May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 1

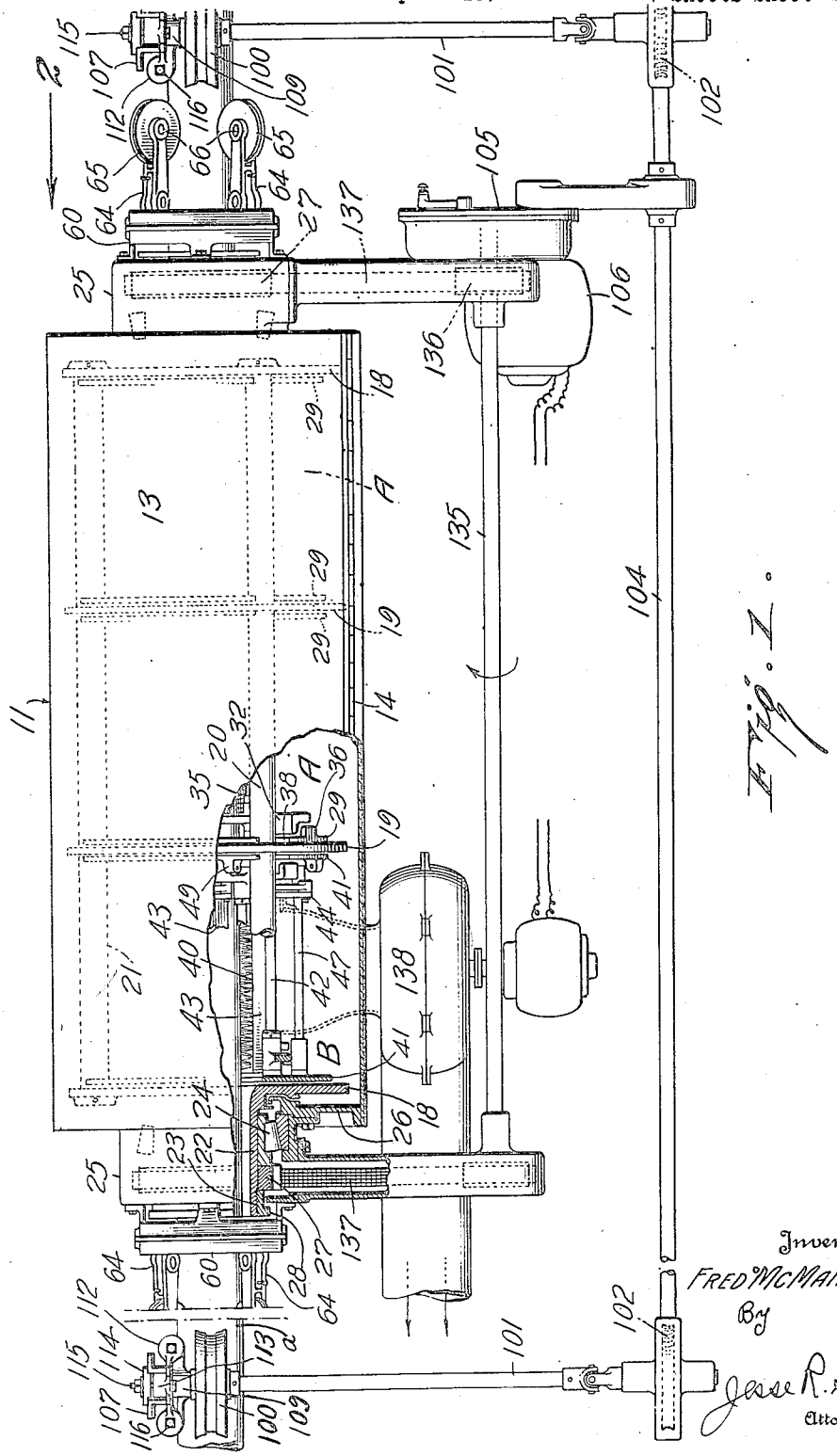


Fig. 1.

Inventor
FRED McMANIS,
By
Jesse R. Stone
Attorney

May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 2

Fig. 2.

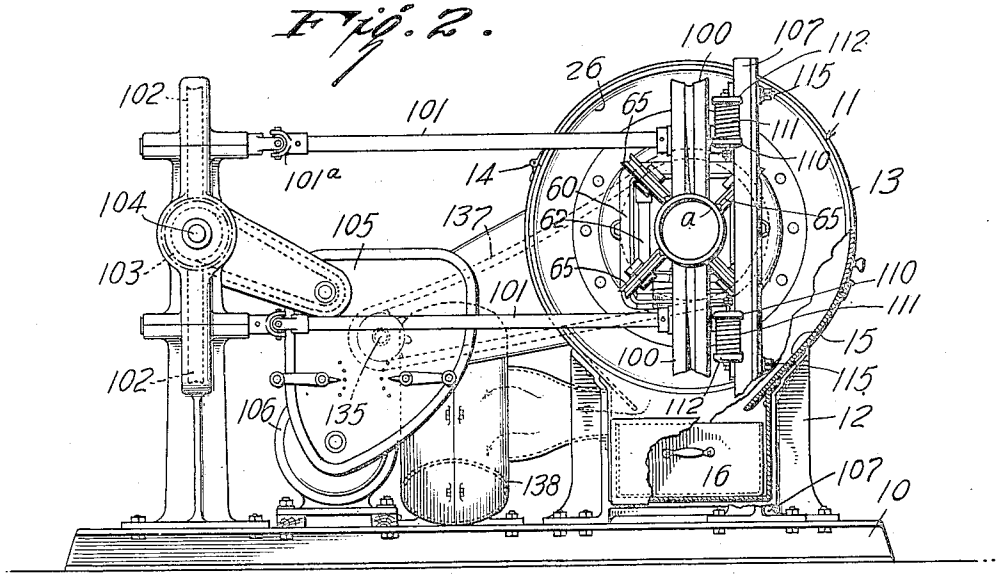
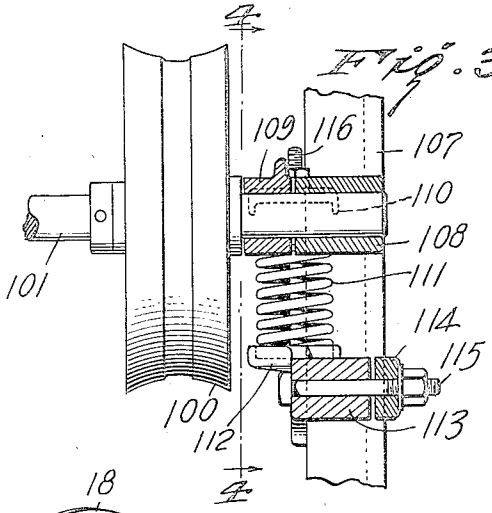


Fig. 3.



