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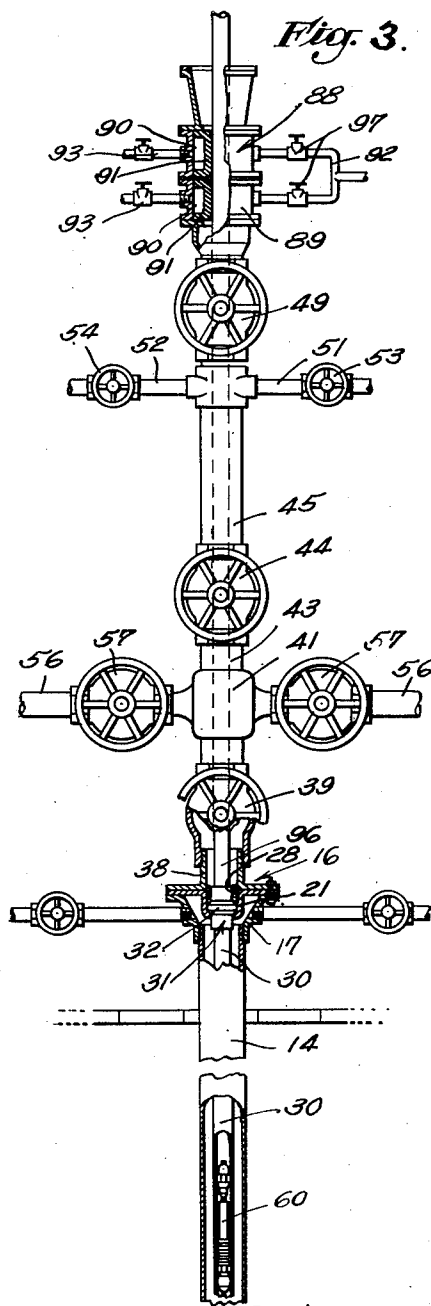
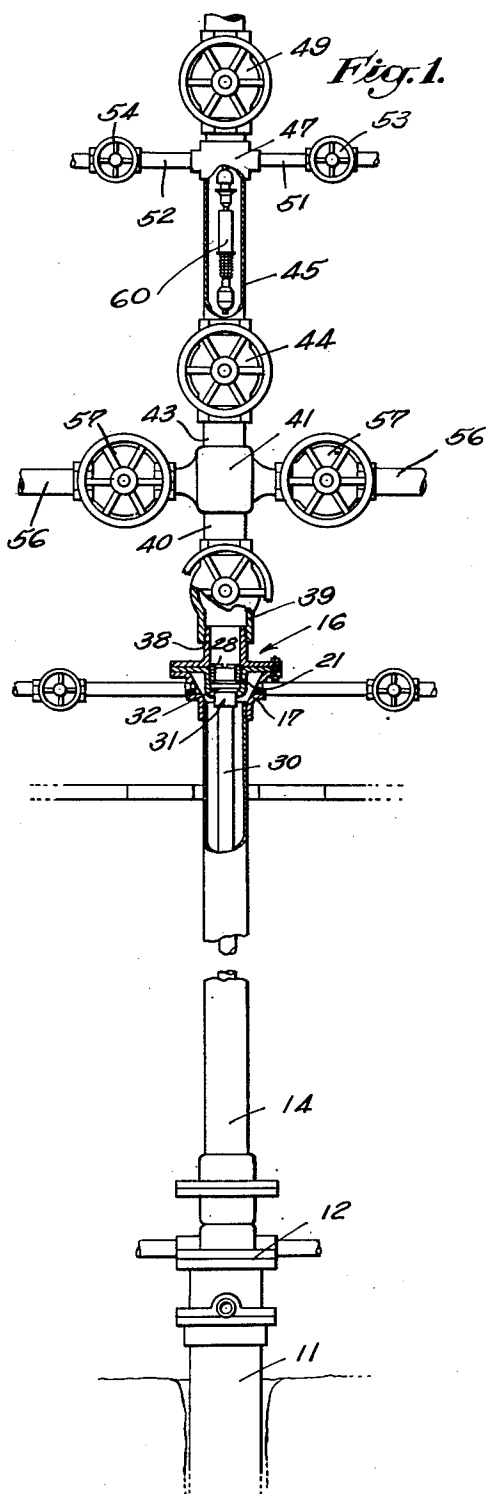
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1,859,793

