Aug. 30, 1938. A. T. KNOERZER 2,128,650

SEWER CLEANER

Filed Aug. 13, 1936 2 Sheets-Sheet 1

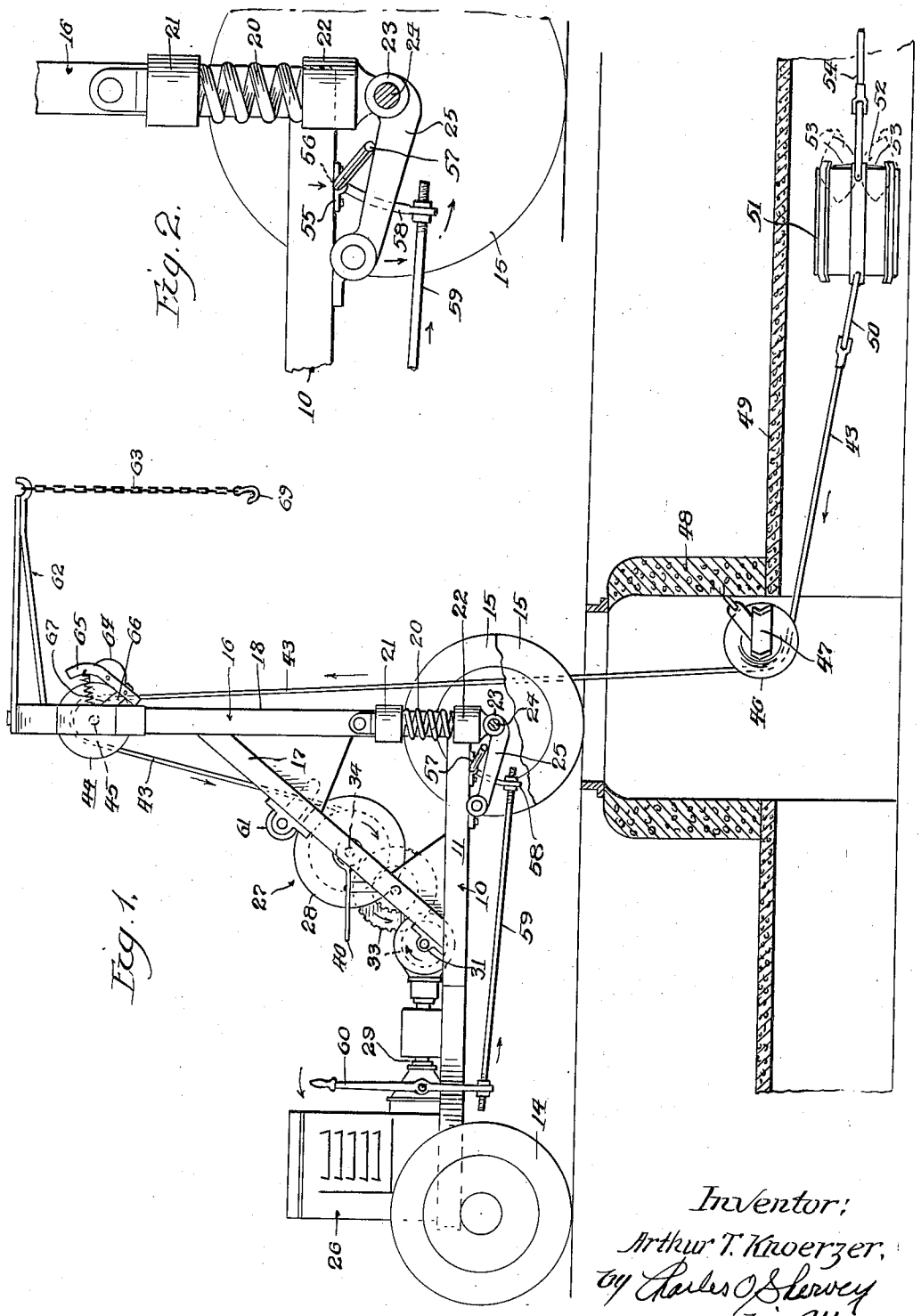


Fig. 2.

