

[54] **SEWER AUGERING MACHINE**

[72] Inventors: **Lee H. Silverman; Arthur A. Silverman; Edward T. Gaworski**, all of Pittsburgh, Pa.

[73] Assignee: **General Wire Spring Company**, Pittsburgh, Pa.

[22] Filed: **Jan. 6, 1971**

[21] Appl. No.: **104,242**

[52] U.S. Cl. **15/104.3 SN**

[51] Int. Cl. **B08b 9/02**

[58] Field of Search **15/104.3 R, 104.3 SN; 242/54**

[56] **References Cited**

UNITED STATES PATENTS
2,661,489 12/1953 Rudolph et al. **15/104.3 SN**

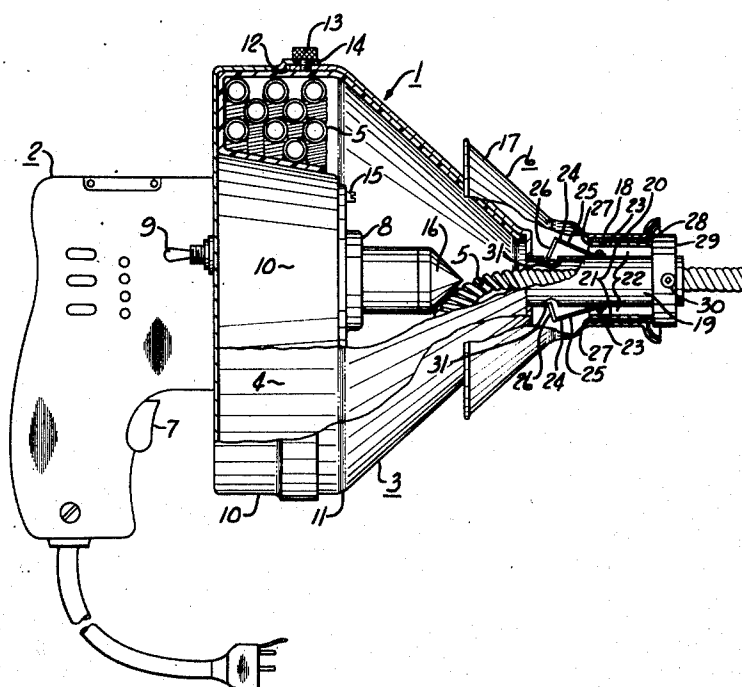
2,685,097 8/1954 Allen **15/104.3 SN**
3,268,937 8/1966 Bollinger **15/104.3 SN**

