Jan. 27, 1953

W. A. KRANER

2,626,717

PIPE FEEDING DEVICE

Filed April 29, 1950

4 Sheets-Sheet 1

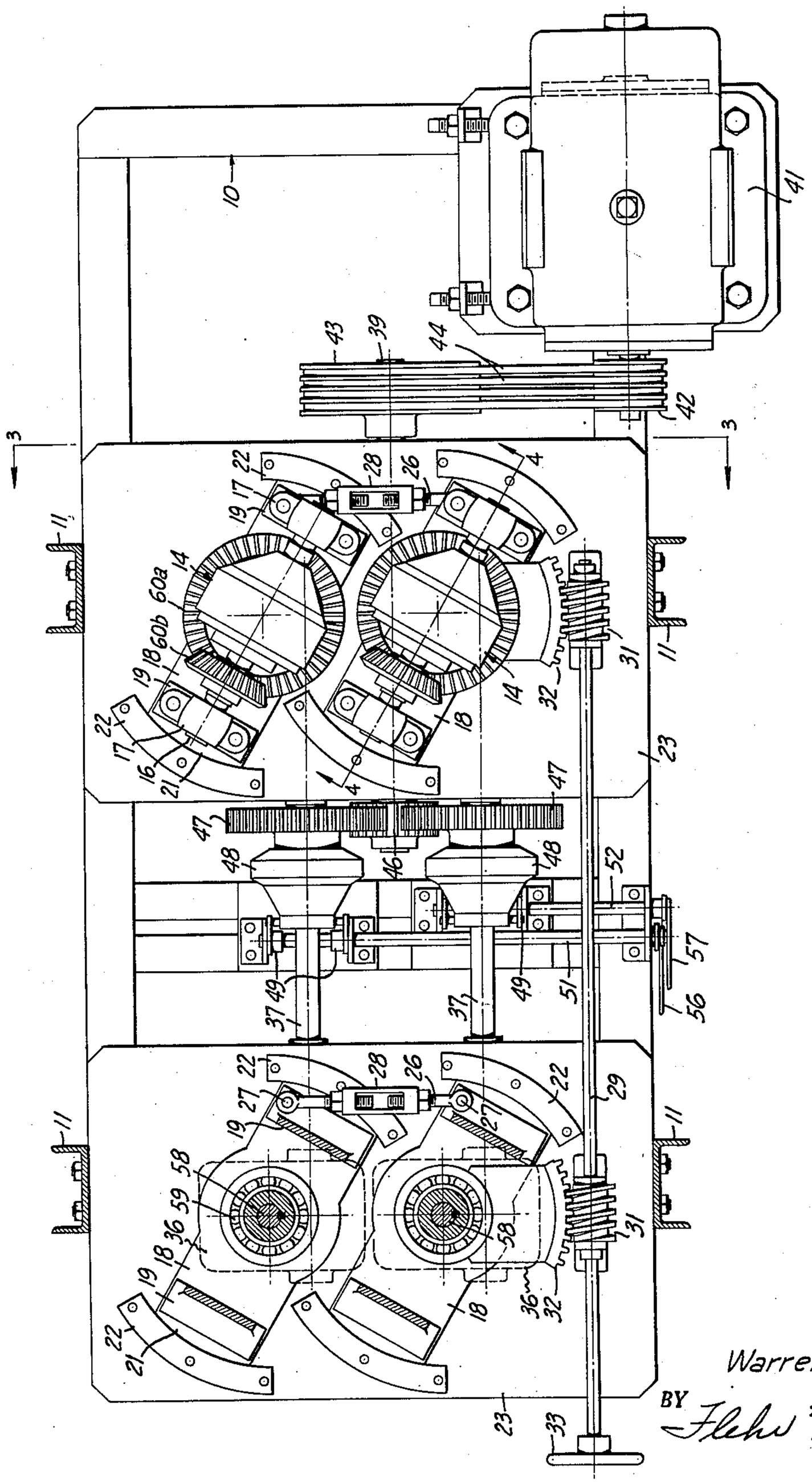

