Aug. 6, 1929. D. A. CANT 1,723,600

WELL PACKING DEVICE

Filed Oct. 21, 1925

Fig. 1

Fig. 2

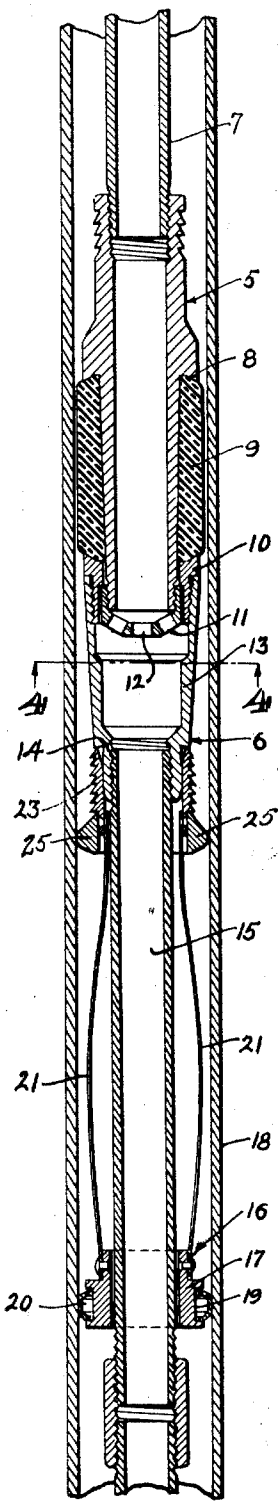
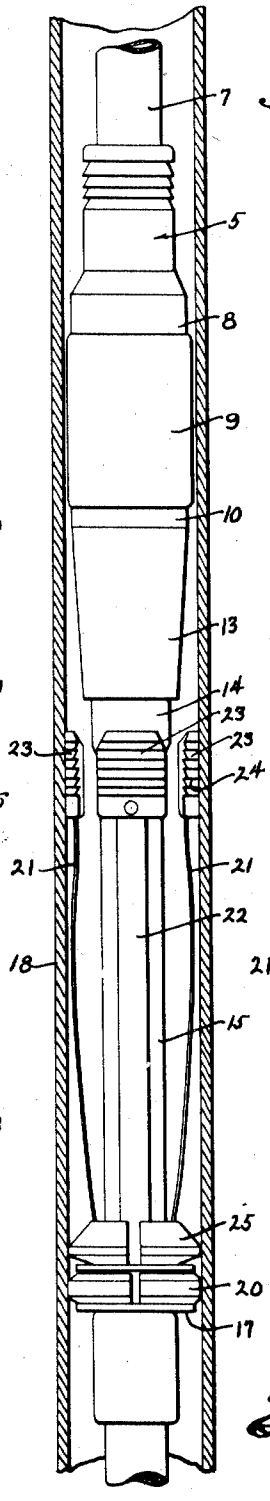


Fig. 3



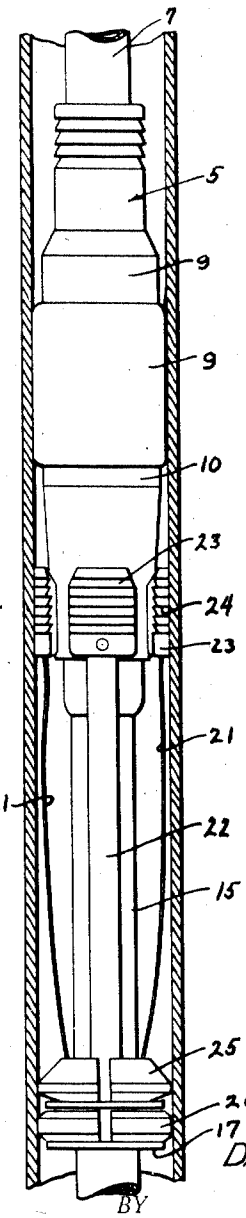
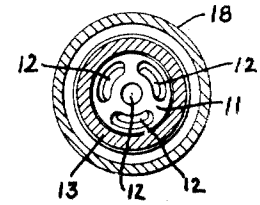


Fig. 4



INVENTOR.
DAVID A. CANT

BY

Edmund A. Thomas

ATTORNEY.

Patented Aug. 6, 1929. 1,723,600

UNITED STATES PATENT OFFICE.

DAVID A. CANT, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO REGAN FORGE & ENGINEERING COMPANY, OF SAN PEDRO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

WELL-PACKING DEVICE.

Application filed October 21, 1925. Serial No. 63,872.

This invention relates to packer mechanisms for oil wells, and is particularly adapted for sealing the space between the well tubing and casing in order to seal the well above the oil bearing sands to facilitate pumping operations in case the well does not naturally flow, and to further prevent the entrance of water or other objectionable fluids to the well during its flow.

It is an important object of the invention to provide a comparatively simple packing device which may be readily set in position at the desired point in a casing, and which may be quickly removed therefrom without the necessity of employing mechanisms or special tools to set the packer in the well or to remove the same therefrom.

