

May 9, 1933.

T. W. ADAIR

1,908,652

PIPE HOLDER

Filed May 5, 1930

2 Sheets-Sheet 1

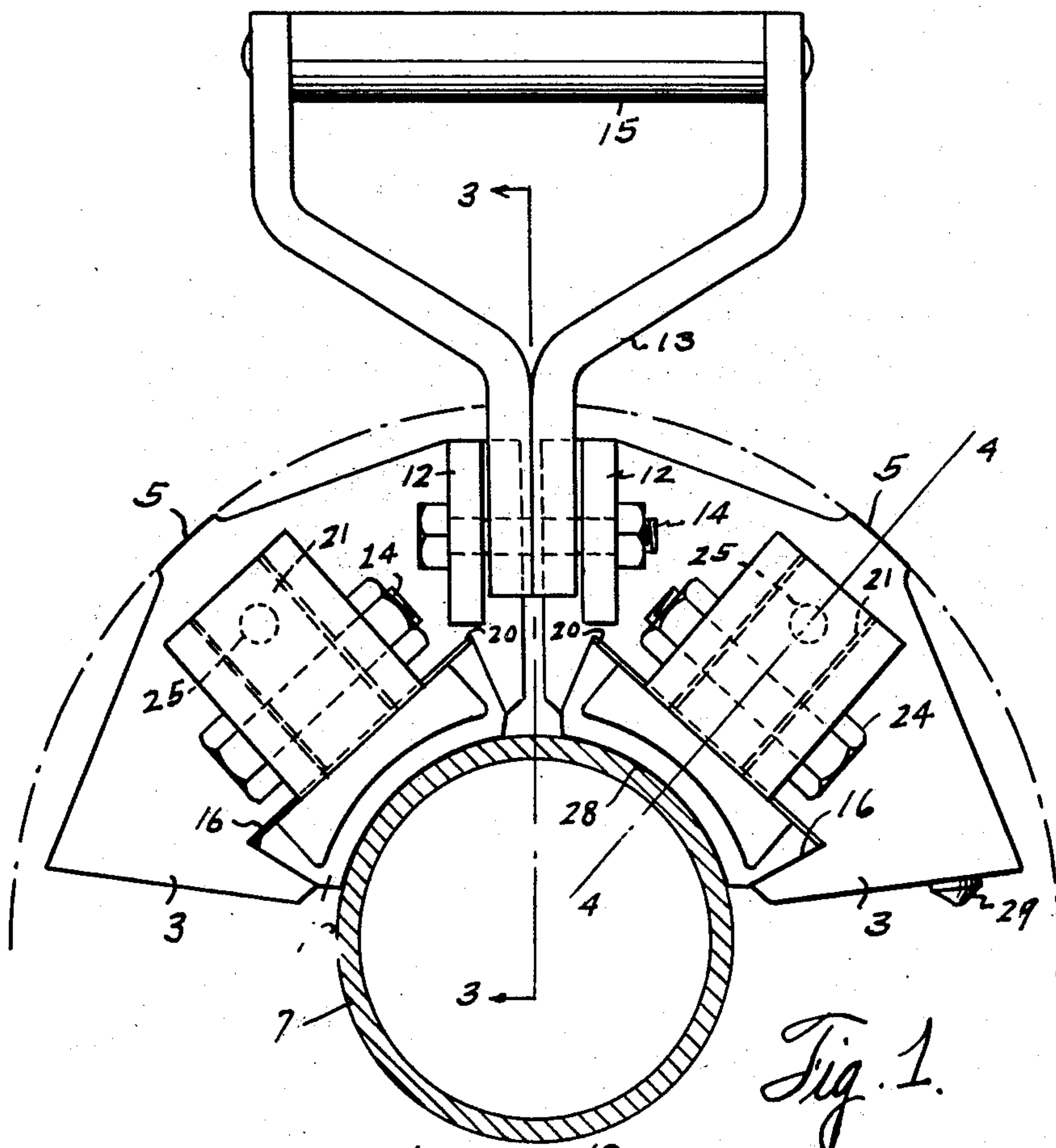


Fig. 1.

