April 11, 1950 G. A. HUMASON 2,504,025

SPECIAL WELLHEAD

Filed Jan. 25, 1945 2 Sheets-Sheet 1

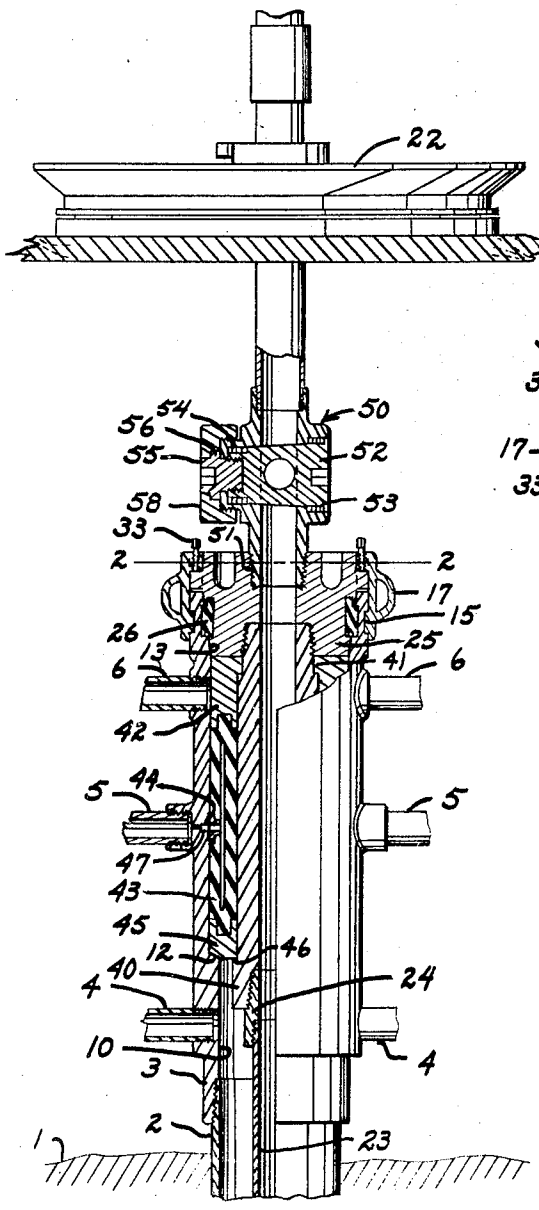


Fig. 1

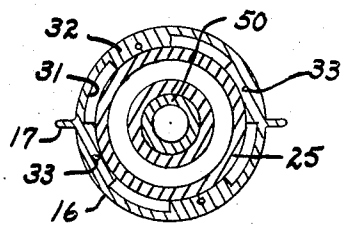


Fig. 2

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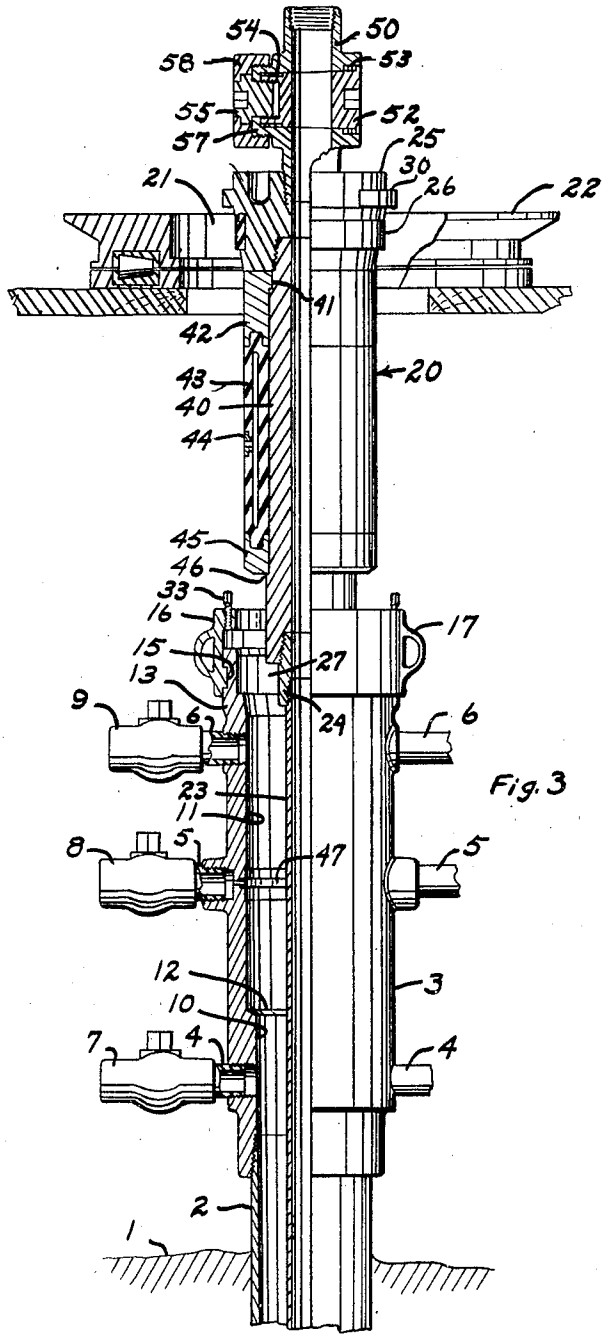


