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TWO-WAY PIPE ROLLER REST

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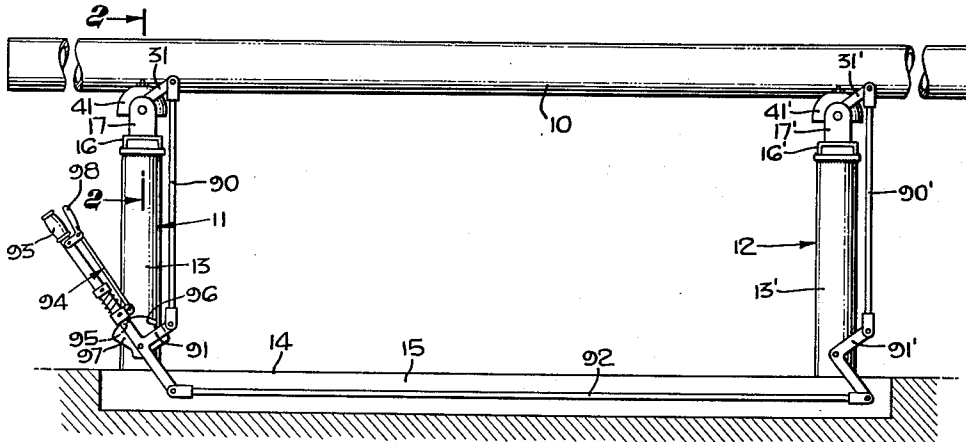


Fig. 1.

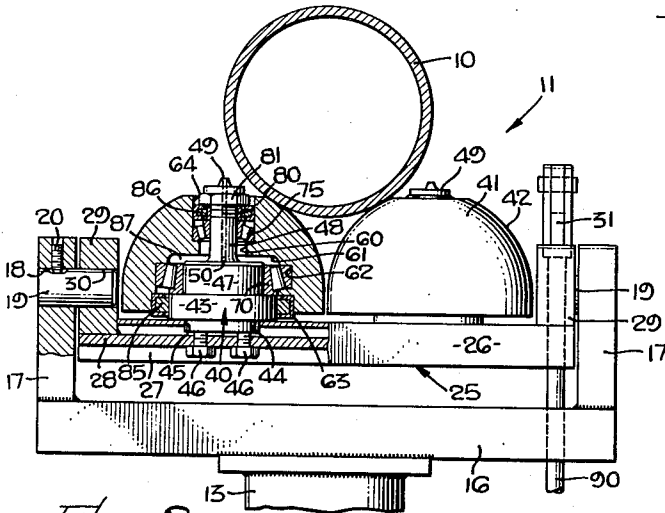


Fig. 2.

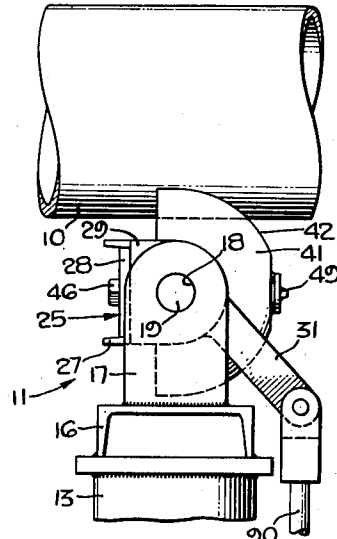


Fig. 4.

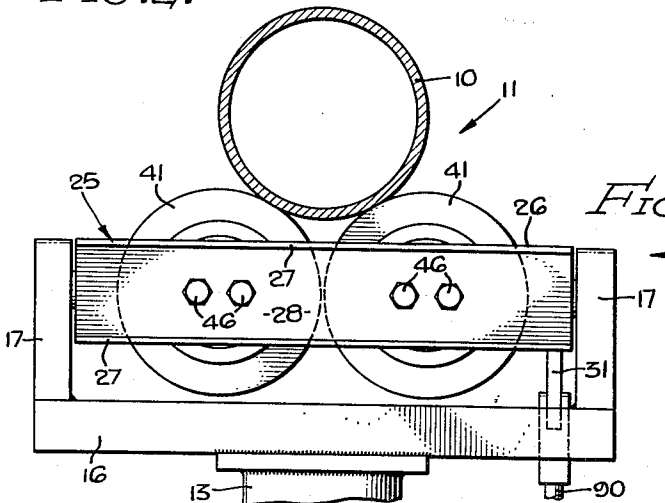


Fig. 3.

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TWO-WAY PIPE ROLLER REST

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6 Claims. (Cl. 214-1)

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This invention relates to equipment for handling pipe and particularly to supports for pipe permitting this to be optionally fed longitudinally or rotated about its own axis.

