April 9, 1929. L. M. PEARCE 1,708,322

PIPE HOLDER

Filed Dec. 20, 1926 3 Sheets-Sheet 1

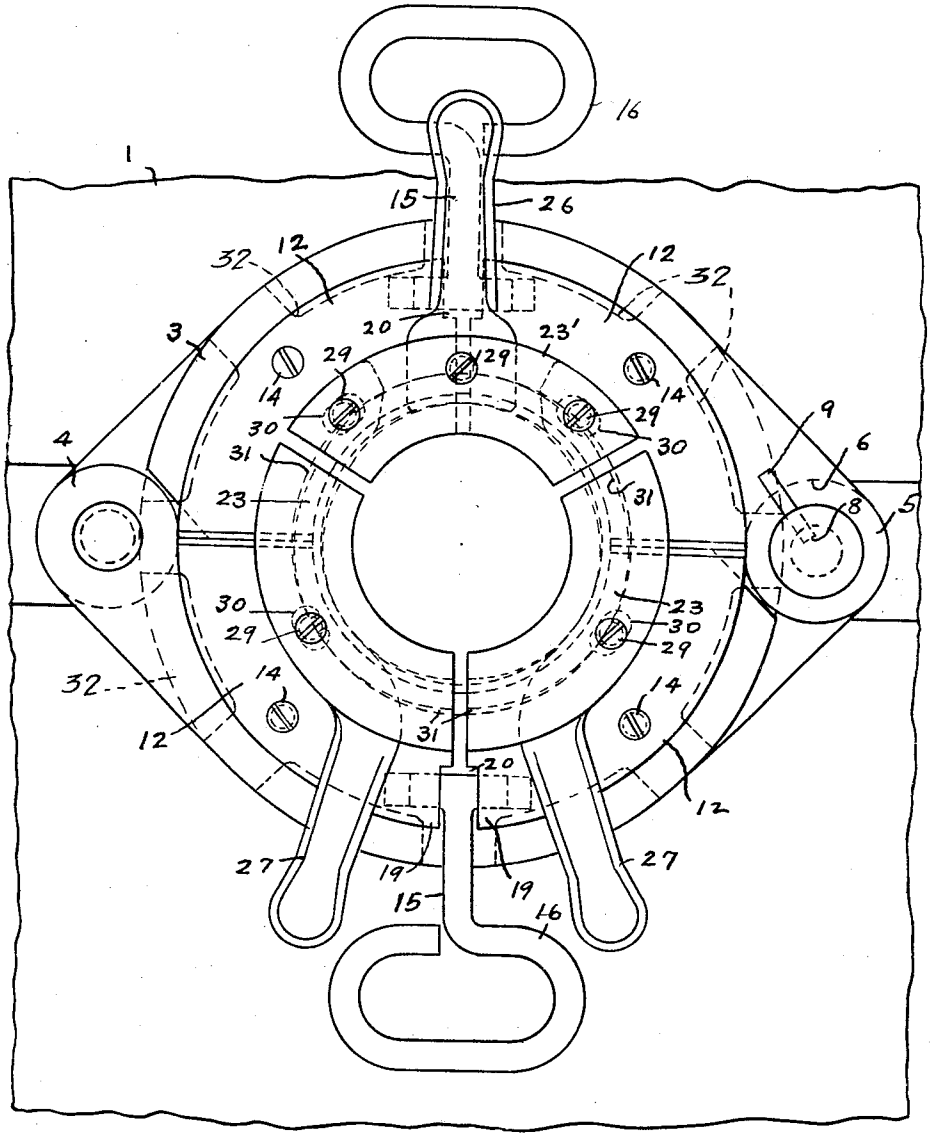


Fig. 1.

