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BOTTOM WELL CHOKE

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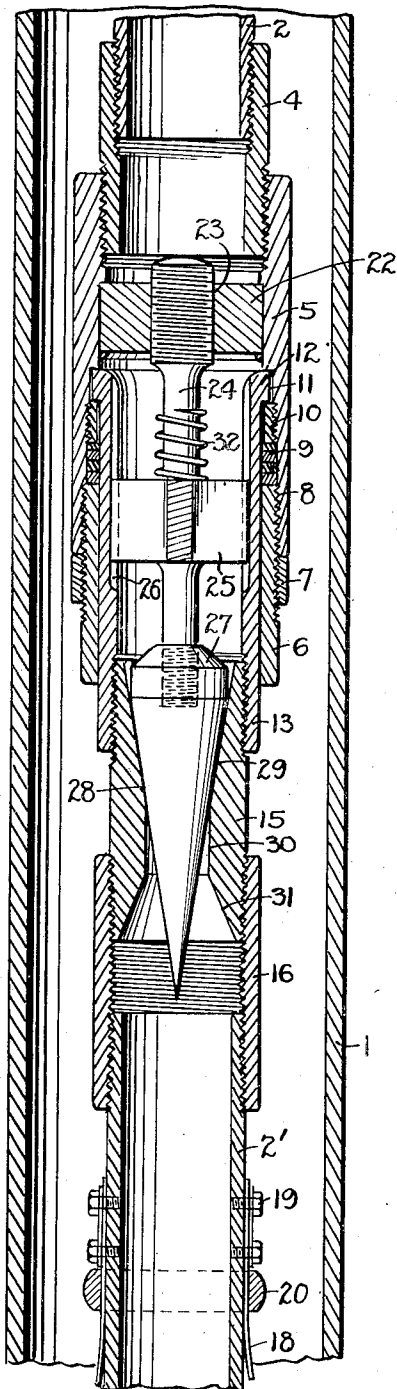


Fig. 1.

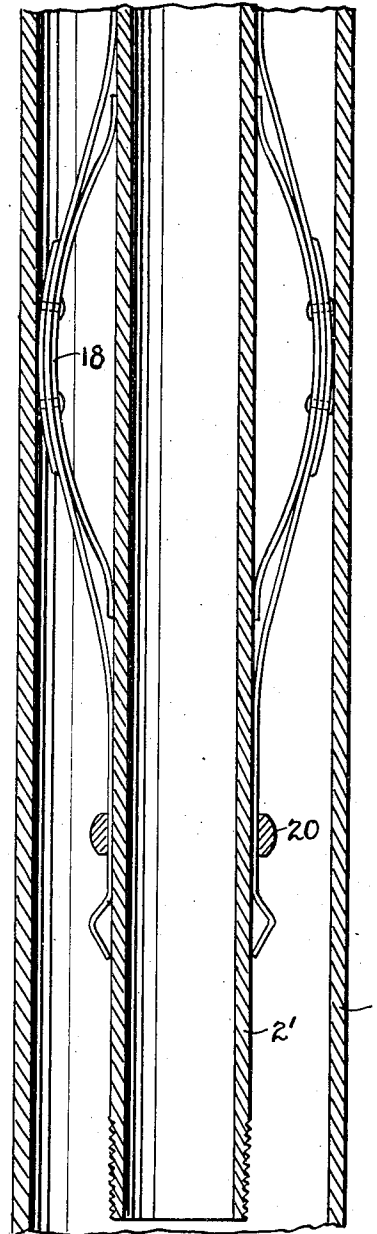


Fig. 2.

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BOTTOM WELL CHOKE

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1 Claim. (Cl. 166—2)

The invention relates to an improvement in chokes or valve structures which are adapted for use in connection with restricting the flow of fluid through pipes.

5 This invention as disclosed in the present application is particularly intended for use in oil and gas wells and is arranged to be located at the bottom of the well.

10 It is one of the objects of the invention to provide a means for controlling the amount of fluid flow from oil or gas wells wherein the control mechanism is located at the bottom of the well or at some point below the surface.

15 Another object of the invention is to provide a mechanism which is adapted to close the tube while it is being lowered into the well and which may thereafter be opened up to permit and adjust the amount of flow occurring through the tubing.

20 A still further object of the invention is to provide a bottom well choke which may be adjusted by manipulation of the tubing through which the fluid is flowing.

25 A still further object of the invention is to provide a bottom well choke whereby the oil gas ratio may be controlled.

30 A still further object of the invention is to provide a choke which will be readily adjustable, simple and economical in its construction, and which may be readily applied to existing structures.

35 The invention will be best understood by having reference to the drawing wherein Figs. 1 and 2 are central vertical sectional views of the invention installed in a well, Fig. 2 being a continuation of Fig. 1.

40 Various devices have been devised in connection with oil field equipment in an attempt to control the flow of oil and gas from the wells and particularly where heavy pressures are encountered. Many of these devices have been located at the top of the well in an attempt to shut off the flow of fluid. I have found, however, by various tests, that it is most desirable to control the flow of fluid at the base of the well and thus eliminate excessive strains and stresses upon the string of tubing and control the pressure at the point of its origination and before it has had an opportunity to force itself through the tubing. With a choke of the type shown in this application the oil gas ratio may be accurately controlled to conform with existing statutes, and the ever-increasing tendency of the authorities to more accurately control the ratio of oil and

gas which is being discharged from the oil sand facilitated.