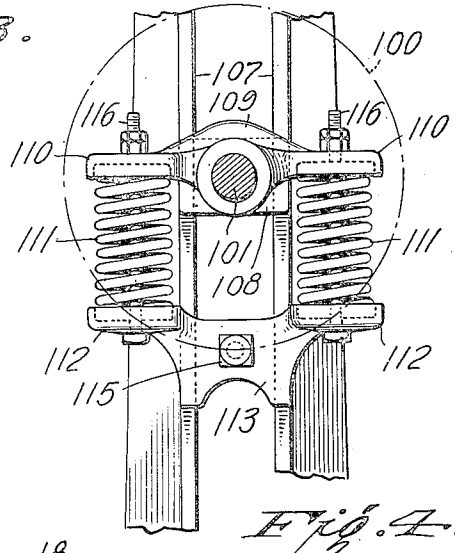


Fig. 4.

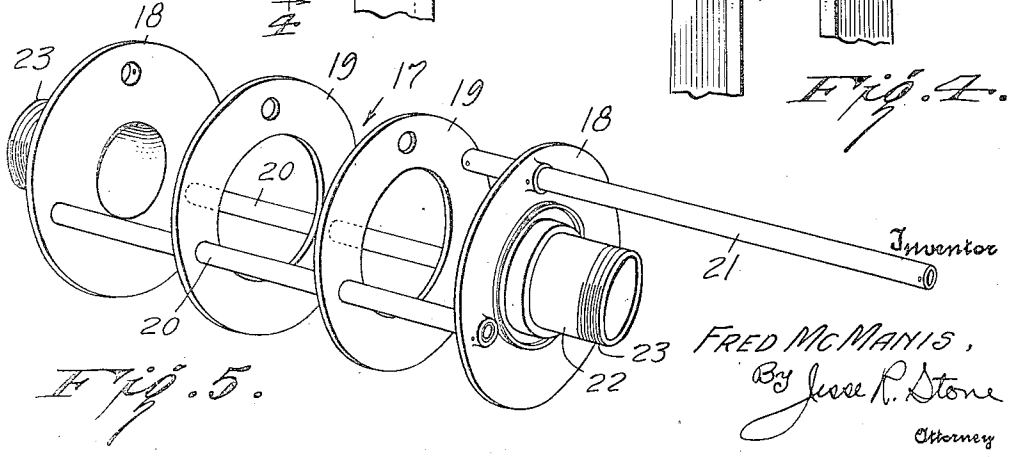


Fig. 5.

Inventor

FRED McMANIS,

By Jesse R. Stone

Attorney

May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 3

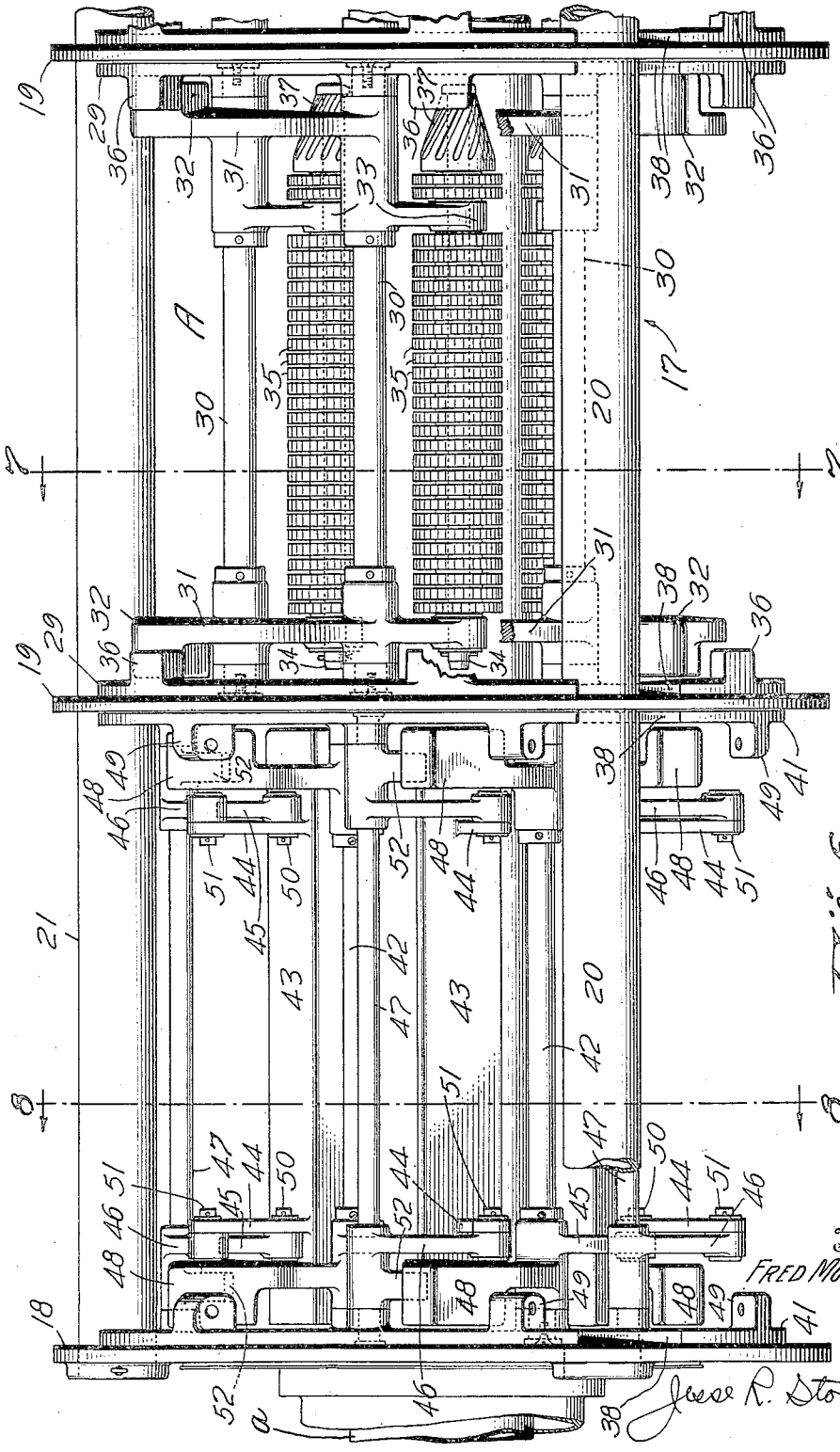


Fig. 6.

Inventor
FRED McMANIS,
By
Jesse R. Stone
Attorney

May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 4

Fig. 7.