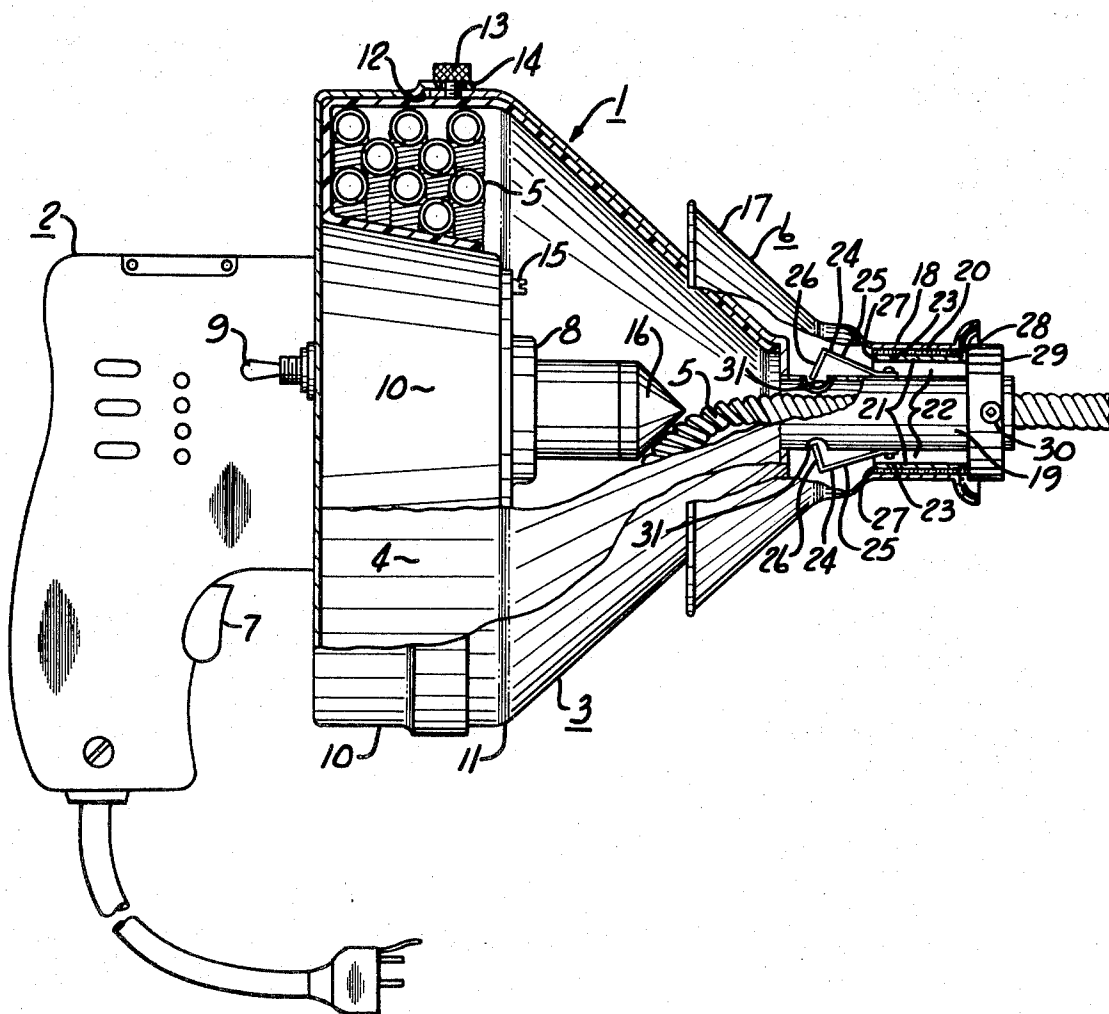
Primary Examiner—Edward L. Roberts
Attorney—Carothers and Carothers

[57] **ABSTRACT**

A plumber snake apparatus for cleaning pipes with a plumber snake wherein a changeable snake cartridge with a snake coiled therein is removeably housed in a cartridge housing. A handgrip is provided at the forward end of the housing for gripping the tool as the snake within the pipe being cleaned is rotated with the housing. Upon rearward axial displacement of the handgrip a chuck is automatically actuated to grip the snake and prevent further axial feed.

10 Claims, 1 Drawing Figure





INVENTORS.
 LEE H. SILVERMAN,
 ARTHUR A. SILVERMAN &
 EDWARD T. GAWORSKI
 BY
 CAROTHERS & CAROTHERS
 THEIR ATTORNEYS

SEWER AUGERING MACHINE

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates generally to conduit cleaning devices and more particularly to apparatuses for driving plumber's snakes.

2. Discussion of the Prior Art

Power driven snakes, due to foreign use, generally comprise a reversible motor having a rotatable drive member at its forward end which receives and secures with a snake drum having a snake coiled therein. These drums are removable and one may normally select a different drum for a different task as each drum may contain a different diameter snake for a particular cleaning purpose.

However, the construction of these drums is relatively expensive as they must be specifically keyed and adapted at their rearward end for the securement to the drive member, and their forward end must also be especially adapted with a relatively expensive type of mount in order to receive a grip with which the operator may grasp the tool. These grips may also have a chuck mounted therein to engage the snake or cable passing therethrough. These chucks are normally operable by twisting a sleeve member or squeezing a trigger. As such, these chucks are either relatively intricate in operation and, therefore, expensive as in the latter mentioned trigger type, or rather awkward to operate as by twisting a collet with the same hand with which the operator is attempting to hold the forward end of the device (as is the situation with the first mentioned chuck).

Therefore, if many different type selections of drums are desired, either for the purpose of connecting successive snakes as they are fed into a conduit or sewer line, or for the purpose of having the versatility of interchanging different diameter snakes, the drums of the prior art are relatively expensive because of their special requirements as to their forward and rearward connection adapters. Therefore an accumulation of these drums is undesirably expensive. Furthermore, each time a drum is changed, not only must the old drum be removed and the new one mounted to the drive member, but also, the chuck which is secured to the forward end of the drum must, in each instance, be removed and resecured to the new drum thereby requiring additional expenditure of time for part assembly which could be more fruitfully applied to the task to be accomplished.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide a plumber snake apparatus which eliminates the foregoing disadvantages and provides an inexpensive snake cartridge which does not have to be especially adapted for driving engagement with a drive member and does not have to have a special mounting arrangement at its forward end for engagement with a chuck for the gripping of the spring or snake being fed from the forward end of the cartridge, thereby providing a much less expensive means of permitting the operator to have a better selection and more numerous selection of plumber's snakes at a low cost not heretofore possible and requiring only one operation for attachment to the drive member without the additional requirement

of reattaching a chuck gripping member at the forward end of the drum each time a drum change is made.

