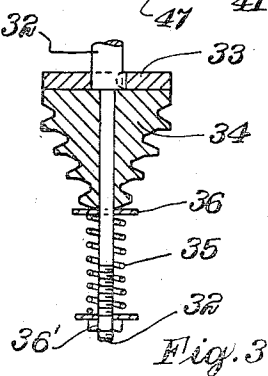
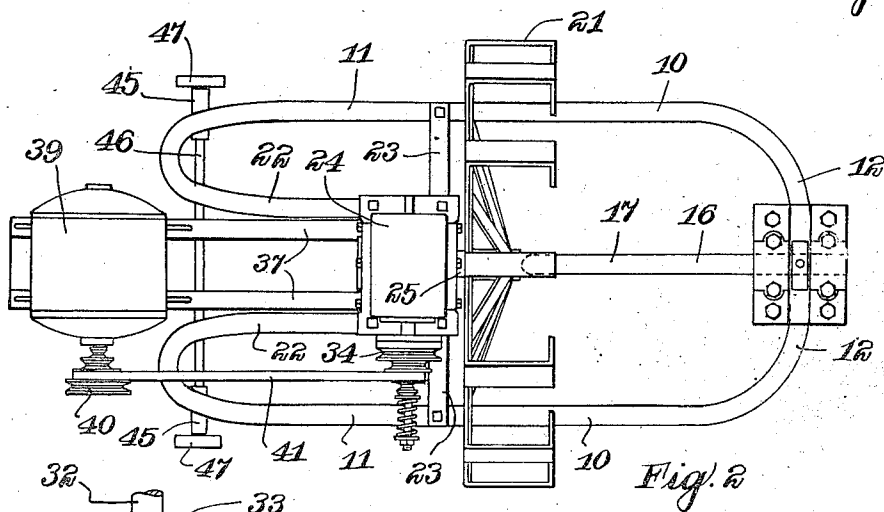
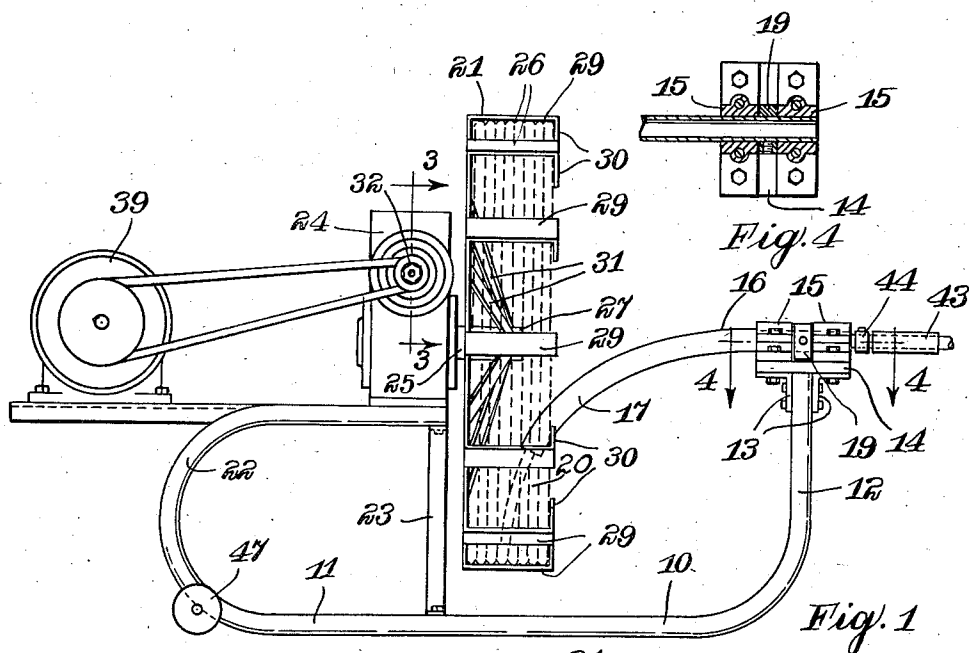


Aug. 11, 1942.

