Nov. 17, 1925.

1,561,768

R. C. BAKER

CEMENT BASKET

Filed May 1, 1924

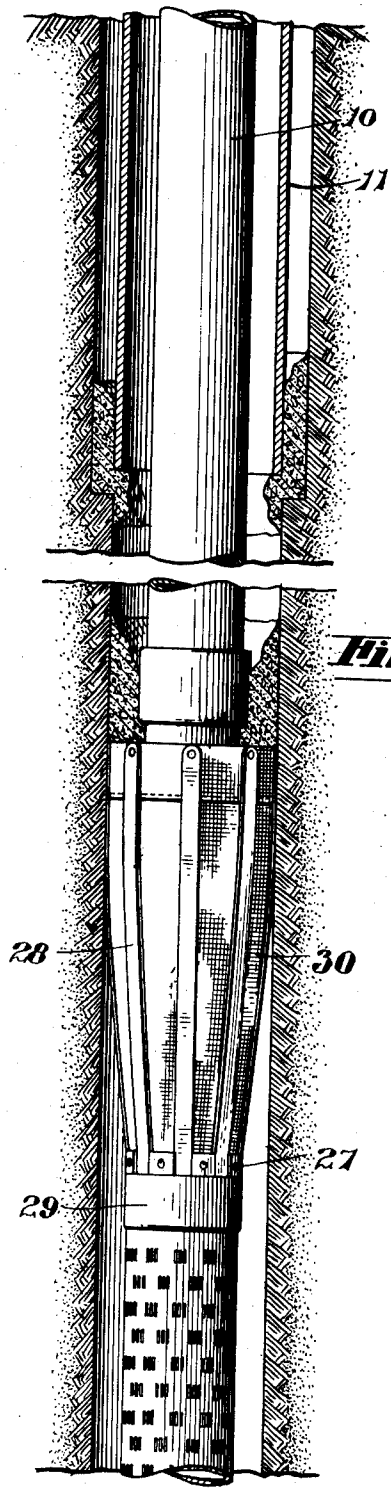


Fig. 1.

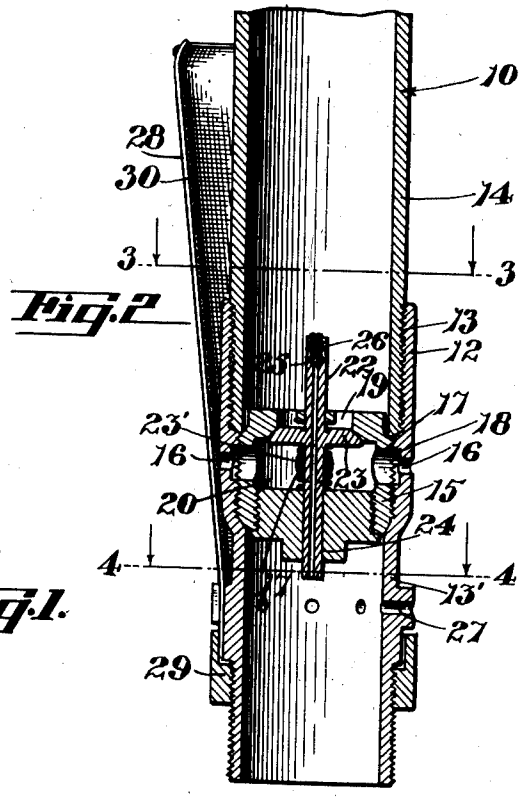


Fig. 2.

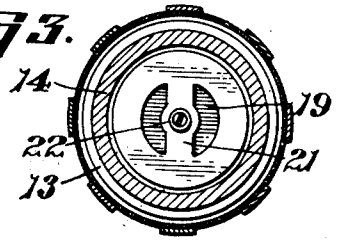


Fig. 3.

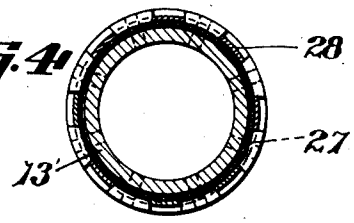


Fig. 4.

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UNITED STATES PATENT OFFICE.

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CEMENT BASKET.

Application filed May 1, 1924. Serial No. 710,302.

To all whom it may concern:

Be it known that I, REUBEN C. BAKER, citizen of the United States, residing at Coalinga, county of Fresno, and State of California, have invented new and useful Improvements in Cement Baskets, of which the following is a specification.

This invention relates to an appliance for sinking wells, such as oil, gas, or artesian wells, and particularly pertains to a cement basket for use in shutting off the wall at any point throughout the length of the casing.

It is the principal object of the present invention to provide means which may be readily used in connection with the casing of a driven well and which will assist in creating a permanent barrier within the well shaft and around the casing to insure that surface materials and liquids in the casing may not gravitate to the lower end of the casing and enter the inside of the shaft, at the same time providing means to permit gases within the shaft to escape through the shaft.

