April 21, 1936. J. J. FLAVIN 2,038,170

TOOL FOR USE IN PIPES

Filed May 24, 1935

Fig. 1.

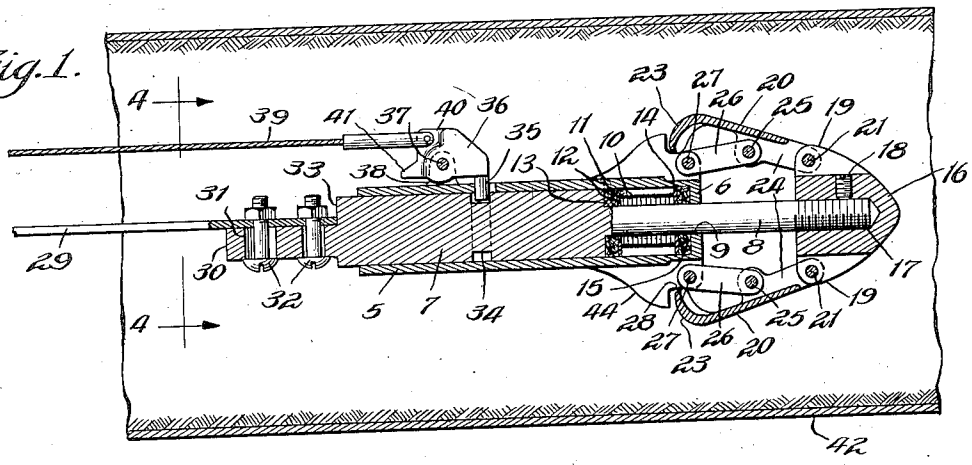


Fig. 2.

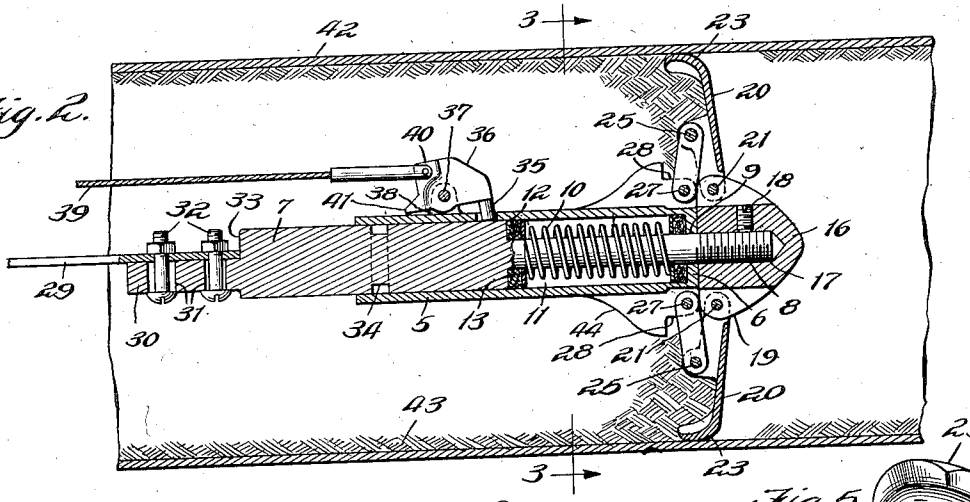


Fig. 4.

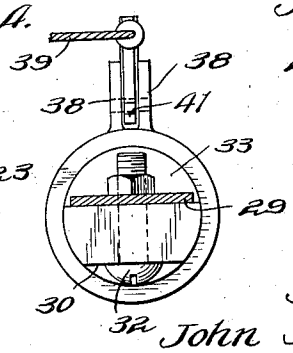


Fig. 5.

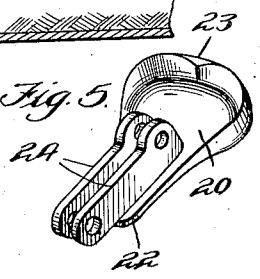
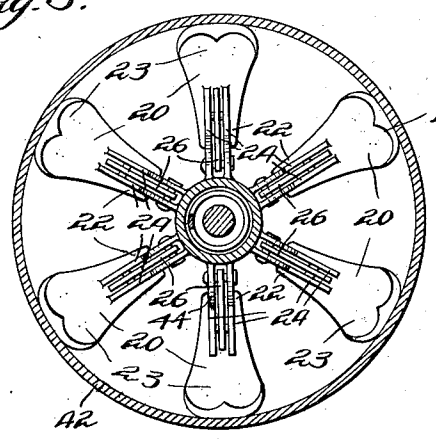


Fig. 3.



