No. 764,769. PATENTED JULY 12, 1904.

L. E. ROBINSON & P. E. DAUBENSPECK.

PACKER FOR DEEP WELLS.

APPLICATION FILED JUNE 24, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

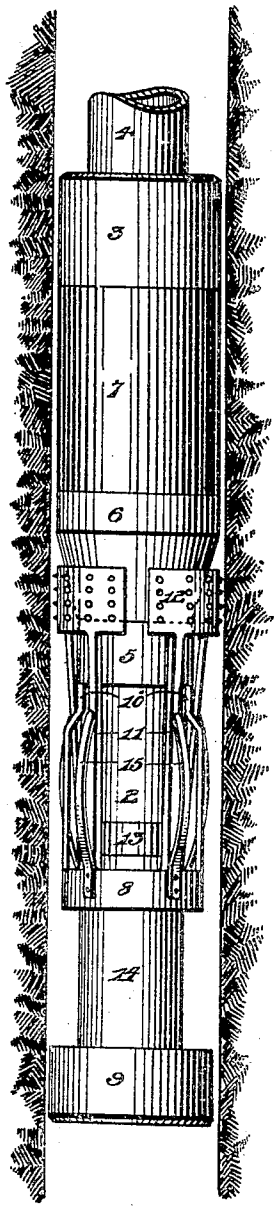
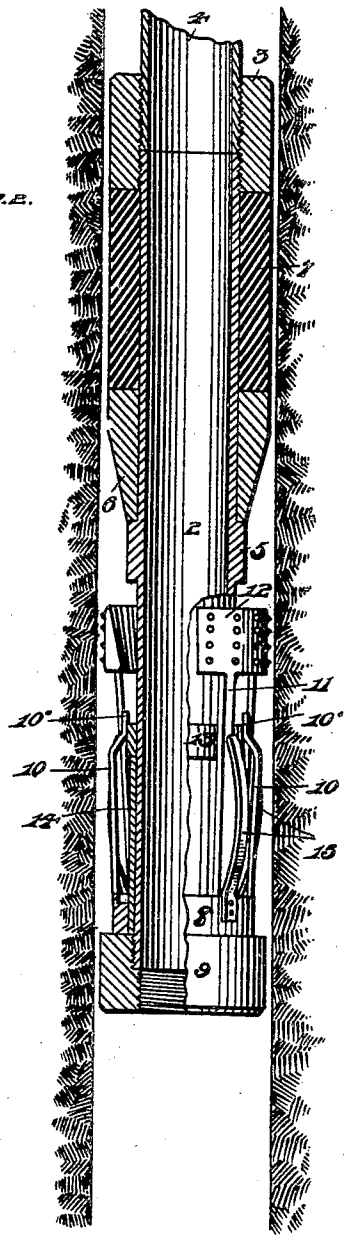


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

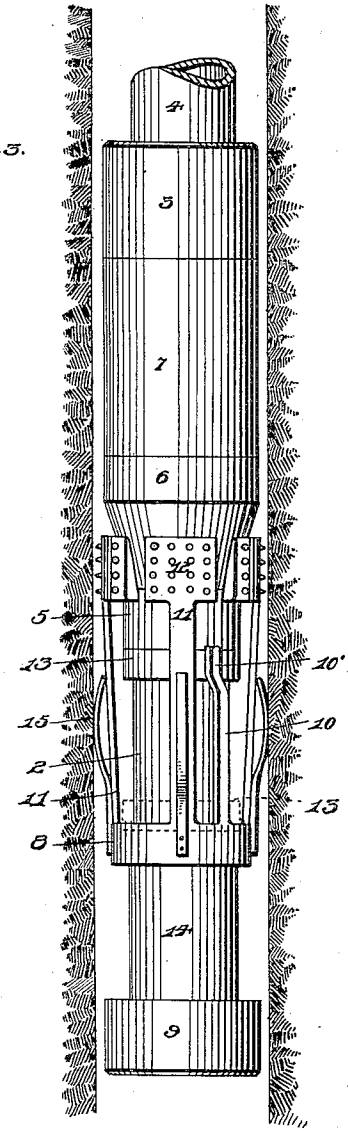


Fig. 4.

