Nov. 23, 1943. F. A. REED 2,335,025

OIL WELL PACKER

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Fig. 1.

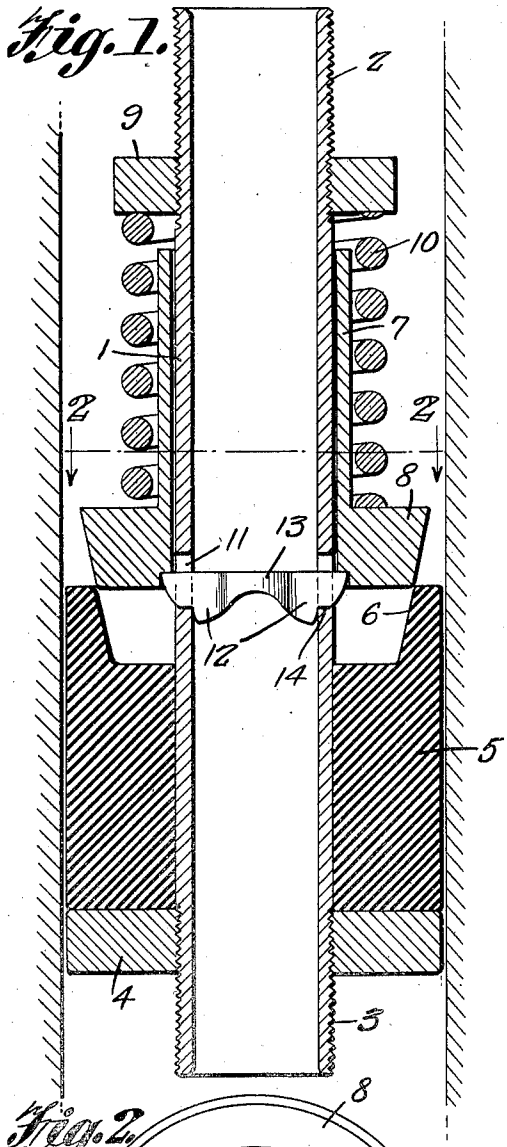


Fig. 3.

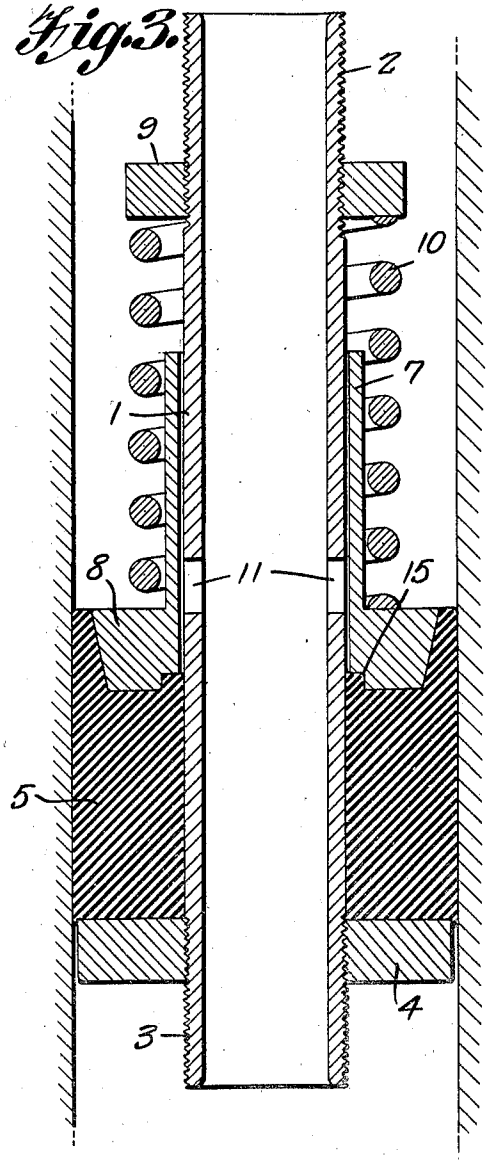
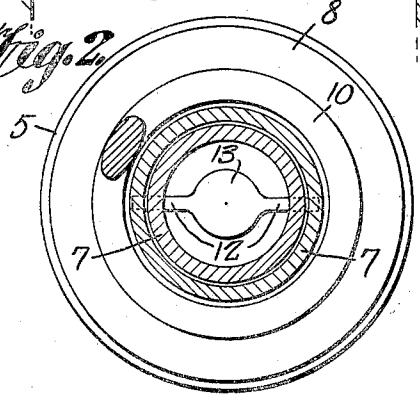


Fig. 2.



Frank A. Reed,
INVENTOR.

BY Victor J. Evans & Co.
Attorneys

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OIL WELL PACKER

Frank A. Reed, Butler, Pa.

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5 Claims. (Cl. 166—10)

This invention relates to well packers, and its general object is to provide a packer that is primarily designed for use in oil wells, to form a bridging seal at any predetermined point in the bore of the well above the producing sand, and between the tubing and the bore; to act as a seat or support for a column of cement to anchor the tubing, when fluid or air under pressure is introduced therein, during the process of flooding the producing sand or repressuring the sand for increasing oil production.

A further object is to provide a well packer that includes expansible sealing means and spring pressed means for expanding the same into sealed position, the spring pressed means being normally held inactive by fragile means which when broken releases the spring pressed means to bring about the sealing function.

Another object is to provide a well packer that can be attached to the tubing and lowered into the bore of the well for disposing the packer at any predetermined position therein desired, in that my packer requires no bottom support and can be released in set or sealed position at the exact point desired, as no rotary or reciprocatory movement of the packer is necessary, for that purpose.