Inventor
Louis M Pearce

By Harding Cathey
Attorneys

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Filed Dec. 20, 1926 3 Sheets-Sheet 2

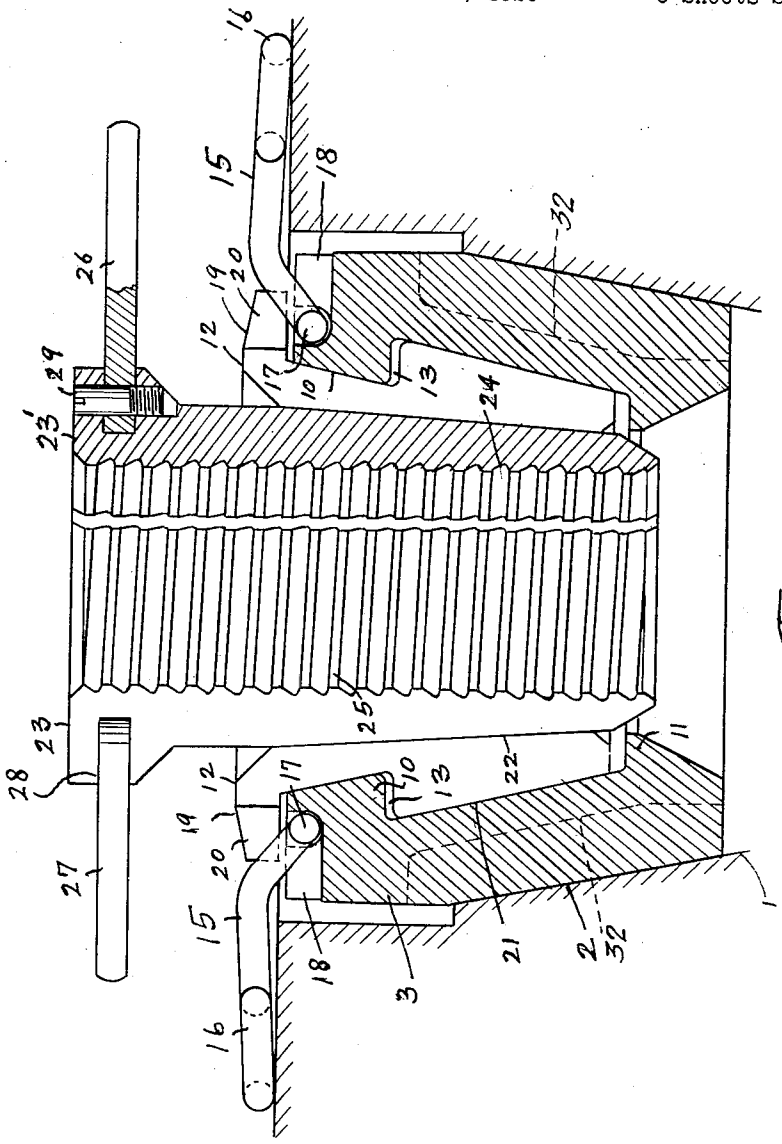


Fig. 2.