The plumber snake apparatus of the present invention comprises a snake cartridge having a flexible snake coiled therein. A housing is secured to a rotatable drive member for rotating the same and is provided with a forward axial opening for the passage of the flexible snake. Access means is also provided in the housing for the insertion and removal of the snake cartridge which may be removably positioned in the housing for rotation therewith and has an axial opening at its forward end which is aligned with the forward housing opening for the passage of the flexible snake.

The housing is preferably provided at its forward end with a tubular spindle projecting therefrom axially of its forward opening. A tubular handgrip coaxially overlies this spindle and a bearing means is positioned between the grip and the spindle to permit relative axial and rotational movement therebetween. A chuck means is operable with axial displacement of this grip to clamp the snake passing through the spindle.

The snake cartridge may be molded of an inexpensive plastic which is retained in fixed relationship for rotation with a housing merely by the exertion of the housing pressing against the plyable plastic as the molded cartridge generally conforms to the interior shape or contour of the housing. Thus, the molded cartridge is very inexpensive, requires no extra adaptations for mounting to the drive member or for the mounting of a handgrip, and does not have to be made as heavy duty as the replaceable drums of the prior art.

The chuck means preferably comprises an opening in the tubular spindle with a spring jaw member having a flexible spring arm connected at one end to the outside of the spindle and extending outwardly therefrom and ending in a jaw head which extends over the opening for passage therethrough into the spindle to engage the spring or snake when the spring arm is flexed inwardly. Guide means is provided in the bearing means to receive the flexible spring arm in order to force the jaw head inwardly through the opening upon axial displacement of the tubular grip. The arrangement is preferably set up so that the chuck is actuated upon rearward axial displacement of the tubular hand grip.

Other objects and advantages appear hereinafter in the following description and claims.

The accompanying drawing shows, for the purpose of exemplification without limiting the invention or the claims thereto, certain practical embodiments illustrating the principles of this invention wherein the FIGURE is a view in front elevation with portions removed for internal viewing of the plumber snake apparatus of the present invention.

Referring to the drawing, the power driven plumber snake apparatus 1 of the present invention comprises a variable speed reversible motor 2, a snake cartridge housing 3 mounted on the forward end of the motor 2 for rotation, a plastic molded snake cartridge 4 housed within housing 3 and having snake 5 wound therein, and a forward tubular handgrip 6 housing a collet chuck therein for engagement of the snake 5 upon rearward displacement of the tubular handgrip 6.

Referring again to the variable speed motor 2, it is actuated by trigger 7 which varies the rotational speed of the forward housing mounting means 8 according to the degree of depression.

A reversing switch 9 is mounted on a stationary portion of the motor housing and permits reversal of the direction of rotation of the housing 3 and consequently the snake or snake spring 5.

The housing 3 is provided with a rear portion 10 and a front portion 11. The conically shaped front portion 11 has its annular rearward end received within the annular opening of the rearward housing portion 10 and seated on an annular shoulder 12.

The housing portions are temporarily secured together by means of a plurality of thumb screws 13 which are threadably received in the forward housing portion 11. The threaded stems of thumb screws 13 are permitted to slide rearwardly into forwardly open slots 14 of the rearward portion 10. Once the rearward annular opening of the housing portion 11 rests against the annular shoulder 12, then the thumb screws may be tightened in order to clamp the housings together as the undersurface area of the knurled head portion of the thumb screws 13 is larger than the width of the slots 14 and therefore bears against the outer surface of the rearward housing 10.

Rearward housing portion 10 is rigidly secured for rotational movement with the forward rotational drive member 8 of motor 2 by means of screws or bolts 15. The forward end of drive member 8 is provided with a conical head 16 which helps to guide the snake 5 for proper coiling within its plastic snake cartridge 4.

