March 7, 1933. G. A. HUMASON ET AL 1,900,714

TUBING HEAD

Filed July 16, 1931 4 Sheets-Sheet 1

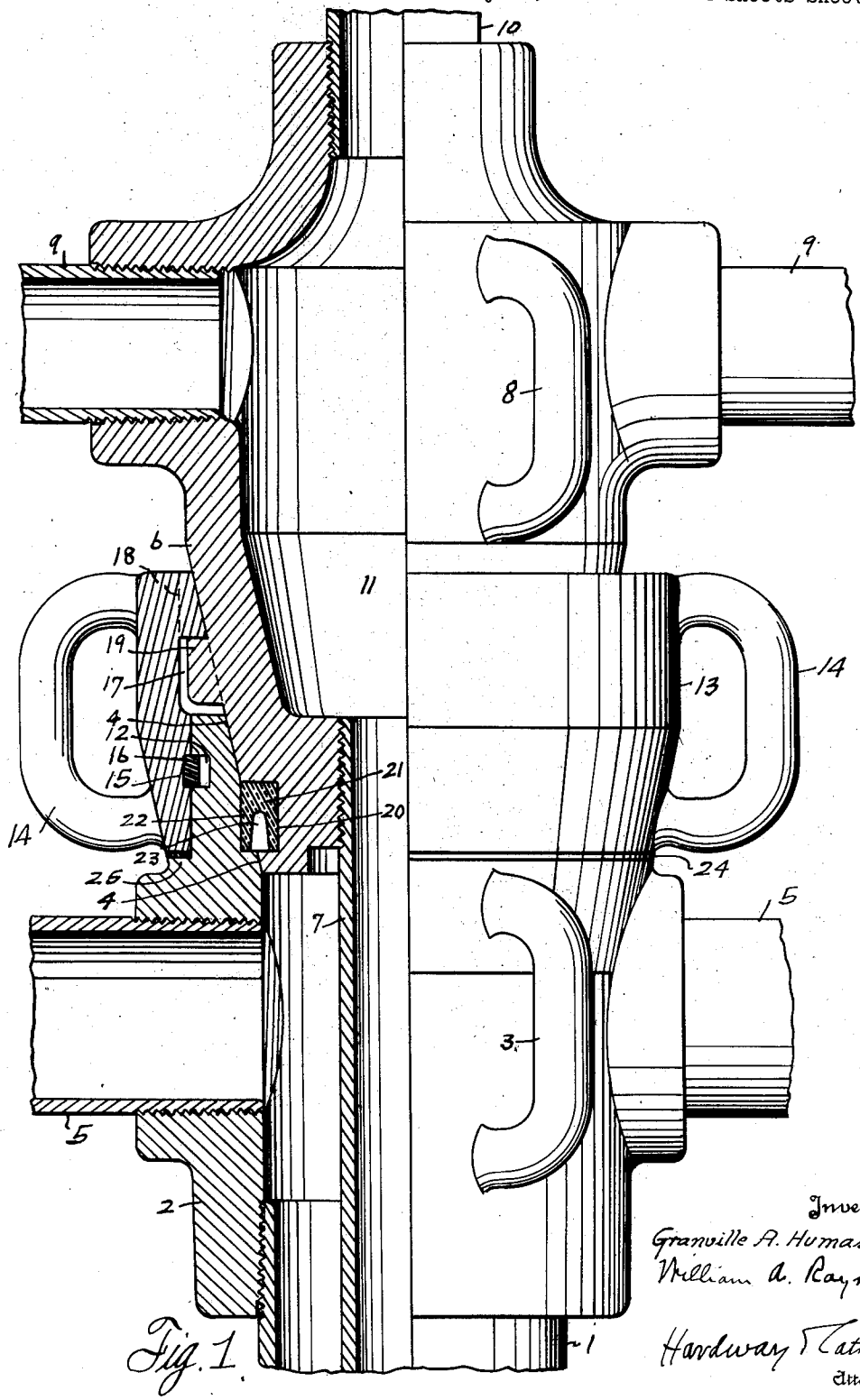


Fig. 1.

