

June 28, 1932.

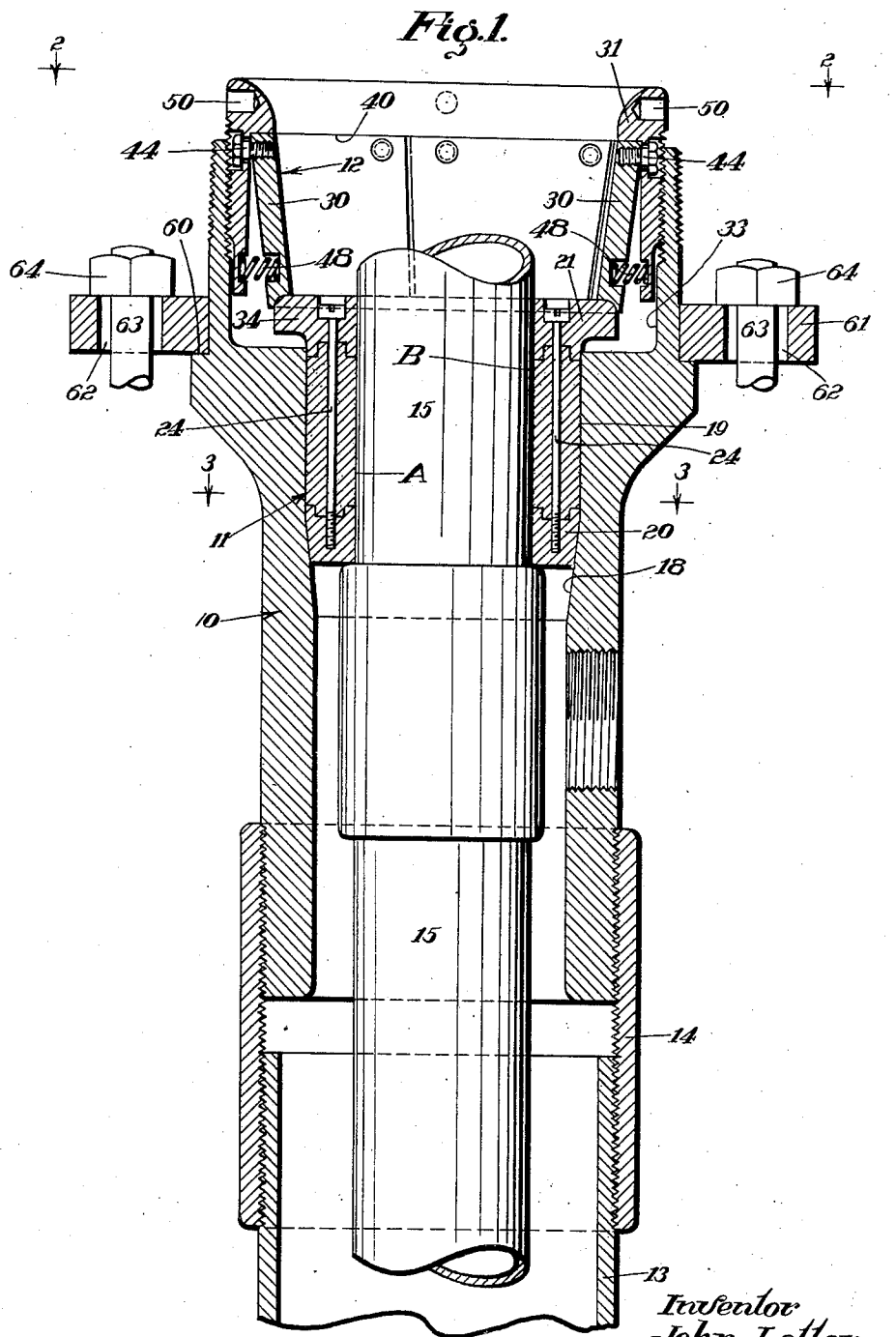
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1,865,121

WELL CASING HEAD

Filed Sept. 13, 1926

2 Sheets-Sheet 1



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Fig.2.

