

March 18, 1952

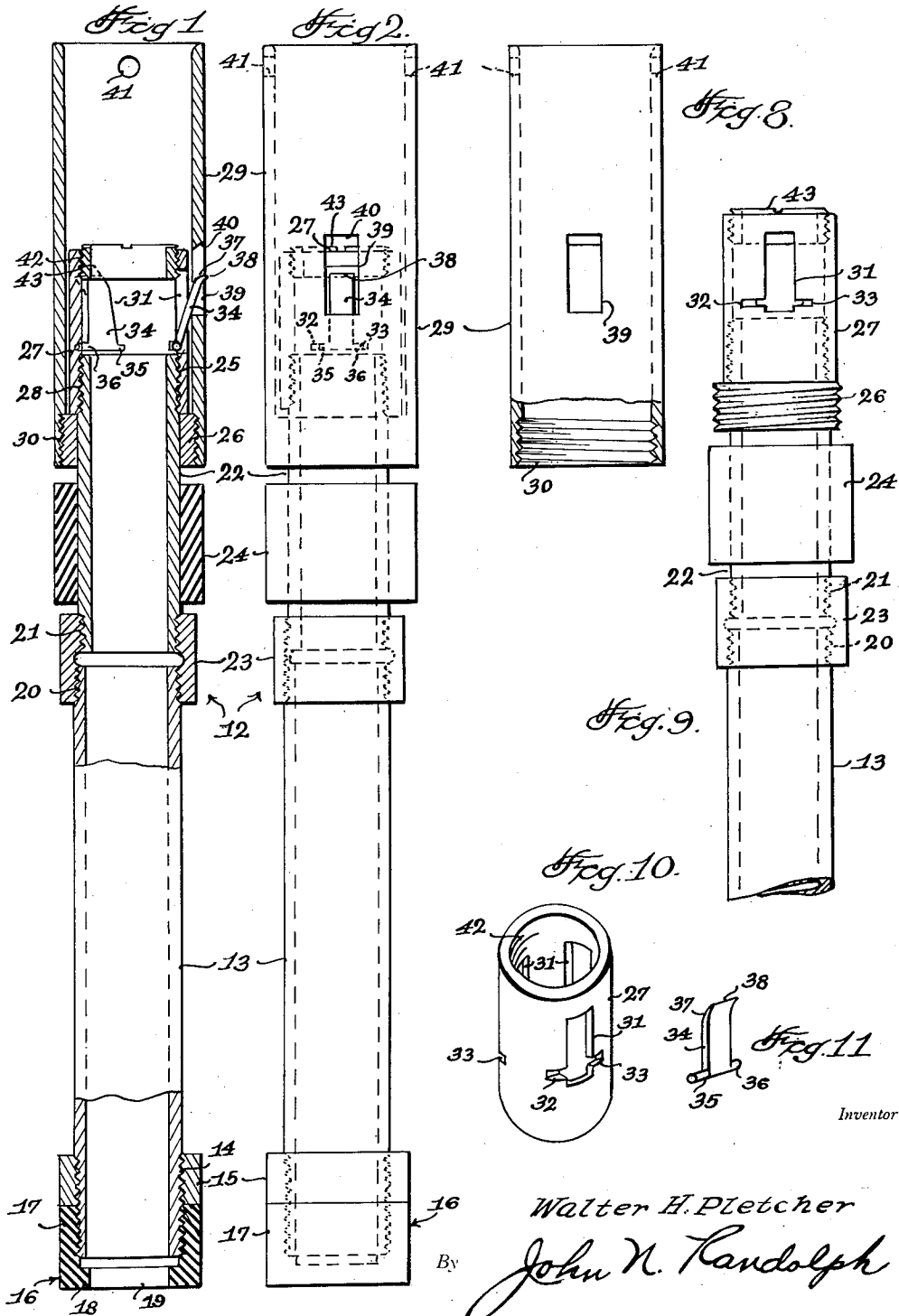
W. H. PLETCHER

2,589,430

APPARATUS FOR SEALING OFF WELLS BEING DRILLED

Filed July 21, 1950

2 SHEETS—SHEET 1



March 18, 1952

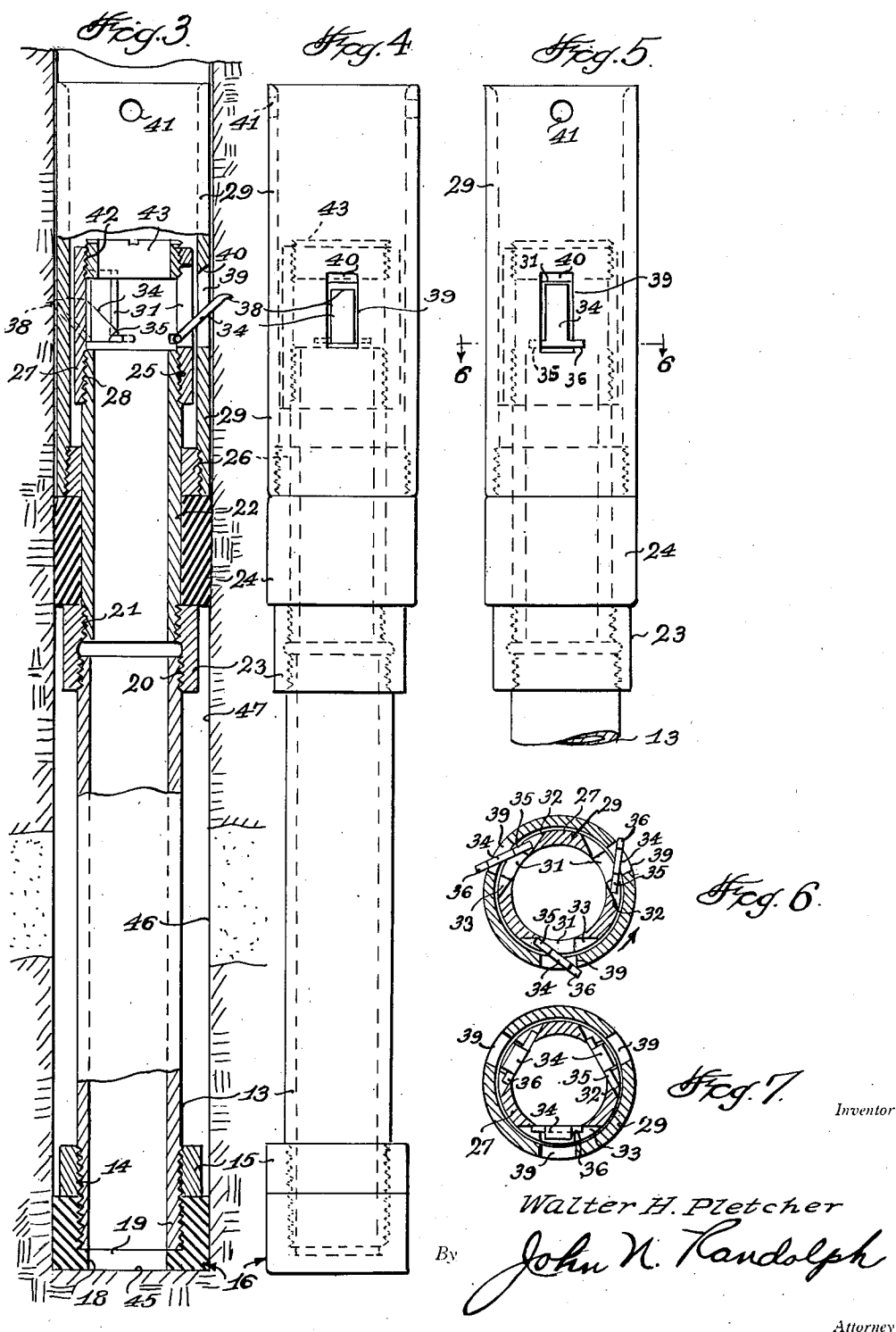
W. H. PLETCHER

2,589,430

APPARATUS FOR SEALING OFF WELLS BEING DRILLED

Filed July 21, 1950

2 SHEETS—SHEET 2



UNITED STATES PATENT OFFICE

2,589,430

APPARATUS FOR SEALING OFF WELLS
BEING DRILLED

Walter H. Fletcher, Philo, Ohio

Application July 21, 1950, Serial No. 175,198

8 Claims. (Cl. 166—12)

1

This invention relates to a device for use primarily in the drilling of oil and gas wells for sealing off the water in each stratum of water sand as the drilling of the well is accomplished and to provide an improved apparatus for use in lieu of the conventional casing or string of pipe below the first stratum of solid rock in a partially drilled well, and which eliminates the necessity of drilling on down through the pipe with smaller tools to the next stratum of water sand and subsequently running additional pipes of smaller diameters inside of the previously set pipe for shutting off each subsequent stratum of water sand reached during the drilling operation and which frequently requires several hundred feet of pipe before completion of the drilling operation.