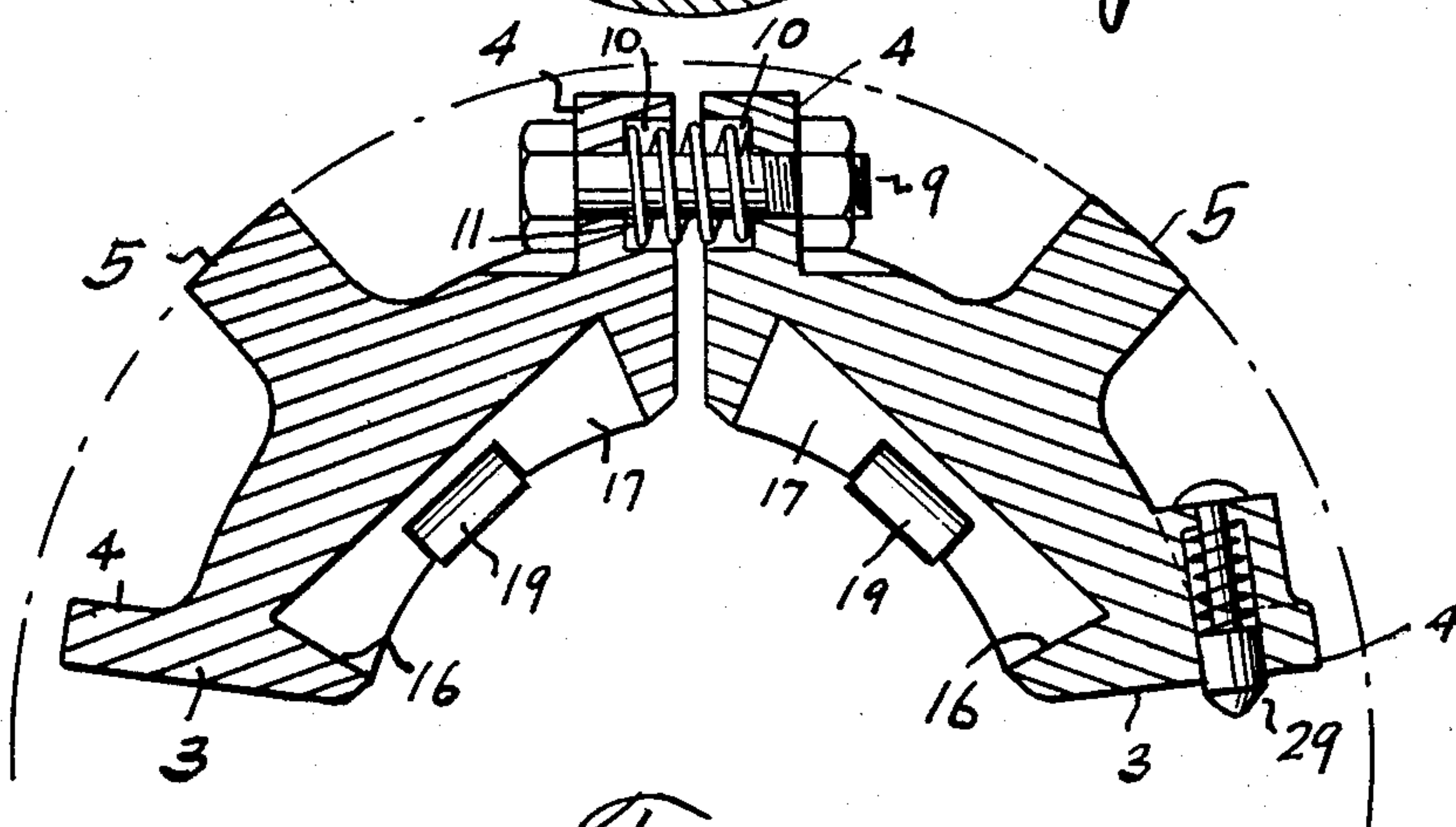


Fig. 2.