The invention will best be understood by having reference to Fig. 1, wherein the casing or outside tubing is indicated by the numeral 1. This is the usual string of tubing or casing and may extend from the top to the bottom of the well bore. In some instances strainer screens are connected to the lower end of the tubing or the strainer screen may be carried by the lower end of the inside tubing indicated at 2. This string of tubing is known as the inner string and extends to the surface and is the one through which the oil and gas are usually discharged from the well.

15 The present invention is arranged for insertion between two sections of this tubing or at the lower end thereof, and embodies a nipple 4, which is arranged for connection with a coupling 5, which is in turn connected with a second coupling 6, which is threaded inside of the lower end of the coupling 5 and is arranged to be retained in any adjusted position by means of the lock ring 7. The coupling 6 has a seat 8 on its upper end which is adapted to receive a plurality of packing rings 9 of any desired type. This packing is held in position by means of the seating ring 10, which is threaded to the coupling 5. Above this seating ring the coupling 5 is recessed at 11 to receive the flange 12 of the guide member 13. This guide member is free to rotate inside of the coupling 6 and the packing 9 but is prevented from longitudinal movement by engagement of the flange 12 inside the recess 11. In this manner a swivel connection is formed between the tubing 2 and the lower section of the tubing which will be designated by the numeral 2'. This lower section of tubing 2' is connected with the guide member 13 by means of the valve seat 15 and coupling 16 and is prevented from rotation by a set of springs 18, which are connected to the tubing by means of screws or other means 19. Adjustment of the amount of tension in the springs may be accomplished by means of the adjuster rings 20, which are spaced above and below the main portion of the springs 18.

45 When the device is lowered into the well the springs 18 are in the position shown in Fig. 2 and scrape along on the inside of the casing 1 until the elevation at which the choke is to be placed has been reached. The springs press against the casing with sufficient force to hold the tube 2', the valve seat 15 and the guide member 13 from rotation and are adapted to exert

a resistance greater than the friction between the coupling 5 and the packing 9 with respect to the guide member 13. With this construction it seems apparent that when the device is lowered into the well that the valve seat 15 will normally be held from rotation when the string of tubing is rotated.

In order to have an adjustable member which will control the oil gas ratio and the flow of fluid through the tubing there has been provided a spider 22, which is shown in section through the wing portions of the spider in Fig. 1. It is to be understood that there are any desired number of passages between the wings of this spider which permit the free flow of fluid thereby. This spider is preferably welded or otherwise affixed to the coupling 5 so that it is anchored thereto and will rotate therewith. This spider is threaded internally at 23 and is arranged to receive the threaded stem 24 of the valve. The stem 24 has fixed thereto the guide wings 25 which extend radially from the stem and are arranged for engagement in the grooves 26, which are formed in the guide member 13. Thus it seems apparent that, due to the fact that the spider 22 is fixed to the coupling 5 and will rotate with the string of tubing 2, and the guide member 13 is fixed to the tubing 2', and will be held stationary by the springs 18, rotative movement between the parts will occur to the threaded portion 23 of the spider 22.

Thus, if the tubing 2 is rotated while the tubing 2' is held stationary the valve stem 24 will be moved longitudinally due to this threaded engagement. When this occurs the wings 25 will slide in the grooves 26 and this longitudinal movement will cause similar longitudinal movement of the valve or choke member 27 with respect to the valve or choke seat 15. The choke member may be formed of any desired construction and the one here illustrated has a tapered face 28 which terminates in a point to

form a conical member. The valve or choke seat 15 has a tapered outlet 29, a straight portion 30 and a tapered inlet 31, so that a venturi effect is obtained and considerable wearing surface will be available on which the choke member 27 may seat. A spring 32 is shown on the valve stem 24 in order to cause the threads to reengage with the spider 22 when the rotation is reversed in event the tubing has been rotated a sufficient amount to cause the stem to have passed entirely through the spider 22. It is intended that the taper of the choke 27 and of the seat 29 may be of the same degree so that a very fine adjustment and long wearing area may be available.

With the foregoing construction it seems apparent that a very fine adjustment may be obtained for the purpose of controlling the flow of fluid into the tubing 2. By slight rotation of the tubing at the surface adjustment of the choke 27 may be accomplished as desired so that the choke may be opened to allow a full flow of fluid or it may be choked down to restrict the flow in accordance with proration regulations or to obtain the best and most efficient oil gas ratio in the well.

I claim:

A flow choke of the character described comprising two adjacent pipes, a swivel connection between said pipes, a spider fixed in one pipe, a stem threaded in said spider adapted for movement upon relative rotation of the stem and spider, a wing piece on said stem, means on the other piece of pipe to engage said wing piece so that said stem and wing piece will rotate therewith, a valve on said stem, a seat therefor on said last piece of pipe whereby relative rotation of said pipe accomplishes threading of said stem through said spider to adjust said valve as a choke.

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