It is a primary object of the present invention to provide an apparatus which will effectively function to shut off the water in a strata of water sand and which due to its novel construction will cooperate with the water pressure to effectively maintain the device in a position for sealing off the water at a strata of water sand utilizing the water pressure for maintaining the apparatus in place across the water sand stratum.

Still a further object of the invention is to provide an apparatus which may be quickly and easily released to be raised out of the well or hole after it has accomplished its intended purpose.

Still a further object of the invention is to provide a sealing device of the aforescribed character of extremely simple construction capable of being economically manufactured, which may be readily assembled and quickly and easily lowered into a well being drilled and anchored in position to seal off the water from a water sand stratum and which apparatus is capable of being assembled before application to a well or hole being drilled.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a central vertical sectional view, partly in side elevation, showing the apparatus as it will appear while being lowered into a well or hole being drilled;

Figure 2 is a side elevational view showing the parts in the same relative positions as in Figure 1;

Figure 3 is a longitudinal vertical sectional view, partly in side elevation, showing the apparatus in an anchored position in a well or hole;

Figure 4 is a side elevational view similar to

2

Figure 3 and showing the parts in their same relative positions;

Figure 5 is a fragmentary side elevational view, similar to Figure 4, illustrating one method of assembling the apparatus;

Figure 6 is a cross sectional view of the apparatus taken substantially along a plane as indicated by the line 6—6 of Figure 5;

Figure 7 is a view similar to Figure 6 illustrating certain of the parts in full assembled positions;

Figure 8 is a side elevational view of one element of the apparatus shown removed;

Figure 9 is a fragmentary side elevational view of a portion of the apparatus;

Figure 10 is a perspective view of another part of the apparatus shown removed, and

Figure 11 is a perspective view of one of the anchoring lugs.

Referring more specifically to the drawings, the apparatus for sealing off water from a strata of water sand of a well being drilled is designated generally 12 and includes a length of pipe 13 of a proper length and of a diameter to loosely fit a hole being drilled which is provided with an externally threaded lower end 14 to receive an internally threaded collar 15 which is threaded upwardly thereon to substantially above the lower end of the pipe 13. A sealing member, designated generally 16, is then applied to the lower end of the pipe 13 and includes a sleeve portion 17 which fits relatively tight around the lower externally threaded end of the pipe 13 and the upper end of which abuts against the lower end of the collar 15. The sleeve 17 is provided with an integral inwardly projecting annular flange 18 which is disposed below the lower end of the pipe 13 and which defines an opening 19 which communicates with the bore of the pipe 13.

The upper end of the pipe 13 is externally threaded as seen at 20 and is coupled to the externally threaded lower end 21 of a shorter length of pipe 22 by an internally threaded collar 23 which is threadedly connected to the adjacently disposed externally threaded pipe ends 20 and 21. The pipe 22 is preferably of the same external and internal diameter as the pipe 13. A relatively long sleeve 24 formed of an expansible material is disposed on the intermediate portion of the pipe 22, above and adjacent the collar 23 and has a bore sized to fit relatively snug around the pipe 22. The pipe 22 is provided with an externally restricted, externally threaded upper end 25 and an externally threaded ring 26 is slidably dis-

posed on the pipe 22 between its threaded upper portion 25 and the upper end of the sleeve 24.

A lug supporting member comprises a sleeve 27 having an internally threaded lower end 28 which threadedly engages the threaded portion 25 of the pipe 22 and which is disposed above the ring 26 and is of a larger external diameter than the bore of said ring to form a stop for limiting the upward sliding movement of the ring on the pipe 22, for a purpose which will hereinafter become apparent. A lug actuating member 29 comprises a sleeve which is substantially longer than the lug supporting sleeve 27 and the bore of which is of a larger diameter than the external diameter of the lug supporting sleeve 27. The actuating sleeve 29 has an internally threaded lower end 30 which threadedly engages the externally threaded ring 26 and is thereby slidably connected to the pipe 22 and retained by the lug supporting sleeve 27 and expansion sleeve 24 in a position around said sleeve 27.

