The invention relates to an improvement in casing heads for wells and particularly of the type where high pressures are encountered in the formations drilled.

Various types of casing head constructions have been devised heretofore. It is the usual practice, however, to provide the casing head for connection to the well-casing and to provide separate valves for closing the passages through the casing and tubing which are to be mounted above the casing head and which general assembly is known in the field as a Christmas tree.

The present arrangement contemplates a combination casing head and valve construction so that a valve to control the flow of fluid from the casing and a valve to control the flow of fluid from the tubing will both be carried by the same unitary construction so that complete control of the well can be had by the use of this one construction.

It is intended that this plug valve casing head can be kept on the derrick floor during the drilling operation so that it can be readily applied when it is desired to close in the well either during the drilling operation or when the tubing is being run into position so as to flow the well when production has been obtained.

Other and further objects of the invention will be readily apparent when the following description is considered in connection with the accompanying drawing wherein:

Fig. 1 is a vertical sectional view illustrating the general arrangement and assembly of the parts and showing the inside of the head in section.

Fig. 2 is a side elevation of the head per se looking at the same from the left of Fig. 1.

The well casing is indicated at 2 and is arranged to receive the closure assembly indicated generally at 3, which includes the flanged coupling 4 which is shown as threaded at 5 to the well casing. This coupling may be provided with a tapered seat 7 which can receive slips to support the pipe 8 which is positioned in the well.

A cap 10 is arranged to seat on the coupling 4 and may have a seal ring 11 therein which engages both the coupling and the cap 10. A plurality of bolts 12 hold these two parts together in fluid tight relationship.

About the cap 10 is the plug valve member 15 which includes a housing 16 shown as threaded at 17 to the cap 10. This housing 16 is of peculiar construction in order to receive the tubing plug valve 18 and the casing plug valve 19.

The housing is generally cylindrical with a projecting portion 20 thereon and the inside of which is forced with a chamber 21. A partition 22 closes the top of the chamber 21 except for the passage 23 from the casing and the passage 24 from the drill stem or tubing which is in the well.

This partition is shown as threaded at 25 in order to receive the pipe 8 so that the pipe may be suspended from the head 16.

The passage 23 is closed by the plug valve 18 when desired by turning the valve so that the passage 27 therein is out of alignment with the passage 23. This rotation is accomplished by means of the stem 28 which may have a wheel or wrench attached thereto in order to rotate the valve 18. A suitable stuffing-box 29 forms a seal about the plug valve and a hold-down ring 30 serves to retain the valve in position.

A tubing 31 extends from the passage 23 on the eccentric portion 20 and is connected with a flow line 32. A suitable valve 33 may be positioned in this flow line so that the volume of flow through the passage 23 from the casing can be governed.

The plug valve 18 is similar to the valve 19 except that it closes the passage 24 and has a stem 29, stuffing-box 28, and hold-down ring 30, the same as the valve 19. Rotation of this valve moves the passage 35 out of alignment with the passage 24 to close the pipe 8. The passage 24 has a connection 36 therein which is controlled by the valve 37 and leads into the cross-member 38 which forms part of the flow line 32.

A suitable gate valve 40 may be positioned in the line 32 and a pressure gauge 41 is arranged to record the well pressure.

The head will preferably be provided with projecting ears 42 so that it may be conveniently picked up by an elevator or other hoisting equipment.

When the well is being drilled it is desirable to be able to quickly close the casing as well as the string of drill pipe in event the drill bit penetrates a formation carrying an excessive pressure. With this equipment the head 16 may be suitably supported in the corner of the derrick and in event an excessive pressure is encountered it may be lowered to position over the coupling 4.

The pipe 8 is then suspended in the bowl 7 by means of the slips so that the pipe will project above the coupling 4.

The pipe nipple 46 may be utilized to connect the head with the pipe 8. If a coupling such as 45 constitutes the upper end of the pipe 8 then the nipple 46 may be threaded to the head at 25 and when the head is moved into position it will be 45.
rotated to connect the nipple 48 with the coupling 45.

If, on the other hand, the nipple 48 is carried by the pipe 8 then the head will be rotated to engage the threads 28. In either instance as soon as the pipe and the head are connected together the head is raised so that the slips may be removed from the bowl 7 and then the pipe suspended from the head is lowered until the head engages the coupling 4, whereupon the bolts 12 are then used to firmly anchor it in position.

The valves 18 and 19 can be turned to completely close the well until the flow line or other fitting can be connected thereto. The cap 10 may or may not be carried by the head 15 when it is suspended in the corner of the derrick, depending upon whether the threads 17 are to be engaged or the bolts 13 to be placed when it is desired to attach the head.

In event the pipe 8 constitutes the well tubing, the same procedure may be followed and the head 15 used as the permanent cap for the well construction.

The advantage of the present construction is that the plug valves 18 and 19 may be readily rotated to close off the flow through the well head and the enormous body of material present prevents the cutting away of the valve which occurs in event a gate valve with the ordinary sliding type of gate is utilized.

What is claimed is:

1. A well head closure including a housing, a partition across said housing closing the top thereof, a plurality of vertical passages through said partition, rotatable plug valves in said partition closing each passage, and a tubing suspended from said partition at one of said passages.

2. A well head closure including a housing, means to attach said housing to the well casing head a partition across said housing closing the top thereof, a plurality of passages through said partition, rotatable plug valves in said partition and closing each passage, a tubing suspended from said partition at one of said passages, and a flow line connected to each of said passages above said partition and valves whereby said valves may control the flow from the well casing or tubing.

3. The combination in a well head closure of a generally cylindrical housing to be attached to the well casing, means therein to suspend the well tubing within the casing, a passage through the top of said body from the tubing, a sidewardly projecting portion on said housing having a passage through the top of the body from the casing, a plug valve rotatable to close each of said passages, and a flow line connected to each of said passages.

4. A closure head for well casings comprising a body, means to connect said body to the well casing, an opening in said body to receive a flow of fluid from the well casing, a plurality of outlet passages thru the top of said body from said opening, a valve in said body to control the flow thru each of said passages, means to connect a flow line to each passage, and means to suspend a string of pipe in the well casing from at least one of said passages, said valves being plug valves.

5. A closure head for well casings comprising a body, means to connect said body to the well casing, an opening in said body to receive a flow of fluid from the well casing, a plurality of outlet passages thru the top of said body from said opening, a valve in said body to control the flow thru each of said passages, means to connect a flow line to each passage, and means to suspend a string of pipe in the well casing from at least one of said passages, said valves being plug valves which are axially aligned in said body.

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