Inventor
John J. Flavin

By Glenn S. Noble
Atty.

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2,038,170

TOOL FOR USE IN PIPES

John J. Flavin, Chicago, Ill.

Application May 24, 1935, Serial No. 23,150

10 Claims, (Cl. 15—104.30)

This invention relates particularly to tools or cleaners adapted for various uses but particularly intended for cleaning sewers. Sewers are frequently choked up or obstructed with various and sundry deposits or obstructions and heretofore the methods of cleaning the same have not been satisfactory.

The present invention provides means for pulling out or removing such deposits from the sewer pipes and also for locating breaks or other damaged portions of the sewer.

Other objects of the present invention are to provide an improved pipe cleaner which is adapted to negotiate the ordinary curves used in sewer construction and to draw or pull out deposits in the sewer pipe; to provide a pipe cleaner having an automatically expanding head for engagement with the material to be drawn from the pipe; to provide means for locating breaks or damages in sewer pipe; to provide an improved tool for cleaning sewer pipes or drain pipes; to provide a tool for the purposes indicated having an operating head which may be locked in collapsed position for insertion in a pipe and may then be released to permit expanding of the same for retraction and cleaning of the pipe; to provide a tool adapted to be mounted on a sewer rod for cleaning and trouble detecting purposes; and to provide such other improvements in construction and advantages in operation as will appear more fully hereinafter.

In the accompanying drawing illustrating this invention,

Figure 1 is a longitudinal sectional view of a pipe and tool with the tool shown in collapsed or inserting position;

Figure 2 is a similar view showing the tool in expanded or cleaning position;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a sectional view taken on the line 4—4 of Figure 1; and

Figure 5 is a detail of one of the cleaning spoons or scoops.

My improved tool comprises a cylinder or tubular casing 5 having a cap or closure 6 at one end which is preferably cast or formed integrally with the cylinder. A slide or piston 7 is mounted in the cylinder and is adapted to slide freely therein. The piston 7 has a reduced extension or rod 8 which may be attached thereto but which is preferably formed integrally therewith and which extends through a hole or bearing 9 in the end 6. The piston is normally urged toward opening position by a compression spring 10 which is mounted in the chamber 11 between the piston and the end of the cylinder. One end of the spring abuts against a washer 12 which presses against a felt or packing washer 13 which engages with the end of the piston and is adapted to make a tight closure between the same and the cylinder. The other end of the spring engages with a washer 14 which coacts with a packing washer 15 to make a tight closure between the rod or extension 8 and the end of the cylinder as will be readily understood from Figures 1 and 2. The chamber 11 is preferably packed with grease or lubricant to lubricate the parts and also to prevent water from entering the cylinder.

The operating head includes a penetrating point or nose 16 which is preferably tapered as shown and which is secured to the outer end of the rod or extension 8 in any convenient manner as by being threaded thereto as shown at 17 and being further held by a set screw 18. The nose 16 has a plurality of bearings 19 to which are pivotally connected the cleaning scoops or spades 20 by means of pivots 21. These spade or scraper elements are preferably shaped substantially as shown in Figure 3 with relatively narrow forward or shank portions 22 or widened or spoon-like rear portions which terminate in curved ends 23, the extreme portions or edges of which are preferably turned inwardly a sufficient amount so that they are not apt to engage with or be caught upon any slight obstructions or joints in the pipe, this being an important feature in the operation of the device. The spades or scrapers 20 have longitudinal ribs or links 24 to provide for the pivots 21 and also to provide central bearings for pivots 25 which engage with links 26. The opposite ends of these links are pivoted at 27 to bearings or lugs 28 extending radially around the end of the cylinder 5, thus forming toggle-like connections between the cylinder and the nose 16. The cylinder may be provided with radial guide or protecting lugs 44 to facilitate withdrawing same.

The tool is adapted to be mounted or fastened to the end of a sewer rod 29 which may be of any ordinary or preferred kind but which usually comprises a flat strip of ribbon or steel such as commonly used for this purpose and which is readily bent or flexed in one direction in order to pass around curves. While it may be secured to the rod in any desired manner I have shown the piston 7 as being provided with a rearwardly extending projection 30 which is flattened to engage with the rod and which has holes or slots 31 for the fastening bolts 32, the arrangement

being such that the tool may be readily secured to the end of the rod which is perforated to receive the bolts and the end of the rod may abut against the shoulder **33** at the end of the cylinder.