A. A. O'LEARY
SEWER CLEANING DEVICE

2,292,712

Filed Aug. 15, 1938



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UNITED STATES PATENT OFFICE

2,292,712

SEWER CLEANING DEVICE

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Application August 15, 1938, Serial No. 224,925

3 Claims. (Cl. 15-104.30)

My invention relates to an improvement in sewer cleaning devices wherein it is desired to provide a device capable of digging out pipe such as sewer pipes and the like which have been obstructed by foreign matter.

Various types of sewer cleaning devices have been constructed. All of these various constructions have a similar purpose in mind, namely that of producing rotation of a cutting element mounted on the end of a flexible shaft in order to bore through or to cut away obstructions in sewer pipes or the like. I have found that these former types of devices have certain serious disadvantages which I have attempted to eliminate. For example, most of the devices with which I am familiar for accomplishing a similar purpose, rotate in such a manner that the shaft or device rotatably supporting the shaft is directly connected to a motor. Thus when the obstruction engages the cutting element too strongly, either the cutting element or the shaft or the supporting means connecting the shaft with the motor must break, or else the motor itself must stall. If the cutting element or the shaft breaks within the sewer pipe, it is then necessary to find a means of removing the broken portion of the shaft from the sewer pipe which is a difficult task without digging up the pipe. Accordingly with prior devices having direct connection between the cutting element and the motor driving the same, occasionally a shaft will break within the sewer, making necessary the task of removing this broken shaft as well as removing the obstruction.

It is a purpose of my invention to provide a sewer cleaning device in which the motor is connected to the shaft through a suitable clutch mechanism which may be set to any desired tension. The clutch is so arranged that the cutter will be rotated by the motor continuously unless an extreme force is exerted upon the cutter tending to stop rotation of the same. If such an extreme strain occurs the clutch actuates to prevent further rotation of the shaft with the motor and to permit the shaft to remain stationary even though the driving motor is still in rotation. With this construction I prevent the breaking down of the shaft or the cutter within the pipe and construct my device so that should the cutter become locked within the pipe against rotation, the cutter may be withdrawn slightly and worked into the opening more slowly in order to prevent the locking of the cutter a second time. If the cutter blade continually locks, it is possible with my construction to remove the

cutter and insert into the pipe to be opened a smaller cutter or one of a different shape which will more easily work through and form a small opening which can be enlarged by reaming cutters.

It is a feature of my invention to provide a reel formed of bars or spokes bent inwardly at their ends to contain a roll or coil of flexible shaft within the same. This coil has its free end extending through a curved guide pipe which carries the flexible shaft from the reel. The guide is bent to provide a portion thereof extending axially with respect to the reel and is mounted in bearings at this axially extending portion so that the curved guide will rotate with the reel. Thus the coiled loop of flexible shaft is guided from coiled or spiral condition within the reel out through the axis of the reel and may be fed longitudinally in either direction so as to feed the shaft into coiled or uncoiled position. Obviously when the hollow curved guide member rotates slightly slower than the reel, the flexible shaft is being fed away from the machine and while the arm is rotating faster than the reel, the shaft is being coiled within the reel.

It is a feature of my invention to provide a means of changing the speed of rotation of the cutter. This means when used in combination with my clutch mechanism, makes it possible for the cutter to be rotated at the desired speed. Normally the cutter may travel at a relatively low speed when the machine is automatically feeding out the cable; however, when an obstacle or stubborn resistance is met, it is possible to increase the speed of rotation of the cutter and to feed the cable in slowly by hand until the cutter works its way through the obstacle.

It is a further feature of my construction to provide a spring frame which may simply and easily support the various parts of the machine, making up my invention, and yet which may be readily transmitted from place to place because of the wheels mounted thereupon which are normally out of contact with the ground but which will enable the machine to be tilted and moved from place to place.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawing forming a part of this specification:

Figure 1 is a side elevational view of my sewer cleaning device.

