Nov. 22, 1955 G. E. KJELLBERG 2,724,175

DEVICE FOR FACILITATING PREFABRICATION OF SOIL PIPE UNITS

Filed Aug. 14, 1952 2 Sheets-Sheet 1

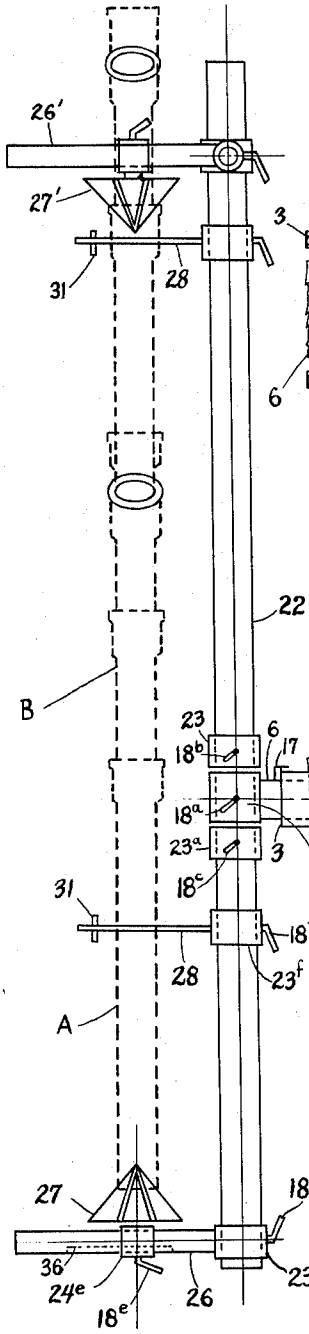


Fig. 1

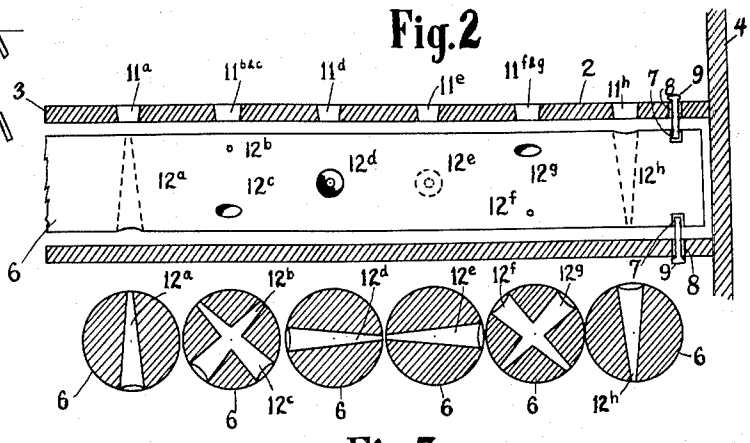


Fig. 2

Fig. 3

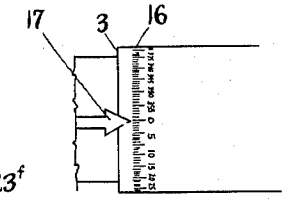


Fig. 4

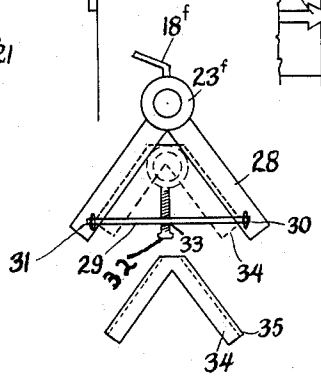


Fig. 6

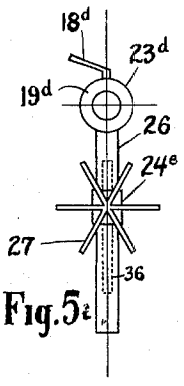


Fig. 5

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DEVICE FOR FACILITATING PREFABRICATION OF SOIL PIPE UNITS

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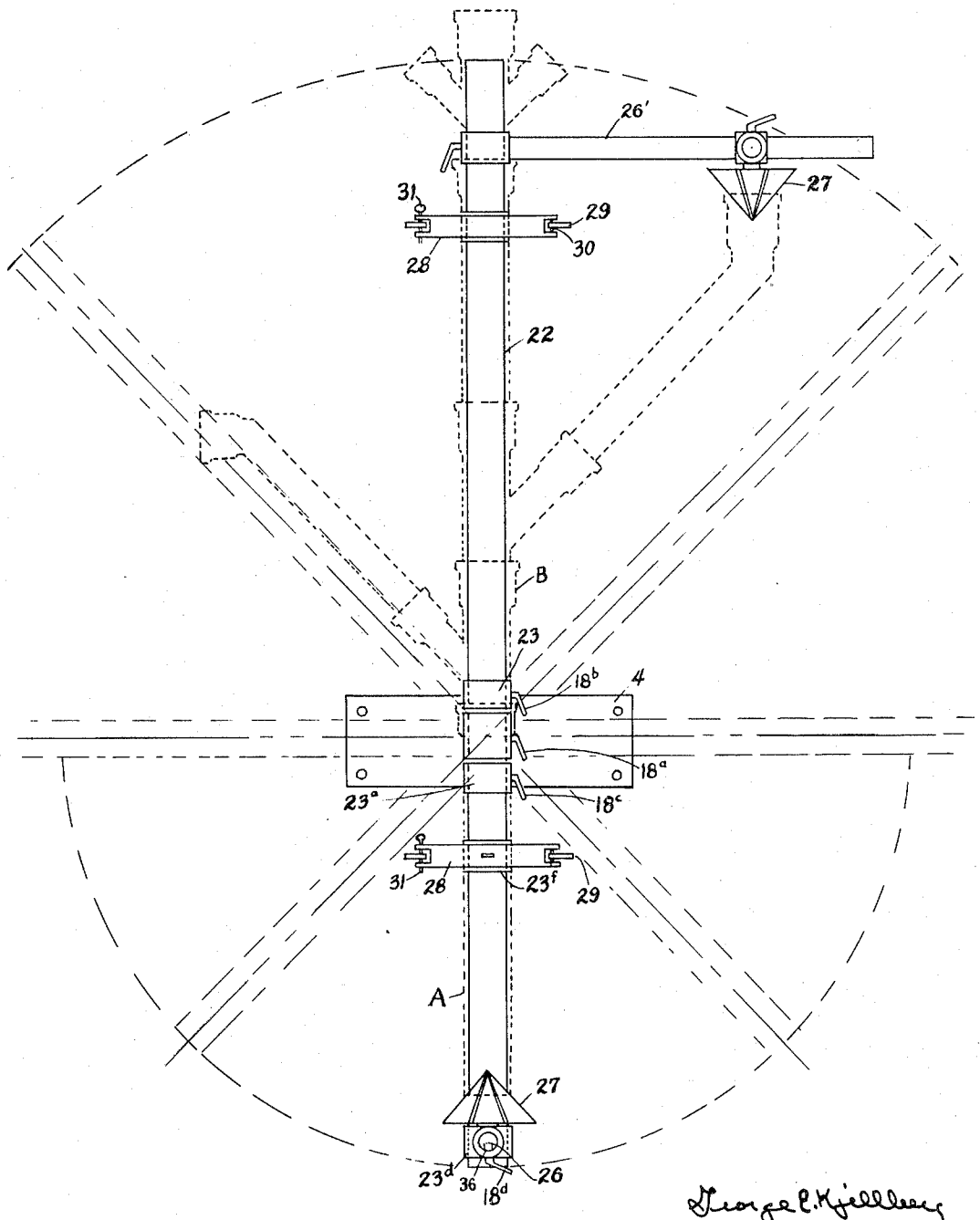


Fig. 7

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DEVICE FOR FACILITATING PREFABRICATION OF SOIL PIPE UNITS

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6 Claims. (Cl. 29—287)

This invention relates to the pre-fabrication of soil pipe units and relates more particularly to apparatus for facilitating the assembly or pre-fabrication of packed-joint soil pipe units.

Heretofore, soil pipe installations in buildings have been fabricated in place in the building. The standard procedure employed in assembling soil pipe in a building requires special tools and techniques, but invariably is a time-consuming procedure and is wasteful of materials, particularly so when running horizontal joints.