FIG. 1

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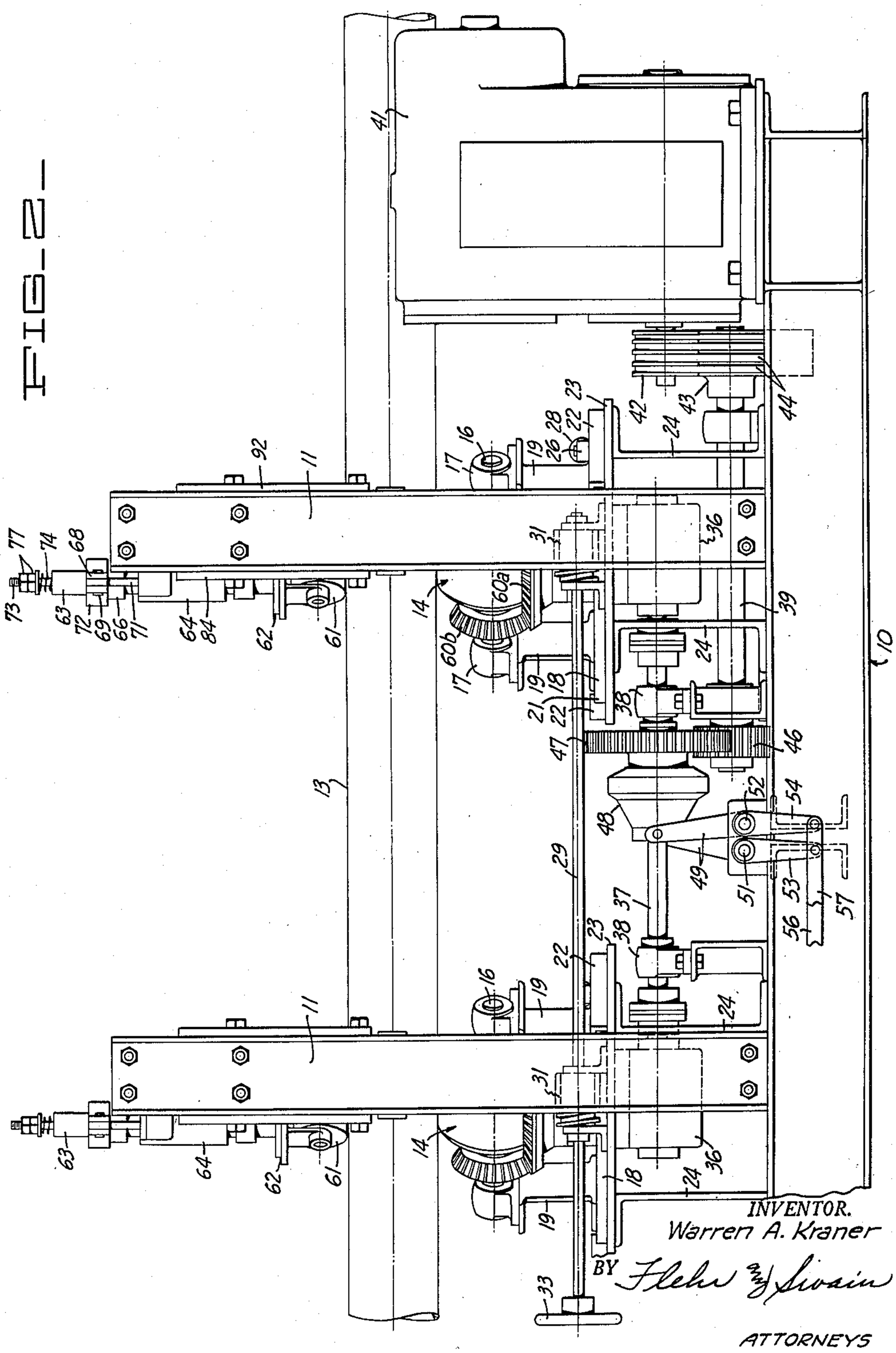
FIG. 2