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TUBING HEAD

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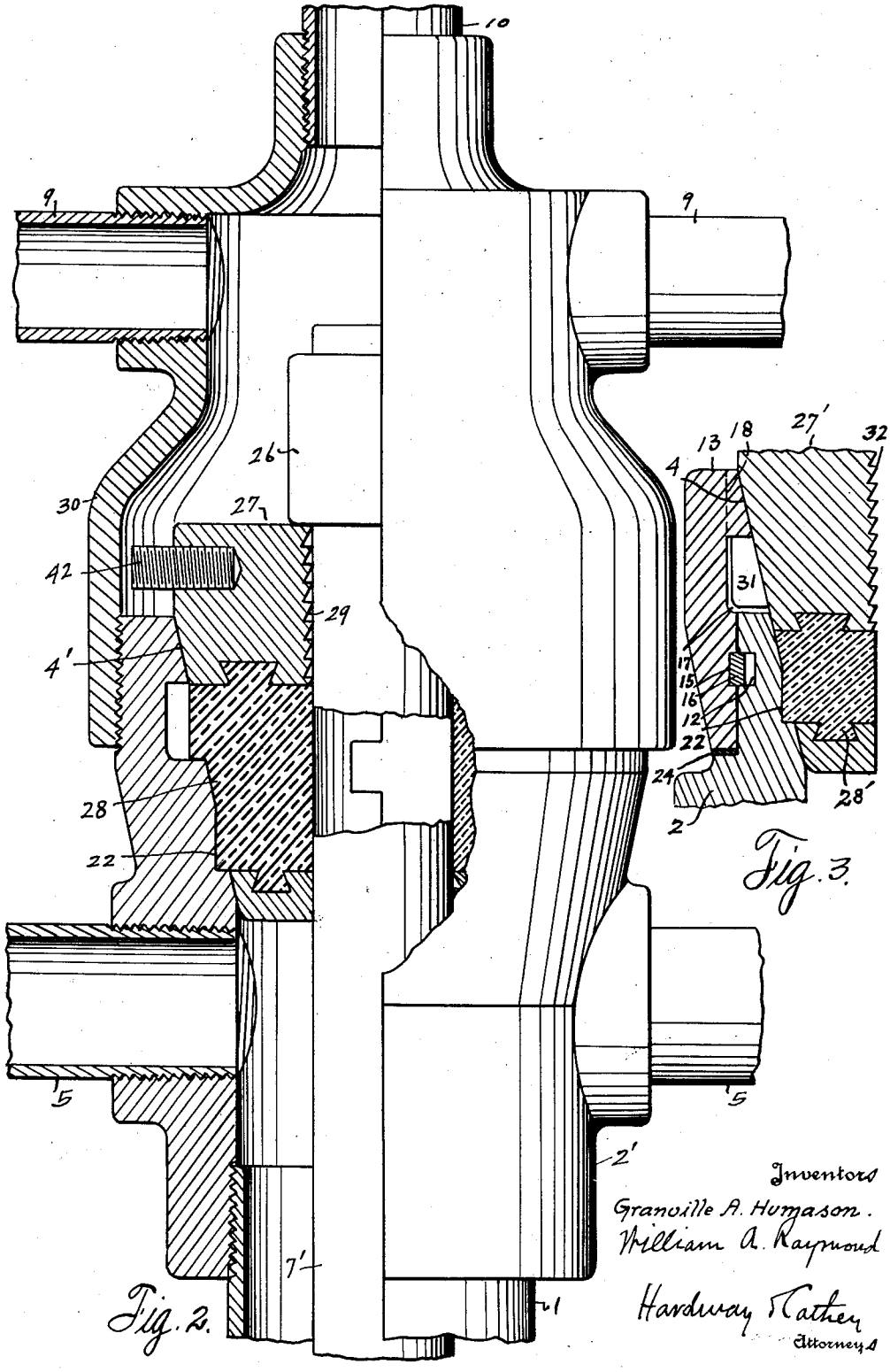


Fig. 2.

Fig. 3.

