Sept. 20, 1949. W. C. KINCAID 2,482,345

APPARATUS FOR CLEANING DRAINS, PIPES, CONDUITS, AND THE LIKE

Filed Feb. 28, 1946

Fig. 1.

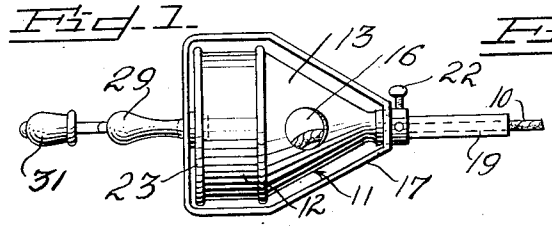
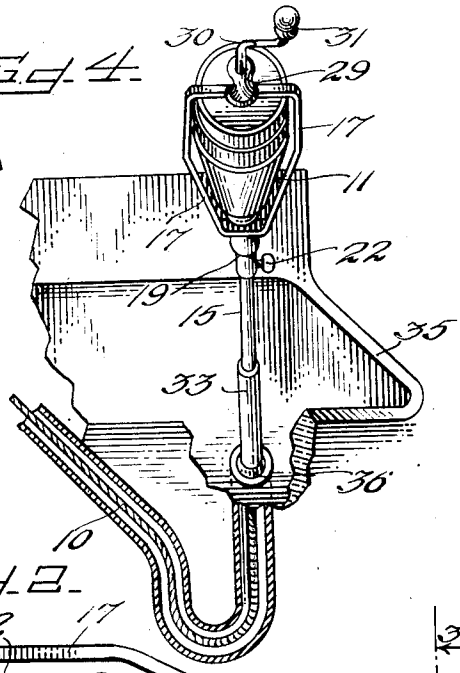


Fig. 4.



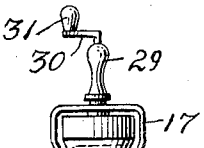


Fig. 5.

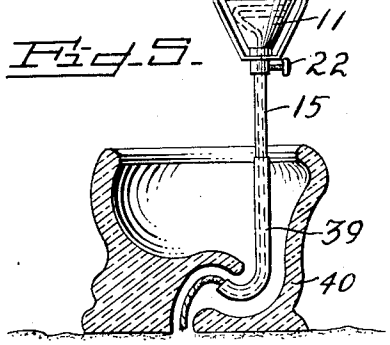


Fig. 2.

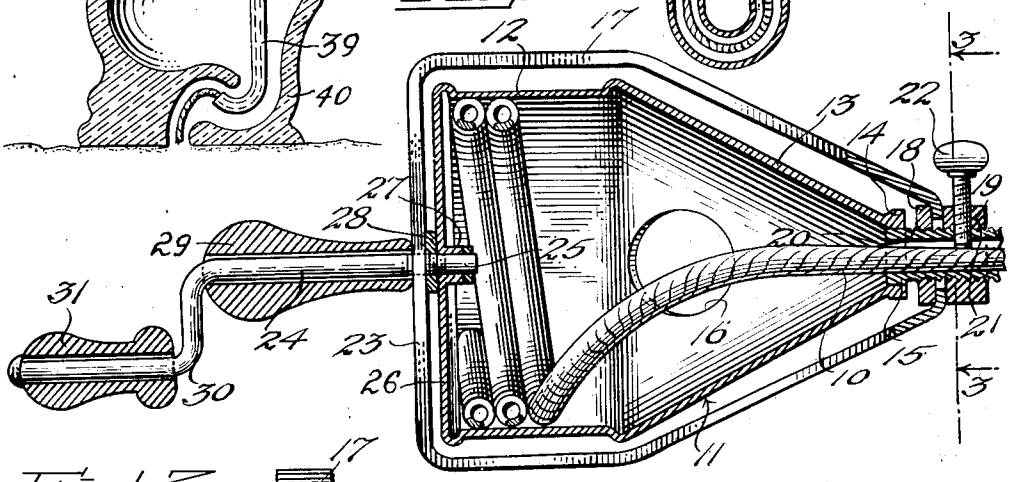
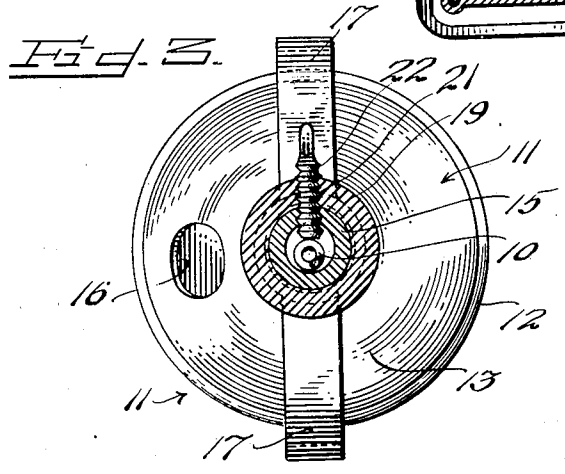


