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G. B. KITCHEL ET AL

2,074,923

CASING HEAD

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Fig. 1.

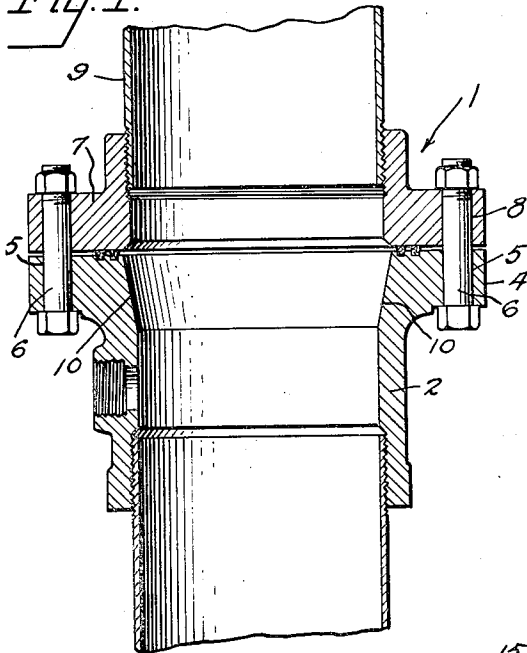


Fig. 2.

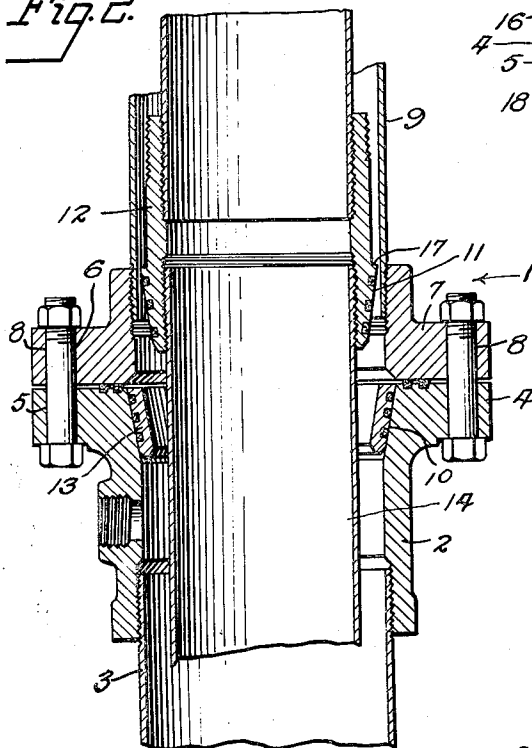
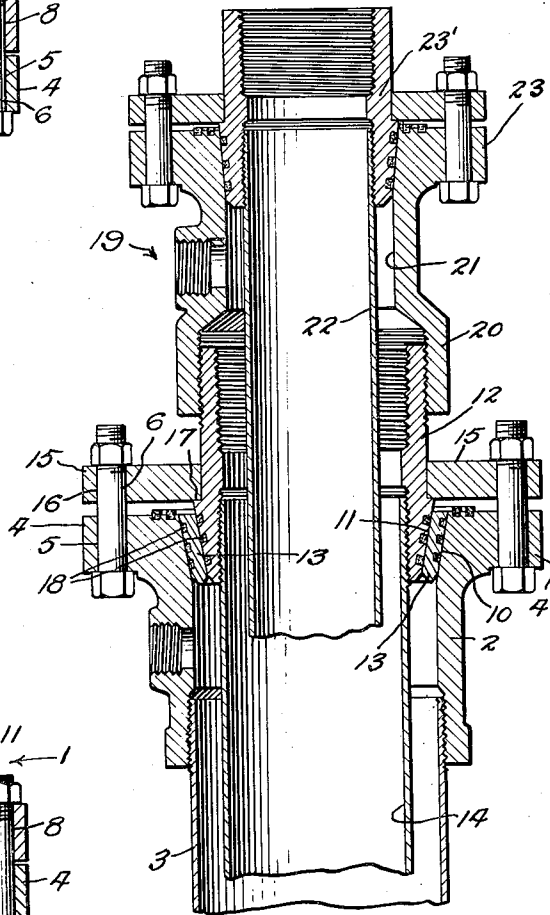


Fig. 3.



Inventor

G. B. Kitchel

E. J. Roach

By *Mason Fenwick & Lawrence*
Attorneys

UNITED STATES PATENT OFFICE

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CASING HEAD

George B. Kitchel, Houston, and Edmund J. Roach, Beaumont, Tex., assignors to Beaumont Iron Works Company, Beaumont, Tex., a corporation of Texas

Application January 24, 1936, Serial No. 60,683

1 Claim. (Cl. 285—22)

The invention forming the subject matter of this application is a casing head particularly adapted for use in the drilling of wells.

The main object of the invention is to provide a safety type casing head primarily designed to eliminate the blow-out menace while drilling-in and landing well casing.

A further object of the invention is to provide a casing head with a full open-hole body; that is, a casing head having an internal diameter equal to that of the casing to which it is attached, so that the drilling operation may be effected through blow-out preventers.

Another object of the invention is to provide a casing head with means for securing a positive seal against oil or gas leakage.

Other objects of the invention will appear as the following description of a preferred and practical embodiment thereof proceeds.

In the drawing which accompanies and forms a part of the following specification and throughout the several figures of which the same characters of reference have been employed to designate identical parts:

Figure 1 is a central vertical section through a casing head embodying the present invention;

Figure 2 is a central vertical section through the casing head illustrated in Figure 1, but illustrating an inner string in movement to a final fixed position within the casing head; and

Figure 3 is a central vertical section illustrating a series of casing head bodies coupled with locking rings to support a series of concentric inner strings.

As shown in Figures 1 and 2 of the drawing, the casing head designated generally by the reference numeral 1, comprises a body 2 internally screw-threaded at its lower end to engage external screw-threads at the upper end of a surface casing 3. The upper end of the body 2 is provided with an outwardly extending annular flange 4 having a series of apertures 5 through which pass the shanks of the bolts 6.

At the start of the drilling operation, a blow-out preventer adapter flange 7, having its internal diameter equal to that of the internal diameter of the body 2 and of the surface casing 3, is secured to the flange 4 by means of the bolts 6 passing through apertures 8 formed in the flange 7 in registry with the apertures 5 in the flange 4. The adapter flange 7 is internally screwthreaded to receive the externally screwthreaded end of the casing 9 forming part of the blow-out preventer mechanism, the structural details of which

are well known in this art and are not illustrated herein.

As shown in the drawing, the upper end of the bore through the body 2 is tapered upwardly and outwardly to form a tapered seat 10 adapted to receive the correspondingly tapered end 11 of a hanger 12; or adapted to receive a solid correspondingly tapered space ring 13, in case the inside diameter of the blow-out preventer is not large enough to pass the solid tapered end of the hanger 12. If the inside diameter of the preventer is large enough to pass a solid hanger the space ring 13 is not required, since the tapered surface of the hanger can then seat directly on the tapered seat 10 of the body 2.

With the parts assembled as shown in Figure 1, the drilling is started for the next size casing to be used. When this drilling operation is finished, and the drill pipe drawn from the hole, the blow-out equipment, with the flange 7 connected thereto, is disconnected or loosened from the flange 4 of the body 2, and is raised a sufficient distance to permit the insertion of the space ring 13 on the seat 10. Then the blow-out preventer equipment is lowered and again bolted to the body 2.

Casing 14, of the desired size is then lowered through the head 2; and when the desired amount is lowered, the hanger 12 is screwed on to the threaded upper end of the last joint in such position as to place said casing at the desired depth in the body. The casing 14 and hanger 12 secured thereto, is then lowered through the blow-out preventer equipment until the tapered end of the hanger rests on the tapered seat 10 of the body 2, or on the tapered inner surface of the space ring 13 when the use of such ring is required.

The blow-out preventer equipment, along with the adapter flange 7, is then removed; and a locking ring 15 is substituted for the adapter flange. The ring 15 is provided with a series of bolt receiving apertures 16 located to register with the apertures 5 in the body flange 4; and is adapted to slide snugly over the outer periphery of the hanger 12 until it seats against the shoulder 17 formed on said hanger. The nuts of the bolts 11 are then adjusted to clamp the tapered end of the hanger securely against the ring 13, when the latter is used, and thereby form a gas and liquid tight seal in the lowermost head. The outer surfaces of the ring 13 and hanger end 11 are suitably grooved to receive suitable packing rings 18.

An adapter head 19, screwthreaded on to the external screwthreads of the hanger 12, is sub-

stantially the same in construction as the body 2 of the lower head 1, except that it is reduced in size to correspond with the difference in size between the casings 3 and 14. The lower end 5 20 of the adapter head is internally screwthreaded to fit the external screwthreads at the upper end of the hanger 12. The inner periphery 21 of the adapter head 19 is substantially the same as that of the casing 14.

10 At the start of drilling operation for the second string of casing 22 the flange 23 of the adapter head 19 will have a blow-out preventer adapter flange secured thereto in the manner shown in Figure 2. After completion of the drilling through the string 14, the blow-out preventer 15 flange is removed, and the string 22 secured to the hanger 23' is secured in seated position in the adapter head 19 by the lock ring mechanism as shown.

It will be understood, of course, that adapter heads of suitable sizes will be provided to extend

the use of this system to any number of casing sizes, or numbers of strings of casing used. Hanger 23 may be considered as the last and uppermost hanger of a series. Since the last hanger would not be connected at its upper end to an adapter head, it is not necessary to provide it with the external screwthreads shown on the upper end of each of the lower hangers.

We claim:

In a well casing: a tubular head provided at its upper end with an outwardly flared seat; a hanger having its exterior diameter smaller than the interior diameter of said head and having its lower end flared to correspond to the flare of said seat; a space ring fitting and supported by said seat and forming a seat for the flared lower end of said hanger; and means for holding said hanger and ring in sealing contact with their respective seats.

GEORGE B. KITCHEL.
EDMUND J. ROACH.