A still further object is to provide a well packer, that is simple in construction, easy to install, inexpensive to manufacture, and extremely efficient in operation, use and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a vertical sectional view taken through my packer, lowered within a well, and illustrates the position of the parts before the packer is set.

Figure 2 is a sectional view taken approximately on line 2—2 of Figure 1.

Figure 3 is a view similar to Figure 1, but with the packer released or in set position.

Referring to the drawing in detail, it will be noted that my packer includes a tubular body 1 which in fact is a short section of ordinary tubing or pipe, that is threaded for a portion of its length from its upper and lower ends, as at 2 and 3 respectively, and threadedly mounted on the lower portion 3 is a flat ring like collar 4 that provides an abutment for a hollow cylindrical relatively thick gasket 5 formed from rubber or other like compressible material to set up a sealing action in a manner which will be later described. The gasket is of course sleeved on the body 1 and the top of the gasket has a relatively shallow annular recess 6 therein, opening into its bore, and the recess is of substantially conical formation, in that the side wall thereof is inclined outwardly from the bottom of the recess, as clearly shown in Figure 1.

Loosely mounted for free sliding movement on the body above the gasket is a plunger that includes a sleeve 7 having a head 8 formed on the lower end thereof and the head is of conical formation to fit within the recess for compressing the gasket against the well bore and the body 1, as shown in Figure 3.

Threaded on the upper end portion 2 of the body is an upper flat ring like collar 9 that provides an abutment for one end convolution of a coil spring 10, the latter being sleeved about the sleeve 7 and having its lower end convolution bearing against the head 8. By the provision of the threaded abutment collar 9, it will be obvious that the tension of the spring can be varied.

The body 1 is provided with a pair of diametrically opposed slots 11 which are relatively short and extend longitudinally thereof for receiving the shouldered end portions of arms 12 of a so-called disk member 13, the arms extending from diametrically opposite sides of the disk body of the member 13 and the shoulders 14 of the arms are seated on the lower walls of the slots, for disposal of the disk member in bridging relation to the body and with the outer ends of the arms extending through the slots, to be received in notches 15 in the lower face of the head 8 for supporting and holding the plunger against the action of the coil spring 10, as well as the head out of the recess 6, or in other words the parts of the packer in their normal position of Figure 1, while being lowered within the bore of the well and before the packer is released to its set position of Figure 3.

The disk member 13 is formed from cast iron or other suitable substantially fragile or brittle metal or the like of sufficient strength to hold the plunger elevated against the action of the spring, so that the packer can be freely lowered within the bore of the well, and after it has reached the desired point therein, a weight is dropped through the tubing or run on a line therethrough for breaking the disk member, it

being obvious that the body is coupled to the lower end of the tubing in the usual manner for lowering the packer into the well.

It will be further obvious that when the disk member 13 is broken, the plunger is released and the spring will force the head into the recess, to urge the gasket against the lower abutment collar 4, and thereby expand the gasket in a sealed or leakproof connection against the body 1 and the wall of the bore of the well, as shown in Figure 3, so that the packer will bridge the space between the same and thereby provide a seat or support for a column of cement to anchor the tubing against any possibility of displacement when air or fluid is introduced therein, during the process of flooding or repressuring the well.

After the packer is disposed to set position, the cement column is formed by pouring fluid cement into the well bore, and it might be mentioned that the additional weight brought about by the cement, increases the packing pressure of the gasket, thus movement or displacement of the packer after it has been set, is practically impossible.

It will be noted as shown in Figures 1 and 2, that the top of the disk member 13 is flat, but the bottom thereof decreases in thickness toward its center, to weaken the same accordingly, so that the disk member will tend to break across its center at right angles to the arms 12, to assure complete removal of the arms from the slots and the falling of the disk member through the tube, when broken by a weight hitting the flat upper face or top.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:

1. A bore-hole well packer comprising a tubular body to be coupled to the lower end of a well tubing and being provided with diametrically opposed openings, abutment means secured to the lower end portion of the body, a plunger slidably mounted on the body above the abutment means, a spring above the plunger and urging it downwardly, a compressible gasket surrounding the body between the abutment means and plunger and having a recess in its top, fragile means bridging the body and extending through its openings, engaging the lower face of the plunger and holding it out of the recess with the spring of the plunger under compression, said fragile means being adapted to be broken by a weight dropped or lowered into the tubing to release the plunger for downward movement by its spring into the recess of the gasket to expand the gasket into sealing engagement with the body and the well.

2. A bore-hole well packer as set forth in claim 1, wherein the recess of the gasket is of substantially conical formation, wherein the spring-pressed plunger comprises a sleeve surrounding the body and a head at the lower end of the sleeve shaped to fit the recess of the gasket, and wherein the fragile means has arms extending into the openings of the body.

3. A bore-hole well packer as set forth in claim 1, wherein the fragile means has arms extending into the openings of the body and provided with shoulders engaging the inner side of the body at the lower ends of the openings, and wherein said means has a flat weight receiving top and is reduced toward its center to bring about breakage thereof midway of its ends.

4. A bore-hole well packer as set forth in claim 1, wherein the plunger comprises a sleeve slidable on the body and a head at the lower end of the sleeve, wherein a collar is mounted on the body above the sleeve, and wherein the spring of the plunger surrounds the sleeve with its ends in contact with the collar and head.

5. A bore-hole well packer as set forth in claim 1, wherein said fragile means has arms extending through the openings of the body and wherein the plunger is provided in its lower side with recesses receiving the ends of the arms.

FRANK A. REED