July 24, 1962 J. F. MUSE 3,045,758

COMPENSATING TUBING ANCHOR

Filed July 11, 1958 2 Sheets-Sheet 1

FIG. 1.

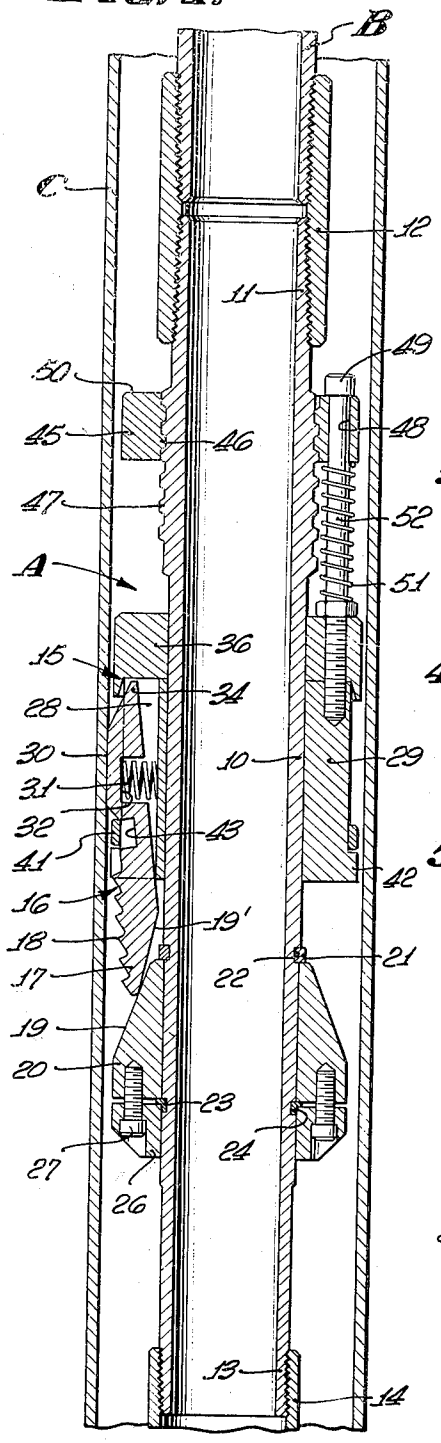

FIG. 2.

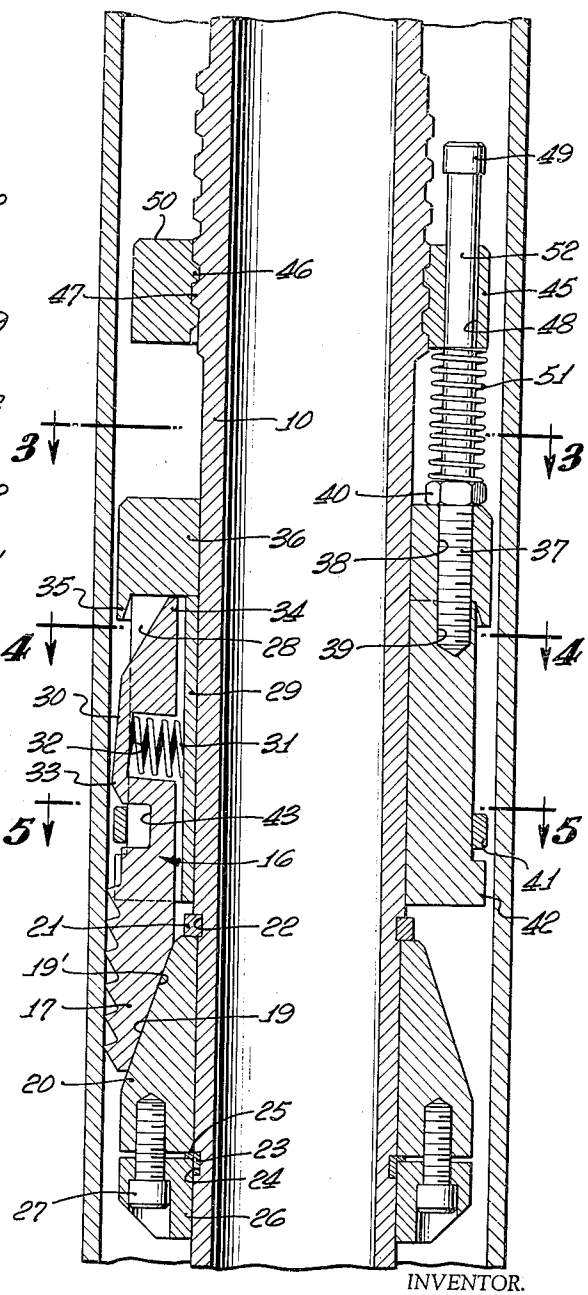

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FIG. 3.