Fig. 1.

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SEWER CLEANER

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Fig. 4.

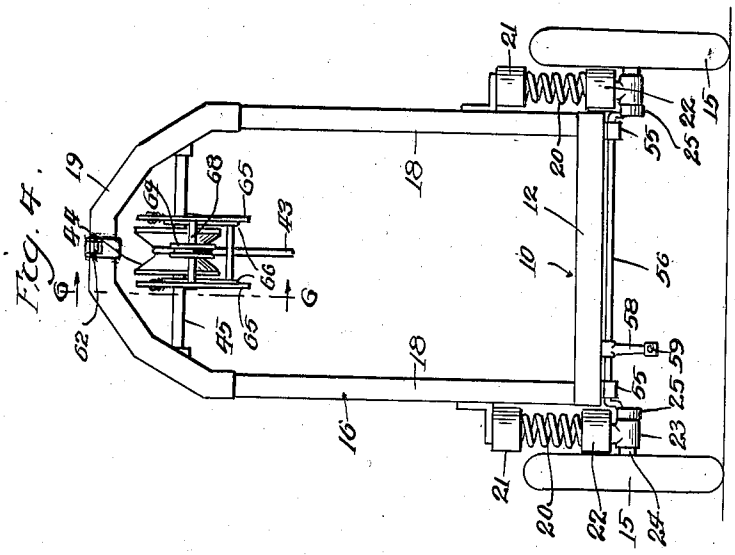


Fig. 3.

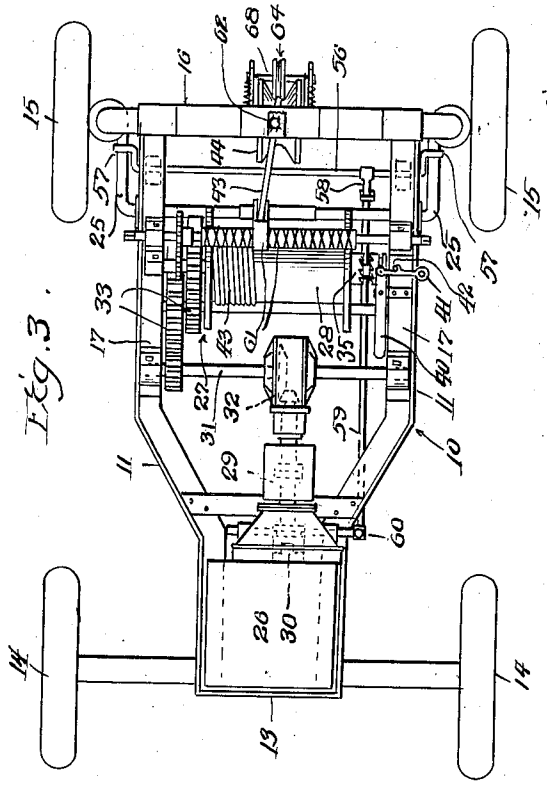


Fig. 6

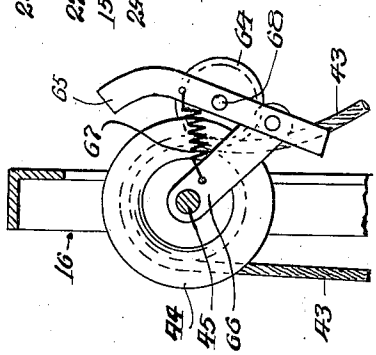
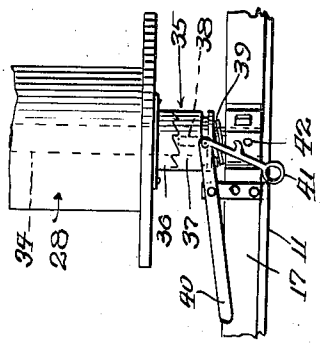


Fig. 5.