As best illustrated in Figure 10, the lug supporting sleeve 27 is provided with a plurality, preferably three elongated longitudinally extending openings 31 which are equally spaced circumferentially from one another and from the ends of the sleeve 27 and the lower ends of which are disposed above and adjacent the internally threaded portion 28. The sleeve 27, adjacent the lower end of each opening 31, is provided with circumferentially extending grooves 32 and 33 which extend in opposite directions from opposite sides of each opening 31 and which grooves are disposed in circumferential alignment. Each opening 31 is adapted to accommodate an elongated anchoring lug 34 which fits relatively loosely therein and which is provided with pins or trunnions 35 and 36 which project in opposite directions from opposite side edges of its lower end and which pins or trunnions are disposed in alignment. The longer pins 35 of the three lugs 34 are adapted to be journaled in the longer grooves 32 and the shorter pins 36 are journaled in the shorter grooves 33, so that said grooves form bearings for the pins or trunnions to swingably mount the locking lugs 34 for swinging movement on the lug supporting sleeve 27 from nested positions within or partially within the openings 31, as illustrated in Figure 1, to extended, anchoring positions, as illustrated in Figure 3 and as will hereinafter be described. Each lug 34 is provided with an outwardly flared upper end portion providing a beveled inner surface 37 on its inner side at its upper, free end and an outwardly flared or projecting outer edge 38, which may be toothed or serrated, if desired, for a purpose which will hereinafter become apparent.

The lug actuating sleeve 29 is provided intermediate of its ends with three longitudinally elongated openings 39 which are circumferentially spaced relatively to one another and which are of a width slightly greater than the width of the lugs 24 to permit said lugs to swing there-through, as will hereinafter become apparent. The openings 39 are preferably beveled on their outer sides at their upper ends, as seen at 40, to provide cam surfaces for cooperation with the beveled surfaces 37 of the lugs. The lug actuating sleeve 29 adjacent its upper end is provided with oppositely disposed openings 41.

The upper end of the lug supporting sleeve 27 is preferably but not necessarily internally threaded as seen at 42 to receive an externally threaded ring member 43 which may be detachably mounted therein so as to overlie the upper

ends of the openings 31 to form a stop to positively prevent the lugs 34 from swinging inwardly through the openings 31 beyond nested, substantially upright positions within said openings; however, the apparatus will function without the annular stop member 43 as will hereinafter become apparent.

The assembly of the apparatus 12, with the exception of the lugs 34 is considered obvious. The lugs 34 may be positioned in the openings 31 and with their trunnions 35 and 36 engaging the bearing grooves 32 and 33, respectively, before the lug actuating sleeve is applied over the lug supporting sleeve 27. The lug actuating sleeve 29 may then be applied downwardly over the lug actuating sleeve 27 and with the openings 39 thereof out of registry with the openings 31 and lugs 34 and with the lugs held nested in the openings 31, the sleeve 29 may be rotated and threadedly engaged with the ring 26 while the latter is held stationary or the sleeve 29 may be held stationary and the ring 26 rotated for threading the ring into the threaded lower end 30 of the sleeve 29. Likewise, if desired, the sleeve 29 may be attached to the ring 26 before the lugs 34 are applied after which the sleeve 29 may be rotated slightly in a counterclockwise direction from its position of Figure 6 to permit the longer trunnions 35 to be inserted diagonally into the grooves 32 and with the lugs 34 then projecting diagonally outwardly through the openings 39, the sleeve 29 may be rotated counterclockwise as seen in Figure 6 to beyond its position of Figure 6 sufficiently so that the lugs 34 and their trunnions 36 may be swung inwardly through the openings 39 to position the lugs 34 in the openings 31 and the trunnions 36 in the grooves 33. The sleeve 29 may then be rotated slightly in a clockwise direction to its position of Figure 7 to complete the assembly of the apparatus 12.

