

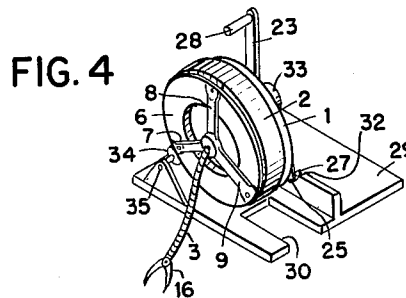
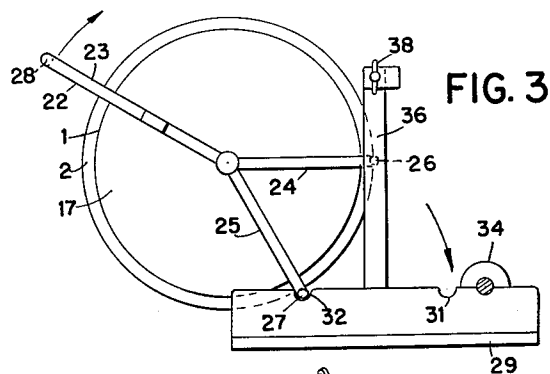
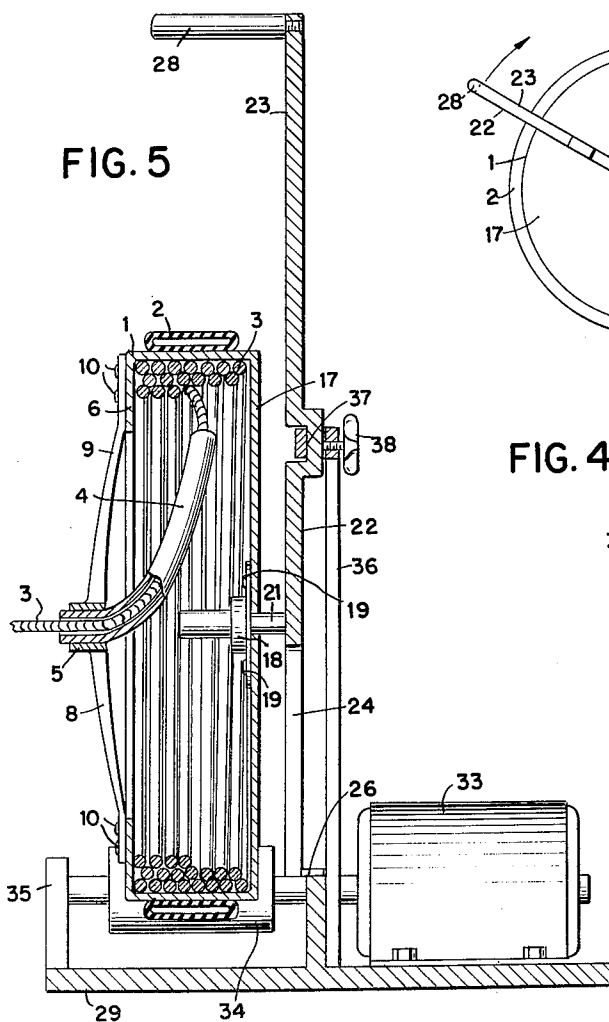
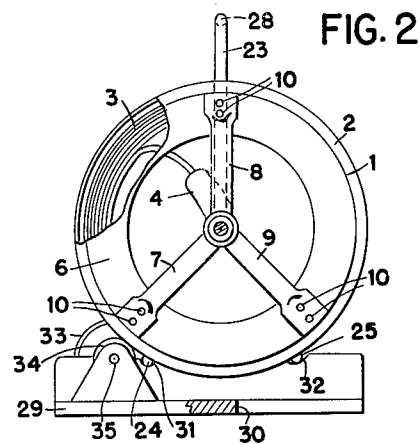
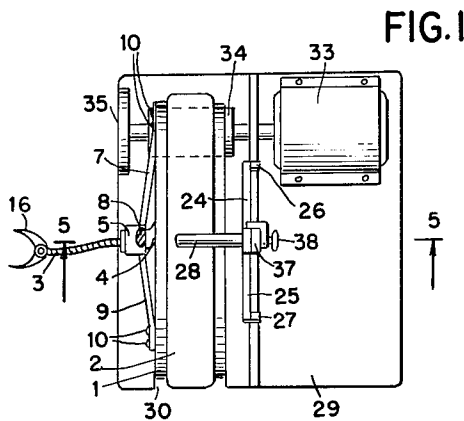
Aug. 14, 1962

