

July 27, 1926.

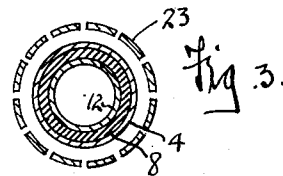
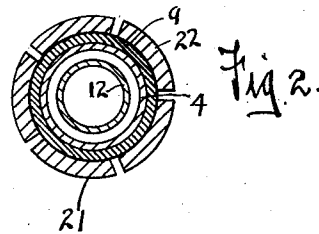
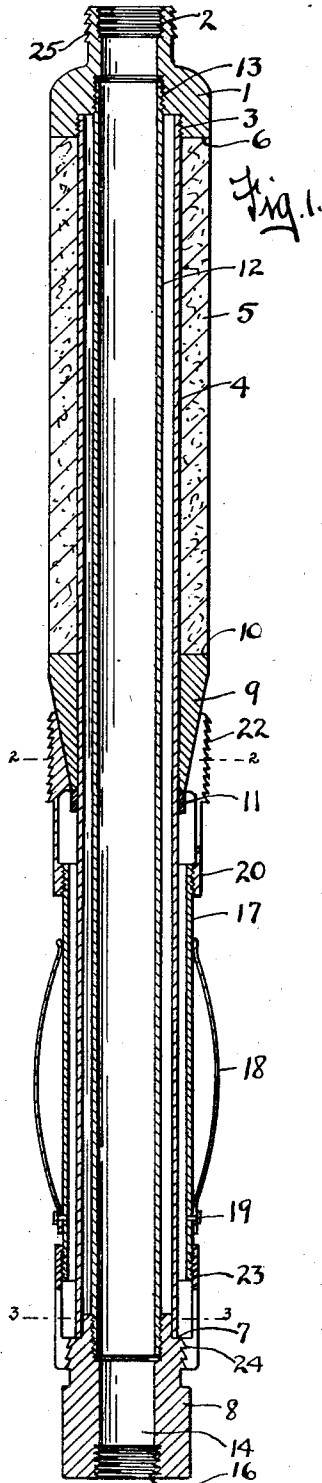
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J. D. NIXON

WELL PACKER

Filed Jan. 22, 1924

2 Sheets-Sheet 1



J. D. NIXON, Inventor

By *Jesse R. Stone*

his Attorney

July 27, 1926.

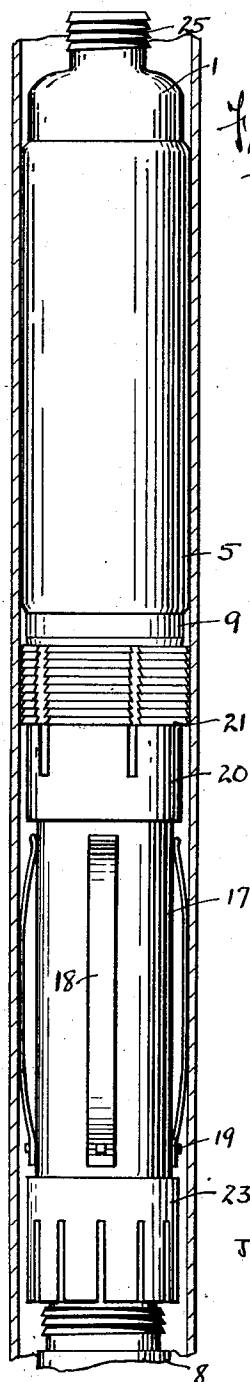
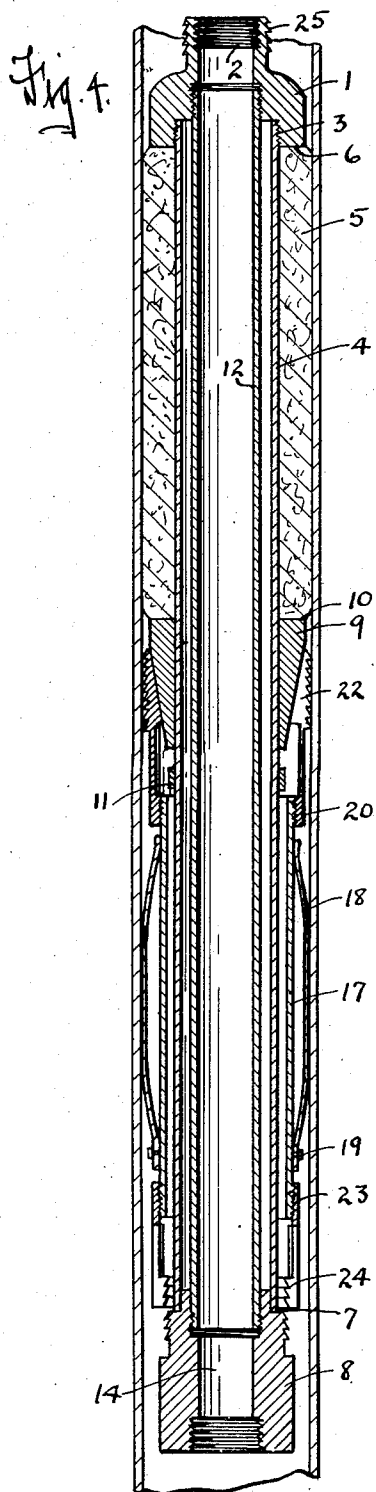
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2 Sheets-Sheet 2