The present invention contemplates the use of a semi-collapsible basket structure which may be positioned around a string of casing at any point in its length, and which will serve as a receptacle for holding concrete or other cementitious material while it sets and forms a barrier around the casing, and furthermore embodying means for permitting the escape of gases from the shaft into the casing and then from the casing above the ground.

The invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a fragmentary view in section and elevation showing a portion of a casing string with the cement basket mounted therearound.

Fig. 2 is an enlarged view in central and vertical section through the portion of the casing string upon which the cement basket is mounted, and further showing details of the basket valve.

Fig. 3 is a view in transverse section through the basket structure as seen on the line 3—3 of Fig. 2.

Fig. 4 is a view in transverse section through the basket structure as seen on the lines 4—4 of Fig. 2.

Referring more particularly to the drawings, 10 indicates a string of casing. In some instances an outer casing wall 11 may be provided, and in that event the present invention has particular advantage as it permits the string of casing 10 to be blocked off by the cement barrier at any point throughout its length irrespective of whether there is an exterior casing or not. The cement basket comprises a sleeve 12 having an upper threaded portion 13 receiving the exteriorly threaded end of the casing member 14.

A fragile valve cage 15 is exteriorly threaded and positioned within the threaded bore of the sleeve 13 and at a point beneath the end of the length of casing 14. This valve cage forms a part of a valve structure having two functions, one to permit cementitious material to be forced outwardly through openings 16 in the sleeve 13, and the other to permit gases within the well shaft or within the casing portion beneath the valve structure to be vented. The valve cage is formed with openings 17 in its side walls in register with an annular recess 18 formed in the threaded face of the sleeve 13. The openings 16 are formed through the portion of the sleeve in which the annular recess occurs.

The top of the valve structure is formed with openings 19 through which cementitious material may be forced to the chamber 20 within the cage. A transverse member 21 separates openings 19 and provides a guide for the stem 22 of a valve 23. The valve 23 is of the tappet valve type and fits upwardly against the annular valve seat of openings 19. The valve is held in its closed position by a spring 23.

The stem 22 extends outwardly through a bore 24 of the cage which serves as a guide for the stem. Attention is directed to the fact that the stem has a longitudinally extending perforation. This will permit gases to pass through the stem when the valve is closed and when they are of sufficient pressure to lift a ball valve 25 held on its seat at the top of the frame by a spring 26. This gas may pass in through a lower extension 13′ of the sleeve 13 by way of openings 27 formed in the wall of the sleeve as indicated more clearly in Fig. 2 of the drawings. This lower extension is also exteriorly threaded to receive a coupling joint of the casing string.

In order to form a permanent barrier within the well shaft and around the casing string at the point occupied by the structure previously described, the lower sleeve extension is fitted with a plurality of longitudinally extending yieldable arms 28. These arms are arranged in equal spaced relation to each other around the sleeve 12 and flare outwardly as they extend upwardly. The lower ends are secured within a collar 29 threaded onto the lower extension 13′ of the sleeve 13. The arms carry an inverted frusto-conical bag 30. This bag is preferably made of canvas and extends completely around the string of casing.

By reference to Fig. 1, it will be seen that the outwardly flaring arms 28 will yieldably support the canvas bag so that the back will substantially fill the space between the casing and the wall of the well shaft. This bag acts as a receptacle for cementitious material pumped downwardly through the string of casing and outwardly into the canvas basket through the openings 16 and 17.

In operation of the present invention the cement basket structure may be interposed between the ends of any two lengths of casing throughout a string of casing, and with the idea in view of forming a barrier around the casing and between it and the well shaft wall at a predetermined point. The string of casing is lowered into the shaft at which time the outwardly flaring spring blades 28 will bear against the wall of the casing shaft. When the string of casing has reached the desired depth, cementitious material may be forced down the casings and will act to open the valve 23 against the expansion of spring 23′. This will permit the cementitious material to pass in the chamber 20 and thereafter be forced outwardly through the openings 16 and 17 in the lower portions of the canvas bag 30. This bag will gradually fill and will eventually tend to overflow at its upper end as shown in Fig. 1 of the drawing. The delivery of cementitious material may then be discontinued and the material held by the canvas bag may then be permitted to set. When this has been done a permanent and complete barrier will be formed between the casing and the wall of the shaft preventing surface materials or undesired liquids from working into the bottom of the shaft and passing upwardly with the gases and liquids which it is desired to draw over the string of casing.

Any casing head gas or fluid under excessive pressure may be vented through the central passageway in the valve stem 22 and when the pressure has become sufficient to lift the valve ball 25.

After the cementitious material has hardened, the valve cage 15 may be demolished by dropping a weight down the casing string so that the casing will be clear to permit the upward flow of fluids therein.

