

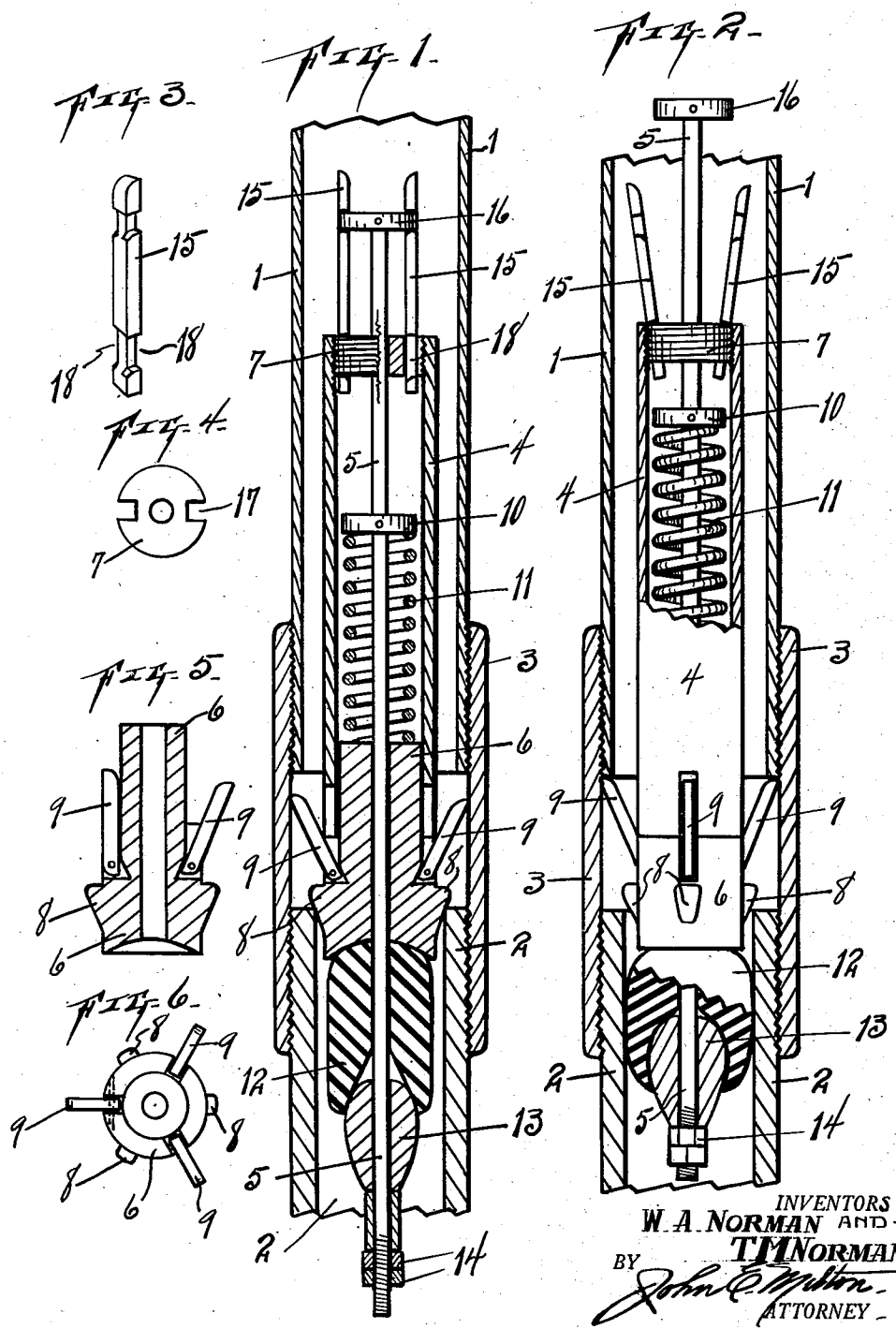
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PLUG FOR WELLS AND THE LIKE

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PLUG FOR WELLS AND THE LIKE

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Our invention relates to plugs for sealing the fluid passage of wells and the like, and more particularly to a device for sealing the working barrel and tubing of oil wells so that the same may be removed and replaced.

The object is to provide a simple inexpensive unit which may be inserted into the well tubing and permitted to gravitate to the working barrel where it will automatically anchor itself and act to seal the barrel and tubing against fluid passage.

An advantage of this invention is that it eliminates the disadvantage of having the fluid flow over the workmen and tools during removal and replacement of the barrel and its cooperating parts, thus eliminating the fire hazard and expediting the work.

Another advantage is that the device is formed so that it may gravitate to the desired position before acting to seal the tubing and barrel.

Still another advantage is that it is adapted to be forced to the desired position or elevation in the well in case its natural gravitation is retarded by obstructions in the well.

Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Fig. 1 is a vertical section of the device, showing the same set in inoperative position.

Fig. 2 is a similar view, showing the same in a sealing position in the well.

Fig. 3 is a perspective view of one of the locking members for holding the device in inoperative position.

Fig. 4 is a plan view of the plug used in pivotally supporting the locking arms.

Fig. 5 is a vertical section of that portion adapted to anchor the device in the well.

Fig. 6 is a plan view of the extension plug of the device, showing the arms thereof in operative position.

Similar characters of reference are used to indicate the same parts throughout the several views.

The invention consists of inserting a sealing unit in the delivery pipe or tubing 1 of a well and permitting the same to gravitate to the working barrel 2 where it will anchor itself and act to seal the barrel. In this instance, the tubing 1 of the well is connected to the working barrel 2 by means of a joint 3 so that there is sufficient space between the lower edge of the tubing 1 and

the top of the barrel 2 to permit the anchoring medium of the device to function.