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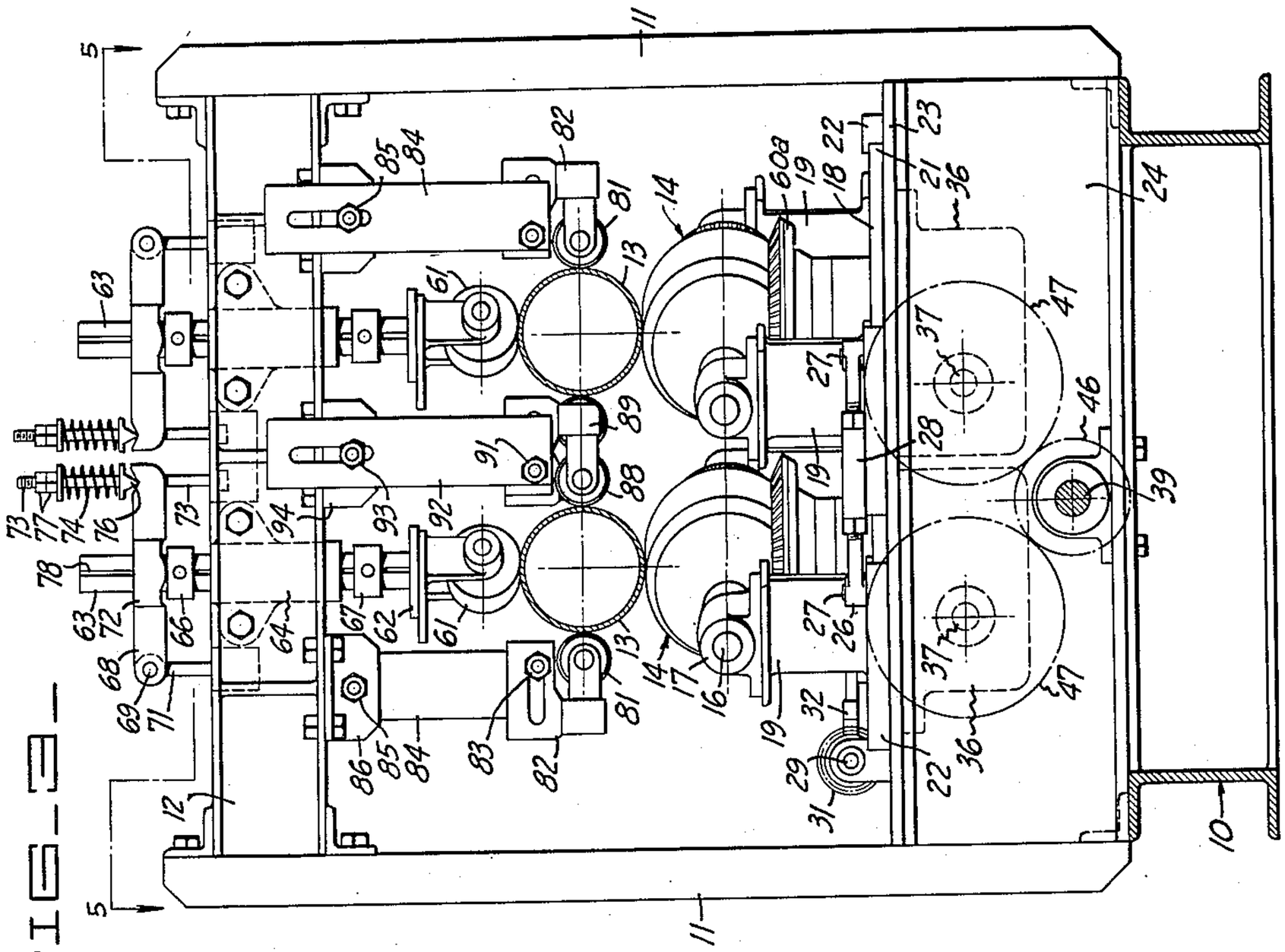
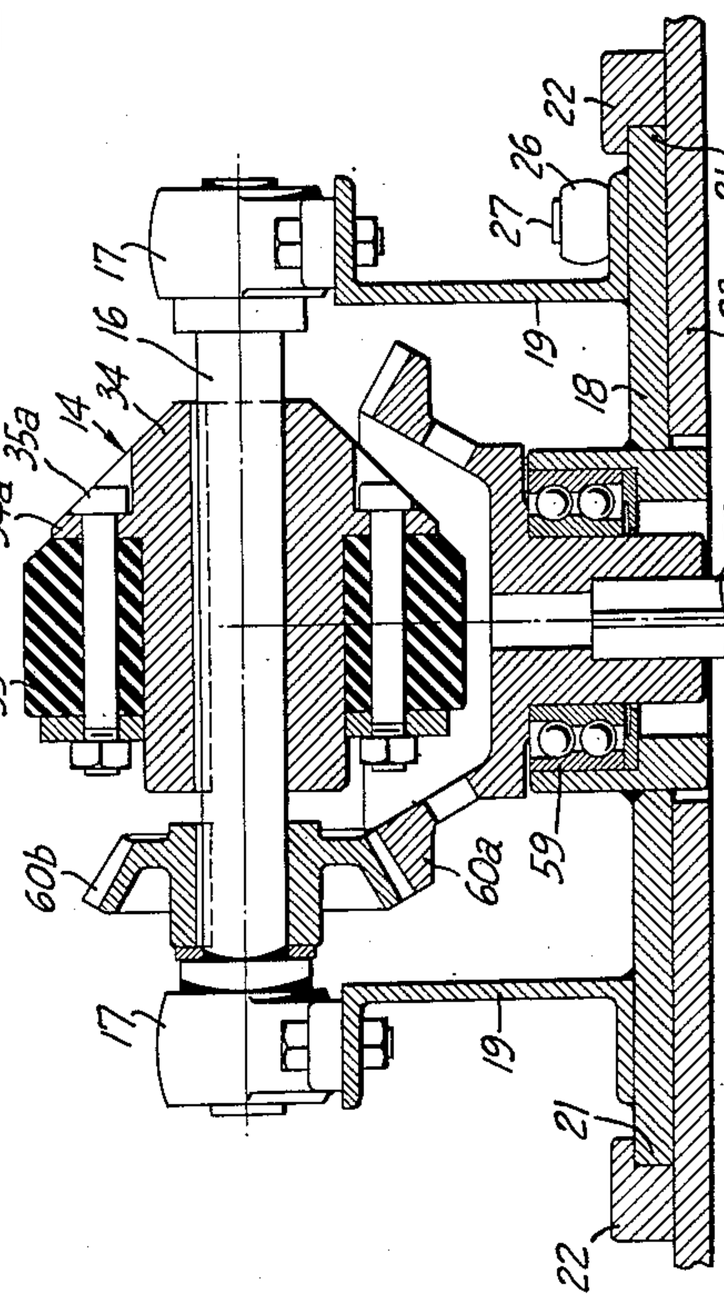
FIG—3—