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TUBING HEAD

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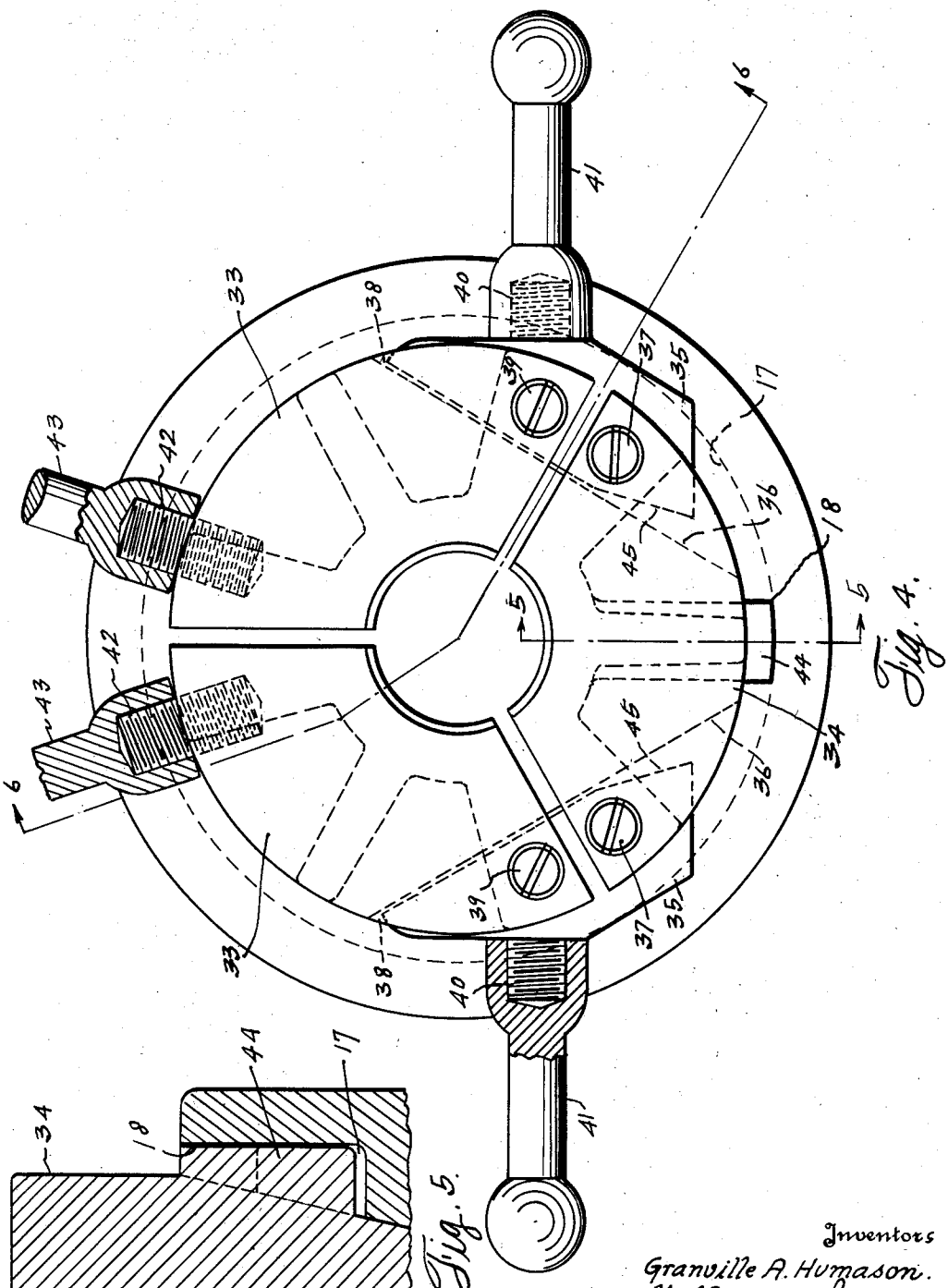


Fig. 4.

Fig. 5.