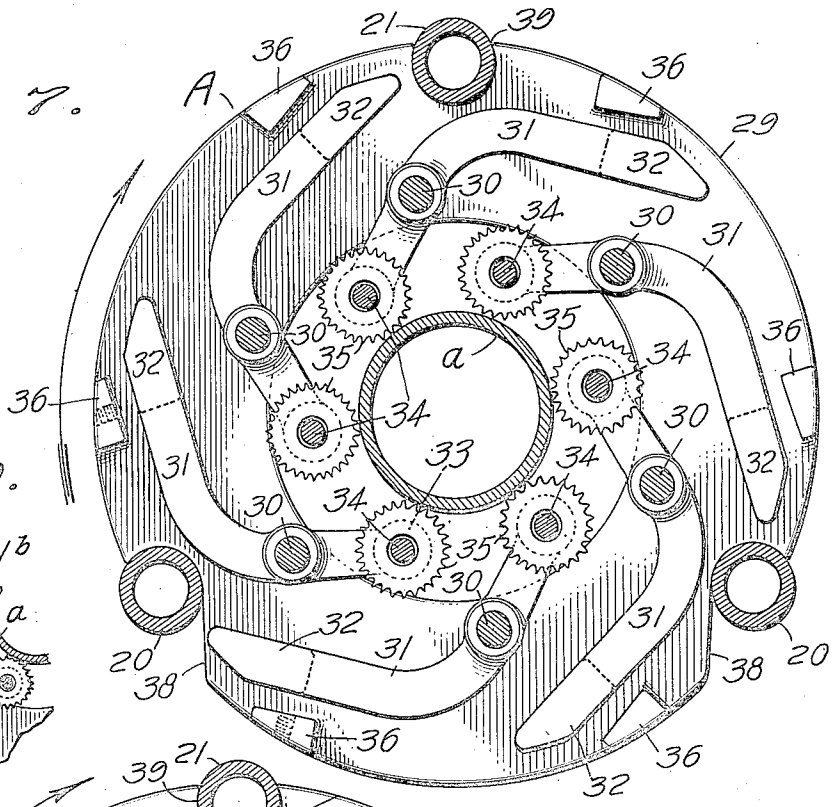


Fig. 9.

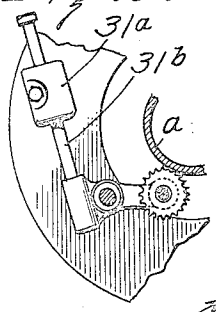
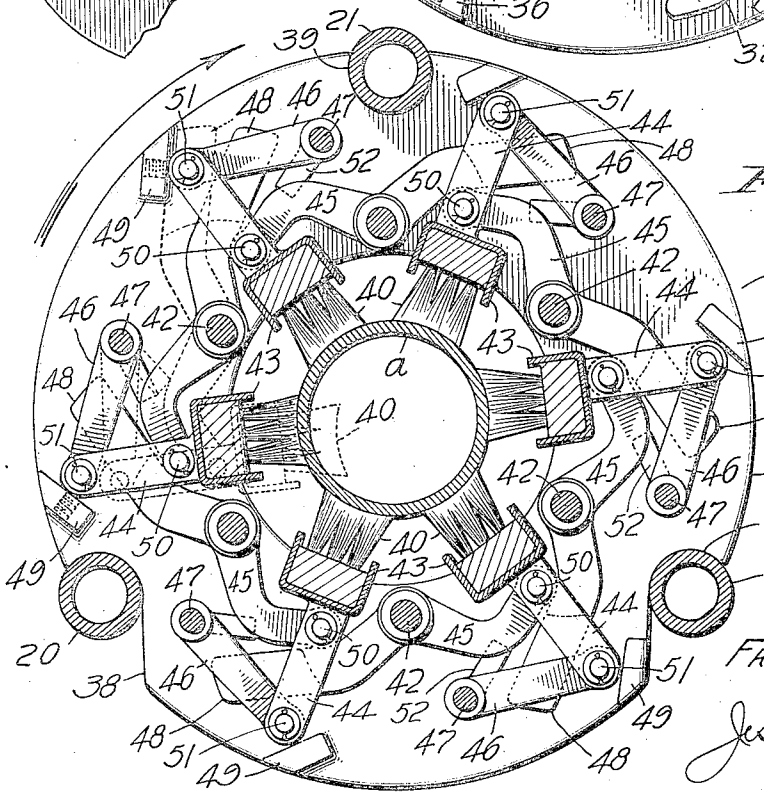


Fig. 8.



Inventor

FRED McMANIS,

By Jesse R. Stone

Attorney

May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 5

Fig. 11.

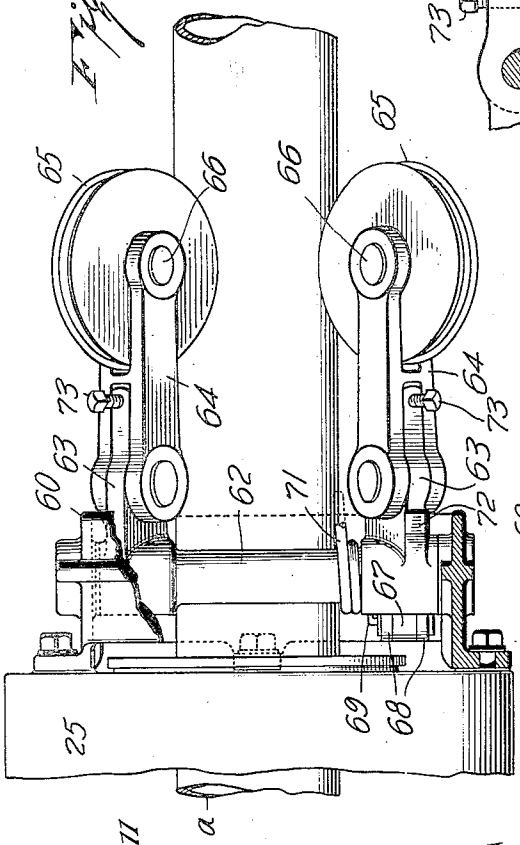


Fig. 13.

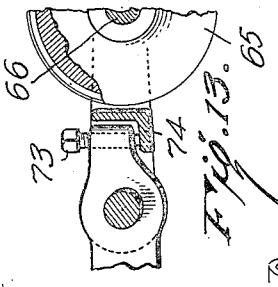
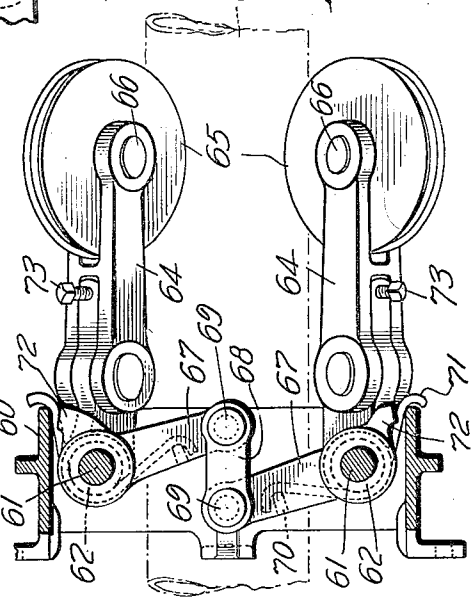


Fig. 12.



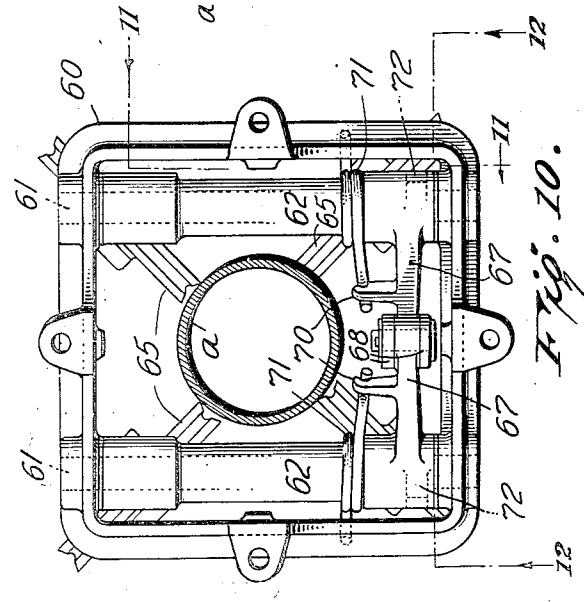
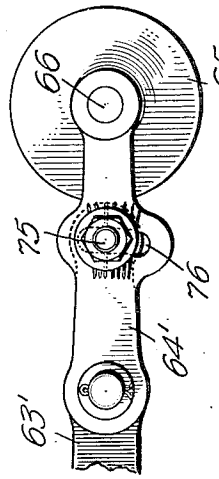


Fig. 10.