The plastic cartridge 4 may be produced by common blow mold techniques in a single operation and is contoured to fit the interior contours of housing 3. A plurality of such cartridges 4 may thus be provided, each with its own snake coiled therein, such that as a snake extension is required or a change in snake diameter is required, the cartridges may be quickly changed by removing the front housing portion 11 as previously described.

The snug fit of the plastic cartridge 4 within the housing 3 is all that is required in order to provide the necessary driving force between the housing 3 and the cartridge 4 so that the snake 5 will rotate with the housing. Thus, the pliability or flexibility of plastic is preferred for the substance of materials selected for use in the cartridge 4.

The tubular grip member 6 is provided with a rearward conical shaped shield 17 and a forward tubular handgrip portion 18 which is grasped by the operator with one hand while his other hand is manipulating the trigger 7.

It will be noticed that the forward end of housing 3 is provided with a tubular spindle 19 which extends axially from the forward opening of housing 3. This spindle is rigidly secured to the forward housing portion 11. The tubular handgrip 6 remains stationary in the hand of the operator while the tubular spindle 19 rotates with the housing 3. To permit friction free relative rotation between these two members a bushing type bearing 20, such as a bronze "oil-lite" bearing, is provided with a force fit inside the tubular portion 18 of the grip member 6 so that it will move integrally therewith.

A sleeve 21 is coaxially received within bearing 20. Thus, sleeve 21 is permitted both rotational and axial relative movement between itself and the handgrip 6.

Sleeve 21 is also provided with two axially extending key ways 22 which permit clearance for machine screws 23 which clamp ribbon spring jaw members 24

rigidly to the outside surface of tubular spindle 19. Ribbon spring jaw members 24 consist of spring arms 25 and jaw heads 26.

It can be visualized that when sleeve 21 is displaced axially in a rearward direction, the leading edges 27 of the key ways 22 will engage the spring arms 25 thereby acting as cam guideways depressing jaw heads 26 inwardly through openings 31 to engage and grip snake spring 5 to prevent relative rotational movement between the rotary drive of motor 2 and the snake 5 during operation to clean a conduit. When it is desired to either feed more snake out of the cartridge 4 into the conduit, or to return the snake from the conduit to the cartridge 4, the rearward pressure placed on tubular housing 6 is merely released and the outward spring force of spring arms 25 will urge tubular grip 6 forward again into its natural position thereby releasing the chuck to permit one to slide the snake 5 either into or out of the cartridge 4.

When the tubular grip member 6 is displaced axially in the rearward direction, the sleeve 21 will simultaneously move with it to depress spring arm 25 as the forward end of the bronze bushing 20 is provided with an annular shoulder 28 which the forward end of sleeve 21 abuts to prevent it from remaining stationary as the bearing 20 is moved rearwardly with the tubular grip 6. In order to prevent the entire tubular assembly from slipping forward entirely off tubular spindle 19, annular abutment ring 29 is coaxially received over the outer end of tube 19 and secured rigidly with respect thereto by means of the Allan set screw 30. This abutment ring 29 is of sufficient diameter to engage and abut the forward hand of grip member 6. The axial displacement of abutment member 29 may of course be adjusted to provide the desired amount of axial displacement required of tubular grip member 6 before jaw members 24 will engage the snake 5 by passing the jaw heads 26 through their respective openings 31.

We claim:

1. A plumber snake apparatus for pipe cleaning comprising a snake cartridge, said snake cartridge having a flexible snake coiled therein, a housing adapted for encasement of said snake cartridge therein and having means to rotate the same and provided with an axial opening at its forward end for the passage of said flexible snake, access means on said housing for the insertion and removal of said snake cartridge, said snake cartridge removably positioned in said housing for rotation therewith and having an axial opening at its forward end aligned with said housing forward opening for passage of said flexible snake.

2. The plumber snake apparatus of claim 1 wherein said snake cartridge is a molded plastic container which conforms to the internal shape of said housing.

3. A plumber snake apparatus for pipe cleaning comprising a snake cartridge, said snake cartridge having a flexible snake coiled therein, a housing for said snake cartridge having means to rotate the same and provided with an axial opening at its forward end for the passage of said flexible snake, access means on said housing for the insertion and removal of said snake cartridge, said snake cartridge removably positioned in said housing for rotation therewith and having an axial opening at its forward end aligned with said housing forward opening for passage of said flexible snake, a tubular spindle pro-

jecting from said housing axially of said opening, a tubular hand grip coaxially overlying said spindle, bearing means between said grip and said spindle to permit relative axial and rotational movement therebetween, and chuck means operable with axial displacement of said grip to clamp said snake passing through said spindle.