J. D. NIXON,
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UNITED STATES PATENT OFFICE.

JEDDY D. NIXON, OF HOUSTON, TEXAS, ASSIGNOR TO W. K. M. COMPANY, INC., OF HOUSTON, TEXAS.

WELL PACKER.

Application filed January 22, 1924. Serial No. 687,694.

My invention relates to packers for use in shutting off the space outside the tubing employed in raising the oil or water from deep wells. It may be employed in pumping operations or in providing an outlet for fluid in flowing wells.

An object of the invention is to provide a packer having the same internal diameter as the tubing throughout.

Another object is to provide a packer which may be positively expanded at any desired point in the well.

Another object is to so construct the packer that it may be released and adjusted to a different position after it is once set, without removing the tubing from the well. It is also desired to provide a simple and strongly constructed packer, easily assembled and not liable to get out of order.

Referring to the drawing herewith, Fig. 1 is a central longitudinal section through a packer embodying my invention. Figs. 2 and 3 are transverse sections on the planes 2-2 and 3-3, respectively, of Fig. 1. Fig. 4 is a longitudinal section showing the packer in expanded position; and Fig. 5 is a side elevation of the same.

In the drawing I have shown my improvement in packers adapted to be secured at a point within a string of tubing inserted into the well, it being desired to provide a packer which may be expanded at any point desired within the well, and to so arrange the mechanism that the packer may be released and again adjusted at any time thereafter. At the upper end of the packer is a nipple 1, threaded internally at 2 for engagement with the section of tubing above; the lower end of the nipple is flared outwardly and has two threaded openings therein to engage with sections of pipe constituting the body of the packer. The outer seat 3 is threaded for engagement with a tube or barrel 4 upon which the compressible packing sleeve 5 is seated. The lower end of the nipple 1 forms a shoulder at 6 to bear against the upper end of the packing sleeve. The lower end of the barrel 4 is adapted to contact with a shoulder 7 upon a coupling 8.

Immediately below the packing sleeve 5 is a downwardly tapered ring or mandrel 9 of the same thickness as the packing sleeve, and having an upper seat 10 thereon to support the packing. The lower ta-

pered end of the mandrel rests upon a flange or ring 11, which is secured rigidly upon the barrel 4 preferably by being shrunk thereon. It will be noted that this ring will prevent the downward movement of the mandrel, and thus tend to support the packing sleeve in position between the shoulders 6 and 10.

The lower coupling or nipple 8, is held in spaced relation relative to the nipple 1 by means of an inner tube 12. This tube is screwed within a seat 13 in the nipple 1 and is formed of the same interior diameter as the tubing through which the pump plunger is to work. By this means the pump may operate through the packer without difficulty. The lower end of the tube 12 is threaded within the coupling 8 and it will be noted that when thus secured in position the shoulder 7 will bear firmly against the lower end of the barrel 4, thus securing it rigidly in position. The nipple, or coupling 8 has a central passage 14 therethrough of the same internal diameter as the barrel 12 and the tubing. The lower end of the coupling 8 is threaded at 16 for connection in the string of tubing in an obvious manner.

To support my packer operatively at any desired point in the well, I employ an anchor comprising an outer anchor sleeve 17 concentric with the barrel 4, and having on the outer surface thereof a plurality of spaced springs 18 of the ordinary leaf type bowed outwardly between the ends, and secured on the lower end thereof to the sleeve 17 by means of screws or rivets 19. The upper ends of these springs bear slidably against the outer surface of the sleeve so as to allow the springs to move somewhat under compression within the casing. These springs tend to bear strongly against the inner face of the casing and prevent relative rotation of the sleeve 17 relative to the casing.

