March 14, 1933. F. KINZBACH 1,901,247

PIPE CLEANING MACHINE

Filed Feb. 1, 1927 4 Sheets-Sheet 1

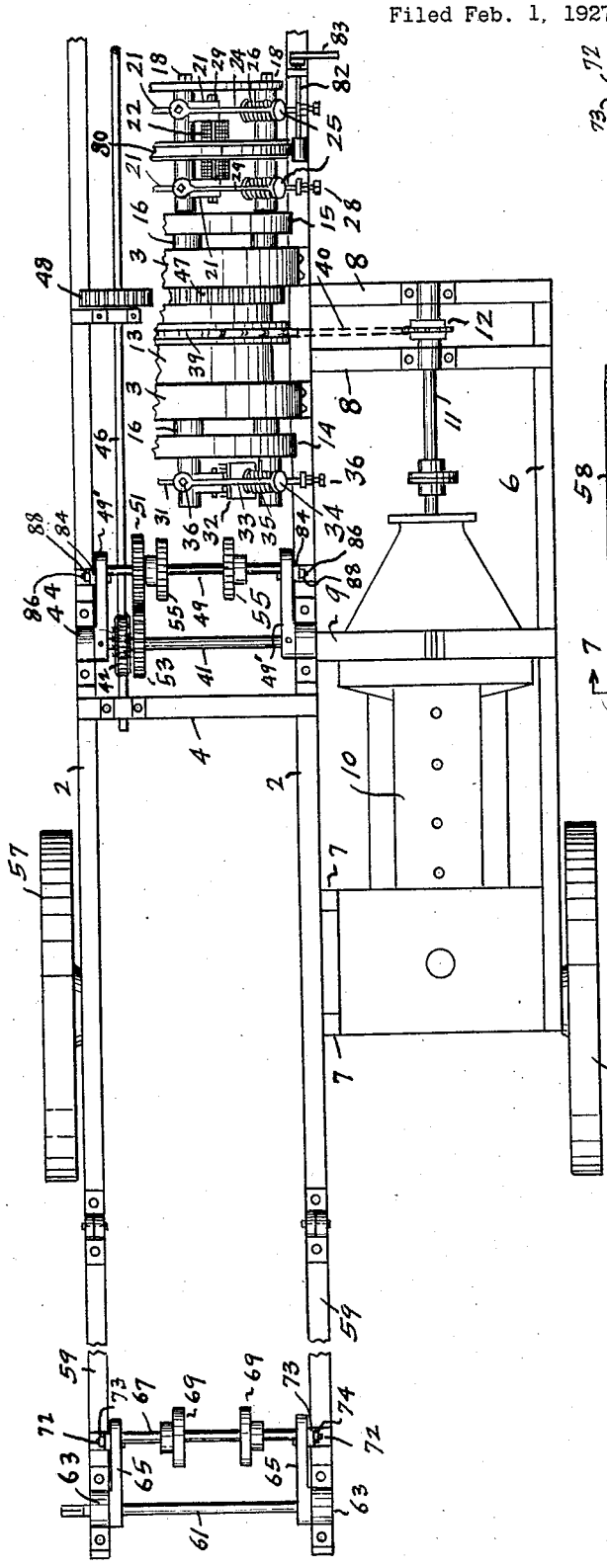


Fig. 1.