Fig. 14.



INVENTOR.

BY FRED McMANIS,

Jesse R. Stone

ATTORNEY.

May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 6

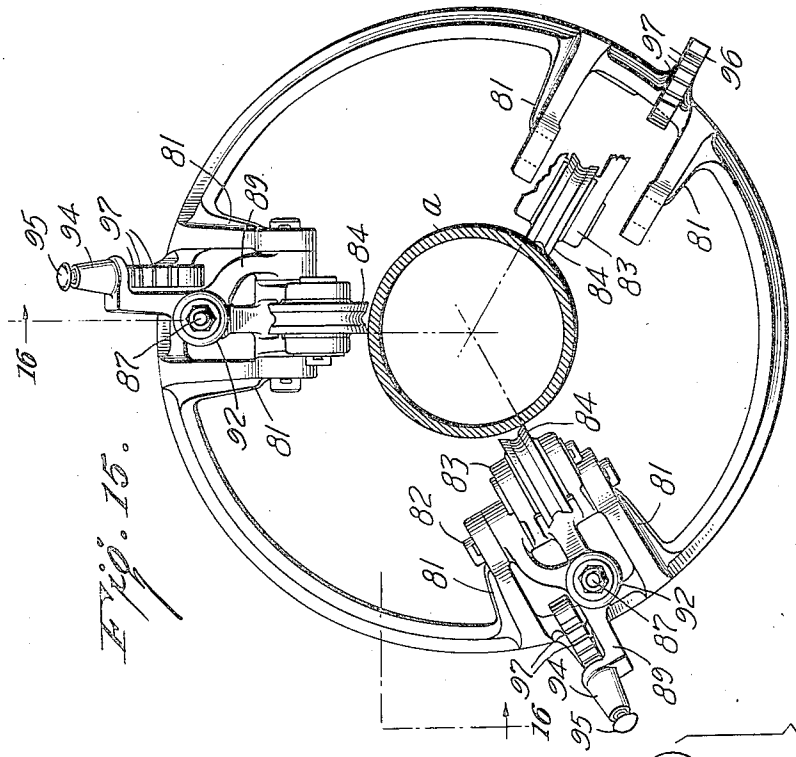


Fig. 15.

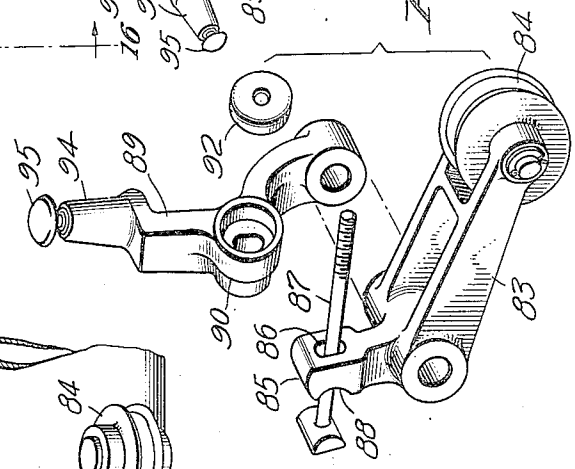


Fig. 17.

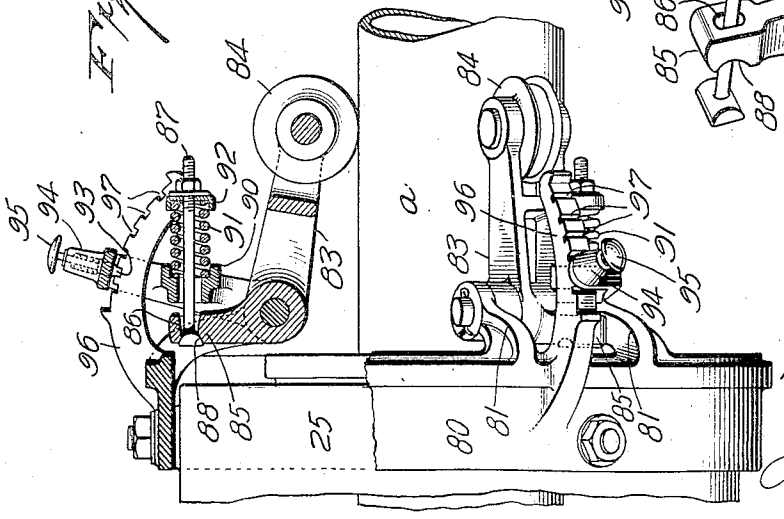


Fig. 16.

INVENTOR.
FRED McMANIS,
BY
Jesse R. Stone
ATTORNEY.

May 8, 1934. F. McMANIS 1,957,792

OUTSIDE PIPE CLEANING MACHINE

Filed April 19, 1929 7 Sheets-Sheet 7

Fig. 18.

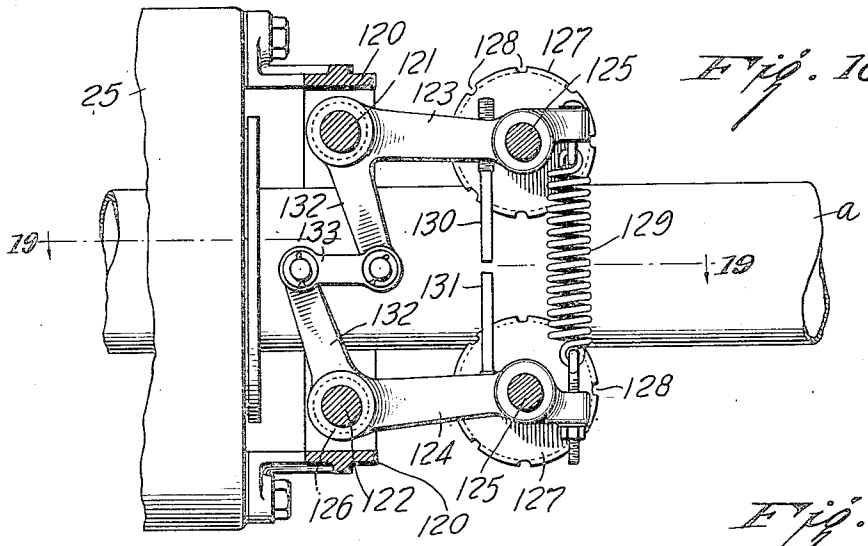


Fig. 19.

