Nov. 15, 1949 W. A. BUCHMILLER 2,488,490

FEEDING AND RECIPROCATING MECHANISM FOR SEWER CLEANER SNAKES

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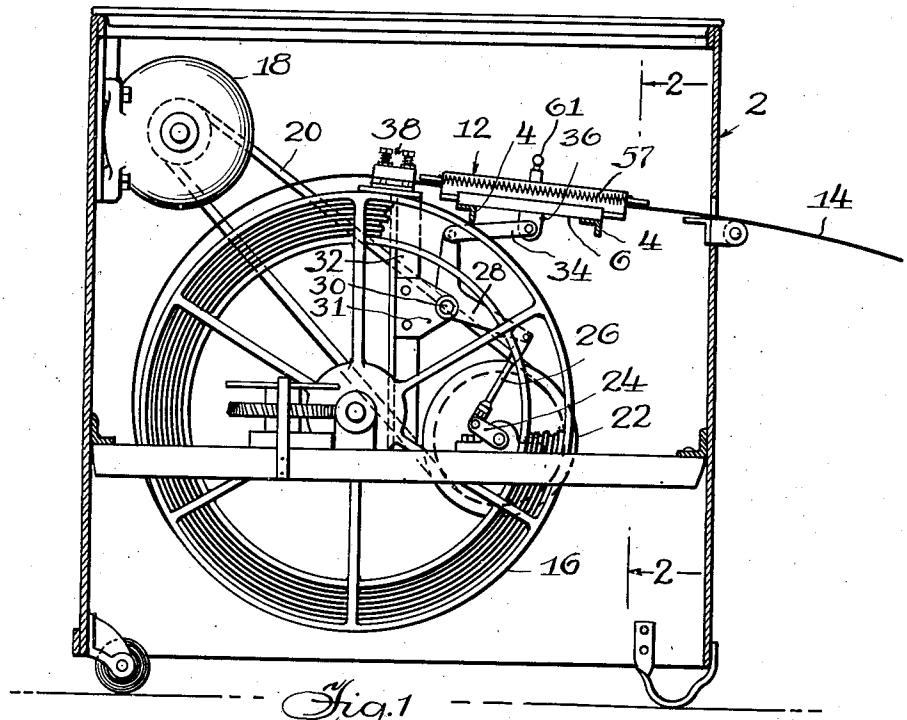