Accordingly, an object of this invention is to provide a device for pre-fabricating soil pipe units with each joint maintained in a vertical position for packing and leading.

Another object of this invention is to provide a device for holding soil pipe units to be joined in vertically level relationship at said joinder for packing and leading.

Another object of this invention is to provide a device for use in pre-fabricating soil pipe units having only two axes of movement but which assumes any desired angular position.

A further object of this invention is to provide a device for use in pre-fabricating soil pipe units with adjusting means to accommodate any size soil pipe and different sizes of soil pipe units in a single pre-fabrication.

The foregoing and other objects and advantages of this invention will be more apparent from studying the following specification together with the accompanying drawings, forming a part thereof, wherein:

Fig. 1 is a side elevation of the device of this invention, with a plurality of soil pipe units pre-fabricated therein shown by dotted outline;

Fig. 2 is a longitudinal cross-sectional view of the horizontal bushing and spindle in elevation of the device of this invention;

Fig. 3 is a plurality of transverse cross-sectional views of the horizontal spindle taken through the various tapered apertures therethrough as indicated in Fig. 2;

Fig. 4 is a side elevation view of the open end of the horizontal bushing and spindle showing means for indicating degree of rotation therebetween;

Fig. 5 is a plan view of an adjustable pipe support of the device of this invention;

Fig. 6 is a plan view of an adjustable pipe positioner and securer of the device of this invention showing an insert positioner out of position and shown in dotted outline in position and with pipe shown in dotted outline before positioning the insert positioner; and

Fig. 7 is a front elevation of the device of this invention, with various types of soil pipe fabricated therein by dotted outline, and the positions of rotation of the spindle shown in dotted outline, parts removed for clarity.

In the drawings, wherein like members are given the same reference numeral, a support member 1, which may be a building wall, separate wall, side of a vehicle body, or any other suitable support member, has secured thereto a horizontally extending bushing or bearing member 2 having an open end 3 and means 4 securing the bushing 2 to the support member 1. The means 4 of securing the

bushing 2 to the support member 1 is preferably a flat plate which is welded to the bushing 2, preferably a length of pipe, and welded or bolted to the support member 1. The securing means 4 may equally be a flanged portion of a pipe serving as a bushing, which flanged portion is welded or bolted to the support member 1.

Positioned in the bushing 2 is a spindle 6 mounted in a manner to freely rotate therein but preventing longitudinal displacement. This spindle 6 may be a solid rod, but it is preferably a length of pipe having heavy wall sections to provide adequate strength with minimum weight. It is maintained against longitudinal displacement but permitting free rotation by providing an annular groove or recess 7 in the spindle 6 into which a plurality of bolts 8 extend but do not abut. These bolts 8 are positioned in any suitable manner, such as welding in apertures 9 in the bushing 2, or by threaded engagement with the apertures 9 which have been tapped, provided in the bushing 2, in alignment with the annular groove 7.