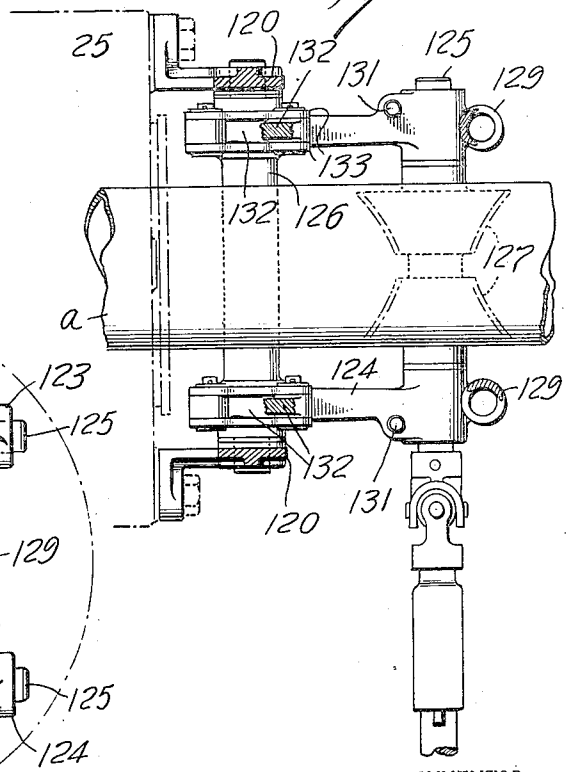
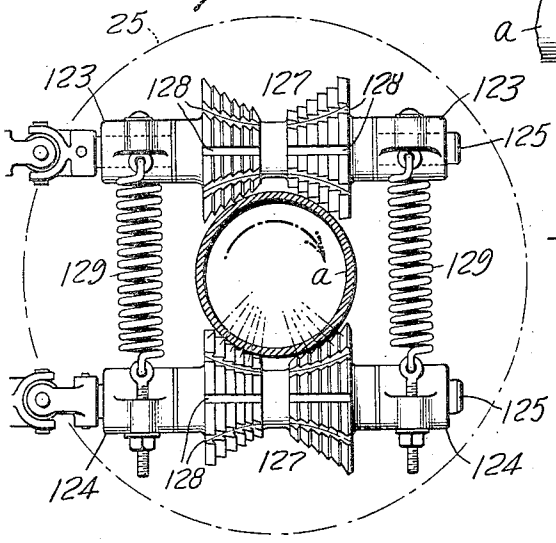


Fig. 20.



INVENTOR.

FRED McMANIS,

BY

Jesse R. Stone

ATTORNEY.

Patented May 8, 1934 1,957,792

UNITED STATES PATENT OFFICE

1,957,792

OUTSIDE PIPE CLEANING MACHINE

Fred McManis, Houston, Tex., assignor to W-K-M Company, Houston, Tex., a corporation of Texas

Substitute for application January 21, 1928, Serial No. 248,294. This application April 19, 1929, Serial No. 356,555

12 Claims. (Cl. 29—81)

My invention relates to an improvement in devices for cleaning the outside of pipe, and pertains particularly to machines of the stationary type wherein the sections of pipe are fed longitudinally through the machine to be cleaned.

It is an object of the invention to provide a cleaning machine of this character wherein the machine is stationary and has means thereon for moving the pipe longitudinally therethrough with cleaning elements rotated about the pipe during its progress through the machine.

It is desired to provide a supporting frame for the cutting elements adapted to rotate about said pipe and in which the rotation of said frame acts to force the said cleaning elements against the pipe with varying amounts of pressure, depending upon the speed of rotation of said frame.

It is also an object to improve the means for feeding the pipe through the machine for cleaning and for resiliently mounting and operating said feeding means. A structure of the feeding device is contemplated which will act not only to move the pipe through the machine but also to resist rotation of said pipe while being thus moved.

It is also an object to provide adjusting means for mounting the cleaning elements so that they may be adapted for operation upon pipes of varying diameters.

It is also an object to provide means for removing the matter chipped from the pipe and to carry the same from the machine in an effective manner.

The invention resides particularly in the construction and arrangement of the parts making up the machine whereby an adjustable and effective cleaning action upon the pipe is secured and in which the pipe is traversed longitudinally through the machine.

For a better understanding of the invention, attention is directed to the drawings herewith wherein:

Fig. 1 is a top plan view of my improved pipe cleaning machine partially broken away and shown in section.

Fig. 2 is an end view thereof looking in the direction of the arrow 2 shown in Fig. 1.

Fig. 3 is a detail sectional view showing a portion of the pipe feeding mechanism.

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 3 looking in the direction of the arrows.

Fig. 5 is a view in perspective of the frame for supporting the pipe cleaning elements.

Fig. 6 is a side elevation partially broken away illustrating portions of the pipe cleaning elements in their relative positions within the frame.

Fig. 7 is a transverse sectional view taken on the line 7—7 of Fig. 6 and looking in the direction of the arrows.

Fig. 8 is a similar view taken on the line 8—8 of Fig. 6.

Fig. 9 shows a detail view of another form of my invention.

Fig. 10 is an end view illustrating one form of my invention for preventing the rotation of the pipe while the machine is in operation.

Fig. 11 is a side view thereof as indicated by the arrows 11—11 of Fig. 10 and showing part of the frame broken away.

Fig. 12 is a bottom plan view showing the frame in section as indicated by the arrows 12—12 in Fig. 10.

Fig. 13 is a broken detail view illustrating one means of adjusting the roller with respect to its supporting arm.

Fig. 14 is a fragmentary side elevation showing another means of adjusting the rollers.

Fig. 15 illustrates a front elevation of another embodiment of my invention for preventing pipe rotation during the operation of the pipe cleaning machine.

Fig. 16 illustrates a side view thereof, the upper portion being broken away and shown in section, as indicated by the line 16—16 in Fig. 15.

Fig. 17 illustrates several of the members associated with this embodiment of my invention, in perspective.

Fig. 18 illustrates a still further embodiment of my invention wherein I show a unitary means for preventing the rotation of the pipe and feeding it during the operation of the machine.

Fig. 19 is a longitudinal sectional view thereof taken on the line 19—19 of Fig. 18; and

Fig. 20 is a front elevation thereof.

The present application is a substitute for my application for Outside pipe cleaning machines, Serial #248,294, filed January 21, 1928.

My invention in the form or embodiment shown in the drawings and briefly described comprises a main frame or pedestal 10 Fig. 2, which may be constructed of channel members or in any other described manner, necessary to support the main structure of the machine. A substantially cylindrical and relatively stationary casing or hood, indicated generally as at 11, is provided with suitable supporting legs 12, which may be secured to the pedestal 10 by bolts. The casing 11 is provided with a cover portion 13, hinged

at 14 to the stationary body thereof for a purpose to be hereinafter described. The lower portion of the casing is provided with downwardly converging side members 15, and suitably spaced apart at their lower extremities adjacent to the box or drawer 16, which is longitudinally slidable with respect to the casing 11.