Fig. 1

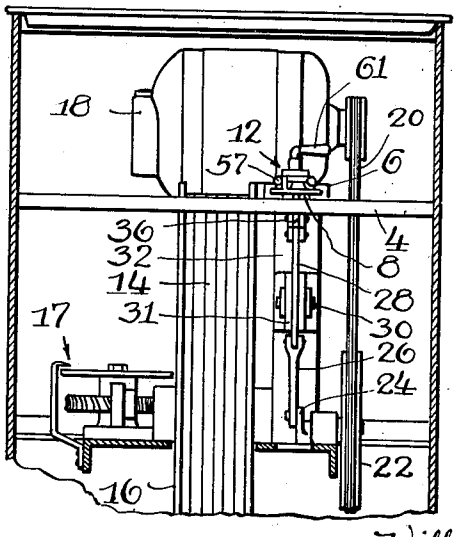

Fig. 2

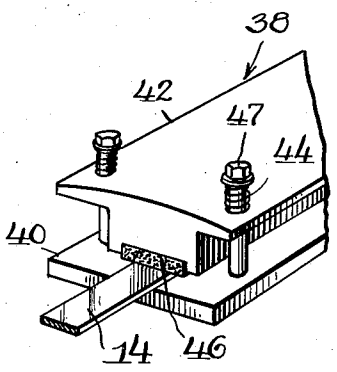

Fig. 3

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Fig. 4

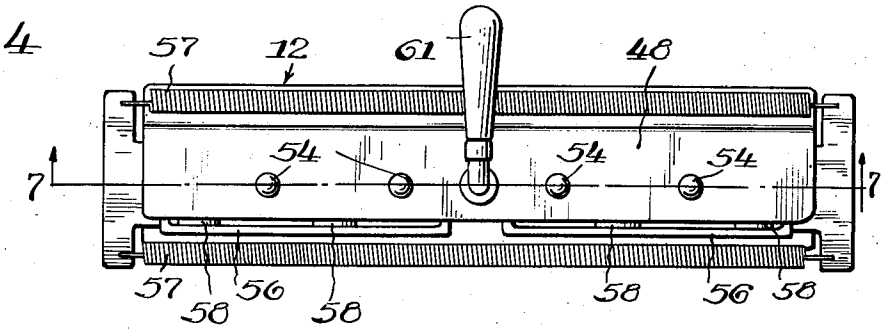


Fig. 5

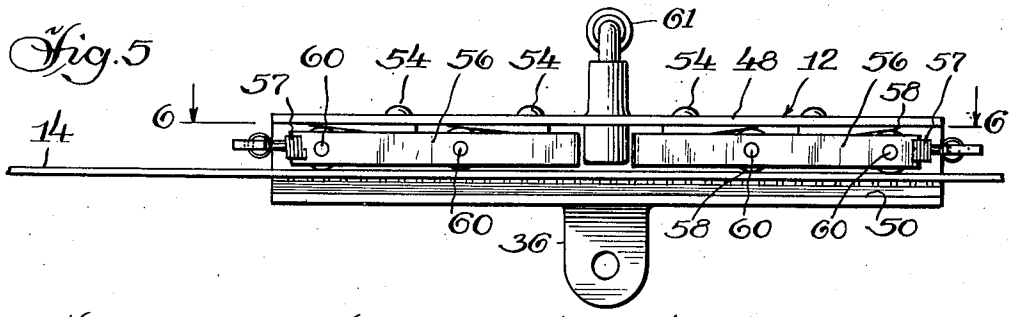


Fig. 6

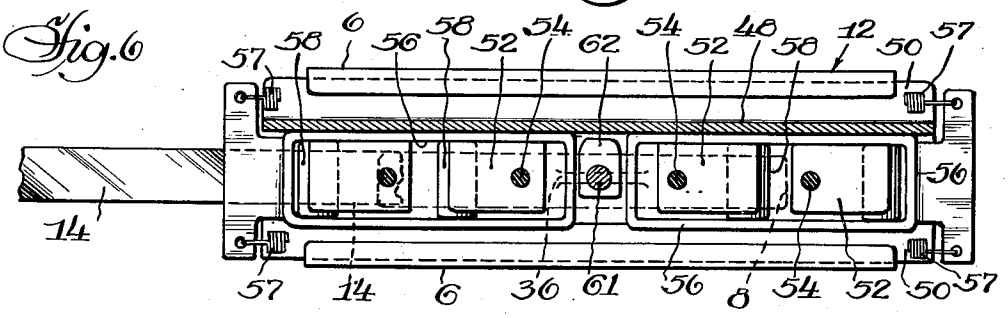


Fig. 7

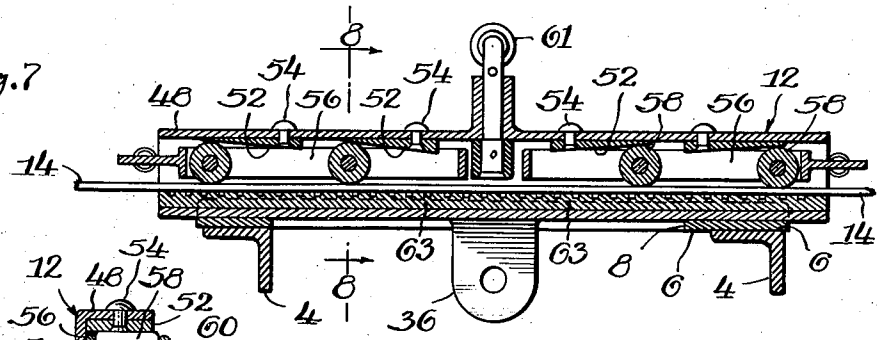
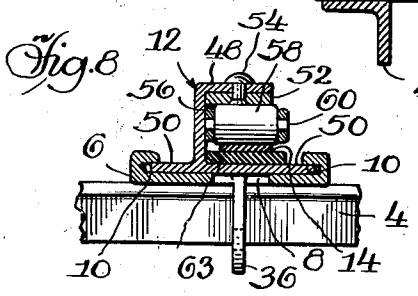


Fig. 8



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FEEDING AND RECIPROCATING MECHANISM FOR SEWER CLEANER SNAKES

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Application April 19, 1946, Serial No. 663,481

9 Claims. (Cl. 15—104.30)

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This invention relates to sewer cleaning devices and more particularly to a device wherein a flexible strap or snake is urged into a sewer to break up masses of sewage clogging the same.

A general object of the invention is to design a novel sewer cleaner device of simple and economical construction and capable of long life in service.

Another object of the invention is to design a sewer cleaner device comprising novel and improved means for feeding the snake into and out of the sewer.

