Aug. 16, 1927. 1,639,079

W. C. CUSHING

PLUG FOR OIL WELLS

Filed March 6, 1926

Fig. 1.

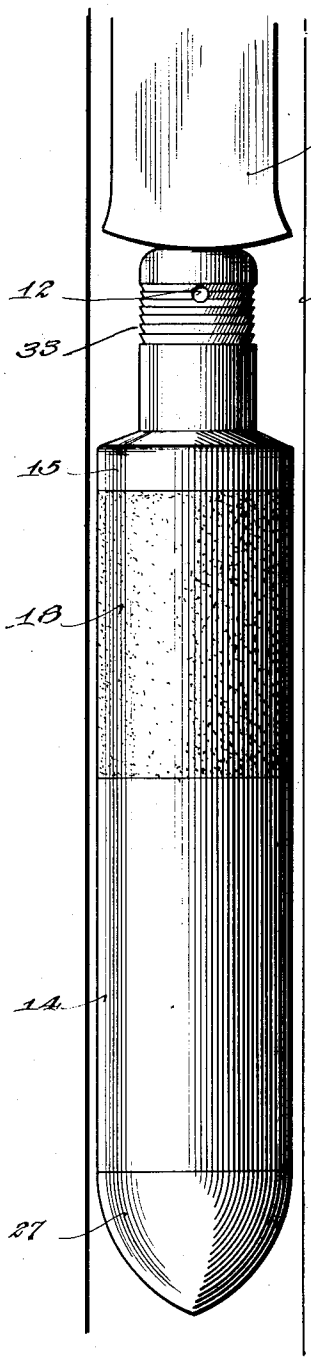


Fig. 2.

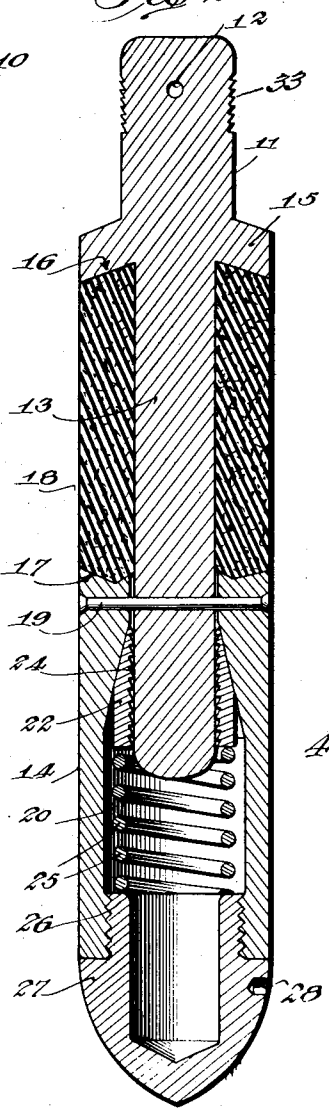


Fig. 4.

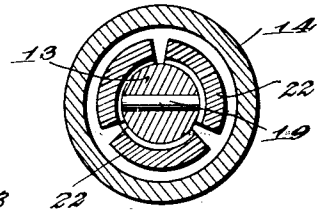
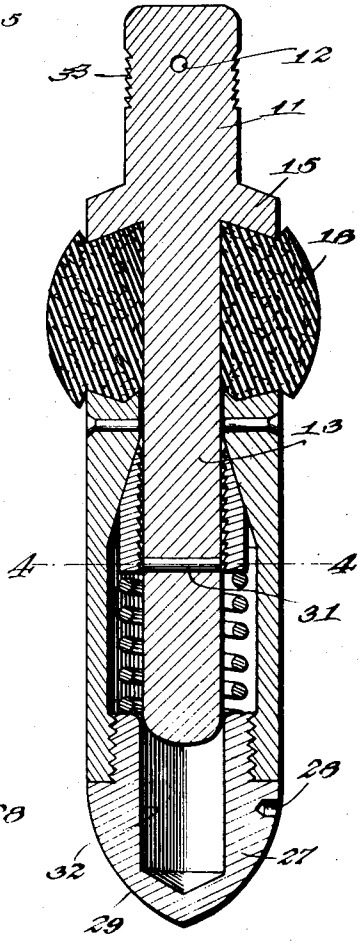


Fig. 3.



WITNESSES

Lawrence O. Hawkins

Harry E. Seidel

INVENTOR

W. C. Cushing

BY Munn & Co.

ATTORNEYS

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UNITED STATES PATENT OFFICE.

WILLIAM C. CUSHING, OF BRISTOW, OKLAHOMA.

PLUG FOR OIL WELLS.

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This invention relates to plugs for oil wells.

