

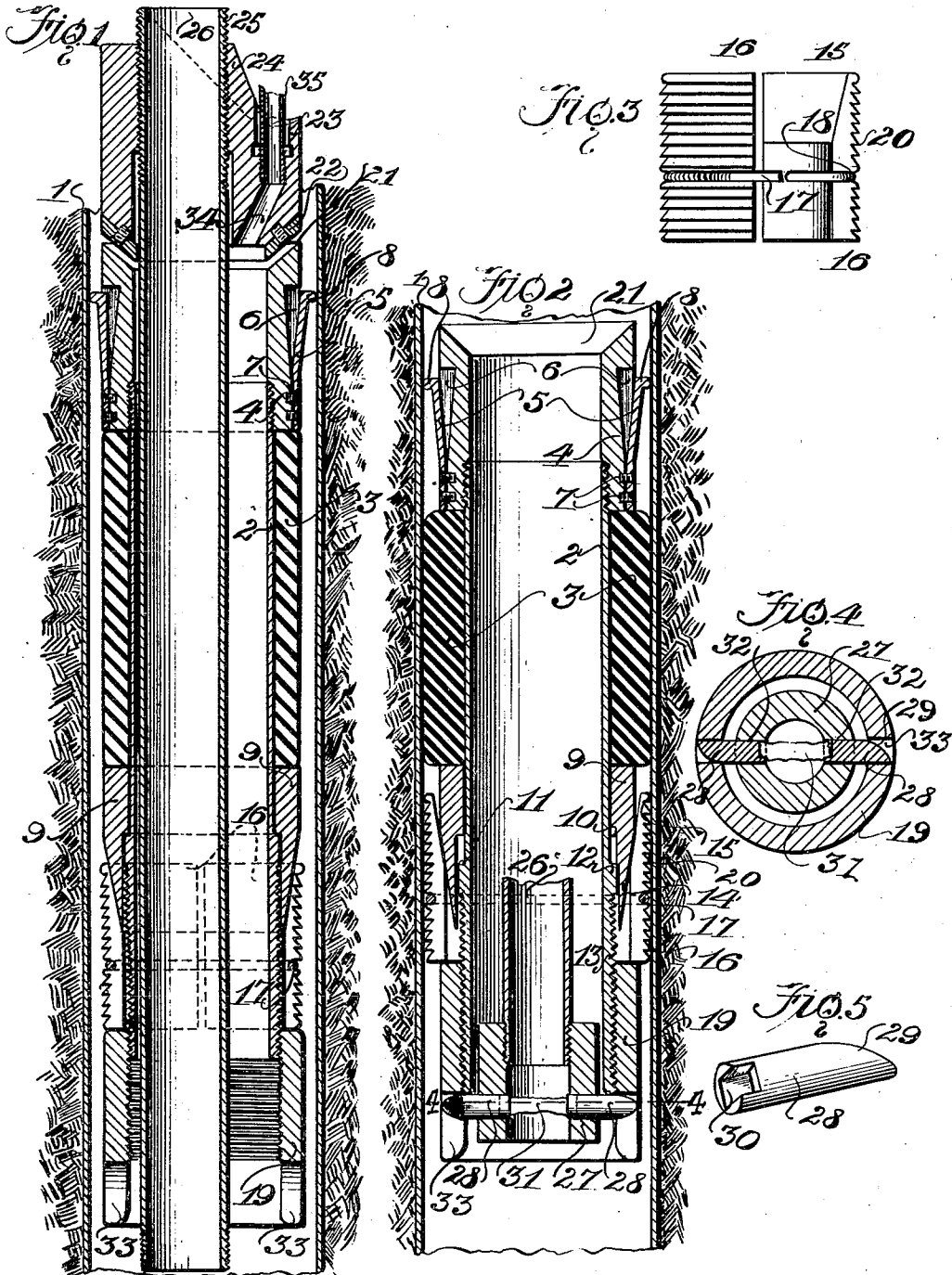
Dec. 11, 1923.

1,476,727

J. S. QUIGG

OIL WELL PACKER

Filed Aug. 1, 1922



WITNESSES

*M. W. Fowler*

INVENTOR

*J. S. Quigg*

BY *Mum & Co.*

ATTORNEYS

## UNITED STATES PATENT OFFICE.

JAMES S. QUIGG, OF DEWEY, OKLAHOMA.

## OIL-WELL PACKER.

Application filed August 1, 1922. Serial No. 578,876.

*To all whom it may concern:*

Be it known that I, JAMES S. QUIGG, a citizen of the United States, residing at Dewey, in the county of Washington, State of Oklahoma, have invented certain new and useful Improvements in Oil-Well Packers, of which the following is a specification.

This invention relates to packers for oil wells, and has for its object the provision of a device which will effectually prevent any fluid detrimental to an oil well from flowing through an opening in the wall of the casing or around the bottom of the casing, down into the oil or gas sand, whereby the oil or gas is drowned out.

