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C. B. CAPERTON
SEWER RODDING EQUIPMENT
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3,473,182

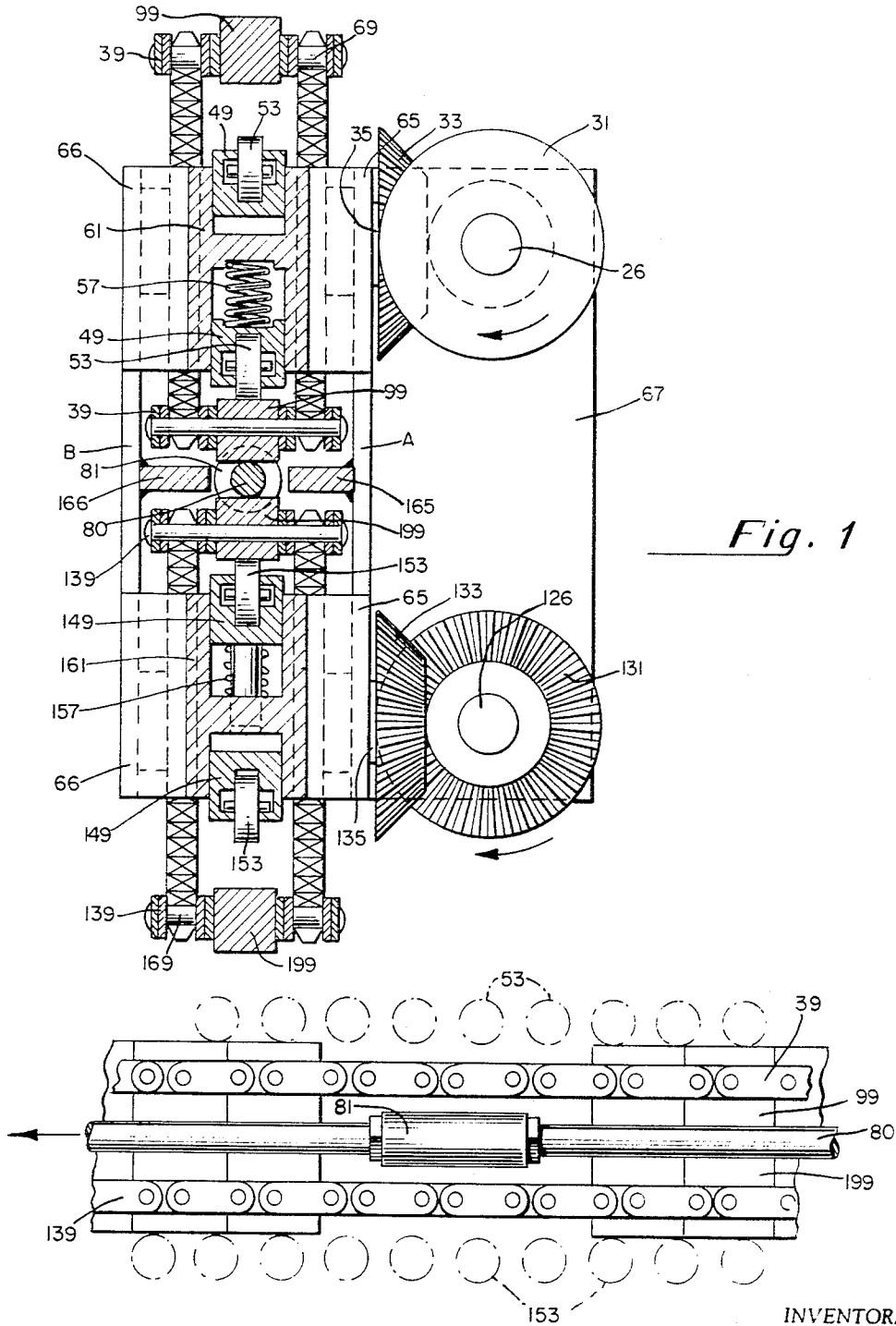


Fig. 1

Fig. 2

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3,473,182

SEWER RODDING EQUIPMENT

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Continuation-in-part of application Ser. No. 565,281,
July 14, 1966. This application July 25, 1968, Ser.
No. 747,527

The portion of the term of the patent subsequent
to Sept. 3, 1985, has been disclaimed
Int. Cl. B08b 1/02, 9/02, 1/04

U.S. Cl. 15—104.3

3 Claims

ABSTRACT OF THE DISCLOSURE

In a sewer rodding machine, pressure means squeeze the rod to prevent axial rotation thereof (relative to the squeeze means) to prevent twist from running back into the storage cage. To turn the tool into the obstruction, the squeeze means are rotated. The squeeze means are also driven in the lengthwise direction of the rod to drive the rod forwardly, or rearwardly.

CROSS REFERENCES TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 565,281, filed July 14, 1966, by Charles B. Caperton, entitled "Sewer Rodding Equipment," on which U.S. Patent 3,399,416 was granted Sept. 3, 1968.