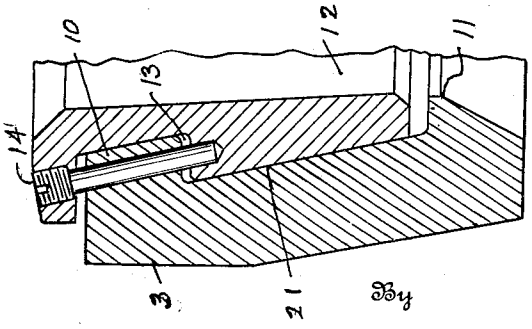


Fig. 3

Inventor
Louis M Pearce
By Hardway & Cathey
Attorneys

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PIPE HOLDER

Filed Dec. 20, 1926 3 Sheets-Sheet 3

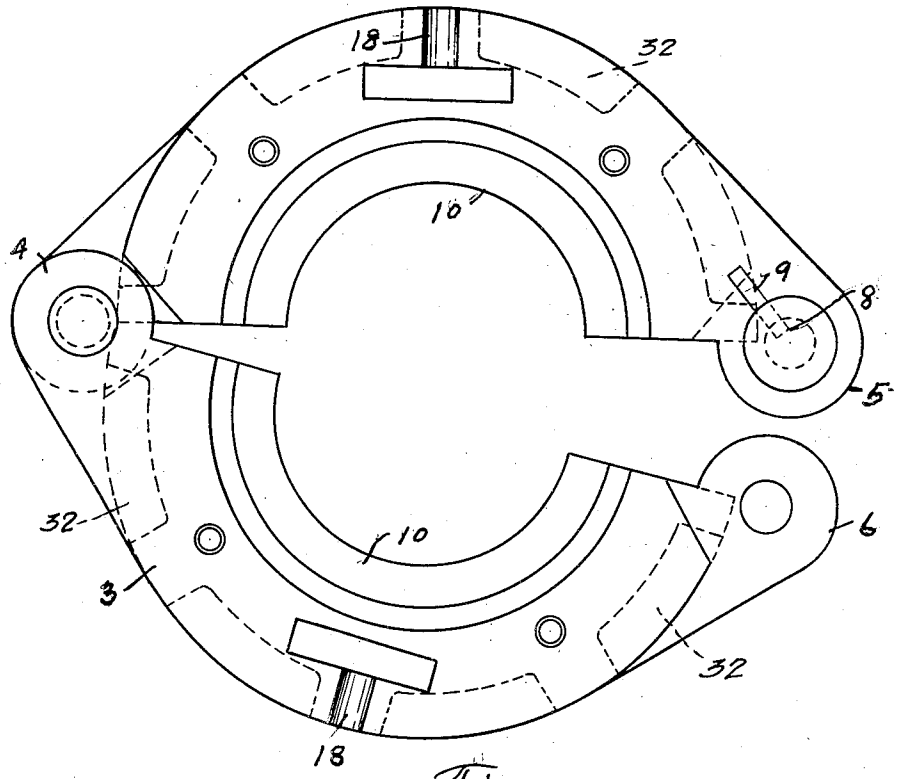


Fig. 4.

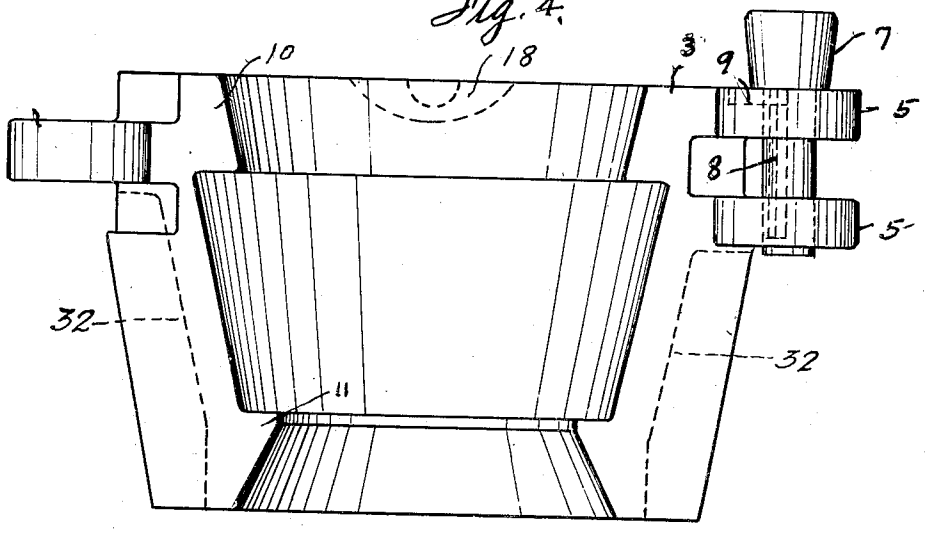


Fig. 5.

INVENTOR.
Louis M. Pearce
BY
Hardway & Carter
ATTORNEYS

Patented Apr. 9, 1929. 1,708,322

UNITED STATES PATENT OFFICE.