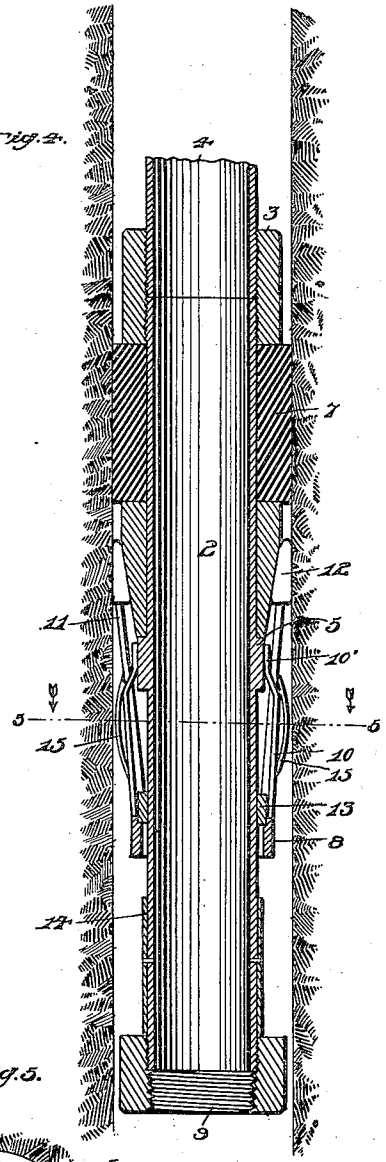
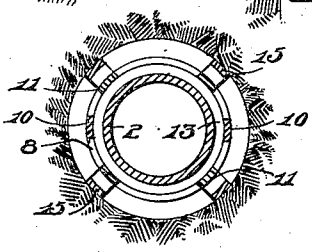


Fig. 5.



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No. 764,769. Patented July 12, 1904.

UNITED STATES PATENT OFFICE.

LAWRENCE E. ROBINSON AND PETER E. DAUBENSPECK, OF BUTLER, PENNSYLVANIA.

PACKER FOR DEEP WELLS.

SPECIFICATION forming part of Letters Patent No. 764,769, dated July 12, 1904.

Application filed June 24, 1903. Serial No. 162,892. (No model.)

To all whom it may concern:

Be it known that we, LAWRENCE E. ROBINSON and PETER E. DAUBENSPECK, citizens of the United States, residing at Butler, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Packers for Deep Wells, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of packers for oil and gas wells wherein the expansible packing material is sustained within the well-hole by suitable anchor mechanism and expanded by the weight of the casing. In all such devices provision must be made for holding the anchor mechanism retracted or out of engagement with the hole sides until the packer has been properly positioned.

The primary object of this invention is to provide effective anchor locking and releasing mechanism of simple and improved construction.

A further object is to so construct the mechanism that after the packer has been set it may be released, moved, and reset without removing the same from the well.

In the accompanying drawings, Figure 1 is a view in elevation of our improved packer, showing the position of the parts when being lowered in a well. Fig. 2 is a vertical sectional view showing the casing raised with relation to the anchor mechanism to engage the latter with the unlocking or shifting device. Fig. 3 is a view similar to Fig. 1, the casing being lowered with relation to the anchor mechanism for releasing the latter. Fig. 4 is a view similar to Fig. 2 with the packer set. Fig. 5 is a section on line 5 5 of Fig. 4.

In the present adaptation of our invention 2 designates a tube extending from end to end of the packer and provided at its upper end with coupling 3 for uniting with the lower end 4 of the casing.

5 is an annular projection on the exterior of tube 2, formed preferably integral therewith and about midway its length, and adapted to rest thereon is the exteriorly-tapered anchor-head 6, which is loose and freely movable on the tube. Confined on the tube between this head and coupling 3 is the expansible rubber packer-sleeve 7.

Freely movable on tube 2 above shoe 9 is sleeve 8, and projecting upward from this sleeve are two sets of spring-arms 10 and 11, the latter being longer than arms 10 and carrying slips 12, while the upper extremities 10′ of arms 10 are disposed inwardly, as shown, and are normally in vertical line with and adapted to engage the under side of tube projection 5. Carried by sleeve 8 are the outwardly-bowed wall-engaging springs 15. The parts thus movable on tube 2 comprise our preferred embodiment of the anchor mechanism referred to in the claims. As thus arranged the anchor mechanism includes means for engaging the tube and holding said mechanism in lowered position; but it will be understood that this and other structural details may be variously embodied without departing from the underlying principles of our invention.

13 is a ring fitting tube 2 and freely movable thereon beneath annular projection 5, the ring being adapted to rest on sleeve 14, secured to the lower portion of tube 2 and over which sleeve 8 moves freely.