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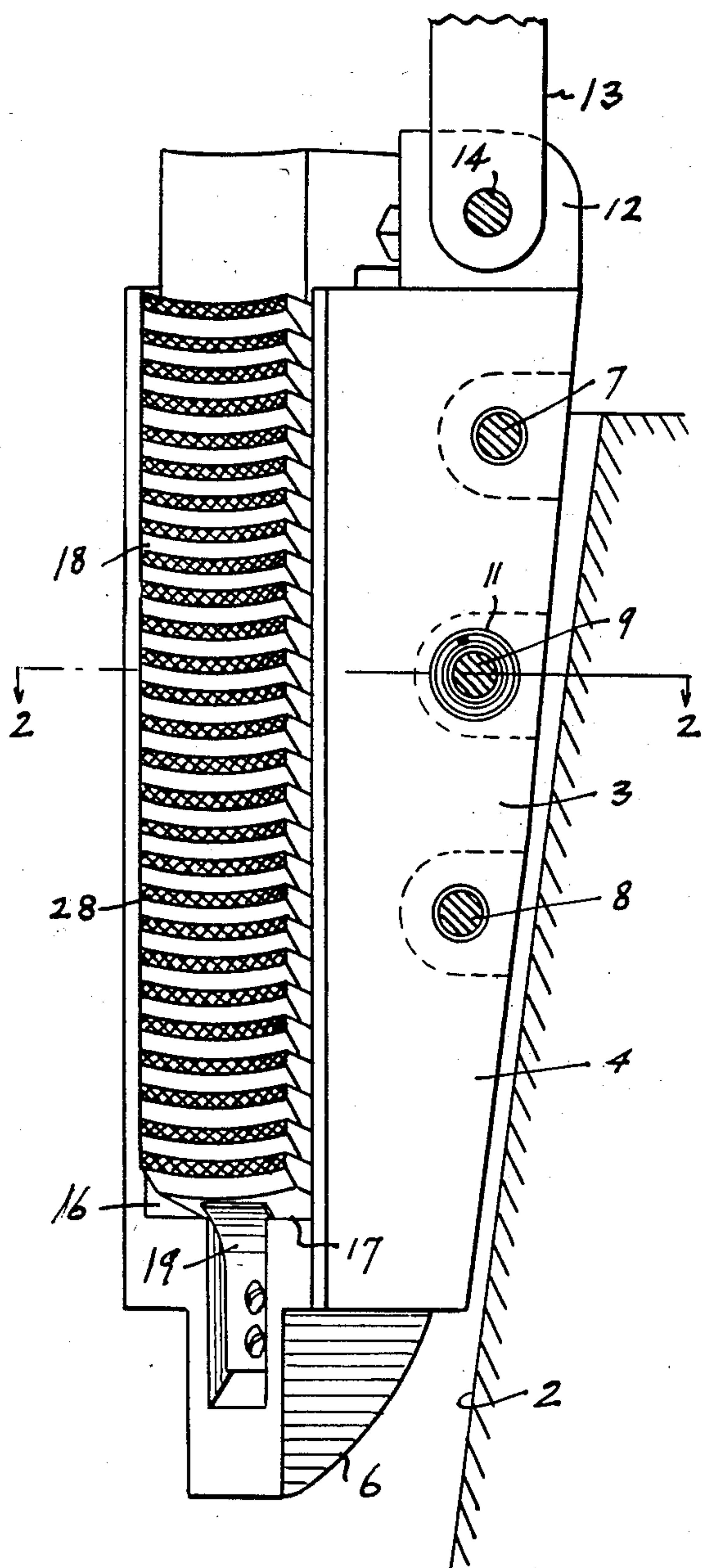


Fig. 3.