Fig. 3.



Inventor

WALTER CAMERON KINCAID.

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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APPARATUS FOR CLEANING DRAINS, PIPES, CONDUITS, AND THE LIKE

Walter Cameron Kincaid, Pueblo, Colo.

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3 Claims. (Cl. 15—104.30)

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This invention relates to drain cleaners, drain broaches and similar cleaning apparatus using a specially wound spring cable, sometimes called a plumber's snake, which is rotated and pushed forward or withdrawn to perform the cleaning operation. Apparatus of this type, comprises a container for storing the cable in coiled form and means for rotating the same, the latter means being, connected with the former, so that the cable is rotated by rotating the container. This construction is simple but has very serious drawbacks. When the cable is rotated by power applied to the container difficulties in handling the tool and especially difficulties in keeping the cable and the container rotating as a unit always develop. When the means for clamping the cable and the container, however, fail to rotate the cable conjointly and uniformly work the container, the cable in the container is strained and kinked whereby operation is delayed, this leads to a rapid destruction of the cable.

The invention has for its object to provide an apparatus of the above described type in which the cable cannot be strained or kinked whatever the operational conditions may be and which, while being of the same simplicity as other apparatus, permits easy handling in whatever position it may be applied.

This object is attained according to the invention by dissociating the means for rotating the cable during operation from the container and by providing separate means for such rotation while the container itself is freely rotatable and therefore permits free and unrestrained self-adjustment of the cable.

Further objects of the invention consisting in improving some further features of cable or snake operating devices and these apparatus in general will be apparent from the following detailed specification.

The invention will be more fully understood when described with reference to specific modifications. These modifications, however, are merely examples which are intended to illustrate the inventive idea. They are not to be interpreted as limitative. The following specification describes and the accompanying drawings illustrate the invention in such a way that the principles employed will be clearly understood and these principles may, obviously, be applied by the expert skilled in the art in such a manner as to produce other embodiments of the invention. However, these other embodiments as they have been clearly foreshadowed by the present specification and as they use the same principles of

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construction, which are defined in the annexed claims do not constitute a departure from but form a part of the essence of the invention.

In the accompanying drawings:

Figure 1 is an elevational view of one embodiment of the invention.

Figure 2 is an elevational sectional view of the apparatus on an enlarged scale.

Figure 3 is a sectional elevational view of the apparatus when looked at from the outlet side of the cable, the section being taken along line 3—3 of Figure 2.

Figures 4 and 5 are partly sectional views illustrating the application of the modification shown in Figures 1 to 3, Figure 4 being a perspective view illustrating the cleaning of a sink or wash basin, while Figure 5 is an elevational view illustrating the cleaning of a toilet bowl.

