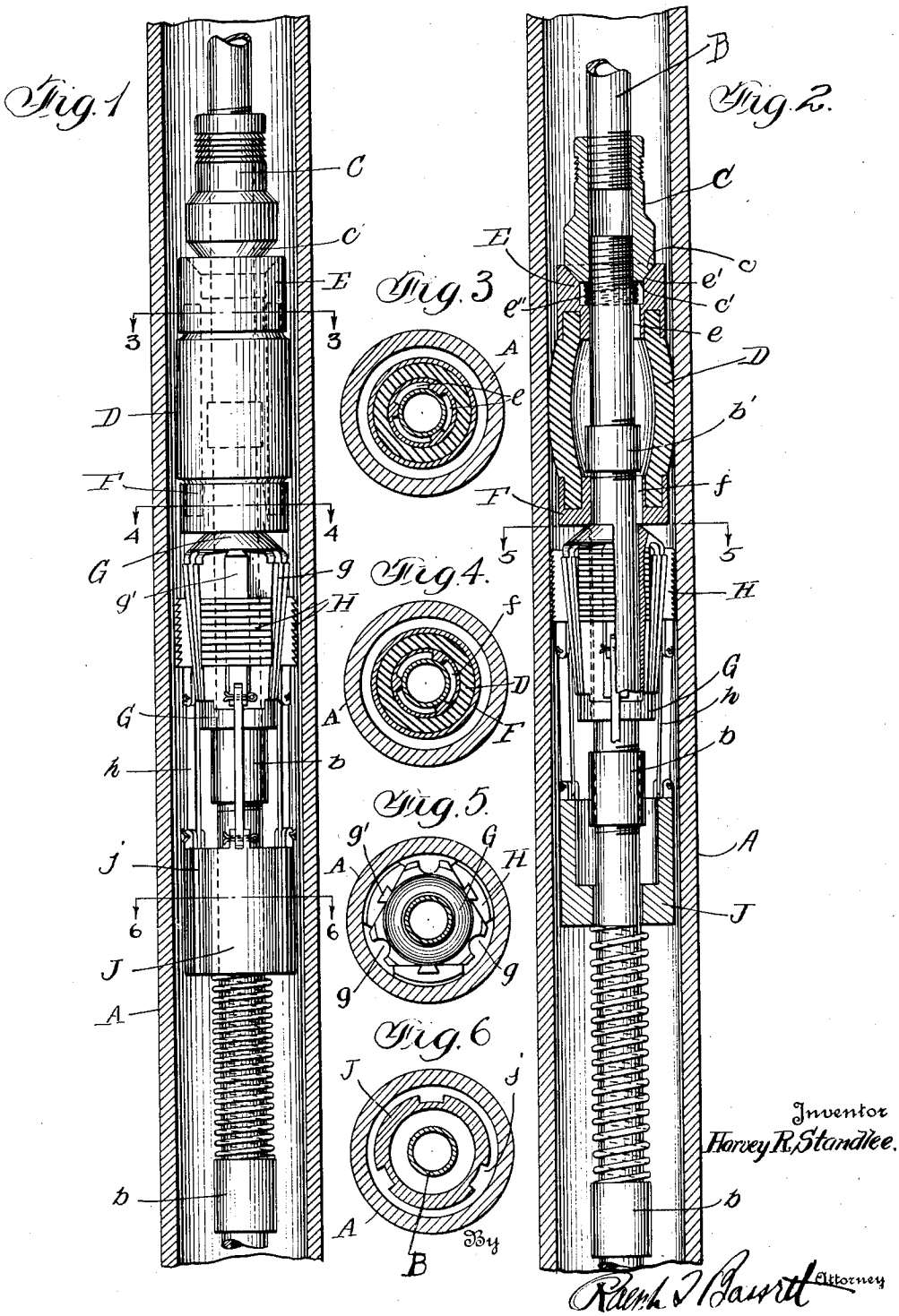
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H. R. STANDLEE

PACKER

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UNITED STATES PATENT OFFICE.