At the upper end of the sleeve 17 is a ring or collar 20 threaded for attachment to the upper end of the sleeve. The upper end of the collar is split longitudinally into a plurality of jaws 21. These jaws are beveled outwardly at their upper ends on the inner faces thereof to bear against the tapered seat provided by the mandrel 9. The outer faces of the jaws or dogs are toothed at 22 to contact with the casing

when expanded and thus anchor the device within the well. The teeth are inclined downwardly so as to better support the weight of the tubing above.

5 The sleeve 17 and the anchoring jaws thereon, are held downwardly in inoperative position by means of the collar 23 having threaded engagement with the lower end of the sleeve 17. The lower portion of this
10 collar is split longitudinally at spaced intervals around the periphery thereof from the lower end to a point spaced from the upper end. The inner face of the ring at the lower end is extended inwardly and threaded at 24 with a so called buttress thread, the
15 axes of which are inclined downwardly as shown in Figs. 1 and 4. The upper end of the coupling 8 below the barrel 4 is threaded with a similar thread to engage
20 with the collar. By splitting the lower end of this collar 23, the expansion of the collar is possible and it will be noted that if the device is jerked upwardly from the surface the barrel 4 will tend to move within the
25 anchor sleeve thus forcing the thread thereon into engagement with the collar 23 without rotation. When it is desired to disconnect the collar 23 from the coupling 8, it will be necessary to rotate the coupling
30 within the collar so as to screw the said coupling downwardly out of the collar 23.

In the operation of this device the packer will be secured within the tubing at the desired point and will be lowered into position where it is to be expanded. When thus
35 assembled for lowering into the well, the parts will be in position as shown in Fig. 1. The anchor sleeve will be engaged with the coupling 8 so as to hold it in operative
40 position. When the point is reached where expansion is desired, the tubing and the packing device will be rotated in a right hand direction. The springs 18 bearing against the casing will prevent the rotation
45 of the anchor sleeve 17. The coupling 8 will thus be screwed downwardly out of connection with the collar 23 on the sleeve. About three turns will be sufficient to disengage the parts. A downward thrust upon
50 the tubing and the body of the packer will then force the mandrel 9 downwardly between the dogs 21 and expand them against the casing which will be firmly gripped thereby. This will anchor the mandrel 9,
55 and the further downward movement of the tubing will force the upper nipple 1 against the packing sleeve 5, thus compressing the said sleeve between the shoulders 6 and 10, compressing it longitudinally and forcing it
60 outwardly against the inner wall of the casing, and thus serve to entirely close off the passage between the tubing and the casing.

If it is later determined to alter the position of the packer in the well or to withdraw it entirely, the tubing may be drawn

upwardly, thus pulling the mandrel 9 out of clamping relations with the jaws 21, and releasing the packer. If the device is drawn upwardly with some force, the threads upon
70 the upper end of the coupling 8 will be forced into the lower end of the collar 13, so that the threads 20 thereon will engage the coupling in the manner shown in Fig. 1, and thus prevent the further expansion
75 of the jaws while the packer is being lowered or raised within the casing. The resiliency of the packer itself will tend to draw it back out of contact with the casing, and allow the movement in either direction without detriment to the packer sleeve. 80
The upper end of the nipple 1 may be provided with downwardly inclined teeth or threads 25 so that it may be engaged by fishing tool or other device in case of accident within the well, and thus enable the
85 tool to be easily withdrawn.

The advantages of this construction lie in the fact that the expansion of the packer may be readily accomplished when desired, and that the packer may be again released from the casing and adjusted at other positions, either up or down in the well without drawing the tubing or any of the parts from the well. This is a great advantage where
90 the exact position of the packer to shut off gas, water or other fluid cannot be determined without experiment. The use of the two tubes or barrels 4 and 12 makes it possible to use light pipe and a packing sleeve not too thick, and at the same time, leaves
95 the internal diameter the same as the tubing for pumping purposes. The outer barrel may be dispensed with and the inner tube only be used to support the packer and anchor mechanism when the device is used in a smaller size of casing as will be obvious.

Other objects and advantages will be apparent to those skilled in the art.