CASING HEAD

Filed April 19, 1930

2 Sheets-Sheet 1



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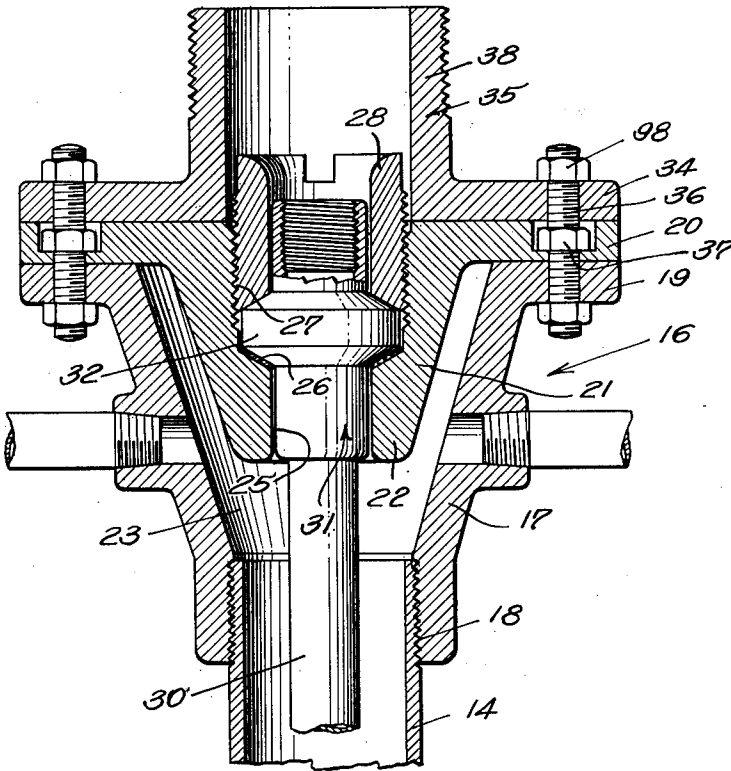
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Fig. 2.



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CASING HEAD

Application filed April 19, 1930. Serial No. 445,650.

This invention relates to oil well apparatus adapted for use, by way of example, in connection with the method of procedure set forth in my co-pending application Serial No. 444,120, filed Apr. 14, 1930.

More particularly the invention relates to a novel casing head construction possessing special features and characteristics which render it easy to manufacture and simple and practical to operate, and which is particularly adaptable to pressure wells where the tubing is to be moved for purposes of repair or new installation.

Accordingly, a primary object is to provide a casing head including a novel tubing support adapted to receive a tubing supporting fixture in such a way that the same may be locked in place while the well is in operation, but on the other hand may be readily unlocked or released to permit of elevating the string or tubing for service operations.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction of features and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a view illustrating the general application of the invention.

Figure 2 is an enlarged vertical cross sectional view showing the details of the casing head construction.

Figure 3 is a view similar to Figure 1 illustrating the apparatus when the flow tube is being removed or replaced in the well.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

Referring first to Figure 1, the well casing installed in the well is designated 11 and the main casing head at the surface of the well is designated as 12, the same providing the usual fluid tight seal for the casing. The main casing head 12 is provided with a casing extension 14 to make the flow lines more

readily accessible above the derrick floor than they are in the cellar.

Secured to the upper end of the casing extension 14 is a tubing head designated generally as 16 and which embodies the features of the present invention. The tubing head 16 includes a body 17 which is fitted to the casing extension 14 by means of the threads 18. The upper part of the tubing body is formed with a horizontally offset flange 19 on which the flange 20 of a tubing support 21 rests. The body 17 is preferably flared or tapered upwardly conveniently to receive tubing slips or wedges for gripping the tubing as it is being lowered into the casing before the flow of the well is started. The central part of the tubing support 21 provides a socket portion 22 which is disposed within a chamber 23 provided by the body 17 of the tubing head 16. The socket portion 22 has an opening 25 formed through it which is enlarged at its upper end to provide an annular tubing supporting shoulder 26. The upper portion of the socket 22 is of larger diameter than the opening or bore 25 and is provided with internal threads 27 to receive a tubing locking nut or ring 28.