Another object of the invention is to eliminate the necessity for complicated apparatus adapted to rotate the snake as the latter is urged into the sewer. This object is accomplished by providing novel means for reciprocating the snake when the latter encounters resistance due to the accumulation of masses of sewage obstructing the sewer. It has been found that by reciprocating the snake longitudinally thereof, such masses of sewage are effectively broken up without the necessity of rotating the snake by means of complicated and expensive mechanism.

Another object of the invention is to design a sewer cleaner wherein the snake is preferably in the form of an inexpensive, flat, elongated strap capable of being engaged by a simple and sturdy feeding mechanism of novel construction. In devices known in the prior art, the snakes have been constructed of round cross-section to accommodate the above-mentioned rotation thereof within the feeding mechanism, and thus complicated and expensive feeding mechanisms have been required to engage the snakes, which because of their construction have also been relatively expensive.

The foregoing and other objects and advantages of the invention will become apparent from the following specification and the accompanying drawings, wherein:

Fig. 1 is a side elevation of a sewer cleaner embodying the invention, portions of the frame and snake being broken away to clarify the illustration;

Fig. 2 is a front view of the device shown in Fig. 1, a portion of the frame being shown in section as indicated by the line 2—2 of Fig. 1;

Fig. 3 is an enlarged perspective view of the strap brake shown in Figs. 1 and 2;

Figs. 4 to 8 inclusive illustrate in detail the novel strap feeding device shown in Figs. 1 and 2, Fig. 4 being a top plan view of the device, Fig. 5 being a side elevation thereof, Fig. 6 being a sectional view taken on the line 6—6 of Fig. 5, with

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the support structure for the device being shown in plan view, Fig. 7 being a central vertical sectional view through the device and its supporting structure, as indicated by the line 7—7 of Fig. 4, and Fig. 8 being a sectional view taken in the transverse vertical plane indicated by the line 8—8 of Fig. 7.

Referring first to Figs. 1 and 2, the novel sewer cleaner comprises a frame 2 including spaced beams 4 supporting a bracket 6 secured thereto in any convenient manner as by welding. The bracket 6 comprises a slot 8 (Figs. 2, 7, and 8), and the bracket is flanged and reflanged at each side of said slot to define a guide or recess 10 (Fig. 8) adapted for engagement with a reciprocal clutch or strap feeding mechanism 12, as hereinafter described in detail.

The mechanism 12 is operatively associated with a flat snake or strap 14 stored in the frame by winding on a reel 16, which is operatively connected to a conventional device 17 for indicating the amount of strap which has been fed out from the reel.

The snake 14 is fed on and off the reel 16 by reciprocation of the mechanism 12, which is reciprocated by a motor 18 secured to the frame and operatively connected to a belt 20 for rotating the same, said belt being in driving engagement with a wheel 22. The wheel 22 is connected to an arm or rod 24 connected by a link 26 to a bell crank lever 28 fulcrumed at 30 (Fig. 1) to a bracket 31 on a column or standard 32 integrally formed with the frame 2. The bell crank lever 28 is connected by a link 34 to a lug 36 of the feeding mechanism 12, hereinafter described in detail, whereby said mechanism is reciprocated within the slot 8.

A conventional brake or friction device 38 is mounted on the frame 2 to develop friction against the strap for a purpose hereinafter described. The friction device may be of any standard design and as illustrated in Fig. 3 comprises a flat platelike member 40 mounted on the frame 2 and affording a seat for one side of the strap 14. A clamping member 42 is urged by springs 44 against the opposite side of the strap to urge a friction block or member 46 thereagainst, thereby developing friction between the strap and the members 40 and 46. The springs 44 are adjustably tensioned by bolt and nut assemblies 47 connected to the member 40.

Referring now to Figs. 4 to 8, it will be seen that the strap feeding mechanism or device 12, which is an important feature of the invention, comprises a channel-section carrier member 48,

the bottom web of which is provided with the before-mentioned lug 36 (Figs. 1, 7, and 8), said lug projecting through the slot 8 for connection to the link 34 as heretofore described. The bottom web of the carrier member 48 is provided with flanges 50 as best seen in Fig. 8 for slidable engagement with the bracket 6 within the recesses 10.

The undersurface of the top web of the member 48 is provided with spaced wedges 52 secured thereto as by rivets 54. Disposed within the member 48 between the top and bottom webs thereof are a pair of oppositely arranged yokes 56 interconnected by a pair of tension springs 57 operable to urge the yokes toward each other and toward the transverse center line of the member 48. Each yoke carries a pair of rollers 58 rotatably connected thereto as at 60 (Figs. 5 and 8) and adapted for engagement with the associated wedge 52.