FIG—4—



FIG—5—

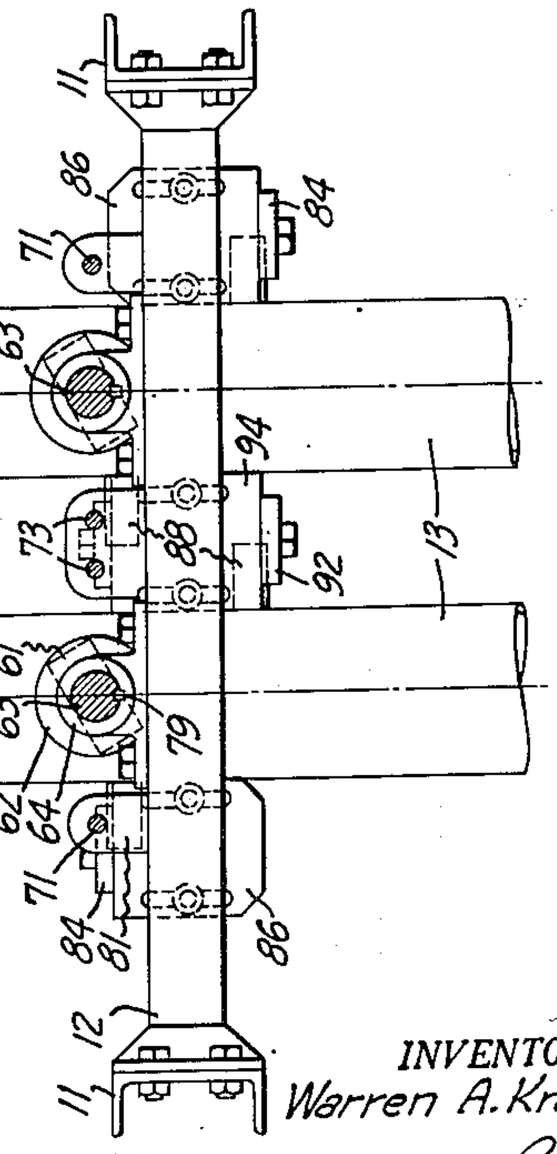


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FIG-6-

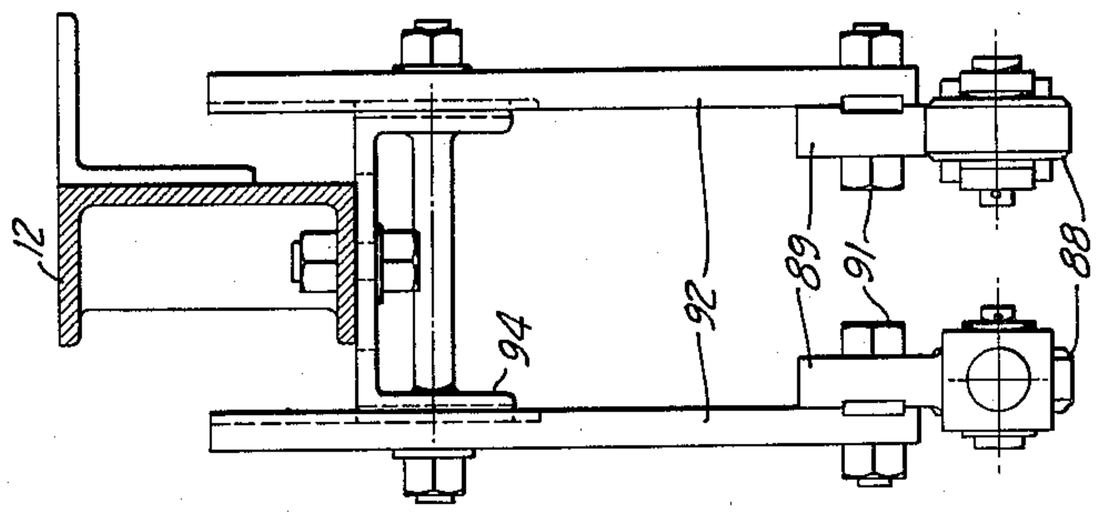

FIG-5-

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PIPE FEEDING DEVICE

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Application April 29, 1950, Serial No. 159,012

3 Claims. (Cl. 214—1)

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This invention relates generally to feeding machines such as are useful to supply pipe or conduit to coating, wrapping or other processing operations, at controlled longitudinal and rotational rates.

Various machines have been developed for performing processing operations on steel pipe such as is used in water, gas or oil distribution systems. For example, in some instances it is desirable to feed used pipe to devices which serve to remove scale and other foreign material for the purpose of conditioning the pipe for coating operations. In other instances new or cleaned pipe is supplied to operations for applying a helicoidally wound protective wrapping or other type of coating. In some of the more elaborate machines the pipe may be fed continuously through both cleaning and coating operations. In all such machines it is necessary to provide accurate means for feeding the pipe at a controlled rate. In most instances it is desirable for the pipe to rotate at a predetermined speed, while advancing the same in a longitudinal direction. It is desirable to have the rate of feed adjustable over a relatively wide range at the will of the operator. This is important because in operations such as application of a protective coating in the form of a helicoidal wrap, proper wrapping of the adjacent convolutions is dependent upon proper feeding of the pipe. Also in such wrapping operations it is desirable to turn the pipe at a relatively slow constant rate.