In the modification shown in Figures 1–3 the spirally wound cable 10, frequently called "snake" or "plumber's snake" is held within a container or cage 11 which may accommodate a substantial length of the cable and which, as customary, consists of a cylindrical portion 12 housing the windings of the cable and in a funnel-shaped conical or truncated portion 13, whose end portion 14 surrounds and turns freely on the guiding tube 15 for the cable 10. No guide or drum arranged within the cage or container 11 is necessary to cause coiling of the cable in the interior of the cage as the latter when passing through the central opening at the end of the funnel shaped portion of the cage 11 coils automatically at the other end.

The truncated portion of the cage is provided with window openings 16 permitting inspection, cleaning and lubricating of the cable when coiled. A cleaning cloth and/or a cloth holding some lubricant is passed through said opening after use to prevent rusting of the cable when not in use.

Surrounding the cage 11 is a frame 17 consisting of a band, iron or the like and whose shape conforms itself to that of the cage. This frame is held fixedly on the guide tube 15 by means of nuts 18, 19 engaging a screw threaded portion 20 of the guiding pipe and clamping the frame firmly between them. The frame 17 is thus firmly joined to the guide tube 15.

A screw threaded radial hole 21 is provided in the guide tube 15 and, if necessary, in the nut 19, into which a winged screw bolt 22 is inserted. The latter cooperating with the guide tube acts as a clamping device for the cable which may thus be solidly fixed to the frame and tube and

is compelled to rotate with it, when the bolt **22** is screwed down and bears against the cable.

On the opposite end of the frame **17** a cross piece **23** closes the same and carries a crank which is centrally mounted on it so that the axis of the crank coincides with the axis of the guide tube **15**. The crank consists of a central axle **24** whose end portion is screwed into the frame **17** and is held thereby a nut **28**. The axle **24** is provided with a short stub shaft portion **25**, projecting towards the outlet end of the cage which serves as a support or bearing for the sleeve **27**.

The axle **24** of the crank is surrounded by a freely rotatable hand piece **29** which is grasped by the operator and which secures a firm central grip in a line passing through the center of gravity of the arrangement. When held in a vertical or almost vertical position as is the case with most jobs to be performed by this type of apparatus the gravitational pull acts lengthwise and is, therefore, taken up easily by the operator. When the apparatus has to be held in an inclined or in a horizontal position, this being a more infrequent case, the torque due to the gravitational force is not very large, as the gravitation center will always be close to the front side of the cage where the cable is coiled, and the lever arm measured from said center to the nearest point gripped by the operator is therefore short.

The crank **30** itself is arranged at the other end of the axle **24**. It may simply consist of a bent portion of the rod forming the axle. It is preferably also provided with a rotatable sleeve **31** acting as a hand piece.

It will be observed that when the hand piece **29** is gripped by one hand of the operator and is firmly held while the crank is turned by the operator's other hand, the axle **24** will rotate together with the frame **17** and the guiding pipe **15**. When the clamping screw **22** has been applied the cable **10** will rotate with the guide tube. The cage **11** will also rotate along with the cable. However, the rotation of the cage is not entailed positively. The cage may rotate freely on the stub shaft **25** and on its ends **14** and is therefore unable to twist or kink or otherwise strain the cable **10**. The latter is thus held merely at the point where the clamping screw **22** fixes it to the guide piece, while the entire length of the cable is free and may therefore adjust itself freely and completely in accordance with the position which is given to the fixed point.

The application of the device for the cleaning of a sink or wash basin **35** is illustrated in Figure 4. The device is provided with a straight telescoping guide tube **33** adapted to slide on guide tube **15**. The tube **33** is set upon the upwardly directed drain opening **36** of the sink or basin. The operator pulls out a sufficient length of the cable, introduces it into the drain pipe through the drain opening and holds the device in a vertical position above the drain opening by means of hand piece **29**, with the telescoping guide tube **15** and **33** drawn out to full length. The operator then turns the crank **30** with the other hand, thus rotating the cable **10** within the pipe. At the same time by pressing downwardly on the apparatus he makes the guide tubes telescope into each other and thus advances the cable **10** slowly for the length of the guide tube. When the tubes **15** have completely slid into each other and the operator feels that he has cleaned the stretch he loosens screw **22**, pulls out a fresh length of cable, slides tube **33** away from tube **15**, tightens screw **22** again and repeats the operation, thus cleaning a further stretch. The operation thus continues until the cleaning of the drain pipe is finished.

