

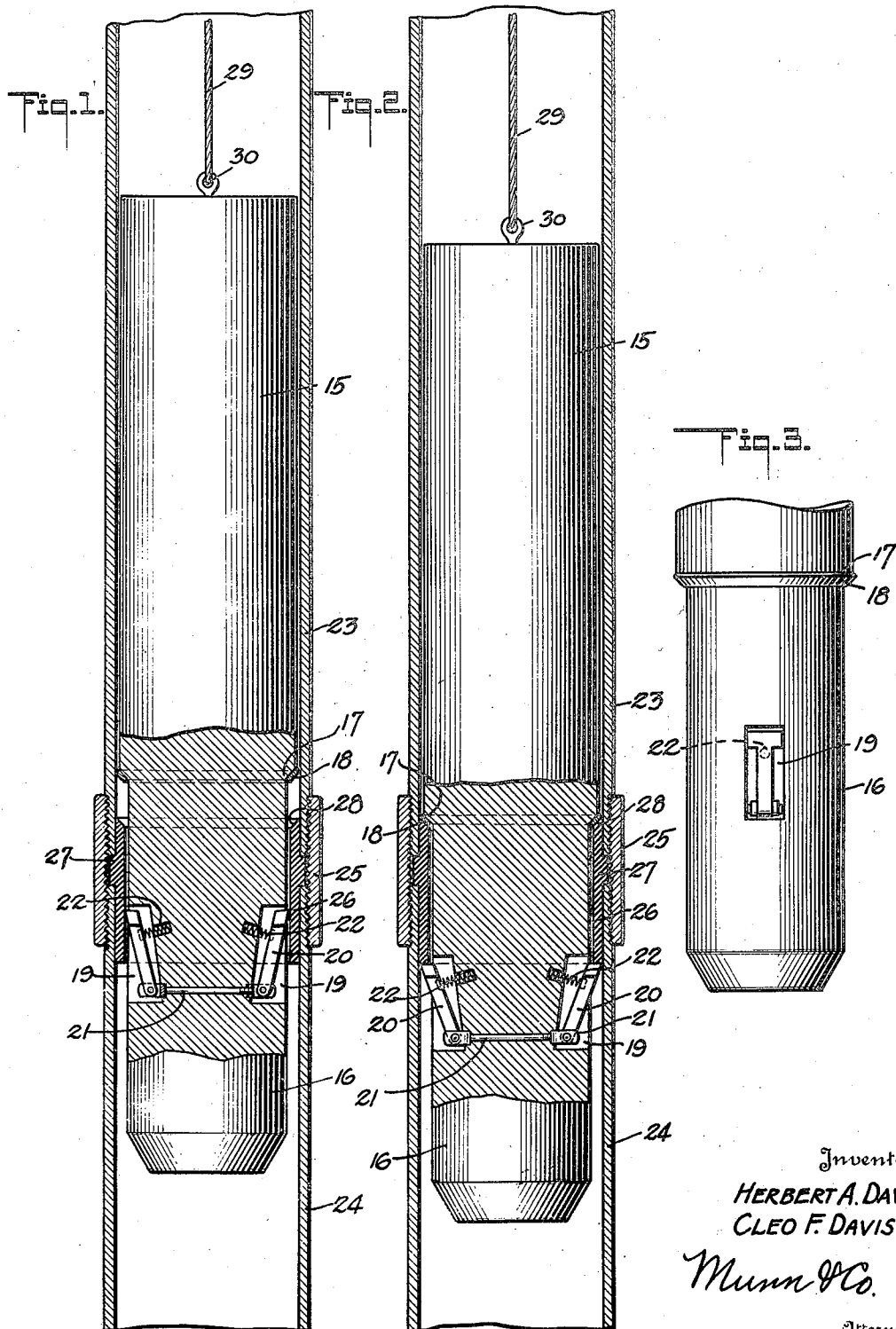
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CEMENT PLUG

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CEMENT PLUG.

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Our invention relates to cement plugs used in oil wells for closing the bottom of a well casing to be cemented after the cement has been dumped through the casing into the bottom of the hole so that when the casing is lowered into the liquid cement the plug will not allow any cement to re-enter the casing, but will force the cement up on the outside of the casing so that when it subsequently sets water cannot flow into the opening.

It is a purpose of our invention to provide a cement plug of the above described character which can be inserted into a well casing to a predetermined depth, where it seals the casing to positively prevent the passage of cement above the plug, and automatically locks itself against upward movement within the casing irrespective of the fluid pressure exerted upwardly on the plug.

We will describe only one form of cement plug embodying our invention, and will then point out the novel features thereof in claims.

In the accompanying drawings

Figure 1 is a view showing in side elevation and partly in section one form of cement plug embodying our invention in a non-sealing position within a well casing;

Figure 2 is a view similar to Figure 1, showing the plug in sealing position;

Figure 3 is a fragmentary view showing in side elevation the lower portion of the core of the plug shown in the preceding views, and taken at right angles thereto.

Referring specifically to the drawings, in which similar reference characters refer to similar parts, our invention in its present embodiment comprises a core body 15 formed of suitable material, such as wood or the like, and having a lower portion 16 of reduced diameter to provide at the junction of the two a valve 17 upon which is fitted a gasket 18. The reduced portion 16 of the bore body is provided with recesses or pockets 19 at diametrically opposed points in which are mounted slips or dogs 20. A clevis 21 extends between the pockets and provides a pivotal mounting for the slips 20 so that under the action of springs 22 the dogs are urged outwardly to the position shown in Figure 2. The pockets 19 are such as to allow the dogs 20 to move within the area defined by the reduced portion 16 or to the position shown in Figure 1.

