June 14, 1927. 1,632,271

H. H. BREENE

WELL SEALING DEVICE

Filed May 8, 1926

Fig. 1.

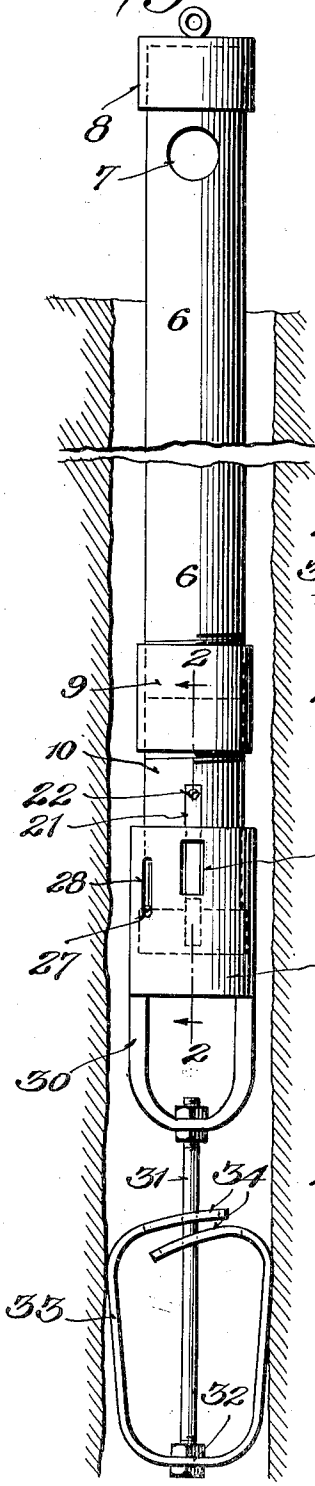


Fig. 2.

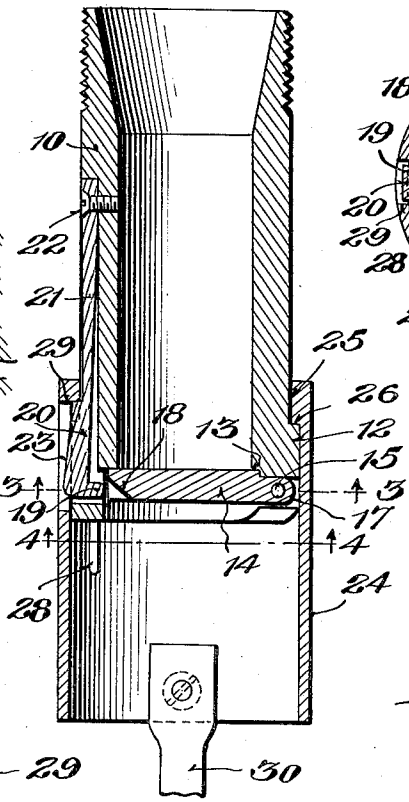


Fig. 3.

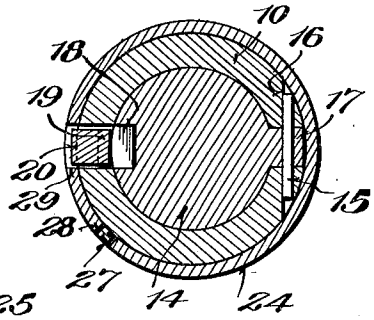


Fig. 4.

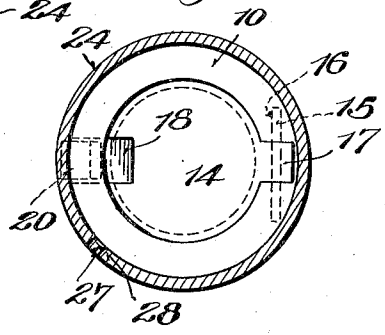
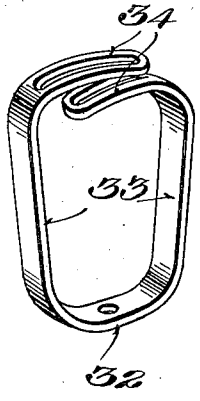


Fig. 5.



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Patented June 14, 1927. 1,632,271

UNITED STATES PATENT OFFICE.

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WELL-SEALING DEVICE.

Application filed May 8, 1926. Serial No. 107,730.