The sealing unit consists of a cylindrical shaped member 4 through which a rod 5 is adapted to project. Plugs 6 and 7 are inserted, one in each end of the cylinder 4 and serve to slidably anchor the rod 5 in the device. The lower plug, 6, is formed so as to serve as an extension for the base of the member 4 and the larger circumference of the same is equivalent to that of the member 4. This plug 6 carries the means for checking the gravitation of the device and the means for anchoring the device so as to seal the barrel 2 of the well.

The outer periphery of the plug 6 is provided with rigid wedge shaped projections 8 which are so formed as to engage the top of the working barrel 2 and hold the sealing unit in operative relation therewith. A plurality of arms 9 are pivotally attached to the plug 6, a slight distance above the projections 8, and are adapted to normally extend outwardly and upwardly so as to engage the end of the tubing 1 and anchor the device in the well. These arms 9 are pivoted at their lower ends to the plug 6 and are so positioned in the outer periphery thereof that when folded against the plug their outer walls stand flush with the outer side walls of the device, when the same is being lowered in the tubing 1. When the sealing unit has passed to operative position in the well, the projections 8 rest upon the top of the working barrel 2 and the arms 9 project against the sides of the joint 3 and in position to engage the base of the tubing 1 of the well. Any upward movement of the device will be arrested by the contact of the arms 9 with the well tubing 1.

The plug 7 is first placed on the rod 5 and then a piston or yoke 10 is attached to the rod so that it will be interposed between the two plugs 6 and 7, when the plugs are positioned in the cylindrical member 4. A spring 11 is carried about the rod 5 and interposed between the plug 6 and the piston 10. This coil spring 11 normally stands so that its tension will cause an expansion of a resilient member 12 and seal the working barrel 2 of the well.

The resilient member 12 may consist of any suitable member that is resilient, preferably a rubber composition, and formed so as to fit over the lower end of the rod 5. The upper end of the sealer 12 is adapted to have frictional contact with the concave lower end of the plug 6 of the device. A conical shaped member 13 is passed over the end of the rod 5 and against the base

of the sealing member 12. The shape of the member 13 permits that portion that contacts with the sealer 12 to pass into the central opening thereof or between the rod 5 and the inner periphery of the member 12 for spreading the same and sealing the working barrel. The conical member 13 is held on the rod 5 by means of lock nuts 14 screwed on the end of the rod 5.

The upper plug 7 is so formed as to carry arms 15 which are adapted to engage and hold the head 16 of the rod, when the spring 11 is compressed. The plug 7 is provided with grooves or slots 17 in its side walls for pivotally retaining the lower ends of the arms 15. The arms 15 are provided with indentations 18 which fit into the slots 17 of the plug 7. The upper ends of the arms 15 are provided with similar grooves which fit into openings of the rod head 16 and lock the rod against movement by the coil spring 11. When the rod 5 is locked against the tension of the spring 11 by the arms 15, the member 13 and lock nuts 14 are positioned on the lower end of the rod 5 so that the sealing member 12 will stand in an inoperative position. Upon release of the arms 15 from the rod head 16, the tension of the spring 11 will bring the conical member 13 into the expander or sealing unit 12 and cause the same to engage the internal side walls of the barrel 2 and seal the same against flow of fluid therethrough.

The shape of the grooves of the arms 15, that contact with and hold the rod head 16, serve to release the rod 5 when the same is pushed downwardly against the spring tension. This permits the plug to be actuated either by jarring the same or striking the head 16, when the device is at the desired elevation in the well. The upper tips of the arms 15 may be tapered outwardly so that, when it becomes necessary, the sealing means may be unlocked and operated by inserting a tool in the well that will spread the arms apart and away from locking contact with the head 16 of the rod 5.

It is apparent that various changes may be made in the size, shape, and general arrangement of the plug without departing from the spirit of our invention. The object is to provide a simple form of a plug that will anchor itself at the de-

sired elevation in a well and automatically act to seal the same.

What we claim, is:

1. A plug for wells and the like consisting of an elongated cylindrical member adapted to be inserted into the delivery pipe of the well, a sealing means carried by said member, a rod vertically disposed in said cylinder and passed through said sealing means, swinging arms cooperating with said member for anchoring said plug at a predetermined elevation in said pipe, and means for resiliently moving said rod for forcing said sealing means against the inner periphery of said pipe and sealing the same against fluid passage therethrough.

2. A plug for wells and the like consisting of a cylindrical member having a rod passing therethrough, a sealing means carried by said rod, means for anchoring said cylinder at a predetermined elevation in said well, and resilient means coacting with said rod for forcing said sealing means against the side walls of said well.

3. A plug for wells and the like consisting of a member adapted to be positioned at a predetermined elevation in a well and anchored therein, a rod slidably disposed in said member, a sealing means carried around said rod and disposed between one end thereof and one end of said member, the other end of said rod being locked against the urge of a resilient means, and means for releasing said resilient means for causing said sealing means to be expanded against the side walls of said well.

4. A plug for wells and the like consisting of a member adapted to engage the working barrel of a well, gravitational means carried by said member for anchoring the same below the well tubing, resilient sealing means carried on the base of said member, means disposed on the upper end of said member for locking said sealing means in an inoperative position, a rod connecting said locking means with said sealing means, and means for manually releasing said locking means for expanding said sealing means against the side walls of said well.

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