A supporting frame indicated generally as at 17 Fig. 6 is centrally mounted within the stationary casing 11, and rotatable with respect thereto for the purpose of housing and supporting the several series of pipe cleaning elements. With particular reference to Figs. 1, 5 and 6 of the accompanying drawings, it will be noted that the supporting frame comprises a pair of end flanges 18, a plurality of intermediate flanges or discs 19, a pair of rigidly secured connecting rods or tubes 20 and a removably mounted rod or tubular member 21. Each of the end plates or flanges 18 are provided with outwardly extending and integrally formed tubular portions 22, which are threaded at their extreme outer ends as indicated at 23. Roller bearings 24 may be interposed between the rotatable tubular portions 22 and the stationary end portions 25, which are in turn preferably bolted to the end plates 26, integrally secured to the stationary casing 11.

A sprocket wheel 27 is keyed or otherwise secured upon each of the tubular extensions 22, and is held in position by the roller bearing 24, and the adjacent end of the threaded ring or nut 28, which is mounted upon the end of each of the sleeves 22.

In order to obtain the best results, I have found it desirable to employ two units or series of cutter elements, indicated generally as at A, and one unit or compartment of brushes, shown generally as at B Fig. 1. Each of these units, A and B, are preferably assembled and conveniently slipped or spaced between either the adjacent surfaces of the flanges 19, or between the similar surfaces of the flanges 18 and 19, depending upon the desired location.

Referring now to Figs. 6 and 7, which illustrate the cutter elements, I provide a pair of oppositely disposed ring plates 29, which are provided with a plurality of substantially stationary supporting rods 30. Suitable screws and washers may be employed in the extreme ends of the rods 30, for preventing their accidental displacement, if desired.

In my present invention for cleaning the pipe "*a*", I utilize a plurality of equi-distantly spaced arms 31, which are pivoted upon the rods 30, and each provided with a weighted end 32 and a rod supporting end 33. Rods 34 are extended between the oppositely aligning ends 33 and held in position by means of cotter pins or the like for the purpose of supporting thereon a plurality of loosely mounted toothed cutters 35. These cutters 35 are also preferably separated from one another by means of loosely mounted washers, so that the cutters may more readily follow the contour of roughened portions of the pipe during the cleaning operation.

It is, of course, to be understood that the length of the weighted arms 31, together with the size of the weights 32, are predetermined, depending upon the speed of rotation and the approximate size of the pipe to be cleaned. Laterally extending projections 36 are integrally formed with the rings 29 for the purpose of providing stops to limit the outward movement of the arms 31. These lugs 36 may be provided with threaded openings for the purpose of receiving set screws for varying the limit of movement of the arms 31, if desired.

In order to prevent the cutters 35 from binding while passing over a coupling between adjacent sections of pipe, I provide on the forward end of each of the rods 34 a loosely mounted conical and grooved member 37. In this manner it will be readily understood the conical headed members 37 will ride upon the enlarged coupling and elevate the cutters to the surface of the coupling encountered.

In the embodiment of my invention illustrated in Fig. 9, I provide a suitably mounted weight 31—*a*, which is carried by the rod or arm 31—*b*, instead of the integrally weighted arm above described, thus enabling me to readily vary the effective action of the weight.

For the purpose of effectually removing all particles of loosened scale or other foreign matter from the outside of the pipe after the cutters have passed over this surface, I provide a plurality of equi-distantly spaced wire brushes, as clearly shown in Figs. 6 and 8. These brushes 40, as in the instance of the cutters 35, are moved toward the surface of the pipe "*a*", due to the use of weighted arms actuated by means of centrifugal force due to rotation of the cleaner.

The unit B also comprises a pair of oppositely disposed ring plates 41 and is supported in its relative position by means of the tubular supports 20 and 21 and may be likewise secured with respect to the rings 18 and 19, by means of screws and washers. Each of the brushes is preferably held in a substantially U-shaped or channeled member 43, which is provided with outwardly extending and integrally formed arms 44 adjacent to each end thereof. Said arms are pivotally secured by pins 51 to the outer ends of arms 46, rigidly mounted on rods 47. Levers 45 are pivoted intermediate their ends upon shafts 42, said levers being mounted to oscillate upon their respective shafts and are provided with oppositely extending and integrally cast weighted arms 48, which, for convenience of operation, are slightly offset from the arms 45. The outward movement of the weighted arms 48 is limited by the lugs 49 which may be integrally formed upon the inner sides of the ring 41, this fact being clearly illustrated by dotted lines in Fig. 8. Should a finer adjustment be desired for the limited movement of the weights 48, set screws may be provided through the threaded openings in the lugs 49. If desired, the adjustable weight such as shown in Fig. 9 may also be applied to the arms 45 in the same manner that it applies to the arm 31*b*.

The outer or free ends of the levers 45 are pivotally connected to the radially extending arms 44, at points adjacent the brushes, by means of the pins 50, which may be held in position by means of cotter pins or the like. I form the distance between the pivotal points 50 and 51 equal to the distance between the rods 42 and 47, so that the brushes 40 are thus caused to move toward and from the pipe "*a*" in a substantially radial direction, due to the fact that the arms 45 and 46 are, in effect, parallel. A relatively short lug 52 is integrally formed with each of the levers 46 and is located in the path of movement of the weighted arm 48, so as to effectually limit the movement of the weighted arm in a forward direction.

For the purpose of easily assembling the cutter and brush units A and B within their supporting frame 17, I provide the lower portions of

the rings 29 and 41 with cutout portions 38, which are provided on their upper sides with rounded or seat portions 38—*a*, adapted to fit upon the stationary tubular supports 20. A substantially circular cutout portion 39 is also provided in each of the rings 29 and 41 for the reception of the slidably mounted tubular member 21 of the supporting frame 17, as seen in Fig. 5. In this manner it will be readily understood that the several units may be detachably locked in their respective positions within the supporting frame without danger of accidental displacement.

During the rotation of the pipe cleaning cutters and brushes, it is important in this embodiment of my invention to prevent the pipe from turning. One means of accomplishing this result is clearly shown in detail in Figs. 10 to 14 inclusive.

A substantially rectangular frame 60 is preferably secured to the outer side of each of the stationary end portions 25 of the housing by bolts or in any other suitable manner. A pair of vertically extending shafts 61 are supported at the ends thereof on the frame 60 and are adapted to receive the oscillatory mounted sleeve members 62. Each of the sleeve members is provided with enlarged portions at its upper and lower ends on which are formed the longitudinally extending arms 63 to which are pivotally mounted the arms or brackets 64. Rollers or discs 65 having relatively sharp edges are mounted to rotate in the free forked ends of the arms 64 upon the pivot pins 66.

For the purpose of causing the opposite sleeve members 62 to move the arms toward or away from the pipe simultaneously, I provide the integrally formed arms 67, Figs. 10 and 12, upon the lower ends of the enlarged portions of the sleeve members and the outward or free ends of each of these arms 67 are connected together by means of the link 68 and the pivot pins 69 which may be held in their proper position by means of cotter pins. Upwardly extending lugs 70 may be formed upon the arms 67 against which the inward ends of springs 71 may bear. Said springs are coiled about the sleeves 62 and have their outer ends bearing on the frame 60. The force of said springs serves to press the wheels 65 resiliently against the pipe "*a*" to prevent the rotation of the pipe.