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PACKER.

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This invention relates to packers of that type including automatic gripping elements for securing same with relation to the casing.

More specifically the present device includes a hollow rubber packing element freely mounted on a tubing section and provided with suitable valve and valve seat at its upper extremity, a tapered guide block similarly mounted immediately above a tubing joint and adapted to shut the lower end of the packer element, and a series of slips on logs travelling on the guide block.

The main object of this device is to provide a construction in which the elements are so arranged as to eliminate the jarring effect usually present due to the quick gripping action and the weight of the moving parts, which results in the destruction and collapse of the tubing.

Other objects will more clearly hereinafter appear by reference to the accompanying specification, claims and drawings, in which:

Fig. 1 is a side elevation showing the arrangement in position in a section of tubing;

Fig. 2 is a similar view, parts being broken away in section;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a section on line 4—4 of Fig 2;

Fig. 5 is a section on line 5—5 of Fig. 1; and

Fig. 6 is a section on line 6—6 of Fig. 1.

Referring now to the construction involved, reference character A indicates a section of casing common in deep wells and utilized to retain the walls of the well in position and shut off such undesirable elements as water and gas.

In many instances it is essential to the successful development of a well to reduce the size of the tubing through which the oil flows and in the present illustration such reduced tubing is illustrated at B comprising a series of sections jointed as will hereinafter be described. The joints b are all of conventional type and comprise internally threaded external sleeves. The joint at b' is shown in the present instance as somewhat smaller than the lower joint element, due to its arrangement within the packer; however, this is optional and will depend upon the size of the packer in use. The upper tubing joint is shown at C and is enlarged at its lower end and formed with annular beveled face c spaced by horizontal adjacent face c' from the tubing, and which bevelled face c acts as a valve for the upper end of the packer.

The packer comprises the hollow rubber body D spaced from the tubing, and upper and lower slidable collars E and F respectively, which suitably channeled on their inner faces, receive and hold the ends of the rubber body. The upper collar E is formed with inner channels e, shown more clearly in Fig. 3, which permit the passage of the fluid. A valve seat e' is formed in the upper face of the collar E to accommodate the valve face c and the portion of the collar adjacent the valve seat and tubing is channeled to provide room for the coil spring e'' which normally tends to space the valve and valve seat. The lower collar F is channeled at f which channels correspond to the channels e of the upper collar. Attention is directed to the fact that the coupling member b' is located between the collars E and F and within the body D, thereby limiting the movement of the parts.

Immediately below the packer is the slip or dog guide block G of frusto-conical formation arranged to slide freely on the tubing and channeled externally at g to permit the passage of the fluid. As a unit, this block G is of triangular cross-section, the channels g being located at equi-distant points and defining the three faces. Intermediate each face of the block and extending vertically are the dovetailed guide ribs g' along which travel the dogs H each having complementary grooves which engage the ribs g'.

The dogs H are connected by means of flexible straps h to the sliding collar J and the collar J is channeled at j, Fig. 6, to permit the passage of the fluid. A coiled spring K is arranged between the collar J and the lower coupling member b and tends to force the dogs upwardly into engaging position. The movement of this member H provides a jarring action essential at times to release the slips or rubber should they become locked in position.

Attention is directed to the location of the tubing joints in each instance disclosed in the drawings. The upper joint member C forms a valve for the upper end of the packer, the smaller coupling b' is arranged within the packer, and the two lower joints b, b, act as stops for the guide block and the spring.

Particular attention is directed to the fact that each and every element is freely mounted on the tubing and in addition to the relative movement between the various parts and the tubing, there is a relative motion, when necessary, between each part. This assembly permits of a gradual and easy seating of the packer and eliminates the collapsing of the tubing which naturally results when a sudden seating of the packer is brought about. In addition to the desirable results caused by the cushioned seating of the parts, the wear on the elements constituting the packer is reduced to a minimum.