J. M. CRISCUOLO
SEWER CLEANING DEVICE

3,048,870

Filed Feb. 19, 1960

2 Sheets-Sheet 1



INVENTOR.
James M. Criscuolo
BY
Adams, Forward & McLean
ATTORNEYS

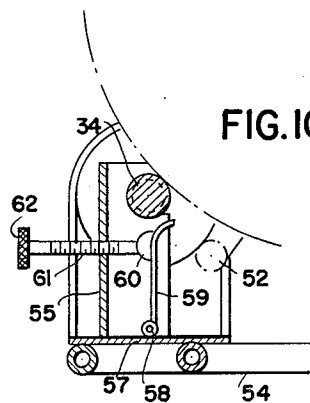
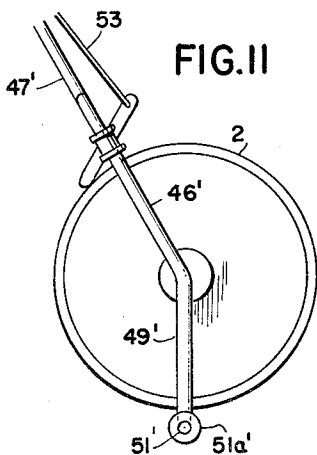
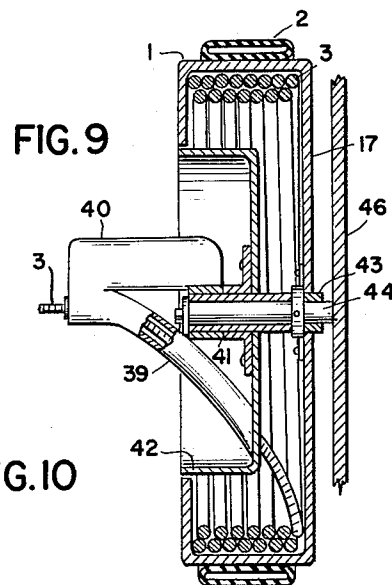
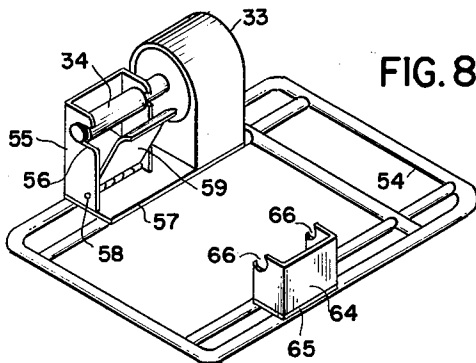
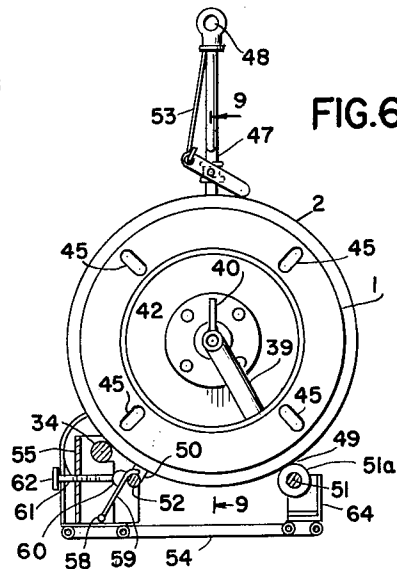
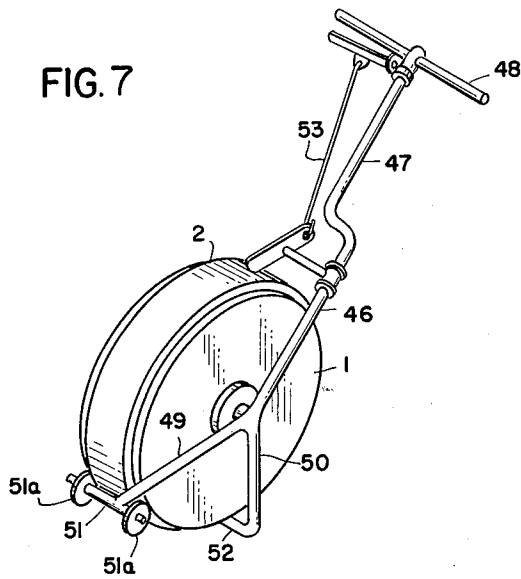
Aug. 14, 1962