Assuming that the apparatus is completely assembled, as previously described, with the device thus assembled and ready to be lowered into a well 47 being drilled, to lower the apparatus any suitable element, not shown, such as an old drill bit having a hole drilled transversely therethrough may be positioned with the hole aligning with the openings 41 and a pin may then be inserted through the aligned openings for suspending the apparatus 12 from the drill bit, or any suitable hook members may be attached to the actuating sleeve 29 by being engaged in its openings 41. The apparatus 12 is then lowered into the well 47 to the depth that it has been drilled and assuming that the bottom of the drilled well as indicated at 45 is beneath and adjacent a stratum of water sand, as indicated at 46, when the apparatus 12 has been lowered so that its sealing member 16 comes to rest upon the well bottom 45 the support of the apparatus at the ground level is released so that its weight plus the weight of a drill stem or other apparatus connected thereto, not shown, will cause the pipe 13 to slide downwardly relatively to the sealing member 16 so that the lower end of the pipe will come to rest upon and compress the flange 18 against the well bottom 45 and the collar 15 will come to rest upon the sleeve portion 17 of the sealing member 16 to expand said sealing member so that the expanded sleeve portion 17 thereof will seal the wall of the well 47 adjacent the well bottom 45 and the flange 18 will be compressed by the pipe 13 into tight sealing engagement with the well bottom 45 so that

5

the sealing member 16 will effectively seal off the lower end of the pipe 13 to prevent water from the water sand stratum 46 passing upwardly through the bore of the apparatus 12. The opening 19 is provided so that water within the well 47 will not obstruct the downward movement of the apparatus 12 to its position of Figure 3. When the sealing member 16 has come to rest upon the well bottom 45 and said apparatus is no longer supported from above, the weight of the lug actuating sleeve 29 and any suspending apparatus connected thereto by means of the openings 41 will cause the sleeve 29 to slide downwardly relatively to the remainder of the apparatus 12 carrying with it the ring 26. The weight of the parts 26 and 29 and any suspending apparatus, not shown, connected thereto, will cause the resilient sleeve 24 to be displaced downwardly against the collar 23 and then compressed between the collar 23 and ring 26 and thereby expanded into sealing engagement with the rock or other solid stratum of the well 47 above the water sand stratum 46, so that the resilient sleeve 24 will function as an upper seal, as illustrated in Figure 3, and in combination with the lower seal 16 to seal off the water sand stratum 46 above the seal 16 and below the seal 24 so as to prevent any water therefrom flowing upwardly either around or through the apparatus 12. Likewise, when the lug actuating sleeve 29 thus slides downwardly relatively to the pipe 22 and lug supporting sleeve 27, as just previously described, from its position of Figures 1 and 2 to its position of Figures 3 and 4, the openings 39 will move into substantially full registration with the openings 31 to allow the lugs 34 to swing outwardly on their journals afforded by the grooves 32 and 33 and trunnions 35 and 36 through the openings 39 and should said lugs 34 not swing outwardly of their own initiative, the upper ends 40 of the openings 39 will strike the beveled inner sides 37 of said lugs for forcibly swinging the lugs outwardly to position the edges 38, defining the free ends of the lugs, in engagement with the wall of the well 47. Accordingly, if the pressure of the water from the stratum 46 tends to force the apparatus 12 upwardly this will merely result in the free ends 38 of the lugs being more firmly imbedded in the earth stratum of the well 47 to more effectively anchor the apparatus against upward displacement by a force exerted from below the sleeve 29.

During the downward movement of the apparatus 12 the lugs 34 will ordinarily be disposed as illustrated in Figure 1 so as to extend partially into the openings 39 and thereby prevent the sleeves 27 and 29 from turning relatively to one another while the apparatus 12 is being lowered.

When it is desired to remove the apparatus 12 from the well 47, this can be readily accomplished by a hoisting means, not shown, connected to the sleeve 29 by means of the openings 41. When an upward pull is exerted on the sleeve 29 it will initially slide upwardly with the ring 26 relatively to the remainder of the apparatus 12 thereby releasing the sleeve 24 from its compressed, expanded position as seen in Figure 3 allowing it to resume its normal shape of Figures 1 and 2. As the openings 39 move upwardly relatively to the lugs 34, the bottom edges of said openings will engage the outer sides of the lugs and cam said lugs inwardly out of engagement with the earth stratum of the well 47 so that when the sleeve 29 has returned to its position of Figures 1 and 2 the lugs 34 will be retracted completely

