

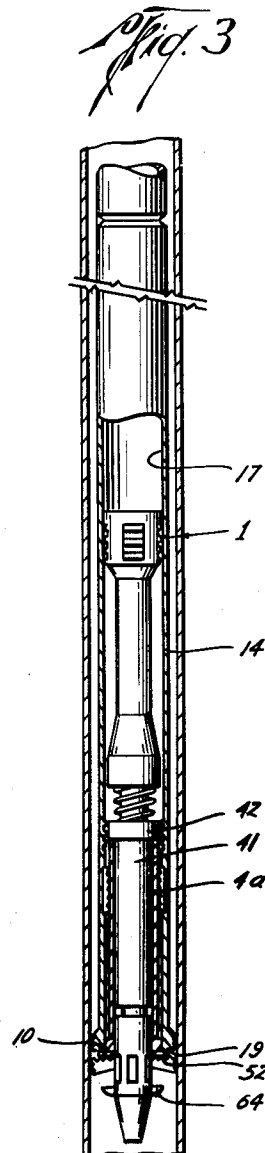
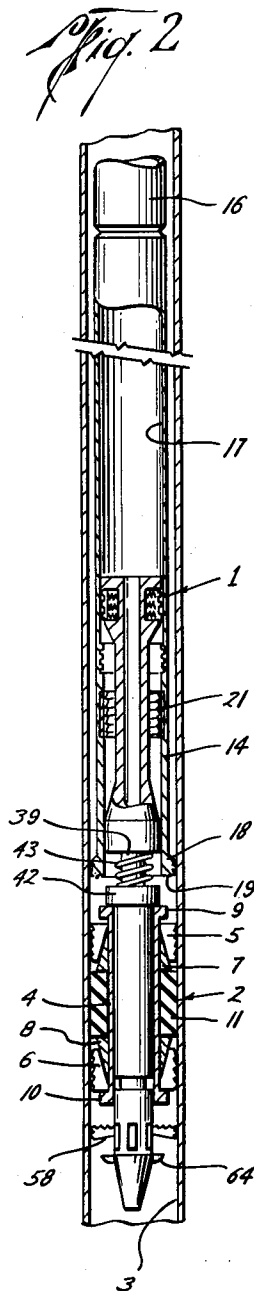
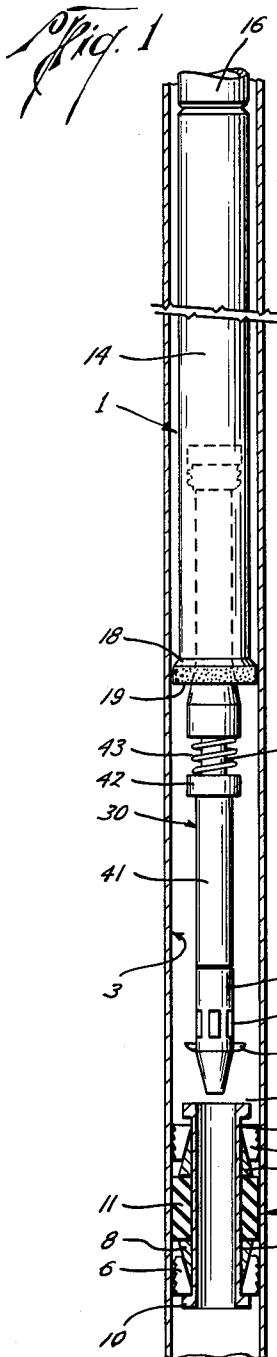
Feb. 6, 1962