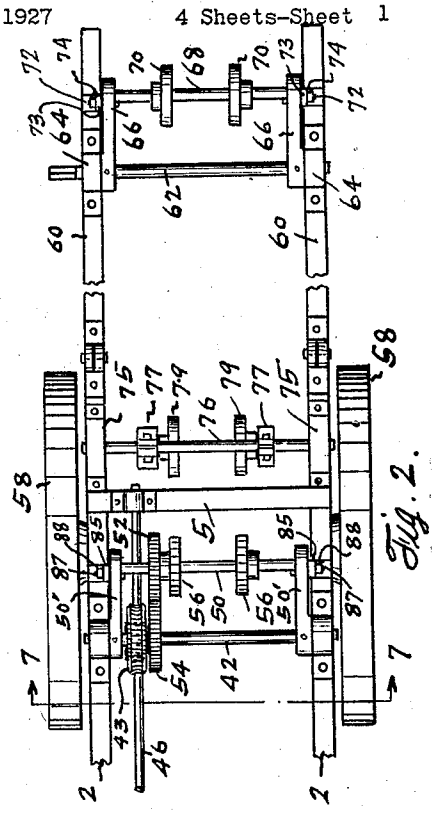


Fig. 2.

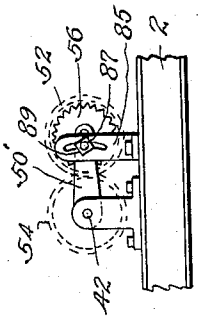


Fig. 3.

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PIPE CLEANING MACHINE

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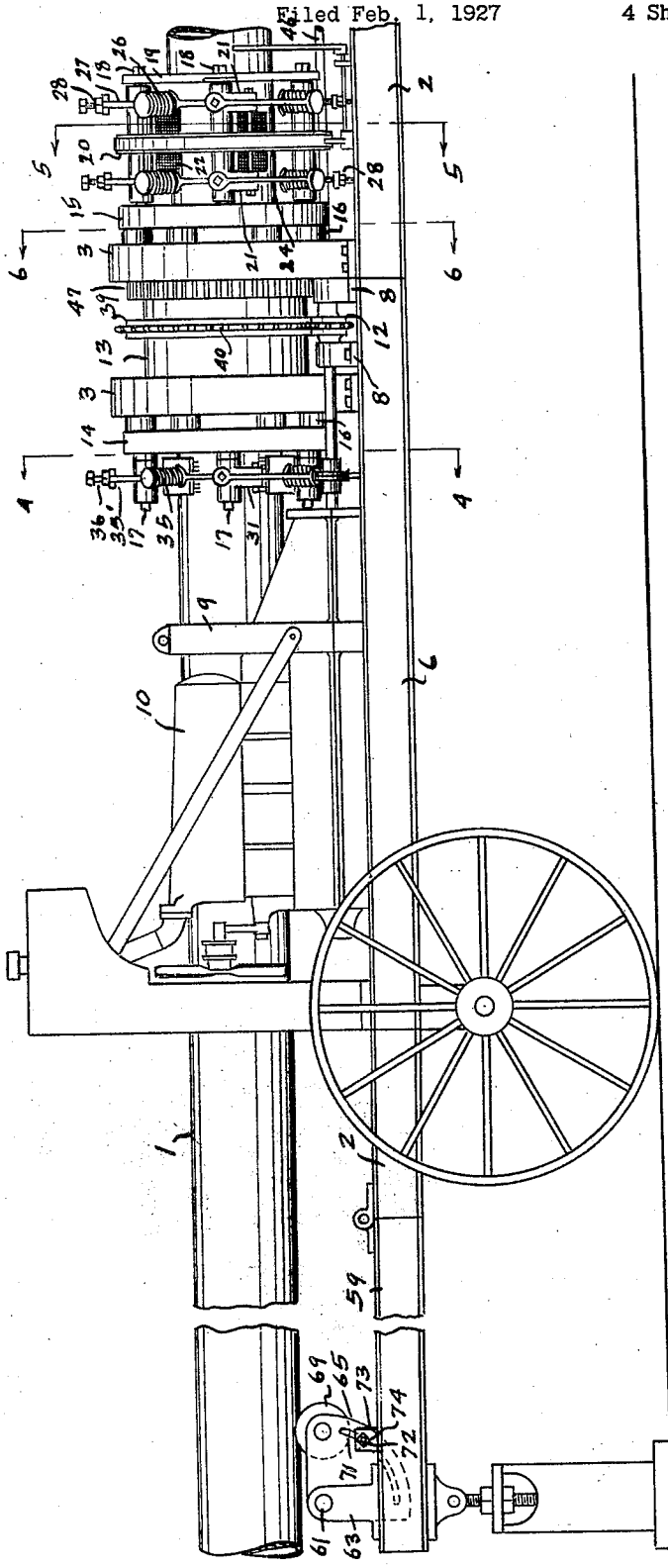


Fig. 3.

