March 31, 1942. H. M. SMITH 2,278,026

SEWER AND PIPE CLEANER

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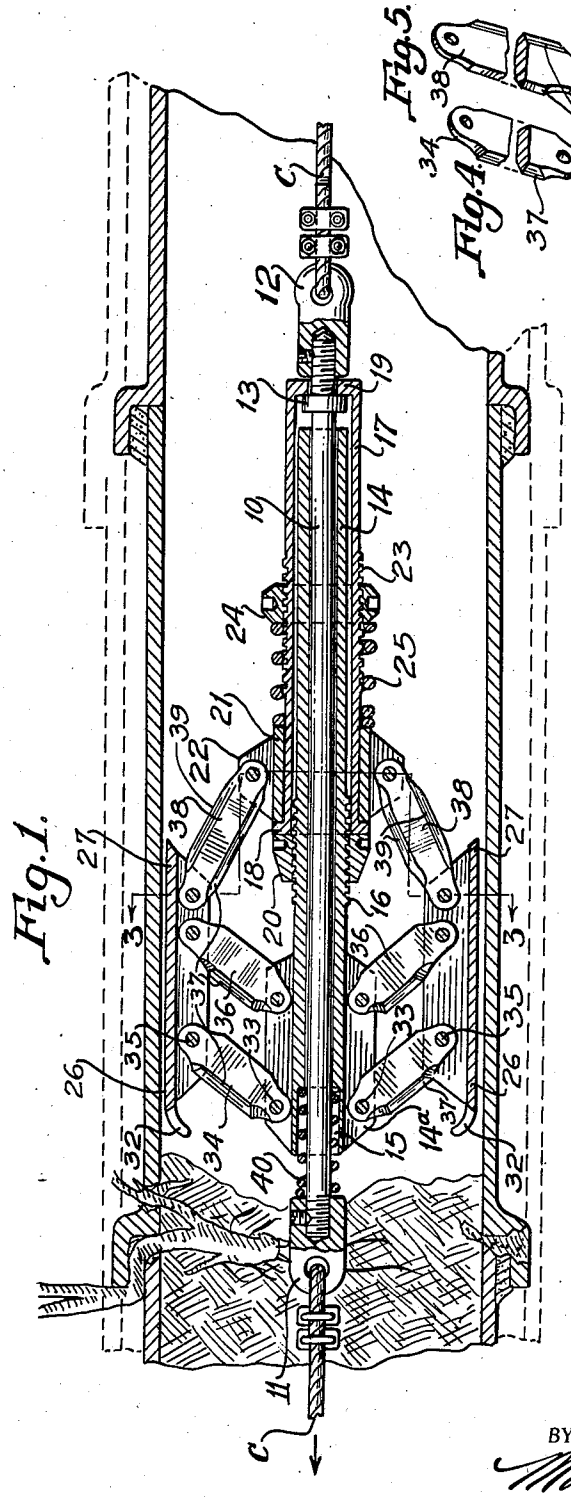


Fig. 1.

Fig. 5.

Fig. 4.

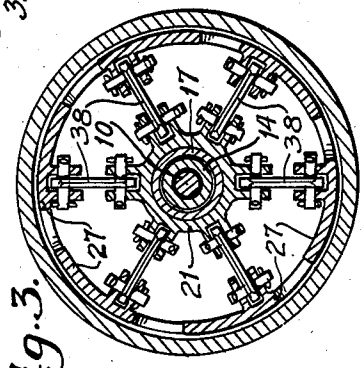


Fig. 3.