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TUBING HEAD

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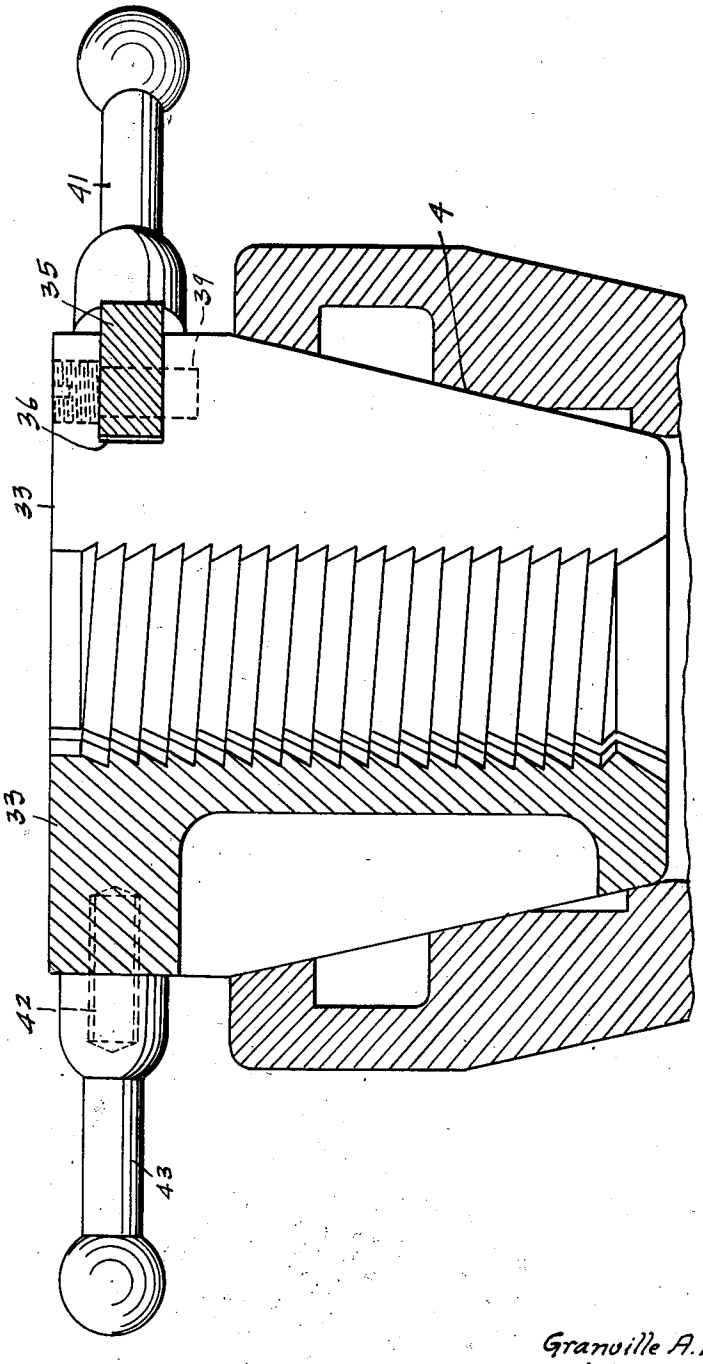


Fig. 6.

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UNITED STATES PATENT OFFICE

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TUBING HEAD

Application filed July 16, 1931. Serial No. 551,122.

This invention relates to a tubing head.

An object of the invention is to provide a device of the character described, designed to be attached to the upper end of a pipe in a well bore and whereby a tubing may be supported in the well.

Another object of the invention is to provide in a device of the character described, means for supporting the tubing and for forming a fluid tight joint between the outer pipe and the tubing.

Another object of the invention is to provide in a device of the character described, a novel type of packing.

A still further feature of the invention resides in the provision of means whereby the tubing hanger may be readily interlocked with or released from the bowl.

Still further feature of the invention resides in the provision of novel type of slips for supporting the tubing from the bowl.

A still further feature of the invention resides in a novel combination between the slips and the bowl whereby a fluid tight joint is formed between said slips and bowl and whereby the slips may be prevented from rotation in the bowl.