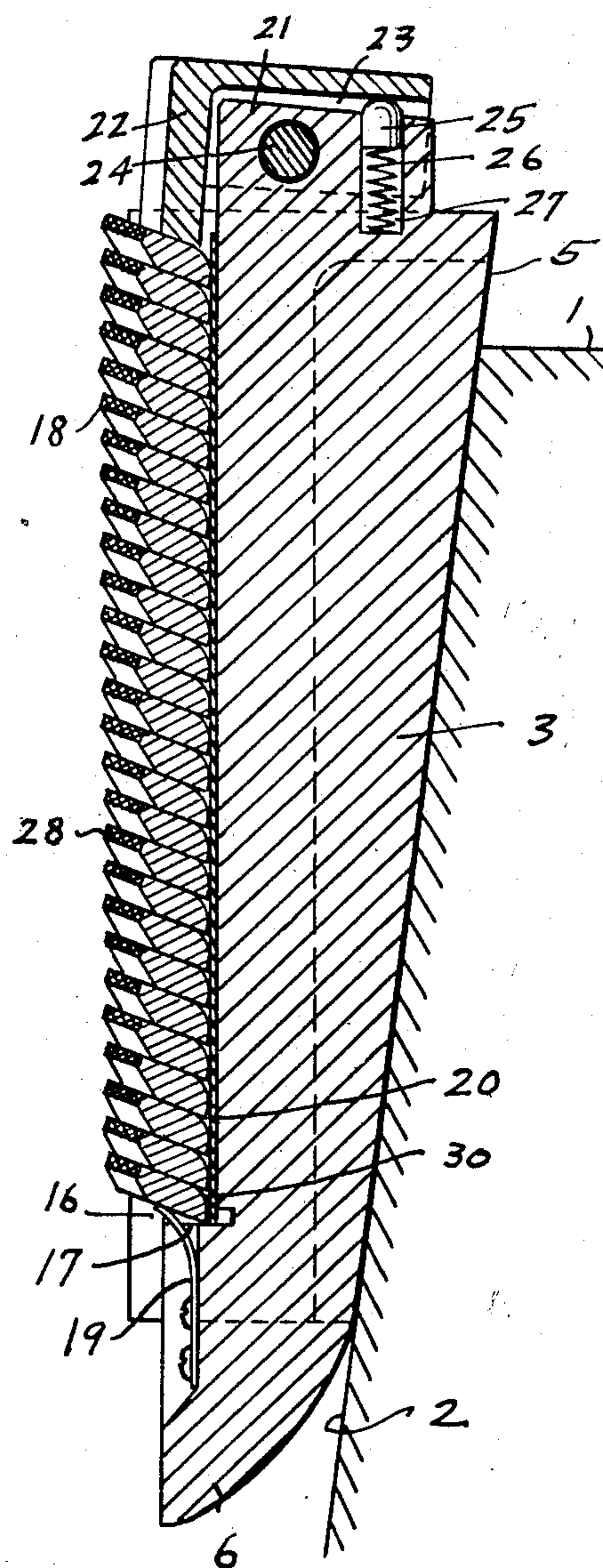


FIG. 4.

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UNITED STATES PATENT OFFICE

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PIPE HOLDER

Application filed May 5, 1930. Serial No. 449,784.

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

One object of the invention is to provide a holder of the character described, designed to be mounted in a rotary table or other support and provided to support pipe or tubing suspended in a well bore and which is of such construction that it will hold the pipe while the pipe is suspended therefrom and which will readily release the pipe when the pipe is moved upwardly relative to the holder.

The invention involves certain improvements on that type of pipe holder described in application Serial No. 323,733 filed December 4, 1928, and now pending in the United States Patent Office.

Another object of the invention is to provide a pipe holder whose segments have the respective series of super-imposed pipe engaging dogs adapted to grip and suspend the pipe without injury to said pipe and which, upon upward movement of the pipe will readily release the same to the end that the holder will not stick or wedge, between the pipe and the seat in which the holder is located, so tightly as to make it difficult to release the pipe when it is desired to elevate the pipe in making up or breaking up the string and the invention comprehends also a removable wearing plate against which the outer edges of the dogs work and further comprehends yieldable means normally holding said dogs inwardly and upwardly inclined so as to more readily grip and hold when the weight of the pipe is assumed by said dogs.

A further feature of the invention resides in the provision of guides on the holder segments through which the holder may be prevented from hanging on the rotary table or other support and which will guide the holder segment into the supporting seat.

A still further feature of the invention resides in the provision of a novel form of a holder segment more specifically hereinafter described.

With the above and other objects in view, the 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 one section of the holder.

Figure 2 shows a transverse sectional view taken on the line 2—2 of Figure 3.

Figure 3 shows a vertical sectional view of the holder taken on the line 3—3 of Figure 1, and

Figure 4 shows a vertical sectional view taken on the line 4—4 of Figure 1.

Referring now more particularly to the drawings wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 designates a suitable support having the downwardly converging seat 2. This support may be a rotary table of a rotary drilling machine or it may be the conventional adapter ring in said rotary table or any other suitable support. The pipe holder is formed of confronting sections, each section being preferably formed of two segments as 3, 3. If desired the holder or slip, may be formed of more than two sections and each section of more segments than shown. The outer side of each segment tapers downwardly so that when the sections are assembled into a complete holder or slip it will fit within the seat 2. In the preferred form each segment has the marginal outstanding wings 4, 4 and a central vertical bearing rib 5. The outer margin, of the rib 5, only bears against the wall of the seat 2, when the holder is seated in said seat, and the outer margins of the wings 4 are spaced from said seat. The lower ends of the ribs 5 are extended beneath the segments proper and are beveled inwardly forming the guides 6 which serve to prevent the holder sections from hanging on the upper end of the support when said sections are inserted into the seat around the pipe 7 to be held.

