

July 30, 1935.

J. BEGG

2,009,989

OIL WELL CASING HEAD

Filed March 6, 1933

2 Sheets-Sheet 1

Fig. 1.

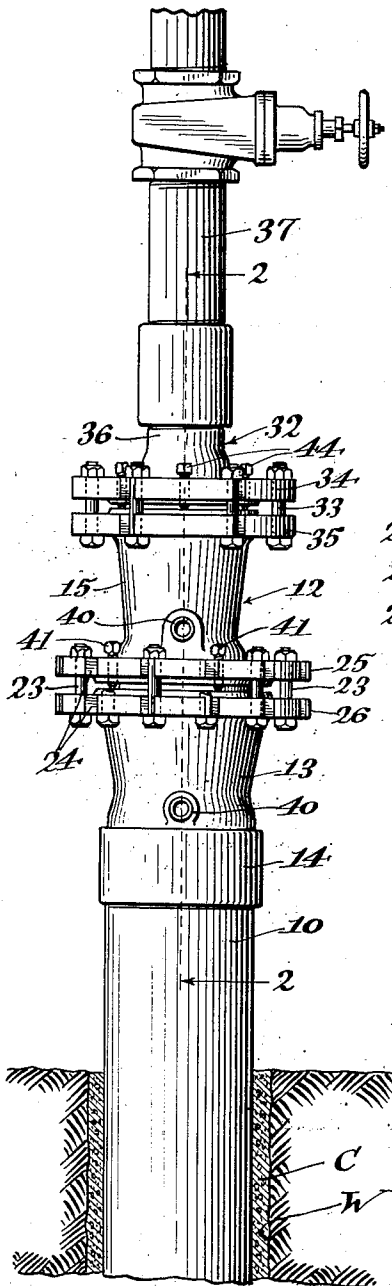
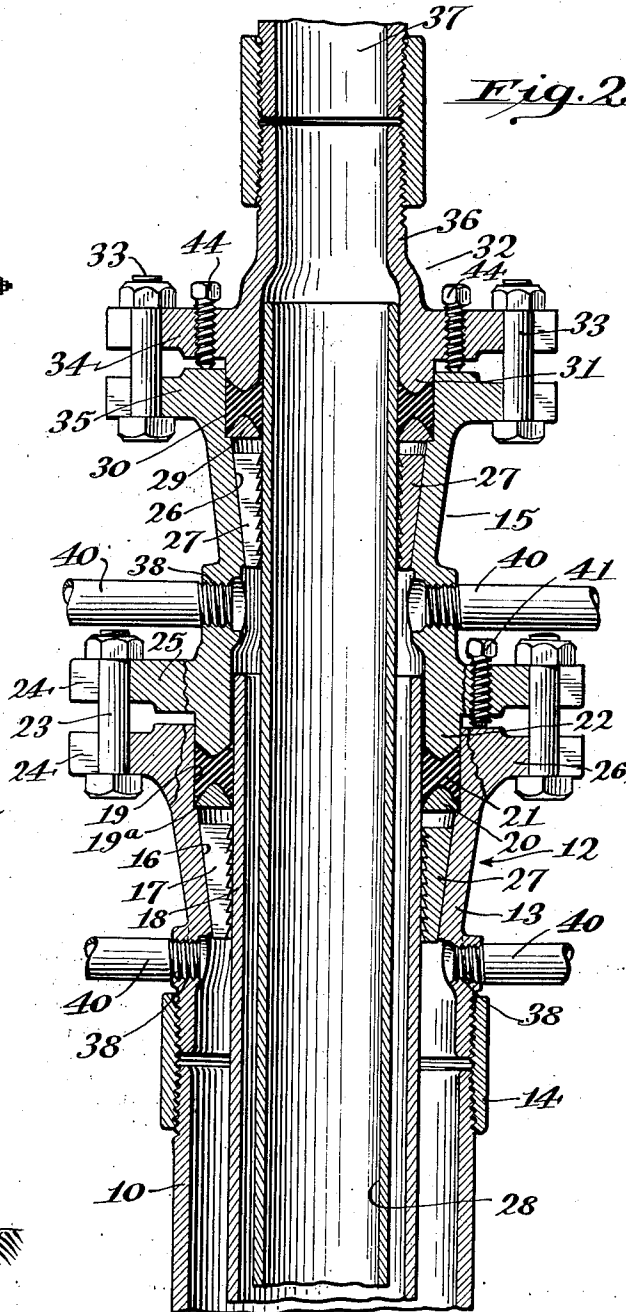


Fig. 2.