It is an object of the present invention to provide an improved pipe feeding machine which can be used to advantage in conjunction with pipe cleaning or pipe coating operations, and which enables close regulation and adjustment of the feed rate.

Another object of the invention is to provide a novel machine of the above character having novel provision for controlling and adjusting of the longitudinal rate of feed of the pipe.

Another object of the invention is to provide a machine of the above character which can be adjusted with respect to the rate of feed while the machine is in operation.

Another object of the invention is to provide a machine of the above character which can be employed to feed two pipes simultaneously.

Further objects of the invention will appear from the following description in which the preferred embodiment has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Figure 1 is a plan view, partly in section, and

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illustrating a machine incorporating the present invention.

Figure 2 is a front view of the same machine shown in Figure 1.

Figure 3 is a cross-sectional view taken along the line 3—3 of Figure 1.

Figure 4 is a cross-sectional detail taken along the line 4—4 of Figure 1, and on an enlarged scale.

Figure 5 is a cross-sectional view taken along the line 5—5 of Figure 3.

Figure 6 is a fragmentary detail illustrating particularly the rollers which engage the inner sides of the two pipes, and the adjustable mounting for the same.

Figure 7 is a side view of the same mechanism illustrated in Figure 6.

In general my machine consists of a suitable base support or frame 10, which serves to carry all of the working parts. Vertically extending structural members 11 are secured to the base, and are connected at their upper ends by the cross-beams or structural members 12. Preferably the machine is constructed to simultaneously feed two pipes such as indicated by the numerals 13 in Figures 3 and 5. When being fed by the machine these pipes extend side by side and parallel, and are fed horizontally to a pipe cleaning, coating or wrapping machine which may for example be located to the left of the machine as illustrated in Figure 2.

The pipes are engaged at two points along their lower sides by the drive rollers 14. The rollers 14 are grouped in two sets as shown particularly in Figure 2, whereby two aligned rollers engage the lower side of a pipe at longitudinally spaced points.

The means for supporting and for driving each of the rollers 14 is the same in each instance, and is preferably as follows: As shown particularly in Figure 4 each roller 14 is carried by a shaft 16, which in turn is carried by the bearing blocks 17. A plate 18 underlies the shaft 16 and carries brackets 19 which in turn serve to mount the journal blocks 17. Plate 18 has arcuately contoured end portions 21 which are engaged by the arcuate flanged members 22. A plate 23 forms in effect a supporting table for plate 18, and also serves to mount the retaining members 22. Each plate 23 is fixed to the base of the machine by brackets 24. The plate 18, together with brackets 19 and the parts supported by the same for journaling the roller 14, can be termed a head which is adjustable about a vertical axis whereby the roller can be turned

to change its angular position with respect to the pipe. The vertical axis intersects the axis of the roller shaft 16.

As shown particularly in Figure 2 it is desirable to connect two adjacent heads together for conjoint adjustment. Thus links 26 are pivotally attached at 27 to the adjacent plates 18, and are provided with a turnbuckle arrangement 28 to facilitate setting the adjacent drive rollers 14 at the same angle.

Manual means is provided for changing the angular setting of all of the heads and the drive rollers 14. For this purpose a shaft 29 is journaled along one side of the machine (Figure 1) and is provided with worm gears 31 for engaging the worm gear racks 32. Upon turning the hand wheel 33, which is attached to one end of the shaft 29, the plates 18, to which the racks 32 are secured, are turned to a desired angle.