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 side elevation partly in section of the tubing head.

Figure 2 shows a side elevation partly in section of a modified form thereof, showing tubing slips therein.

Figure 3 shows a fragmentary vertical sectional view showing a modified form of the slip.

Figure 4 shows a plan view of the slips.

Figure 5 shows a fragmentary sectional view of the slips, taken on the line 5—5 of Figure 4, and

Figure 6 shows a sectional view taken on the line 6—6 of Figure 4.

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 pipe or casing in a well bore screwed onto the upper end of which there is a bowl 2 having one or more handles 3 by means of which it may be screwed onto or unscrewed from the upper end of the casing. The upper end of the bowl has the upwardly flared seat 4 and beneath this seat has one or more flow lines 5, 5. Seated in the seat 4 there is a hanger 6 which is also bowl shaped and into the bottom of which the upper end of the well tubing 7 is screwed. This hanger also has one or more handles 8 by means of which the hanger may be handled. As shown the hanger is of the general form of a Christmas tree or cross having the lateral flow lines 9, 9, and the upwardly extending flow line 10 and within said hanger there is the enlarged flow chamber 11.

Around the bowl there is an annular groove 12 forming a keyway and fitted over the upper end of the bowl there is an annular retainer ring 13 having the handles or grips 14 for handling the same and this ring has an inside annular keyway 15 which registers with the keyway 12 and in said keyways there is an annular interlocking key 16 which locks the ring on the bowl. The ring 13 has an inside annular groove 17 leading upwardly from which there may be one or more gates 18 and the hanger has one or more external lugs 19 which may be fitted downwardly through the corresponding gates 18 and the ring 13 then turned to lock said anchor in place.

Seated in a suitable annular external groove 20 in the hanger there is an annular resilient packing 21 preferably rectangular in cross sectional contour and which fits in an internal triangular groove 22 in the bowl when the hanger is seated therein. The underside of the packing has an annular groove 23 therearound, arranged to register with the joint beneath between the bowl and hanger. Any fluid under pressure escaping through said joint will enter said groove and expand the packing to prevent the escape of said fluid.

There is a packing gasket 24 located be-

tween the lower end of the ring 13 and the external annular shoulder 25 of the bowl beneath.

The tubing 7 may be connected to and suspended from the hanger 6 as shown in Figure 1. The type of construction hereinabove described is primarily intended to be used in connection with a flowing or pumping well. In case the fluid flows from the well under strong pressure, the fluid may be delivered out through the lines 9, 10 or either of them. The flowing fluid will fill the enlarged flow chamber 11 and the body of fluid in this flow chamber will act as a cushion to retard the flow of fluid flowing under strong pressure to the end that the gritty substances therein will not cut, or erode, away the connections thus protecting the hanger and the flow lines leading therefrom.

In assembling the hanger 6 with the bowl 2 the lug or lugs 19 may be lowered through the corresponding gates 18 and the ring 13 then turned to lock the lugs 19 in the groove 17 so that the hanger will be securely attached to the bowl.

In the form shown in Figure 2, there is a bowl 2′ secured to the upper end of the casing 1 having the upwardly flared seat 4′ and having one or more flow lines as 5, 5 leading outwardly therefrom beneath said seat. This type of the tubing head is particularly designed for use while drilling and bringing in the well where strong internal pressure is encountered. In case a blowout is threatened the tubing slips shown in Figure 2, may be seated in the seat around the drill stem 7′ and said stem then lowered until a coupling 26 of said stem rests on said slips and the pressure fluid in the well may then escape out through the flow lines 5, 5 but will be prevented from passing up through the bowl 2′ and between it and the drill stem.

The particular type of slips shown in Figure 2 is composed of a plurality of slip segments 27 each segment having a resilient packing element 28 incorporated therein formed of rubber or other suitable resilient material which seats in the triangular groove 22 around the inside of the bowl 2′ and when the weight of the stem is on said slips this packing insert will form a tight joint with the bowl as well as with the drill stem.

Above the packing element 28 the slip segments have the internal teeth 29 to engage the drill stem 7′ or other tubing in the slips and support the weight of said stem or tubing from the slips independent of the coupling 26.