A further object of the invention is the provision of a packer which may be predeterminedly anchored at a point in the well below a leak in the casing so that it will be possible to remove the oil well tubing without disturbing the packer.

It has been proposed to construct packers which are adapted to be securely fastened to the oil well tubing in such a manner that the usual rubber sleeve of the packer becomes so distorted and tightly wedged within the casing and on the oil well tubing that it is necessary to disrupt the tubing at this point before removing said tubing. This frequently results in damage to the well which is incapable of being repaired.

To this end, I have constructed a packer which will effectually prevent water from reaching the oil sand, but which is anchored independently of the oil well tubing, with said tubing removably supported by the packer, whereby the tubing may be removed without breaking the tubing at the point where the packer has been anchored.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing in the drawing, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Fig. 1 is a vertical section of the packer applied to an oil well casing.

Fig. 2 is a vertical section of the same anchored in position within the casing.

Fig. 3 is a view in elevation of the packer slips.

Fig. 4 is a transverse-horizontal section taken along the line 4—4 of Fig. 2.

Fig. 5 is a view in perspective of a member of the tool for anchoring the packer in position.

Referring to the drawing, 1 designates the usual oil well casing which is adapted to be sunk at a predetermined depth in the oil well. Into said casing is inserted a packer body 2 below a leak in said casing and provided with the usual compressible sleeve 3, preferably formed of rubber, and mounted concentrically on the packer body.

The upper end of the packer body is externally threaded to receive the internal threads of a packer top or sleeve 4, with its lower end in abutting relation with the upper end of the compressible sleeve 3. The packer top 4 is provided with diametrically disposed vertical slots 6 in its outer wall adapted to receive a spring member 5, with the lower end of the spring member anchored at 7 in the lower end of the slot, and its upper end free to move in the upper end of the slot. The upper portion of the slot is of greater depth than the lower end, whereby the free end of the spring may oscillate within the slot sufficiently to wholly seat a lug 8 which is formed at right angles to the body of the spring. The spring members 5 tend at all times to project outwardly from the packer top 4, with the lugs 8 engaging the inner wall of the casing 1 in order to prevent turning of the packer body during the anchoring of said body member within the casing.

Concentric with the body member 2 is a packer cone 9 slidable on said packer body, but limited in its downward movement by an annular shoulder 10 on the packer cone adapted to engage a shoulder 11 formed by an enlargement 12 on the packer body. The construction of the shoulder 10 on the inner wall of the packer cone provides a close fitting for the upper inner wall of the packer cone on the packer body, while the lower portion of the inner wall of said cone is spaced from the packer body and adapted to ride over the outer surface of the projection 12, and likewise

over the lower threaded portion 13 of the packer body. The lower portion of the outer wall of the cone 9 is gradually reduced in diameter to form an inwardly-tapered wall 14 adapted to engage the inner wall 15 of the slips 16, the upper portion of the inner wall of the slips 16 being inclined coincident to the inclination of that portion of the outer wall of the cone 9 represented by the numeral 14.

I have shown four slips concentric with the body member 2 and held together by a coil spring 17 mounted in a groove 18 of the slips for retaining the slips in position relative to each other and to the packer cone 9.

The lower threaded end 13 of the packer body 2 is adapted to loosely receive an internally threaded nut 19 having its upper end in engagement with the lower end of the packer slips 16, so that as the nut 19 is rotated and moved upwardly towards the compressible sleeve 3, the slips 16 will be moved upwardly and when riding on the tapered outer wall of the cone 9, will cause the externally fluted portion 20 of said slips to bite into the inner wall of the casing 1 and anchor the packer body in position within the casing.

The upper end of the packer top 4 is beveled inwardly as shown at 21, upon which is adapted to be seated an annular gasket 22 secured to the lower beveled end of a removable cap 23. The top 24 of said cap is provided with an internally threaded passage adapted to receive the threaded portion 25 of an oil well tubing 26 so that when the cap 23 is seated on the packer top 4, the weight of the tubing will be born by the packer body 2 through the cap 23. The weight of the tubing on the top 4 compresses the sleeve 3, expanding the same and forcing it outwardly into engagement with the inner wall of the casing 1, with its lower end abutting the upper end of the cone 9. The cone 9 is limited in its downward movement by the cooperating shoulders 10 and 11, respectively, located on the cone 9 and the packer body 2.

In order to rotate the nut 19 to force the segments of the slips 16 into biting relation with the inner wall of the casing 1, I have provided an internally threaded sleeve 27 adapted to screw on the end of the oil well tubing 26. Below the connection between the sleeve 27 and the oil well tubing 26, I have provided diametrically-disposed passages 32 in which are adapted to be inserted turning tools 28. These tools are in the form of pins having their outer ends sheared and rounded as shown at 29, presenting a cam surface to one vertical wall of the diametrically-disposed slots 33 formed in the nut 19. The inner ends of the pins are provided with a socket 30 adapted to re-

ceive the opposite ends of a cast iron pin 31 for maintaining the pins 28 extended through the passages 32 in the sleeve 27 and projected into the diametrically-disposed slots in the lower end of the nut 19. That side of the end of the pins 28 which is diametrically opposite the rounded portion 29 engages the other vertical wall of the slots 33 in the nut 19, when the tubing 26 is rotated to cause rotation of said nut.