The roller 14 can be suitably constructed to provide a resilient friction surface for engaging and driving the pipe. Thus each roller may consist of a metal hub 34, which serves to support a ring 35. This ring forms in effect a replaceable rubber tire, and can be formed of suitable resilient material such as synthetic rubber, which will provide a proper grip upon the surface of the pipe. It is retained on the hub by the bolts 35*a*, which extend through the flange 34*a* of the hub 34.

Each of the rollers 14 is driven to rotate and advance the engaged pipe at a predetermined speed. The driving means employed for this purpose is arranged concentric with the axis about which each roller is adjustable. Thus below each support plate 23, there are two gear boxes 36 (Figure 3), the gears of which connect with the horizontal shafts 37. Each shaft 37 is suitably journaled as by means of the journal boxes 38.

Extending below the shafts 37, there is a longitudinal drive shaft 39. This shaft is driven by suitable means such as the electric motor 41, which connects with the shaft through the multisheave pulleys 42, 43 and the V belts 44. Shaft 39 carries a drive pinion 46, which meshes with the two gears 47. These gears are loose upon the shafts 37, but are adapted to have driving relation with the same through the clutches 48. Clutch shift levers 49 operatively engage the moving parts of clutches 48, and may be operated from a remote point, through the shafts 51, 52, arms 53, 54 (Figure 2) and links 56, 57.

Vertical shafts 58 connect with the gears within the boxes 36, and the upper ends of these shafts are journaled as by means of ball bearing assemblies 59 to the plates 18. A bevel gear 60*a* is secured to the upper end of each shaft 58, and meshes with a bevel gear 60*b*, which in turn is secured to the shaft 16. Thus when a shaft 58 is rotated, the bevel gears cause continuous rotation of shaft 16, and such rotation takes places for any angular setting of shaft 16 relative to the axis of the pipe.

Additional means is provided for retaining the pipes on a definite feed axis, and for urging the same into frictional relation with the rollers 14. Thus the upper sides of the pipe are engaged by the hold down rollers 61 (Figure 3). Each of these rollers is journaled to a forked member 62, which in turn is attached to the lower end of a vertical shaft 63. Castings 64 are carried by the cross-beam 12, and form means for mounting the shafts 63 whereby these shafts are free to slide a limited distance in a vertical direction. Upper and lower collars 66 and 67 are adjustably secured to each shaft 63, and function as limiting stops. Each shaft 63 is urged downwardly toward the pipe being engaged by spring means which can be constructed as follows: An arm 68 is pivotally secured at 69 to a stud 71, which in turn is secured to the beam 12. Each lever 68 is provided with a widened portion 72 which has an opening for loosely embracing the shaft 63. The free extremity of the lever 68 is forked to accommodate a rod 73, which is likewise mounted on beam 12. The rod 73 carries a compression spring 74, the lower end of which seats upon a follower 76. The follower is normally engaged with the free end of lever 68, thereby urging this lever downwardly and against the collar 66. Nuts 77 can be adjusted to vary the tension of spring 74.

It is desirable that shafts 63 be nonrotatable about a vertical axis, and therefore each shaft is provided with a keyway 78 engaged by a key 79 (Figure 5).

Additional roller means is provided for retaining the pipe between the rollers 14 and 61. Thus the outer sides of the pipes are engaged by the rollers 81, which are journaled to the members 82. These members have adjustable bolt and slot connections 83 with depending support members 84. The support members in turn preferably have adjustable bolt and slot connections 85 with brackets 86 which are mounted on the beam 12.

The inner opposed sides of the pipe are likewise preferably engaged by rollers 88 (Figures 6 and 7), which are journaled to the members 89. Members 89 have adjustable bolt and slot connections 91 with the lower ends of the support members 92. Members 92 in turn have adjustable bolt and slot connections 93 with brackets 94 which are carried by the beams 12.