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UNITED STATES PATENT OFFICE

2,128,650

SEWER CLEANER

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Application August 13, 1936, Serial No. 95,865

7 Claims. (Cl. 15—104.30)

This invention relates to sewer cleaners.

One of the objects of this invention is the provision of automatically operating clutch releasing means, whereby to prevent injury to the apparatus and sewer pipe due to excessive strain thereon.

Another object is the provision of a motor driven windlass, wherein the winding drum of the windlass may be uncoupled from its driving mechanism, whereby it is free to rotate independently of its power transmitting connections.

Another object is the provision of means to prevent the cable from unwrapping from the winding drum due to slack in the cable.

Other objects and advantages will appear in the course of this specification, and with said objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and claimed.

The invention is clearly illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of a sewer cleaner embodying a simple form of the present invention, showing one of the supporting wheels partly broken away;

Fig. 2 is an enlarged detail side elevation of a fragment of the frame of the apparatus and certain members of the clutch releasing mechanism;

Fig. 3 is a plan of the apparatus;

Fig. 4 is an end elevation of the frame of the apparatus and certain members of the clutch releasing mechanism;

Fig. 5 is an enlarged detail plan of fragments of the winding drum and its clutch release mechanism; and

Fig. 6 is an enlarged detail vertical cross-section taken on the line 6—6 of Fig. 4.

Referring to said drawings, the reference character 10 designates the frame or chassis of the apparatus, which, desirably, is of a substantially Y form, having bent up side frame members 11, connected by cross-bars 12, 13 and other reenforcement bars. The frame is mounted on supporting wheels 14, 15, and, as a preference, knee action connections are provided between the frame and wheels 15.

A standard 16 is secured to and rises from the end of the frame on which the wheels 15 are mounted, and said standard is connected to the side frame members by diagonally extending braces 17. The standard desirably comprises two uprights 18, connected at their upper ends by an arch 19.

The knee action connections may take various well known forms. As shown, they comprise coiled compression springs 20, interposed between socket members 21, secured on the uprights of the standard, and socket members 22 secured on the blocks 23 that carry the spindles or stub shafts 24 for the wheels 15. Swinging arms 25 connect the blocks 23 with the frame. The springs not only cushion the frame, but they serve to yieldably permit the adjacent end of the frame to be depressed in case excessive downward strain is placed upon it during the sewer cleaning operation, the purpose of which will be presently explained.

Upon the end of the frame, opposite the end carrying the standard, is a motor 26, desirably of the internal combustion engine type, and carried by the frame is a windlass 27, having a winding drum 28 connected to the motor by suitable power transmitting connections. The connections shown comprise a motor shaft 29 having a clutch 30 therein, a countershaft 31 journaled in bearings carried by the braces 17, bevel gears 32, between the motor shaft and countershaft and a train of speed reducing gears 33 between the countershaft and the winding drum shaft 34. The winding drum is rotatably mounted on the drum shaft 34, whereby it is free to rotate thereon and a clutch 35 is provided between the shaft and drum for connecting them. One clutch member 36 is secured to one head of the drum (see Fig. 5) and one clutch member 37 is slidably, but non-rotatively, mounted on the drum shaft, as by a spline or feather 38, and is spring pressed into clutching engagement with the clutch member 36 by a spring 39. A clutch lever 40 engaging in a groove in the clutch member 37 provides means for unclutching the clutch. A catch lever 41 connected to the clutch lever and arranged to engage with a pin 42, provides means to hold the clutch out, thereby enabling the drum to rotate freely, and independently of the power transmitting mechanism, whenever the cable is unwound from the drum.