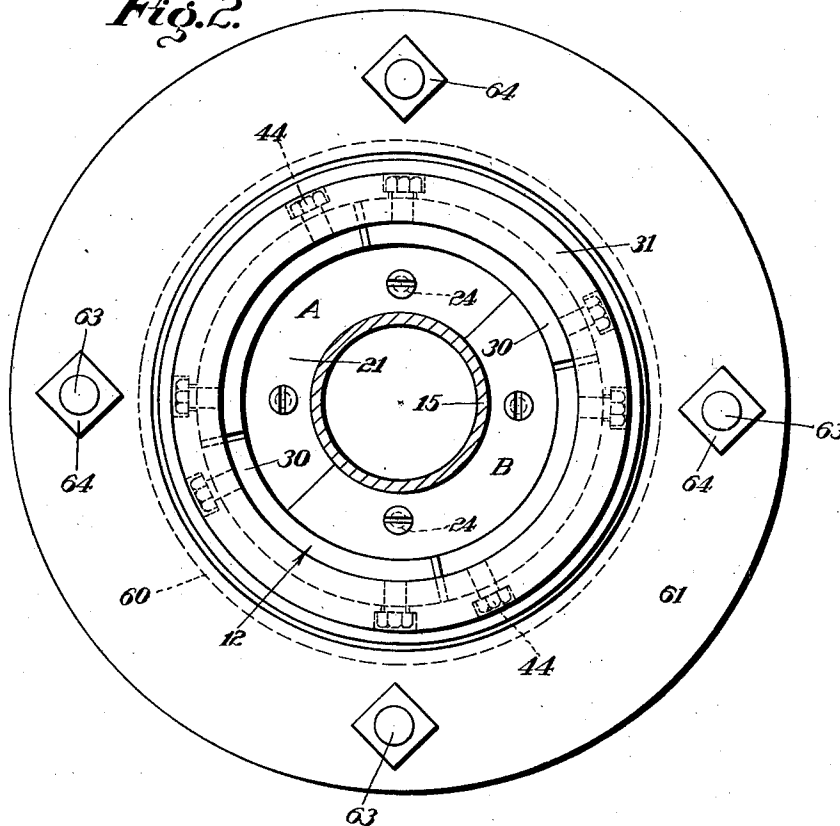
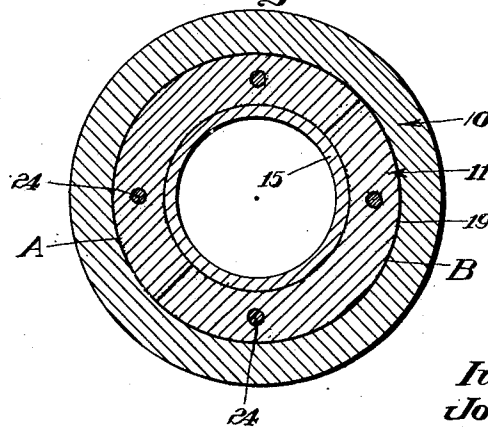


Fig.3.



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WELL CASING HEAD

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This invention has to do with a head to be applied to a well casing, and it is an object of the invention to provide a practical effective head operable to prevent a well from blowing out through the casing.

In the drilling of oil wells, particularly in certain territories, there is considerable danger of the well blowing out while it is being drilled or while the drilling tools are in the casing. Various packing devices or blow-out preventers have been proposed or used from time to time to prevent blowing out, it being common practice to provide blow-out preventers which embody packing operable to pack between the upper end of the casing and the drill pipe extending into the casing. Blow-out preventers utilizing the weight of the drill pipe to actuate the packing have met with considerable success and are usually effective and practical except in cases where the drill pipe is not sufficiently heavy to actuate the packing under the pressure tending to blow out throughout the casing.

It is an object of my present invention to provide a practical effective packing or blow-out preventer operable by means of the drill pipe in the casing regardless of the weight of the drill pipe.

Another object of my invention is to provide a blow-out preventer in which the packing element is operable either by lowering the drill pipe with reference to the casing or by raising the drill pipe with reference to the casing.

Another object of my invention is to provide an effective improved means for detachably securing the packing in operative position in the head.

Another object of my invention is to provide a packing retaining means in a blow-out preventer which operates to automatically secure the packing in place upon the packing reaching its operative position in the head.

The various objects and features of my invention will be best and more fully understood from the following detailed description of a typical preferred form of the invention throughout which description reference is had to the accompanying drawings, in which:

Fig. 1 is a vertical detail sectional view of the head;

Fig. 2 is a plan view of the head being a view taken as indicated by line 2—2 on Fig. 1; and

Fig. 3 is a transverse sectional view of the head taken as indicated by line 3—3 on Fig. 1.

The device provided by this invention includes, generally, a body 10, packing means 11 to be carried in the body, and means 12 for releasably holding the packing in position in the body.

The body 10 is adapted to be applied to a well casing 13 preferably to the upper end of the casing. In practice the body may be connected with the casing in any suitable manner, for instance, it may be connected to the casing through a coupling 14, as clearly shown in Fig. 1, of the drawings. The body projects upwardly from the casing 13 and has a central opening through it, to pass a drill pipe 15, or the like.