J. M. CRISCUOLO
SEWER CLEANING DEVICE

3,048,870

Filed Feb. 19, 1960

2 Sheets-Sheet 2



INVENTOR.
JAMES M. CRISCUOLO

BY
Adams, Forward and McLean
ATTORNEYS

1

3,048,870

SEWER CLEANING DEVICE

James M. Criscuolo, 1938 Wallace Ave., Bronx, N.Y.

Filed Feb. 19, 1960, Ser. No. 9,846

11 Claims. (Cl. 15—104.3)

My invention relates to cleaning sewers and drain pipes and, more particularly, provides an easily assembled and readily transportable sewer cleaner equipped to withstand the stresses, especially angular stresses, imposed on such devices by obstructions in sewers and drains.

The sewer cleaning machines commonly in use today are made up primarily of a cleaning instrument, usually a rotating cutting tool strong enough to cut through tree roots and similar obstructions found in sewer pipe, a rotating drive device, and a connecting link for connection the drive device to the tool. Such connecting links are most commonly braided steel cables or tightly wound steel wire coils, or a combination of both, attached at one end to the cutting tool and at the other end to the drive device, which usually is an electric motor. Various arrangements are commonly used for attaching the drive device to the cable link, such as belts, pulleys, gears, and chains, which permit a portion of the link to be retained on a drum or reel while an extended portion, attached to the cutting tool, is rotated.

The forward progress of the cutting tool along the internal length of the sewer or drain is usually made by passing the relatively stiff cable or wire coil hand over hand into the conduit to be cleaned to drive the cutting tool forward so long as no obstructions interfere or so long as there is cable or coil left on the reel or in the cable drum. As a result, the operator is rarely out of close contact with his sewer cleaning equipment and must almost continuously hazard the dangers inherent in being close to or in actually handling a continuously moving steel cable.

The greatest hazard to the operator and his equipment, and one which often befalls even the most experienced operator arises when his rotating cutting tool strikes an obstruction in the sewer line which does not give way and which causes the cutting blade to stop rotating, despite the fact that torque is still applied to the cable. This sort of stoppage causes the cable to twist, kink, and perhaps break. Consequently, a potentially destructive strain is put on an expensive piece of equipment, no matter how quickly power may be shut off. More important, however, is the danger to the operator of having the twisting cable torn from his hands and, just as easily, of being struck by the lashing cable or its broken ends. It is an object of my invention substantially to eliminate this danger without the necessity of completely cutting off the power supply.

Another disadvantage common to sewer cleaning devices is their bulk and weight. The cable is particularly cumbersome, since it is not uncommon to employ it in 100' lengths weighing from about 60 to about 80 pounds which are normally stored on reels or drum cable containers having about a 2' radius and which are most often themselves of metal. It is an object of my invention to make the transportation of such cable and its containers as safe and as convenient as possible by substantially eliminating the need for lifting them.

It is also an object of my invention to make the assembly of the equipment, particularly the connection between the cable and the drive power source for rotating the cutting tool, as simple as possible by eliminating the need for belts, pulleys, gears or chains and excessive manipulations by the operator.