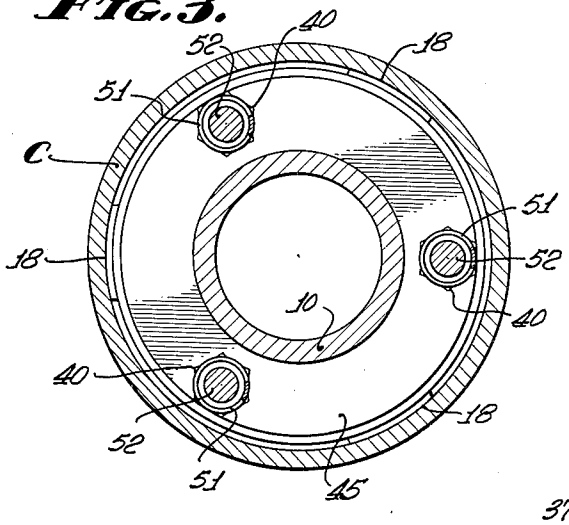


FIG. 6.

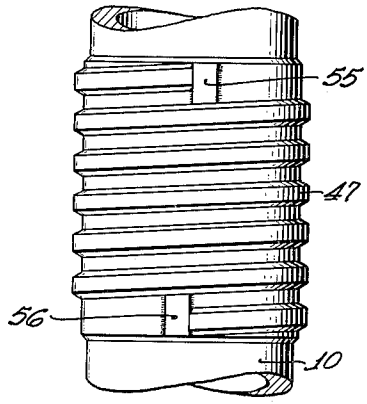


FIG. 4.

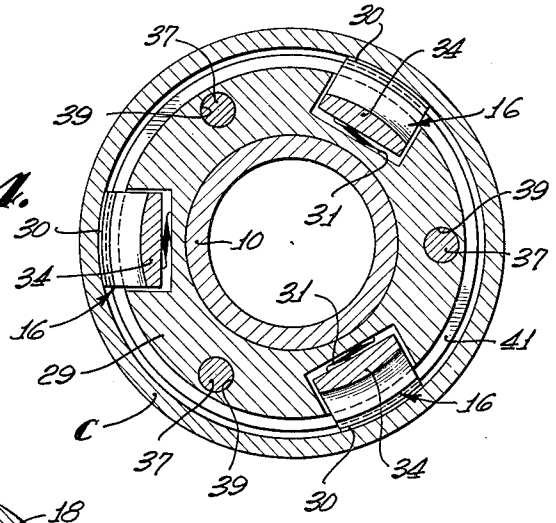
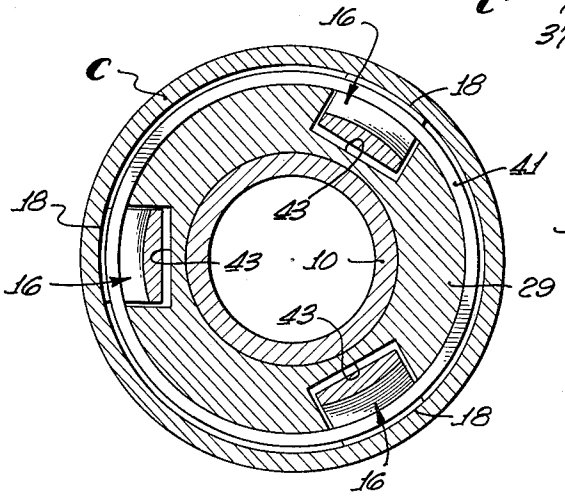


FIG. 5.



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COMPENSATING TUBING ANCHOR

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15 Claims. (Cl. 166—216)

The present invention relates to subsurface well devices, and more particularly to anchors adapted to secure tubular strings in well casings disposed in well bores.

An object of the present invention is to provide an improved anchor to secure a tubing string to a well casing in a tension condition.