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Fig. 3.

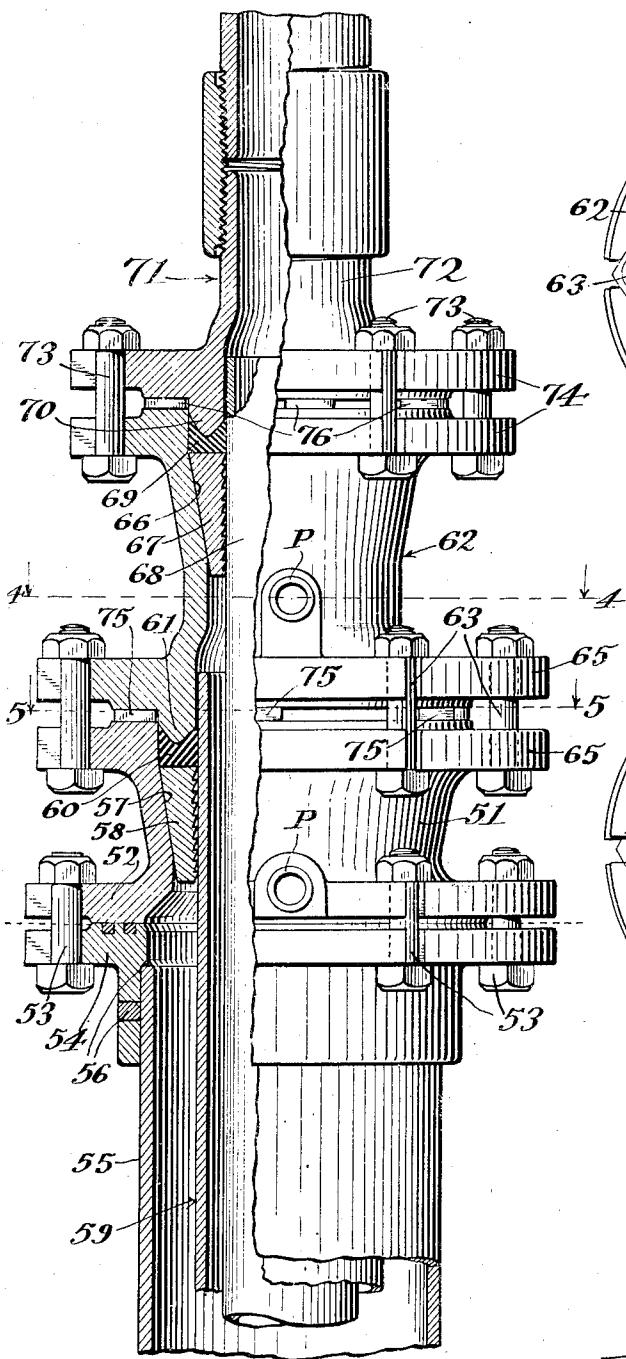


Fig. 4.

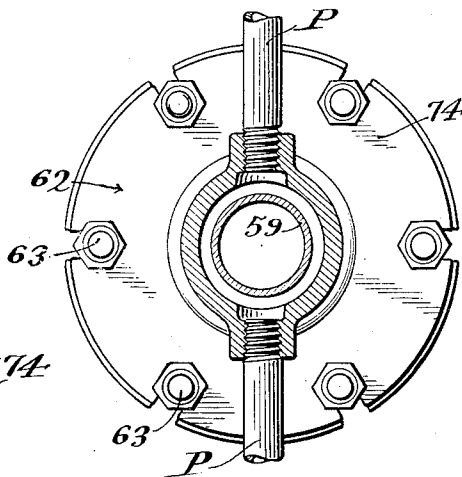
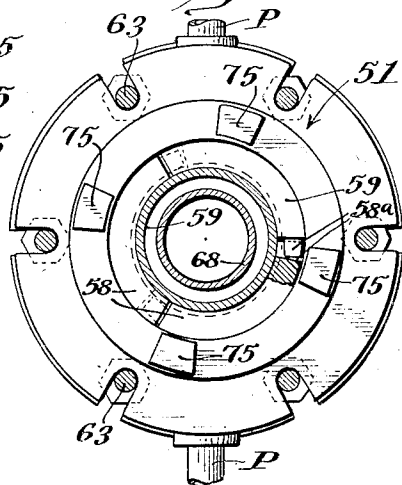


Fig. 5.



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OIL WELL CASING HEAD

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9 Claims. (Cl. 166—14)

This invention relates to oil well equipment and more particularly to a casing support or control head.

In certain types of casing heads, the dead weight of the casing has been utilized to compress the packing therein employed to form a fluid tight seal between the several strings of casing or tubing.

While this is a very desirable feature for the reason that it eliminates the use of bolts or the like to compress the packing, considerable trouble however has been experienced due to collapsing of the casing caused by excessive compression of the packing, especially so in deep wells where long and heavy strings of casing are necessary.

It is therefore the principal object of the present invention to provide a casing or control head so constructed that the weight of the casing or tubing itself may be utilized to compress the packing without danger of collapsing the casing or tubing.

Another object is to provide a casing head in which the weight of one string is utilized to compress the packing around another of larger diameter and having means associated therewith whereby the pressure exerted on the packing may be controlled.

Briefly stated, the invention resides in a casing head construction comprising a base member adapted to be secured to an outer string of casing and having a plurality of slips for suspending a second string of casing.

An upper spool-like member is detachably secured to the base member and is provided with a plurality of slips adapted to suspend a string of tubing within the second string. Disposed in the base member is a packing ring that forms a fluid-tight seal between the second and outer strings of casing, which ring is compressed by the weight of the tubing when suspended on the slips in the upper member, the degree of pressure exerted on the packing ring by the weight of said tubing being controlled by adjustable means associated with said base and upper members.

Other objects and advantages will be apparent from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a side elevation of the improved casing head as it appears when applied to a casing within a well hole.

Fig. 2 is an enlarged vertical sectional view taken on line 2—2 of Fig. 7.

Fig. 3 is a side elevation partly in section, illustrating a slightly modified form of the casing head.

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 3.

Fig. 5 is a horizontal section taken substantially on line 5—5 of Fig. 3.

Referring to the drawings, more specifically to Fig. 1, 10 designates an outer or first string of casing that has been landed in a well bore W and cemented therein as indicated at C.

The casing or control head of the present invention generally designated at 12 consists of a hollow base member 13 that is adapted to be connected to the upper end of the casing 10 preferably by a pipe coupling 14 and an upper section or spool-like member 15.

Formed in the base member is a frusto-conical seat 16 for the reception of a plurality of slips 17 that serve to support the second string 18.

Mounted in a bore 19 formed in the upper end of member 13 and resting on a shoulder 19a is a metal ring 20 that serves to support a pliable packing ring 21 (preferably formed of rubber or lead) which ring in turn is engaged by a gland 22 formed on the lower end of member 15 and forms a fluid tight seal between the second and outer strings of casing when the same is compressed.

The metal packing supporting ring and end face of the gland 22 are preferably tapered or wedge shaped in cross section and engage correspondingly shaped grooves formed in the packing ring in order that the same will be equally expanded into engagement with the second casing and bore 19 of member 13.

The upper and lower members are connected by bolts 23 that are extended through slots or openings 24 in companion flanges 25 and 26 respectively formed on said members.

Mounted in a tapered bore or seat 26 formed in member 15 is a plurality of slips 27 the teeth of which engage and suspend the inner tubing or oil string designated at 28, and disposed in a bore formed in the upper end of member 15 above the slips is a metal ring 29 that supports a packing ring 30 which in turn is compressed by a gland 31 formed on a fitting 32, the supporting ring 29, packing ring 30 and gland 31 being of the same shape in cross section as those above described.

Fitting 32 is connected to member 15 by bolts 33 disposed in openings in companion flanges 34 and 35 formed on said flange and member respectively, and is provided with an externally threaded neck 36 for connection through a pipe 37 to the usual flow control pipe lines and

fitting commonly referred to as the "Christmas tree" (not shown).

The base and upper members of the casing head are provided with threaded openings 33 for connection with the usual valve controlled gas vent pipes indicated at 40.

Screw threaded in flange 25 of member 15 is a plurality of set screws or the like 41 that engage the face of the flange 26 on the base member.

In actual practice the hole or bore for the second string is drilled (with the base member only applied to the outer casing 10) i. e. until conditions indicate that the second string 13 may be landed, whereupon the slips 27 are dropped into the seat so that they will engage and support the same.

The second casing 18 is then stretched (if cemented) and the end thereof projecting above flange 26 cut off at the required length. The supporting ring 20 and packing ring 21 are next placed in the bore 19, and the upper member 15 applied and connected to the base member by the bolts 23, which bolts then serve to compress the packing ring 21 until the hole for the tubing 23 has been drilled into the oil sands.

The string 23 is then lowered through member 15 to the required depth and slips 27 placed in bore 26 to suspend the same.

From the above it will be apparent that when engaged by the slips the weight of the tubing 23 will be transmitted through member 15 and effect compression of the packing ring 21.

It is desirable to utilize the weight of the tubing to effect a compression of the packing, for the reason that it will relieve practically all strain on the bolts 23. The tubing, however, is usually of such weight that if it were allowed to bear thereon, the packing ring would be compressed to such an extent that it would result in collapsing the upper end of the second string of casing.

This inherent danger of collapsing the second string of casing is counteracted by the set screws 41. If required, set screws 44 may be threaded in fitting 32 to regulate the pressure exerted and consequent compression of packing ring 30 by the weight of the "Christmas tree."

It will be noted that after the casing head has been assembled in the manner above described, practically all tension or strain on the connecting bolts will be relieved and that by adjusting the set screws the compression of packing rings may be regulated from time to time as required.

Referring to the modification shown in Figs. 3, 4 and 5, 50 generally designates the casing head which is composed of a base member 51 provided with a flange 52 that is connected by bolts 53 to a flange 54 secured to the upper end of the outer casing 55, preferably by spot welding indicated at 56. Formed in the base member is a tapered bore 57 that forms a seat for a plurality of slips 58 that serve to suspend the second string of casing indicated at 59.

Mounted on the slips 58 is a pliable packing ring 60 that is compressed by a gland 61 formed on the lower end of an upper member 62. The slips 58 are preferably provided with interlocking tongues and grooves indicated at 58a in Fig. 5 in order that their upper faces will present a substantially flat surface for engagement with the packing ring 60.

The base and upper members are connected by bolts 63 disposed in slots or openings 64 in companion flanges 65 formed on said members.

Formed in member 62 is a tapered seat 66 for

positioning a plurality of slips 67 that serve to support the inner or oil string of tubing designated at 68 and mounted on the slips is a pliable packing ring 69 which in turn is compressed to form a seal between the second string and tubing by a gland 70 formed on a flow fitting 71.

The flow fitting has an externally threaded neck 72 for connection with a "Christmas tree" and is removably secured to the upper member 62 by bolts 73 disposed in openings in flanges 74 formed on said fitting and member.

Formed in members 51 and 62 below the slips are threaded openings for connection with usual gas vent pipes designated at P.

Positioned between flanges 65 are a plurality of flat spacer plates 75 that serve to control the pressure exerted on packing 69, i. e. when the inner tubing 68 is suspended on slips 66.

A plurality of plates 76 may be placed between flanges 74 to adjust compression of packing 69 if required.

The casing head above described is adapted to be assembled in the same manner as the preferred form, the spacer plates being employed in lieu of the set screw for the purpose set forth. Compression of the packing may be adjusted by substituting or interchanging spacer plates of varied thickness. This may be easily accomplished by loosening the bolts and driving wedges (not shown) between the flanges.

I claim:

1. A casing head comprising a base member connected to an outer casing, gripping means carried by said base member for supporting a second concentric casing, packing disposed in said base member above said gripping means, an upper hollow body member mounted in slidable relation to said base member and engaging said packing, gripping means mounted in said upper member for supporting a string of tubing within said second casing whereby the weight of said tubing will be transmitted to and compress said packing to form a fluid tight seal around the second casing with said base member.

2. A casing head comprising a base member connected to an outer casing, slips removably mounted in said base member for supporting a second concentric casing, packing disposed in said base member above said slips, an upper body member mounted in slidable relation to said base member and having a gland formed thereon engaging said packing, and slips mounted in said upper member for supporting a string of tubing within said second casing.

3. A casing head comprising a base member connected to an outer casing, slips removably mounted in said base member for supporting a second concentric casing, packing disposed in said base member above said slips, an upper body member mounted in slidable relation to said base member and having a gland formed thereon engaging said packing, slips mounted in said upper member for supporting a string of tubing within said second casing, and means associated with said base and upper member for controlling the pressure exerted on the packing when said tubing is suspended on the slips in said upper member.

4. A casing head comprising a base member having a tapered seat formed therein and adapted to be secured to an outer casing, slips mounted in the seat in said base member for supporting a second string of casing, a packing ring mounted in said base member above said slips, an upper spool-like member mounted in slidable

relation to said base member having a gland formed thereon engaging said packing ring, means connecting said base and upper member arranged to temporarily compress the packing ring, slips
 5 mounted in said upper member for suspending a string of tubing extending through said second casing, whereby the weight of the tubing will compress said packing ring, and adjustable means carried by said upper member and engaging said
 10 base member for controlling pressure exerted on said packing ring when said tubing is engaged by the slips in said upper member.

5. A casing head comprising a base member having a tapered seat formed therein and adapted to be secured to an outer casing, slips mounted
 15 in the seat in said base member for supporting a second string of casing, a metal supporting ring mounted in said base member above said slips, a pliable packing ring engaging said supporting
 20 ring, an upper spool-like member mounted in slidable relation to said base member having a gland formed thereon engaging said packing ring, means connecting said base and upper mem-
 25 ber arranged to temporarily compress the packing ring, slips mounted in said upper member for suspending a string of tubing extending through said second casing, whereby the weight of the
 30 tubing will compress said packing ring, and adjustable means carried by said upper member and engaging said base member for controlling pressure exerted on said packing ring when said tubing is engaged by the slips in said upper mem-
 35 ber.

6. A casing head comprising a base member connected to an outer casing, slips removably
 35 mounted in said base member for supporting a second concentric casing, packing disposed in said base member above said slips, an upper member detachably secured to said base member
 40 and having a gland formed thereon engaging said packing, slips mounted in said upper member for supporting a string of tubing within said second casing, and a plurality of set screws threaded in said base member and engaging said
 45 upper member for controlling the pressure

exerted on the packing when said tubing is suspended on the slips in said upper member.

7. A casing head comprising a base member connected to an outer casing, slips removably
 5 mounted in said base member for supporting a second concentric casing, packing disposed in said base member above said slips, an upper member detachably secured to said base member and having a gland formed thereon engaging said
 10 packing, slips mounted in said upper member for supporting a string of tubing within said second casing, and a plurality of spacer plates resting on said base member and engaged by said upper member for controlling the pressure exerted on
 15 the packing when said tubing is suspended on the slips in said upper member.

8. A casing head comprising a base member connected to an outer string of casing, slips
 20 mounted in said base member for supporting a second string of concentric casing, packing disposed in said base member above said slips, an upper body member mounted in slidable relation to said base member and having a gland formed
 25 thereon engaging said packing, slips mounted in said body member for supporting a second string of concentric casing within said second casing, and means associated with said base and upper member for controlling the pressure exerted on
 30 the packing when said casing is suspended on the slips in said upper member.

9. A casing head comprising a base member connected to an outer casing, slips removably
 35 mounted in said base member for supporting a second string of concentric casing, packing disposed in said base member above said slip, an upper member mounted in slidable relation to said base member and having a gland formed
 40 thereon engaging said packing, slips mounted in said upper member for supporting a string of tubing within said second casing, and means to prevent an upward movement of said body member and to temporarily compress the packing rings
 45 before suspending the casings therein.

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