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PIPE CLEANING MACHINE

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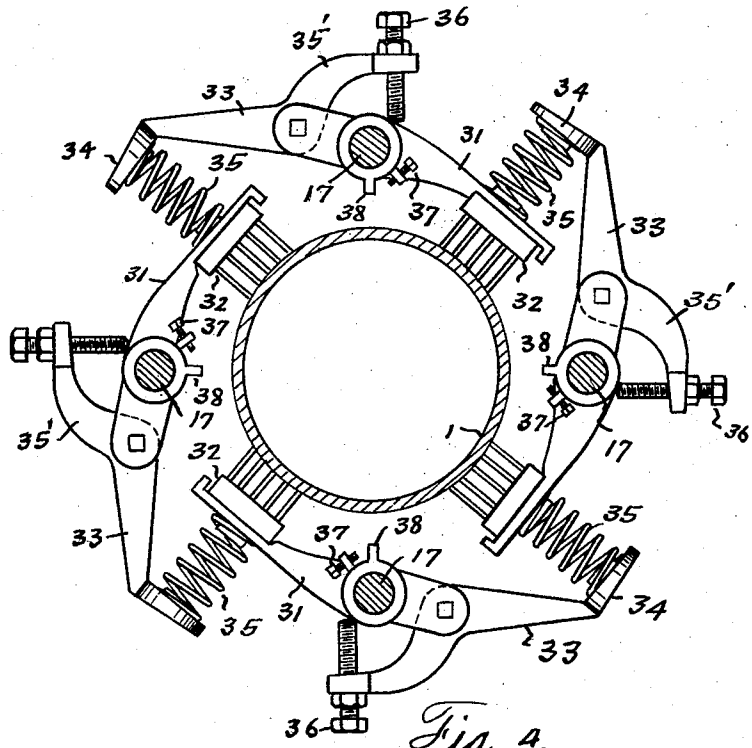


Fig. 4.