The flow tubing of the well is indicated by the numeral 30. This flow tubing extends downward through the oil string 14 to a point below the oil level in the well. The upper end of the flow tubing is provided with a special fixture 31 having an annular enlargement 32 which rests on the annular shoulder 26 of the tubing support 21. The nut 28 is screwed into the upper end of the opening 25 and engages the annular enlargement 32, thus holding the flow tubing 30 in place.

In connection with the fixture 31, it is pointed out that this is a special fitting or coupling particularly adapted and designed for use in connection with pressure wells. That is to say, the fixture 31 is provided with the intermediate annular enlargement 32, previously indicated, the same resting in the socket 22 to support the weight of the tubing and being anchored against lifting by the lock nut 28 secured into the upper end of the socket.

Continuing now with the description of the

surface apparatus, placed on the horizontal flange 20 is a flange 34 of a connecting member 35. The three flanges 19, 20, and 34 are secured together by suitable bolts 36. The flanges 19 and 20 are separately secured together by nuts 37 screwed onto the central portions of the bolts 36. This permits removal of the connecting member 35 without disturbing the tubing support 21. Extending upward from the flange 34 is a cylindrical portion 38 which is externally threaded, and secured thereto is a lower gate valve 39. Connected to the upper part of the gate valve 39 is a short nipple 40 to which is secured a cross 41. Secured to and extending upward from the cross 41 is another short nipple 43, to the upper end of which an upper gate valve 44 is connected. Secured to the upper gate valve 44 and extending upward therefrom is a pipe 45 which constitutes a plug-receiving member of the invention. Secured to the upper end of the pipe 45 is a cross 47 having a gate valve 49 secured thereabove and having lateral inlet and outlet pipes 51 and 52, respectively, having valves 53 and 54, respectively. The gate valves 39 and 44, the crosses 41 and 47, the short nipples 40 and 43, the pipe 45, and the gate valve 49 are in axial alignment with the oil string 14, and their internal diameters are substantially the same as that of the oil string 14. Extending laterally from the cross 41 are oil laterals 56 having shut-off valves 57.

When the well is flowing, the valves 53 and 54 and the valves 49 and 44 are closed. The valve 39 is open, and either or both of the valves 57 may be open. Oil will flow upward through the flow tubing 30 into the surface apparatus and laterally outward through either or both of the oil laterals 56. When it is desired to reach the flow tubing 30 in order to shorten or lengthen it, the valves 57 are closed and the gate valve 39 is also closed. The first step in the process of changing the length of the flow tubing 30 is to place a plug, such as indicated by the numeral 60, in the pipe 45. This is accomplished by opening the gate valve 49 and lowering the plug 60 into the pipe 45. After this, the gate valve 49 is again closed.

In Fig. 3 I show one type of apparatus which may be used during the removal of the flow tubing 30. I secure to the upper end of the gate valve 49 a sealing means 88 which has a body 89 divided into chambers 90, in which chambers are placed annular sealing members 91. Connected to the body 89 and adapted to communicate with the chambers 90 are fluid supply pipes 92, and also connected to the body 89 in communication with the chambers 90 are fluid exhaust pipes 93.

After the plug has been set, it is possible to open the gate valves 39, 44, and 49 due to the fact that the plug seals the flow tubing, which prevents a flow of oil through the

flow tubing due to the fact that there is a seal between the upper end of the flow tubing and the oil string which is provided by the casinghead 16 shown in detail in Fig. 2. A relatively short lift pipe 96 is extended downward through the surface apparatus, as shown in Fig. 4, and the lower end thereof is provided with a means for removing the nut 28, which secures the flow tubing to the casinghead. When this nut 28 is removed, there may be a leakage of oil around the upper end of the flow tubing; and if there is, the sealing means 88 may be brought into operation. The sealing means is operated by opening the valves 97 in the fluid lines 92, which allows fluid under pressure to enter the chambers 90. This fluid forces the packing members 91 into fluid-tight engagement with the lift pipe 96. The lift pipe 96 is then raised until the lower end thereof rests above the gate valve 39. The gate valve 39 is then closed, and the lift pipe may be removed from the sealing means. The lower end of the lift pipe may then be provided with a threaded connection so that it may be threadedly connected to the upper part of the fixture 31. The lift pipe is then extended through the sealing means, and the sealing means is then operated to form a seal, after which the gate valve 39 is opened to permit the lift pipe 96 to be moved downward so that it may be connected to the fixture 31.