Briefly the invention preferably consists of a pair of tubular members detachably secured together, the ends of the connected members being internally threaded for the reception of the threaded ends of the oil tubing sections. Mounted on the tapered mandrel of the upper member is a compressible packing sleeve adapted to engage the wall of the casing to pack off the well at any desired point above the oil sands. The exterior surface of the lower member is of conical form, and slidably mounted therebelow on the tubing is a casing slip mechanism consisting of a slidable sleeve carrying a split friction ring. Attached to this sleeve are upwardly extending spring fingers carrying on their upper ends casing slips, the said slips being held in an inoperative position by a split friction ring when the packer is lowered into position in the casing. As the packer is lowered into the oil tubing the annular flange on the lower member will engage the upper ends of the slips and thus prevent a disengagement of the split friction ring directly beneath the slips. As soon as the packer has reached the point in the tube where it is desired to "pack off", the mechanism is drawn upward a short distance. As the upper split friction ring frictionally engages the casing it will be apparent that the same will remain stationary and thus release the spring fingers carrying the slips (as shown in Fig. 2) on an upward movement of the packer body. On a further downward movement of the packer body the tapered mandrel of the lower member will force the slips into positive engagement with the tube, the weight of the tubing above the packer being then released will expand the packing sleeve into fluid tight engagement with the tube.

Other objects and advantages will become apparent as the description proceeds, reference being had to the accompanying drawing forming a part thereof, in which:

Fig. 1 is a central vertical section of the packing apparatus disposed in an oil tube in an inoperative position.

Fig. 2 is an elevation of the same with the slips in a released position.

Fig. 3 is a view similar to Fig. 2, showing the packer in sealed engagement with the tube.

Fig. 4 is a cross section of the packer taken on line 4—4 of Fig. 1.

Referring to the drawing the packer preferably consists of an upper tubular member 5, and a lower tubular member 6, detachably secured in screw threaded engagement. Member 5 is interiorly threaded at its upper end for engaging the lower end of a tube section 7, and is provided therebelow with an exterior annular flange 8, the remaining portion of the member tapering downwardly to its lower exteriorly threaded end. The tapered portion of this member constitutes a mandrel for the reception of a tubular packing sleeve 9 formed of rubber or other compressible material, being held in position thereon by means of a nut 10 which is in screw threaded engagement with the upper ends of the lower member 6, the ends of the packing sleeve bearing against the bevelled edge of the nut 10 and the flange 8. In order to maintain the upper and lower members together, and at the same time permit of a sliding movement of the upper member 5, to compress the packing longitudinally, a nut 11, provided with a plurality of perforations 12 is secured to the exteriorly threaded lower end of upper member 5, the upper end of the nut bearing against an internal flange of the nut 10. The upper portion 13 of the lower member 6 is cone shaped in order to force the slips into engagement with the interior surface of the tubing when the packer is operated as will be explained in detail further on.

Directly below the tapered portion 13 of the lower member 6, is a cylindrical sleeve 14, internally threaded for the reception of the upper end of the drill tube section 15 when

the packer is mounted between the drill tube sections. Disposed on section 15 of the drill tube is a slip carrying mechanism 16, which preferably consists of a sleeve 17 of smaller diameter than the interior of the casing 18. This sleeve is provided on its exterior surface with an annular groove 19 in which is mounted a split friction ring 20. Secured to the upper portion of sleeve 17 are two pairs of spring fingers 21, 22, each pair being oppositely disposed, and secured to each of their upper ends are slip members 23 of usual form, that is to say their outer faces are provided with serrations 24 in order that they may frictionally engage the interior surface of the casing when operated and hold the lower member 6 against movement in order that the upper member 5 and its connected tube sections may compress the packing ring.

In order to hold the spring fingers carrying the slips 23 in an inoperative position, as clearly shown in Fig. 1, a split friction ring 25 similar to ring 20 is provided, this ring holding the slips 23 against the lower end of the packer body so that their upper ends are engaged by the sleeve 14 formed at the base of the tapered portion of the lower member, and out of contact with the wall of the oil tube.

When it is desired to remove the packer mechanism from the casing, all that it is necessary to do is to exert an upward pull on the tubing, the split friction rings holding the sleeve carrying the slips stationary until the mandrel portion of the packer has moved out of engagement with the slips, the lower collar 26 on the tube below the sleeve then engaging the sleeve and slips and carrying the same upwardly with the packer.

By means of the above construction it will be possible to quickly mount the packer within the well, and to remove the same therefrom, without employing extraneous apparatus or tools of any description.

What I claim is:

A well packing mechanism comprising a pair of upper and lower tubular members detachably secured together in movable relation to each other, an expansible packing sleeve surrounding the upper member, the lower member constituting a slip operating and packing sleeve compressing member, the lower member adapted to engage a lower string of oil tubing, a sleeve carrying a split friction ring loosely mounted on said tubing, a plurality of upwardly extending spring arms secured to said sleeve, each of said arms being provided on its upper end with a casing engaging slip, and a split friction ring surrounding said spring arms and normally holding the slips out of engagement with the casing, whereby when the packer has been lowered into the well casing the friction rings will engage the casing wall on an upward movement of the packer to release the slips, and on a downward movement the lower member will wedge the slips against the casing and expand the packing into fluid tight engagement therewith.

In witness that I claim the foregoing I have hereunto subscribed my name this 1st day of September, 1925.

DAVID A. CANT.