Fig. 3

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SPECIAL WELLHEAD

Granville A. Humason, Houston, Tex.

Application January 25, 1945, Serial No. 574,494

2 Claims. (Cl. 166—14)

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This invention relates to a well head, and more particularly to a novel well head assembly that may be quickly installed and used for controlling or flowing of a well.

The primary object of the invention is to provide a device of the type indicated which can be quickly installed and used for flowing a well.

Another object is to provide a well head including a hanger which cooperates with a manually operable hold-down ring whereby installation or removal is facilitated and a fluid tight seal is insured.

Another object is to provide a well head assembly which includes an inflatable packer or seal member between the assembly and the casing head.

A still further object is to provide a well head which includes a novel valve structure for controlling the flowing of fluids from the tubing string in the well.

The foregoing are primary objects which, together with additional objects and advantages will be more fully apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is an elevational view partly in section, showing a well head embodying the invention;

Fig. 2 is a sectional view taken on the line 2—2 in Fig. 1; and

Fig. 3 is an elevation view similar to that shown in Fig. 1, but showing the hanger assembly in position above the casing head bowl in which the assembly is used.

In the drawings, the numeral 1 indicates the surface of the earth from which the casing 2 protrudes and has the casing head 3 attached thereto.

The casing head 3 has side openings therein such as 4, 5, and 6 which may be provided with any suitable valves as indicated at 7, 8, and 9 (Fig. 3). The bore 10 of the casing head is enlarged in its upper portion at 11 thus forming a seat 12 intermediate the side openings 4 and 5. This enlarged portion of the bore is tapered at 13 whereby the bore 10 is still further enlarged at its upper end to serve a purpose that will be more fully described.

The outer surface of the head 3 has a peripheral groove 15 near its upper end to receive a complementary inner projection on a hold-down ring 16 which may be manually rotated relative to the casing head by manual application of force to the ears 17.

A closure assembly 20 (Fig. 3) comprises an element of the construction of the well head and

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is of such dimension that it may be readily lowerable through the opening 21 in a rotary table 22. This feature enables the assembly to be connected to the upper end of tubing 23 by means of the tool joint 24, the resulting assembly being lowered within the casing head 3 to effect complete closure of the well.

This closure or hanger assembly 20 includes a hanger 25 that is peripherally grooved to receive a seal ring 26 contoured to fit within an annular recess 27 in the tapered surface 13. Above the seal ring 26 the hanger 25 is provided with a segmented flange which forms lugs 30 adapted to enter axial slots 31 (Fig. 2) in the inwardly flanged upper end of the hold-down ring 16.

It seems apparent that when the assembly 20 is lowered to the position just indicated, the hold-down ring 16 will be positioned that the slots 31 therein receive the lugs 30 on the hanger whereby the latter may be seated upon the tapered surface 13 on the casing head or bowl 3. The ring 16 may then be manually rotated through an angle, so that the ears 32 overlie the lugs 30 and the hanger is thus restrained from vertical movement.

