Aug. 15, 1944. W. E. GEAN ET AL 2,355,854

TOOL FOR MOVING AND POSITIONING PACK-OFF ASSEMBLIES

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Fig. 1.

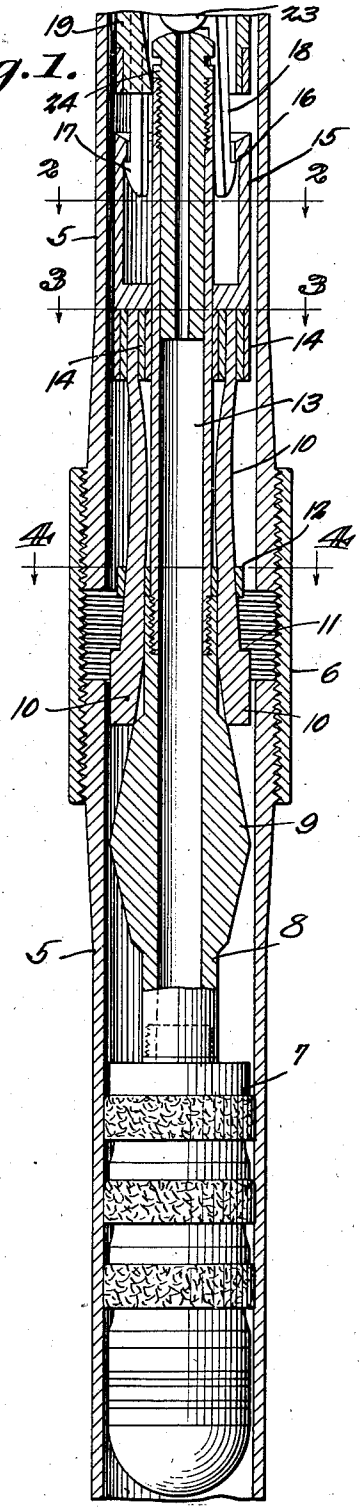


Fig. 2.

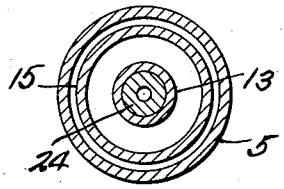


Fig. 3.

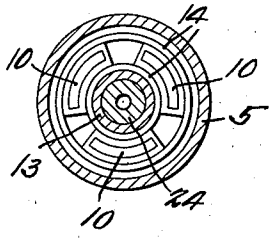
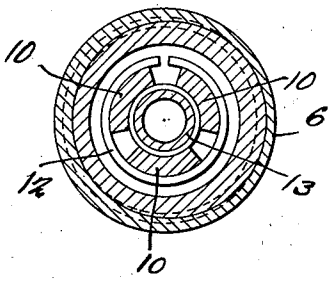


Fig. 4.



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Fig. 5.

