May 18, 1943 D. BROOKSHIRE 2,319,295

WELL PACKER

Filed Aug. 12, 1941

Fig. 1.

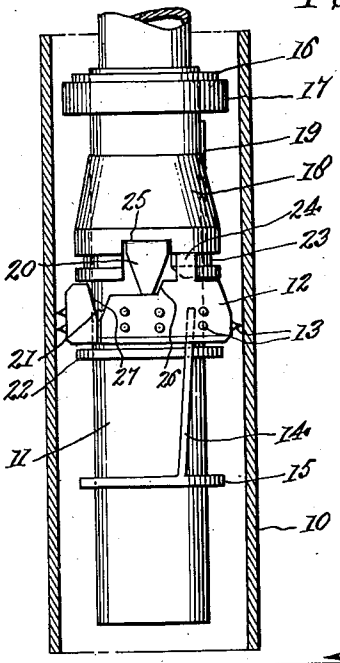


Fig. 5.

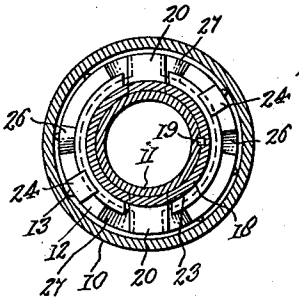
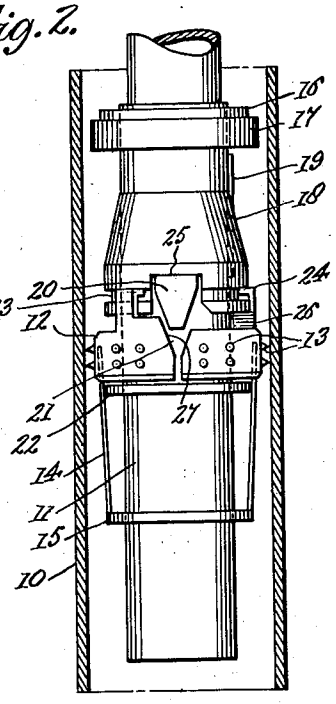


Fig. 2.



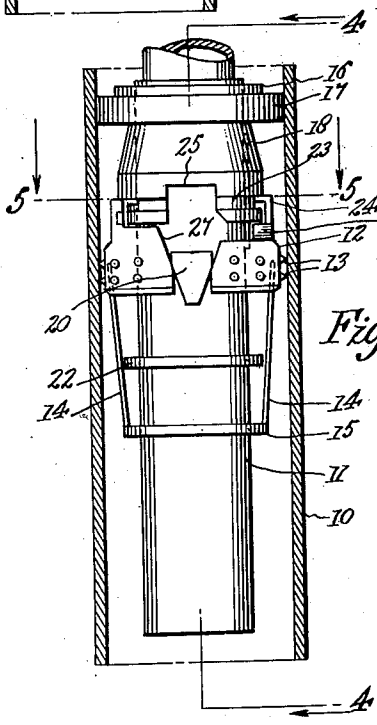


Fig. 3.

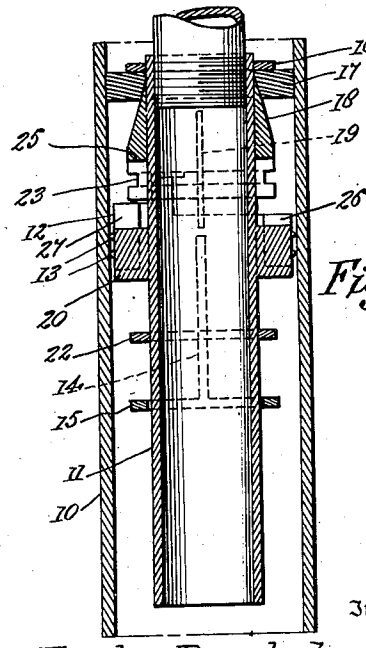


Fig. 4.

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WELL PACKER

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Application August 12, 1941, Serial No. 406,550

2 Claims. (Cl. 166—10)

The present invention relates to improvements in well packers and has for an object to provide an improved packer which will cooperate in an improved manner with the working barrel, which is a section of the tubing inside the well casing near the bottom of the well.

Another object of the invention is to provide an improved packer and associated parts all of which cooperate contributively to the functions of locking, packing and catching with all possible simplicity.

A still further object of the invention is to provide an improved well packer in which the device becomes a part of the working barrel, is normally locked out of operation during the lowering of the tubing, is unlocked by rotary motion of the barrel relative to the catching shoes, and is set by a dropping movement of the barrel relative to the segmental catching shoes.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawing, wherein like symbols refer to like or corresponding parts throughout the several views

Figure 1 is a vertical section through a well casing showing a working barrel and the improved well packer carried thereby in an initial locked condition of the parts.

Figure 2 is a similar view showing the unlocked condition of the parts ready for operation.

Figure 3 is a view similar to Figures 1 and 2 with the parts dropped to partly-set position.

