Feb. 20, 1951 E. L. BARKER 2,542,302

WELLHEAD CONSTRUCTION

Filed Jan. 7, 1948 3 Sheets-Sheet 1

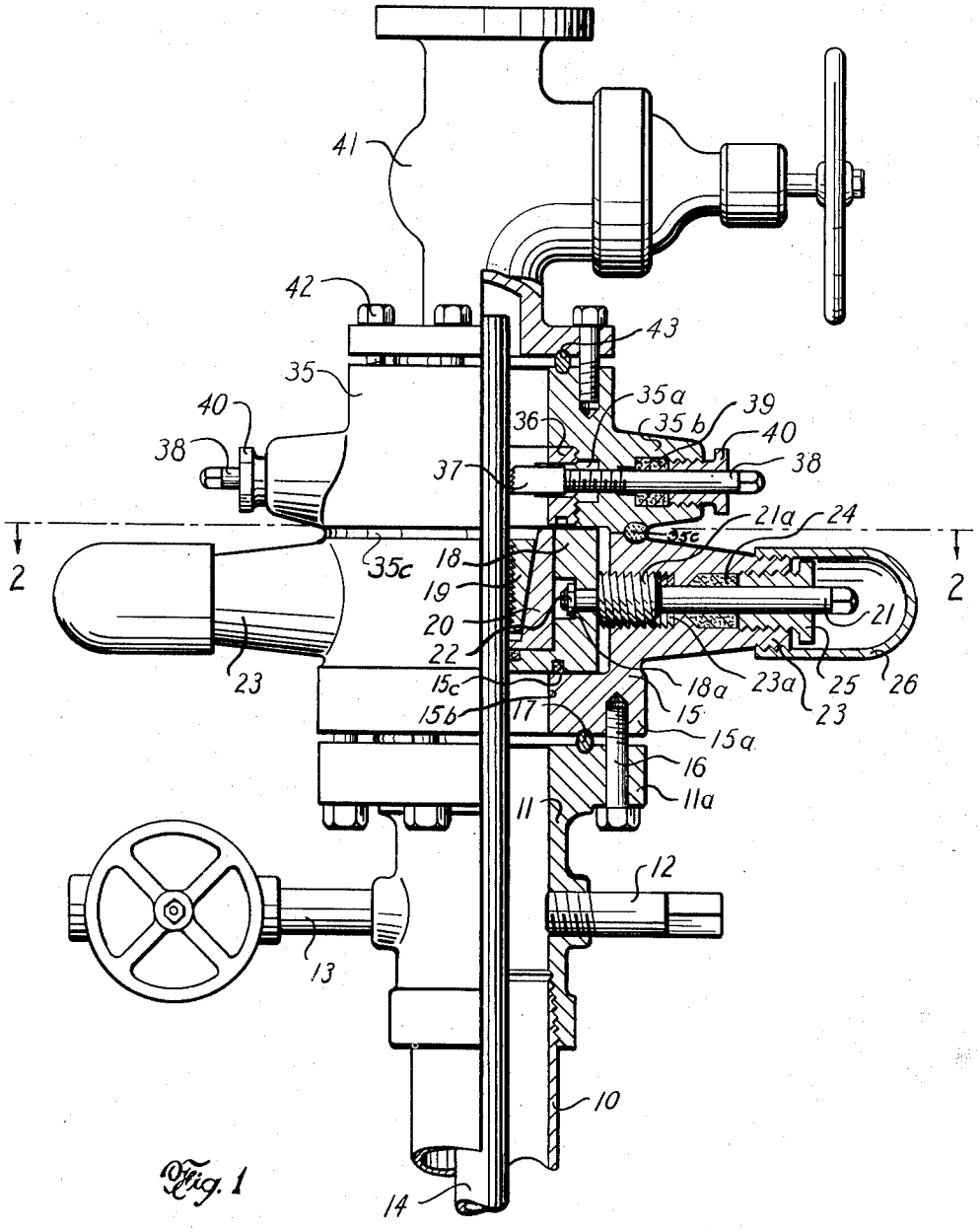


Fig. 1

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Filed Jan. 7, 1948 3 Sheets-Sheet 2