It is an object of this invention to provide a two-way pipe roller rest which may be provided in single or multiple units to support a length of pipe and which will support said pipe by rolling contact therewith when said pipe is shifted longitudinally and which is readily adjustable to support said pipe by rolling contact therewith when said pipe is rotated about its own axis, said adjustment being affected without a substantial change in the level at which said pipe is supported.

It is another object of this invention to provide such a two-way pipe roller rest in which said pipe is supported for longitudinal movement on the same rollers on which said pipe is supported for rotational movement.

Another object is to provide such an invention which will require a minimum of attention for cleaning and lubrication and will operate for long periods in the presence of considerable amounts of scale and other abrasive matter without attention for maintenance being necessary.

The manner of accomplishing the foregoing objects as well as further objects and advantages are made manifest in the following description taken in connection with the accompanying drawings in which

Fig. 1 is a diagrammatic elevational view of a pair of two-way pipe roller rest units in which the present invention is embodied.

Fig. 2 is an enlarged vertical sectional view through one of said units and is taken on the line 2-2 of Fig. 1 and shows the pipe supporting rollers positioned to support a length of pipe for longitudinal movement.

Fig. 3 is a view similar to Fig. 2 and illustrates the roller base of said unit swung to position the pipe supporting rollers to support said pipe for rotational movement.

Fig. 4 is a side elevational view taken in the direction of the arrow 4 in Fig. 3.

Referring specifically to the drawings and particularly to Fig. 1 a length of pipe 10 is here shown as being supported on a pair of two-way pipe roller rest units 11 and 12 which are identical in construction so that a description of one will suffice for both.

Unit 11 includes a standard 13 which is mounted in the ground or pavement 14, there being a ditch 15 formed in the latter for a purpose to be presently described.

Unit 11 also includes a cradle base 16 which is fixed on the upper end of the standard 13 and has posts 17 welded to its opposite ends and extending upward in parallel relation. These posts are provided with aligned bores 18 for receiving pins 19 which are held in fixed positions by set screws 20 provided in said posts. Swingably supported on pins 19 is a cradle 25 including a longitudinal member 26 which is fabricated to include a piece of channel iron 27 and a bar 28 which fits between the flanges of channel iron 27 and is welded thereto. Welded to opposite ends of longitudinal member 26 and extending upwardly therefrom are arms 29 having aligned bearing apertures 30 into which the pins 19 extend to swingably support the cradle 25.

One of the arms 29 is provided with a control arm 31 the purpose of which will be made clear hereinafter.

Rotatably mounted on the longitudinal member 26 by means of a pair of mandrels 40 is a pair of rollers 41 having hemispherical external surfaces 42. The mandrels 40 are mounted with their axes substantially parallel with the arms 29 and intersecting the axis of the pins 19 at the center points of the hemispherical surfaces 42 of rollers 41.

Each mandrel 40 is shaped as shown in Fig. 2 to include a base section 43 from which a boss 44 extends downwardly through one of a pair of holes 45, formed in the channel iron 27 of the longitudinal member 26. Cap screws 46 extend up through suitable apertures in the bar 28 and screw into tapped holes in the boss 44 to rigidly assemble mandrel 40 on the longitudinal member 26. Each mandrel also includes a main bearing section 47 and a stem section 48 the upper end of which is threaded and is provided with a lubrication nipple 49 which connects through a hole 50 with the space surrounding the base of the stem section 48.

Each roller 41 has a bore 60 from which are formed lower counter-bores 61, 62 and 63 and an upper counter-bore 64. Resting in the counter-bore 62 against the shoulder formed at the upper end thereof is a main thrust bearing 70 the inner race of which fits over the mandrel section 47 against the base section 43. Slidably fitting into the counter-bore 64 against the shoulder at the lower end thereof and about the mandrel stem section 48 is a secondary thrust bearing 75. Also slidably receiving the mandrel stem portion 48 and resting on the inner race of bearing 75 is a sleeve 80 against which a nut 81 presses, when it

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is screwed downwardly onto the threaded upper end of the stem section 48, to compactly unite the roller 41 and bearings 70 and 75 in assembled relation on the mandrel 40 with the center point of the surface 42 of said roller lying at the intersection of the axis of this mandrel and the axis of pins 19. Fitting tightly in the counter-bore 63 is a peripherally metal-shod packing ring or seal 85 the inner face of which slides upon the periphery of the mandrel base section 43. Fitting tightly into the counter-bore 64 is a peripherally metal-shod packing ring or seal 86 the inner surface of which slidably fits the sleeve 80, the packing rings 85 and 86 excluding abrasive matter from the space 87 between the mandrel 40 and the roller 41 in which the bearings 70 and 75 are disposed.