T. A. KENNARD
RETRIEVING TOOL

3,019,840

Filed June 25, 1958

4 Sheets-Sheet 1



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BY *Arnold and Stidham*

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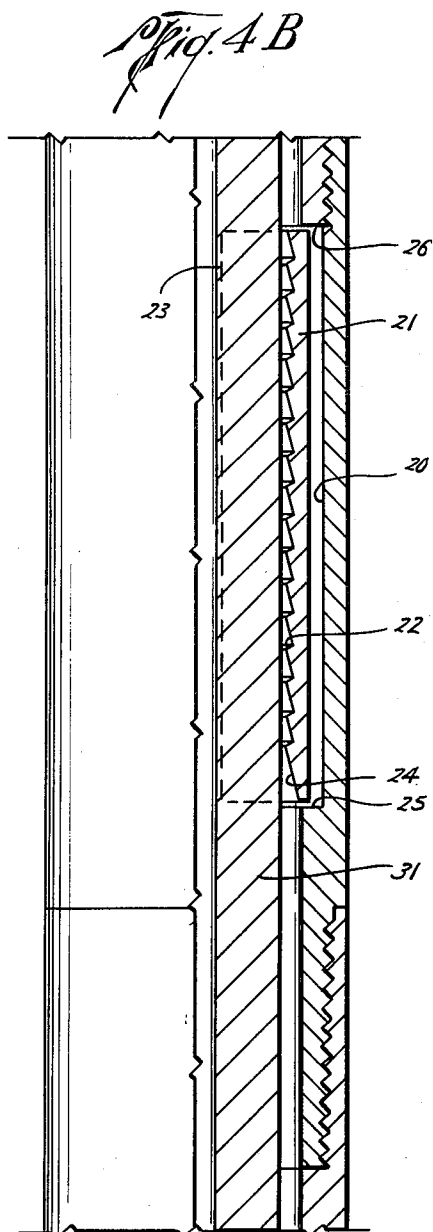
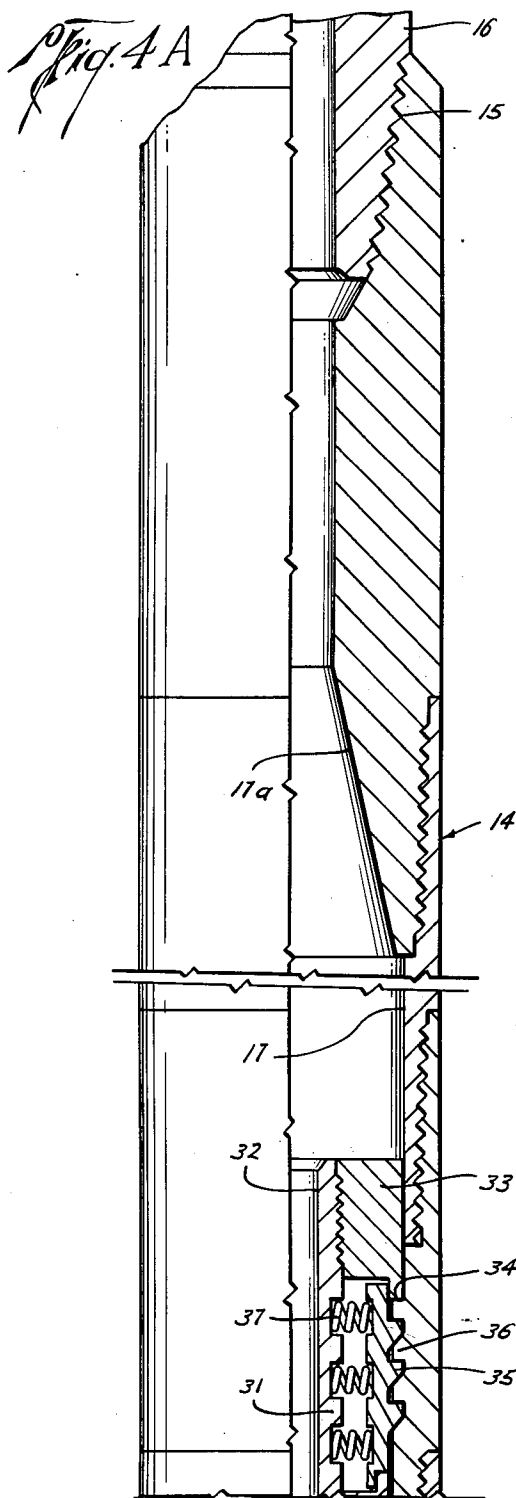
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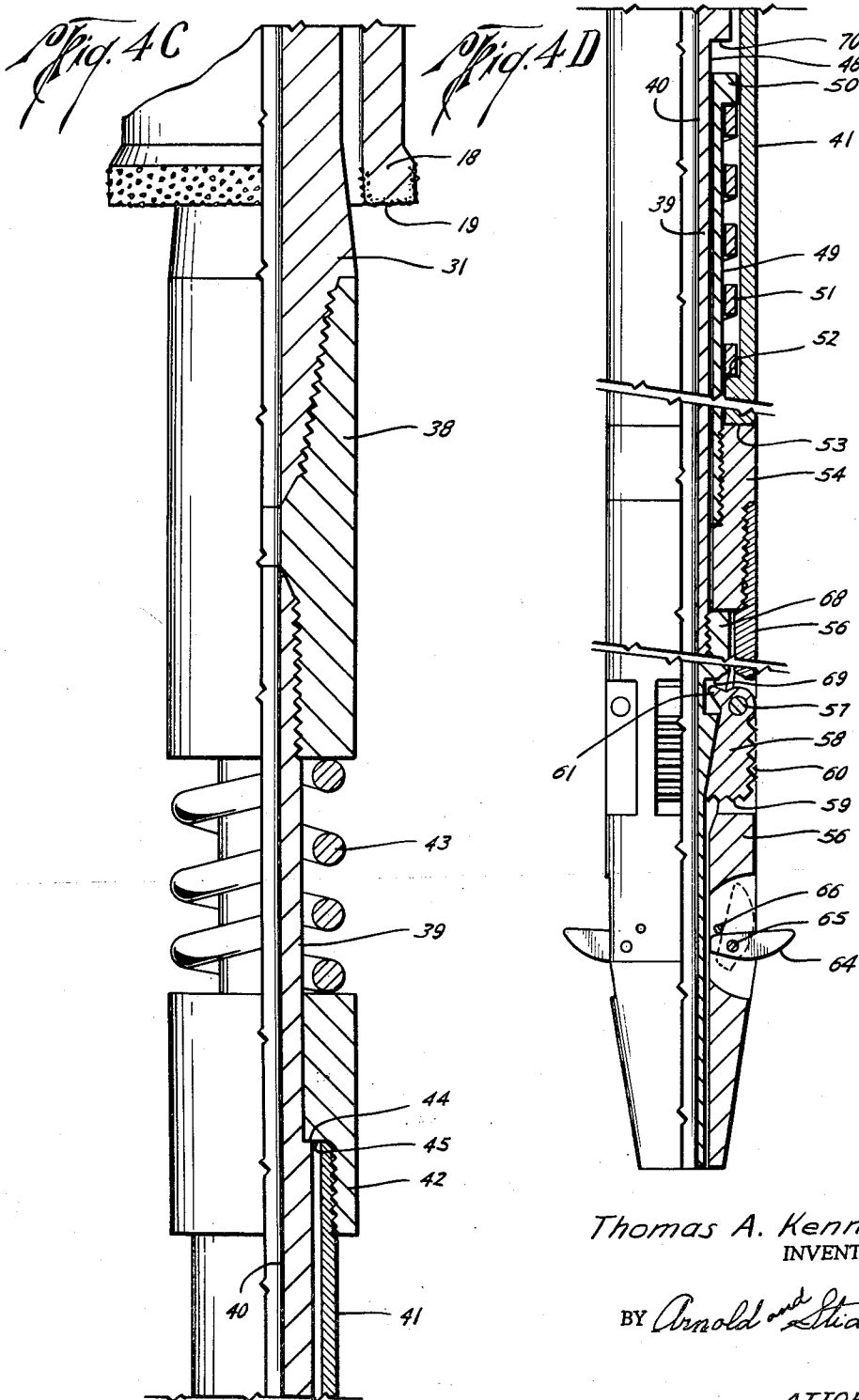
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4 Sheets-Sheet 3