In order to hold the cleaning head in closed or collapsed position I provide manually controlled means for distant control of the same. In the particular arrangement shown the piston or slide **7** has an annular groove or recess **34** which is adapted to be engaged by a catch or stop **35** for holding the same in fixed position in the cylinder. The stop extends through a hole in the side of the cylinder and forms a part of one branch of a bell crank lever **36** which is pivoted or fulcrumed at **37** in a bearing **38** on one side of the cylinder. A wire or cable **39** is connected to the other branch or arm of the bell crank lever at **40** for swinging the lever to withdraw the catch from operative position. The lever is preferably provided with a projection **41** which is adapted to engage with the cylinder to limit the swinging movement of the lever.

In using my improved tool, the head is preferably inserted in a sewer pipe or other pipe **42** to be cleaned, with the scrapers in folded or retracted position as shown in Figure 1. The parts are held in this position by means of the stop or catch **35** which is in engagement with the piston. The tool is pushed in by means of the sewer rod and will ordinarily slide in on the lower surface of the pipe although for convenience it is shown as being centrally located, which might be its position if sufficient sediment or coating were in the pipe. The tapered or pointed form of the tool as a whole assists in shoving the same through any sediment or coating within the pipe. When the tool has been inserted a sufficient distance, which will preferably be limited, as for instance two or three feet, depending upon the nature of the deposit in the pipe, the rod **29** is held stationary and the wire or cable **39** is pulled to withdraw the catch **35**. This permits the spring **10** to move the cylinder **5** forwardly as shown in Figure 2 to expanded or cleaning position, at which time the scrapers or spades **20** will project radially into engagement with the material in the pipe so as to be in position to engage therewith when the tool is withdrawn. Then by pulling out on the rod **29** the deposits on the wall of the pipe, such as shown at **43**, or other solid material, may be readily scraped out as will be understood by those familiar with the art. After the first section has been cleaned the head is again collapsed and inserted a further distance in the pipe and expanded and withdrawn and another section cleaned, and thus the operation is continued until the work is completed. It will be noted that the flexibility of the sewer rod and the draw wire or cable **20** is such that the tool may be used in a large variety of places and under different conditions.

Should the scrapers in their cleaning movement engage with a relatively immovable obstruction as for instance a broken section of pipe, the operator may note the location of the same by measurement of the rod which gives him definite location of such obstruction so that the tool serves for accurately locating the position of any break or obstruction and provides a detector for detecting or locating faults or impediments in the pipe. By thus definitely locating the break or obstruction the sewer may be opened at such point in order to fix the same, thus saving the labor and expense which might otherwise occur in opening a long section in order to find the obstruction. In order to pass the obstruction and withdraw the tool the operator holds tight on the wire **39** and pushes on the rod **29**, thus causing the piston **7** to be pushed into the cylinder to move the head to collapsed or entering position as shown in Figure 1, then by holding the rod or wire in such relative fixed position he may draw the head beyond the obstruction and then release the tension on the wire which permits the spring **10** to move the parts of the head to open or cleaning position as shown in Figure 2, and continue the operation in this manner.

From this description it will be seen that I provide a tool for the purposes set forth, which is simple in construction and which is particularly durable and efficient in operation. While I have shown a preferred form of my invention it is obvious that changes may be made in the arrangement of the parts or details of construction in order to adapt it for use with different pipes or for different conditions, as for instance instead of having the scrapers formed integrally with the toggle or link members connecting the cylinder and nose, such scrapers may be otherwise attached or connected with such toggle members. Therefore, I do not wish to be limited to the particular construction herein shown and described except as specified in the following claims, in which I claim:

1. The combination with a sewer rod, of an expansible and contractible cleaning head, resilient means coacting with the head for expanding the same, locking means on said head for maintaining said head in its contracted position against the tendency of said resilient means to open the same, and manually operable means coacting with the rod for releasing said last named means to permit said resilient means to become operative, said manually operable means extending and being adapted to be controlled outside of the sewer to be cleaned.

2. The combination with a rod, of an expansible and contractible head for cleaning pipes, resilient means tending to hold the head in expanded position, means for fastening the head in contracted position, and manually operable means for releasing the fastening means to permit the head to expand.

3. The combination with a sewer rod of the character indicated, of a piston secured to the rod, a pin projecting from said piston axially at the forward end thereof, a nose secured to the free end of said pin, a cylinder enclosing said piston, toggle arms pivotally connected with the nose and cylinder, scrapers carried by said arms, a spring in said cylinder tending to draw the nose toward the cylinder to extend the toggles, a catch on said cylinder for holding the piston with the toggles in retracted position, and a flexible member connected with the catch and extending along the rod for releasing the catch.