This invention relates to the sealing of deep wells, and provides an efficient and easily operable device for use in depositing mud fluid or cement in dry or abandoned oil and gas wells, for "mudding off" or "cementing off" oil and gas sands, and for "cementing in" casing in wells during the drilling process to prevent entrance of water and other extraneous matter into the well and its mixture with the oil sought to be recovered.

An object of the invention is to provide a device for those purposes that will deposit a charge of cementing or sealing material at any desired level of the well simply by subjecting the device to upward pull of the cable or other lowering instrumentality. The charge having thus been released, the device is hoisted out by continuance of the upward pull. Consequently, it is not necessary to lower the device to the bottom of the well to release the charge by contact of some part with the well bottom, but the charge is released at any point at which the lowering is discontinued and upward pull started. This not only permits the charge to be released at any desired place between the top and bottom of the well, but it also avoids the difficulties encountered in common forms of cement-containing devices that have to be lowered to the bottom of the well before the charge is released. When the well bottom contains soft mud or cement that just has been deposited, it often is difficult, and sometimes impossible, to release the charge from ordinary forms of devices.

Another object of the invention is to provide a charge-depositing device that includes a comparatively short lower portion containing a valve and releasable holding means therefor, a well-contacting member separately connected to the lower end of the lower portion and arranged to cause the valve to be released, and a charge-containing body portion of pipe form that may be screwed at its lower end onto the top of the lower portion and at its top onto ordinary well pipe or casing. In view of the fact that these parts easily may be assembled and disassembled, they may be transported with facility in ordinary passenger motor-vehicles.

The charge-containing portion of the device is provided with a lateral opening, in order that it may be loaded through its side and thus the necessity of pouring in the charge through the upper end of a long train of pipe having the device at its bottom end is avoided.

Moreover, the device provided by the invention is capable of association and use with standard parts ordinarily employed in the oil-well industry, it may be used satisfactorily on a sand-line, and its parts may be assembled and disassembled with ordinary pipe-fitting tools.

When considered with the description herein, the characteristics of the invention are apparent from the accompanying drawings, forming part hereof, wherein an embodiment of the invention is disclosed, for purposes of illustration.

Although the disclosures herein exemplify what now is considered to be a preferable embodiment of the invention, it is to be understood that it is not the intention to be limited necessarily thereto in interpretation of the claims, as modifications and adaptations within the limits of the claims can be made without departing from the nature of the invention.

Like reference-characters refer to corresponding parts in the views of the drawings, of which—

Fig. 1 is a view of the device in operative position at a place in a deep well;

Fig. 2 is a longitudinal section;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is a section on the line 4—4, Fig. 2;

Fig. 5 is a view of the latch-releasing shoe.

The upper and charge-containing part of the device is a hollow cylindrical member 6, having a lateral opening 7 near its top through which it is charged with cement or other matter it is desired to deposit in a well. The member 6 may be made of pipe or casing of a standard size, and it may be connected at its upper end by a collar 8 or in any other suitable manner to the lower end of a train of well piping or casing.

The member 6 is connected by a collar 9 or in any other suitable manner to the screw-threaded upper end of a hollow cylindrical member 10 with which there is associated means for holding and releasing the charge.

At its lower end, the member 10 is enlarged on the exterior or formed with an annular abutment 12, and its bore is enlarged to afford an annular internal abutment or seat 13. A valve or gate 14 is swingable upwardly against and downward-

ly from the seat 13 on a pin 15, which extends across a slot 16 in member 10 and through a lug 17 of the valve. The valve has diametrically opposite to its pivotal mounting a peripheral seat 18. It normally is held closed by engagement with that seat of a terminal flange 19 of an enlarged foot 20 of an outwardly-springing latch 21. The latch is set into the outer side of the member 10, and it is secured therein at its upper end by a screw 22 or other suitable means. The lower end of the latch-foot has an inclined exterior bearing surface 23.

A sleeve 24 is slidable over and in close contact with the collar 11, and it has at its upper end an internal annular integrally-formed bushing 25, which bears against the surface of the member 10 above its collar, and which affords an annular abutment 26. Longitudinal movement of the sleeve in the upward direction on the member 10 is limited, and its turning movement thereon prevented, by a stop 27 on that member, which extends into a longitudinally-disposed slot or groove 28 in the sleeve. The sleeve is prevented from being pulled off of the member by contact of the abutments 12 and 26. The sleeve is formed with a slot or internal groove 29, of a size to accommodate the foot of the latch and to permit the latter to spring outwardly from holding engagement with the valve. When the sleeve is to be kept closed, the sleeve is in its upward position, with its slot or groove 29 above the latch-foot, so that the latch is maintained in holding engagement with the valve.