Extending through the top web of the carrier member 48 is a control handle 61 fixed to a cam-like nose 62 adapted to selectively engage the respective yokes 56 to urge the rollers thereon out of engagement with the associated wedges, for the purpose hereinafter described.

It may be noted that the wedges 52 at opposite sides of the handle 61 are reversely arranged as best seen in Fig. 7, so that when the handle is in the neutral position thereof, as shown in the drawings, all of the rollers 58 are urged tightly into engagement with the associated wedges by the springs 57. Under these conditions, the strap reciprocates with the carrier member 48, inasmuch as the strap is wedged between all of the rollers and a friction member 63 fixed to the bottom web of the member 48. It will be understood that if desired the member 63 may be integrally formed with the bottom web of the member 48 or may be secured thereto in any convenient manner.

When it is desired to feed the strap 14 off the reel 16 and into an associated sewer (not shown), the handle 61 is rotated counterclockwise to engage the nose 62 with the left hand yoke 56 (Figs. 4 to 7) thus urging the rollers therein out of engagement with the associated wedges 52. Under these conditions, movement of the member 48 to the right during reciprocation thereof wedges the rollers in the right hand yoke against the strap 14 moving the same toward the right with the member 48. As the member 48 moves toward the left during reciprocation thereof, the rollers in the left hand yoke are not wedged against the strap inasmuch as they have been urged out of engagement with the associated wedge 52. Thus the strap is fed off the reel 16 at each movement of the member 48 to the right as seen in Figs. 1 and 4 to 7, during reciprocation of the device 12. The tendency of the strap to creep toward the left, under these conditions, due to friction between the strap 14 and the member 63, as well as the rollers 58, is prevented or adjustably limited by the brake or friction device 38. Thus, for example, if the strap 14 is urged four inches into the sewer at each movement of the device 12 to the right during reciprocation thereof, the brake may be adjusted to accommodate a one inch withdrawal of the strap from the sewer at each movement of the device 12 to the left during reciprocation thereof. This action has proved to be effective in breaking up masses of sewage encountered by the strap. If such masses of sewage offer extreme resistance to insertion of the strap into the sewer, the handle 61 may be rotated to the neutral position thereof whereat the strap reciprocates with the device 12 and is thus afforded a whipping action within the sewer, an action which has proved to be extremely effective in breaking up the obstructing masses.

The strap 14 is fed back onto the reel 16 by engaging the nose 62 with the right hand yoke 56, whereupon the action is the reverse of that described above.

It is to be understood that the invention is not limited to the exact embodiment of the device shown which is merely by way of illustration and not limitation, inasmuch as various and other forms of the device will, of course, be apparent to those skilled in the art, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a sewer cleaning device, a frame, a strap stored therein, and means for feeding said strap comprising an elongated hollow member moveably mounted on said frame, means for reciprocating said member longitudinally thereof, and clutch means mounted in said member for engaging said strap, said clutch means comprising spaced reversely arranged wedge surfaces in said member sloping inwardly toward the transverse centerline thereof, spaced yokes housed within said member and movable longitudinally thereof, a roller rotatable mounted within each yoke in engagement with one side of said strap and with the associated surface, the opposite side of said strap being engaged with a portion of said member, and resilient means connected between said yokes for urging the same toward said centerline, and means supported by said member between said yokes and selectively engageable therewith for urging one or the other of said yokes longitudinally of said member in the direction away from said centerline.

2. In a sewer cleaning device, a frame, a strap stored therein, and means for feeding said strap comprising an elongated hollow carrier member moveably supported by said frame, means for reciprocating said member longitudinally thereof, and clutch means mounted in said member for engaging said strap, said clutch means comprising spaced reversely arranged wedge surfaces in said member sloping inwardly toward the transverse centerline thereof, spaced yokes housed within said member and movable longitudinally thereof, a gripping member mounted within each yoke in engagement with said strap and with the associated surface, and resilient means connected between said yokes for urging the same toward each other and toward said centerline, whereby said strap is gripped between said gripping members and portions of said carrier member, and means carried by said carrier member between said yokes and selectively engageable therewith for moving one or the other of said yokes longitudinally of said carrier member, thereby moving the associated gripping member from its engagement with its related wedge surface.