The packer body is supported when inserted in the casing 1 by the sleeve 27, pins 28 and the tubing 26. The coiled spring 17 retains the slips 16 on the body member 2 and out of engagement with the casing 1 when the packer is lowered.

When the packer body has been properly positioned within the casing 1 and below an opening in said casing which admits water to the well, the tubing 26 is rotated with the pins 28 engaged within the slots 33 of the nut 19, whereby said nut will force the slips 16 upwardly and over the cone 9 and into engagement with the inner wall of the casing 1, with the cone forming a wedge between the slips and the packer body 2. The cone 9 remains stationary when the nut 19 is turned. After the nut has been sufficiently adjusted and the packer body has been properly anchored, an iron rod may be dropped within the oil well tubing 26 onto the cast iron pin 31, fracturing the same to permit relative movement of the pins. A reversal of the rotation of the tubing 26 will cause the cam surfaces 29 on the ends of the pins to ride against one vertical wall of the slots 33 and force the pins inwardly within the sleeve 27, and out of engagement with the nut 19. The tubing 26 may then be removed.

The cap 23 is applied to the top of the packer body for supporting the tubing 26, the weight of which compresses the elastic body 3 between the sleeve 4 and the cone 9, causing said elastic sleeve to be jammed between the packer body 2 and the casing 1, thus effectually stopping the flow of water or any other deleterious fluid to the well.

The weight of the oil well tubing on the cap 23 causes said cap, through the gasket 22 on its seat 21 at the upper end of the sleeve 4 to seal the upper end of the packer save for a passage 34 in said cap which permits the escape of gas from the well.

This passage is internally threaded to receive the threaded end of a string of gas pipe 35 for letting off the gas from the casing whenever such necessity arises.

What is claimed is:—

1. In a packing device for oil wells, the combination of a body member, an elastic sleeve thereon, a sleeve on the body member abutting one end of the elastic sleeve, a cone slidable on the body member and abutting

the other end of said elastic sleeve, anchoring slips adapted to be expanded by said cone, and a rotatable means for causing the slips to be moved into expanding relation with the cone.

2. In a packing device for oil wells, the combination of a body member, an elastic sleeve thereon, a sleeve on the body member abutting one end of the elastic sleeve, a cone slidable on the body member and abutting the other end of said elastic sleeve, anchoring slips adapted to be expanded by said cone, a rotatable means for causing the slips to be moved into expanding relation with the cone, and means to frictionally retain the body member in position upon rotation of the first-mentioned means.

3. In a packing device for oil wells, the combination of a body member, an elastic sleeve thereon, a sleeve on the body member abutting one end of the elastic sleeve, a cone slidable on the body member and abutting the other end of said elastic sleeve, anchoring slips adapted to be expanded by said cone, a rotatable means for causing the slips to be moved into expanding relation with the cone, and a cap for sealing the upper end of the body member and removably supporting an oil well tubing within the body member.

4. In a packing device for oil wells, the combination of a body member, an oil well tubing projecting from the body member, an elastic sleeve on the body member, a sleeve on the body member abutting one end of the elastic sleeve, a cone slidable on the body member and abutting the other end of the elastic sleeve, anchoring slips adapted to be expanded by said cone, a rotatable means for causing the slips to be moved into expanding relation with the cone, and means

on the end of the oil well tubing for rotating the last-mentioned means and releasable at will from said means.

5. In a packing device for oil wells, the combination of a body member, an oil well tubing projecting from the body member, an elastic sleeve on the body member, a sleeve on the body member abutting one end of the elastic sleeve, a cone slidable on the body member and abutting the other end of the elastic sleeve, anchoring slips adapted to be expanded by said cone, a rotatable means for causing the slips to be moved into expanding relation with the cone, means on the end of the oil well tubing for rotating the last-mentioned means and releasable at will from said means, and a cap for sealing the upper end of the body member and removably supporting the oil well tubing within the body member.

6. In a packing device for oil wells, the combination of a body member, an elastic sleeve concentric with the body member, a sleeve having threaded engagement with the body member and abutting one end of the elastic sleeve, resilient means seated within slots in the last-mentioned sleeve to frictionally retain the body member in a non-rotatable position, a cone slidable on the body member and abutting an end of the elastic sleeve, means to limit the downward movement of the cone relative to the body member, anchoring slips adapted to be expanded by the cone, a nut rotatable on the body member for forcing the slips into expanding relation with the cone, and a removable cap adapted to seal the upper end of the body member and support an oil well tubing within the body member.

JAMES S. QUIGG.