Two segments may be assembled into a slip section as shown in Figures 1 and 2 by means of the upper and lower transverse bolts 7, 8 and an intermediate transverse bolt 9 which may be fitted through adjacent wings, 4. Each bolt has the usual head on one end and nut on the other end, to retain the bolts in

position and around the intermediate bolt 9 and seated in facing sockets 10, 10 there is a coil spring 11. This spring gives the slip section the required flexibility. The upper ends of adjacent segments have the upstanding lugs 12, 12 and between these lugs the lower ends of the arms of the handle 13 are fitted and retained by the bolt 14 which is fitted through said lugs and through the adjacent end of the handle. Each handle 13 has a suitable grip 15 and through these handles the slip sections may be handled independently.

The inner side of each segment has a relatively wide vertical channel 16 preferably dovetailed in cross section and which extends from the upper end of the segment down to the transverse ledge or shoulder 17 near the lower end of said segment. In this channel of each segment there is a series of plate like dogs 18 which are formed to fit loosely in the channel but which are dovetailed therein against detachment and the dogs of the series are superimposed one upon the other as shown.

Secured to the inner side of the lower end of each segment there may be provided an inwardly curved flat spring or other yieldable seat 19 on which the lower dog of each series rests. This seat 19 supports said lower dog in such manner that it will incline inwardly and upwardly, as and for a purpose to be hereinafter stated. The outer edges of the dogs of each segment bear against a removable wearing plate or liner plate 20 formed of durable material and fitted into the corresponding channel 16 behind said series of dogs 18. When this bearing plate 20 becomes worn it may be removed and reversed in position so as to present a smooth surface to said dogs and when destroyed or worn out a new one may be readily substituted for it.

Each segment has an upstanding lug as 21 at its upper end and there is a yieldable mounted dog 22 having a recess 23 in its underside into which the lug 21 projects. This dog is pivoted to the lug by means of the transverse bolt 24. A plunger 25 is seated on a spring 26 in the socket 27 in the upper end of each segment and this plunger normally holds the inner end of the dog 22 against the upper side of the upper dog of the corresponding series of dogs 18. This dog 22 presses against the adjacent dog 18 near the outer margin of the latter and cooperates with supporting seat 19 of the series to normally hold the dogs of said series inclined inwardly and upwardly.

The ends of the dogs 18 are beveled inwardly and between said beveled portion the inner margins of the dogs are arcuate as at 28 so that when the segments are assembled into a complete slip or holder, the inner margins of the dogs 18 will conform to the contour of and engage about the pipe 7 to be held. The pipe engaging margins of said

dogs may be milled or otherwise roughened or toothed if desired and their inner edges are beveled upwardly.

In use, the holder sections are inserted into the seat 2 around the pipe 7 to be held. Each section of the slip has a yieldably mounted spacer 29 projecting outwardly from the face thereof on one side and when the complete holder is assembled in the seat 2 around the pipe one of these spacers 29 will be on each side so as to space the confronting sections of the holder substantially an equal distance apart on each side of the pipe.

When the pipe is released by the pipe handling mechanism in the derrick and moves downwardly it will be frictionally engaged by the dogs 18 and the holder or slip will be moved downwardly and inwardly in the seat. The inner edges of the dogs 18 will swing inwardly and downwardly with a toggle lever effect with the pipe until the lower dog lands on the ledge 17. The said dogs will thereafter grip and hold the pipe suspended in the bore without biting into or materially injuring said pipe. Upon elevating the pipe, when for any reason it is desirable to do so, the dogs 18 will swing upwardly about the outer bearing edges 30, thereof which bear against the plate 20, and the inner edges 28 of said dogs are swung upwardly and outwardly away from the pipe and the pipe will thus be readily released from the slip.

As hereinabove stated the outer margins of the ribs 5 bear against the wall of the seat 2, thus forming a single contact with the seat, and the outer margins of the wings 4 are spaced inwardly from the seat. If the outer margins of the wings 4 extended out to the same circumference as the outer margin of the ribs 5, when the holder moved downwardly in the seat 2 the marginal wings 4 would contact with the gradually contracting walls of the seat, and the ribs 5 would be held clear said seat and would form no contact therewith and the load would be sustained by the marginal wings 4 thus having a tendency to cause the segments 3 to assume a greater curvature which would cause the dogs 18 to become locked against movement in their respective channels. Furthermore, the single central contact of each segment reduces the friction with the seat 2, thus lessening the liability of the holder to become wedged and stuck between the seat and the pipe.