The packing means 11 is an annular structure or assembly adapted to operate in the opening in the body 10 at a point immediately above a downwardly convergent portion or tapered shoulder 18 formed in the opening. The packing means includes, generally, a body of packing 19 arranged between two packing rings 20 and 21. The packing ring 20 is arranged at the lower end of the packing 19 and its exterior is tapered to fit the tapered shoulder 18. The packing ring 21 is at the upper end of the body of packing and slidably fits the opening in the body. The packing means just described is divided or split longitudinally on a diametrical line into two separable sections A and B so that it can be assembled around the drill pipe 15 and lowered into the opening in the body 10 without disturbing the drill pipe. In practice it is desirable to join the several parts of the packing means, for instance the rings 20 and 21 and the packing 19, so that the sections A and B are in the form of units which can be easily handled. In practice it is convenient to join the parts by means of tie members 24 which extend between the rings and pass through the packing. In the drawings I have shown the tie members in the form of

screws having their lower ends screw threaded into the ring 20 and their head ends slidably carried in suitable openings formed in the ring 21.

5 The means 12 which operated to hold the packing sections A and B in place in the body upon their being arranged therein, may as far as the broader principles of my invention are concerned, be any suitable device
10 or construction. The improved means 12 which I have provided is in the nature of a spring latch means adapted to automatically engage the packing sections A and B upon their being arranged in place, and it can be
15 easily and quickly released when it is desired to remove the packing sections. In the particular embodiment of the invention illustrated in the drawings the means 12 includes a plurality of latches 30 mounted in
20 the body immediately above the packing means 11 to cooperatively engage the upper packing ring 21 to prevent it from moving upwardly after it has been lowered to operating position as shown in Fig. 1 of the
25 drawings. The latches 30 are preferably mounted in a carrier 31 which in turn is mounted on or carried by the upper end of the body 10. The carrier 31 is preferably in the form of a ring externally screw threaded
30 to screw thread into the upper end of the opening formed through the body 10. In the preferred construction the upper end portion 33 of the opening in the body immediately above the portion of the opening which carries the packing 19 is made considerably
35 larger in diameter than the other parts of the opening so that the carrier 31 and the latches 30 carried by it do not in any way interfere with the passage of parts into or
40 through the head. In the arrangement and proportioning of parts shown in the drawings the packing ring 21 at the upper end of the packing 19 has an outwardly extending flange 34 which projects outwardly to form
45 a part to be engaged by the latches 30. The latches 30 are segmental parts mounted in the carrier 31 to extend downwardly and inwardly from a downwardly facing shoulder 40 provided in the upper part of the carrier.
50 The latches are suitably connected to the carrier at their upper ends or adjacent the shoulder 40 so that their lower end portions are movable outwardly to allow the flange 34 on the packing ring 21 to be moved to position
55 below the latches. In practice any suitable connections may be provided between the latches and carrier. In the drawings I have shown screws 44 loosely fitted in openings in the carrier and screw threaded into the latches. There is sufficient play between
60 the screws 44 and the carrier 31 to allow for the desired movement of the latches. Springs 48 may be provided in connection with, for instance, behind the latches
35 30 to normally hold the latches in position

where they will engage the flange 34 to hold the packing means in the body. In practice I have found it desirable to hold the carrier 31 against rotation so that it will not be disengaged from the body by the working of drill pipe through the body. I have found it convenient to provide holes or sockets 50 in the ring to receive a spanner wrench. The wrench can be left in place on the carrier 31 and may be tied or otherwise held so that it operates to prevent rotation of the carrier relative to the body.

In practice it is desirable to secure the body 10 through means other than the coupling 14. I have provided the exterior of the body 10 with an upwardly facing shoulder 60 and have arranged a ring 61 on the body to seat on the shoulder. This ring 61 is formed with openings 62 to pass anchor bolts 63. The anchor bolts may extend downwardly any desired distance and may be anchored or secured in any suitable manner. Nuts 64 may be applied to the upper ends of the bolts above the ring 61 in the manner clearly shown in Fig. 1 of the drawings.

In operation the normal drilling operations may be performed with the body 10 of the head applied to the upper end of the casing 13, the body carrying only the latch carrier 31. When it is desired to pack between the well casing and drill pipe the two sections A and B of the packing means may be assembled or placed together around the drill pipe 15 and lowered into position in the body 10. During the passage of the packing means into the body of the latches 30 are depressed and when the packing means reaches operating position the latches engage the flange 34 of the upper packing ring to positively hold the packing in the body. It is to be noted that the latches operate under compression between the upper packing ring and the shoulder 40 in the carrier 31 and are therefore particularly reliable and secure.
110 With the packing means in place in the body it can be operated so that the packing 19 is expanded between the drill pipe and body either by allowing the drill pipe to lower so that a drill pipe coupling 70, tool joint or other projection on the pipe engages the upper packing ring 21 to force it downwardly,
115 or by moving the drill pipe upwardly so that a coupling or tool joint engages the lower packing ring 20 to move it upwardly. Under the first mentioned condition the lower packing ring 20 seats on the tapered shoulder 18 in the body to form an abutment against which the packing 19 is compressed by the downward movement of the upper packing ring 21. In this way the packing 19 is expanded
120 to make the necessary packed connection between the drill pipe and body. Under the other condition the upper packing ring 21 is held under the latches 30 so that it forms an abutment against which the packing 19 is
125 130