When this type of tubing head is used with a flowing or pumping well, the slips 27 may be used to support the pump tubing and a nipple 30 may be threaded onto the bowl 2′ to form a connection for the lateral flow lines 9, 9 and the upwardly extending flow line 10.

In substitution for the hanger 6 as shown in Figure 1, the slips 27′ may be seated in the seat 4 to engage and support the tubing 7. These slips have an external lug 31 which may pass down through the gate 18 of the ring 13 and said ring may then be turned to lock against the upper end of said lug to lock said slips in place. This type of slips 27′ is substantially similar to the type of slip shown in Figure 2 having the packing insert 28′ to form tight joints between the slip and bowl as well as between the slip and tubing and also having the inside teeth 32 above said insert to grip and support the tubing therein.

The general type of the slip hereinabove referred to is shown more in detail in Figures 4 and 6 but without the packing insert in the slip segments. Preferably this type of slip comprises three segments 33, 33 and 34. These segments are arcuate in horizontal cross sectional contour and are downwardly tapered on their outer sides to seat in the downwardly tapered seat 4 of the bowl and the segments 33 are hingedly connected to the segment 34 one on each side by means of the rigid links.

These links are seated, at one end, in the external bearings 36, 36 at the upper end of the segment 34 and cut in opposite sides thereof and are mounted to pivot on the pins 37 of said segment. The other ends of the links 35 are extended into the external grooves 38, 38 cut across the upper ends of the segments 33 in alignment with the grooves 36 and are secured therein by the vertical pins 39 in said segments 33. The links 35 have the outwardly extended externally threaded studs 40, 40 onto which are threaded the outwardly extending handles 41, 41 by means of which the slip may be handled.

If desired the free ends of the segments 33 may be equipped with the outwardly extended externally threaded studs 42 to receive the handles 43, 43 providing additional means for handling and manipulating the slip.

If desired one of the slip segments may be provided with the external lug 44 adapted to fit through the gate 18 of the bowl and down into the groove 17 beneath as shown in Figure 5 which is effective to hold the pipe sustained by the slips against turning in case it be desired to unscrew a joint of the pipe above or to screw an additional joint onto said pipe.

In manipulating the slip when it is lifted out of the bowl by suitably manipulating the handles 41 the slip segments may be swung open and the slip removed from the pipe and conversely in seating the slip in

the bowl by an appropriate manipulation of the handles 41 the slip may be swung into position around the pipe and then lowered into the bowl. The slip is equipped with the additional handles 43, 43 in case the weight of the slip is such as to require two workmen to handle it. The ends of the links 35 located within the bearing slots 36 have their inner ends outwardly beveled as at 45, 45 to give them sufficient freedom of movement so that the segments 33, 33 may be swung apart a sufficient distance to clear the pipe in removing the slip from around or in placing it around the pipe to be held and the segments 33 may be loosely connected to said links 35 to give the required flexibility.

The type of slip shown in Figures 2 and 3 is substantially the same as the type shown in Figures 4 and 6, the type shown in the last named figures not having the packing insert therein.

The drawings and description disclose what we now consider to be preferred forms of the invention by way of illustration only, while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. In a tubing head, the combination with a bowl having an inside seat, of a tubing hanger in the bowl on said seat, a turnable ring on the bowl, interlocking means carried by said ring and hanger arranged to be interlocked or released by appropriate turning movements of said ring, and an annular, resilient insert in said hanger forming a packing between the hanger and seat and whose underside has an annular groove aligned with the joint between the hanger and seat.

2. In a tubing head, a bowl having an inside seat, a turnable ring on the bowl, said bowl and ring having registering grooves, a key in said grooves arranged to prevent the detachment of the ring from the bowl but to permit the turning movement of the ring relative to the bowl, a hanger in said bowl, said ring and hanger being provided one with a groove having a gate and the other with a lug adapted to pass through said gate into said groove and to be locked therein upon an appropriate relative turning movement of said ring and hanger.

In testimony whereof we have signed our names to this specification.

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