Wells of smaller type which are drilled in shallow sands are sunk to the lower sands and where water is frequently encountered. This water will rise to the top of the well and it is almost impossible to stop the flow from the lower sands. It is necessary, however, to stop the flow if the oil from the upper sands is to be recovered. It is usual in such cases to attempt to plug the well by means of lead wool, or lead or wood of various types. However, these materials fail to stop the flow due to the fact that the materials do not adhere sufficiently to the sides of the well and thereby be retained in place for stopping the flow of water.

It is an object of the present invention to provide a plug having a rubber element which when compressed will rigidly adhere to the wall of the well so that the rubber is supported in place and will thus prevent further flow of the water.

A further object of the invention is the provision of a tool having a sliding mandrel for compressing a rubber gasket between the mandrel and the body of the plug so that the rubber is forced outwardly and compressed rigidly against the walls of the well.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specification; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the apended claims.

In the drawings:

Figure 1 is a view in elevation of a plug shown in position in an oil well.

Figure 2 is a vertical section of the tool.

Figure 3 is a vertical section of the tool showing the rubber gasket compressed.

Figure 4 is a transverse horizontal section taken along the line 4—4 of Figure 1.

Referring more particularly to the drawings, 10 designates an oil well in which is disposed a plug constructed in accordance with the principles of my invention. The plug comprises a mandrel 11 having a perforation 12 in which is adapted to be inserted the end of a wire for lowering the plug into the well. This wire is adapted to be removed as soon as the plug is in position. The mandrel has a centrally disposed cylindrical member 13 projecting downwardly and into a hollow body 14.

The mandrel has an annular collar 15 provided with a bevelled face 16. The upper end of the body member 14 is provided with an annular groove 17 adapted to receive the lower end of a rubber gasket 18. The upper end of the gasket is sheared off to conform to the inclination of the face 16 of the collar 15 so that the upper end of the gasket will be neatly received by said collar.

A pin 19 passes through the diametrically disposed perforations in the upper end of the body member 14 and through a passage in the centrally disposed member 13 of the mandrel. The hollow bore 20 of the body member 14 is provided with a tapered upper end 21 in which is adapted to be seated a plurality of slips 22. These slips are tapered as shown at 23 to conform to the tapering of the upper end of the bore. The slips are provided with teeth 24 adapted to engage the elongated bar 13.

A spring 25 has its upper end in engagement with the lower end of the sleeves 22 while its lower end is seated upon the inner end 26 of a plug 27 which is screwed into the lower threaded end of the body or barrel 14.

The plug is provided with a recess 28 adapted to be engaged by some suitable tool for turning the plug since the plug is rounded on its exterior surface as shown at 29.

A drilling bit 30 is shown in engagement with the upper end of the mandrel 11. A plug is lowered into the well by connecting the plug to a bailer by means of a wire through the passage 12. When the plug is in position the wire is snapped free from the bailer and the bailer is removed from the well. The tool is lowered into the well and driven down upon the top of the mandrel 11 with sufficient force to compress the rubber gasket 18 as shown in Figure 3 and with sufficient force to cause the pin 19 to be sheared off within the bar 13 and carried downwardly into a recess 32 within the plug 27. The rubber gasket is compressed lengthwise and thereby forced outwardly and in rigid engagement with the walls of the well and the slips 22 hold the rod 13 against reverse or upward movement. In removing the plug a short spud is employed to cut the

rubber from the mandrel so that the mandrel may be driven deeper which will cause further expansion of the rubber and which may be cut from the plug by the spud. The mandrel may then be driven further into the body member 14 which will cause the rubber gasket to be removed entirely from the plug. After this has happened the plug may be removed by employing a fishing tool to engage the threaded portion 33 of the mandrel 11. The plug may be fished out by any standard combination socket in the ordinary manner.

What I claim is:

A plug for oil wells comprising a mandrel having a collar and a cylindrical bar projecting from the collar, the inner face of the collar being concaved, a body having a central bore adapted to receive the bar and provided with an annular seat at the inner end thereof, a pin connecting the inner end of the body member through the inner end of the bar, said pin adapted to be sheared when the bar is driven into the hollow body, a rubber gasket embracing the bar and having one end seated in engagement with the concaved face of the collar, the other end of the gasket being received within the annular seat at the inner end of the body member, the hollow portion of the body member at its inner end being provided with a conical face, slips engaging the bar and having inclined faces in engagement with the conical face of the hollow body, a plug screwed into the outer end of the body and provided with an inner shoulder, a spring engaged at one end by the shoulder, the other end of the spring being in engagement with the ends of the slips, said plug having a recess adapted to receive the free end of the bar of the mandrel when the mandrel is driven into the body member, with the bar moving into the recess in the plug whereby the rubber gasket is compressed and expanded laterally of the mandrel.

WILLIAM C. CUSHING.