A relatively short lug 72 may be integrally formed upon the outer portion of each of the sleeve members 62 for the purpose of engaging the frame and limiting the outward movement of these members. In Fig. 13 is illustrated one means of adjusting the roller 65 with respect to the pipe in which the adjustment may be accomplished by means of the adjusting screws 73 mounted in the ends of the arms 63 and bearing against the transversely extending bridged member 74 upon the bracket 64.

Adjustment in the position of the rollers 65 may be otherwise effected, as illustrated in Fig. 14, which discloses a different means for readily adjusting the rollers 65 to various sized pipes. A fastening bolt 75 is extended through the outer end of the arm 63' and through an arcuate slot 76 in the bracket 64'. A washer on the bolt 75 interfits with notches in the bracket 64' to hold the arm and bracket in adjusted position when the nut is tightened on the bolt. It is, of course, obvious that when the contacting edges of the rollers or discs 65, which, as seen in Fig. 10, are preferably arranged at an angle of 90° with respect to one another, become worn, they may be reversed so that the other cutting edge will be brought against the pipe.

Figs. 15, 16 and 17 illustrate another embodiment of my invention for preventing the rotation of the pipe and yet permitting its lengthwise movement through the machine. This structure comprises a cylindrical frame 80, which is adapted to pass over the stationary end portions 25, to which it is preferably bolted, as shown. In this instance, a plurality of pairs of outwardly extending arms 81 are provided, each having in its extreme end enlarged portions for the reception of transversely extending pivot pins 82. Upon these pivot pins, I mount a bell crank member 83 which supports at one end thereof a rotatably mounted roller 84 grooved to form two marginal cutting edges similar in construction to those of the rollers 65, above described.

The relatively short arm 85 of the bell crank 83 is provided with an elongated opening 86 for the reception of a headed bolt 87. The contacting surfaces between the head of the bolt 87 and the adjacent grooves 88 of the arm 85 are rounded, as clearly shown in Figs. 16 and 17, so that the bolt may rock with respect to the arm 85.

For the purpose of adjusting the arms 83 to firmly bear against the various sizes of pipe and to also allow a certain amount of movement between the rollers 84 and the pipe, I mount arms 89 upon the pivot pins 82 adjacent one side of the bell cranks 83 and between the respective arms 81. Each of the arms 89 is provided with an offset portion 90 having an opening therethrough on one end of which is a recess for the reception of one end of a coil spring 91. The opposite end of the coil spring 91 is arranged to bear against a cup-shaped washer 92, which is loosely mounted upon the bolt 87 and held adjustably in position by means of a suitable nut and washer. A spring pressed pin 93 is suitably mounted to slide within the enlarged head or casing 94 integrally formed at the upper end of the arm 89. The outer end of each of the pins 93 is provided with an enlarged hand-operated knob 95, for permitting its ready adjustment when it is desired.

Segmental racks 96, preferably formed integrally with the member 80, are arranged in alignment with the pins 93 and are provided with a plurality of notches 97 to receive the pin 93. In this construction, it is merely necessary to disengage the pin 93 from its respective notch 97 when it is desired to reset the device for a different size of pipe. In this instance the rollers 84 are offset laterally from the radial line so that one of the edges thereof will effectually grip the pipe and present its rotation with respect thereto.

The means for feeding the pipe longitudinally through the pipe cleaning machine at the desired rate of speed as shown in Fig. 1 consists of a pair of rollers mounted on each end of the machine and driven from a common source. The upper and lower feed rollers 100 are each mounted upon a separate horizontally disposed shaft 101, which shafts are provided on their opposite ends with worm gears 102 and adapted to be engaged with suitable mating worms 103, which are in turn driven from a main shaft 104. Said shafts 101 are made flexible through the use therein of universal joints 101—*a*, as shown.

A gear change box, indicated diagrammatically as at 105, may be utilized to impart the desired speed of rotation to the shaft 104, the power being derived from the motor 106 connected with said gears.

In Figs. 3 and 4 are illustrated in detail means for causing the upper and lower feed rollers 100 to firmly bear against the pipe "*a*", for positively feeding it through the machine. In carrying out

this construction, I provide a pair of vertically spaced angle members or standards 107 which are preferably secured at their lower ends to the main frame 10, in any desired manner. The ends of each of the shafts 101, adjacent to the feed rollers 100, are adapted to be supported by slidably mounted bearings 108, which are held against rotation by the opposing surfaces of the standards 107. A loosely mounted collar 109 is supported upon each of the shafts 101 between the rollers and the slidable bearing 108, and is provided with a pair of laterally extending cup-shaped flanges 110, the cups being presented downwardly for the purpose of receiving one end of the coil springs 111. The opposite ends of the coil springs are supported by similarly constructed cup-shaped members 112, which are integrally formed with the relatively stationary supporting member 113 mounted upon the standards 107, as shown, and adapted to be firmly secured thereon by the clamping member and bolt 114 and 115. To limit the upward movement of the bearings 109 and 108 and to retain the springs 111 in their seats, I provide bolts 116 which are arranged to pass through the cup-shaped flanges 110 and 112 and said springs, as clearly shown in Fig. 4. The springs are arranged above the bearings for the upper shaft 101 and below those for the lower shaft 101 and tend to force the shafts and the rollers 100 thereon toward the pipe.

Instead of providing a separate means for preventing the rotation of the pipe "*a*" and to feed the pipe lengthwise through the machine, as previously described, I may embody these structures into a single device, as is clearly shown in Figs. 18, 19 and 20. In this instance, the frame 120 may be supported by the reduced stationary portion of the machine by bolts, as in the previous embodiment, and is provided with suitable bearings for supporting the upper and lower shafts 121 and 122. A pair of upper and lower bell crank levers 123 and 124 are carried by the shafts 121 and 122, and the substantially horizontal arm of each of these pairs of levers 123 and 124 are provided on their free ends with enlarged bearings for the reception of the rotatably mounted shafts 125. For the purpose of assuring the operation of each pair of bell crank levers, they are preferably connected together by means of sleeves or tubular members 126, rotatably mounted on shafts 121 and 122.

Upper and lower toothed rollers 127 are fixed upon the shafts 125 and concaved to fit the pipe operated upon. By grooving these rollers 127 circumferentially to conform to a substantial saw teeth formation and at the same time have the outer edges thereof arcuate, a positive gripping action will be effected between the rollers and the pipe to prevent the rotation of the pipe with respect thereto. With particular reference to Fig. 20, it will be noted that the tendency of the pipe "*a*" to rotate is indicated by the dotted arrow and that the teeth are inclined on both upper and lower rollers to resist this rotation and to prevent the turning of the pipe in that direction.

For the purpose of positively feeding the pipe "*a*" lengthwise while it is being held against rotation between the rollers 127, I provide each of the rollers with a plurality of suitably spaced longitudinal grooves 128. These grooves, of course, have the effect of more readily gripping or biting the pipe to exert a traction force thereon and move it lengthwise. A pair of tension springs 129 are secured between each pair of upper and lower arms 123 and 124, and preferably at the outer ends thereof, as clearly shown in the drawings. Adjustable stop members 130 and 131 are carried by the upper and lower arms 123 and 124 for the purpose of limiting the inward movement of the rollers, as for example when the pipe "*a*" is out of the path of movement of the rollers. I provide for uniform movement of the traction rollers 127 through the arms 132 which are integrally formed upon each of the arms 123 and 124. These arms extend inwardly and are pivotally connected together by means of links 133, the pivot pins being preferably held in position by means of cotter pins. These links 133 will, of course, effectually cause the rollers 127 to simultaneously move toward and from each other for gripping or releasing the pipe "*a*". The means for driving the shafts 125 may, of course, be similar in construction to the means for driving the shafts 101, previously mentioned. (See Figs. 19 and 20.)