These and other objects are accomplished by my sewer

2

cleaner which, in one of its embodiments, has two larger components. These are a rotatable drum cable container mounted upon a horizontal axis which serves not only to store and transport the cable or wire to be used, but also to impart to the cable the rotational force ultimately to be communicated to the cutting tool, and a base upon which the drum and the power source for rotating the drum can be firmly secured. The two components are so constructed as to afford the operator as much ease as possible in transporting the device and in wheeling the drum into and upon the base when it is placed in position for operation of the device. For a more complete understanding of the practical application of the features and principles of my invention, reference is made to the appended drawings in which:

FIGURE 1 is a plan view of a sewer cleaning system employing a sewer cleaner constructed in accordance with my invention;

FIGURE 2 is a front elevation of the sewer cleaner of FIGURE 1;

FIGURE 3 is a rear elevation of the sewer cleaner of FIGURE 1 as it is being assembled;

FIGURE 4 is an isometric elevation of the fully assembled sewer cleaner of FIGURE 1;

FIGURE 5 is a vertical section of the sewer cleaner in FIGURE 1 taken substantially along line 5—5 in FIGURE 1;

FIGURE 6 is a front elevation of another embodiment of a sewer cleaning system of my invention;

FIGURES 7 and 8 are isometric elevations showing the two components of FIGURE 6 disassembled;

FIGURE 9 is a vertical section of the drum portion of FIGURE 6 taken along line 9—9 in FIGURE 6;

FIGURE 10 is an enlarged fragmentation view of the lower left-hand portion of FIGURE 6;

FIGURE 11 is a further embodiment of the drum component of a sewer cleaning system of my invention.

As shown in FIGURES 1 to 7 and 11, the drum cable container 1 of my sewer cleaner is of the general size and shape of a truck wheel made of, preferably, sheet metal. A tire 2, preferably of rubber, is mounted thereon. As shown in FIGURE 5, the cable or wire 3 is annularly coiled in the drum. The coils begin at the outer perimeter of the drum.

As shown in FIGURES 1, 2, 4 and 5, a freely rotatable curved cable conduit 4 is held in a bushing 5 which is, in turn, connected to a partial side-wall 6 of the drum 1. Struts 7, 8 and 9 connect the bushing 5 to the side-wall 6 by means of bolts 10. The conduit 4 is a hollow, bent pipe which curves from the bushing 5 into the drum 1 and outwardly along a radius of the drum. Cable 3 is led out of the drum, through the conduit, toward the obstructed pipe to be cleaned. A cutting tool 16 is fastened to this end of the cable.

As shown in FIGURES 1 to 5, the other side of the drum is substantially closed as by wall 17. This closure is largely for reasons of safety, but it also permits mounting a ball bearing journal 18 within the drum 1 on the side-wall 17 by means of bolts 19 as shown in FIGURE 5.

As shown in FIGURE 5, the axle 21 upon which drum 1 is mounted is an integral part of a support member 22, the shank 23 of which, when the sewer cleaner is assembled, stands upright and upon two legs 24 and 25 and feet 26 and 27. This support member has a handle 28 by means of which the mounted drum can be transported when it is not secured upon its base 29.

As shown in FIGURES 1 to 5, the base 29 of my sewer cleaner can be a platform, usually of metal or wood. It can have wheels, though these are not shown. When mounted on wheels, the base portion of my sewer cleaning device advantageously has slot 30 into which the drum 1 is rolled preparatory to being secured on the base. This

3

slot has a breadth which is, at least, the thickness of the drum and extends from one side of the base into it, in a line parallel to the line of two spaced-apart open seats 31 and 32 in or, as shown, on the base, past at least one of such seats. Also shown on the base 29 is a power source, e.g., electric motor 33, having an output shaft 34 which is in contact with the periphery of the tire 2 on the drum 1. This shaft can be supported on its other end in a ball bearing assembly 35 to prevent undue stress on the motor.

FIGURES 1, 3 and 5 show an upright element 36 affixed on the base 29. This element, like the support member 22 upon which the drum 1 is mounted, can be a one-piece forging. The element secures the support member feet 26 and 27 in the open seats 31 and 32 on the base 29, holds the support member 22 in an upright position, and assures contact between the tire 2 and the output shaft 34. This is accomplished by forming a disengageable joint 37 between the support member and the upright element and/or by employing a thumb screw 38 to clamp the support member in place.

The transport of the sewer cleaner of FIGURES 1 to 5 is facilitated by the fact that it can be disassembled into two larger components. The first comprises the cable-loaded drum 1 and conduit 4, together with the support member 22. The second comprises the base 29, motor 33, and upright element 36. Thus, the drum 1, when it is not secured to the base 29, can be wheeled along the ground or floor on its tire 2 by means of the support member 22 and its handle 28 by virtue of its rotatability about the axle 21. The base 29, in turn, can be carried or wheeled into position.