The lower end of the sleeve has secured thereto a depending bail-like member 30, to which is secured a depending rod or shaft 31. The latter has secured to its lower end a foot part 32 of a substantially U-shaped metallic shoe, the side limbs 33 of which extend upwardly and at their upper portions inwardly, as shown at 34, where they are formed with slots through which the rod or shaft 31 is disposed. The shoe is wider at the top than at the bottom, and it is formed of spring material tensioned to cause its limbs to expand and bear against the wall of a well.

When the device is loaded with a charge of cement or other matter, the sleeve is in its upward position and maintains the latch in engagement with the valve, and thus the valve is kept closed. While the device is being lowered or forced down into a well, the resistance of the shoe against such movement would keep the sleeve in the valve-holding position, even if the weight of the sleeve were sufficient to overcome friction and permit it to drop on the member 10. When the device reaches the place in a well at which it is desired to deposit the charge, downward movement thereof is stopped and an upward pull is given thereto. Thereupon, the drag resistance of the shoe on the sleeve is such that the member 10 is pulled upwardly in the sleeve, the valve is released, and the charge flows out of the lower end of the device. Then the device may be withdrawn from the well by continuance of the upward pull thereon.

After withdrawal from a well, the device may be reset by returning the sleeve to its original upward position; and, during such return movement, the sleeve at the end of its groove 29 rides over the inclined surface 23 of the latch-foot and presses the latch against the valve.

A device formed as hereinbefore described does not have to be lowered to the bottom of a well to cause it to release its charge, for merely by change from downward to upward movement its charge-retaining valve is released and the charge deposited at the desired place. In view of the fact that is provided with a lateral charge-receiving opening, cement or other material may be taken directly from a mixer and loaded into the device by use of a steam jet or in any other suitable manner and it is not necessary to employ a mud-pump. The device is particularly useful in plugging dry holes since it saves the expense of procuring and transporting tubing, and tubing the well to run mud fluid into it, and expense of employment of a mud-pump.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A device for depositing sealing material in a well comprising a hollow member containing a valve, an outwardly-springing latch in said member engageable with said valve while depressed, and a sleeve longitudinally movable on said member depressing said latch while in one position and arranged to release said latch on movement to another position.

2. A device for depositing sealing material in a well comprising a hollow member containing a valve, an outwardly-springing latch in said member engageable with said valve while depressed and having an enlarged foot, and a sleeve longitudinally movable on said member and having a groove in its upper portion into which said foot is outwardly springable and said sleeve being arranged while in its upward position to engage said foot and hold said latch in engagement with said valve.

3. A device for depositing sealing material in a well comprising a hollow member having an exterior abutment near its lower end, a downwardly-opening valve in said member, an outwardly-springing latch in said member engageable with said valve while depressed, a longitudinally-movable sleeve on said member depressing said latch while in

its upward position and arranged to release said latch on downward movement, and an abutment on said sleeve contactable with said first-mentioned abutment whereby to limit downward movement of said sleeve.

4. A device for depositing sealing material in a well comprising a hollow member containing a valve, a latch arranged to hold said valve closed, a sleeve longitudinally movable on said member holding said latch against said valve while in its upward position, and a shoe expansible against the wall of a well connected with said sleeve and arranged by its drag to cause such relative movement of said member and sleeve as to release said latch from said valve.

5. A device for depositing sealing material in a well comprising a charge-retaining valve and relatively movable parts arranged to hold and release said valve, and a shoe associated with said parts comprising an expansible member arranged to contact with and drag against the wall of a well.

6. A device for depositing sealing material in a well comprising a charge-retaining valve and relatively movable parts arranged to hold and release said valve, and a shoe associated with said parts comprising an expansible substantially U-shaped metallic member arranged to contact with and drag against the wall of a well.

7. A device for depositing sealing material in a well comprising a hollow charge-containing member having a charging opening in its side a valve therebelow, a latch arranged to hold said valve closed, and a longitudinally-movable sleeve holding said latch against said valve while in one position and arranged to release said latch on movement to another position.

8. A drag-shoe for well devices comprising an expansible U-shaped metallic member having the upper portions of its limbs inturned, lapped, and slotted, and a rod secured to the foot of said member and extending through the slots of said inturned and lapped portions.

In testimony whereof I affix my signature.

HARRY H. BREENE.