In order that the connection between the hanger 25 and the bowl 3 shall be tight, and that the hold-down ring 16 shall be locked in the desired position, a lockscrew 33 is provided in each of the ears 32. This interlocking of elements may be effected by means of a hand wrench, the only tool necessary to secure the assembly 20 within the casing head 3.

The inter-connection of the hanger 25 and the tool joint or coupling 24 is a tubular extension 40 which is grooved at 41 at its upper end to receive an inwardly extending flange on a packer ring 42. The packer of which this ring forms a part includes an expansible ring or sleeve 43 and a lower packer ring 45 which normally engages the seat 12 within the casing head 3 and also engages a shoulder 46 on the tubular extension 40. It is intended that the opening 44 for the admission of pressure fluid to the interior of the packer sleeve 43 shall be in mating relation with an annular groove 47 which communicates with the passage or opening 5.

It seems apparent that when the parts are in assembled position as just indicated, pressure may be applied to the interior of the expansible packer ring or sleeve 43 whereby a high pressure seal is provided between the assembly 20 and the casing head 3.

The flow of fluids through the tubing 23 and

the assembly **20** is controlled at the upper end of the head by a valve **50** of which the valve body is threaded into the hanger **25** at **51**. A transverse tapered passage within the body receives a tapered valve plug **52**, a gasket seal being provided between the plug and the body at **53** and **54**.

The plug **52** has a threaded portion at its smaller end to receive a plug **55** having a flange **56** which overlies the outer end of a boss **57** on the body **50**. An annular cap **58** is threaded upon the boss **57** and overlies the flange **56** on the plug **55** so that the plug may be rotated but is restrained from axial movement.

The operation of the well head of the invention is believed apparent from the foregoing description. By way of summary it will be assumed that closure of a well is to be effected. As is customary, the casing head **3** was previously installed upon the casing **2** when the casing was set. Connection is made through the tool joint or the coupling **24** between the member **40** and the tubing **23**. The resulting assembly is then lowered until the hanger **25** seats within the bowl at the top of the casing head **3**. During the lowering of the assembly **20** the lugs **30** enter the slot **31** in the hold-down ring **16** and the ring may then be rotated manually so that the ears **32** overlie the lugs **30**. The screws **33** are then tightened to complete the connection. To further effectuate sealing against high pressures such as are encountered in many wells, fluid under pressure is supplied through the valve **8** and passage **5** to the interior of the packer sleeve **43**.

It is assumed that the valve **50** is closed during the installation operation and accordingly the well is completely enclosed after a seal between the assembly **20** and the casing head **3** has been effected. If it is then desired to admit or withdraw fluid through the well head, the plug **55** is rotated to effect axial movement of the valve plug **52** whereby the wedging action of the valve plug within its seat is broken. The valve may then be easily rotated to open the passage therethrough whereupon the plug **55** is tightened to again seal the valve plug **52** within its tapered seating surface.

Broadly the invention comprehends a well head that may be quickly installed or removed and one that will efficiently provide effective closure of a well.

The invention claimed is:

1. In a well head, a tubular bowl having a passage in the side thereof, an internal annular groove in said bowl communcating with said passage, a hanger adapted to be seated in the upper end of said bowl, a seal between said hanger and said bowl, a downward extension on said hanger for connection to a tubing string, an inflatable seal ring interposed between said bowl and said extension, said seal ring having an opening proximate said groove when the hanger is seated within the bowl whereby pressure fluid is admitted to the seal ring from said passage.

2. A well head comprising, a tubular bowl having a passage in the side thereof, an internal circumferentially extending groove in said bowl communicating with said passage, a seat in the bowl below said passage, a hanger adapted to be seated in the upper end of said bowl and having a downward extension thereon, an inflatable seal ring interposed between said bowl and extension and intermediate said hanger and seat, said seal ring having an opening communicating with said groove when the hanger is seated wthin the bowl whereby pressure fluid is admitted to the seal ring from said passage.

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