The bearings 70 and 75 are supplied with lubricant injected into the space 87 through the hole 50 by a grease gun applied to the nipple 49.

In referring to parts of unit 12, use will be made of reference numerals applied to similar parts of unit 11 with prime attached. For controlling the units 11 and 12 links 90 and 90' are pivotally connected at their upper ends to arms 31 and 31' and at their lower ends to the upper arms of bell cranks 91 and 91' which are pivotally mounted on the standards 13 and 13', the lower arms of said bell cranks extending downward into the ditch 15 and being pivotally connected with opposite ends of a link 92. The bell crank 91 has a handle 93 equipped with a spring mechanism 94 which yieldably urges a dog 95 into one or the other of two notches 96 provided in a quadrant 97 which is fixed to the standard 13 to set the units 11 and 12 with the axes of the rollers 41 and 41' thereof either in vertical position as shown in Figs. 1 and 2 or horizontally disposed as shown in Figs. 3 and 4. The mechanism 94 is adapted to be actuated to withdraw the dog 95 from the notch 96 in which it is resting by simultaneously claspings the handle 93 and a bell crank 98 of said mechanism.

When the rollers 41 and 41' are positioned with their axes vertically as shown in Figs. 1 and 2, pipe 10 may be caused to roll longitudinally on these rollers with the application of relatively small effort. At any time while the pipe 10 is resting on units 11 and 12 that it may be desired to rotate said pipe, as to facilitate a slotting operation thereon, the dog 95 is withdrawn from the notch 96 in which it rests, as shown in Fig. 1, the handle 93 is swung to the point at which the dog 95 is propelled by the mechanism 94 into the other notch 96 in quadrant 97, thereby swinging the cradles 25 of units 11 and 12 90 degrees about the axes of the pins 19—19' and then setting said cradles in their new positions as shown in Figs. 3 and 4.

The rollers 41 and 41' are now disposed with their axes parallel with the axis of the pipe 10 so as to give rolling support to said pipe whereby the latter may with relatively small effort be rotated about its own axis.

After the desired rotation of pipe 10 has been accomplished, the setting of units 11 and 12 may remain unchanged to facilitate further rotation of pipe 10 at a later stage in whatever operations are being performed thereon in connection with its being supported on units 11 and 12 or, if no further rotation is anticipated as desirable prior to it again being necessary to shift pipe 10 longitudinally, the units 11 and 12 may again be reset with the roller axes vertical, by a reverse action of the lever 93 to that described herein-

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above in which said axes were changed from vertical to horizontal.

The present invention is especially adapted for use in connection with pipe slotting machines in which gang mills are employed. In such an operation a pipe length 40 ft. long might be slotted by a gang mill capable of forming slots in only 10 ft. of pipe at one time. To bring the pipe 10 into this machine and locate it for starting the slotting operations on the initial 10 ft. of said pipe, the rollers 41—41' are positioned with their axes vertical. To slot the first ten foot section of this pipe length the milling machine makes a series of single file rows of slots in said section, the pipe 10 being rotated by uniform stages between successive slotting operations so that lines of slots are formed in said section of pipe entirely around the same at uniform spaced intervals. To facilitate rotating the pipe 10 during this series of operations, the rollers 41—41' would be disposed with their axes horizontally. As soon as this series of operations are completed, however, and it is desired to perform a similar series of operations on the next ten foot section of the pipe length 10, the rollers 41—41' are returned to their position shown in Fig. 1 which facilitates shifting the pipe length 10 longitudinally ten feet further into the milling machine. As soon as the pipe 10 is properly repositioned lengthwise for this new series of operations the lever 93 is swung ninety degrees to position rollers 41—41' as shown in Figs. 3 and 4.

A particular advantage of this invention may be seen in the fact that support of the pipe length 10 on the rollers 41—41' is maintained without lifting or lowering said pipe when said rollers are swung between one of their two positions above described and the other of said positions. This is because in being shifted from one of said positions to the other, said rollers are swung about the center points of the hemispherical surfaces 42 of said rollers upon which said pipe is resting and because the axes of said rollers are parallel and are swung in vertical planes to effect each of said shifts in position.

One of the results of this is to make it relatively easy to swing the lever 93 in shifting the rollers of units 11 and 12 between their two operating positions. Another result is to reduce the strain and consequent wear on the mechanism for controlling the positions of said rollers.