Obviously, the positioning of a packer and tubing with the present invention is brought about by a change of pace in the lowering motion, which results in the upward movement of the dogs and consequent gripping of the pipe. During the lowering movement the liquid is free to pass through the ports or channels in the various elements and upward through the valve. As the dogs grip, the various parts travel upwardly and the valve is closed. The closing of the valve results in the expanding of the packer from the pressure in the well and the discharge is subsequently through the tubing.

What I claim is:

1. In a well, a casing, a tubing arranged in the casing and adapted to extend to the top of the well, a valve mounted on the tubing, spaced collars slidably mounted on the tubing, one above the other, an elastic packing sleeve surrounding the tubing and having its ends connected to said collars, each collar being provided with channels to permit fluid in the well to travel past the packing sleeve and collars while the tubing is being lowered into the well, the upper collar having a valve seat adapted to be closed permanently by the valve when the tubing has been lowered a predetermined distance, a guide block slidably mounted on the tubing below said collars and adapted to bear against the lower collar to assist in bearing the weight of the tubing when the tubing has been placed in position, said block permitting at all times the passage of fluid through the channels in the lower collar, and means controlled by movement of the tubing for locking said block to the casing.

2. In a well, a casing, tubing arranged therein and adapted to extend to the top of the well, tubular packing means loosely mounted on the tubing and including an elastic tube adapted to expand radially when the ends of the tubular packing means are pressed toward each other, the tubular packing means having a passageway therethrough to permit the fluid in the well to pass by the packing means while the tubing is being lowered, a valve surrounding the tubing and arranged to close said passageway permanently after the tubing has been lowered a predetermined distance, a guide block loosely mounted on the tubing and arranged to engage one end of the packing means for compressing the latter, and means controlled by movement of the tubing for locking the guide block to said casing.

3. In a well packer including an expansible packer element formed with a valve seat at its upper end, a tube carrying said packer element, a valve for said valve seat fixed to said tubing, a slip carrying member arranged on said tube, a plurality of slips for said slip carrying member, a collar supporting said slips, a spring supporting said collar, all of said elements being movable with relation to each other and to said valve

4. In a well as claimed in claim 2, a coupling forming part of the tubing and arranged directly below the guide block for supporting the latter during the lowering of the tubing, said coupling being adapted during the raising of the tubing to engage the guide block and lift the latter for the purpose of releasing said locking means.

5. A well packer having an expansible packer member mounted on slidable collars, a sectional tube carrying the same, enlarged coupling members for said tube sections, said packer being provided with a valve seat near its upper end, a valve for said valve seat carried by one of said coupling members, a spring for normally spacing said valve and valve seat, a gripping member slidably arranged on one of said tube sections, and means for limiting the movement of the movable parts.

6. In a well as claimed in claim 2, the guide block and locking means being arranged to provide passageways to permit fluid in the casing to readily flow past the guide block and locking means during the lowering of the tubing, and after the packing means has been expanded.

7. In a device of the class described, a packer and a gripping member formed with channels for the passage of fluid, said packer being provided with a valve seat at its upper end, a sectional tubing carrying said packer and gripper, a plurality of coupling members for said tubing, one of said coupling members being formed with a valve for seating on the valve seat of said packer and the other coupling members forming stops for limiting the movable parts.

8. In a well as claimed in claim 2, the locking means consisting of spaced dogs

slidably mounted on said block, straps connected to said dogs, a ring slidably mounted on the tubing and connected to the straps, and a coiled spring surrounding the tubing, having one of its ends fixed to the latter and its other end bearing against said ring.

9. In a well as claimed in claim 2, said locking means including spaced dogs mounted on the guide block, said guide block having channels to permit the flow of fluid along the block and between said dogs.

In testimony whereof I affix my signature.

HARVEY R. STANDLEE.