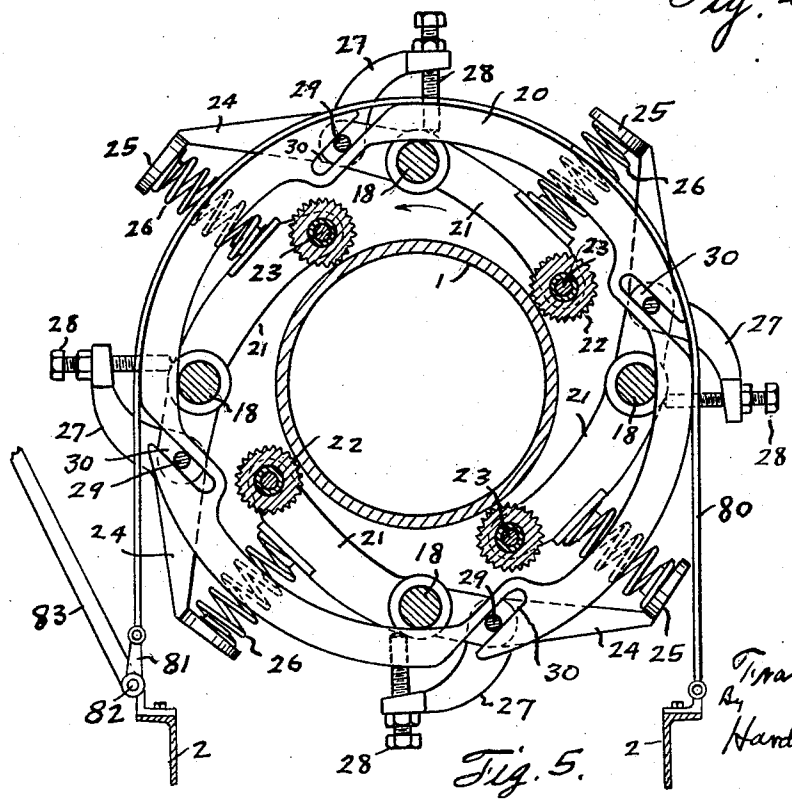


Fig. 5.

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PIPE CLEANING MACHINE

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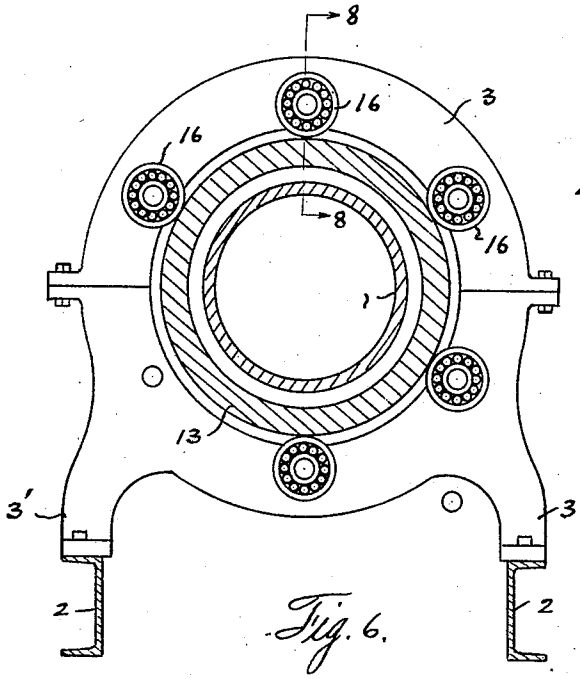


Fig. 6.

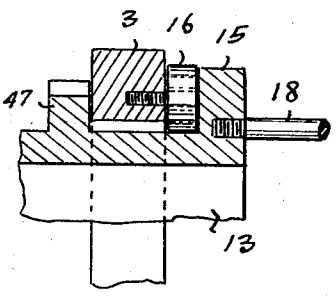


Fig. 8.

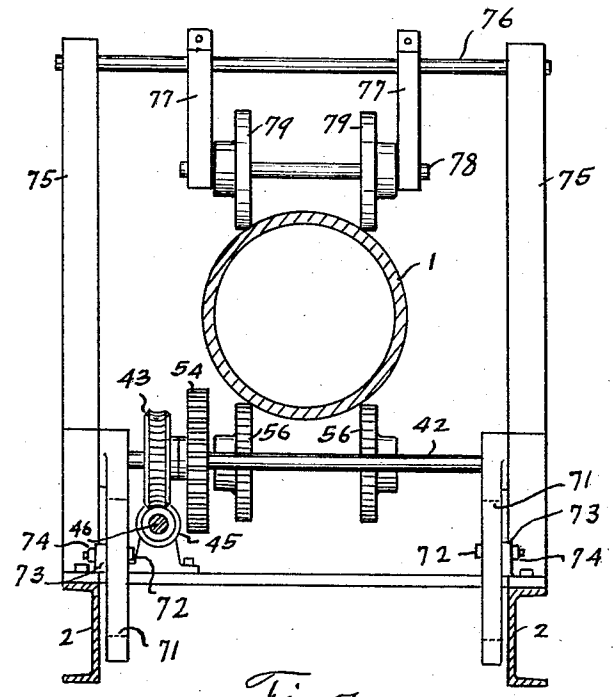


Fig. 7.