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RETRIEVING TOOL

4 Sheets-Sheet 4



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3,019,840

RETRIEVING TOOL

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Filed June 25, 1958, Ser. No. 744,376

10 Claims. (Cl. 166-55)

This invention relates to a retrieving tool and, more particularly, to a tool for retrieving oil well packers and other oil tools of the type which is permanently secured within casings by positive gripping means locking it to the inner wall of the casing.

In various operations designed to condition or maintain oil wells for production, it is necessary or desirable to secure permanently at a selected depth an appropriate tool, valve or assembly. For example, it is customary to seal or pack-off a well casing against fluid flow at a given depth to isolate one or more geological zones for production. For this purpose, well packers have been designed with serrated slips or other means adapted to grip the inner wall of the casing to secure the packer at the selected depth. Permanent type packers, once set, are locked against upward or downward movement within the well casing in order to resist fluid pressures from either direction. As such, the permanent type well packer cannot be removed from the well by ordinary grapple means and have, therefore, been designated as unretrievable. When, for some reason or another, it becomes desirable to remove the packer from its set position, it has heretofore been necessary to mill away the entire packer and then to employ fishing devices to retrieve the broken pieces which fall to the bottom of the well.

Recently, other retrieving tools have been devised which include means to grip and support the packer body while a tubular cutting member mills away the slips locking the packer to the casing. However, one extremely troublesome problem is encountered when the annular milling shoe penetrates to the lower gripping slips. There, the downward forces of the cutting shoe frequently tends to loosen the slip expander wedges just enough to cause the well packer to rotate with the cutting shoe but not enough to retract it sufficiently to permit complete removal of the packer from the well. Moreover, since the slips normally tend to re-set during upward movement of the packer mandrel, it is apparent that attempts to remove the packer before complete retraction of the slips, will often meet with frustration. With the packer rotating with the cutting shoe, further milling is, of course, impossible and since direct withdrawal is precluded by the still extended slips, it has often been necessary to abandon recovery by releasing the packer and leaving it in place.

It is, therefore, an object of my invention to provide a retrieving tool permitting complete recovery of permanently set well packers in substantially all cases.

It is a further object of my invention to provide a retrieving tool including an anchoring member for locking a permanently set sub-surface well tool against rotation in the casing until complete severance of the slip mechanism is completed.

It is a further object of my invention to provide a retrieving tool for permanently set well packers having means for retrieving severed portions of the packer intact for complete removal thereof from the well.

It is a further object of my invention to provide a retrieving tool for well packers including means to confine the packer mandrel and elements thereof within the retrieving tool and auxiliary elements to prevent severed elements from falling to the bottom of the well.

It is a further object of my invention to provide a retrieving tool which is simple, efficient and reliable in operation.