LOUIS M. PEARCE, OF HOUSTON, TEXAS, ASSIGNOR TO TEXAS IRON WORKS SALES CORPORATION, OF HOUSTON, TEXAS, A CORPORATION OF TEXAS.

PIPE HOLDER.

Application filed December 20, 1926. Serial No. 155,879.

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

One object of the invention is to provide a pipe holder especially adapted to engage and hold a string of tubing, or pipe, suspended in a well bore and which may be easily applied to and readily released from said pipe.

Another object of the invention is to provide a holder of the character described, the jaws of which are of such special formation that they will firmly grip and hold the suspended pipe but will not bite into, or injure, the pipe.

A further feature of the invention is to provide a pipe holder of such special construction that when it is seated in a rotary table, or other pipe supporting means, it will securely grip and hold the pipe suspended, but when the pipe is elevated the holder will not clamp the pipe, as is the case with pipe slips, or holders, now in common use, but will readily release the pipe.

A still further feature of the invention is to provide a pipe holder of the character described, equipped with novel means for handling the same.

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

Figure 1 shows a plan view of the holder, as mounted in a rotary table.

Figure 2 shows a vertical sectional view thereof.

Figure 3 shows a fragmentary vertical sectional view thereof.

Figure 4 shows a plan view of the adapter employed, and

Figure 5 shows an inside view of one section of the adapter.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures the numeral 1 designates the rotary table of a rotary drilling machine having the downwardly converging opening or seat 2 therein for the usual and well known purpose. The numeral 3 designates a sectional adapter formed preferably of two sections, arcuate in horizontal cross sectional contour. These sections are hinged together at one side by the hinge 4 and opposite said hinge one of said sections is formed with the spaced bearing members 5, 5, and the other with an ear 6 adapted to fit between the said bearing members and ear having vertical openings which align when the adapter is in closed position to receive a lock pin 7. One side of said pin has a vertical groove or keyway 8 into which the free end of the key 9, carried by the upper bearing member 5 projects. This construction permits the pin 7 to be lifted to release the ear 6, thus permitting the adapter to be opened, or its sections swung apart, but the lower end of the slot 8 engages the key 9 and prevents the complete detachment of said pin 7.

The lower portion of the adapter converges downwardly to conform to the taper of and to fit within the seat 2. Each section of the adapter has the upper and lower inwardly extending flanges 10 and 11, spaced apart. That portion of the inner side of each adapter section, between said flanges, as well as the inner side of each flange 10, tapers or converges, downwardly at a pitch substantially the same as the pitch of the seat 2.

There is a sectional releasing ring preferably composed of four sections indicated by the numerals 12. These sections are arcuate in horizontal sectional contour and around their upper ends they have the external grooves 13 to receive the corresponding flanges 10. The outer sides of the ring sections 12 taper, or converge, downwardly to conform to the taper of the contacting parts of the adapter 3.

The sections 12 of the releasing ring have a limited vertical movement between the flanges 10, 11, the grooves 13 also having sufficient width to permit this movement. Each ring section 12 is retained in its proper position by means of a retaining pin 14 which extends through suitable bearings in the corresponding ring section and flange 10 and which has a threaded connection with its ring section.

Each section of the adapter has a handle 15. The outer end of each handle has a hand grip 16, and its inner end is formed with a T 17 which lies in the T slot 18 and these handles are retained, in said slots, by the adjacent overhanging flanges 19 of the releas-

ing ring sections 12, said flanges having cut away portions forming notches 20 through which the handles 15 may work.