4. The plumber snake apparatus of claim 3 wherein said snake cartridge is a molded plastic container which conforms to the internal shape of said housing.

5. The plumber snake apparatus of claim 3 wherein said chuck means comprises an opening in said tubular spindle, a spring jaw member having a flexible spring arm connected at one end to the outside of said spindle and extending outwardly therefrom and ending in a jaw head extending over said opening for passage therethrough into said spindle to engage said snake when said spring arm is flexed inwardly, and guide means in said bearing means to receive said spring arm to force said jaw head inwardly through said opening upon axial displacement of said tubular grip.

6. The plumber snake apparatus of claim 5 wherein said bearing means includes a sleeve coaxially slidable over said tubular spindle, an axially extending cam guideway inside said sleeve to receive said spring arm and operable to force said jaw head inward through said opening in said tubular spindle when said sleeve is displaced rearwardly, said sleeve having antifriction rotational engagement with said tubular grip and being axially displaceable therewith, and stop means on said tubular spindle forward of said sleeve to limit the forward axial movement of said grip and sleeve.

7. A power driven conduit cleaner snake apparatus comprising: a power tool providing a rotatable drive member; a snake cartridge housing mounted on said drive member for axial rotation therewith to receive, house and rotate a snake cartridge and having an axial opening at its forward end for the passage of a snake, said housing having access means to permit the insertion and removal of a snake cartridge; a snake cartridge having a snake coiled therein and removably positioned in said housing for rotation therewith and having a forward opening aligned with said forward opening in said housing for the passage of said snake; a tubular spindle projecting from said housing axially of said opening; a tubular hand grip coaxially overlying said spindle; a bearing positioned between said grip housing and said spindle to permit relative axial and rotational movement therebetween; and a collet chuck between said grip housing and said spindle which is operable to grip said snake passing through said spindle when said grip housing is axially displaced in a predetermined direction.

8. A power driven plumber snake assembly compris-

ing: a hand power tool providing a rotatable drive member at its forward end; a snake cartridge housing mounted on said drive member for axial rotation therewith to receive, house and rotate a snake cartridge, and having an axial opening at its forward end opposite said drive member for the passage of a snake; said housing being separable into forward and rear portions to permit the insertion and removal of a snake cartridge; a snake cartridge having a flexible plumber snake coiled therein and removably positioned in said housing for axial rotation therewith and having a forward opening aligned with said forward opening in said housing for the passage of said snake; a tubular spindle forwardly projecting from said housing axially of said opening; a tubular hand grip coaxially overlying said spindle; a bearing positioned between said grip and said spindle and a sleeve coaxially received in said bearing and axially displaceable therewith and slidable on said spindle to provide relative axial and rotational movement between said grip and said sleeve; at least one jaw member between said grip and spindle and extendable through an opening in said spindle upon axial displacement engagement by said sleeve to clamp said snake passing through said spindle when said grip is displaced rearwardly.

9. A plumber snake apparatus comprising a snake housing, a snake coiled in said housing about an axis, means operative for rotating said housing about said axis, an axial opening in said housing for the passage of said snake, a tubular spindle projecting from said housing axially of said opening, a tubular hand grip coaxially overlying said spindle, bearing means between said grip and said spindle to permit relative axial and rotational movement therebetween, a spring jaw member having a flexible spring arm connected at one end to the outside of said spindle and extending outwardly therefrom and ending in a jaw head extending over said opening for passage therethrough into said spindle to engage said snake when said spring arm is flexed inwardly, and said tubular grip operable upon axial displacement in one direction to force said jaw head inwardly through said opening to clamp said snake passing through said spindle.

10. The plumber snake apparatus of claim 9 wherein said bearing means includes a sleeve coaxially slidable over said tubular spindle, an axially extending cam guideway inside said sleeve to receive said spring arm and operable to force said jaw head inward through said opening in said tubular spindle when said sleeve is displaced rearwardly, said sleeve having antifriction rotational engagement with said tubular grip and being axially displaceable therewith, and stop means on said tubular spindle forward of said sleeve to limit the forward axial movement of said grip and sleeve.

* * * * *