My retrieving tool comprises a tubular housing having a milling shoe at the lower open end thereof which, when

2

the housing is rotated mills away the slip mechanism from the packer mandrel and receives the packer mandrel within gripping elements in the tubular housing. Releasably positioned in the housing is an elongate anchor member which extends below the housing and is adapted to pass completely through the tubular mandrel of the packer. After the anchor member is passed through the packer mandrel, gripping dogs are extended to lock against the well casing and thereby hold the anchor member against rotation. After the anchor is thus set, its releasable connection within the tubular housing is broken and the housing is free to rotate and the milling operation can be continued until the lower slips are completely milled away and the well packer is supported by gripping elements within the tubular housing. As an additional feature of my invention, I provide projections at the lower end of the anchor rod to catch and support fragments of the well packer that might otherwise fall to the bottom of the well.

Other objects, advantages and novel features of my invention will become apparent from the following specification when viewed in connection with the accompanying drawings wherein:

FIG. 1 is a plan view of my retrieving tool as it is lowered into engagement with a well packer;

FIG. 2 is a vertical section of my retrieving tool conditioned for milling with the anchor rod locked to the well casing;

FIG. 3 is a vertical section of my retrieving tool after severance of gripping elements is completed;

FIGS. 4A to 4D are detailed vertical sections of my retrieving tool conditioned for operation; and

FIGS. 5 and 6 are partial section views in detail of the anchor member forming a part of my invention showing the means by which it is locked to the casing.

Referring now to the drawings in particular, my retrieving tool 1 is particularly adapted to retrieve a permanent type packer bridge plug or the like 2 permanently set against axial movement in either direction within a well casing 3. The packer illustrated by way of example has a tubular central mandrel 4 on which are slidably carried upper and lower slips 5 and 6 urged outwardly by corresponding slip expanders 7 and 8 in response to axial force thereon transmitted by top and bottom flanges 9 and 10 on the mandrel 4. Carried around the central portion of the tubular mandrel 4 is an expansible packer element 11 which, concurrently with the setting of the slips 5 and 6, expands into sealing engagement with the inner surface of the well casing 3. Again, it is emphasized that the well packer 2 is shown by way of illustration only and that my retrieving tool is capable of removing from a well casing many other types of equipment heretofore classified as non-retrievable.

My retrieving tool includes a tubular housing or recovery barrel 14 internally threaded at the upper end 15 (FIG. 4A) to receive the threaded end of a drill pipe 16 or the like. The interior of the recovery barrel forms a fluid passage 17 in direct communication with that of the drill pipe 16 to permit continuous fluid circulation during retrieving operations. At the lower end of the housing 14 is a cutting shoe 18 having an annular cutting or milling bit 19 of extremely hard material, such as tungsten carbide or the like, to permit it to mill away the steel slips 5 and 6 of the packer 2 when rotated thereagainst. The cutting shoe 18 is of an outer diameter sufficiently small to permit the housing 14 to be lowered through the casing 3 but sufficiently large that it will guide the cutting surface 19 in the casing without excessive radial wandering. The internal diameter of the cutting shoe 18 is substantially co-extensive with the inner surface 17 of the recovery barrel so that the central portion of a

3

packer being cut away will be received snugly within the housing 14.

Near the lower end of the recovery barrel or housing 14 is an enlarged bore 20 (FIG. 4B) accommodating an internal slip sleeve 21 having upwardly directed teeth 22. The sleeve is split at one side 23 and of controlled resiliency to permit radial expansion thereof within the limits permitted by the enlarged bore 20. The upwardly directed teeth 22 function as inclined cam surfaces 24 which, when engaged by a milled away core 4a of a lodged packer as the recovery barrel 14 moves downward thereover, force the sleeve outward to embrace and grip the core or central body. The sleeve 21 is sufficiently rigid that it will tightly grip and support a body weighing in excess of that to be encountered in recovery operations but resilient enough to release a body gripped thereby upon the application of substantial force at the surface. Thus, it is possible, when desired, to release a body when its removal is prevented. Shoulders 25 and 26 at the ends of the enlarged bore retain the slip sleeve against axial movement. Thus, it can be seen that as the milling shoe 19 cuts down over the slips 5 and 6 of the packer 2, the remaining central portions will move upwardly within the housing and be gripped and supported by the slip sleeve 21 so that when the packer is severed from engagement with the well casing 3 it can be retrieved with the recovery barrel 14.