The bushing 2 has a plurality of inwardly tapering apertures 11^{a-h} provided in the top portion thereof and positioned in a longitudinal line along the bushing. The spindle 6 has a plurality of tapered apertures 12^{a-h}, provided therein at different degrees around the periphery thereof and in alignment with the other corresponding tapered apertures 11^{a-h}, respectively, it being illustrated that the two tapered apertures 11^{b} and 11^{c} in the bushing 2 may be combined into one aperture 11^{b} and 11^{c} because the corresponding apertures 12^{b} and 12^{c} in the spindle 6 intersect; the same is true of apertures 11^{f} and 11^{g} may be combined due to the fact that apertures 12^{f} and 12^{g} intersect. A tapered pin 14 inserted through aligned and registering apertures 11^{a-h} and 12^{a-h} respectively locks the spindle against rotation. The open end 3 of the bushing 2 is provided with a circle scale 16 therearound dividing the periphery into degrees and fractions thereof; and the spindle 6 has a pointer 17 mounted thereon and having the pointer end thereof positioned over the scale 16. When the tapered pin 14 in cooperation with the apertures 11^{a-h} and 12^{a-h} is not used to lock the spindle 6 in a pre-determined degree of rotation not provided for by the apertures, the spindle 6 is rotated to the desired degree and locked in position by a hand screw 18 threadedly engaging a tapped aperture 19 in the bushing 2 until the end of the screw 18 frictionally secures the spindle 6 against rotation. When the tapered pin 14 is used, with apertures 11^{h} and 12^{h} aligned in true vertical position the scale 16 reads 0°; with apertures 11^{f} and 11^{g} and 12^{g} aligned the scale reads 45°, and with apertures 11^{f} and 11^{g} and 12^{g} aligned the scale reads 315°, the apertures 12^{f} and 12^{g} being 45° from vertical 12^{h} and positioned on opposite sides thereof; with apertures 11^{e} and 12^{e} aligned the scale reads 90°; with apertures 11^{d} and 12^{d} aligned the scale reads 270°; with apertures 11^{b} and 11^{c} and 12^{c} aligned the scale reads 135°, and with apertures 11^{b} and 11^{c} and 12^{b} aligned the scale reads 225°; and with apertures 11^{a} and 12^{a} aligned the scale reads 180°. The arrangement of these cooperating apertures to provide means to lock the spindle in each 45° of rotation is attributable to the fact that soil pipe fittings are designed with limited few exceptions which are now practically obsolete, for joints at 45° and multiples thereof angular displacement.

The spindle terminates in a clamp means, here illustrated as cylindrical collar, bearing or bushing member 21 having a hand screw bolt 18^{a} threadedly engaging a tapped aperture provided in wall of said collar 21. A cylindrical support column or shaft 22, preferably a length of pipe, is inserted in the collar bearing 21 and frictionally held in place by turning the hand screw bolt 18^{a} until it securely abuts the shaft 22 clamping it

against the side wall of the collar 21, by releasing the pressure of the hand screw bolt 18^a, the shaft 22 may be rotated or moved longitudinally in the collar 21. To prevent longitudinal movement of the shaft 22 in the collar 21, with the pressure of the hand screw released, cylindrical thrust bearings 23 and 23^a are positioned around the column and on opposed sides of the collar 21. The thrust bearings 23 and 23^a are secured to the column 21 by hand screw bolts 18^b and 18^c engaging threaded apertures in the bearings 23 and 23^a, respectively. When the device is used in less than 180° rotation of the spindle, the bottom thrust bearing 23^a can be eliminated; but the device is designed for 360° rotation of the spindle 6, and in such utility both thrust bearings must be used.

A work support arm 26 is releasably and slidably mounted on the shaft 22 by means of a cylindrical collar 23^d secured to said arm 26 and having a hand screw bolt 18^d threadedly engaging a tapped aperture in the collar 23^d. The work support arm is preferably a length of pipe. Slidably mounted on the arm 26 is a collar 24^e having a hand screw bolt 18^e threadedly engaging an aperture in the collar, and having the same general construction as the other collars having hand screw bolt means for releasably clamping to a member. Secured to the collar 24^e in any suitable manner, such as welding or cast integral therewith, is a pipe support member 27. This member 27 is preferably conical-shaped to positively center and support various pipe of different diameters. Another work support arm 26', with collar, hand screw bolt, and pipe support member 27' may be positioned on the shaft 22 opposed to the first pipe support member 27 to support pipe from that end of the column and also to reinforce the first pipe support 27 when Y fittings are joined in the units of soil pipe fabricated. This top pipe support 27' assembly can in many cases be eliminated.

Slidably connected to the shaft 22, on opposed sides of the collar bearing 21 are pipe aligning assemblies. These assemblies comprise a cylindrical collar 23^f having a hand screw bolt 18^f threadedly engaging a tapped aperture therein to releasably clamp the column 22, a V-shaped member 28 having the vertex thereof rigidly secured to the collar 23^f by welding or other suitable means and positioned parallel to the transverse axis of said cylindrical collar. Stated differently, the plane of the V-shaped member is perpendicular to the longitudinal axis of the shaft 22, a bar 29 is pivotally mounted by a pin 30 to one leg of the V-shaped member 28 and is releasably fastened to the other leg of the V-shaped member 28 by removable pin 31 to form an isometric triangle. A bolt 32 threadedly engages a tapped aperture 33 positioned in the bar 29 at a point bisecting the bar 29 and directed toward the vertex of the V-shaped member 28.