What I claim as new, and desire to protect by Letters Patent is:

1. In a packer for wells, a barrel having an upper shoulder, an expansive packing sleeve on said barrel below said shoulder, a slidable support on said barrel below said
105 sleeve, means to limit the downward movement of said support, means to anchor said support to the well casing when desired, said means being formed for engagement with the lower end of said barrel by the upward
110 movement of said barrel and to be disengaged for operation by unscrewing of said anchoring means therefrom, for the purpose described.

2. In a packer for wells, a barrel, a coupling at the lower end thereof, downwardly tapered buttress threads on said coupling, a downwardly tapered mandrel supported
115 slidably on said barrel, a packing sleeve on said barrel above said mandrel, an anchor sleeve below said mandrel, expanding jaws
120

on said sleeve engaging said mandrel, an expandible collar at the lower end of said sleeve adapted to engage the said threaded coupling on an upward movement of said coupling and to disengage therefrom when said coupling is screwed downwardly, and means tending to resist rotation of said sleeve.

3. In a packer for wells, a barrel, a packing sleeve thereon, means supporting said sleeve at both ends thereof, the lower support being slidable, a coupling, means having a threaded engagement therewith adapted when released to anchor said slidable support in the well, and a tube secured in said upper support and said coupling to hold said barrel against said coupling.

4. In a well packer, a barrel, a coupling at the lower end thereof, a packing sleeve on said barrel, a slidable mandrel supporting said sleeve on the upper end of said barrel, expanding dogs working on said mandrel, a sleeve supporting said dogs having its lower end split longitudinally and threaded with an upwardly inclined buttress thread, means preventing rotation of said sleeve, and cooperating buttress threads on said coupling for the purpose described.

5. In a well packer, an upper nipple, a lower coupling, a barrel secured within said nipple, separate means connecting said nipple and coupling, a downwardly tapered mandrel slidable on said barrel, means to limit the downward movement of said mandrel, a packing sleeve on said barrel above said mandrel, an anchor sleeve, expanding dogs on said sleeve adapted to fit on said mandrel and cooperating means on said coupling and said anchor sleeve adapted to engage on the upward movement of said coupling and disengage by unscrewing thereof for the purpose described.

6. In a well packer, a nipple threaded for engagement within a string of tubing, a tube connected thereto of the same internal diameter as said tubing, a concentric outer barrel secured in said nipple, means to connect the lower ends of said barrel and tube, a packing sleeve on said barrel below said nipple, a supporting mandrel slidable on said pipe below said packing sleeve, and means releasable by rotating said pipe to support said mandrel against movement downwardly in the well, whereby said pipe may be forced downwardly to expand said packer, said releasable means being formed to be again secured out of operative position by the upward movement of said barrel and tubing.

7. In a packer for wells, a barrel, an upper shoulder thereon, a slidable tapered mandrel supported intermediate the ends of said barrel, a packing sleeve between said shoulder and mandrel, casing engaging dogs slidable on said mandrel, a coupling at the lower end of said barrel, means engaging said dogs with said coupling on an upward movement of said coupling, said means adapted to be released by an unscrewing movement of said barrel and coupling and means to prevent rotation of said dog engaging means.

8. A packer for use on well tubing comprising a nipple, a tube connected therewith of the same interior diameter as said tubing, an outer barrel in said nipple, a coupling at the lower ends of said tube and barrel, and expanding packing means on said barrel in the manner and for the purpose described.

9. A packer for use on well tubing, comprising a nipple, a barrel connected therein, a coupling having a shoulder bearing against the lower end of said barrel, a support slidable on said barrel, a packer sleeve above said support on said barrel, means to anchor said support in the well hole, said means detachably engaging said coupling, and a tube connecting said nipple and said coupling, said tube being of the same internal diameter as said tubing.

10. A tubing packer comprising, a nipple, a coupling, an inner tube connecting said nipple and coupling, a barrel outside said tube connected in said nipple and bearing against said coupling, a support slidable on said barrel, a packing sleeve between said support and said nipple and means to anchor said support in the well, comprising a sleeve, expansible jaws thereon, said sleeve being slidable on said barrel and adapted to engage detachably with said coupling.

11. A packer for use on well tubing comprising a nipple having two attaching seats in its lower end, a coupling, a tube secured in one of said seats in said nipple and secured centrally in said coupling, a barrel outside said tube, and secured in said nipple at its upper end and resting on said coupling at its lower end and packing means on said barrel adapted for releasable connection with said coupling and to be expanded on said barrel, said tube being of the same internal diameter as said tubing.

In testimony whereof I hereunto affix my signature this 16th day of January, A. D. 1924.

JEDDY D. NIXON.