The elements thus far described could complete the removal of the packer from the well if the packer remained stationary against rotation until the slips 5 and 6 were completely milled away. However, it frequently happens that before the slips 5 and 6 are completely milled away their grip on the well casing is weakened sufficiently to cause the packer to rotate with the annular cutter 19 and thus prevent further cutting thereof. This often occurs when the cutter 19 penetrates to the lower slips 6 at which point the force thereof may produce a slight interaction between the slips 6 and the cooperating wedges 8. However, the simultaneous engagement of the cutting edge 19 with the wedges limits the extent to which the slips may be retracted and though their grip with the casing is weakened, the slips may still be in contact with the casing. Unless completely retracted, the slips may lodge against collars or other obstructions in the well so that removal of the packer is still prevented. Moreover, sliding engagement with the casing during upward movement of the packer will tend to wedge the slips tighter. Thus, the lower slips 6 may be free to rotate to prevent drilling but at the same time conditioned to grip the casing to prevent removal.

In order to insure complete recovery, I provide an anchor spear 30 carried by the recovery barrel 14. The anchor spear 30 includes an upper tubular mandrel 31 having a central bore 32 forming a flow passage there-through. A top flange 33 on the upper mandrel is adapted to engage and be supported by a shoulder 34 in the recovery barrel 14 so that the lower end thereof extends below the annular cutter 19. Upward movement of the mandrel 31 is prevented by engagement of toothed ratchet segments 35 with internal threads 36 in the recovery barrel. The teeth of the ratchet segments are profiled so that they will cam the segments inwardly against springs 37 and thereby ratchet over the threads 35 until the flange or cap 33 comes to rest on the shoulder 34. When thus secured to the recovery barrel 14 the upper mandrel can be freed for sliding movement within the barrel only by rotation relative to the barrel to thread the teeth 35 out of engagement with the internal threads 36.

Secured to the lower end of the upper mandrel 31 by means of a coupling 38 is a tubular inner mandrel 39 (FIG. 4C) forming a continuation of the upper mandrel 31 and having a central fluid passage 40 in communication therewith. The inner mandrel 39 is telescopically slidable within an outer mandrel 41 having an enlarged

4

head 42 secured on the upper end thereof. The outer mandrel is of a diameter small enough to permit it to be passed freely through the tubular body 4 of the well packer as shown in FIGS. 1 to 3. However, the head 42 is too large in cross-section to pass through the packer mandrel and will be engaged by the top flange 9 on the packer mandrel. Further downward movement of the recovery barrel 14, and hence the upper mandrel 31, after the head stop 42 engages the lodged packer, will cause the inner mandrel 39 to move downward through the outer mandrel 41. A powerful spring 43 acting between coupling 38 and head stop normally urges the inner mandrel into its uppermost position determined by engagement of shoulders 44 and 45 on the inner and outer mandrels respectively.

Slidably carried on a reduced portion 48 of the inner mandrel between the inner and outer mandrels is a drive sleeve 49 having a top flange 50. A compression spring 51 acting between top flange 50 and a shoulder 52 at the lower end of the outer mandrel 41 normally urges the drive sleeve 49 upwardly to the position in FIG. 4D, defined by engagement of the lower end 53 of the outer mandrel and an enlarged drive coupling 54 secured on the drive sleeve 49.

Threadedly secured on the drive coupling 54 to constitute a continuation of the drive sleeve 49 is an anchor sub 56. Pivotally carried on the anchor sub about fixed pivot points 57 thereon is a plurality of anchor dogs 58, each being serrated at its extreme end 59 and along the side 60 outwardly directed in FIG. 4D. The anchor dogs 58 are made of an extremely hard material, such as tungsten carbide, for biting firmly into the metal casing as hereinafter described. Adjacent the pivot point 57, each anchor dog has a short cam arm 61 extending therefrom.

Also carried on the anchor sub 56 are a plurality of retrieving lugs or arms 64 pivotally mounted in fixed pins 65. The retrieving dogs are so weighted as to normally assume the extended position indicated by the solid lines in FIG. 4D but, while the tool is being lowered through the well and through the packer mandrel 4, it will swing freely to the retracted position shown in dotted line to permit the anchor sub end to pass freely through the packer mandrel. A stop member 66 limits the pivotal movement of each retrieving lug and is formed of a frangible material so that when it is desired to do so, a force may be exerted to lift the anchor sub and shear the stop member 66 when the retrieving lugs are prevented by some obstruction from moving upwardly through the well casing 3.

At the lower end of the inner mandrel 39 is secured a cam sleeve slidable but not rotatable in anchor sub 56. Cam sleeve 68 and anchor sub-sleeve 56 are locked against relative rotation by continuous projection of the cam arm 61 of anchor dogs 58 into the slots in the cam sleeve in which are formed the cam surfaces 69. Additionally, if desired the cam sleeve 68 and anchor sub-sleeve 56 may be splined together. Cam sleeve 68 is normally held by powerful spring 43 in the position shown in FIG. 4D against the drive coupling 54. Upon downward movement of the cam sleeve 68 relative to the anchor sub 56, cam surfaces 69 thereon will engage the arms 61 of the anchor dogs 58 to force the anchor dogs 58 outwardly to the position shown in FIG. 5 with the outer teeth 59 biting into the well casing 2. This relative movement of the cam sleeve and anchor sub is effected during the initial part of the downward movement of the inner mandrel after engagement of the head stop 42 with the top of the packer mandrel. The cam surfaces 61 and 69 are disposed so that the anchor dogs engage the well casing before a shoulder 70 on the inner mandrel engages the top flange 50 of the drive sleeve to thereafter carry the drive sleeve 49 downwardly with it in opposition to the spring 51. With the tips 59 of the anchor dogs gripping the well casing this downward movement of the anchor sub and hence pivot pins 57 will