There is provided an insert V-shaped member 34 having channels 35 formed in the legs thereof adapted to receive the inside edges of the legs of the V-shaped member 28. This insert member 34 is so constructed and arranged that when one size pipe is being used and a joinder therewith of a smaller size pipe is desired, the insert positions the smaller size in coaxial or concentric alignment with the large pipe. The insert member 34 is equally of value in aligning pipes of different diameters when the converse relationship exists.

In operation the device is quite simple, efficient, durable and economical. With the tapered pin 14 inserted in the tapered apertures 11^h and 12^h, the spindle 6 is held stationary and with the hand screw bolt 18^a clamping the shaft 22 in vertical position, a length of soil pipe A is positioned on the pipe support 27, which has previously been adjusted for the correct diameter pipe, and a pipe aligning assembly is positioned in a manner such that the top section of the pipe A rests in the V of the V-shaped member 28 which is clamped by means of the hand screw bolt 18^f to the shaft 22. The pivotally mounted bar 29 is fastened in place with the removable pin 31 and the bolt 33 turned to abut the pipe A. Another section of pipe B is positioned in the bell section of the pipe A, these sections of pipe are then packed and molten lead poured in the bell section according to usual standard procedure for packing and leading a vertical joint. When sections are to be added to the angular branch of a Y section of pipe in which the plane of the longitudinal axes thereof are parallel to the plane of a transverse section of the spindle 6, the pin 14 is removed and the spindle rotated 45 deg. from vertical in the direction opposite the angle of the Y pipe. For illustration, if the angle of the Y is to the right the spindle 6 is rotated to the left and the tapered pin 14 is inserted in the then aligned apertures 11^g and 12^g locking the spindle 6 and positioning the angular section of the Y pipe in vertical position for vertical packing and leading.

When T or Y sections of pipe have longitudinal axes in a plane perpendicular to the plane of a transverse section of the spindle 6, and it is desired to pack and lead the angular section or leg thereof, the hand screw bolt 18^a clamping the shaft 22 in the collar bearing 21 is released and the shaft 22, with the pipe supported and held in position by the supports 27 and 27' and aligning assembly V-shaped member 28 and related parts, is rotated up and back towards the support member 1 the desired degree until the angular section or leg is vertical, the hand screw bolt 18^a is tightened and a vertically packed and leaded joint is made in the usual manner.

It is thus illustrated and described that the device of this invention enables one to prefabricate soil pipe units with a vertical joinder, which is a saving of time and material. It has been calculated that there is a saving of one-half pound of lead per joint in vertical joinder over horizontal or substantially horizontal joinders. The saving in time is obviously much greater than the saving in material, because vertical joinders are simple gravity flow pour procedures.

In order to prevent the work support member 27 from rotating on the work support arm 26 when the hand screw bolt 18^e is released, a longitudinal groove 36 is provided in the lower section of the arm 26 to receive the end of the hand screw bolt 18^e. The groove 36 is so constructed and designed in cross-section to permit only clearance tolerance between the bolt 18^e and side walls of the groove, i. e., the cross-sectional dimension of the groove is slightly more than the cross-sectional dimension diameter, of the bolt.

Having thus described the invention, what is claimed as new and desired to secure by grant of United States Letters Patent is:

1. A device for facilitating prefabrication of soil pipe units comprising a horizontal spindle, means mounting said spindle for free rotation, a bearing member secured to said spindle, a shaft rotatably mounted in said bearing member, releasable means fastening said shaft to said bearing member, conical-shaped pipe support members adapted to center and support various diameters of pipes, means connecting each of said pipe support members to said shaft adjacent the outer ends thereof for movement toward and away from the ends of said shaft and nearer and farther away from said shaft, said means comprising a support element slidably mounted on said shaft, an arm attached to said support element and extending outward from said shaft and means connecting said pipe support member to said arm whereby said conical-shaped pipe support member may be moved toward and away from the ends of the shaft and nearer and farther away from said shaft, and pipe aligning means comprising an aligning means mounting element slidably mounted on said shaft and a pipe receiving guide attached to and extending outward from said mounting element, said pipe receiving guide having spaced apart legs for aligning the pipe.