While I have shown the preferred form of my invention as now known to me, I wish it understood that various changes may be made in its construction without departing from the spirit of the invention as defined in the appended claims.

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

1. In combination with a well casing disposed in a shaft, of means for creating a surrounding barrier between the well casing and the shaft at a desired point, comprising a valve structure disposed at a point along the length of the shaft, said valve structure having ports communicating with the exterior of the casing, and a check valve acting to permit the cementitious material to be forced outwardly from the casing through the ports, and a supporting structure disposed around the casing at a point below the ports whereby the cementitious material may be caused to accumulate in the space between the casing and the wall of the shaft to form a permanent barrier within the shaft surrrounding the casing.

2. In combination with a string of casing disposed within a well shaft, means for creating a surrounding barrier between the casing and the shaft comprising a valve structure adapted to be interposed between lengths of casing, said structure being formed with side ports for permitting cementitious material to be forced from within the casing to the space within the shaft surrounding the casing and including valve means for preventing the backflow of the cementitious material into the casing, and means whereby fluids under pressure within the portion of the casing below the valve may escape through the valve to the upper casing.

3. In combination with a string of casing disposed within a well shaft, means for creating a surrounding barrier between the casing and the shaft, comprising a valve structure adapted to be interposed between lengths of casing, said material to be forced from within the casing to the space within the shaft surrounding the casing and including valve means for preventing the backflow of the cementitious material into the casing, and means circumscribing the casing for receiving the cementitious material forced outwardly through the ports and holding it while it sets around the casing.

4. In combination with a string of casing disposed within a well shaft, means for creating a surrounding barrier between the casing and the shaft, comprising a valve structure adapted to be interposed between lengths of casing, said structure being

formed with side ports for permitting cementitious material to be forced from within the casing to the space within the shaft surrounding the casing and including valve means for preventing the backflow of the cementitious material into the casing, and means disposed around the casing for forming a dam between the casing wall and the wall of the shaft at a point below the valve ports to support the cementitious material while it sets and forms a permanent barrier.

5. In combination with a string of casing disposed within a well shaft, means for creating a surrounding barrier between the casing and the shaft comprising a valve structure adapted to be interposed between lengths of casing, said structure being formed with side ports for permitting cementitious material to be forced from within the casing to the space within the shaft surrounding the casing and including valve means for preventing the backflow of the cementitious material into the casing, and means whereby fluids under pressure within the portion of the casing below the valve may escape through the valve to the upper casing, and means disposed around the casing for forming a dam between the casing wall and the wall of the shaft at a point below the valve ports to support the cementitious material while it sets and forms a permanent barrier.

6. In combination with a string of casing disposed within a well shaft, means for creating a surrounding barrier between the casing and the shaft, comprising a valve structure adapted to be interposed between lengths of casing, said structure being formed with side ports for permitting cementitious material to be forced from within the casing to the space within the shaft surrounding the casing and including valve means for preventing the backflow of the cementitious material into the casing, and yieldable means disposed around the casing for forming a dam between the casing wall and the wall of the shaft at a point below the valve ports to support the cementitious material while it sets and forms a permanent barrier.

7. In combination with a string of casing disposed within a well shaft, means for creating a surrounding barrier between the casing and the shaft, comprising a fragile valve structure adapted to be interposed between lengths of casing, said structure being formed with side ports for permitting cementitious material to be forced from within the casing to the space within the shaft surrounding the casing and including valve means for preventing the backflow of the cementitious material into the casing, and yieldable means disposed around the casing for forming a dam between the casing wall and the wall of the shaft at a point below the valve ports to support the cementitious material while it sets and forms a permanent barrier.

8. In combination with a string of casing having ports, a valve cage having a closed lower end, said cage having side ports communicating with the ports in the casing, the upper end of said cage being formed with a passageway, a spring pressed valve normally closing said passageway, said valve being adapted to be opened by cementitious material forced down the casing under pressure, said cementitious material passing through said passageway and said ports to form a barrier around said casing, a stem on said valve disposed longitudinally of the casing and projecting through the closed end of the cage, a passageway formed through said stem and valve, and a check valve in said passageway whereby fluids under pressure in the casing below the valve cage may escape through said passageway to the portion of the casing above the valve cage.

9. In combination with a string of casing disposed within a well shaft, an inverted frusto-conical receptacle circumbscribing the well casing and secured around its lower end to the well casing and adapted to receive cementitious material to form a barrier between the casing and the wall of the shaft, said receptacle comprising a plurality of longitudinally extending flexible arms secured at their lower ends to the well casing and flaring outwardly as they extend upwardly so as to engage the wall of the well shaft, and a lining carried by said arms to form a receptacle for receiving cementitious material.

REUBEN C. BAKER.