Figure 2 is a top elevational view of the cleaning device illustrated in Figure 1.

Figure 3 is a sectional view through the clutch and speed change mechanism taken on the line 3—3 of Figure 1.

Figure 4 is a cross-sectional view through the bearing device used for supporting the guide, by means of which the flexible cable is coiled and uncoiled, the section being taken on the line 4—4 of Figure 1.

My device comprises a frame 10 including a pair of substantially parallel supporting runners 11 having the front ends thereof angled inwardly and upwardly at 12 as illustrated in Figures 1 and 2 of the drawing. The upper ends 12 of the frame members 10 are secured between angles 13 bearing a supporting block 14. Spaced bearings 15 are mounted on the block 14 to accommodate the straight end portion 16 of the curved hollow guide member 17. A guide member 17 is equipped with a collar 19 mounted thereon between the bearings 15 to prevent longitudinal movement of the straight end portion 16 of the guide pipe 17.

The guide pipe 17 is curved to create a bend in the flexible cable 20 illustrated in dotted outline in Figure 1 of the drawing. The cable 20 is unwound from the reel along the substantially radially extending path and extends through the curved guide 17 and through the bearings 15 so that the flexible cable 20 may be wound or unwound from the reel while the reel is in rotation. As will be seen from the drawing, the guide pipe or tube 17 is free to rotate with the reel 21 and when the flexible cable 20 is not being reeled off from the reel 21 or is not being coiled within the reel 21 the reel and the guide pipe are travelling at the same rotative speed.

The rear ends 22 of the frame members 10 are looped upwardly and inwardly as shown in the drawing, and the extreme ends of these upwardly looped portions are supported in definite relationship with the runners 11 by means of braces 23. A transmission member 24 is mounted upon the ends 22 of the frame members 10 and a shaft 25 extending from the transmission 24 supports the reel 21.

The reel 21 comprises a series of angularly extending spokes 26 which extend outwardly from a central hub 27 and which are bent transversely at 29 and which are provided with ends 30 which turn inwardly toward the hub to make each of the spokes substantially hook shaped. Reinforcing braces 31 are provided between the hub 27 and the spokes 26 to further support the same. The hub 27 is mounted upon the transmission shaft 25.

Within the transmission which may be of any suitable type or design, gears or other means are provided which connect the shaft 25 with a transversely extending shaft 32. Upon the shaft 32 is mounted a disc or collar 33 which is connected to the shaft 32 for rotation therewith. A pulley 34 frictionally engages the disc 33 and the pulley 34 is forced against the disc 33 by means of a spring 35 which forces the washer 36 against the end of the pulley 34 which in turn urges this pulley 34 against the disc 33. The spring 35 is adjustably supported by the nut 36' which enables the tension of the spring 35 to be adjusted. Thus the spring 35 may be set so that slippage will occur between the pulley 34 and the disc 33 when any desired strain is exacted upon the shaft 32, and therefore, the motor of the device may rotate without effecting rotation of the reel 21.

A pair of angle iron supporting members 37 extend rearwardly from the ends 22 of the frame

members 10 and a motor 39 is mounted upon these angle members 37. A pulley 40 is provided on the motor shaft which pulley is connected by a belt 41 to the pulley 34 connected to the transmission 24. Therefore, when the motor 39 is put into operation, the pulley 40 is rotated, which acts through the belt 41 to rotate the pulley 34. The pulley 34 frictionally engages the disc 33 and rotates this disc thereby rotating the shaft 32. Rotation of the shaft 32 actuates through suitable gears within the transmission 24, not shown in the drawing, to rotate the shaft 25. Upon this shaft 25 is mounted the hub 27 of the reel 21, and therefore rotation of the motor 39 acts to rotate the reel 21.

As the reel 21 rotates, the flexible cable 20 coiled therein causes rotation of the curved guide 17 therewith. The cable may be pulled inwardly or outwardly even during rotation of the device.