The drawings and description disclose what is now considered to be a preferred form of the invention by way of illustration only, while the broad principle of the invention will be described by the appended claims.

What I claim is:

1. In a pipe holder a segment, a series of superimposed, movable, pipe engaging dogs on the inner face of said segment, yieldable means normally maintaining said dogs inclined inwardly.

2. In a pipe holder a segment having a substantially central longitudinal, external rib whose lower end extends beneath the segment and terminates in an inwardly beveled guide.

5 3. In a pipe holder a segment having an external longitudinal rib whose lower end is extended beneath the segment and formed into an inwardly beveled guide.

10 4. In a pipe holder a segment, a series of superimposed, movable, pipe engaging dogs on the inner face of said segment, yieldable means normally maintaining said dogs inclined inwardly, and a removable bearing plate between said dogs and segment.

15 5. In a pipe holder a segment having an inside vertical channel, a bearing plate therein, a series of superimposed, movable, pipe engaging dogs in said channel and having curved faces bearing against said plate.

20 6. In a pipe holder a segment having an inside vertical channel, a bearing plate therein, a series of superimposed, movable, pipe engaging dogs in said channel and bearing against said plate, and yieldable means bearing against the lower and upper dogs of said series.

30 7. In a pipe holder a segment having an inside vertical, dovetailed channel, and a series of superimposed, pipe engaging dogs, dovetailed in said channel, and having curved bearing faces and a removable bearing plate between said dogs and the segment against which said curved faces bear.

35 8. A pipe holder formed of sections, each section being composed of segments, connected together, a series of superimposed, inwardly inclined, pipe engaging dogs on the inner face of each segment, the inner margin of each dog being movable vertically about a transverse axis.

40 9. A pipe holder formed of sections, each section being composed of segments, connected together, a series of superimposed, pipe engaging dogs on the inner face of each segment, a vertical, external rib on each segment, the lower ends of the ribs terminating in inwardly beveled guides.

50 10. A pipe holder formed of sections, each section being composed of segments, connected together, a series of superimposed, pipe engaging dogs on the inner face of each segment, each dog having a curved bearing face and a bearing plate between the bearing faces of each series and the corresponding segment.

60 11. A pipe holder formed of sections, each section being composed of segments connected together, a series of superimposed, movable, pipe engaging dogs on the inner face of each segment and yieldable means normally holding the dogs of the respective series inclined inwardly and upwardly.

65 12. In a pipe holder, a segment, a series of plate like, superimposed, pipe engaging dogs on the inner face of said segment and pivotal

about horizontal axes and yieldable means normally holding the dogs inclined inwardly.

13. In a pipe holder, a segment, a series of plate-like superimposed, pipe engaging dogs on the inner side of the segment and pivotal about approximately horizontal axes, a hold down member pivotally mounted on the segment, yieldable means acting against said member and effective to hold said member yieldingly against said series.

14. In a pipe holder, a segment having an inside vertical dove-tailed channel, and a series of super-imposed pipe engaging dogs dove-tailed in said channel, each dog being movable on a transverse axis.

15. In a pipe holder, a segment having an inside vertical dove-tailed channel and a series of superimposed pipe engaging dogs dove-tailed in said channel and pivotal about horizontal axes.

16. In a pipe holder a plate like dog having an inner, arcuate, pipe engaging face, said dog having ends which diverge outwardly and having a substantially straight outer margin from end to end which recedes upwardly and inwardly forming an outer bearing face approximately coextensive in length with the outer margin of the dog.

17. In a pipe holder, a pipe engaging dog having flat, substantially parallel faces and one margin of which is shaped to engage a pipe, the margin of said dog opposite said pipe engaging margin being so curved as to preserve a straight line of contact with a flat surface while rocking against the same in a direction parallel to the planes of said faces, said dogs having ends which diverge.

18. In a pipe holder a pipe engaging dog, dovetailed in shape and having flat faces which are approximately parallel, one margin of said dog having an arcuate pipe engaging face and the opposite margin of said dog being shaped to preserve a straight line of contact with a flat surface while rocking against the same in a direction perpendicular to the planes of said flat faces.

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

THOMAS W. ADAIR.