5

pivot the anchor dogs about their tips 59 to force them into the horizontal disposition shown in FIG. 6. In this position, the anchor dogs are securely engaged to the inner surface of the well casing and thereby held against rotation and the side edge serrations 60 are now upwardly disposed in a position to grip the lower end 16 of the well packer.

Since the anchor sub 56 and the inner mandrel 39 are now locked against rotation, further rotation of the housing or recovery barrel 14 will release the teeth 35 from the thread members 36 to permit the recovery barrel and cutting shoe 19 to slide freely down over the anchor member. With the inner mandrel thus released the spring 43 will return the cam sleeve 68 into engagement with the drive coupling 54.

As the cutting shoe 19 penetrates through the slips 5 and 6, the tubular packer mandrel 4 will be received within the recovery barrel 14 to be supported by the slip sleeve 21. However, in the event that large segments of the packer slip assemblies or the like fall before they can be encased within the recovery barrel 14, the retrieving lugs or hangers 64 being in an extended position as shown in FIG. 4D will catch them and permit substantially complete recovery of the well packer 2. If desired, the tubular passage 17 through the housing 14 may be restricted at 17a near the upper end thereof at a particular point dependent upon the extent of penetration required to free the packer so that when the upper flange 33 on the upper mandrel packer reaches the restricted portion, fluid cannot flow around the flange 33 but is restricted to flow through the central passage 17, resulting in an increase in pressure which is indicated at the surface.

When it is desired to release the tool from the well casing, it is merely necessary to pull upwardly on the recovery barrel 14 to first cause the spring pressed ratchet teeth 35 to slide over the threads 36 until the cap 33 engages shoulder 34. Thereafter, further upward movement will force the inner mandrel upward and, by engagement of cam sleeve 68 with the drive coupling 54, will pull the anchor sub 56 and, hence the pivot pins 57 upwardly to rock the anchor locking dogs about their ends 59 back to their retracted positions. As soon as the anchor dogs are released from engagement with the well casing, the parts will tend to again assume their normal positions shown in FIGS. 4C and D.

In operation of my device when it is desired to remove a permanently set packer 2 from a well casing 3, the recovery barrel 14 and the anchor member are assembled at the surface and secured to a pipe string 16 or the like. Because the diameter of the cutting shoe 18 is slightly less than the well casing, the tool is guided with reference to the well casing so that the anchor sub 56 is directed completely through the tubular mandrel 4 of the well packer until the radial head stop 42 on the outer mandrel engages the top 9 of the packer. Thereafter, the housing is forced down farther so that the inner mandrel telescopes into the outer mandrel so that the cam sleeve 68 pivots the arms 61 on the anchor dogs 58 to force the anchor dogs into engagement with the well casing in the position shown in FIG. 5. Thereafter, upon engagement of the radial shoulder 70 on the inner mandrel with the top flange 50 of the drive sleeve 49, the anchor sub 56 upon which the anchor dogs are pivotally mounted, is driven downwardly causing the dogs to pivot about the end teeth 59 which are biting into the well casing.

With the anchor sub 56 and inner mandrel 39 locked securely to the casing, the recovery barrel 14 may be rotated in a direction to release the teeth segments 35 from the internal threads 36 in the recovery barrel to permit the recovery barrel to be lowered over the upper mandrel 31 of the anchor member into engagement with the packer slips. The recovery barrel is then rotated to commence milling of the teeth. If the cutting operation proceeds to the extent that the slips 5 or 6 begin to allow some slipping of the packer element, the downward force of the

6

annular cutter will drive the packer down into engagement with the upwardly directed serrated gripping surfaces 60 of the anchor dogs 58 to lock it against rotation relative thereto. Since the anchor dogs are in turn locked to the well casing, the packer is now held against any rotation. Thereafter, the milling operation may continue until the slips are completely severed and removal of the tool assured. As the milling progresses, the packer mandrel 4 and components thereon are received within the housing and held by the slip sleeve 21 from falling to the bottom of the well. With the severed central portion of the mandrel contained within the recovery barrel, elements thereon are normally restrained against separating from the mandrel and falling. Should, however, any of the components slidable on the packer mandrel 4 drop before they are received within the housing 14, the extended retrieving dogs 64 on the anchor sub 56 are adapted to prevent them from falling below the bottom of the tool. When severance is completed, recovery barrel is raised over the anchor member until the upper mandrel 31 is secured in its initial position by ratcheting the spring-urged teeth 35 over the threads 36 of the recovery barrel. Thereafter, further upward movement of the recovery barrel raises the inner mandrel and by engagement of the cam sleeve 68 with the drive coupling 54, forces the anchor sub upward to rock the anchor dogs about the ends 59 thereof to retract them. My retrieving tool is now completely free from the well casing and the pipe string may be elevated to remove the tool and the packer from the well.