The cable 43 is wound upon the drum and passes over a sheave 44, mounted upon a shaft 45 carried by the standard 16 adjacent its upper end. From the sheave 44 the cable extends downward and, during the operation of the apparatus, passes around a sheave 46 mounted in a brace 47 which is arranged to be fastened on the walls 48, of a manhole of the sewer pipe 49. To the cable is connected, as by a bail 50, a sewer bucket 51. The ends of the bucket are open and the end 52 has hinged jaws 53 that are open when the bucket is drawn forward to fill it, but which close

when the bucket is drawn backward. A second cable 54 is connected to the other end of the bucket and runs through the sewer pipe to the next adjacent manhole where it is led up to a second sewer cleaning apparatus, desirably one similar to that illustrated. The apparatus shown is the one which pulls the filled bucket and the other apparatus is the one which pulls the bucket while it is being filled.

In cleaning a sewer the bucket is dragged through the sewer pipe from one manhole part way to another, and fills with the solids, debris and muck. It is then drawn back and emptied. Sometimes it meets with an obstruction in the sewer pipe, or its progress is resisted by the solids in the sewer pipe to such an extent that it can proceed no further. The strain on the apparatus, which is pulling the bucket, the cable, the bucket and the sewer construction, sometimes becomes so great that some part is likely to be damaged. To eliminate this possibility, means are provided to automatically unclutch the windlass from the motor of the apparatus pulling the bucket, and upon such an occurrence, the other sewer cleaning apparatus is set into operation and the bucket is drawn back, the contents emptied and again drawn forward through the sewer pipe.

The automatic clutch release mechanism illustrated will now be described. Fulcrumed in bearings 55 on the frame 10 adjacent the end carried by the wheels 15, is a swinging element, here shown as comprising a shaft or rod 56, on the ends of which are crank arms 57 that incline downwardly and rest on the knee action, swinging arms 25. Secured to and extending down from the shaft or rod 56 is an arm 58 to which is connected one end of a rod or link 59 which extends to the clutch lever 60 of the clutch 30 in the motor shaft. In the drawings, the clutch 30 is shown in its clutched condition. To manually unclutch this clutch the clutch lever 60 is swung in the direction of the adjacent arrow. When in operation with the clutch thrown in, the crank arms 57 rest on the knee action arms 25 and the coiled springs of the knee action connection yieldably support the frame in the position shown. If, however, the bucket meets with an obstruction that is great enough to prevent further progress of the bucket, the tension on the cable overcomes the pressure of the coiled springs and the frame is depressed at the end carrying the standard, and as a result the upper ends of the crank arms 57 are swung down, on the knee action arms 25 as a fulcrum, the rod or shaft 56 is partially rotated and the arm 58 is swung in the direction of the adjacent arrow, thereby drawing forward the rod or link 59, swinging the clutch lever 60 and unclutching the motor shaft clutch 30, thereby releasing the windlass from the motor and relieving the strain on the cable and other parts of the apparatus.

Desirably a level wind mechanism 61 is provided for guiding the cable to the drum in such manner that it is wound in an even manner thereon. Any suitable level wind mechanism can be employed, the one illustrated is more fully shown and described in Letters Patent, Number 1,875,467, dated September 6, 1932, issued to Leonard Knoerzer and myself, to which reference may be made.

An arm 62 (see Fig. 1) may be provided at the top of the standard to carry a chain 63 having a hook 69 on its lower end on which the bucket may be suspended whenever desired. When so suspended the cable is slacked and is likely to partially unwind from the drum, thereby disturbing the level wound coils. To prevent the slack in the cable from reaching the drum, a tension device is provided adjacent the top of the standard which presses the cable against the sheave 44 and prevents the slack in the cable from passing the sheave. As shown, the tension device comprises a small sheave 64 which is aligned with the sheave 44, and mounted on a shaft 68, carried by arms 65, which are pivotally supported by links 66, that are carried by the shaft 45. Coiled tension springs between the arms 65, 66 serve to press the sheave 64 against the cable, thereby preventing any slack part therein from passing over the sheave 44 to the drum.

It will be observed that the spaces between the narrow part of the Y frame and adjacent wheels are large enough to permit the attendant to stand entirely out of the way of passing traffic.