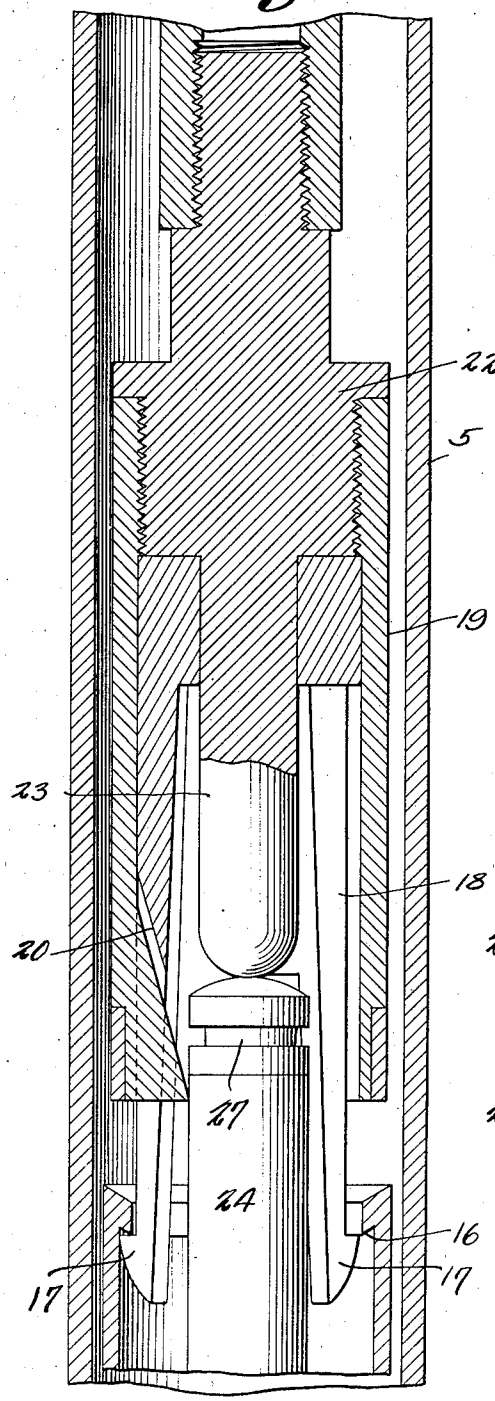
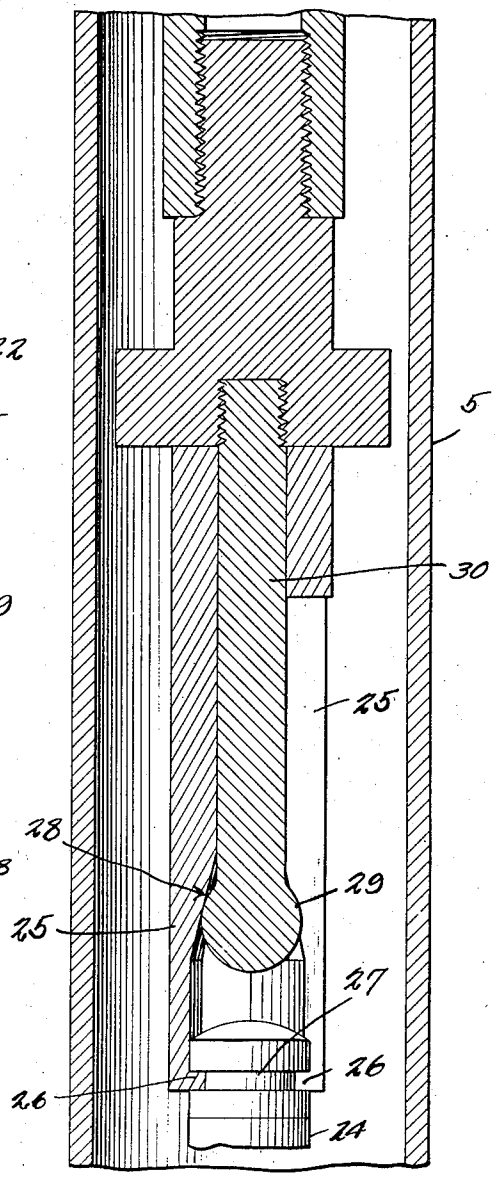


Fig. 6.



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TOOL FOR MOVING AND POSITIONING PACK-OFF ASSEMBLIES

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Application February 26, 1942, Serial No. 432,538

3 Claims. (Cl. 294—93)

This invention relates to well tubing plugs or pack-off plugs, the primary object of the invention being to provide a plug of this character, constructed in such a way that the plug may be readily and easily removed and replaced.

An important object of the invention is to provide a combined running and pulling tool which will grip the plug and securely hold the plug as it is being forced to its operative position within the tubing.

Another object of the invention is to provide a tool which may be operated to release the tubing plug or pack-off plug, when the plug has been properly positioned within the well tubing, to accomplish its purpose.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein described, may be made within the scope of what is claimed, without departing from the spirit of the invention.

Referring to the drawings:

Figure 1 is a longitudinal sectional view through well tubing illustrating a pack-off assembly and tool constructed in accordance with the invention, for positioning or removing the pack-off assembly, the pack-off assembly securing fingers being shown as moved to release the pack-off assembly.

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

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is a sectional view taken on line 4—4 of Figure 1.

Figure 5 is an enlarged longitudinal sectional view through the upper portion of the tool.

Figure 6 is a longitudinal sectional view through a modified form of removal tool.

Referring to the drawings in detail, the well tubing is indicated by the reference character 5 and as shown adjacent sections of the tubing are connected by means of the coupling indicated at 6, the coupling being so arranged that when the tubing sections are connected, a space will be provided between the adjacent ends of the tubing, for purposes to be hereinafter more fully described.

The pack-off assembly, includes the main or plug section 7 which is formed with a threaded extension to receive the internal threads formed at the lower end of the section 8 of the pack-off assembly, securing the section 8 to the plug. An enlargement indicated at 9 is formed on the section 8, and presents an inclined or tapered surface over which the spring fingers 10 move, spreading the spring fingers to positions so that the shoulders 11 on the spring fingers, will be exposed to engage the lower edge of the upper section of the tubing, to secure the pack-off assembly within the tubing. The spring fingers 10 pass through openings in the ring 12 which is held stationary on the pipe 13, the pipe 13 being formed with external threads to cooperate with the internal threads formed at the upper end of the section 8, connecting the pipe 13 with the section 8. The upper ends of the fingers 10 are secured to the pipe 13, by means of the bands 14 that are shown as tightly gripping the upper ends of the fingers 10.