2. A device for facilitating prefabrication of said pipe

units according to claim 1 wherein said means connecting said conical-shaped pipe support member to said arm comprises a collar slidably mounted on said arm, said conical-shaped pipe support member is fixed to said collar and said arm is fixedly attached to said support element slidably mounted on said shaft.

3. A device for facilitating prefabrication of soil pipe units comprising a horizontal spindle, means mounting said spindle for free rotation, a bearing member secured to said spindle, a shaft rotatably mounted in said bearing member perpendicular to said spindle, releasable means fastening said shaft to said bearing member, conical-shaped pipe support members adapted to center and support various diameters of pipes, means connecting each of said pipe support members to said shaft adjacent the outer ends thereof for movement toward and away from the ends of said shaft and nearer and farther away from said shaft, said means comprising a collar slidably mounted on said shaft, an arm attached to said collar and extending outward from said shaft and means connecting said pipe support member to said arm, pipe aligning means comprising an aligning means mounting collar slidably mounted on said shaft and a pipe receiving guide attached to and extending outward from said last-named collar, said pipe receiving guide having spaced apart legs for aligning the pipe, and means locking said spindle against rotation in a predetermined position.

4. A device for facilitating prefabrication of soil pipe units comprising a rotatably mounted spindle, releasable means locking said spindle in predetermined position, a shaft rotatably connected to said spindle and perpendicular thereto, releasable means locking said shaft against rotation, conical-shaped pipe support members adapted to center and support various diameters of pipe, means connecting each of said pipe support members to said shaft adjacent the outer ends thereof for movement toward and away from the ends of said shaft and nearer and farther away from said shaft, said means comprising a collar slidably mounted on said shaft, an arm attached to said collar and extending outward from said shaft and means connecting said pipe support member to said arm, pipe aligning means comprising an aligning means mounting collar slidably mounted on said shaft and a pipe receiving guide attached to and extending outward from said last-named collar, said pipe receiving guide having spaced apart legs for aligning the pipe, and a removable insert member slidably engaging said legs for aligning said pipe.

5. A device for facilitating prefabrication of soil pipe units comprising a rotatably mounted horizontal spindle, releasable means locking said spindle in predetermined position, a shaft rotatably connected perpendicular to said spindle, releasable means locking said shaft against rotation, conical-shaped pipe support members adapted to center and support various diameters of pipes, means connecting each of said pipe support members to said shaft adjacent the outer ends thereof for movement toward and away from the ends of said shaft and nearer and farther away from said shaft, said means comprising a collar slidably mounted on said shaft, an arm attached to said collar and extending outward from said shaft and means connecting said pipe support member to said arm, and pipe aligning means comprising an aligning means mounting collar slidably mounted on said shaft and a pipe receiving guide attached to and extending outward from said last-named collar, said pipe receiving guide having spaced apart legs for aligning the pipe.

6. A device for facilitating prefabrication of soil pipe units comprising a rotatably mounted horizontal spindle, a bushing surrounding said spindle, aligned apertures in said spindle and bushing, a pin adapted to be inserted in said apertures to lock said spindle against rotation, a shaft rotatably and slidably connected to and perpendicular with said spindle, releasable means locking said shaft against rotation, releasable means locking said shaft against slidable movement, conical-shaped pipe support members adapted to center and support various diameters of pipes, means connecting each of said pipe support members to said shaft adjacent the outer ends thereof for movement toward and away from the ends of said shaft and nearer and farther away from said shaft, said means comprising a collar slidably mounted on said shaft, an arm attached to said collar and extending outward from said shaft and means connecting said pipe support member to said arm, and pipe aligning means comprising an aligning means mounting collar slidably mounted on said shaft and a pipe receiving guide attached to and extending outward from said last-named collar, said pipe receiving guide having spaced apart legs for aligning the pipe.

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