A sleeve 43 is mounted freely upon the flexible shaft 20 and collar means 44 are provided to move the flexible shaft in either direction without stopping rotation of the reel 21. If collars 44 are positioned on either side of the sleeve 43, the cable or flexible shaft may be coiled inwardly or outwardly by use of this sleeve. When it is desired to change the position of the sleeve 43, it is only necessary to stop rotation of the cable or flexible shaft 20 and to move the sleeve 43 to a slightly different position.

The operation of my device is believed clear from an observation of the foregoing specification. The manner in which the flexible shaft or cable is reeled and unreeled is believed clearly seen. The flexible cable may be fed in at any desired speed by means of the sleeve 43, and when the obstruction is reached, the pressure upon the cutter may be regulated by means of the force placed upon the sleeve 43. The cutter is permitted to travel at the highest speed advisable for devices of this sort and should the cutter reach an obstruction and become locked in place against rotation, the pulley 34 will slip with respect to the disc 33, and the motor 39 will continue to rotate while the shaft 20 and the reel 21 will remain stationary. The speed of the cutter may then be reduced and the cutter advanced into the obstruction more cautiously. If the obstruction cannot be removed in this way, it is possible to remove the flexible shaft from the sewer and to place a smaller cutter on the end of the shaft 20 or to use a cutter of a different shape, thereby permitting a small hole to be made which can be enlarged by suitable cutters.

A pair of sleeves or bearings 45 are secured in alignment on the frame members 10 and through these aligned sleeves 45 I provide a shaft 46 supporting wheels 47. The wheels 47 ordinarily just contact the ground or floor when the runners 10 are rested upon the ground, so that the weight of the device rests upon the runners 11 rather than upon the wheels 47. However, when it is desired to move the machine from one place to another, the front end of the frame may be lifted upwardly so that no portion of the device except the wheels 47 contact the ground or floor, whereupon the entire machine may be wheeled from one position to another.

In accordance with the patent statutes, I have described the principles of construction and operation of my sewer cleaning device, and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that this is only illustrative of a means of carrying out

my invention, and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A sewer cleaning device comprising a rotatable reel, means for driving said reel, a short shaft projecting from said driving means, said reel comprising an axial hub, arms extending radially from said hub, feet substantially parallel to the axis of said hub on the outer extremities of said arms, intumed ends on said feet, and brace arms within said reel extending from a point on said hub spaced longitudinally from said arms, said brace arms secured to said arms at a point spaced from the axis of said shaft.

2. A sewer cleaning device including a pair of spaced parallel frame portions, rear ends on said frame portions extending upwardly and inwardly and terminating in supporting portions above said frame, a motor supported on said supporting portions, a rotatable reel, said rotatable reel supported by and closely adjacent said supporting portions, said motor providing means for driving said reel, said reel comprising an axle hub, arms extending outwardly from said hub, feet substantially parallel to the axis of said hub on the outer extremities of said arms, intumed ends on said feet, brace arms within said reel project-

ing from said hub and spaced longitudinally from said arms, and said brace arms secured to said arms at a point spaced from the axis of said shaft.

3. A sewer cleaning device comprising a pair of spaced parallel frame members, upwardly and forwardly extending rear extremities on said frame members, said rear extremities on said frame members terminating in spaced parallel supporting ends, a transmission mounted on said parallel supporting ends, a motor connected to said transmission to drive the same, a short shaft projecting from said transmission, a rotatable reel secured to said short shaft closely adjacent said supporting ends, said reel having an axle hub parallel to said frame members, a series of arms projecting outwardly from said hub, feet on the outer extremities of said arms, said feet parallel to the axis of said hub, intumed projecting ends on said feet parallel to said arms, a series of brace arms, said brace arms extending within said reel from said hub to said arms at a point spaced from the axis of said hub, upwardly extending forward ends on said frame members, said forward ends supporting a bearing coaxial with said reel, and a curved hollow tube journaled in said bearing and extending into the interior of said reel.

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