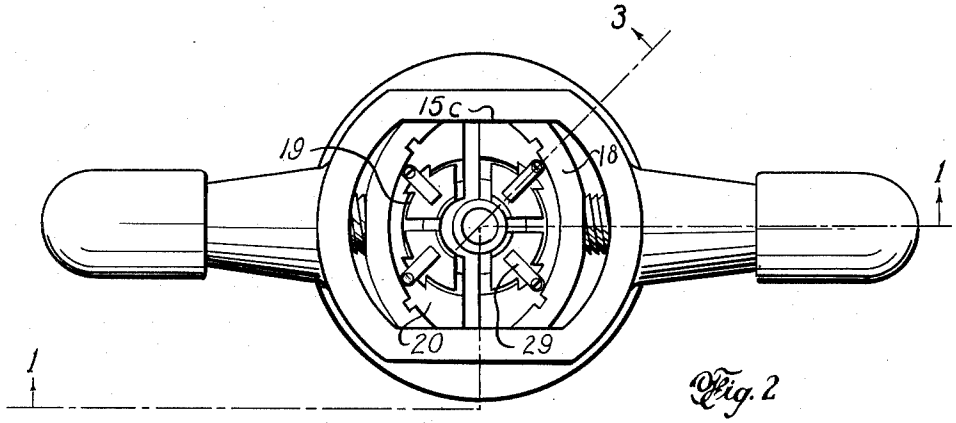


Fig. 2

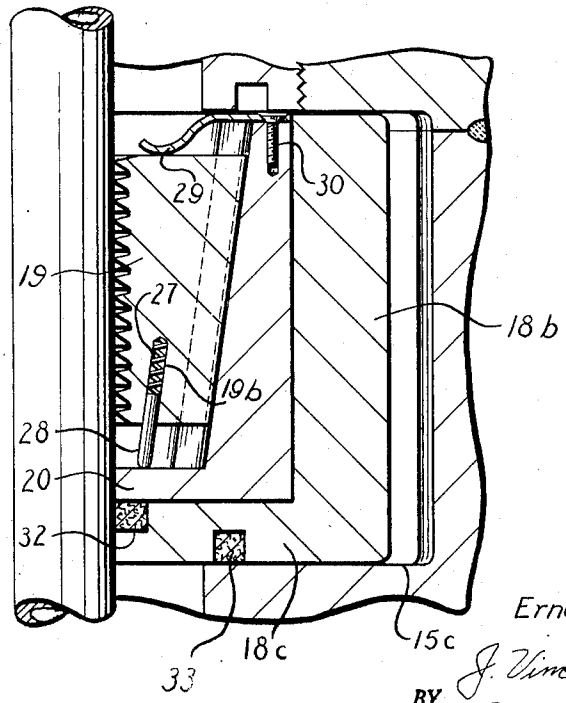


Fig. 3

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Filed Jan. 7, 1948 3 Sheets-Sheet 3