Secured on the pipe 13, is a collar 15 that has an inwardly extended flange presenting a shoulder 16 under which the lugs 17 of the spring fingers 18 engage. These spring fingers 18 are normally urged outwardly to engage the shoulder 16. Surrounding the spring fingers 18, is a sleeve 19 that is formed with inclined surfaces 20 that are adapted to engage the inclined surfaces of the spring fingers 18 to urge the spring fingers 18 inwardly, when the sleeve 19 is pulled upwardly, thereby causing the lugs 17 to disengage the shoulder 16, releasing the upper section of the device or jar section, from the pack-off assembly, to the end that the upper section of the device may be removed, releasing the pack-off assembly.

It will of course be understood that the sleeve 19 is carried on the section 22 of the pipe jar, the section 22 carrying the striking pin 23 that strikes the upper end of the pipe 24 to loosen the spring fingers, when it is desired to remove the apparatus. It will also be understood that the section 8 is formed with a central bore communicating with the pipes 13 and 24, so that fluid may pass upwardly therethrough.

It might be stated that when a pack-off assembly has been positioned in well tubing for a short period, well conditions cause the pack-off assembly to become stuck, and it cannot be removed by a direct pull on the pack-off assembly removing apparatus. It therefore becomes necessary to break the pack-off assembly loose by a tool commonly known in oil pumping, as a jarring tool.

As shown by Fig. 1 of the drawings, the jarring tool, which includes striking pin 23, has been dropped, striking the pipe 24 which moves the

pipe 13 and ring 12 downwardly. As the ring 12 moves over the spring fingers 10, the shoulders of the fingers are moved inwardly out of contact with the sections of the tubing, and the entire pack-off assembly drops a few inches. Further action of the striking pin will tend to loosen the pack-off assembly, so that it may be pulled from the tubing by the fingers 18, which move into engagement with the shoulder 16 of the collar 15.

In the form of the invention as shown by Figure 6 of the drawings, the sleeve 19 and fingers 18 have been eliminated and the tool comprises spring fingers 25 that have inwardly extended lugs 26 at their free ends adapted to engage within the annular groove 27 formed at the upper end of the pipe section 24. The inner surfaces of the spring fingers 25 are inclined as at 28 to be engaged by the head 29 formed at one end of the hammer or releasing section 30, to the end that when the section 30 is pulled upwardly, a camming action will take place at the inclined surfaces 28 of the fingers, spreading the fingers to release the pipe 24.

It will of course be understood that the apparatus is connected with the usual line that extends over the usual pulleys that in turn are operated to raise or lower the apparatus within the well tubing.

What is claimed is:

1. A tool for removing a pack-off assembly held within well tubing by spring fingers and having a vertically movable ring engaging said fingers and adapted to move the fingers to their inactive positions, said tool embodying spring fingers adapted to connect with the pack-off assembly to lift the pack-off assembly from the well tubing when the tool is elevated, a striking pin forming a part of the tool and adapted to strike the pack-off assembly, dislodging the pack-off assembly and simultaneously move the ring member over the fingers of the pack-off assembly disengaging the fingers and well tubing.

2. A tool for removing pack-off assemblies from well tubing wherein the pack-off assemblies are secured by means of spring fingers gripping the well tubing, and including a ring adapted to move the spring fingers to disengage the well tubing, said tool comprising spring fingers adapted to grip the pack-off assembly, means for moving the fingers of the tool out of engagement with the pack-off assembly, and a striking pin carried by the tool and adapted to engage the pack-off assembly dislodging the pack-off assembly for removal by the tool.

3. A tool for removing pack-off assemblies from well tubing wherein the pack-off assembly embodies spring fingers adapted to grip the wall of the well tubing and a vertically movable ring contacting with the spring fingers for moving the spring fingers out of contact with the well tubing, said tool embodying normally expanding spring fingers adapted to grip the pack-off assembly, a vertically movable member moving over the fingers of the tool and adapted to press the fingers of the tool inwardly disengaging the fingers of the tool and pack-off assembly, and a reciprocating striking pin carried by the tool and adapted to strike the pack-off assembly, loosening the pack-off assembly within the well tubing for removal by the tool.

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