This completes the operation of engaging the flow tubing 30. The lift pipe is then moved upward, and the flow tubing is moved therewith. When the fixture 31 reaches the sealing means 88, the lower packing member 91 is released so that the fixture may pass therethrough. When the fixture has been raised through the lower packing member, the lower packing member is again actuated to form a seal, and the upper packing member is released to permit the fixture 31 to be raised above the upper packing member. It will be seen that the sealing means permits joints of the flow tubing to pass therethrough without releasing pressure in the well. When the flow tubing has been sufficiently removed so that it may be worked upon above the surface apparatus to either lengthen it or shorten it, this work is done, and thereafter the flow tubing is again set in the well. This is accomplished by lowering the flow tubing by use of the lift pipe 96. When the fixture 31 reaches the seat 26 in the casinghead 16, the lift pipe is disconnected, and the nut 28 is replaced, thus securing the flow tubing in place.

I claim as my invention:

1. A casing head having a flange at its upper end, a tubing support having a flange adapted to rest upon the flange of the casing head, a tubular member having a flange adapted to rest upon the flange of the tubing

- support, said tubing support having a central opening formed with an intermediate shoulder, said opening being threaded at one side of the shoulder, a tubing carrying fixture resting upon said shoulder, and an exteriorly threaded locking ring engaging the threaded portion of the opening and clamping the fixture to the shoulder to prevent upward movement of the tubing.
2. A casing head having a flange at its upper end, a tubing support having a flange adapted to rest upon the flange of the casing head, a tubular member having a flange adapted to rest upon the flange of the tubing support, said tubing support having a central opening formed with an intermediate shoulder, said opening being threaded at one side of the shoulder, a tubing carrying fixture resting upon said shoulder, packing interposed between the shoulder and the fixture, and an exteriorly threaded locking ring engaging the threaded portion of the opening and clamping the fixture to the shoulder to prevent upward movement of the tubing.
3. A casing head having a flange at its upper end, a tubular member having a flange adapted to be supported by the flange of the head, a tubing support arranged in the casing head and having a central opening formed with an intermediate shoulder, said opening being threaded at one side of the shoulder, a tubing carrying fixture resting on said shoulder, and an exteriorly threaded locking ring engaging the threaded portion of the opening and clamping the fixture to the shoulder to prevent upward movement of the tubing.
4. A casing head having a flange at its upper end, a tubular member having a flange adapted to be supported by the flange of the head, a tubing support arranged in the casing head and having a central opening formed with an intermediate shoulder, said opening being threaded at one side of the shoulder, a tubing carrying fixture resting on said shoulder, packing interposed between the shoulder and the fixture, and an exteriorly threaded locking ring engaging the threaded portion of the opening and clamping the fixture to the shoulder to prevent upward movement of the tubing.
5. A casing head having a flange at its upper end, a tubular member having a flange adapted to be supported by the flange of the head, a tubing support arranged in the casing head and having a central opening formed with an intermediate shoulder, and a tubing carrying fixture resting upon said shoulder, said support having a threaded portion, and a locking ring engaging the threaded portion of the support and clamping the fixture to the shoulder to prevent upward movement of the tubing.
6. A casing head having a flange at its upper end, a tubular member having a flange adapted to be supported by the flange of the head, a tubing support arranged in the casing head and having a central opening formed with an intermediate shoulder, and a tubing carrying fixture resting upon said shoulder, packing arranged between the shoulder and the fixture, said tubing support having a threaded portion, and a locking ring engaging the threaded portion of the tubing support and clamping the fixture to the shoulder to prevent upward movement of the tubing.
- In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 7th day of April, 1930.
- CHESTER A. RASMUSSEN.