In my co-pending application Serial No. 127,125 filed on November 14, 1949, I have disclosed a method and apparatus for slotting screen pipe. Included in said apparatus is a machine having an elevator on longitudinally spaced rests on which a pipe is supported while said elevator lifts said pipe against a series of cutting saws by which the pipe is slotted. In other forms of slotting machines for effecting the same purpose the pipe is supported upon similar rests while cutter saws are carried on a vertically reciprocating power head which lowers said saws against the pipe, while the latter remains stationary, so as to cut slots therein.

It is to be understood that the two-way pipe roller rest units 11 and 12 of my invention may be applied to the pipe supporting rests in either of said types of machines to support said pipe while it is being slotted therein. The support thus afforded said pipe will facilitate either the longitudinal movement of said pipe in said machine or the rotation of said pipe between successive slotting operation in slotting a given section of said pipe as well as the longitudinal

movement of said pipe when moving the pipe into or out of the machine, or when, following the completion of the slotting of one section of pipe, it is desired to move the latter longitudinally to present a fresh uncut section to the saws.

Another distinct advantage of this invention is its ruggedness in operation and freedom from impairment by abrasive matter such as scale and dirt which is generally present in the environment in which the invention is employed.

The claims are:

1. In a two-way pipe roller rest, the combination of: a cradle base including posts extending upwardly therefrom; a cradle including a longitudinal member and arms extending upwardly from opposite ends thereof, said arms having aligned apertures; aligned pins mounted on said posts for extending into said apertures to pivotally mount said cradle on said base; a pair of bearing mandrels mounted on said longitudinal cradle member in parallelism with said arms so that the axes of said mandrels intersect the axis of said pins; a pair of hemispherical rollers rotatably mounted on said mandrels, the center points of the hemispherical faces of said rollers lying substantially at the points of intersection of the axes of said mandrels with the axis of said pins; and means to optionally set said cradle with said mandrels disposed either vertically or horizontally.

2. In a two-way pipe roller rest, the combination of: a cradle base including posts extending upwardly therefrom; a cradle including a longitudinal member and arms extending upwardly from opposite ends thereof, said arms having aligned apertures; aligned pins mounted on said posts for extending into said apertures to pivotally mount said cradle on said base; a pair of bearing mandrels mounted on said longitudinal cradle member in parallelism with said arms so that the axes of said mandrels intersect the axis of said pins, each mandrel having a base section, and a relatively small diameter upper stem section; a pair of rollers having hemispherical outer faces, each roller having a central bore and upper and lower counter-bore into which said mandrels extend; opposed thrust bearings for each of said rollers the lower of said bearings fitting against a mandrel base section and within the lower counter-bore of said roller, the upper of said thrust bearings fitting about the stem section of said mandrel and within the upper counter-bore of said roller, said rollers thus being rotatably mounted on said mandrels; nuts on said mandrel stem sections to compactly assemble said rollers and bearings on said mandrels with the center points of the hemispherical outer surfaces of said rollers lying approximately at the points of intersection between the axes of said mandrels and the axis of said pins; and control

means for optionally setting said cradle with said mandrels disposed vertically or horizontally.

3. In a two-way pipe roller rest, the combination of: a cradle base; a cradle swingably mounted on a horizontal axis on said base; a pair of hemispherical rollers rotatably mounted on parallel axes on said cradle, said axes intersecting the axis on which said cradle is swingable on said base at right angles therewith and at approximately the centers of the hemispherical outer faces of said rollers; and means for optionally setting said cradle in a position in which said roller axes are vertical or in a position in which said roller axes are horizontal.

4. A multiple pipe rest comprising a plurality of aligned units each including a cradle base, a cradle swingably mounted on a transverse horizontal axis on said base, a pair of hemispherical rollers rotatably mounted on parallel axes on said cradle, said axes intersecting the cradle axis at right angles therewith and at approximately the centers of the hemispherical outer faces of said rollers; and means for optionally and simultaneously setting said cradles of said units with the roller axes thereof vertical or with said axes horizontal.

5. In a two-way pipe roller rest, the combination of: a cradle base; a cradle swingably mounted on a given axis on said base; a pair of rollers rotatably mounted on said cradle on axes which intersect said cradle axis; and means for selectively shifting said cradle to either of two positions with reference to a pipe supported on said rollers, the first of said positions being with said roller axes in a plane substantially at right angles to said pipe and the second of said positions being with said roller axes in a plane substantially parallel with said pipe.

6. In a two-way pipe roller rest, the combination of: a cradle base; a cradle swingably mounted on a given axis on said base; a pair of rollers rotatably mounted on said cradle on axes which are non-parallel with said cradle axis; and means for selectively shifting said cradle about its axis to either of two positions, the first of said positions being with said roller axes in a plane substantially at right angles to said pipe and the second of said positions being with said roller axes in a plane substantially parallel with said pipe.

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