Figure 4 is a vertical section taken on the line 4—4 in Figure 3, and

Figure 5 is a cross section taken on the line 5—5 of Figure 3.

Referring more particularly to the drawing, 10 designates generally a well casing into which the tubing is lowered, such tubing including in part the working barrel 11.

Slidably and rotatively mounted upon the barrel 11 are segmental catching shoes 12 having barbs or friction points 13 for biting into the casing 10. The shoes 12 are carried by spring arms 14 from a collar 15 slidable and rotatable on the working barrel 11.

A fixed collar 16 on the working barrel acts as a backing for the expansible packing 17. The cone or other packer 18 is slidable vertically on the working barrel 11 but is held from rotation by the key 19. The working barrel carries one or more V-shaped spreaders 20 for cooperating with a V-cut or slot between adjacent segments 12. The working barrel 11 carries a collar 22 as an integral part thereof on which the shoes 12 are normally supported.

In the packer 18 is an annular groove 23 for receiving the inverted L-shaped clamps 24 on the shoes 12. The lower portion of the packer 18 is formed with a groove or cut-away portion 25 for receiving the upper basal end of the wedge spreader 20.

The shoes 12 are formed with upstanding shoulders 26 and 27. One shoulder 26 is spaced angularly from the V-cut 21; while the other shoulder 27 rises upwardly beyond such cut 21. These shoulders 26 and 27 are disposed in the annular path of the spreader 20 to limit the rotation of the barrel with reference to the shoes 12 without entraining the shoes 12 with the rotary motion of the barrel 11.

In operation, Figure 1 shows the locked position of the parts in which the barrel 11 has been rotated relatively to the shoes 12 to cause the spreader 20 to move towards the right against shoulder 26. Thus the shoe 12 is locked between the spreader 20 and the collar 22, both of which members are fixed upon the working barrel 11. In this position the tubing may be lowered without the catcher and the packer operating. In other words, the mechanism is locked so as to be inoperative.

In Figure 2 the parts are shown in unlocked position ready to pack and catch the tube should it be allowed to fall. In this case the barrel 11 has been rotated to the left relatively to the catching shoe or shoes 12 until spreader 20 strikes shoulder 27 which will notify the operator above that the spreader 20 is now poised directly above the V-cut 21.

The catching shoes 12 are prevented from rotating easily with the barrel 11 by the friction of the barbs 13 against the casing 10 caused by the light tension of the springs 14 holding such friction points 13 against the casing wall. While the function of the springs 14 is to bias the segments or shoes 12 to an inner contracted position, such inner position will be one in which the friction points 13 lightly touch upon the internal wall of the well casing 10.

When the parts are in the position shown in Figure 2 and the operator allows the casing to drop, due to the light friction pressure heretofore referred to the catching device 12 will re-

tain its position while the barrel 12 drops therethrough carrying the spreader 20 down into the V-cut 21, causing the expansion of the segments 12 radially outward against the casing 10 and thus setting the shoes in place for the heavier work which must be done when the packing 17 descends upon the cone 18. As the packing 17 rides down over the cone surface 18, it is expanded outwardly against the wall of the casing 10 to seal off the area below the packing 17 from that above in accordance with usual well practice.

The downward movement of the catching half sections is stopped by the fixed abutment collar 22 which may be an integral part of the barrel 11.

The use of the words "working barrel" in the claims will be understood to mean any tube section or part capable of performing the operations stated.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. In a well packer, a working barrel or tube section, a packing thereon, expanding means through which the barrel may drop to cause riding of the packing out on said expanding means, said expanding means having a groove therein, catching sections having a substantially V-cut therebetween mounted adjacent said expanding means and having clamp means engaging said groove to permit said expanding means to rotate with respect to said catching means but to entrain the expanding means against axial motion with respect to the catching means during dropping movement of the barrel, a wedge spreader on said barrel moved by the barrel through said cut when the barrel is dropped, said spreader movable angularly with the barrel out of registering position with said cut to lock the barrel against relative axial movement with the catching means, an abutment fixed on the barrel below said catching means, and means on the barrel for lightly urging said catching sections outwardly.

2. In a well packer, a working barrel or tube section, a packing thereon, a cone expander keyed for rotation with the barrel and axially sliding movement thereon toward and from said packing, said expander having a cut-away portion opening through its lower edge and an annular groove intersecting the cut-away portion, toothed separable catching shoes on the barrel below the expander having a V-cut therebetween, substantially inverted L-shaped clamps upstanding from the shoes rotatably engaging in said groove, a stop shoulder on one section rising up at one side of said cut, a stop shoulder on the other section angularly displaced from said cut, a spreader wedge on the barrel received in said cut-away portion and adapted to enter said cut and being located in the annular path of said shoulders, an abutment ring fixed on the barrel below said catching sections, a spring ring slidable on the barrel below said abutment ring, and light spring arms extending up from said spring ring and engaging said catching shoes to urge the same lightly outward.

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