In the present instance we have shown two well casing sections 23 and 24 connected by a conventional collar 25 threadedly engaging the confronting ends of the sections and disposed exteriorly thereof. The plug includes a seat element for the valve 17, which comprises an annular member 26 having an exterior annular projection 27 which, in applied position within the well casing, is interposed between the confronting ends of the sections 23 and 24 and thus sustained in fixed position within the casing. The upper edge of the member 26 is beveled, as indicated at 28, so as to conform to the shape of the valve 17 and thus provide a tight seat for the latter when used in conjunction with the compressible gasket 18.

In practice, the bore body 15 and 16 is forced down into the well casing, and through the medium of a cable 29 connected to an eye 30 secured to the upper end of the portion 15, the depth to which the plug is lowered can be definitely determined. As the core body moves downwardly within the casing, the slips or dogs 20 are pressed inwardly against the action of the springs 22 by virtue of the fact that they contact with the walls of the well casing. It will thus be seen that they do not interfere with the lowering of the plug within the casing nor the extension of the portion 16 through the seat members 26. When the extension 16 has been projected through the seat member 26 as shown in Figure 2, the valve 17 reposes upon the seat 28, with the gasket 18 interposed between the two to provide a fluid-tight joint. As the valve engages the seat, the slips or dogs 20 having moved free of the lower end of the seat member 26, now respond to the action of the springs 22 and move outwardly to points beneath the lower edge of the seat member, thereby locking the valve upon the seat and preventing movement of the body upwardly within the casing.

From the foregoing operation it will be manifest that the cement plug can be lowered into a well casing and automatically locked in sealing position so as to prevent the passage of liquid upwardly past the plug, or displacement of the plug vertically irrespective of the liquid pressure beneath the plug. In this manner the cement plug functions to prevent the liquid cement from re-

entering the casing when the latter is lowered so that the cement is properly forced up on the outside of the casing.

Although we have herein shown and described only one form of cement plug embodying our invention, it is to be understood that various changes and modifications may be made herein without departing from the spirit of the invention and the spirit and scope of the appended claims.

What we claim is:

1. In combination, a well casing, a plug insertable wholly into the casing and provided with a valve, and means having a valve seat and secured at a predetermined point in the casing coacting with means on the plug to lock the plug against movement vertically within the casing when the plug has been lowered to the predetermined point within the casing to engage said valve with said seat.

2. In combination, a well casing, a plug insertable wholly into the casing, means adapted to be secured within the casing, and means on the plug coacting with the first means to provide a liquid tight seal between the plug and casing and to lock the plug to the first means.

3. A cement plug comprising a core having a valve thereon, a member adapted to be secured within a well casing and providing a seat for said valve, and means on the core automatically engageable with said member to lock the core in a position in which the valve is tightly fitted on said seat.

4. A cement plug comprising a core having a valve thereon, a member adapted to be secured within a well casing and providing a seat for said valve, and slips on the core automatically engageable with said member to lock the core in a position in which the valve is tightly fitted on said seat.

5. A cement plug having a core provided with a main portion and a reduced portion to form a valve at the junction of the two portions, a member adapted to be secured within a well casing and providing a seat for the valve and slips mounted in the reduced portion and urged outwardly to engage the member and lock the valve on the seat.

6. In combination, a well casing, a plug insertable wholly into the casing and having a valve, an annular member insertable into the confronting ends of adjacent sections of the casing and formed with a valve seat with which the valve of the plug is adapted to have fluid-tight engagement, a fixed projection on the member adapted to be en-

gaged by and clamped between the confronting ends of the casing sections when the latter are coupled together so as to secure the member in fixed position at a predetermined point in the casing, and means on the plug coacting with the member to lock the plug against movement vertically when the plug has been lowered into the casing with its valve in engagement with said seat.

7. In combination, a well casing, a plug insertable wholly into the casing and having a valve, an annular member insertable into the confronting ends of adjacent sections of the casing and formed with a valve seat with which the valve of the plug is adapted to have fluid-tight engagement, means on the member adapted to be engaged by and clamped between the confronting ends of the casing sections when the latter are coupled together so as to secure the member in fixed position at a predetermined point in the casing, and means on the plug coacting with the member to lock the plug against movement vertically when the plug has been lowered into the casing with its valve in engagement with said seat.

8. A cement plug comprising a core including a main portion and a reduced portion, a valve on the core at the junction of the main and reduced portions, a member having means thereon adapted to be gripped between the ends of casing sections for securing the member in fixed position within a casing, a valve seat on the member upon which the valve seats when the reduced portion is extended through the member, and slips mounted in the reduced portion and adapted to engage the member for locking the valve on said seat.

9. A cement plug comprising a core including a main portion and a reduced portion, a valve on the core at the junction of the main and reduced portions, an annular member having a projection on its outer surface adapted to be gripped between the ends of the casing sections for securing the member in fixed position within a casing, a valve seat on the upper edge of the member upon which said valve seats when the reduced portion is extended through the member, and spring pressed slips on the reduced portion movable to allow the passage of the reduced portion through the member, but engaging the lower edge of the member to lock the valve in tightly seated position on said seat and prevent upward movement of the core within a casing.

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