Another object of the invention is to provide a tubing anchor adapted to secure a string of tubing in a well casing, the anchor automatically shifting down the casing to a new anchored location as the tubing string elongates, as a result of the action of a sucker rod operated pump in the tubing string, increase in the hydrostatic head differential in the tubing string, increase in the temperature of the tubing string, or other condition in the well bore.

A further object of the invention is to provide an anchor for a tubing string that automatically adjusts itself to a new anchoring location as the tubing string elongates in the well casing, and in which the anchor can be forcibly and readily released from the casing in the event that its normal release cannot be secured.

An additional object of the invention is to provide an anchor for a tubing string that automatically adjusts itself to a new anchoring location as the tubing string elongates in the well casing, the anchor being comparatively simple in construction and mode of operation.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of a form in which it may be embodied. This form is shown in the drawings accompanying and forming part of the present specification. It will now be described in detail, for the purpose of illustrating the general principles of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

FIGURE 1 is a longitudinal section through a tension tubing anchor disposed in a well casing, with the anchor in its released or retracted position;

FIG. 2 is an enlarged longitudinal section through the major portion of the anchor illustrated in FIG. 1 in set condition against the well casing;

FIG. 3 is a cross-section taken along the line 3—3 of FIG. 2;

FIG. 4 is a cross-section taken along the line 4—4 on FIG. 2;

FIG. 5 is a cross-section taken along the line 5—5 on FIG. 2;

FIG. 6 is a side elevational view of a portion of the apparatus.

As illustrated in the drawings, a tubing anchor A is provided which is capable of securing a string of tubing B in a tensioned condition within a well casing C, the tubing string extending to the top of the well bore. Normally a string of sucker rod (not shown) is disposed within the tubing string for operating a deep well pump (not shown) for the purpose of elevating the well production through the tubing string B to the top of the hole.

The anchor A includes a tubular mandrel or body **10** that may have the same inside diameter as the inside diameter of the tubing string B, and through which the well production will flow. The upper end of this mandrel is constituted as a threaded pin **11** for threaded attachment to a coupling **12** secured to an adjacent section B

of the tubing. Similarly, the lower end of the mandrel or body is constituted as a threaded pin **13** threadedly secured to a lower coupling collar **14** which, in turn, is threadedly attached to portions of the tubular string therebelow.

A slip structure **15** is disposed around the mandrel, including circumferentially spaced slip member **16** having lower gripping portions **17** provided with upwardly faced wickers or teeth **18** adapted to dig into the wall of the well casing C and anchor the tool against upward movement therein. The lower inner surfaces **19¹** of the slips are tapered in an upward and inward direction and are adapted to coact with a companion tapered external surface **19** on an expander **20**, which may be of generally frusto-conical shape. The upper or smaller end of this expander is adjacent a snap ring **21** fitting within a peripheral groove **22** in the body; whereas the expander itself is releasably secured to the mandrel by a split shear ring **23**, the inner portion of which fits within a peripheral groove **24** in the mandrel **10**, and the outer and thinner portion **25** of which is disposed within a space in the expander provided between the upper main portion of the expander **20** and a lower expander portion **26** secured to the main portion by longitudinally extending screws **27**. The screws **27** serve to clamp the outer portion **25** of the shear ring between the upper and lower expander portions.

The slip members **16** are disposed within longitudinal ly extending grooves **28** provided in a slip ring or sleeve **29** slidably mounted on the mandrel or body **10** of the tool. Each slip member includes the lower gripping portion **17** described above, and also an upper drag portion **30** adapted to frictionally engage the wall of the well casing, being urged outwardly thereagainst by a helical compression spring **31** disposed within a slip ring groove **28**, with its inner end engaging the base of the groove and its outer portion disposed within a socket **32** in the drag portion **30** and engaging the base of the socket. The spring **31** tends to urge the drag portion **30** into full surface engagement with the wall of the well casing C. When the drag portion is so engaged, the gripping portion **17** is disposed inwardly with its wickers **18** out of contact with the wall of the well casing (FIG. 1). However, when the expander **20** moves upwardly within the gripping portions **17**, the slip members **16** are rocked about the lower ends **33** of their drag portions, the teeth **18** of the gripping portions being shifted into engagement with the wall of the well casing C, and the drag portions **30** moving inwardly to further compress the springs **31** (FIG. 2). When the gripping portions **17** are fully engaged with the well casing, with the expander **20** wedged therebehind, a full surface engagement is made between the tapered surfaces **19¹**, **19** of the gripping portion **17** and the expander **20**, such as shown in FIG. 2.

Outward expansion of the drag portions **30** under the influence of the springs **31**, as when the tool A is out of the casing C, is limited by engagement of the upper ends **34** of the slip members with the depending rim portion **35** of a stop ring **36** slidable on the body **10**, and which is secured to the slip ring **29** by a plurality of circumferentially spaced screws **37**. Each screw extends through a longitudinal hole **38** on the stop ring **36** and is threaded into a threaded bore **39** in the slip ring **29**. The stop ring **36** and slip ring **29** are firmly secured together by a lock nut **40** threaded on the screw **37** and bearing against the upper end of the stop ring **36**.

The stop ring **36** engages the upper ends of the slip members **16** and insures their joint longitudinal movement downwardly in the well casing. Joint upward movement of the slip members in the well casing is also secured by disposing a coupling ring **41** around the slip ring **29**, the lower end of this ring engaging an outward-

ly extending lower flange 42 of the slip ring, the coupling ring being received within grooves 43 in the slip members 16 provided between the drag and anchoring portions 30, 17. When the slip ring 29 is moved upwardly, the flange 42 will engage the coupling ring 41 and the latter will engage the upper sides of the grooves 43 to move all of the slip members 16 in an upward direction with the slip ring 16. As stated above, downward movement of the slip ring 29 will cause the stop ring 36 to engage the upper ends 34 of the slip members 16 and move them downward. Thus, the stop ring 36, coupling ring 41, and the flange 42 insure the joint longitudinal movement in both directions of the slip members 16, while such members are still free to rock radially in order to either bring the drag portions 30 into full surface engagement with the wall of the well casing C under the influence of the springs 31, or to enable the gripping portions 17 to move outwardly into firm gripping engagement with the wall of the well casing.

The slip structure 15 is yieldedly urged in a downward direction relative to the mandrel or body 10 of the tool. It also may be forcibly retracted when necessary. These actions are secured by providing a thrust ring 45 on the upper portion of the body 10 having internal right-hand threads 46 meshing with companion threads 47, such as a seat feed screw or jack screw, on the mandrel or body. Circumferentially spaced, longitudinally extending drag and release screws 37, which may be the same screws that secure the stop ring 36 and slip ring 29 together, are slidable relatively through longitudinal holes or bores 48 in the thrust ring 45. Each screw has an upper head 49 adapted to engage the upper end 50 of the thrust ring, there being helical compression springs 51 disposed around the shank 52 of the screw, with its upper end engaging the lower end of the thrust ring 45 and its lower end engaging a spring seat, which may be constituted by the lock nut 40 that clamps the stop ring 36 to the slip ring 29.

The thrust ring 45 is threaded on the feed screw 47 and rotational stops 55, 56 are then welded to the mandrel 10 at the upper and lower ends of the feed screw, to limit the extent to which the feed screw can thread downwardly within the thrust ring 45, and also upwardly within the thrust ring. The rotational stops 55, 56 will engage the ends of the last upper thread and the last lower thread on the thrust ring 45. Provision of the rotational stops insures against complete unthreading between the feed screw portion of the mandrel and the thrust ring 45.

Initially, the thrust ring 45 occupies its upper threaded position on the feed screw, engaging the heads 49 of the guide and release screws 37. When the parts are in this position, with the expander 20 attached to the mandrel 10 by the shear ring 23, the slip structure 15 occupies an upper position relative to the expander, the springs 31 shifting the drag portions 30 of the slip members outwardly, with the gripping portions 17 then occupying inner retracted positions, as illustrated in FIG. 1. The anchor A is then secured to the tubing string B and is lowered in the well casing. During its downward movement in the well casing, the drag portions 30 of the slips are bearing frictionally against the wall of the casing, but the entire slip structure 15 is forced down the casing since the downward movement of the mandrel 10 is transferred through the thrust ring 45, springs 51 and lock nuts 40 to the stop ring 36, which bears against the upper end of the slip members 16 and pushes them downwardly in the casing. The shear ring 23 couples the expander 20 to the body and insures that the expander will move downwardly with the body. The downward thrust of the mandrel is also transmitted to the expander through the snap ring 21.

When the anchor has been lowered to the desired location in the well casing, the tubing string B and mandrel 10 are rotated in a left-hand direction. The fact that the drag portions 30 are frictionally engaging the wall of the well casing will cause the slips 16 to resist and, for that matter, prevent any significant rotation of the slip ring 29, stop ring 36, guide and release screws 52 and the thrust ring 45 in the well casing C. Accordingly, rotation of the mandrel 10 to the left, or in a counterclockwise direction, will effect a relative downward threading of the thrust ring 45 along the body, the downward motion of the thrust ring being transferred through the springs 51 to the lock nuts 40 and from the latter to the stop ring 36 and slip ring 29, the stop ring engaging the upper ends 34 of the slip members 16, and resulting in the entire slip structure 15 shifting downwardly. As a result, the gripping portions 17 are moved down along the tapered surface 19 of the expander 20, which will rock the slips 16 about the lower drag portions 33 and shift the wickers 18 into firm anchoring engagement with the wall of the well casing. Left-hand rotation of the mandrel or body 10 can be continued until the thrust ring engages the rotational stop element 56, the thrust ring 45 then being at the lower portion of the feed screw 47 (FIG. 2).

The parts are so proportioned that the slips 16 will have been expanded fully into engagement with the wall of the well casing before the thrust ring 45 reaches its lowermost position along the feed screw 47. Additional feeding of the screw in a downward direction will then result in additional compression of the springs 51. Despite the fact that the thrust ring 45 may not move downwardly to any great extent the springs 51 are constantly urging the entire slip structure 15 in a downward direction along the body or mandrel 10 of the tool. This operating capacity of the springs 51 on the entire slip structure is availed of to cause the anchor to automatically adjust itself within the well casing in the event the tubing string B elongates or shifts downwardly to a lower position in the well casing.

With the anchor in its set position, such as disclosed in FIG. 2, any upward pull taken on the tubing string B will be exerted through the shear ring 23 on the expander 20, which is wedged behind the slips 16 to embed the wickers 18 into anchoring engagement with the wall of the well casing and prevent upward movement of the anchor therewithin. Such upward moving tendency of the tubing string B does not exert an upward pull on the slip structure since the thrust ring 45 has shifted downwardly a substantial distance below the heads 49 of the guide and release screws 37, as disclosed in FIG. 2. In the event the tubing string B now elongates, which may occur as a result of an increase in temperature, or as a result of the reciprocation of the sucker rods or pump in the well casing, or because of an increase in the hydrostatic head of the fluid within the tubing string as compared to the hydrostatic head external of the tubing string, the expander 20 and the body 10 of the tool move downward in the casing C. The expander will not move away from the gripping portions 17 of the slips since the springs 51 are exerting a constant force on the entire slip structure 15 and will slide such slip structure downwardly along the casing to follow up on the downward movement of the expander 20, retaining the tapered surfaces 19^1, 19 of the slips and expander in engagement with one another. Accordingly, despite any downward movement of the expander 20, any subsequent tendency for the tubing string B, the mandrel 10 and expander 20 to move upwardly will immediately wedge the expander behind the slips 16 and dig their wickers 18 into anchoring engagement with the wall of the well casing. At most, the expander and mandrel might move upwardly about $\frac{1}{64}$ of an inch to embed the wickers in the wall of the well casing.

Elongation of the tubing string B and the consequent downward movement of the mandrel 10 and the expander 20 can occur to a considerable extent, and the slip structure 15 will still be caused to follow the downward move-

ment of the expander, being urged in the downward direction by the compressed springs **51**. The spring tension remains at a substantial value at all times, since the downward movement of the mandrel **10** is also accompanied by downward movement of the thrust ring **45**. Accordingly, the springs **51** will always have a substantial compressive force tending to urge the slips **16** downwardly and hold them in snug engagement with the companion expander **20**.

In the event it is desired to release the anchor A from the well casing, the tubing string B and mandrel **10** are rotated in a right-hand or clockwise direction. Since the slips **16** are engaging the wall of the well casing, they will resist rotation of the slip ring **29**, stop ring **36**, guide and release screws **37** and thrust ring **45**. Accordingly, right-hand rotation of the mandrel **10** will cause it to feed relatively in a downward direction within the thrust ring **45**. At first, the longitudinally extending springs **51** will cause the slips **16** to follow the expander **20** in a downward direction, since the spring force is then greater than the friction force of the drag portions **30** against the wall of the well casing. However, as the thrust ring **45** feeds in a relative upward direction along the feed screw **47**, the compressive force of the springs **51** decreases, the thrust ring **45** engaging the heads **49** of the release screws **37**, whereupon continued rotation and downward feeding of the mandrel **10** within the thrust ring **45** will result in a positive downward shifting of the expander **20** away from the slips **16**, inasmuch as the thrust ring **45**, acting through the release screws **37**, the stop ring **36**, flange **42** and coupling rings **41**, prevents downward movement of the slips **16**. Rotation of the feed screw **47** in a right-hand direction will continue until the stop member **55** on the feed screw **45** engages the thrust ring, at which time the parts again occupy the position illustrated in FIG. 1, the slip springs **31** having rocked the drag portions **30** outwardly to the fullest extent, which will result in an inward rocking of the gripping portions **17** to their full retracted positions. The tubing string B can now be elevated, such upward movement being transmitted through the mandrel **10**, thrust ring **45** and screws **37** to the slip ring **29**, the flange **42** engaging the coupling ring **41**, which then engages the slip members **16** to elevate them as a unit with the body **10** of the tool. The anchor A, if desired, can be removed completely from the well casing without fear of the expander **20** shifting upwardly behind the gripping portions **17** and forcing them into anchoring engagement with the wall of the well casing.

The threaded connection **46**, **47** between the body **10** and the thrust ring **45** provides a jack screw for effecting a forcible release of the slips **16** from the well casing, in the event that the expander **20** does not shift readily in a downward direction relative to the gripping portions **17**, to enable the latter to be released from the well casing. Assuming that the rotation of the tubing string B and the body of the tool to the right, in effecting release, does not at first result in relative downward feeding of the expander **20** from its wedged position behind the slips, such rotation will still result in an upward feeding of the thrust ring **45** along the screws **37** until the upper end **50** of the ring engages the screw heads **49**. When this occurs, continued turning of the tubing string B and the body **10** of the tool to the right will exert an upward feeding force on the thrust ring **45**, which force is transmitted through the heads **49** to the screw shanks **52** and from the latter to the slip rings **29**, the flange **42** engaging the coupling ring **41**, which will engage the upper sides of the slip grooves **43**, to force the slips **16** in an upward direction. Thus, the feed screw, in effect, is tending to jack the expander **20** in a downward direction, the thrust ring **45**, acting through the screws **37** and slip ring **29**, and the other parts referred to above, tending to jack the slips **16** in an upward direction. The mechanical advantage afforded by the feed screw **47** and the inner internal thread **46** on the thrust ring can provide a very great longitudinal force tending to move the expander **20** and slips **16** relatively in opposite directions, the expander **20** being forced downwardly and the slips **16** relatively upwardly to free the slips from the well casing.

In the event that the jack screw **46**, **47** is incapable of freeing the slips **16** from the well casing, an upward pull can be taken on the tubing string B and body **10** of the tool, with the slips **16** anchored against the well casing, of a sufficient force to shear the outer portion **25** of the shear ring **23** from its inner portion. Such upward pull will then free the body **10** of the tool from the expander **20** and will release any upward wedging force on the expander that may have been retaining it wedged behind the slips **16**. The expander **20** can then drop down along the body **10** of the tool and away from the slips to the extent limited by its engagement with the lower coupling collar **14**, whereupon the drag springs **31** will rock the drag portions **30** outwardly into full engagement with the wall of the well casing and the anchoring portions **17** in an inward direction.

In the event that shearing of the ring **23** still does not effect release of the slips **16**, then a downward movement of tubing string B and body **10** will bring the snap ring **21** into engagement with the upper end of the expander **20**, and will force the latter downwardly from behind the gripping portions **17** of the slips. If necessary, the body **10** of the tool can be reciprocated to cause the snap ring **21** to deliver hammer-like blows upon the upper end of the expander **20** to drive it downwardly from behind the slips **16**. The apparatus can now be elevated in the well casing and removed completely therefrom.

The inventor claims:

1. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; and means yieldedly urging said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means.

2. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; and spring means engaging said slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from sad slip means, said spring means having a greater spring force than the friction force of said drag means against the conduit.

3. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; and means interconnecting said body and slip means whereby rotation of said body moves said slip means relatively toward said expander means to expand said slip means against the well conduit.

4. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; means interconnecting said body and slip means whereby rotation of said body moves said slip means relatively toward said expander means to expand said slip means against the well conduit; said interconnecting means including spring means engaging said slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means.

5. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; spring means engaging said slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means, said spring means having a greater spring force than the friction force of said drag means against the conduit; and means interconnecting said body and spring means whereby rotation of said body moves said spring means and slip means relatively toward said expander means to expand said slip means against the well conduit.

6. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with said conduit to resist movement of one of said means therewithin; and means interconnecting said body and slip means whereby rotation of said body moves said slip means relatively toward said expander means to expand said slip means against the well conduit.

7. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with said conduit to resist movement of one of said means therewithin; means interconnecting said body and slip means whereby rotation of said body moves said slip means relatively toward said expander means to expand said slip means against the well conduit; and spring means engaging said slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means.

8. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains

fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of one of said means therewithin; spring means engaging said slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means, said spring means having a greater spring force than the friction force of said drag means against the conduit; and means interconnecting said body and spring means whereby rotation of said body moves said spring means and slip means relatively toward said expander means to expand said slip means against the well conduit.

9. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; and means threadedly interconnecting said body and slip means whereby rotation of said body moves said slip means relatively toward said expander means to expand said slip means against the well conduit.

10. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; spring means engaging said slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means, said spring means having a greater spring force than the friction force of said drag means against the conduit; and means threadedly interconnecting said body and spring means whereby rotation of said body moves said spring means and slip means relatively toward said expander means to expand said slip means against the well conduit.

11. An apparatus to be disposed within and anchored to a well conduit: a body; slip means movable longitudinally on said body; expander means fixed to said body against longitudinal movement thereon in both directions and adapted to coact with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit; drag means frictionally engageable with the well conduit to resist movement of said slip means therewithin; a thrust member on said body; spring means engaging said thrust member and slip means to urge said slip means toward said expander means to maintain said slip means engaged with said expander means as said body moves said expander means in a direction away from said slip means; and intermeshing threads on said body and thrust member, whereby rotation of said body moves said thrust member, spring means and slip means toward said expander means to expand said slip means against the well conduit.

12. An apparatus to be disposed within and anchored to a well conduit: a body; slip means movable longitudinally on said body; expander means fixed to said body below said slip means against longitudinal movement thereon in both directions and adapted to move upwardly into wedging engagement with said slip means while said expander means remains fixed to said body to expand and hold said slip means against the well conduit to prevent upward movement of said body therewithin; drag means frictionally engageable with the well conduit to resist movement of said slip means therewithin; a thrust mem-

ber on said body; guide rods secured to said slip means and slidable in said thrust member; spring means engaging said thrust member and slip means and tending to urge said slip means downwardly to maintain said slip means engaged with said expander means as said body moves said expander means downwardly; and intermeshing threads on said body and thrust member.

13. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means on said body adapted to coact with said slip means to expand and hold said slip means against the well conduit; means including releasable instrumentalities securing said expander means to said body against longitudinal movement thereon in both directions, whereby said body and expander means moved jointly to expand said slip means against the well conduit and whereby release of said instrumentalities allows said expander means to move on said body away from said slip means; drag means frictionally engageable with the conduit to resist movement of said slip mean therewithin; and means yieldably urging said slip means towards said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means.

14. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means on said body adapted to coact with said slip means to expand and hold said slip means against the well conduit; means including shearable instrumentalities releasably securing said expander means to said body against longitudinal movement thereon in both directions, whereby said body and expander means moved jointly to expand said slip means against the well conduit and whereby shearing of said instrumentalities allows said expander means to move on said body away from said slip means; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; and means yieldably urging said slip means towards said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means.

15. An apparatus to be disposed within and anchored to a well conduit: a body; slip means on said body adapted to engage the well conduit to anchor the body therewithin; expander means on said body adapted to coact with said slip means to expand and hold said slip means against the well conduit; means including releasable instrumentalities securing said expander means to said body against longitudinal movement thereon in both directions, whereby said body and expander means moved jointly to expand said slip means against the well conduit and whereby release of said instrumentalities allows said expander means to move on said body away from said slip means; means on said body engageable with said expander means for moving said expander means away from said slip means in response to longitudinal movement of said body; drag means frictionally engageable with the conduit to resist movement of said slip means therewithin; and means yieldably urging said slip means towards said expander means to maintain said slip means engaged with said expander means and conduit as said body moves said expander means in a direction away from said slip means.

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