The machine described above operates as follows: The working parts of the machine are first adjusted in accordance with the sizes of pipe to be handled. Thus with two lengths of pipe in the machine and upon the drive rollers 14, the tension of springs 74 is adjusted whereby the rollers 61 are pressed downward with considerable force upon the pipes, and the locations of rollers 81 and 88 are adjusted so that these rollers engage the sides of the pipe, thus preventing the pipe from moving laterally. Wheel 33 is turned to locate the angular positioning of drive rollers 14, in accordance with the rate of advancement desired. Rotating the hand wheel 33 in such a manner as to swing the drive rollers clockwise as viewed in Figure 1, serves to increase the rate of advancement of the pipe, while adjustment to turn the drive rollers in a counterclockwise direction from the position shown in Figure 1, serves to decrease the advancing movement. Upon starting the electric motor 41, the shaft 39 is driven continuously, and thereafter either one or both of the pipes can be rotated and simultaneously advanced by engaging the proper clutch 48. Assuming that both clutches are engaged, the shafts 37 are rotated, and this causes rotation of the bevel gears 60*a*, 60*b*, to rotate the shafts 16 and drive rollers 14. Turning of the drive rollers 14 causes the pipes to be rotated, and simultaneously the pipes are advanced longitudinally, because each roller 14 has its axis inclined to the axis of the pipe. If during the operation of the machine it is desired to adjust or modify the rate with which a pipe is being advanced, it is only necessary to turn the hand wheel 33 in one direction or the other, to change the angular setting of the drive rollers.

The pipe sections being handled by the machine may be either coupled together, by the use of suit-

able coupling devices, or new sections may be introduced into the machine manually by applying their forward ends in abutting relationship with the rear ends of sections being fed from the machine.

It will be evident that my machine is particularly advantageous when it is desired to accurately feed pipe to operations when accurate advancement for a given speed of rotation is necessary or advantageous. Thus my machine can be used to particular advantage where it is desired to feed pipe to operations for the application of protective wrappings. Wrappings of materials such as tar paper can be applied with accurate positioning of adjacent convolutions, in order to avoid undesirable overlap or a spacing between convolutions which would leave a part of the pipe improperly protected. The pipe can be rotated at speeds sufficiently slow to facilitate application of bitumen and other coating materials in conjunction with application of such wrapping. The machine has high capacity particularly because it can feed two pipes simultaneously.

I claim:

1. In a pipe feeding machine, a base support, a drive roller disposed on a horizontal axis, the periphery of said roller being adapted to engage one side of a horizontal pipe, a roller adapted to engage the diametrically opposite side of the pipe to urge the pipe against said drive roller, a horizontal shaft serving to mount the drive roller, a horizontal mounting plate, journal means carried by said mounting plate and serving to journal the end portions of the shaft, said plate having arcuately contoured end portions, a base plate carried by the base support and underlying the mounting plate, arcuate guideways on the base plate serving to retain said arcuate end portions of the plate whereby said mounting plate can be turned about a vertical axis, means including a rotatable shaft extending through said mounting plates in alignment with said vertical axis for driving the drive roller, and means for adjustably turning the mounting plate about said vertical axis to thereby adjust the angle of the roller axis relative to the axis of the pipe.

2. A machine as in claim 1 in which said last named means consists of a gear segment mounted upon the mounting plate and a rotatable worm gear rotatably mounted upon the base plate, the worm gear engaging the gear segment to effect adjustment of the mounting plate responsive to turning the worm gear.

3. In a pipe feeding machine, a base support, a drive roller, the periphery of said roller being adapted to engage the underside of a horizontal pipe, a horizontal shaft serving to mount the roller, means serving to urge a pipe against the periphery of the roller to thereby provide frictional driving engagement between the roller and the pipe, a mounting plate underlying the roller, journal means carried by said mounting plate and serving to support and journal the shaft, said plate having arcuately contoured end portions, a base plate directly underlying the mounting plate and secured to said base support, arcuate guideways carried by the base plate and engaging said arcuately contoured end portions of the mounting plate, whereby the head can be adjusted about a vertical axis which intersects the horizontal axis of the roller, a shaft concentric with said vertical axis and extending through both said plates, a beveled gear attached to the upper end of said shaft, and a beveled gear mounted upon said roller shaft and operatively engaging said first named beveled gear, rotation of said vertical shaft serving to drive the roller to cause rotation of the pipe.

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