6

into the openings 39 allowing the apparatus to be readily elevated.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. An apparatus for sealing off a well comprising an elongated tubular body structure defining a passage through the apparatus from end-to-end thereof, an expansible bottom sealing member mounted on the lower end of said body structure, an annular top sealing member disposed adjacent the upper end of said body structure, means for supporting said top sealing member secured to the body structure below and adjacent said top sealing member, a ring slidably mounted on the body structure above the top sealing member, a supporting member constituting a part of the body structure disposed above said ring forming a stop to limit upward sliding movement of the ring on the body structure, an actuating member loosely disposed around said supporting member having an upper end extending thereabove and a lower end extending therebelow and connected detachably to said ring whereby said apparatus may be suspended from above, said apparatus being adapted to be suspended by said actuating member for lowering the apparatus into a well, and said actuating member being adapted to be released for compressing the bottom sealing member between the bottom of the well and the lower end of said tubular body structure and to permit said actuating member to slide downwardly with the ring relatively to the remainder of the tubular body structure for expanding and compressing the top sealing member between said supporting means and ring for expanding the sealing member into engagement with a portion of the well wall to seal off the well between said sealing members and around the portion of the tubular body structure disposed therebetween, and a plurality of lugs mounted in said supporting member having lower ends swingably connected thereto, said supporting member having means for housing said lugs therein in a nested position, said actuating member having openings movable into registry with said lugs when the actuating member is moved downwardly relatively to the supporting member and through which said lugs are swingable outwardly of the actuating member to be anchored in the wall of the well above the top sealing member to prevent upward displacement of the apparatus.

2. An apparatus for sealing off a well comprising an elongated tubular body structure defining a passage through the apparatus from end-to-end thereof, an expansible bottom sealing member mounted on the lower end of said body structure, an annular top sealing member disposed adjacent the upper end of said body structure, means for supporting said top sealing member secured to the body structure below and adjacent said top sealing member, a ring slidably mounted on the body structure above the top sealing member, a supporting member constituting a part of the body structure disposed above said ring forming a stop to limit upward sliding movement of the ring on the body structure, an actuating member loosely disposed around said supporting member having an upper end extending thereabove and a lower end extending

7

therebelow and connected detachably to said ring whereby said apparatus may be suspended from above, said apparatus being adapted to be suspended by said actuating member for lowering the apparatus into a well, and said actuating member being adapted to be released for compressing the bottom sealing member between the bottom of the well and the lower end of said tubular body structure and to permit said actuating member to slide downwardly with the ring relatively to the remainder of the tubular body structure for expanding and compressing the top sealing member between said supporting means and ring for expanding the sealing member into engagement with a portion of the well wall to seal off the well between said sealing members and around the portion of the tubular body structure disposed therebetween, and a plurality of lugs mounted in said supporting member having lower ends swingably connected thereto, said supporting member having means for housing said lugs therein in a nested position, said actuating member having openings movable into registry with said lugs when the actuating member is moved downwardly relatively to the supporting member and through which said lugs are swingable outwardly of the actuating member to be anchored in the wall of the well above the top sealing member to prevent upward displacement of the apparatus, said supporting member having openings constituting said means for accommodating the lugs in inoperative nested positions therein, said supporting member having circumferentially extending external grooves communicating with said openings adjacent their lower ends, and said lugs having trunnions projecting in opposite directions therefrom and adjacent the lower ends of said lugs and which are journaled in said grooves.

3. An apparatus for sealing off a well comprising an elongated tubular body structure defining a passage through the apparatus from end-to-end thereof, an expansible bottom sealing member mounted on the lower end of said body structure, an annular top sealing member disposed adjacent the upper end of said body structure, means for supporting said top sealing member secured to the body structure below and adjacent said top sealing member, a ring slidably mounted on the body structure above the top sealing member, a supporting member constituting a part of the body structure disposed above said ring forming a stop to limit upward sliding movement of the ring on the body structure, an actuating member loosely disposed around said supporting member having an upper end extending thereabove and a lower end extending therebelow and connected detachably to said ring whereby said apparatus may be suspended from above, said apparatus being adapted to be suspended by said actuating member for lowering the apparatus into a well, and said actuating member being adapted to be released for compressing the bottom sealing member between the bottom of the well and the lower end of said tubular body structure and to permit said actuating member to slide downwardly with the ring relatively to the remainder of the tubular body structure for expanding and compressing the top sealing member between said supporting means and ring for expanding the sealing member into engagement with a portion of the well wall to seal off the well between said sealing members and around the portion of the tubular body structure disposed therebetween, and a