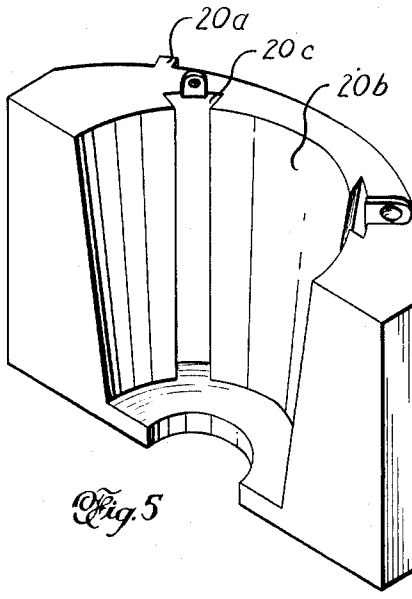


Fig. 5

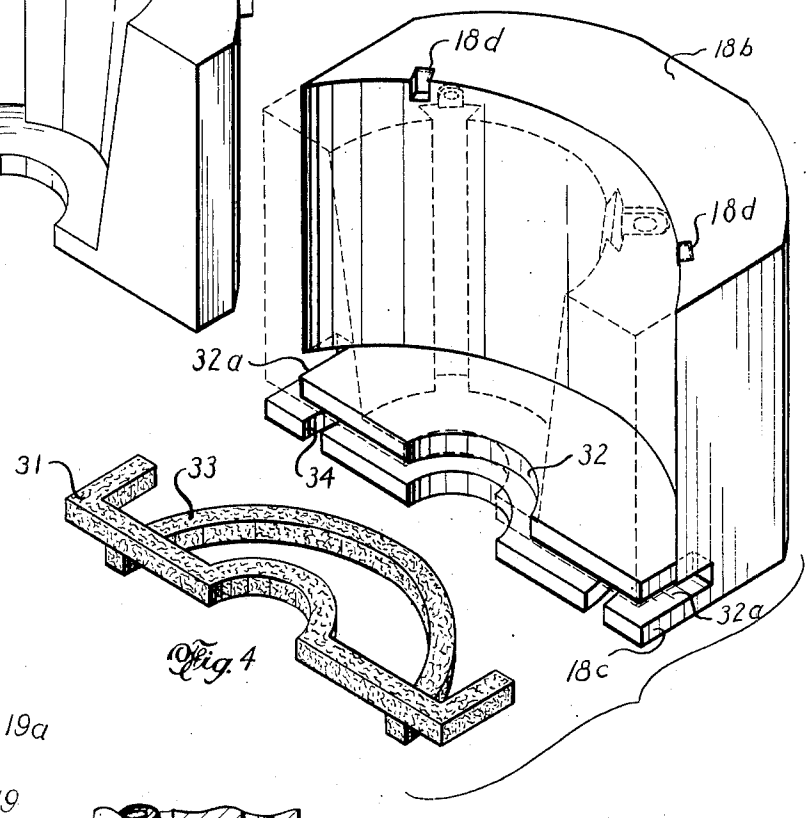


Fig. 4

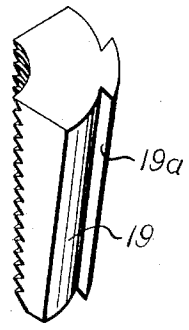


Fig. 6

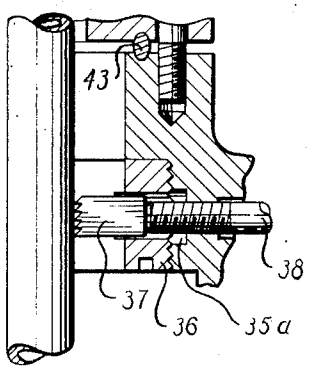


Fig. 7

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2,542,302

UNITED STATES PATENT OFFICE

2,542,302

WELLHEAD CONSTRUCTION

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Application January 7, 1948, Serial No. 1,013

16 Claims. (Cl. 285—22)

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This invention relates to a tubing head and has for its general object the provision of an improved means for hanging and sealing a tubing within a well. This application is a continuation in part of my co-pending application for U. S. Letters Patent, Serial No. 534,673, filed May 8, 1944, now abandoned.

In hanging tubing within an oil well or gas well the tubing is usually provided with a packer for packing off the annular space between the tubing and the casing and in some cases a plurality of such packers are spaced apart along the tubing. A plurality of packers are customarily used in wells known as dual or multiple completion wells, wherein the wells are permitted to flow from more than one level or horizon through perforations in the casing. These packers are located within the well bore beneath the well head and usually it is necessary to manipulate the tubings by shifting them axially in order to expand the packers into sealing engagement with the casing. After the packers have been set the tubing is hung within the tubing head at the top of the well in such a manner that a predetermined amount of the weight of the tubing string will be placed upon the packer, the balance being supported by the tubing head. It is difficult to set the packer with the proper weight thereon and then suspend the tubing in a hanger, where the tubing is of conventional structure with a hanging nipple or other positive anchoring part thereon. In accordance with this invention the tubing may be gripped directly at any point that happens to be adjacent the gripping elements after the proper weight has been placed upon the packer.

An additional problem is found in conventional tubing heads in providing a seal between the body and a tubing suspended therein. It is desirable for the longitudinal body opening of the tubing head to have a minimum internal diameter at least as great as the internal diameter of the well casing upon which it is to be mounted so that any tools that may be lowered within the casing itself may be passed through the tubing head. This structure leaves a large space between the body wall and the tubing which heretofore has not been satisfactorily sealed. The tubing head of this invention utilizes a novel structure which makes it possible to readily and positively provide a seal transversely of the passage through the body and about the tubing.

It is an object of this invention to provide a tubing head wherein the tubing is readily hung to properly distribute the weight of the tubing string between the hanger and packer.

Another object is to provide a tubing head having a highly efficient seal between the tubing head and the tubing to prevent leakage from the tubing into the casing or vice versa.

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A further object is to provide a pipe hangar having rams carrying slips for hanging a pipe wherein sealing material is carried by the rams to provide a seal between the hangar and a pipe, hung therein.

Still another object is to provide a pipe hangar having rams carrying slips for hanging the pipe therein wherein sealing material associated with the rams provides a seal between the hangar and pipe while the pipe is in hanging engagement with the slips.

Still a further object is to provide a pipe hangar having rams carrying slips for hanging a pipe wherein sealing material is associated with the rams to provide a seal between the rams and hangar body and between the rams and pipe to be hung wherein the sealing material is contiguous and the weight of the pipe suspended by the slips is utilized to place the sealing material under pressure to perfect the seal upon hanging engagement of the slips with the pipe.

Yet another object of this invention is to provide a tubing hangar of such a construction that a tubing hung therein cannot be dropped without first picking up that part of the weight of the tubing which is suspended from the hangar, but in which, when the weight is lifted, the hanging elements may be easily and quickly disengaged from the tubing.

Yet a further object is to provide a tubing hangar of the character described having a means for holding down the tubing in case of excessive pressures developing within the oil string of casing, said hold down means being readily operable from the exterior of the tubing head.

Even another object is to provide a device of the type referred to which may by the substitution of minor parts be modified for use with tubing having varying outside diameters.

Even a further object is to provide a tubing head wherein a sealing means is associated with the hanging means thereby reducing the requisite overall size of the device.

Still another object is to provide a device of the character described which may be manufactured without the usual regard for close tolerances and employing an actual minimum of machine work.

A still further object is to provide a tubing head with an axially extending passage therethrough of such dimensions as to pass any object or tool that may be lowered into and accommodated by the casing upon which the tub-

ing head is supported, and wherein a seal may readily be established between the tubing head body and a tubing of small outside diameter compared with the I. D. of the casing.

Another object is to provide a seal means for a tubing head which is normally inactive when a tubing is lowered into a well, but which may be readily actuated at the will of the operator to provide a seal between the tubing head body and tubing to function as a blow-out preventer.

Other and further objects of this invention will appear from the following description.

In the accompanying drawings which form a part of the instant specification, are to be read in conjunction therewith and wherein like reference numerals are used to indicate like parts in the various views;

Fig. 1 is a view in side elevation shown partially in section illustrating a tubing head constituting an embodiment of this invention;

Fig. 2 is a view taken along the line 2—2 in Fig. 1 in the direction of the arrows;

Fig. 3 is a view on an enlarged scale, similar to that of Fig. 1, illustrating the tubing hangar elements;

Fig. 4 is an exploded isometric view upon an enlarged scale of the ram shown in Fig. 1 showing the sealing means separate from the ram;

Fig. 5 is an isometric view upon an enlarged scale of the slip bowl shown in Fig. 1;

Fig. 6 is an isometric view upon an enlarged scale of a slip employed in the hangar unit of the device shown in Fig. 1; and

Fig. 7 is an enlarged fragmentary view detailing the hold down element in the device of Fig. 1.

The device of this invention, in general, comprises a tubing head made up of a body mounted upon an oil string of casing within a well bore and equipped with flow lines communicating with the interior of a casing upon which is secured a tubing hangar carrying rams having slip elements therein. The rams also provide a part of the seal between the body and a tubing suspended therein and packing material is associated with the rams which perfects the seal when the slips suspend the tubing. Above the hangar and sealingly secured thereto is another body member which houses a hold down mechanism for preventing excess pressure which may develop within the casing from blowing the tubing out of the well. A suitable master valve may then be secured to the upper end of the housing for the hold down mechanism. A longitudinal passage extends through the body members making up the device through which a tubing may be lowered and anchored in place with a predetermined portion of its weight suspended by the tubing hangar and the remainder of the weight thereof resting upon packers or the like disposed within the string of casing. The narrowest portion of this passage is at least as great as the internal diameter of the casing and yet the gap between the tubing head body and tubing is positively bridged and sealed when the tubing is hung.

Referring to the drawings in detail, the numeral 10 designates the oil string of casing of an oil or gas well. To the upper end of the string of casing is threaded or otherwise secured a body member 11 of the tubing head. This body member has lateral ports which may be equipped with bull plugs 12 or valved flow lines 13. These ports, upon completion of the installation communicate with the annular space between the string of flow tubing 14 and the string of casing 10.

To the upper end of body member 11 is secured the hanger body or housing 15. This mounting may be satisfactorily provided by confronting flanges 11a and 15a upon the body members respectively which are secured in position by bolts 16 extending through openings in one of the flanges into tapped threaded holes in the other. A seal ring 17 fits registering grooves in the confronting surfaces of flanges 11a and 15a to seal the joint.

The hangar 15 has a central bore 15b therethrough for receiving tubing or other tools. The I. D. of the bore is the same as that of casing 10. Above this bore are disposed transverse guideways 15c for receiving the hanging elements. The guideways and the hanging elements are shown generally in Figs. 1 and 2 and in detail in Fig. 3. The hanging elements include rams 18 which operably carry slip elements 19. The slip elements have upturned teeth upon their inner surface for engaging a pipe or tubing extending through the longitudinal body opening of the tubing head. In the embodiment illustrated slips 19 are mounted in the rams by means of slip bowls 20. The particulars or details of mountings of the slips in the rams will be hereinafter more fully explained and attention will now be turned to the mechanism for shifting the rams in the guideways and locking them in operative position with a tubing suspended by the slips.

The mechanism for shifting the rams in guideways 15c includes stems 21 each having one end rotatably secured to separate rams. This mounting is provided by recesses 18a upon the internal faces of the rams. Within these recesses are nuts 22 threaded to the end of the stems. The stems carry an enlarged threaded portion 21a, one face of which abuts the exterior face of the rams. Nuts 22 are threaded upon the end of stem 21 so as to provide some play of the stems in their extension through the rams so that they may freely rotate relative to the rams.

The hangar body 15 is provided with laterally extending arms 23 having operable connections with stems 21 to provide for shifting of the rams within the guideways, as well as to provide for frictionally locking the rams in operative or hanging position. The arms have central bores therethrough communicating with the guideways. One section of the bores is provided with buttress type threads 23a which receive the buttress type threads upon the enlarged portion 21a of the stems. Upon rotation of the stem relative to arms 23 the rams are shifted in the guideways. When they are advanced toward a tubing, and the tubing is set or hung in the slips, a considerable radially outward force is exerted upon the rams and in turn transmitted to the stems causing the buttress type threaded connection between the stems and arms to frictionally engage and lock. Due to the surface area of this engagement a positive lock is provided making it impossible for the stems to rotate to release the rams; on the other hand this lock may be readily released by slightly lifting the tubing to relieve the engagement of the tubing with the slips whereupon the rams may be retracted.

A seal is provided between the stems 21 and the arms 23 through which they pass. This may be provided by a suitable stuffing box including packing material 24 held in place within an enlarged portion of the bore through arms 23 by packing glands or nuts 25 threaded within the arms. The ends of stems 21 exterior of the body are formed with non-circular parts for receiving

wrenches or the like to facilitate manipulation of the stems and rams. Preferably caps 26 are threaded to the ends of arms 23, after hanging of a tubing to protect the protruding ends of stems 21.

Referring now to the details of the hanging elements, reference is made to Figs. 3 to 6, inclusive. Rams 18 have an upstanding arcuate portion 18b and a lower portion or footing 18c. Footing 18c has a cut out portion upon its inner face to accommodate a tubing and is of sufficient length to be advanced into contact with the pipe and the other ram of the device. Slip bowl 20 rests upon the portion 18c and is secured to the concave face of portion 18b of the ram by lugs 20a fitting within grooves 18d of the rams. With this arrangement the slip bowl may be moved downwardly into position within the ram but when in place may not be moved relatively to the ram except in an upward direction, which of course is resisted by gravity. The slip bowls have conically tapered seat surfaces 20d which receive slips 19. In order to secure the slips within the bowls and yet provide for their sliding movement therein the bowls are provided with dovetailed grooves 20c in their conical seat surface which receive dovetail guides 19a upon the slips. Preferably the slips are provided with spring pressed means for holding them in an elevated position relative to the bottom of the slip bowl. Suitable means for accomplishing this includes holes 19b tapped in the bottom of the slips and in which are mounted coil springs 27 which urge pins 28 downwardly against the bottom of the slip bowl and normally maintain the slips in an intermediate position along the grooves 20c of the seating surface. Thus in a hanging operation when the rams are advanced toward the tubing and the toothed surface of the slips engage the pipe, the slips are free to move somewhat downwardly with the pipe as it is hung in place whereby the slips are forced radially inwardly by the tapered seat of the slip bowl. Preferably means are provided for resiliently resisting upward movement of the slips and this is provided by springs 29 secured to the upper end of the slip bowls by screws 30.

As has been previously indicated the hanging elements themselves are associated with or may carry sealing material for providing a seal transversely of the body opening between the body and a pipe or tubing suspended therein. In the embodiment illustrated the packing material is carried by the ram in grooves formed therein. These grooves are best shown in Fig. 4 which also shows the shape of the packing material. One groove 32 is along the upper front edge of the bottom or footing 18c of the ram. This groove extends across the face of the ram including the arcuate or cutaway portion provided to accommodate a pipe. The groove also has end extensions 32a which terminate in the upright portion 18b of the ram. A strip of packing material 31 lies within the groove and preferably is well bonded therein. The exposed faces of the packing are substantially level with adjacent faces of the ram but preferably protrude somewhat past the adjacent surface of the ram. The size of the slip bowl is such that when in place within the ram, as shown in dotted lines in Fig. 4, the under face of the slip bowl abuts the upper face of the packing material and the side surfaces of the slip bowl are substantially flush with adjacent surfaces of the packing material. If the packing material extends somewhat past the adjacent ram surfaces it will also extend past the side surfaces of the slip bowl. This strip of packing material 31 is contiguous with a strip of packing material to be next described. Due to the hydraulic characteristic of packing material pressure to which the packing is subjected will be reflected throughout the strips of packing causing the material of strip 31 to flow into sealing engagement with the pipe suspended in the device, the under face of the slip bowl, confronting packing strips of adjacent rams, and the packing within extensions 32a is caused to sealingly engage the adjacent portion of the wall of body part 15 and the slip bowls.

Referring now to the packing strip 33 which is semi-circular in form, it is embedded within groove 34 in the bottom surface of ram 18 and preferably is bonded thereto. The ends of groove 34 communicate with groove 32 whereby the strips 31 and 33 of packing material are contiguous. The strip of packing 33 preferably protrudes very slightly past the under surface of ram 18 and rests upon the bottom of the guideway 15c. Thus when a part of the weight of a string of tubing is supported by the slips the packing 33 as well as strip 31 are placed under pressure by this weight to insure a proper seal. It is then seen that a seal will be completed transversely of the opening through the body of the tubing head when a pipe is suspended therein, the rams bridging the space between the body and tubing and strips 31 and 33 providing the seal. However, this sealing material is under some pressure when the rams are advanced to engage the slips with the pipe even though a pipe is not suspended therein. However, with the rams retracted the sealing material is not under pressure and as a pipe or tubing is run into the well casing the packing material is not subjected to a wearing engagement therewith. Nevertheless the seal may be effectively and readily provided immediately and automatically with the hanging of the tubing in the device.

Packing material 31 and 33 may be formed of rubber, synthetic rubber or the like. It is also contemplated that grooves 32 and 34 may be supplied with plastic packing in the conventional manner by means operable exteriorly of the tubing head. Such means are well known and eliminated from the drawings in the interest of simplicity.

Referring to the structure provided for holding down the tubing against a blow out in the event excess pressure develops within the well casing, a body member 35 is sealingly secured to the upper portion of body member or hangar housing 15. In the embodiment shown member 35 is secured to housing 15 by welding shown at 35c. This body member 35 has a central passage therethrough for receiving a tubing whose smallest diameter is as great as the internal diameter of casing 16. The passage has an enlarged diameter portion in which ring 36 is threaded. This ring has ports therein which receive hold down dogs 37. These dogs are also disposed in recesses 35a formed in the body. The dogs have downturned teeth which may be brought into engagement with the string of tubing, when it has been hung, to hold the tubing down against excess pressures that may develop within the casing. In order to actuate the dogs the dogs have a rotatable mounting upon the ends of stems 38. The stems extend through the wall of body member 35 and the ends thereof exteriorly of the body member have non-circular portions for receiving

suitable wrenches for actuating them. The stems extend through bores in arms 35b of the body member and these bores have enlarged portions for receiving packing 39. This packing 39 is held in place by glands or nuts 40. With this construction it is apparent that the dogs may be advanced and retracted into and out of engagement with a pipe extending through the longitudinal opening through the tubing head.

Mounted on top of the body member 35 is a valve 41 which is the master valve of the tubing head and may be of conventional construction. The valve is secured to body member 35 by bolts 42 and a seal ring 43, fitting registering grooves upon adjacent faces of body 35 and valve 41, seals the joint.

It is believed that the operation of the device of this invention is apparent from the foregoing description. The tubing will first be run into the well in the usual manner, but with the tubing head of this invention secured in place upon the upper end of the well casing. If desired, valve 41 and perhaps other requisite fittings may be secured in place thereabove prior to the running in of the tubing, or in some instances may be secured to body member 35 after the tubing has been run into the well.

While the tubing is being lowered into the well rams 18 will all be in their outermost position in guideways 15c. After the packers, if any, have been set within the casing providing the seal between casing 10 and tubing 14 and prior to removal of the elevators from the string of tubing the rams 18 will be advanced inwardly in the guideways until slips 19 engage the tubing. During this time the slips are held in an upward position in the slip bowl by the spring pressed pins 28. The rams are advanced by rotation of stems 21 and then the pull upon the tubing string by the elevators is partially released permitting the tubing string to be lowered somewhat within the casing. The slips 19 are moved downwardly in the slip bowl and due to the tapered seat of the bowl the slips are moved inwardly into tight gripping relation with the string of tubing. Obviously the amount of movement of the tubing string is very slight because it becomes suspended by the slip elements.

Simultaneously with the gripping of the tubing by slips 19, upon advancement of the rams, the packing material 31 and ends of material 33, along the inner faces of rams 18 abut with like material carried by opposed rams and as the rams are moved further inwardly into metal to metal contact with one another the packing material is placed under pressure to provide a seal, because of the slight protrusion of the material from adjacent metal surfaces. Then the suspension of the tubing within the slips places a great downward load upon the slip bowls which rest upon rams 18. This force causes the packing material of strips 31 and 33 to be placed under increased pressure whereby the packing material is caused to flow into positive sealing engagement between the rams and the tubing head body, the rams and the slip bowls, and abutting surfaces of the rams. This automatically provides an efficient seal transversely of the opening through the body and at the same time the great load due to the weight of the tubing string is borne by metal to metal contact between the slips and slip bowls, the slip bowls and rams, and the rams and body member 15.

The weight of the tubing string also results in a force component in a radially outward direction being imposed upon the rams. This component of force is transmitted to the enlarged portions 21a of stems 21 and therethrough to the body member 15 through the buttress type threaded connection therebetween. This outward force upon the stems freezes the buttress type threads locking the stems against rotation to prevent accidental outward displacement of rams 18.

When the string of tubing has been suspended hold down dogs 37 are advanced inwardly into engagement with the tubing string by manipulation of stems 38. The downwardly directed teeth of dogs 37 prevent any rising of the string of tubing due to excess pressures being developed within the casing.

With the suspension of the tubing completed the customary fittings for handling production from the well (not shown in the drawings) may then be made and the well is ready for production.

As heretofore pointed out the string of tubing when once suspended cannot be released without first lifting the string so as to release slips 19 because of the action of the buttress type threads between the stem 21 and body 15. Nevertheless the gripping elements may be readily released in the event withdrawal of the tubing is desired for repairs or otherwise. To release the gripping elements the tubing string is lifted upwardly by means of an elevator or the like and this releases slips 19 as it moves them upwardly within the slip bowls. With this release of the slips the radially outward force upon stem 21 is relieved and the stems may be readily rotated to withdraw the rams from gripping position. Simultaneously with the release of slips 19 from engagement with the tubing string the pressure upon the packing material of strips 31 and 33 is released to break the seal. The tubing string then may be readily withdrawn from the casing and as the rams have been moved outwardly from contact with the tubing the packing material is not subjected to wear occasioned by contact with the moving tubing string as in seals heretofore used.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having described my invention, what is claimed is:

1. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for shifting the rams in the guideways, a slip bowl removably mounted in each of the rams and sealing means between the rams and the body, the rams and slip bowls, and adapted in operation to sealingly engage a tubing extending through the body opening.

2. In a tubing head, a body having an opening therethrough and guideways transversely of the

body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for shifting the rams in the guideways, a slip bowl removably mounted in each of the rams and sealing material carried by the rams between the rams and body, the rams and slip bowls, and adapted in operation to sealingly engage a tubing extending through the body opening, said sealing material being contiguous.

3. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for shifting the rams in the guideways, a slip bowl removably mounted in each of the rams, slips mounted in the bowl and having teeth adapted to engage a tubing extending through the body opening, and sealing means between the rams and the body, the rams and slip bowls, and adapted in operation to sealingly engage a tubing extending through the body opening with the rams at an innermost position within the guideways.

4. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for shifting the rams in the guideways, a slip bowl removably mounted in each of the rams, slips mounted in the bowl and having teeth adapted to engage a tubing extending through the body opening, and sealing means carried by the rams to provide a seal transversely of the body opening.

5. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, stems, each rotatably connected to separate rams, extending outwardly through openings in said body, and threadedly engaging the openings whereby said rams may be shifted in the guideways, a slip bowl removably mounted in each of the rams and sealing means between the rams and the body, the rams and slip bowls, and adapted in operation to sealingly engage a tubing extending through the body opening.

6. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, stems, each rotatably connected to separate rams, extending outwardly through openings in said body, buttress type threads between the stem and the body whereby the stem may be rotated to shift the rams in the guideways and lock the rams against outward movement when a tubing is suspended in the tubing head, a slip bowl removably mounted in each of the rams and sealing means between the rams and the body, the rams and slip bowls, and adapted in operation to sealingly engage a tubing extending through the body opening.

7. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for axially shifting the rams in the guideways, a slip bowl removably mounted in each of the rams and sealing means between the rams and the body, the rams and slip bowls, and adapted in operation to sealingly engage a tubing extending through the body opening, a dog having downwardly directed teeth on its inward surface, said dog mounted for radial movement in the carrier and means for moving the dog inwardly to engage its teeth with a tubing extending through the body opening.

8. In a tubing head, a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for axially shifting the rams, in the guideways, a slip bowl removably mounted in each of the rams, slips mounted in the bowl and having teeth adapted to engage a tubing extending through the body opening, sealing means carried by the rams to provide a seal transversely of the body opening, a dog having downwardly directed teeth on its inward surface, said dog mounted for radial movement in the carrier and means for moving the dog inwardly to engage its teeth with a tubing extending through the body opening.

9. In a tubing head a body having an opening therethrough and guideways transversely of the body and intersecting said opening, rams slidably mounted in the guideways, means operable exteriorly of the body for shifting the rams in the guideways, a slip bowl removably mounted in each of the rams, and slips mounted in the bowl and having teeth adapted to engage a tubing extending through the body opening.

10. In a tubing head, a body having an opening therethrough and guideways intersecting said opening, rams slidably mounted in said guideways and carrying tapered seating surfaces for slips, downwardly and inwardly inclined slots on the seat surfaces, toothed slips carried by said seating surfaces and having parts fitting said slots, means for shifting the rams in the guideways to bring the toothed slips into engagement with a tubing, and means yieldingly urging the slips upwardly to raised positions along the tapered seat surfaces.

11. In a tubing head, a body having an opening therethrough and guideways intersecting said opening, rams slidably mounted in said guideways and carrying tapered seating surfaces for slips, downwardly and inwardly inclined slots on the seat surfaces, toothed slips carried by said seating surfaces and having parts fitting said slots, a stem rotatably carried by each ram and extending through an opening in said body to the exterior thereof, buttress type threads between said stem and said body to shift the rams in the guideways to slip engaging position and lock them in position therein when a radially outward thrust is imparted to the rams, and means yieldingly urging the slips upwardly to raised positions along the tapered seat surfaces.

12. In a tubing head, a body having an opening therethrough and guideways intersecting said opening, rams slidably mounted in said guideways and carrying tapered seating surfaces for slips, downwardly and inwardly inclined slots on the seat surfaces, toothed slips carried by said seating surfaces and having parts fitting said slots, means for shifting the rams in the guideways to bring the toothed slips into engagement with a tubing, said means including a friction locking means for locking the slip against outward movement when a radially outward thrust is imparted to the rams, and means yieldingly urging the slips upwardly to raised positions along the tapered seat surfaces.

13. In combination, a tubing head body having a passage therethrough to accommodate a tubing, slips in the body having teeth thereon adapted to grip the adjacent surface of the tubing

to hold it against downward movement, and dogs carried by the body operable from exteriorly of the body and having teeth thereon adapted to grip a tubing at any point to hold it against upward movement.

14. In a tubing hangar a body, radially movable slip carrying rams in said body for suspending a pipe therein, packing means associated with the rams for providing a seal between the body and a pipe suspended therein, and means extending through the body operable from exteriorly thereof and directly connected to the rams for moving said rams radially within the body.

15. A tubing suspension assembly adaptable for use with tubing heads comprising a ram with a slip bowl carried therein, packing material extending across the gripping face of the ram and between the ram and bowl and terminating at each end in the ram rearwardly of the bowl, said packing material having one face exposed adjacent to face surfaces of the ram and bowl, and a strip of packing material carried in the bottom surface of the ram adapted to sealingly engage the support for the ram in operation and having its ends exposed upon the gripping surface of the rams.

16. A tubing suspension assembly adaptable for use with tubing heads comprising a ram with a slip bowl carried therein, packing material extending across the gripping face of the ram and between the ram and bowl and terminating at each end in the ram rearwardly of the bowl, said packing material having one face exposed adjacent to face surfaces of the ram and bowl, and a strip of packing material carried in the bottom surface of the ram adapted to sealingly engage the support for the ram in operation and having its ends exposed upon the gripping surface of the rams, said packing materials being joined together by similar hydraulic material.

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