The supporting frame 17 and the cleaning elements secured thereon in the manner previously set out is rotated about the pipe as it is fed through the machine through the motor 106, previously mentioned. Operative connections are made through the variable speed changing device 105 and the shaft 135, shown in Fig. 1, operated thereby. The connection between said shaft and the sprocket wheel 27, previously mentioned is made through a sprocket chain 137 connecting said sprocket wheel with a similar wheel 136, mounted upon said shaft 135. As will be seen from Fig. 1, there are operative connections of identical structure between said shaft 135 at both ends of the rotating frame.

The heavier particles of foreign matter which are separated from the pipe during the cleaning operation fall between the inclined sides 15 of the casing 11 into the elongated slidable drawer 16, whereas the finer particles or dust are preferably drawn by suction from one end of the casing 11 by means of the suction fan shown diagrammatically as at 138. The outlet of the exhaust from this fan may, of course, be remote from the machine, as desired. The pivotally mounted cover 13 of the casing 11 permits the ready access to the interior of the casing when it is desired to insert or remove the cleaning elements from its respective supporting frame.

In the operation of my device, the rotating of the frame 17 with the cleaning elements thereon, as described, will carry the cleaning elements, both the cutters and the brushes, around the pipe and the speed of rotation may be varied, as described. The cutters 35 will be moved inwardly toward the pipe as the speed of rotation becomes sufficient to throw the weighted ends 32 of the levers 31 outwardly away from the center, thus carrying the cutting discs against the pipe to chip off and remove the scale and corrosion from the surface of the pipe. It will be obvious that the cutters may be moved away from the pipe when the device is not in operation so as not to interfere with the movement of the pipe through the frame, and when the pipe has been removed, the inward movement of the cutters thereafter will be limited by the throwing of the weighted ends 32 of the levers in contact with the lugs or stop members 36. Obviously, the pressure exerted by the cutters upon the pipe is a function of the speed of rotation of the frame and may be thus regulated. Where the movable weight 31—*a* is employed, the pressure of the cutters may be also varied by the effective length of the arm 31—*b*.

The brushes 40 are also brought in contact with the pipe through the weighted arms 48 upon the levers 45. The arrangement previously described of the two swinging arms 45 and 46 connected in substantially parallel relation with the arms 44 upon which the brushes are mounted causes the brushes to move in radial alignment to and from the pipe. Obviously, the pressure of the brushes against the pipe in this arrangement is also a function of the speed of rotation of the supporting frame.

The arrangement whereby the pipe is moved through the machine and held in properly spaced relation axially thereof has been previously described, and, as will be seen, this structure may be varied within certain limits without departing from the spirit of the invention. It is contemplated that various expedients functioning in the manner of the structures herein described may be employed without departing from the spirit of the invention. I do not wish to be limited, therefore, in the exact construction of the elements employed in carrying out my invention further than comes within the scope of the claims herewith.

What I claim as new and desire to protect by Letters Patent is:

1. In a pipe cleaner, a supporting housing, a frame rotatably mounted therein, said frame comprising a plurality of spaced parallel annular discs, a plurality of rods extending through said discs, one of said rods being removable, a cleaning unit mounted in said frame, said unit including end plates having marginal notches therein to receive said rods, cleaning elements between said plates, and means to rotate said frame.

2. In a pipe cleaner, a supporting housing, a frame rotatably mounted therein, said frame comprising a plurality of spaced parallel annular discs, a plurality of rods extending through said discs, one of said rods being removable, a cleaning unit mounted in said frame, said unit including annular end plates, bearing rods between said plates, cleaning elements on said bearing rods, said plates having marginal notches to removably receive said first named rods, and means to rotate said frame.

3. In a pipe cleaner, a support, a frame rotatably mounted therein including two spaced annular end discs, hollow trunnions thereon, supporting rods connecting said discs one of said rods being removable, intermediate discs on said rods, cleaning units adapted to be received between said discs, including end plates having marginal notches to receive said rods, bearing rods between said plates and cleaning elements pivotally mounted thereon to move inwardly as said frame is rotated.

4. In a pipe cleaner, a rotatable frame, cleaning units mounted therein and removable as a unit therefrom, said units including annular plates. bearing rods connecting said plates, levers on said rods, cleaning elements on said levers, and means responsive to the rotation of said frame to move said elements inwardly.

5. In a pipe cleaner, a rotatable frame, cleaning units mounted therein and removable as a unit therefrom, said units including annular plates, bearing rods connecting said plates, cleaning elements mounted between said plates, and means responsive to the rotation of said frame to move said elements inwardly.

6. In a pipe cleaner, a supporting casing, a frame rotatable therein, cleaning elements in said frame, a plurality of pipe supporting arms extending longitudinally from each end of said casing, rollers on said arms edged to engage the pipe and resist rotation thereof, said rollers being grooved to form two pipe engaging edges and mounted in a position offset from a radial line so that said rollers may be reversed, as described, and means to advance the pipe through said frame.

7. In a pipe cleaner, a support, a frame mounted for rotation therein, said frame comprising annular discs adapted to encircle the pipe, rods connecting said discs, pipe cleaning units mounted on said rods between said discs, said rods fitting in peripheral notches in said units one of said rods being removable to release said units from said frame and means to rotate said frame.

8. In a pipe cleaner, a rotatable frame, a cleaning unit mounted thereon including end plates, rods connecting said plates, brush elements, arms thereon, a pair of levers pivoted on said rods and pivotally engaging said arms, and a weighted extension on one of each pair of said levers acting to assist in forcing said brushes inwardly toward the pipe.

9. A pipe cleaner support, rectangular frames at each end thereof, opposite shafts on said frames, sleeves rotatable on said shafts, arms on said sleeves, brackets pivoted on said arms, and pipe-engaging rollers on said brackets.

10. A pipe cleaner support, rectangular frames at each end thereof, opposite shafts on said frames, sleeves rotatable on said shafts, arms on said sleeves, brackets pivoted on said arms, pipe engaging rollers on said brackets, means to hold said arms resiliently inwardly and means to adjust said brackets relative to said arms.

11. In a pipe cleaning machine, a supporting casing, a frame thereon adapted to rotate about the pipe, cleaning elements thereon, longitudinally extending arms parallel with the pipe at each end of said casing, idle rollers thereon to contact with and guide the pipe, means engaging said arms to hold said rollers resiliently against the pipe, and separate means spaced outwardly from said idle rollers to move the pipe through said machine.

12. In a pipe cleaner, a supporting casing, a frame rotatable therein, cleaning elements in said frame, a plurality of pipe supporting arms secured to and extending longitudinally from each end of said casing, rollers on said arms edged to engage the pipe and resist rotation thereof, and means comprising upper and lower rotated rollers to advance the pipe through said frame.

FRED McMANIS.