8

plurality of lugs mounted in said supporting member having lower ends swingably connected thereto, said supporting member having means for housing said lugs therein in a nested position, said actuating member having openings movable into registry with said lugs when the actuating member is moved downwardly relatively to the supporting member and through which said lugs are swingable outwardly of the actuating member to be anchored in the wall of the well above the top sealing member to prevent upward displacement of the apparatus, each of said lugs having an outwardly flared upper free end including a beveled side disposed adjacent the supporting member and forming a cam surface to be engaged by the upper end of one of the openings of the actuating member for camming the lugs outwardly of the actuating member.

4. An apparatus for sealing off a well comprising an elongated tubular body structure, an expansible bottom sealing member mounted on and projecting beneath the lower end of said body structure having a restricted opening therein disposed beneath and registering with the bore of the body structure, said body structure having an enlargement disposed above and bearing on said bottom sealing member, an annular expansible top sealing member mounted on said body structure above and spaced from the bottom sealing member, said body structure having an external enlargement disposed beneath the top sealing member and on which the top sealing member is supported, a ring slidably mounted on the body structure above the top sealing member, an annular supporting member mounted on the body structure above the ring and providing a stop to limit upward movement of the ring, a sleeve loosely disposed around said supporting member and having a lower end connected to the ring and an upper end disposed above the supporting member and adapted to be suspended from above for lowering the apparatus into a well for positioning the bottom sealing member in engagement with the well bottom, said sleeve being adapted to be released whereby the weight of the apparatus will compress the bottom sealing member against the well bottom and expand said bottom sealing member into engagement with the wall of the well adjacent the bottom, said sleeve and ring being displaceable by gravity downwardly when released for compressing and expanding the top sealing member between the last mentioned enlargement and ring into sealing engagement with the well wall for sealing off the well between said sealing members, a plurality of lugs mounted in said supporting member longitudinally thereof and pivotally connected to the supporting member at their lower ends, means receiving and nesting the lugs in inoperative positions in the supporting member, said sleeve having openings movable into alignment with the lugs when the sleeve and ring are displaced downwardly relatively to the body structure and through which said lugs are swingable outwardly to position the upper, free ends of the lugs in engagement with the well wall for anchoring the apparatus against upward displacement.

5. An apparatus as in claim 4, said lugs extending outwardly and upwardly of the supporting member and sleeve when in projected positions and having beveled free ends adapted to be imbedded in the well wall.

6. An apparatus for sealing off a well comprising an elongated tubular body structure, an

expansible bottom sealing member mounted on and projecting beneath the lower end of said body structure having a restricted opening therein disposed beneath and registering with the bore of the body structure, said body structure having an enlargement disposed above and bearing on said bottom sealing member, an annular expandible top sealing member mounted on said body structure above and spaced from the bottom sealing member, said body structure having an external enlargement disposed beneath the top sealing member and on which the top sealing member is supported, a ring slidably mounted on the body structure above the top sealing member, an annular supporting member mounted on the body structure above the ring and providing a stop to limit upward movement of the ring, a sleeve loosely disposed around said supporting member and having a lower end connected to the ring and an upper end disposed above the supporting member and adapted to be suspended from above for lowering the apparatus into a well for positioning the bottom sealing member in engagement with the well bottom, said sleeve being adapted to be released whereby the weight of the apparatus will compress the bottom sealing member against the well bottom and expand said bottom sealing member into engagement with the wall of the well adjacent the bottom, said sleeve and ring being displaceable by gravity downwardly when released for compressing and expanding the top sealing member between the last mentioned enlargement and ring into sealing engagement with the well wall for sealing off the well between said sealing members, a plurality of lugs mounted in said supporting member longitudinally thereof and pivotally connected to the supporting member at their lower ends, means receiving and nesting the lugs in inoperative positions in the supporting member, said sleeve having openings movable into alignment with the lugs when the sleeve and ring are displaced downwardly relatively to the body structure and through which said lugs are swingable outwardly to position the upper, free ends of the lugs in engagement with the well wall for anchoring the apparatus against upward displacement, each of said lugs having laterally projecting trunnions at its lower end, said supporting member having grooves for receiving and journaling said trunnions and combining therewith to provide the pivotal mounting of the lugs.