Whatever resistance the cable **10** may meet no straining or kinking of the cable may occur as the rotation of the cable does not start in the coils but only at a point where the cable is already straight. The torsion of the cable is moreover limited and cannot go beyond a safe amount.

Figure 5 shows a similar cleaning operation which is, however, performed with a curved telescopic guide tube **39** such as is to be used where the drain pipe is curved, the best example being the bowl of a toilet, as shown at **40**.

The operation is very similar to that described so that it need not be specially described. It is, however, to be noted that in this case the strain on the cable is very heavy as it has to rotate within the curved guide and if permitted to go back to the coils the cable is frequently distorted and damaged or at least badly kinked. With the described apparatus, however, no torsional forces are transmitted to the cage or to the cable stored in the cage and if the torsion is very heavy, the cable will slip in the clamping device. Behind such device, however, the cable when slipping through the clamping device will only coil or move the cage within the frame without producing any damaging effect.

The modification, described, gives the operator a good "feel" as regards the functioning of his broach. This "feel" gives notice when the cable reaches the stoppage and an operator will thereby be able to find when the maximum load has been put on the cable. This "feel" enables the operator to exercise his judgment as regards the steps which should be undertaken during the work, whereby a successful performance of the cleaning work is facilitated and a saving of time and greater care for the equipment results.

It will be understood that the main improvement according to the present invention consists in providing a freely rotatable cage and a telescoping guide tube, the rotation of the cable being taken care of without using the cage for this purpose and without coupling it in any way with the rotational movement given to the cable. My invention may, therefore, be realized also by using means other than those specifically described.

I claim:

1. In an apparatus for cleaning drainage pipes in combination, a cable, a partly cylindrical and partly funnel shaped cage for the same, said funnel shaped cage being provided with a central bore for the passage of the cable from the interior of the cage, a guide tube near the end of the funnel shaped portion of the cage, means for supporting the funnel shaped end of said cage for free rotation on the end of said guide tube, a clamping device on said guide tube for clamping the cable to the same for rotation of the latter together with the former, a framework surrounding the cage, fixedly connected with said guide tube, means for rotating said framework and guide tube including a hand operated crank arranged on a shaft, having an axis of rotation coincident with the axis of the guide tube and axis of rotation of the cage, having an inwardly projecting end, and means for supporting the cylindrical part of the cage for free rotation on said shaft end.

2. In an apparatus for cleaning drain pipes, a cable, a partly cylindrical and partly conical cage

for the same, a guiding tube surrounding the cable, a framework surrounding the cage, provided with an inwardly projecting supporting member at one end and connected with said guide tube at the other end, means for supporting said cage for free rotation on said inwardly projecting member and said guide tube and a clamping device for gripping said cable carried by said guide tube.

3. In an apparatus for draining pipes in combination, a partly cylindrical and partly funnel shaped cage for the same, a frame surrounding said cage provided with an inwardly projecting member at one end, a guide tube surrounding said cable, fixedly attached to said frame, having a portion projecting inwardly into said frame, means for supporting said cage for free rotation on said inwardly projecting guide tube portion and frame member, means associated with said guide tube for clamping said guide tube to said cable for rotation in common, and crank means provided with a plurality of handles, including a shaft axially aligned with the axis of the guide

tube and a crank eccentrically arranged with respect to said shaft, the latter connected with said framework and thus to the guide tube for rotating said cable and guide tube around the axis of the latter.

WALTER CAMERON KINCAID.

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