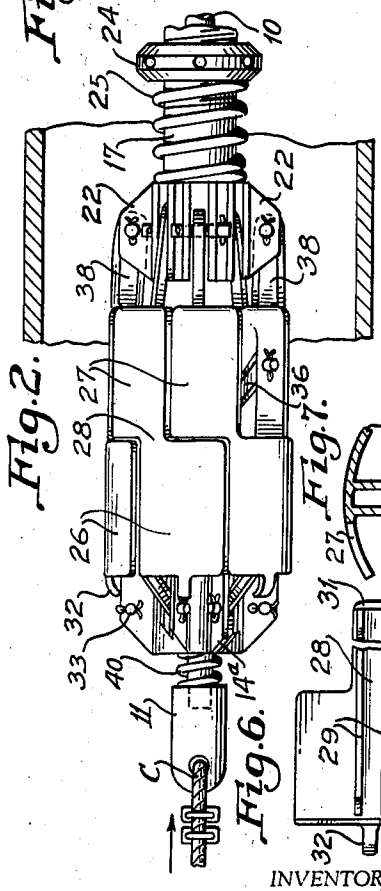


Fig. 2.

Fig. 7.

Fig. 6.

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SEWER AND PIPE CLEANER

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Application May 3, 1939, Serial No. 271,488

3 Claims. (Cl. 15—104.30)

My invention relates to an apparatus particularly designed for cleaning accumulations from sewers, pipes and like conduits, and has for its principal object the provision of a relatively simple, practical and inexpensive apparatus that includes a plurality of expanding cutters which, as the device is drawn through the sewer or pipe by means of a cable or otherwise, will cut and plow through accumulations that tend to clog the flow of liquid through the sewer or pipe, thus cutting and loosening the accumulations to such an extent as to enable the same to be readily flushed out of the pipe or duct with a flow of water from a hose or other jet directing means.

It will be understood that sewer pipes frequently become clogged with accumulations such as sand, dirt, dead leaves and the like, and further, that where the sewer passes beneath trees and shrubs, the roots thereof frequently enter the joints of the sewer pipe, naturally attracted by the moisture in said pipe, and these roots grow to such size as to materially diminish, and in some instances, to entirely cut off flow of the liquid through the sewer.

A further object of my invention is, to provide a sewer and pipe cleaning apparatus of the character referred to that is capable of expanding radially, thus enabling the tool or appliance to be utilized in sewers or pipe lines of different diameters.

A further object of my invention is, to provide a sewer and pipe cleaning device having parts that have their front and rear ends or edges sharpened in order to more readily plow and cut through the accumulations as the tool is drawn forward or rearward within the sewer or pipe line by the cables that are attached to the ends of the implement.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is a vertical section taken lengthwise through the center of a sewer and pipe cleaning implement constructed in accordance with my invention and showing the same positioned within a sewer or pipe line.

Fig. 2 is an elevational view of the implement and showing the cutters thereof in contracted position.

Fig. 3 is a cross section taken on the line 3—3 of Fig. 1.

Figs. 4 and 5 are perspective views of links utilized between the main body of the appliance and the combined plows and cutters.

Fig. 6 is a view looking against the inside of one of the combined plows and cutters.

Fig. 7 is an end elevation of one of the combined plows and cutters.

Referring by numerals to the accompanying drawing, 10 designates a metal rod, on the forward end of which is detachably mounted an eye 11 and a similar eye 12 is detachably mounted on the rear end of said rod. These eyes provide points of attachments for cables C or flexible rods that are utilized for drawing the tool through a sewer or other conduit.

Formed integral with or fixed to rod 10 adjacent its rear end is a collar 13. Mounted to slide freely upon rod 10 between the forward eye 11 and collar 13 is a sleeve 14, the forward end of which is countersunk as designated by 15 and, formed on the intermediate portion of said sleeve is an external thread 16. Formed integral with the forward portion of sleeve 14 is a plurality of longitudinally extending radially disposed pairs of ears or flanges 14a.

Loosely mounted upon and enclosing the rear portion of sleeve 14 is a tubular housing 17, the forward end of which carries an integral outwardly projecting flange 18 and, formed integral with the rear end of this tubular housing is an inwardly presented flange 19 that surrounds the rod 10 and occupies a position between flange or collar 13 and the inner end of eye 12.