The inner sides of the releasing ring sections converge downwardly, having a somewhat greater pitch than the pitch of the seat 21, of the adapter, and forming a seat, as 22, for the slip jaws 23, 23'. There are, preferably, three of these jaws, each arcuate in horizontal cross section, and when assembled they form a complete pipe holding slip whose outer side tapers downwardly to conform to the seat 22, and when seated in the seat 22 of the releasing ring they will securely grip and hold the pipe therein. The inner sides of these slip jaws have transverse grooves 24, spaced apart, forming pockets and between said grooves are the transverse blank faces which contact against and grip the pipe to be held. By reason of the decided pitch 22 these gripping or friction faces 25 will securely grip and hold the pipe by friction without biting into and weakening it, this feature constituting a very decided improvement over pipe holding slips now in common use. The grooves or pockets 24 are provided to receive the paraffin, mud or other coating usually found on drill pipe or other pipe used in a well bore and this coating will be forced into these pockets so that the faces 25 may frictionally engage the metal of the pipe to the end that the pipe will not slip down through the slips.

As stated three of these slip jaws usually constitute a complete slip and they are provided with means for handling them and are hingedly connected together in a manner presently to be described.

Fastened rigidly to the intermediate jaw 23' there is a handle 26 and opposite this handle are the manipulating handles 27, 27. The outer ends of the handles 26, 27 are formed with suitable grips and the inner ends of the handles 27 are formed arcuate and are seated loosely in outside arcuate grooves 28, 28 of the jaws 23 with their extreme inner ends fitted loosely into sockets in the opposite sides of the intermediate slip 23'. These handles are secured to their respective jaws by means of the bearing pins, as 29, which are fitted downwardly through suitable holes in the upper ends of the slip jaws and through bearings in said handles provided to receive them and the lower ends of said pins are screwed into said jaws. The bearings, as 30, 30, of the handles 27 are oblong so as to permit relatively free movement of said jaws with respect to said handles and to each other to the end that they will not bind on the pipe but will readily release it when the pipe is pulled upwardly to unseat the slip jaws from the releasing ring.

As shown in dotted lines in Figure 1 the curvature of the outer sides of each slip jaw is on a smaller circumference than the inside circumference of the releasing ring sections, as is illustrated at 31, Figure 1, to the end that the slip jaws will not contact with the releasing ring throughout their entire outside area, but only the central part of said area will be in such contact, thus permitting an easy release of the slip jaws from the ring seat 22, without lessening their effective grip on the pipe when in pipe holding position.

In making up a string of pipe or tubing the slips are engaged around the upper end of the string suspended in the bore and when an additional joint of pipe or tubing is screwed onto the upper end of the string the string, as thus completed, is elevated carrying the slip jaws upwardly with it and when the jaws clear the upper end of the releasing ring 12 a workman may grip the handle 26 and suddenly pull said jaws outwardly clear of the pipe and rest said jaws on the rotary table in readiness to be again applied to the pipe. The entire string is then lowered until its upper end is opposite said jaws and the workman may then grasp the handles 27 and seat the slip jaws in the seat 22 in pipe holding position around the pipe.

In breaking up a string of pipe, or tubing, the upper joint to be unscrewed extends above the rotary table with the holder in engagement with the string beneath said joint. When the joint is unscrewed and removed the string is elevated carrying the slip jaws upwardly with it until they clear the releasing ring and release the string and they are held in readiness to be reengaged around said string beneath the next joint to be removed and at the proper time are so engaged and seated in the seat 22 of the releasing ring as above explained, until another joint of the string is removed and so on until the string is completely broken up and removed.

When an upward pull is exerted on the pipe held by the holder, as above explained, the releasing ring 12 will readily move upwardly with the slip jaws, relative to the adapter, by reason of the slow taper of the seat 21 and this movement of said ring will result in the quick release of the slip jaws which wedge very tightly around the pipe by reason of the fast taper of the seat 22.

When the work requiring the use of the holder has been completed the slip may be removed from the releasing ring and laid aside and pin 7 of the adapter then released to permit the adapter sections to swing open and the adapter together with the releasing ring then lifted out of the seat 2 of the rotary table and removed by the use of the handles 15.

The outer side of the adapter has a plurality of drain channels, as 32 provided to permit the drainage of slush and other fluid,

that may collect on the rotary table, back into the well.