BACKGROUND OF THE INVENTION

This invention relates to rodding equipment of the type used in cleaning and maintenance of sewer pipes, water pipes, and other underground conduits and structures. Such pipes, conduits and the like are cleared of obstructions by feeding, into the pipe, steel rod having at its foremost extremity a suitable tool for performing a particular cutting or other clearing operation. Such tool may be an auger bit, a root saw, a pick up, or any other of the large variety of tools. In order for the tool, particularly a cutting tool, to be effective it is necessary for the rod to be rotated axially.

While the rod to which the cutting tool is attached may be a continuous length of rod, in many cases it is comprised of a string of individual rods of spring steel stock coupled together by couplers.

If, as the rotating tool progresses forwardly into the pipe, an obstruction is encountered, such obstruction will oppose rotation of the tool and as a result the speed of rotation of the tool will be reduced to a speed lower than that at which the rod is being turned at the machine end. As a consequence, a torsional stress is imposed on the rod and a twist will tend to run back along the rod from the forward or tool end all the way to the coiled rod in the storage reel. This twist, if it enters the storage reel, will distort the loops of stored rod and will, particularly in the case of coupled rod, tend to cause entanglement thereof.

In my copending application, Ser. No. 565,281 referred to above, now U.S. Patent 3,399,416, I disclose means for isolating the torsional twist or stress from the coiled rod in the cage reel. Essentially, the means disclosed and claimed in my said copending application comprise means for squeezing the couplers alone, or means for squeezing both the couplers and the rod, to prevent the twist from going beyond the squeeze point. The present continuation-in-part application discloses and claims means for squeezing the rod alone.

SUMMARY OF THE INVENTION

In preferred form, the means provided by the present application for squeezing the rod alone comprise a pair of continuous loop chains mounted on the supporting

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frame for carrying squeeze blocks about a pair of loop paths. A portion of each loop path parallels the path of the rod. The squeeze blocks apply pressure on the rod in opposing directions, thus squeezing the rod between the blocks.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevational view, partly in section, of one form of squeeze drive for squeezing the rod to prevent the twist on the rod from running back into the cage reel. The squeeze drive may also be used for driving the rod in its lengthwise direction;

FIG. 2 is a side elevational view of a portion of the apparatus of FIG. 1, showing the squeeze blocks being pressed against the rod by pressure rollers.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With the exception of structural differences discussed below, the structure shown in FIG. 1 of the present application is substantially the same as that shown in FIGS. 1-6 of my copending application, Ser. No. 565,281, now U.S. Patent 3,399,416 issued Sept. 3, 1968. The view in FIG. 1 of the present application corresponds to the view in FIG. 4 of the patent. The view in FIG. 2 of the present application corresponds to that shown in FIG. 11 of the patent.

Since the structure of the present application and that of the Patent 3,399,416 issued on my copending application are substantially identical, except for the exceptions which will be discussed, the figures of drawing in the said patent, particularly FIGS. 1, 2, 3, and 5, are relied upon for disclosure, and these said figures of drawing in the patent are incorporated by reference into the disclosure of the present application.

FIG. 1 of the patent issued on my copending application is a side elevational view of the structure shown in FIG. 1 of the present application, and FIGS. 2 and 3 of my said patent show plan and perspective views respectively of the double H-frame which is also employed in the structure of the present application. FIG. 5 of the patent shows gearing for driving the H-frame rotationally and for driving the sprockets and chains.

With respect now to the structural differences between the structure shown in the present application and that shown in FIGS. 1-6 of the patent issued on my copending application, in the present application, the squeeze blocks 99 and 199 are pressed, as by the pressure rollers 53 and 153, against the rod 80 only. No squeeze blocks are applied to the couplers. The squeeze blocks 99 and 199 have surfaces, not contoured surfaces, in contemplation of the fact that the rod will frequently be bent and out of straight. The double chain 39 (which loops about an upper set of sprockets) carries the squeeze blocks 99 on cross pins 69, and a lower double chain 139 (which loops about a lower set of sprockets) carries the squeeze blocks 199 on cross pins 169. At spaced intervals, corresponding to the distance between couplers 81 on the coupled rod, the squeeze blocks 99 and 199 are omitted from the chain. In other words, the chains 39 and 139 carry groups of squeeze blocks with spaces between the groups at intervals corresponding to the locations of the couplers on the coupled rod. This is clearly indicated in FIG. 2 of the drawing of the present application. In the embodiment shown, the squeeze blocks 99 and 199 are pressed in opposing directions against the rod 80 by the pressure rollers 53 and 153 carried by the loop raceways 49 and 149, respectively. Heavy springs 57 and 157 may be installed in the H-frames to press the pressure rollers 53 and 153 against the squeeze blocks 99 and 199. Other means may, if desired, be used to press the squeeze blocks against the rod 80.

There is one further and relatively minor difference between the structures shown in the present application and that shown in my patent issued on my copending application. In the present application, the strips A and B of the H-frames are provided with side rails 165 and 166 which extend inwardly and which tend to confine and limit the allowable lateral movement of the rod 80 as it is carried through the drive. Lateral movement of the chains 39 and 139 is prevented by the strips A and B.