3. In a sewer cleaning device, a frame, a strap stored therein, and means for reciprocating said strap comprising an elongated hollow carrier member moveably supported by said frame, means for reciprocating said member longitudinally thereof, and a pair of clutch means in said member for simultaneously engaging said strap to reciprocate the same during movement of said member in opposite directions longitudinally thereof, each of said clutch means comprising a

roller element and a wedge element engaged therewith, and resilient means urging said elements into said engagement, one of said elements of each clutch means engaging said carrier member, and the other of said elements of each clutch means engaging one side of said strap, the opposide of said strap being engaged with said carrier member, and means for selectively rendering one or the other of said clutch means inoperative, said rendering means comprising means for relieving the pressure of said resilient means against the elements of respective clutch means.

4. In a device for cleaning sewers or the like, a frame, a feeding mechanism comprising a carrier member moveably supported by the frame, means for moving said carrier member first in one direction and then in the opposite direction longitudinally thereof, wedge surfaces in said member sloping toward opposite ends thereof, a pair of yokes housed in said member and movable longitudinally thereof, roller means mounted in respective yokes for engagement with respective surfaces, arms on said yokes, tension springs connected between corresponding arms of respective yokes for urging the same toward each other and thereby urging the roller means in said yokes into engagement with the associated surfaces, a flat snake bearing on one side thereof against a portion of said member, said snake bearing at the opposite side thereof against said roller means, and means carried by said member intermediate said yokes and selectively engageable therewith for urging the roller means thereof out of engagement with the associated surfaces.

5. In a device for cleaning sewers or the like, a frame, a feeding mechanism comprising a carrier member moveably mounted on said frame, a pair of yokes housed in said member and movable longitudinally thereof, rollers mounted in respective yokes, reversely arranged wedge surfaces in said member engaging the rollers of respective yokes, and resilient means reacting against respective yokes for urging the rollers thereof against the associated surfaces, means for reciprocating said member thereby reciprocating said snake, and means on said member adjacent said yokes and selectively engageable therewith for urging the rollers thereof out of engagement with the said surfaces.

6. In a device for cleaning sewers or the like, a frame, a feeding mechanism comprising a carrier member moveably supported by said frame, means for reciprocating said member, reversely arranged wedge surfaces fixed to said member, rollers engaging respective surfaces, and resilient means for urging said rollers against said surfaces, a snake extending through said carrier member and clamped between said rollers and a portion of said member, and means for urging respective rollers out of engagement with the associated surfaces.

7. in a device for cleaning sewers or the like, a flexible snake, a reciprocating feeding mechanism operatively associated therewith, said mechanism comprising a pair of independent gripping means both normally simultaneously engaging said snake to reciprocate the same during movement of said mechanism in opposite directions respectively, a motor operatively connected to said mechanism for continuously and automatically reciprocating the same to effect a whipping action of the snake and means for selectively rendering each of said gripping means inoperative to cause said snake to move principally in one of said directions.

8. In a device for cleaning sewers and the like, a frame, a feeding mechanism moveably supported thereby, a flexible snake, said mechanism comprising clutch means for interlocking said snake therewith as said mechanism is moved in one direction during its reciprocation and other clutch means for interlocking said snake with said mechanism as the latter is moved in the opposite direction during its reciprocation, both clutch means normally engaging the snake, said first-mentioned clutch means being frictionally engageable with said snake as the mechanism is moved in said opposite direction, and said second-mentioned clutch means being fractionally engageable with said snake as said mechanism is moved in said one direction, both of said clutch means being operable at the same time to interlock the snake with respect to said mechanism, thereby reciprocating the snake with said mechanism, means for selectively rendering respective clutch means inoperative with respect to said snake to move the latter principally in one direction, motor means operatively connected to the mechanism for continuously reciprocating the same to effect a whipping action of the snake when both clutch means are operative, and means carried by said frame for developing a predetermined amount of friction against said snake independently of said clutch means to adjust the movement of said snake by friction of either clutch means when the other is inoperative.

9. In a device for cleaning sewers and the like, a frame, a rotable reel carried thereby, a flat elongated, flexible snake colled on the reel, a carrier reciprocal in opposite directions and having a pair of independent engaging means each normally engaging the snake for simultaneously interlocking said snake therewith, means for selectively rendering respective engaging means inoperative, a motor carried by the frame, and means operatively connecting the motor to the carrier for continuously and automatically reciprocating the same, whereby when one of said engaging means is inoperative, the snake is continuously fed by the carrier from the reel, and when the other engaging means is inoperative the snake is continuously fed onto the reel by the carrier, and when both of said engaging means are operative the snake is continuously reciprocated with the carrier to effect a whipping action of the snake for breaking up obstructions in the path thereof.

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