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Patented Mar. 14, 1933 1,901,247

UNITED STATES PATENT OFFICE

FRANK KINZBACH, OF HOUSTON, TEXAS

PIPE CLEANING MACHINE

Application filed February 1, 1927. Serial No. 165,100.

This invention relates to new and useful improvements in a pipe cleaning machine.

One object of the invention is to provide a machine of the character described specially adapted to cleaning and reconditioning pipe.

Another object of the invention is to provide a pipe cleaning machine embodying a rotatable framework which carries toothed cutting rollers and cleaning brushes adapted to revolve about the pipe to clean the same, and also embodying means for propelling the pipe through the machine, as well as for supporting and guiding said pipe.

With the above and other objects in view the invention has particuluar relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 shows a plan view of the front end of the machine.

Figure 2 shows a plan view or the rear end thereof.

Figure 3 shows a side elevation of the front end of the machine.

Figure 4 shows a transverse sectional view of the machine taken on the line 4—4 of Figure 3.

Figure 5 shows a transverse sectional view taken on the line 5—5 of Figure 3.

Figure 6 shows a transverse sectional view taken on the line 6—6 of Figure 3.

Figure 7 shows a transverse sectional view taken on the line 7—7 of Figure 2.

Figure 8 shows an enlarged fragmentary sectional view taken on the line 8—8 of Figure 6, and Figure 9 shows a fragmentary side view of the machine.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures the numeral 1 designates a pipe to be cleaned.

The main frame of the machine includes suitable side members as 2, 2, preferably formed of channel irons, which are connected by the bearing rings 3, 3, each having oppositely disposed legs 3′, 3′ bolted to the corresponding side members 2, as well as by the front and rear cross braces 4 and 5. Secured to one side of the frame there is a motor frame having the outer side member 6 connected to the main frame by the front cross bars 7, 7, and the rear cross bars 8, 8, as well as by the arched bracket 9. The motor 10 of any conventional construction is mounted in the motor frame and suitably supported therein. This motor has a drive shaft 11 which is rotatable in suitable bearings carried by the front cross bars and between these cross bars a suitable sprocket wheel 12 is fixed on said shaft.

Within the bearing rings 3 there is a spool-like drum 13 formed with the front and rear peripheral flanges 14, 15, and this drum is mounted to rotate on suitable roller bearings 16, which are mounted on the respective bearing rings 3 between said bearing rings and the corresponding end flanges of the drum and which bear against the periphery of said drum on all sides. Extending forwardly from the end flange 14 are the bearing rods 17 which are spaced apart and extending rearwardly from the rear flange 15 are the bearing rods 18 whose rearward ends are anchored to the sectional annular anchor ring 19 and surrounding and riding on the rods 18 there is a floating brake ring 20, located between the rear flange 15 and the anchor ring 19. A rotatable framework is thus provided which revolves about the pipe 1 and carries the pipe cleaners, presently to be described.

Pivotally mounted on each rod 18 are the pairs of spaced levers 21, and between the forward, or free ends of these levers the cylindrical rotatable toothed cutters 22 are mounted to rotate on the bearing rods 23, whose respective ends are anchored to said free ends of the corresponding levers 21. The rear end of each lever 21 carries hinged extensions 24, having the flat end bearings 25 and interposed between these bearings 25 and the forward ends of the levers 21 underneath are the coiled pressure springs 26 which operate to hold the cutters 22 yieldingly against the pipe to be cleaned. The hinged end of each extension 24 has an upstanding arm 27 and adjusting screws 28

are threaded through this arm and work against the corresponding levers underneath. The tension of the springs 26 and the pressure of the cutters 22, against the pipe, may be varied through these adjusting screws 28 and the pipe cleaning device also thus accommodated to pipe of different sizes. The respective extensions 24, of the respective pairs of levers 21, mounted on each rod 18, are hingedly connected to said levers by means of the hinge pins 29 and these pins work through the deep peripheral slots 30 cut in the brake ring 20 diagonally with respect to the circumferential line of said ring. Pivotally mounted on each bearing rod 17 there is a lever 31 whose forward end carries a suitable brush 32. The rear end of each lever 31 carries a hinged extension 33 having the flat end bearing 34, and interposed between these bearings, and the ends of the levers underneath are the strong coil springs 35 which operate to hold the brushes yieldingly against the pipe to be cleaned.