compressed by the upward movement of the lower packing ring 20. It will thus be apparent that if the weight of the drill pipe is not sufficient to operate the packing in the manner first described it is merely necessary to lift the drill pipe with enough force to operate the packing in the manner last described. The packing means can be easily removed from the body when the packing is unactuated by simply depressing the latches so that they will pass the flange 34. With the arrangement of parts provided by applicant the latches 30 do not in any way interfere with normal operation of the drilling tools. However, in the event that they should, the carrier 31 can be disengaged from the upper end of the body thus leaving only the body 10 on the casing.

Having described only typical preferred forms of my invention I do not wish to limit myself to the specific details set forth but wish to reserve to myself any changes or variations that may appear to those skilled in the art or that may fall within the scope of the following claims;

Having described by invention I claim:

1. A casing head of the character described, including a body to be applied to the casing and having an opening through it, packing means to be arranged in the opening, and a latch means for releasably holding the packing in the body, said latch means including a carrier screw-threaded to the body, and a latch mounted on the carrier.

2. A casing head of the character described, including a body to be applied to the casing and having an opening through it, packing means to be arranged in the opening, and a latch means carried by the body for releasably holding the packing in the body, said latch means including a downwardly facing shoulder at the upper part of the body and a latch carried by the body in engagement with the shoulder and operable to engage the packing means and operate under compression between the packing means and shoulder to hold the packing means in the body.

3. A casing head of the character described, including a body to be applied to the casing and having an opening through it, packing means to be arranged in the opening, and a latch means for releasably holding the packing in the body, said latch means including a carrier screw-threaded to the body and having a downwardly facing shoulder and a latch mounted in the carrier to engage under the shoulder.

4. A casing head of the character described including a body to be carried by the casing, packing means to be arranged in the body, and a releasable spring-actuated latch pivotally mounted on the body and operable to rigidly hold said packing means against upward movement in the body, the latch being

normally in operating position to engage the packing means.

5. A casing head of the character described including, a body to be carried by the casing, a packing assembly to be arranged in the body, and a pivoted latch mounted on the body pivotable between a position where it engages the packing assembly to positively hold it against upward movement in the body and a position free of the packing assembly.

6. A casing head of the character described including, a body to be carried by the casing, a packing assembly to be arranged in the body, a pivoted latch on the body operable between a position where it engages the packing assembly to operate under compression to hold it in the body and a position free of the packing assembly, and means normally holding the latch in the first-mentioned position.

7. A casing head of the character described including, a body to be applied to the casing, packing means to be arranged in the body, and means carried by the body to releasably hold the packing means in the body including a latch pivotally mounted on the body operable to engage the packing means to positively hold it against movement in one direction, and means normally yieldingly holding the latch in the operating position.

8. A casing head of the character described including, a body adapted to be mounted on a casing and having an opening adapted to pass a string of pipe, packing means in the body for sealing about the pipe, and means for releasably holding the packing means in the body including a latch pivoted to the body operable to engage the packing means and operate under compression to retain it in the body and pivotal to a position free of the packing means.

9. A casing head of the character described including, a body adapted to be mounted on a casing and having an opening adapted to pass a string of pipe, packing means in the body for sealing about the pipe, and means for releasably holding the packing means in the body including a latch pivoted to the body operable to engage the packing means and operate under compression to retain it in the body and pivotable to a position free of the packing means, and means normally tending to pivot the latch to position to engage the packing means.

10. A casing head of the character described including, a body adapted to be mounted on a casing and having an opening adapted to pass a string of pipe, packing means adapted to be lowered into the body and operable to seal about the pipe, and packing retaining means including a latch pivoted to the body operable to automatically engage the packing means to retain it in the body upon the packing means being lowered into the body.

11. A casing head of the character de-

scribed including, a body adapted to be
mounted on a casing and having an opening
adapted to pass a string of pipe, packing
means adapted to be lowered into the body
5 and operable to seal about the pipe, and pack-
ing retaining means including a latch pivoted
to the body adapted to be pivoted outwardly
during passage of the packing means into the
body, and means for automatically pivoting
10 the latch inwardly to the retaining position
in engagement with the packing means when
the packing means is seated in the body.

In witness that I claim the foregoing I have
hereunto subscribed my name this 30th day
15 of August 1926.

JOHN LOTTON.

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