4. A tool for the purposes set forth, comprising a cylinder having a bearing at one end thereof and open at the other end and having a hole in the side thereof, a slide mounted in the cylinder secured to the free end of an operating rod in substantial axial alignment therewith and having a recess therein, a pin connected with the slide and extending outwardly through said bearing, a pointed lead member secured to the free end of said pin, toggles pivotally connected with the bearing and said lead member, scrapers connected with the forward toggle members, a compression spring interposed between the slide and the bearing, a lever pivotally connected with the

cylinder adjacent to the outer surface thereof, a catch on said lever projecting through said hole in the cylinder and adapted to engage with said recess in the slide, a projection on the lever to limit the movement thereof, said lever being connected with a cord for swinging the same to withdraw the catch.

5. The combination with a sewer rod, of a piston, a cylinder engaging with the piston carried by said rod at one end thereof, a bearing at one end of the cylinder, said cylinder being open at its other end, another rod connected with the piston and at the free end thereof extending outwardly through the bearing, a nose secured to the outer end of said other rod, said piston other rod and nose all being coaxial and extending forwardly of said sewer rod, toggle arms pivotally connected with said bearing and with said nose, substantially spoon shaped cleaning members coacting with the toggles, a spring between the piston and the bearing tending to move the piston to draw the rod inwardly, a catch on the cylinder engaging with the piston for holding the piston with the toggles in retracted position, and a flexible member connected with the catch and extending along the band for releasing the catch.

6. A device as per claim 5 in which the catch comprises a bell crank lever pivotally connected with the cylinder and having a plug extending inwardly through the cylinder for engagement with the piston.

7. A device as per claim 5 in which the cleaning members have concave inner surfaces at the outer ends thereof with convex outer surfaces for engagement with the pipe and have inwardly extending longitudinal link members substantially as described.

8. In combination, a sewer rod, a slide having a recess in the side thereof, means for detachably connecting the slide with the rod, said slide having a reduced extension projecting forwardly therefrom, a penetrating nose secured to the forward end of said extension, a cylinder coacting with the slide and having a bearing in one end for said extension and having the other end open, a spring interposed between the bearing and the slide, packing washers between the spring and the slide, packing washers between the spring and the bearing, a plurality of links pivotally connected with the nose, scrapers secured to the links and projecting outwardly therefrom, said scrapers having inwardly curved ends to prevent catching in the pipe to be cleaned, links pivotally connected with the first named links and with the forward end of the cylinder, a catch mounted on the cylinder and adapted to coact with the recess in the slide to hold the slide with the spring in compressed position, and flexible means coacting with the catch and extending along the rod to provide distant control for the catch and for manipulating the position of the cylinder with respect to the slide.

9. The combination with a sewer rod, of a piston secured to the end of said rod, a cylinder enclosing said piston and having openings at both ends with a reduced forward opening as a bearing, a pin projecting from the piston through said reduced opening, a spring interposed between the reduced end and the piston tending to hold the spring in position, a penetrating point secured to the outer end of the pin, toggle links connecting the point with the outer end of the cylinder, scrapers coacting with said toggle links, a catch mounted on the cylinder and adapted to coact with the piston for holding the piston in advanced position, and a flexible member secured to the catch and adapted to extend outwardly along the rod, said flexible member providing means for releasing the catch and also providing means adapted to coact with the rod for manipulating the cleaner head from expanded to contracted position, and to permit it to move to expanded position.

10. A pipe cleaner, comprising a sewer rod, a rigid elongated member attached to the end of the rod and having its axis extending forwardly of said rod, a sleeve surrounding at least a portion of said elongated member and slidable axially thereof, a plurality of scraping members circularly disposed around the forward part of said elongated member and pivotally joined to the forward part of said elongated member, means connecting said sleeve with each scraping member, whereby upon relative movement of said sleeve and elongated member, said scraping members are expanded outwardly or contracted inwardly, said scraping members, when in expanded position, being adapted to operate over a substantially larger cross section than when in contracted position, resilient means interposed between said sleeve and elongated member tending to expand said scraping members, means carried by said sleeve for locking said elongated member when in the contracted position of said scraping members and a flexible cable attached to said locking means for tripping said last named means to permit said resilient means to become operative and for temporarily adjusting the scraping members to any desired position while cleaning.

JOHN J. FLAVIN.