7. An apparatus for sealing off a well comprising an elongated tubular body structure, an expansible bottom sealing member mounted on and projecting beneath the lower end of said body structure having a restricted opening therein disposed beneath and registering with the bore of the body structure, said body structure having an enlargement disposed above and bearing on said bottom sealing member, an annular expandible top sealing member mounted on said body structure above and spaced from the bottom sealing member, said body structure having an external enlargement disposed beneath the top sealing member and on which the top sealing member is supported, a ring slidably mounted on the body structure above the top sealing member, an annular supporting member mounted on the body structure above the ring and providing a stop to limit upward movement of the ring, a sleeve loosely disposed around said supporting member and having a lower end connected to the ring and an upper end disposed above the supporting member and adapted to be suspended

from above for lowering the apparatus into a well for positioning the bottom sealing member in engagement with the well bottom, said sleeve being adapted to be released whereby the weight of the apparatus will compress the bottom sealing member against the well bottom and expand said bottom sealing member into engagement with the wall of the well adjacent the bottom, said sleeve and ring being displaceable by gravity downwardly when released for compressing and expanding the top sealing member between the last mentioned enlargement and ring into sealing engagement with the well wall for sealing off the well between said sealing members, a plurality of lugs mounted in said supporting member longitudinally thereof and pivotally connected to the supporting member at their lower ends, means receiving and nesting the lugs in inoperative positions in the supporting member, said sleeve having openings movable into alignment with the lugs when the sleeve and ring are displaced downwardly relatively to the body structure and through which said lugs are swingable outwardly to position the upper, free ends of the lugs in engagement with the well wall for anchoring the apparatus against upward displacement, said supporting member being provided with openings for accommodating said lugs and forming the means for nesting the lugs in the supporting member, and a lug stop detachably and adjustably mounted in said supporting member and overlying the upper ends of the openings and lugs and limiting the swinging movement of said lugs inwardly of the supporting member and toward nested, inoperative positions.

8. An apparatus for sealing off a well comprising an elongated tubular body structure, an expansible bottom sealing member mounted on and projecting beneath the lower end of said body structure having a restricted opening therein disposed beneath and registering with the bore of the body structure, said body structure having an enlargement disposed above and bearing on said bottom sealing member, an annular expandible top sealing member mounted on said body structure above and spaced from the bottom sealing member, said body structure having an external enlargement disposed beneath the top sealing member and on which the top sealing member is supported, a ring slidably mounted on the body structure above the top sealing member, an annular supporting member mounted on the body structure above the ring and providing a stop to limit upward movement of the ring, a sleeve loosely disposed around said supporting member and having a lower end connected to the ring and an upper end disposed above the supporting member and adapted to be suspended from above for lowering the apparatus into a well for positioning the bottom sealing member in engagement with the well bottom, said sleeve being adapted to be released whereby the weight of the apparatus will compress the bottom sealing member against the well bottom and expand said bottom sealing member into engagement with the wall of the well adjacent the bottom, said sleeve and ring being displaceable by gravity downwardly when released for compressing and expanding the top sealing member between the last mentioned enlargement and ring into sealing engagement with the well wall for sealing off the well between said sealing members, a plurality of lugs mounted in said supporting member longitudinally thereof and pivotally con-

11

nected to the supporting member at their lower ends, means receiving and nesting the lugs in inoperative positions in the supporting member, said sleeve having openings movable into alignment with the lugs when the sleeve and ring are displaced downwardly relatively to the body structure and through which said lugs are swingable outwardly to position the upper, free ends of the lugs in engagement with the well wall for anchoring the apparatus against upward displacement, said lugs having outwardly curved upper free ends providing beveled inner surfaces engageable by the upper ends of the openings of the sleeve for camming the lugs outwardly through said openings.

WALTER H. PLETCHER.

12

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
227,419	Dresser	May 11, 1880
887,836	Newhouse	May 19, 1908
1,371,503	Mack	Mar. 15, 1921
1,460,787	Burch	July 3, 1923
1,487,097	Gallagher	Mar. 18, 1924
1,501,957	Mack	July 22, 1924
1,641,741	Davis et al.	Sept. 6, 1927
2,050,970	Hughes	Aug. 11, 1936