Should for any reason the well packer become so firmly lodged that recovery is impossible, my retrieving tool can be released at any time by exerting extreme force on the recovery barrel 14 causing the packer mandrel 4 to slide out from the slip sleeve 21. When the retrieving lugs 64 engage the lower end of a packer mandrel that cannot be dislodged, a sufficient force will shear the stop members 66 and permit the lugs to be retracted for free passage through the tubular packer mandrel.

While I have described a preferred embodiment of my invention, it is obvious that many changes and modifications can be made within the spirit and scope of my invention as defined by the claims appended hereto.

Having described my invention, I claim:

1. Apparatus for retrieving a fish secured within a well above the bottom thereof, said fish having a tubular body and permanently set locking means on said body positively gripping the wall of said well to prevent axial movement of said body, said apparatus comprising a tubular housing adapted to be moved axially within said well, an annular cutting member on the lower end of said housing adapted to mill away said locking means upon rotation thereagainst, said housing being adapted to receive said tubular body as said cutting member penetrates axially through said locking means, gripping means within said housing to receive and support said body, an anchor spear adapted to extend through said tubular body while said cutting member engages said body, said anchor spear being slidably and rotatably carried in said housing, radially extendable members on the lower end of said anchor spear for gripping the inner wall of said well, and fish gripping means on said anchor spear adapted to engage said body and prevent rotation thereof.

2. The apparatus defined in claim 1 wherein said fish gripping means comprise serrations on said extendable members engageable by the lower end of said body.

3. In combination with a tubular rotary drill adapted to cut through holding means on a tubular fish securing said fish within a well against axial movement, apparatus for securing said fish against rotation with said tubular drill comprising an anchor spear, releasable holding means positioning said anchor spear coaxially within said tubular drill to extend below the lower end thereof, said anchor spear being adapted to pass through said tubular fish, stop means on said spear adapted to engage the upper end of

said tubular fish, radially extendable members on the lower end of said spear operative in response to downward movement of said spear after engagement of said stop means to move into locking engagement with said well, and means on said extendable members adapted to engage and hold said fish against rotation relative thereto.

4. Apparatus for securing a tubular fish against rotation within a well, said fish being secured against axial movement within said well, said apparatus comprising an elongate anchor member, the lower end of said anchor member being adapted to be moved through said tubular fish, said anchor member comprising inner and outer telescopically movable parts, stop means on said outer part adapted to engage the top of said fish, radially extendable members on the lower end of said anchor member adapted to engage positively the wall of said well, means on said anchor member engaged by and responsive to downward movement of said inner part after engagement of said stop means to move said extendable members into gripping engagement with said wall, and gripping means on said extendable members adapted when said gripping members are locked to said wall to engage the lower end of said fish to hold said fish against rotation relative to said anchor rod.

5. Apparatus for securing a tubular fish against rotation within a well, said tubular fish being secured within said well against axial movement thereof, said apparatus comprising a tubular housing, an elongate anchor member comprising inner and outer telescopically movable parts, releasable holding means positioning said inner member axially within said housing to extend below the lower end thereof, said anchor member being adapted to be passed through said tubular fish, a stop member on said outer part below the open end of said housing adapted to engage the top of said tubular fish, radially extendable means on the lower end of said anchor member operative when extended to grip the wall of said well and thereby lock said anchor member against rotation relative to said well, said extendable members being normally retracted, means on said anchor member engaged by and operative in response to downward movement of said inner member after engagement of said stop member with the top of said fish to move said extendable members into gripping engagement with said wall, and gripping means on said extendable member adapted when said member is extended to engage and hold said fish against rotation relative thereto.

6. An apparatus for retrieving a fish secured within a well above the bottom thereof, said fish having a tubular body and permanently set locking means on said body positively gripping the wall of said well to prevent axial movement of said body, said apparatus comprising a tubular housing adapted to be lowered into said well, an annular cutting member on the lower end of said housing adapted to mill away said locking means upon rotation thereagainst, said housing being adapted to receive said tubular body as said cutting member penetrates axially through said locking means, gripping means within said housing to receive and support said tubular body, an elongate anchor member adapted to be passed through said tubular body and comprising inner and outer telescopically movable parts, a releasable connection holding said inner part axially in said housing extending below the lower end thereof, a stop member on said outer part below the open end of said housing adapted to engage the top of said tubular body, radially extendable members on the lower end of said anchor member operative when extended to grip the wall of said well and thereby lock said anchor member against rotation relative to said well, said extendable members being normally retracted, means on said anchor member operative in response to downward movement of said inner member after engagement of said stop part with the top of said tubular body to extend said extendable members, gripping means on said extendable members adapted

when said members are extended to engage and hold said body against rotation relative thereto, said releasable connection being disconnected in response to rotation of said housing after said extendable members are in gripping engagement with the wall of said well.