The operation of the apparatus is apparent from the above description. Briefly, when the clutches 30, 35 are thrown in, and the motor is in operation, the cable is wound up on the drum, and the bucket is drawn along in the sewer pipe. When the bucket meets an obstruction, and excessive strain is placed on the cable, the frame of the apparatus is depressed, and as a result the clutch 30 is thrown out and the windlass released from the motor, thereby preventing injury to the parts. When unwinding the cable from the drum, the clutch 35 is thrown out, thereby permitting the drum to rotate independently of the power transmitting connections. Whenever slack occurs in the cable beyond the sheave 44, the tension device prevents the slack part from passing over the sheave to the drum.

I claim as new and desire to secure by Letters Patent:

1. A sewer cleaner, comprising in combination a frame, supporting wheels therefor, spring connections between the frame and wheels, a motor mounted on the frame, a windlass drum mounted on the frame, driving connections between the motor and windlass drum, including a clutch, a cable wound upon said drum and leading downward from the apparatus, and clutch releasing mechanism having an actuating member operated by the frame, when depressed under excessive strain on the cable.

2. A sewer cleaner, comprising in combination a frame having a standard at one end, supporting wheels for the frame, one pair of which is located adjacent the standard, spring connections between the frame and said pair of wheels, a motor mounted on the frame, a windlass mounted on the frame, driving connections between the motor and windlass, including a clutch, a sheave mounted on the standard, a cable wound upon the windlass drum, and trained over said sheave, and leading downward therefrom, and clutch releasing mechanism having actuating arms fulcrumed on the frame and arranged to be operated thereby when the frame is depressed under excessive strain on the cable.

3. A sewer cleaner, comprising in combination a frame having a standard at one end, supporting wheels for the frame, one pair of which is located adjacent the standard, bearing blocks for said last mentioned pair of wheels, spring connections between the frame and the bearing blocks for said pair of wheels, a motor mounted on the frame, a windlass mounted on the frame, driving connections between the motor and windlass, including a clutch, a sheave mounted on the standard, a cable wound upon the windlass

drum, and trained over said sheave, and leading downward therefrom, a clutch lever for said clutch, arms connecting the frame with said bearing blocks, a swinging element mounted on the frame and having members resting on said arms, and connecting means between said clutch lever and the swinging element.

4. A sewer cleaner, comprising in combination a frame, supporting wheels therefor, knee action connections between two of the wheels and the frame, a standard rising from the frame at the end thereof having the knee action connections, a motor and windlass mounted on said frame, driving connections between said motor and the windlass, having a clutch therein, a clutch lever, a sheave on said standard, a cable wound upon said drum and extending over the sheave and downward, a shaft journaled on the frame adjacent said standard, crank arms on said shaft adapted to engage members of the knee action connections, an arm extending from said shaft, and a rod connecting said last mentioned arm with the clutch lever.

5. In a sewer cleaner, the combination of supporting wheels, a frame and resilient means between the wheels and frame, a windlass mounted on the frame, power transmission mechanism therefor having a clutch interposed therein, a cable operated by said windlass, and clutch operating mechanism actuated by said frame wnen depressed.

6. In a sewer cleaner, the combination of a windlass having a winding drum and level-wind mechanism, a sheave, a cable wound upon said drum and running therefrom through the level-wind mechanism and trained over said sheave, and a tension device comprising a sheave against which the cable exerts pressure when the cable is taut and means to move said sheave towards the first mentioned one when slack occurs in the cable, whereby to bend the cable partly around the first mentioned sheave and thereby prevent slack in the cable from passing to the drum.

7. In a sewer cleaner, the combination of a frame, a motor, mounted thereon, and a windlass, having a drum, mounted on the frame, a cable wound upon the drum, a bucket attached to the cable and adapted to be drawn through a sewer pipe, driving connections between the motor and windlass, clutch mechanism in said driving connections, and clutch disengaging mechanism having an actuating element, operating when excessive strain is placed on the cable by the bucket, to release the clutch.

ARTHUR T. KNOERZER.