The hinged end of each extension 33 has an upstanding arm 35′ and adjusting screws 36 are threaded through these arms and work against the corresponding levers underneath. The tension of the springs 35 and the pressure of the brushes against the pipe may be varied through these adjusting screws 36 and the brushes thus accomodated to pipe of different sizes. Each lever 31 carries an adjustable stop 37 adapted to contact with the opposing stop 38, fixed with respect to the corresponding rod 17, and thus limiting the range of movement of the corresponding brush toward the pipe. The drum 13 is formed with a peripheral sprocket gear 39 and a sprocket chain 40 operates over the sprocket wheels 12 and 39 and drives the latter from the former, thus rotating the pipe cleaning device hereinbefore described.

There are the front and rear transverse shafts 41, 42, mounted to rotate in suitable transversely aligned bearings carried by the side members 2, 2, and fixed on the respective shafts are the screw gears 42, 43, which are in mesh with the worm gears 44, 45, which are fixed on the respective ends of the longitudinal drive shaft 46, which is mounted to rotate in suitable bearings carried by the cross bars 4 and 5. The drum 13 carries a peripheral spur gear 47 adjacent the inner side of the front bearing ring 3, which is in mesh with and drives the spur gear 48, which is fixed on the drive shaft 46. There are the transverse front and rear carrier wheel shafts 49, 50 which are mounted to rotate in suitably transversely aligned bearings in the free ends of the arms 49′, 49′ and 50′, 50′ which are supported on the respective shafts 41 and 42 and fixed on these shafts 49 and 50 are the spur gears 51, 52, which are in mesh with and driven by the corresponding spur gears 53, 54, which are fixed on the respective shafts 41, 42. The shafts 49 and 50 have the spaced carrier wheels 55, 55, and 56, 56, respectively, fixed thereon and whose margins are serrated and these carrier wheels assist in supporting the pipe, as well as operating to propel the pipe through the machine during the cleaning operation. Fixed on the side members 2, 2, and the upstanding therefrom, are the similar vertical lugs 84, 84, and 85, 85 and the arms 49′ and 50′ have the outwardly extending bolts 86 and 87 which project through similar arcuate slots in the lugs 84 and 85 respectively and whose outer ends are threaded to receive the clamp nuts 88 and 89. Means are thereby provided for elevating and lowering the carrier wheels 55, and 56 to adjust them to different sizes of pipe. As the drum 13 rotates the pipe will be moved along through the machine and as it advances the rotatable framework, hereinbefore described, will revolve about the pipe and the cutters 22 will loosen up the incrustation on the pipe and partly remove the same and the following brushes 32 will sweep off any remaining foreign matter clinging to the pipe. The machine may be supported by the front and rear carrier wheels 57, 57, and 58, 58, for supporting the machine and transporting it from place to place when the machine is not in operation.

There are the supplemental front and rear frame extensions consisting of the front and rear side members 59, 59, and 60, 60 which are hinged to the corresponding ends of the side members 2. At the free ends of these respective extensions are the transverse shafts 61, 62, mounted to rotate in suitable upstanding bearings 63, 63, and 64, 64, and fixed on the ends of the shafts 61, 62, inside of the respective side members 59, 60, are the segments 65, 65, and 66, 66, and the outer ends of these segments have transversely aligned bearings in which the respective shafts 67, 68, are mounted and these shafts have the spaced guide rollers 69, 69, and 70, 70, respectively, fixed thereon which run along the pipe underneath and serve to assist in supporting and guiding the pipe. Each of the segments 65, 66 has an arcuate slot 71, and a clamp bolt 72 is fitted through said slot and through a lug 73, fixed to the adjacent side member 59 and whose outer end is threaded to receive the nut 74. This nut may be loosened and the corresponding segments 65, 65, or 66, 66, as the case may be, adjusted up or down and thus adjusted to different sizes of pipe, and the nut then tightened to maintain said adjustment. One end of each shaft 61, 62, is extended and formed polygonal to receive a socket wrench for assisting in this adjustment. The corresponding ends of the framework may be supported, if necessary,