7. An apparatus for retrieving a fish secured within a well above the bottom thereof, said fish having a tubular body and permanently set locking means on said body positively gripping the wall of said well to prevent axial movement of said body, said apparatus comprising a tubular housing adapted to be lowered into said well, an annular cutting member on the lower end of said housing adapted to mill away said locking means upon rotation thereagainst, said housing being adapted to receive said tubular body as said cutting member penetrates axially through said locking means, gripping means within said housing to receive and support said tubular body, an elongate anchor member adapted to be passed through said tubular body and comprising inner and outer telescopically movable members, a releasable connection holding said inner member axially in said housing extending below the lower end thereof, a stop member on said outer part below the open end of said housing adapted to engage the top of said tubular body, an anchor sleeve slidably and non-rotatably carried on said inner member below said outer member, resilient means biasing said anchor sleeve upwardly into engagement with said outer member, radially extendable members on said anchor sleeve operative when extended to grip the wall of said well and thereby lock said anchor sleeve against rotation relative to said well, said extendable members being normally retracted, means on said extendable members engageable by said inner member during downward movement of said inner member after engagement of said stop member with the top of said fish to extend said extendable members, gripping means on said extendable members adapted when said members are extended to engage and hold said fish against rotation relative thereto, and said releasable connection being disconnected in response to rotation of said housing after said extendable members are in gripping engagement with the wall of said well.

8. An apparatus for retrieving a fish secured within a well above the bottom thereof, said fish having a tubular body and permanently set locking means on said body positively gripping the wall of said well to prevent axial movement of said body, said apparatus comprising a tubular housing adapted to be moved axially within said well, an annular cutting member on the lower end of said housing adapted to mill away said locking means upon rotation thereagainst, said housing being adapted to receive said tubular body as said cutting member penetrates axially through said locking means, gripping means within said housing to receive and support said mandrel, an elongate anchor member comprising inner and outer telescopically movable members, releasable holding means positioning said inner member axially within said housing to extend below the lower end thereof, said anchor member being adapted to be passed through said tubular body, a stop member on said outer part below the open end of said housing adapted to engage the top of said tubular body, an anchor sleeve slidably and non-rotatably carried on said inner member below said outer member, resilient means biasing said anchor sleeve upwardly into engagement with said outer member, anchor dogs pivotally mounted on said anchor sleeve operative when pivoted outwardly to engage positively the wall of said well, means on said anchor dogs engageable by said inner member during downward movement thereof relative to said anchor sleeve to pivot said anchor dogs outwardly, said anchor dogs being adapted to firmly grip the wall of said well and thereby lock said anchor sleeve against rotation relative to said well when said anchor sleeve is driven downward after said anchor dogs are pivoted outwardly, means on said inner member en-

gageable with said anchor sleeve to move said anchor sleeve downward therewith after a predetermined downward movement of said inner member after engagement of said stop member with the top of said fish, and gripping means on said anchor dogs disposed when said dogs are gripping the wall of said well in a position to engage and hold said fish against rotation relative thereto, said releasable connection being disconnected in response to rotation of said housing after said anchor dogs are in gripping engagement with the wall of said well.

9. In combination with an annular rotary drill adapted to cut through matter securing a tubular fish within a well, apparatus for securing said fish against rotation with said drill comprising an anchor spear carried by said drill, said anchor spear being provided with means for mounting said spear on said drill for rotational and axial movement relative thereto, said anchor spear having a portion extending downwardly through said tubular fish during operation of said drill, retractable radially extending means on said lower portion of said spear gripping the wall of said well to secure said spear against rotation relative to said well, and fish gripping means on said anchor spear gripping said fish to hold said fish against rotation relative thereto.

10. In combination with an annular rotary drill adapted to cut through matter securing a tubular fish within a well against axial movement, apparatus for securing said fish against rotation with said drill comprising an anchor spear carried by said drill, said anchor spear being provided with means for mounting said spear on said drill for rotational and axial movement relative thereto, said anchor spear having a portion extended downwardly through said tubular fish during operation of said drill, pivotal members mounted on said spear, first means on said pivotal members engageable with the wall of said well to prevent rotation of said spear relative thereto, and second means on said pivotal members engageable with said fish to hold said fish against rotation relative thereto.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,019,840

February 6, 1962

Thomas A. Kennard

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 68, for "excesive" read -- excessive --;
column 6, line 19, before "recovery" insert -- the --;
column 7, lines 72 and 73, for "member" read -- part --;
line 73, for "part" read -- member --.

Signed and sealed this 12th day of June 1962.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents