June 22, 1943. A. B. WILLIAMSON 2,322,679

ROTATING BLOWOUT PREVENTER

Filed Feb. 4, 1941 2 Sheets-Sheet 1

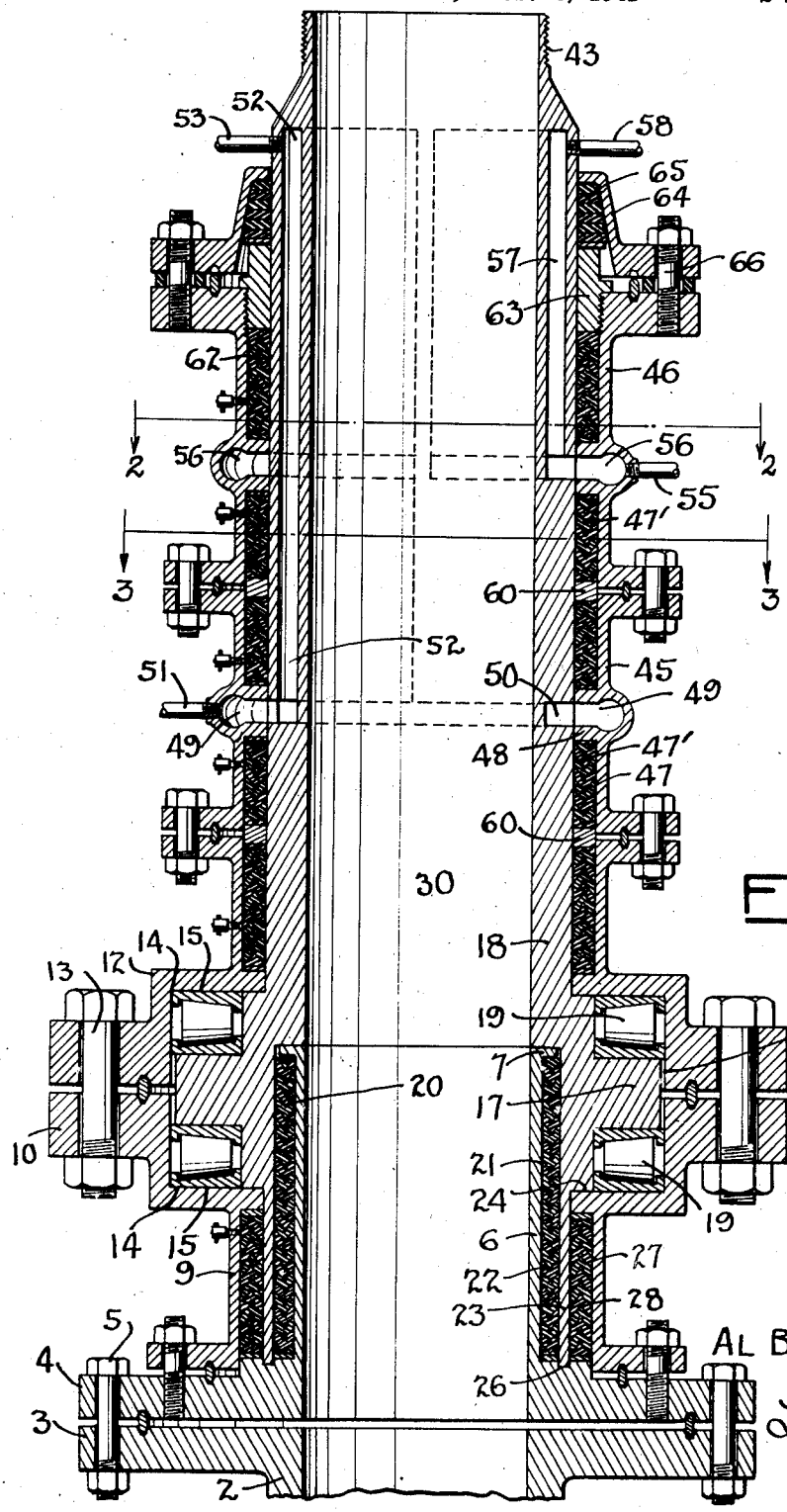


Fig. 1.

AL B. WILLIAMSON
INVENTOR.
Lester B. Clark.
ATTORNEY.

June 22, 1943. A. B. WILLIAMSON 2,322,679

ROTATING BLOWOUT PREVENTER

Filed Feb. 4, 1941 2 Sheets-Sheet 2

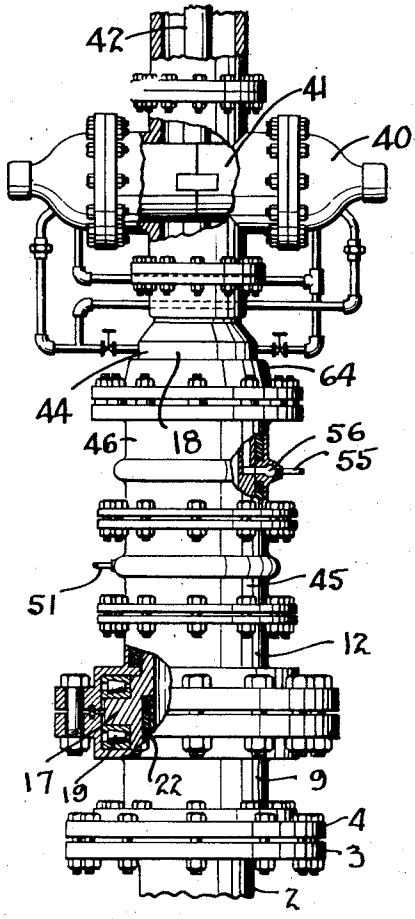


Fig. 4.

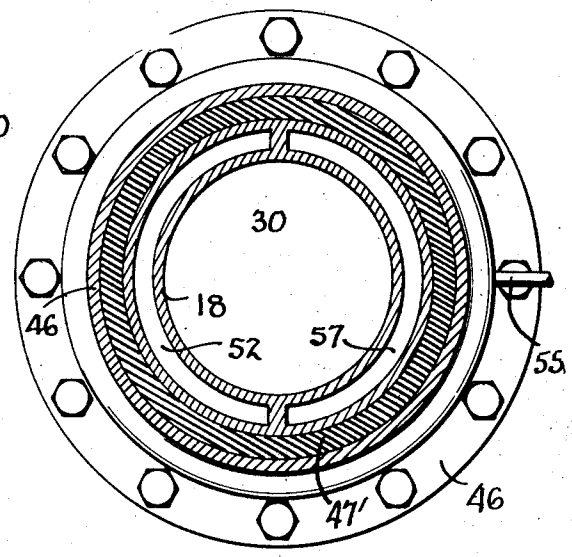


Fig. 2.

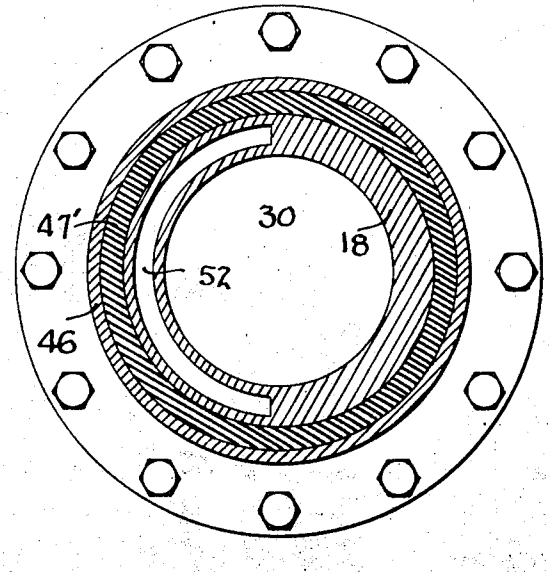


Fig. 3.

AL B. WILLIAMSON
INVENTOR.

BY Lester B. Clark.

ATTORNEY.

Patented June 22, 1943

2,322,679

UNITED STATES PATENT OFFICE

2,322,679

ROTATING BLOWOUT PREVENTER

Al B. Williamson, Corpus Christi, Tex.

Application February 4, 1941, Serial No. 377,294

2 Claims. (Cl. 255—19)

The invention relates to a rotating blowout preventer and the support therefor whereby fluid pressure may be transmitted to the preventer while it is rotating to effect the actuation thereof so as to either close or open the preventer.

In the drilling of wells by the rotary method wherein the drill stem is rotated in the well bore, the bit often penetrates a formation containing high pressures and in many instances the well has been destroyed by an excess of pressure from the formation blowing the drilling mud and the drill stem out of the well. Blowout preventers have been devised to form a seal about the drill stem so as to confine the pressure in the well bore and a majority of these blowout preventers are operated by fluid pressure.

Many attempts have been made to provide a blowout preventer which would successfully form a seal about the drill stem, particularly while the drill stem was rotating. In view of the fact that there is a great deal of drilling mud including various types of abrasives present, it is difficult to form a seal about the drill stem. In other instances the Kelly joint or grief stem, which is a non-circular member used to drive the drill stem, may be present at the elevation of the blowout preventer and if so, it could not be rotated with the blowout preventer closed about it. The present invention, therefore, contemplates a support or mounting for a fluid pressure operated blowout preventer so that the preventer may be actuated to open or closed position and may rotate with the drill stem while it is closed to grip and seal the drill stem.

It is desirable to rotate the drill stem while the well is closed so that a circulation of drilling mud may be had to work off excessive gas pressures, to introduce mud of a greater specific gravity, or to otherwise treat the well.

The drill stem is rotated during each operation to prevent it from freezing or sticking in the long column of liquid or drilling mud in the well.

It is one of the objects of the present invention to provide a rotating support for a fluid pressure operated blowout preventer.

Another object of the invention is to provide a rotatable support to be affixed to a well head.

Still another object of the invention is to provide fluid pressure connections from the well head to a rotating support therein.

A still further object of the invention is to provide a rotating body to be supported upon a well head while maintaining a seal about said body and circulating liquid from the well head into and out of the body.

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

Fig. 1 is a transverse vertical sectional view of a well head and support constructed in accordance with the invention.

Figs. 2 and 3 are sections taken on the lines 2—2 and 3—3 respectively of Fig. 1.

Fig. 4 is a side elevation of a well head and support illustrating the blowout preventer, its operating connections and the drill stem.

In Fig. 1 the well head is illustrated generally at 2 and may have a flange 3 thereon which serves to connect the well head assembly thereto. This well head assembly in turn includes a flange base 4 which is affixed to the well head by a series of bolts 5.

This base is of peculiar construction in that it has an internal upstanding skirt 6 having a flared lip 7 thereon. This base is arranged to have affixed thereto a spool 9 having the flange 10 projecting at its upper end. This spool 9 is arranged to cooperate with a second spool 12 which is very similar to spool 9 but is inverted in its position and affixed to the spool 9 by the bolts 13. The spools 9 and 12 each carries an enlarged portion 14 by which a shoulder 15 is formed. These two shoulders form an enlarged annular chamber 16 which is in turn arranged to receive the flange 17 of the body 18. An antifriction bearing 19 is positioned on each side of the flange 17 and confined against the shoulders 15 so that the body 18 is rotatably mounted and held in a vertical position by the spools 9 and 12.

The body 18 is recessed at 20 so as to fit over the upstanding skirt 6 and the lip 7. The chamber 21 thus formed is filled with a packing material 22 so as to form a seal between the skirt 6 and the downwardly extending flange 23 which forms the lower end of the body 18. A shoulder 24 on the outer periphery of the body 18 fits into the chamber 16 formed by the spools 9 and 12. It should be noted that the lower end 23 of the body 18 extends downwardly into the groove 26 in the base 14 and that an outer packing chamber 27 is thus provided between the body of the spool 9 and this portion 23, which chamber carries a packing 28. In this manner any pressure flowing from the opening 30 through the well head and the body 18 which tends to escape around the top of the skirt 6 would have to follow a tortuous passage through the packings 22 and 28.

Fig. 4 shows a blowout preventer 40 which is

of a type having the rams 41 which are movable by the application of fluid pressure thereto. These rams are arranged to close about the drill stem 42 which may be a section of round pipe or it may be the non-circular kelly or grief stem portion 42.

As hereinbefore indicated, it is desirable that the blowout preventer 40 rotate with the drill stem 42 if a seal is to be maintained about the drill stem under high pressure or for any considerable length of time while the drill stem is being rotated. To accomplish this, the present invention contemplates that the blowout preventer 40 will be connected as by the threads 43 to the upper end 44 of the body 18. In this manner when the drill stem 42 rotates the rams 41 may be clamped firmly about the drill stem and the rotation of the drill stem will cause rotation of the blowout preventer and the consequent rotation of the body 18. In this manner the weight of the blowout preventer will be carried by the supporting body 18 and the body will be sealed in the well head in a rotatable position.

In order that the blowout preventer may be opened or closed while it is being rotated, a suitable assembly has been arranged to conduct the fluid under pressure by which the blowout preventer is actuated. This fluid may be steam, water, drilling mud or oil, as the case may be.

In Fig. 4 the arrangement for conducting the pressure to and from the blowout preventer is shown in the form of the spools 45 and 46 which are supported respectively upon the spool 12. The spool 45 is flanged at its ends for connection with the adjacent spools and is cut out at 47 to receive the packing 47'.

Intermediate the ends of this spool 45 is an annular flange 48 which has the annular opening 49 therein which opens into the inner periphery of the spool. This opening 49 is arranged to be positioned in alignment with an annular opening 50 in the periphery of the body 18. A pipe 51 may be connected to a source of fluid under pressure so that pressure will be forced into the opening 49 and the opening 50.

Inasmuch as the two annular openings 49 and 50 are in alignment, there can be a flow of fluid into the body 18 while it is rotating in the stationary spool 45. In order that this pressure fluid may be conducted to the blowout preventer 40, a chamber 52 extends axially of the body 18 and has the pipe 53 connected thereto which leads to the blowout preventer. As an illustration, the pressure fluid through the pipes 51 and 53 may be used for closing the preventer rams. On the other hand, when it is desired to open the rams, fluid pressure may be introduced on the opposite side of the rams, and to accomplish this the pipe 55 leads into the chamber 56 which in turn connects with the chamber 57 in the body 18 and leads to the pipe 58 which is connected to the inside of the rams in the blowout preventer 40.

By a suitable control valve or valves the pressure can be introduced to open and close the blowout preventer while the drill stem and the preventer are both rotated. Clearly the pressure may be maintained on the preventer to hold the rams closed during any period of rotation. The spool 46 has suitable packing positioned between the body of the spool and the body 18, the same as the other spools previously described.

In order to prevent escape of each packing from its particular recess, a spacer ring such as 60 may be provided between each of the spools.

In order to confine the upper set of packing 62 in the top spool 46 a retainer ring 63 is shown as threaded into the top of the spool. A hold down cap 64 confines the top packing 65 about the body and this cap is, in turn, held in place by the bolts 66.

While two entrances or connections for fluid pressure to pass through the rotating connections to the blowout preventer have been shown and described, it is to be understood that a single connection may be utilized and the upper spool and passage eliminated if a suitable valve control is included in the blowout preventer so as to use the same source of fluid for both opening and closing operations, or if fluid is to be used only in the closing operation.

Broadly, the invention contemplates a rotatable support for blowout preventers wherein fluid pressure may be applied to the preventer.

What is claimed is:

1. A well head for rotatably supporting a blowout preventer including a base spool, a plurality of additional spools stacked thereon, a support for the preventer extending through said spools, means rotatably positioning said support in said base spool, additional means to provide a seal about said support in each of said spools, and a fluid passage through one of said additional spools to said support.

2. A well head for rotatably supporting a blowout preventer including a base spool, a plurality of additional spools stacked thereon, a support for the preventer extending through said spools, means rotatably positioning said support in said base spool, additional means to provide a seal about said support in each of said spools, a fluid passage through one of said additional spools to said support, and an outlet passage through another of said additional spools from said support so that the preventer may be hydraulically actuated while rotating.

AL B. WILLIAMSON.