To assemble my sewer cleaner, as shown in FIGURES 1 to 5, the drum 1 is wheeled into the slot 30 in the base 29. This is done by lowering the handle 28, so that the support member shank 23 is in a substantially horizontal position, and pushing the drum 1 into the slot 30 when the support member 22 is on the same side of the drum 1 as the open seats 31 and 32 are with relation to the slot 30. This is shown in FIGURE 3. The penetration of the drum into the base is defined by the length of the slot. This length is largely dependent upon the location on the base 29 of open seat 32. The location of open seat 32 is, in turn, determined by the positioning of support member foot 27 with relation to the drum 1, particularly with regard to the length of the drum's radii. Thus, the slot 30, the open seat 32, and the foot 27 are so located as to permit contact between the seat 32 and the foot 27 when drum 1 is in the slot 30 and the shank 23 of the support member 22 is in a substantially horizontal position. At this point, the seat 32 is used as a fulcrum for the lever represented by the support member 22 and, particularly, by legs 25. By lifting on the handle 28, as shown in FIGURE 3, the operator lifts the entire drum assembly out of the slot 30 and, then, by pushing the handle forward, the operator brings the shank 23 of the support member 22 into a substantially vertical position, where it can be secured to the upright element 36 by means of the joint 37 formed between them and the thumb screw 38. By these same movements of the operator, support member foot 26 is placed into open seat 31 on the base 29 and the tire 2 on drum 1 is put in contact with output shaft 34. This is shown in FIGURE 4.

In the embodiment of my invention depicted in FIGURES 6 and 9, a freely rotatable curved cable conduit 39, is attached to arm 40 which in turn is attached to bushing 41. Drum 1 with sidewall 17 is mounted on a separate bushing 43 so that bushing 41 with its attachments can rotate independently of drum 1 about axle 44. As shown in FIGURE 6, drum 1 has openings 45 for ventilation.

Axle 44 is joined to support member 46, merging into shaft 47 and handle 48 at its upper end and two legs 49 and 50 at its lower end, the legs 49 and 50 having feet 51 and 52 respectively. Attached to shaft 47 and handle 48 is hand-operated brake 53 contacting tire 2 for controlling the component shown in FIGURE 7 when it is disassembled.

4

bled. Attached to foot 51 are wheels 51a which are useful for transporting the component of the sewer cleaner of my invention shown in FIGURE 7 and for supporting this component as described below.

The base 54 is shown in FIGURES 6 and 8. Referring to FIGURE 8, base 54 as shown can be constructed of tubular steel, aluminum, or the like, and has mounted thereon motor 33 with shaft 34 and three-sided member 55 having grooves 56 for engaging and supporting shaft 34, the three-sided member 55 being mounted on plate 57.

As shown in FIGURES 6 and 8 and in detail in FIGURE 10, hinge pin 58 extends through the side walls of three-sided member 55 supporting hinged plate 59. Hinged plate 59 is connected by universal joint 60 to threaded bolt 61 having handle 62. Threaded bolt 61 extends through a threaded hole in three sided member 55 and has a knob 63 to facilitate its turning.

As shown in FIGURES 6 and 8, also mounted on base 54 is three-sided member 64 attached to plate 65. Three-sided member 64 has seats 66 in its side-walls sized to receive foot 51 and spaced so that wheels 51a abut the side-walls to provide lateral support.

To assemble the embodiment of my sewer cleaner as shown in FIGURES 6 to 10, the drum 1 is wheeled up to base 54 on tire 2 with support member 46 in a substantially horizontal position. Foot 51 is lowered into open seats 66 in the side-walls of three-sided member 64 such that the wheels 51a abut the side-walls of three sided member 64 to provide lateral stability. By lifting on handle 48, tire 2 is brought into contact with drive shaft 34. The plate 59 should be in a substantially vertical position as shown in FIGURE 10 during this operation so that foot 52 will clear plate 59 as foot 52 descends. The sewer cleaning device is now ready for operation.