on conventional lift jacks, as shown in Figure 3.

In front of the cleaning apparatus, and upstanding from the side members 2, are the standards 75 and fixed to their upper ends there is a cross rod 76 clamped to which are the spaced hangers 77, 77, whose lower ends have transversely aligned bearings in which the shaft 78 rotates, and this shaft has the spaced guide wheels 79, 79, which run against the upper side of the pipe and assist in guiding the same through the machine as well as in holding the same against turning.

The pipe to be cleaned is fed to the machine a joint at a time and will be mounted on the front guide wheel 70 and the front carrier wheels 56 and will enter between the cutting rollers 22. In order to permit the insertion of the pipe between said cutting rollers it is necessary to spread said rollers apart. For this purpose there is provided a brake band 80, one end of which is attached to one of the side members 2 and this brake band surrounds the brake ring 20 and its outer end is connected to the brake arm 81 which is fixed to the end of the brake shaft 82. Fixed to the other end of this shaft there is a brake lever 83 by means of which said brake band may be set or released. When the brake band is set the brake rim 20 will be temporarily retarded, drum 13 will continue to rotate moving the hinge pins 29 forwardly and inwardly in the slots 30, which will operate to carry said rollers 22 outwardly to permit the easy entrance between them of the adjacent end of said pipe and upon its entry the brake band may be released and the rollers 22 will thereupon be immediately forced into contact with the pipe by the pressure of the springs 26.

When the machine is to be moved from place to place the extensions 59 and 60 and the appendants carried thereby may be swung over and laid on the main frame of the machine.

What I claim is:—

1. A pipe cleaning machine including means for propelling a pipe lengthwise, a rotatable frame adapted to surround the pipe, cleaning means mounted in the frame and adapted to operate against the surface of the pipe, means for driving said propelling means and frame and means for moving said cleaning means outwardly from the pipe, said moving means including a ring on said frame and normally rotatable therewith, means for retarding the rotation of said ring relative to the frame rotation and operative connections between said ring and cleaning means.

2. A pipe cleaning machine including means for propelling the pipe lengthwise, a frame adapted to rotate about the pipe, cleaning means mounted in the frame and adapted to operate against the surface of the pipe, yieldable means normally holding said cleaning means against the pipe and means adapted to act in opposition to said yieldable means to move the cleaning means outwardly from the pipe, said moving means including, a ring on said frame and normally rotatable therewith, means for retarding the rotation of said ring relative to the frame rotation and operative connections between said ring and cleaning means.

3. A pipe cleaning machine including a framework, pipe supporting and guiding wheels at the ends of said framework, means for vertically adjusting said wheels, means for propelling the pipe along said framework, a rotatable frame on the framework adapted to surround the pipe, pipe cleaning means mounted in the frame and adapted to operate against the surface of the pipe, and means for driving said propelling means and rotating the frame.

4. A pipe cleaning machine including a framework, pipe supporting wheels rotatably mounted in said framework, means for driving some of said wheels to propel the pipe lengthwise, a rotatable frame on said framework adapted to surround the pipe, pipe cleaning means in said frame and adapted to rotate about and operate against the surface of the pipe, means for rotating said frame about the pipe, and guide wheels disposed above the pipe and in engagement therewith adapted to hold the pipe against turning.

In testimony whereof I have signed my name to this specification.

FRANK KINZBACH.