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APPARATUS FOR CLEANING SEWERS AND PIPES

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Witnesses:

Attorneys.
My invention relates to improvements in apparatus for cleaning sewers and pipes, and more particularly in apparatus in which hydraulic means are provided for advancing the head of the apparatus within the pipe or sewer and for operating the cleaning tools. One of the objects of the improvements is to provide an apparatus in which the head carrying the tools is advanced by liquid supplied thereto and acting by reaction for advancing the same. Another object is to provide an apparatus in which a part of the liquid is discharged so as to act upon the cleaning tools and remove the matter loosened thereby from the wall of the pipe or sewer. With these and other objects in view my invention consists in providing the head of the apparatus with a supply of a suitable liquid such as water and discharging the same from the head in rearward direction and into the pipe or sewer being cleaned, a portion of the liquid being discharged so as to rush against the part of the wall of the pipe or sewer which is acted upon by the cleaning tools.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawing, Fig. 1, is a diagrammatical view showing a sewer having my improved apparatus disposed therein, Fig. 2, is a longitudinal section on an enlarged scale of a sewer and a cleaning apparatus disposed therein, Fig. 3, is a cross-section taken on the line 3-3 of Fig. 2 and looking in the direction of the arrows, Fig. 4, is a detail view showing the front end of the head of the apparatus with the rotary cutting members removed, Fig. 5, is an elevation showing one of the tools for removing the incrustations from the pipe or sewer, Fig. 6, is an end view of the pipe being cleaned looking in the direction of the arrows 6 shown in Fig. 1, Fig. 7, is a sectional view similar to the one shown in Fig. 2 and showing a modification, and Fig. 8 is a sectional view taken longitudinally of the arms in the disclosed embodiment of my invention showing certain details of construction.

In the example shown in Figs. 1 to 6 of the drawing my improved pipe or sewer cleaner comprises a carriage composed of tubular members 15, 16, 17, 18 and 19 suitably connected with each other and mounted on eight rollers 3 adapted for engagement with the inner wall of the sewer, said rollers being mounted between arms 20 secured respectively to the members 15 and 19. The members 17 and 19 have anti-friction bearings 21 and 22 for a rotary tubular member or head 2 which is equipped with rearwardly directed discharge pipes 7 opening into the sewer. As appears more particularly from Fig. 4 the pipes 7 are curved laterally and out of the plane passing through the axis of the pipes 15 to 19, and the inner end face of the head is curved from the middle towards the pipes 7 so as to insure a smooth flow of the liquid from the pipes 15 to 19 and through the head 2 to the pipes 7. To the front end of the head 2 an axial pipe 9 is secured which carries a drill member 6 and cutters 5 formed with saw like indentations, as is shown in Fig. 5. The drill member and cutters are removably secured to the pipe 9, so that they can be replaced by tools of other types. The pipe 9 shows discharges 8 directed rearwardly and outwardly and towards the circumference of the cutters 5.

For adapting the apparatus to sewers of larger diameters rollers 3’ of larger diameter are mounted on the arms 20 as is shown in Fig. 2 in dotted lines.

For cleaning a sewer the apparatus is passed into the same a hose 4 being connected to the rear end of the pipe 15 and a suitable supply of water under pressure. By being deflected and discharged rearwardly and through the pipes 7 a forward pressure by reaction is exerted on the apparatus, which assists the attendant in advancing the pipe within the sewer and forces the cutters 5 and drill member 6 into contact with the incrustations and other deposit of the sewer. By bending the pipes 7 laterally rotary movement is imparted to the head 2 and the cutters 5 carried thereby. The material made loose within the sewer by the cutters 5 is flushed rearwardly by the jets of water discharged through the bores 8 and the pipes 7.

In case of long sewers the resistance of the hose 4 moving through the sewer is so large that the proper advance of the head is interfered with. In such cases I provide an
obstructing member 13 at the inlet end of the sewer for collecting water within the sewer. As shown the said obstructing member is in the form of a plate receiving the hose 4 in a cut-out portion and of such size and form as to leave an opening 14 at its bottom for the passage of solid matter from the sewer. By thus slowing water within the sewer the friction of the hose 4 within the sewer is reduced, so that sewers of great length can be cleaned.

For cleaning continuous pipe systems a sectional pipe or sectional pipes are removed at suitable parts, and the apparatus is inserted as described.

In the modification shown in Fig. 7 the carriage provided by the tubular members 25, 26, 27 is mounted on rollers 28 which are adjustable in radial direction for adapting the apparatus to sewers of different diameters. As shown the rollers 28 are mounted on rockable arms 29 pivoted on pins 30 carried by the plate 31 which are in turn carried by the tubular members 25 and 26. The plates 31 are provided with cam slots 32 and the arms are adjustable relative the plates 31 and retained in various adjusted positions by means of the lock bolts 33 which are movable in the slots and adapted to clamp the arms 29 on the plates 31. The pipe members 35 and 36 are provided at their adjacent ends with vanes 35 and 36 directing the flow of water so as to impart rotary movement to the member 34 and thus to assist the function of the discharges 37. The head 34 shows an enlarged front end having the passages 37 formed therein.

While in describing the invention reference has been made to particular examples embodying the same I wish it to be understood that my invention is not limited to the construction shown in the drawing, and that various changes may be made in the general arrangement of the apparatus and the construction of its parts without departing from the invention.

I claim:
1. Apparatus of the class described comprising a rotatable hollow member adapted to be passed into a tubular element, said hollow member comprising a plurality of interconnected tubular sections, a rotatable head member journaled in said hollow member, rearwardly directed and laterally curved discharge pipes carried by said head, an axial pipe extending longitudinally from the head, cutting tools carried by said pipe and rotatable therewith, said pipe having rearwardly directed discharge openings therein, and means for supplying fluid under pressure to said hollow member for advancing the same and imparting rotative movement to the head member.

2. An apparatus of the class described comprising a plurality of interconnected tubular sections, a rotatable hollow member carried by said sections and formed with a head, discharge pipes extending rearwardly and laterally curved from the head, rollers carried by said sections and arranged in opposed relation, an axial pipe carried by the head and extending in alignment with the tubular sections, cutting members carried by said pipe, said pipe being formed with rearwardly directed openings arranged in front of certain of the cutting members, and means for supplying fluid to the tubular sections and heads for imparting rotative movement to the head and cutting members, the discharge of the fluid through said pipes and openings advancing the apparatus and causing rotation of the head.

3. An apparatus of the character described comprising a plurality of connected tubular sections, a rotatable hollow member carried by said sections, rollers carried by the sections and arranged in opposed relation, a head at the outer end of the hollow member, rearwardly directed laterally curved discharge pipes carried by the head, an axial pipe extending forwardly from the head and carried thereby, having rearwardly directed openings therein, a drill member at the outer end of the pipe, a plurality of cutters rotatable with the pipe and arranged in the rear of the openings, and means for supplying fluid under pressure to the hollow rotatable member whereby the discharge of the fluid through the pipes carried thereby will cause the hollow member to rotate and assist the pressure of the fluid in advancing the apparatus.

In testimony whereof I hereunto affix my signature.

GUSTAV OTTO ANDREAS LIEBAU.