Upon assembly, my sewer cleaner as shown in FIGURES 1 to 11 is easily put into operation. After positioning the whole device most advantageously with regard to the job of work to be done, the motor 33 is turned on. The drum 1 will not begin to rotate immediately, since the tire 2 and the output shaft 34 are so contacted as to permit slippage. However, as the operator begins by hand to feed the cable 3, to which a cutting tool 16 has been affixed, into the sewer or drain pipe, the friction between the output shaft 34 and the tire 2 will be put to use in the rotation of the drum 1 and the application of torque to cable 3. The rotation of conduit 4, on the other hand, depends entirely on the positioning of the cable 3 remaining in drum 1.

Whenever the further feeding of cable into the sewer is stopped or prevented, the clutch-like action between tire 2 and output shaft 34 comes into play and the drum 1 stops its rotation. This, in turn, prevents the application of any torque to cable 3 and, as a consequence, the cable is not liable to twist, kink, or even break to the detriment of the equipment or the operator. Further, the motor need not be turned off. The same is true when the cable 3 is being withdrawn from the sewer pipe.

The friction between the output shaft 34 and the tire 2 will ordinarily be sufficient to rotate the drum 1. When heavy obstructions are encountered by cutting tool 16, however, the embodiment shown in FIGURES 6, 8 and 9 provides for increasing the amount of friction between output shaft 34 and tire 2 by turning handle 62. When this is done, threaded bolt 61 moves inwardly and hinged plate 59 is lowered to contact foot 52 as shown in FIGURE 6. Pressure by hinged plate 59 on foot 52 increases the frictional contact between tire 2 and output shaft 34. Also light pressure by hinged plate 59 on foot 52 further augments the lateral stability of the assembled device.

For light duty devices, however, the friction between the output shaft 34 and the tire 2 is sufficient, and the embodiment shown in FIGURE 11 is suitable. This embodiment differs from the embodiment shown in FIGURE 7 only in that leg 50 and foot 52 are omitted. A

5

base for this embodiment need not have hinged plate 59, universal 60, threaded bolt 61 and handle 62.

As regards disassembly of the equipment, it merely proceeds in a reverse manner to that already described.

This application is a continuation-in-part of my co-pending application Serial No. 617,395, filed October 22, 1956 and now abandoned.

I claim:

1. A sewer pipe cleaning device comprising a drum for receiving flexible cables and wires annularly coiled therein, a curved cable conduit one end of which is rotatably mounted at one end of said drum adjacent the axial line thereof with the other end of said conduit disposed within said drum and extending outwardly from said axial line, a support member having a pair of spaced-apart feet at one end and a handle at the other end of said support member, said drum being mounted upon said support member intermediate the ends thereof for rotation about an axis perpendicular thereto, a base for said support member, means on the upper surface of said base defining a pair of spaced-apart open seats to receive said support member feet, detachable fastening means on said base for holding said support member upright upon said base, and drive means on said base for rotating said drum.

2. A device according to claim 1 which further comprises a tire positioned about said drum and in which said drive means includes a rotatable output shaft peripherally contacting said tire.

3. A device according to claim 1 in which the support member is an integral structure comprising two legs on which said feet are mounted, a shank in the same general plane as the legs and joined at one end to said legs at a common point and having said handle at the other end, and an axle perpendicular to said plane, said axle being joined to said structure at the juncture of said legs and said shank.

4. A device according to claim 1 in which said fastening means comprises an upright element affixed to said base, said element being removably secured at its upper end to said support member.

5. A sewer pipe cleaning device comprising a drum for receiving flexible cables and wires annularly coiled therein, a cable annularly coiled in said drum, a tire positioned about said drum, a curved cable conduit one end of which is rotatably mounted at one end of said drum adjacent the axial line thereof with the other end of said conduit disposed within said drum and extending outwardly from said axial line, rotatable cutting means affixed to said cable, journal means affixed to the other end of said drum, said other end of said drum being substantially closed, an integral support member structure having two legs on which feet are mounted, a shank in the same general plane as said legs and joined at one end to said legs at a common point and having a handle at the other end, and an axle perpendicular to said plane, said axle being joined to said structure at the juncture of said legs and said shank and being received by said drum journal means, a base for said support member, means on the upper surface of said base defining a pair of spaced-apart open seats to receive said support member feet, means in said base defining a slot in said base, said slot extending parallel to a line joining said seats from one side of said base past one of said seats and having a width of at least the width of said drum, an upright element affixed to said base, said element being removably secured at its upper end to said support member and drive means on said base including a rotatable output shaft peripherally contacting said tire.