Screw seated on the threaded portion 16 of sleeve 14 is a nut 20 that provides an adjustable shoulder or abutment that is adapted to be engaged by the flange 18 on the forward end of tubular housing 17. Loosely mounted on the forward portion of housing 17 directly to the rear of the flange 18 is a collar 21 and, formed integral with the periphery thereof is a plurality of radially disposed pairs of ears 22 that correspond in number and arrangement with the pairs of ears 14a on the forward portion of sleeve 14. The intermediate portion of housing 17 is externally threaded as designated by 23 and, screw seated on said threaded portion is a nut 24.

Interposed between the rear end of collar 21 and nut 24 is a fairly heavy spring 25 having a considerable degree of resistance to compression strains. The nut 24 being screw seated on the housing 17 provides means for adjusting the tension of spring 25.

The cutters or plows that are designed to pass through the accumulations in a sewer or pipe

adjacent its inner periphery are formed of hard metal, such as steel, and each cutter is in the form of a plate having a forward portion **26** and a rear portion **27**, which portions are offset laterally with respect to each other and connected by a neck portion **28**.

The offset portions **26** and **27**, which are practically identical in size, are substantially square and, formed integral with the under side of each plate and extending longitudinally thereof across the neck **28** is a pair of parallel flanges **29**, both ends thereof being inclined from the outer ends of the plates **26** and **27** toward their connected ends.

The outer ends of the members **26** are beveled to form cutting edges **30** and the outer or rear ends of the members **27** are correspondingly beveled to form cutting edges **31**.

Formed integral with the central portion of the outer or forward end of each plate **26**, is a short finger **32** that curves inwardly toward its outer end, thus tending to cause the cutter or plow to more readily pass the joints between the pipe sections, particularly if the end of one pipe section is slightly offset with respect to the end of the adjacent section.

Pivotally connected to pins or bolts **33** that pass through the forward portions of the flanges **14***a* are the inner ends of links **34** and, the outer ends of said links are pivotally connected to pins or bolts **35** that pass through the forward portions of the ribs **29** on the cutters or plows comprising the connected plates **26** and **27**. Similar links **36** pivotally connect the rear portions of the flanges **14***a* with the rear portions of the flanges **29** and the forward or outer edges of all of the links **34** and **36** are beveled and sharpened to form cutting edges **37**.

Links **38** are arranged between and pivotally connected to the rear ends of the pairs of flanges **29** and the respective pairs of ears or flanges **22** on collar **21**. Both side edges of each link **38** are beveled and sharpened to form cutting edges **39**.

The links **34**, **36** and **38** are clearly illustrated in Figs. 4 and 5 and the construction of the cutters or plows comprising the offset plates **26** and **27** is illustrated in Figs. 6 and 7.

Occupying the countersunk recess **15** in the forward end of sleeve **14** and bearing against the shoulder at the inner end of said recess is the inner end of an expansive coil spring **40**, the forward end of which bears against the inner end of eye **11**. The size and tension of this spring **40** is somewhat less than the size and tension of spring **25**.

In the use of my improved cleaning out tool, a sectional rod is run from one manhole to another through the pipe that connects said manholes, and which is to be cleaned, and, by means of said rod the cable C that is connected to eye **11** is drawn through the pipe. By means of suitable power, for instance, a winch, the cable is drawn through the pipe and the pull on said cable is transmitted directly to the rod **10** and from said rod through eye **12** to the rear end of sleeve **17**. From said sleeve **17** the pulling strains are transmitted through nut **24** and heavy coil spring **25** to collar **21**, to maintain the same against the flange **18** and the latter bearing against nut **20** transmits the pulling strains to sleeve **14** so that during the travel of the tool the rod **10**, sleeve **14** and housing **17** move together practically as one piece.

Under such conditions and due to the pulling strains impressed on the collar **21**, the ends of the links **38** that are connected to the plows or cutters swing outwardly and thus, said cutters or plows are maintained in position adjacent the inner periphery of the pipe through which the tool is being drawn.

