming the basin to have originally contained a substantial amount of liquid; and thereafter the small amount desirably present during cleaning, for carrying the material to the intake is supplied through the agitator line 17. Thus an important step is the introduction of additional water into the basin for agitation and to be drawn in by the ejector jet. The quantity of water so introduced can be regulated by means of the valve seen in the line 17. If the basin was originally dry, this introduction of water is advantageous to supply a medium for carrying the solids into the intake. At the conclusion of operations, water is run back into the basin through the overflow line 15, leaving the basin well charged with liquid, which is of great importance, because a dry sewer basin is a menace to health, whereas one charged with water is not.

What I claim as new is:

1. The method of cleaning out catch-basins, which comprises withdrawing water from an external supply and therewith initially creating an ejector jet, causing the same to remove and elevate the contents of the basin, discharging the water and solids in a region open to atmospheric pressure and separating them, continuously drawing from the water thus separated to maintain the ejector jet, introducing water from the same source into the basin for agitation and to be drawn in and elevated with the pre-existing contents as the cleaning proceeds, and returning water to the basin so as to leave the same charged with liquid at the close.

2. The method of cleaning out catch-basins, which comprises withdrawing water from an external supply and therewith initially creating an ejector jet, causing the same to remove and elevate the contents of the basin, discharging the water and solids in a region open to atmospheric pressure and separating them, continuously drawing from the water thus separated to maintain the ejector jet, and introducing water from the same source into the basin for agitation and to be drawn in and elevated with the pre-existing contents as the cleaning proceeds.

3. The method of cleaning out catch-basins, which comprises withdrawing water

from an external supply and therewith initially creating an ejector jet, causing the same to remove and elevate the contents of the basin, discharging the water and solids in a region open to atmospheric pressure and separating them, and simultaneously drawing from the water thus separated to maintain both the ejector jet and an independently movable agitator jet, the latter supplying water to the basin to be drawn in and elevated with the pre-existing contents as the cleaning proceeds. 10

GEORGE W. OTTERSON.