6. A sewer pipe cleaning device comprising a drum for receiving flexible cables and wires annularly coiled therein, a curved cable conduit one end of which is rotatably mounted at one end of said drum adjacent the axial line thereof with the other end of said conduit disposed within said drum and extending outwardly from said axial line, a support member having a pair of spaced

6

apart feet at one end and a handle at the other end of said support member, said drum being mounted upon said support member intermediate the ends thereof for rotation about an axis perpendicular thereto, a base for said support member, means on the upper surface of said base defining an open seat to receive one of said support member feet, means for holding said support member upright upon said base, drive means on said base for rotating said drum, said drive means being in peripheral contact with the drum and partially supporting the drum, and said drive means and said open seat being spaced apart transversely with respect to the axial line of the drum.

7. A device according to claim 6 which further comprises a tire positioned about said drum and in which said drive means includes a rotatable output shaft peripherally contacting said tire.

8. A device according to claim 6 in which the support member is an integral structure comprising two legs on which said feet are mounted, a shank in the same general plane as the legs and joined at one end to said legs at a common point and having said handle at the other end, and an axle perpendicular to said plane, said axle being joined to said structure at the juncture of said legs and said shank.

9. A device according to claim 7 wherein the means for holding said support member upright on said base includes means for increasing the frictional contact between the tire and the rotatable output shaft.

10. A sewer pipe cleaning device comprising a drum for receiving flexible cables and wires annularly coiled therein, a cable annularly coiled in said drum, a tire positioned about said drum, a curved cable conduit one end of which is rotatably mounted at one end of said drum adjacent the axial line thereof with the other end of said conduit disposed within said drum and extending outwardly from said line, rotatable cutting means affixed to said cable, journal means affixed to the other end of said drum, said other end of said drum being substantially closed, an integral support member structure having two legs on which feet are mounted, a shank in the same general plane as said legs and joined at one end to said legs at a common point and having a handle at the other end, and an axle perpendicular to said plane, said axle being joined to said structure at the juncture of said legs and said shank and being received by said drum journal means, a base for said support member, means on the upper surface of said base defining an open seat to receive one of said support member feet, means cooperating with said open seat and said one support member foot when inserted in said open seat to prevent lateral shifting of said support member upon said base, drive means on said base including a rotatable output shaft for rotating said drum, said drive means being in peripheral contact with the tire and partially supporting the drum, said rotatable output shaft and said open seat being spaced apart transversely with respect to the axial line of the drum, and means on said base for engaging said other support member foot and increasing the frictional contact between the tire and the rotatable output shaft.

11. A sewer pipe cleaning device comprising a drum for receiving flexible cables and wires annularly coiled therein, a curved cable conduit one end of which is rotatably mounted at one end of said drum adjacent the axial line thereof with the other end of said conduit disposed within said drum and extending outwardly from said axial line, a support member having a foot at one end and a handle at the other end, said drum being mounted upon said support member intermediate the ends thereof for rotation about an axis perpendicular thereto, a base for said support member, means on the support surface of said base defining an open seat to receive said support member foot, means for holding said support member upright upon said base, drive means on said base for rotating said drum, said drive means being

in peripheral contact with the drum and partially supporting the drum, and said drive means and said open seat being spaced apart transversely with respect to the axial line of the drum.

References Cited in the file of this patent

UNITED STATES PATENTS

1,156,402 Heim ----- Oct. 12, 1915

2,037,104
2,227,442
2,267,493
2,292,712
2,468,490
2,685,097
2,730,740
2,758,917

5

Yohn ----- Apr. 14, 1936
De Millar ----- Jan. 7, 1941
Clotz ----- Dec. 31, 1941
O'Leary ----- Aug. 11, 1942
Di Joseph ----- Apr. 26, 1949
Allen ----- Aug. 3, 1954
O'Brien ----- Jan. 17, 1956
Popp ----- Aug. 14, 1956