Referring again to FIG. 1 of the present application, the shafts 26 and 126 extend through holes in the lateral extension 67 of the end portion 65 of the H-frame, and at the ends of the shafts 26 and 126 are pinion gears, not shown in the present application but shown in FIG. 5 of my patent issued on my copending application. These pinion gears mesh with an internal spur gear also seen in FIG. 5 of my patent.

The H-frame comprises an upper H-frame 61 and a lower H-frame 161 connected together at each end by Y-portions of which Y portions 66 and 65 are seen in cross section in FIG. 1 of the present application. When the H-frame is driven rotationally, as described in my patent, the lateral extension 67 of the Y portion 65 of the H-frame is driven rotationally. The direction of rotation may be assumed to be counterclockwise, as viewed in FIG. 1 of the present application. When the H-frame rotates counterclockwise, the pinion shafts 26 and 126 also rotate counterclockwise about the axis of the machine, and this counterclockwise movement of the pinion shafts 26 and 126 causes pinions at the ends of the shafts 26 and 126 to rotate clockwise on their respective shafts. This drives the bevel gears 31 and 131 which in turn drive the bevel gears 33 and 133, thereby driving the shafts 35 and 135. Mounted on the shafts 35 and 135 are upper and lower sprockets which drive upper endless chain 39 and lower endless chain 139. All of this is described in detail in my patent issued on my said copending application.

As the upper endless chain 39 moves about its loop path, the pressure blocks 99 in the upper part of the loop move rearwardly and then downwardly, and as the blocks approach the axis of the coupled rod 80 the surface of the rod 80 will be engaged by the undersurface of the squeeze blocks 99 of the upper chain 39. In a similar manner, the opposite surface of the rod 80 will be engaged by the upper surface of the squeeze blocks 199 of the lower chain 139. At about the same time, the upper surface of the squeeze blocks 99 of the upper chain 39, and the under surface of the squeeze blocks 199 of the lower chain 139, will come into contact with the pressure rollers 53 and 153 of the upper and lower raceways 49 and 149, respectively. The upper raceway 49 will be forced upwardly compressing the heavy compression springs 57, and the lower raceway 139 will be forced downwardly compressing the lower compression springs 157. By the means just described, a heavy downward pressure will be placed on the squeeze blocks 99 of the upper chain 39, and a heavy upward pressure will be placed on the squeeze blocks 199 of the lower chain 139, thus squeezing the rod 80 between the upper and lower blocks to such an extent that rotation of the rod within the squeeze blocks is prevented.

In describing the apparatus, it has been convenient to refer to an upper raceway and a lower raceway, to an upper chain and a lower chain, to upper blocks and lower blocks, etc. However, it should be understood that these components are mounted on the H-frame which rotates about the axis of the rod, and that at a given instant the "upper" raceway may be alongside of, or below, the "lower" raceway.

The lengths of the upper and lower raceways 49 and 149 are preferably greater than the spacing between successive couplers 81, so that rod 80 on each side of a coupler 81 is squeezed by the upper and lower squeeze blocks. While heavy springs 57 and 157 have been shown to press the rollers against the blocks, and the blocks against the rod, it may be preferable, at least in certain installations, to employ adjustable screws as the pressure means, in lieu of the springs.

I have described the function of the squeeze blocks 99 and 199 in squeezing the rod 80 therebetween to prevent rotation of the rod on its own axis, thereby to prevent twist from getting back into the storage cage. It is to be understood that since the squeeze blocks 99 and 199 are carried by the endless chains 39 and 139 in the lengthwise direction of the rod 80, the squeeze blocks may also be used to drive the rod 80 in its lengthwise direction.

The apparatus disclosed may be employed for squeezing and driving continuous rod as well as coupled rod.

Having described my invention, I claim:

1. In a sewer rodding machine; squeeze means disposed along the rod path for squeezing only the rod to prevent rotation of the rod relative to the squeeze means, said squeeze means comprising opposing blocks and means for urging the blocks in opposing directions to squeeze the rod therebetween, said rodding machine also including: a supporting frame; a pair of continuous loop chains mounted on said frame for carrying a plurality of said blocks about a pair of loop paths, a portion of each path being parallel to the rod path; a pair of loop raceways supported in said frame within the loops of said continuous chains; and pressure rollers captive in each of said loop raceways but free to move therealong, said pressure rollers engaging said blocks to press said blocks against the rod in opposing directions.

2. Apparatus according to claim 1 characterized in that each of said chains carries a plurality of groups of squeeze blocks spaced apart by a gap at least as long as a rod coupler, the overall length of each group of blocks being not greater than the end-to-end distance between coupler.

3. Apparatus according to claim 2 characterized in that adjustable-pressure means are mounted between said race- and the pressure rollers carried thereon toward said blocks to squeeze said blocks against said rod.

References Cited

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EDWARD L. ROBERTS, Primary Examiner

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,473,182

Dated October 21, 1969

Inventor Charles B. Caperton

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 50, after "race" insert --ways and
said supporting frame for urging
said raceways--

SIGNED AND
SEALED

FEB 17 1970

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents