Sept. 13, 1949. J. E. EDWARDS 2,481,732

WELL HEAD CONSTRUCTION

Filed Jan. 19, 1946 2 Sheets-Sheet 1

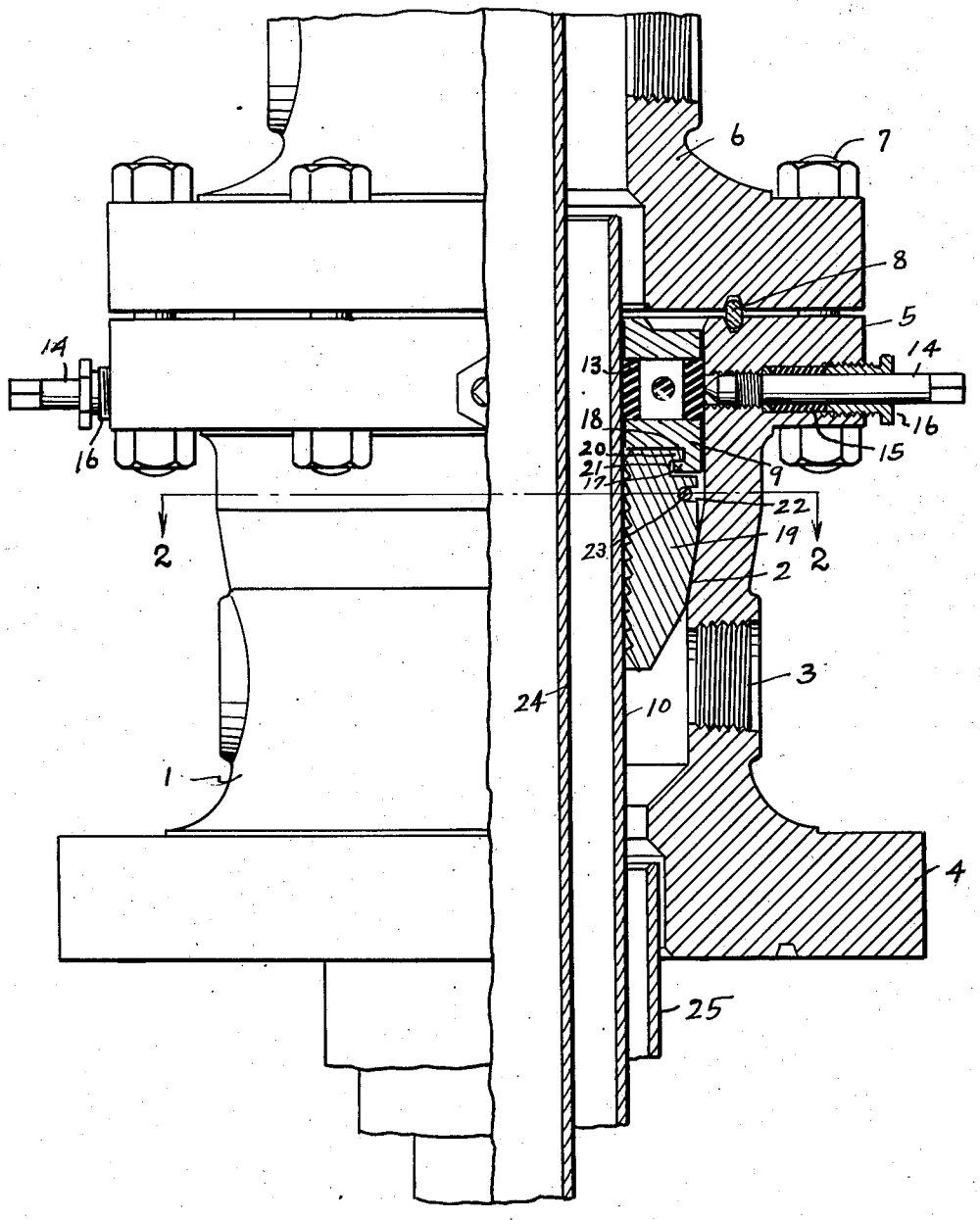


Fig. 1.

Inventor
Jack E. Edwards

By E. V. Hardaway
Attorney

Sept. 13, 1949. J. E. EDWARDS 2,481,732

WELL HEAD CONSTRUCTION

Filed Jan. 19, 1946 2 Sheets-Sheet 2

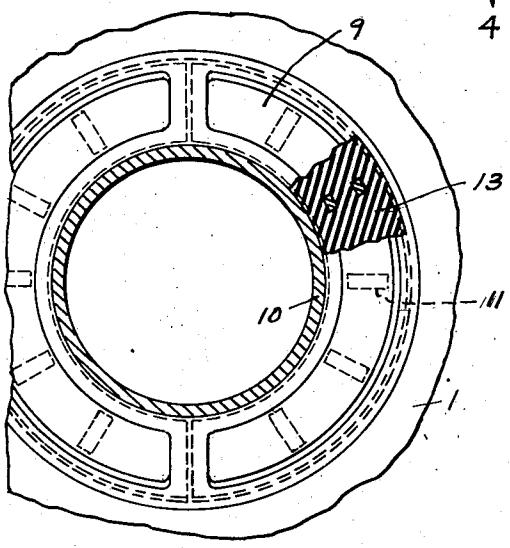


Fig. 4.

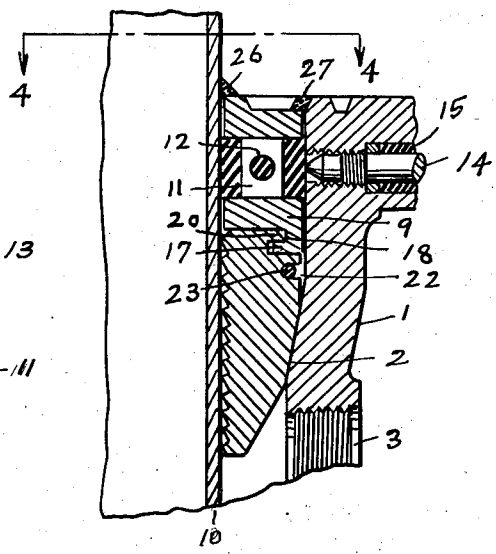


Fig. 3.

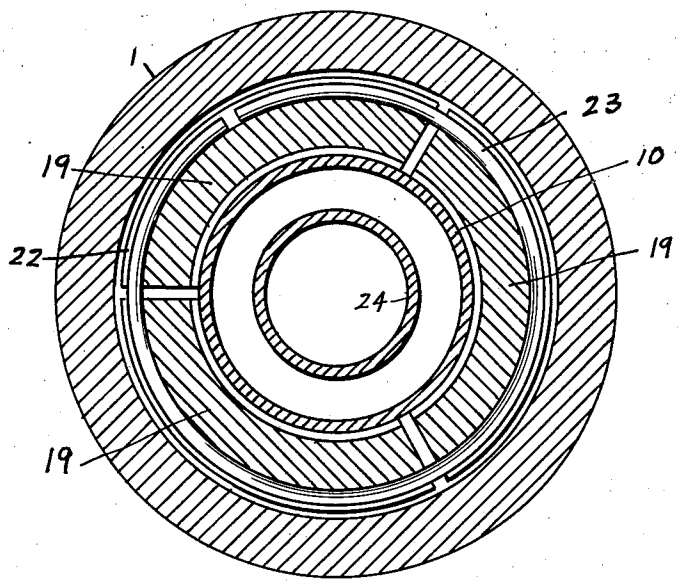


Fig. 2.

Inventor
Jack E. Edwards

By E. V. Hardway
Attorney

Patented Sept. 13, 1949

2,481,732

UNITED STATES PATENT OFFICE

2,481,732

WELL HEAD CONSTRUCTION

Jack E. Edwards, Houston, Tex.

Application January 19, 1946, Serial No. 642,353

4 Claims. (Cl. 166—14)

1

This invention relates to a well head construction.

An object of the invention is to provide, in well head construction, novel means for anchoring the upper end of pipe, or tubing, in the head, said anchoring means being of such construction that the same can be readily assembled and applied to the upper end of the pipe and lowered, with the pipe, through the blowout preventer and seated in the head to securely grip and support the pipe to which the anchoring means is applied.

It is a further object of the invention to provide in well head construction a novel type of pipe anchor, or support, which embodies an anchor ring including a pipe seal and a plurality of pipe engaging slips assembled with the anchor ring and depend loosely therefrom.

It is a further object of the invention to provide, in a pipe anchoring device of the character described means for expanding the seal ring, embodied therein, so that a fluid tight seal will be formed between the anchor ring and the pipe and between the anchor ring and the head member in which the slips are located.

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

Figure 1 is a side view, partly in section.

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a fragmentary vertical sectional view showing the anchor ring welded in place; and

Figure 4 is a fragmentary cross-sectional view taken on the line 4—4 of Figure 3 and partly broken away.

Referring now more particularly to the drawings, wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a tubular casing head having a downwardly tapering inside seat 2 and an outflow connection 3 beneath said seat.

In the present illustration the lower end of the casing head is provided with an external annular flange 4 whereby it may be seated, if desired, on a braden head beneath.

In the present illustration the upper end of the casing head 1 is provided with an external annular flange 5 on which the tubing head 6 is supported and to which it is secured by suitable clamp bolts, as 7.

2

The adjacent ends of the casing head and tubing head may be provided with registering grooves to receive the annular seal ring 8.

Within the casing head above the seat 2 there is an annular anchor ring 9. As is indicated in Figure 4, this anchor ring is formed of two arcuate sections so that it may be readily fitted around the upper end of the tubing 10 which is to be anchored in the casing head. The sections of the anchor ring are of cage like construction, that is, each section of the anchor ring is formed of upper and lower arcuate plates which are integrally united together by the vertical webs 11. These webs are somewhat narrower, radially, than the ring itself and have the perforations 12 therethrough. The space between the upper and lower plates of the anchor ring 9 is filled with rubber 13 or some similar resilient material which is molded in place and which completely surrounds the webs 11 and is molded through the perforations 12 and fills the space between the upper and lower plates so that when the sections of the anchor ring are assembled about the pipe 10 the resilient sealing material will completely surround said pipe so as to form a seal therewith and will also fit closely within the casing head to form a seal therewith.

Threaded radially through the flange 5 are the plungers 14. Around these plungers is the sealing material 15 which is maintained under compression by the glands 16 which are screwed into the flange 5. The inner ends of the plungers 14 are preferably, though not necessarily, cone shaped and are in contact with the sealing material 13 so that should a leak develop past the annular seal the plungers may be screwed inwardly so as to displace sufficient sealing material to cause the seal ring to expand, at the leak, and form a fluid tight seal.

The underside of the anchor ring 9 is formed, at its outer side, with a depending inwardly extending flange 17 thus providing an inwardly facing groove 18 all the way around said anchor ring.

There are a plurality of slips 19, three being shown. The upper ends of these slips have the external arcuate flanges 20 which fit into the groove 18 so that the slips may be assembled with the anchor ring. The upper ends of the slips also have the external arcuate grooves 21 to receive the flanges 17 and beneath the grooves 21 also have the external annular grooves 22 to receive the open ring 23 whereby the anchor ring and slips are maintained assembled.

In assembly the anchor ring sections may be

assembled around the pipe 10 and during the process of this assembly the slips may be assembled with the anchor ring by inserting the flanges 20 into the groove 18 and the ring 23, which is formed of strong steel, or similar material may be sprung open and seated in the groove 22 and the anchor ring and slip assembly will thus be maintained in position about the pipe. While being thus assembled on the pipe 10 the pipe will be in the process of being landed in its final position in the well and it may be lowered on down through the blowout preventer until the slips 19 land on the tapering seat 2. The slips are externally tapered downwardly and inwardly and when they land on said seat they will be forced inwardly into secure engagement with the pipe 10. The plungers 14 may then be screwed inwardly as required to form the necessary fluid tight seal in the head.

In some instances the lower end of the pipe 10 is cemented in the well and said pipe is then placed under tension, in a conventional manner by the use of a pipe elevator clamped around the upper end of said pipe and a block and tackle suspended from the derrick crown block. While the pipe is under tension the anchoring unit may be assembled about the pipe above the casinghead and allowed to move downwardly into the casinghead either independently of the downward movement of the pipe or with the pipe, as it moves downwardly upon release of said tension until the slips 19 land on the seat 2 whereupon said slips will engage with and grip and securely hold the pipe 10 against further movement.

While the anchor ring and slip assembly, above described, are being lowered the tubing head 6 will not be installed but when the pipe 10 is securely anchored and supported in the casing head the blowout preventer may be removed and the tubing head 6 installed in place.

In the present illustration there is also shown an inner tubing 24 which may be supported in the tubing head 6, above, by an anchor ring and slip assembly similar to that above described and shown in Figure 1; also if the casing head 1 is mounted on a braden head beneath the outer casing 25 may be secured in the braden head in a similar manner.

If found desirable the anchor ring 9, when finally installed, may be welded all the way around to the adjacent inner pipe by the weld 26 and may also be welded all the way around to the adjacent head member by means of the weld 27.

The drawings and description are illustrative merely while the broad principle of the invention will be defined by the appended claims.

What I claim is:

1. In well head construction having a tubular head member provided with an inside seat, a pipe supporting and packing assembly including, an anchor ring adapted to surround a pipe extending through the head, said ring comprising an upper plate and a lower plate spaced from the upper plate and connected thereto by radial web elements, resilient material molded into the ring between the plates and around the web elements to provide an annular sealing ring between the plates, and slips depending loosely from the lower plate whereby slips may undergo lateral displacement with respect to the anchor ring, the pipe supporting and packing assembly being adapted to be mounted within the tubular head member with the slips supported upon the inside seat of said head member and engaging the pipe and with the annular sealing ring forming a seal between the pipe and the head member.

2. In a well head construction as set forth in claim 1, together with radially disposed plungers threaded within the head member and having their inner ends adapted to engage the periphery of the sealing ring when the plungers are screwed inwardly.

3. In a well head construction as set forth in claim 1 wherein the loose connection between the slips and the lower plate is formed by an interengaging flange and groove formed on said lower plate and said slips.

4. In a well head construction as set forth in claim 1 wherein the radial web elements which connect the upper and lower plates of the anchor ring are of a lesser width than the width of the plates and also wherein said web elements are formed with openings within which the resilient material forming the sealing ring is molded.

JACK E. EDWARDS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,561,236	Hunt	Nov. 10, 1925
1,620,383	O'Bannon	Mar. 8, 1927
1,973,809	Heggem	Sept. 18, 1934
2,023,033	Spalding	Dec. 3, 1935
2,073,890	Tschappat	Mar. 16, 1937
2,228,555	Barker	Jan. 14, 1941
2,312,476	Penick et al.	Mar. 2, 1943
2,380,388	Allen	July 31, 1945