In operation the packer is secured to the casing and lowered in the hole in the usual manner. Springs 15 frictionally engage the sides or wall of the hole, as shown in Figs. 3 and 5, and this engagement holds said sleeve and the spring-arms raised on tube 2 with extremities 10′ of arms 10 in engagement with projection 5, and ring 13, being freely movable within the spring-arms, rests on sleeve 14, as shown in Fig. 1. When the packer has been lowered to a point where it is to be positioned for shutting off the water, the casing is raised slightly, drawing tube 2 upward through sleeve 8 and the spring-arms, which are held stationary by the engagement of springs 15 with the sides of the hole. This operation raises ring 13 to position between spring extremities 10′, as seen in Fig. 2. The casing and packer are then lowered, bringing tube projection 5 and ring 13 in engagement, as shown in Fig. 3, and springs 10 be-

ing thus spread sufficiently for their extremities to pass upward over projection 5 the anchor mechanism is released or unlocked, and with sleeve 8 and the spring-arms supported by springs 15 further downward movement of the casing lowers anchor-head 6 between slips 12, spreading the latter into engagement with the sides of the hole and securely positioning the anchor mechanism therein. Tube 2 being freely movable through head 6, rubber 7 is compressed by the weight of the casing between said head and coupling 3 and spread or expanded so as to effectually seal the hole. After spring extremities 10′ pass from engagement with ring 13 the latter drops by gravity to its normal position on sleeve 14.

After the packer has been set it may be released and removed from the well or reset in a different location. This is accomplished by simply raising the casing and packer; but sleeve 8 and the spring-arms being held by springs 15 tube 2 moves upward therethrough, and when projection 5 passes spring extremities 10′ the latter drop thereunder. The packer may then be either raised or lowered, as desired, and either reset by the operation above described or removed from the well.

It is characteristic of our invention that the packer is both set and released by vertical movement of the well-tube through the packer-body and without turning the tube laterally or manipulating it in any other way. The operation being accomplished by simply raising and lowering the tube, it is effected in the simplest and easiest possible manner. There is no delicate and easily-disarranged latch or trip mechanism controlling the operations of setting and releasing the packer, and when it is remembered that these operations take place at a depth of hundreds of feet and are accomplished solely by the heavy and cumbersome well-tube the importance and advantages of minimizing the movement of the latter will be fully apparent.

We do not confine ourselves to the structural arrangement here shown, as the invention may be changed and variously embodied without departing from the spirit and scope thereof as defined by the appended claims.

We claim—

1. The combination of a tube, an expansible packer carried thereby, a resistance device movable with relation to the tube and adapted to afford resistance to the packer, a holding device adapted to prevent the operation of said resistance device, and a releasing member having only a vertical operative movement and thereby adapted to release said holding device without any lateral or turning movement of the parts.

2. The combination of a tube, an expansible packer carried thereby, a resistance device movable vertically on said tube and adapted when in its relative raised position to afford resistance to the packer, a holding device adapted to hold said resistance device in its relative lowered position, and a releasing member having only a vertical operative movement and thereby adapted to release said holding device without any lateral or turning movement of the parts.

3. The combination of a tube having a lateral projection, an expansible packer on the tube above the projection, anchor mechanism movable vertically with relation to the tube and adapted to engage the lateral projection and be held thereby out of operation and when released therefrom adapted to afford resistance to the packer, and a device movable below said lateral projection and constructed and arranged to be operated by the independent vertical movement of the tube and anchor mechanism for disengaging the latter from said projection.

4. The combination of a tube having a lateral projection, an expansible packer above the projection, anchor mechanism movable vertically with relation to the tube and adapted when raised to afford resistance to the packer, the anchor mechanism including inwardly-springing members adapted to engage the tube projection and hold said mechanism from being raised, and a device slidable on the tube beneath the lateral projection adapted to be engaged by said spring members and raised and held thereby in engagement with the tube projection while the spring members slip over said projection.

5. The combination of a tube having an annular projection, an expansible packer on the tube above the projection, an anchor-head at the lower end of the packer, said head adapted to rest on the annular projection and movable vertically on the tube above the projection, a collar movable vertically on the lower portion of the tube, springs carried by the collar for frictionally engaging the sides of the hole, laterally-springing slips projecting upward from the collar and operative between the sides of the hole and the anchor-head for securing the latter, upright spring-arms on the collar inwardly disposed at their upper ends to extend beneath said annular projection, and a ring slidable on the tube and adapted to be engaged by said spring-arms and raised and held thereby in engagement with the said tube projection while the spring-arms slip thereover.

In testimony whereof we affix our signatures in presence of two witnesses.

LAWRENCE E. ROBINSON.
PETER E. DAUBENSPECK.

Witnesses:
L. P. WALKER,
WILLIAM PALM.