The cutters or plows pass through the accumulations in the pipe and practically scrape the inner surface thereof, thereby cutting up and loosening the accumulations to such an extent as to permit their being subsequently flushed out of the pipe by the introduction of water under pressure thereinto.

Inasmuch as the forward ends of the cutters are sharpened and likewise the forward edges of links **34** and **36** are sharpened, the resistance to the forward movement of the tool through the pipe is materially decreased and said cutting edges are effective in cutting off any roots that may have entered and grown to considerable size within the pipe.

In the event that the forward ends of the cutters encounter any offsets in the joints between the pipe sections, the curved fingers **32** that project from the forward ends of the cutters will engage such offsets and thereby enable the tool to readily pass same.

Spring **40** arranged between eye **11** and the forward portion of housing **17** is effective in tending to open or expand the plows or cutters and to maintain the same in expanded positions while the device is being drawn through the sewer and the accumulations therein.

In the event that the plows or cutters engage a fixed body of accumulations within the sewer pipe or against an off-set or shoulder that will not permit the tool to pass in its expanded condition, then the continued pull on the cable will cause rod **10**, sleeve **14**, and housing **17** to be drawn forwardly through collar **21** with the result that heavy coil spring **25** will be compressed between the collar **21** and nut **24**. As a result of this action, the flanges **14***a* on sleeve **14** move forwardly with said sleeve so as to draw the lower ends of the links **36** forward while the lower ends of the links **38** remain stationary on collar **21** and as a result, the plows or cutters automatically move inwardly toward the axis of the tool, which in nearly all instances enables the tool to be drawn past the shoulder or projection on the interior of the pipe that is being cleaned.

When it becomes necessary to collapse the tool so as to enable the same to be readily drawn rearwardly through the sewer, pulling strains are impressed on the cable that is connected to eye **12**, thereby imparting rearward pulling strains on rod **10** so that collar **13** bears against the flange **9** on the rear end of housing **17** and pulls the latter rearwardly away from the nut **20** so that flange **18** pulls collar **21** rearwardly, thus causing the links **38** to swing inward toward the axis of the tool and correspondingly swinging links **34** and **36** inwardly, thereby moving the plows or cutters into compact arrangement as illustrated in Fig. 2. Thus the overall diameter of the tool is materially decreased and said tool may be readily drawn rearwardly in the sewer while in such collapsed condition.

Thus it will be seen that I have provided a sewer cleaning apparatus that is relatively simple in construction, inexpensive of manufacture and very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved sewer and pipe cleaner,

may be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In a sewer and conduit cleaning device, an elongated body, a housing slidable with respect thereto, a collar slidable upon said housing, a plurality of cutter members radially disposed about the body, links pivotally connecting said cutter members at each end with said body and collar respectively, relatively strong spring means interposed between said housing and collar, arranged and adapted to oppose movement of said collar in a direction effecting a collapse of the cutters, abutment means on the housing engaging said collar, axially adjustable abutment means on the body and engaging said housing to limit the radial movement of the cutters, cable means operatively connected to said housing for pulling the latter through a pipe being cleaned in a direction tending to expand the cutters, additional cable means extending in the opposite direction and operatively connected to said housing to cause axial movement of said housing in a direction to collapse the cutters and a relatively weak spring interposed between said body and said housing and normally tending to prevent the latter movement of said housing.

2. A sewer and conduit cleaning device as set forth in claim 1, with the end portions of said cutter members offset circumferentially with respect to each other, one end of each cutter member being sharpened to provide a transversely disposed cutting edge and inwardly curved fingers projecting from said cutter members at the other ends thereof.

3. In a sewer and conduit cleaning device, a combined guide and cutter member comprising a plate having offset end portions that are curved transversely on the same radius, one end of said plate being sharpened to provide a transversely disposed cutting edge and a curved finger projecting downwardly from the opposite end of said plate.

HENRY M. SMITH.