What I claim is:

1. In a pipe holder, pipe engaging jaws arcuate in cross sectional contour, a handle fixed to one of said jaws, a pair of handles loosely connected to said last mentioned jaw, the handles of said pair being also loosely connected to the other jaws.

2. In a pipe holder, pipe engaging jaws arcuate in cross sectional contour and whose outer surfaces taper downwardly, a handle fixed to one of said jaws, a pair of handles loosely connected at their inner ends to said last mentioned jaw, the handles of said pair being loosely connected to the other jaws.

3. In a pipe holder, pipe engaging jaws arcuate in cross sectional contour, a handle connected to one of said jaws, a pair of handles whose inner ends are arcuate and loosely connected to said last mentioned jaw and whose outer ends are outwardly turned forming grips, external grooves on the other jaws provided to receive the arcuate portions of the respective handles of said pair and means loosely connecting said jaws to said respective arcuate portions of said handles.

4. In a pipe holder an adapter formed of two arcuate sections hinged together at one side, means for detachably securing said sections together at the other side, the outer surface of the adapter converging downwardly, the inner surface of the adapter also converging downwardly forming a tapering slip ring seat and being formed with upper and lower inwardly extending flanges.

5. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange and a releasing ring having an external groove adapted to receive said flange loosely.

6. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper, or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange, a releasing ring within the adapter, formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an external groove adapted to receive said flange loosely.

7. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an external annular groove adapted to receive the adapter flange.

8. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an external annular groove adapted to receive the adapter flange, said groove being wider than the flange therein to permit a limited vertical movement of said ring relative to said adapter.

9. In a pipe holder an adapter formed of two arcuate sections, whose outer and inner surfaces taper or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an external annular groove adapted to receive the adapter flange, said groove being wider than the flange therein to permit a limited vertical movement of said ring relative to said adapter and means preventing the displacement of the ring sections from the adapter.

10. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an external annular groove adapted to receive the adapter flange, said groove being wider than the flange therein to permit a limited vertical movement of said ring relative to said adapter and an inwardly extending abutment carried by the adapter beneath said releasing ring.

11. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper, or converge downwardly, said sections being hinged together, at one

side, the inner side of each section having an inwardly extending flange, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an inside seat, which converges or tapers downwardly at a greater pitch than the outer side of said ring.

12. In a pipe holder an adapter formed of two arcuate sections, whose outer and inner surfaces taper or converge downwardly, said sections being hinged together at one side, means for detachably securing the sections together at the other side, the inner side of each section having an inwardly extending flange, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, said releasing ring having an inside seat which converges or tapers downwardly at a greater pitch than the outer side of said ring, and a downwardly tapering sectional slip seated in said ring and whose taper conforms to the inside taper of said ring.

13. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper, or converge downwardly, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, the abutting parts of said adapter and ring being provided one with an annular flange, and the other with an annular groove, adapted to receive said flange, said groove being wider than the flange therein, to permit a limited vertical movement of the ring relative to the adapter.

14. In a pipe holder an adapter formed of two arcuate sections whose outer and inner surfaces taper, or converge, downwardly, a releasing ring within the adapter formed of sections whose outer surfaces converge downwardly at a pitch corresponding to the pitch of the inside of the adapter, the abutting parts of said adapter and ring being provided one with an annular flange and the other with an annular groove, adapted to receive said flange, said groove being wider than the flange therein, to permit a limited vertical movement of the ring relative to the adapter, said adapter being provided with external vertically disposed drain channels.

15. In a pipe holder an adapter formed of arcuate sections whose outer and inner surfaces taper downwardly, a releasing ring within the adapter formed of sections whose outer surfaces taper downwardly at a pitch corresponding to the pitch of the inside of the adapter, the abutting parts of said adapter and ring being provided one with a projection and the other with a recess adapted to receive the projection, said recess being wider than the projection therein to permit a limited vertical movement of the ring relative to the adapter.

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

LOUIS M. PEARCE.