Jan. 7, 1958 D. D. WEBB 2,818,926

WELL TOOL ANCHOR RELEASE

Filed March 4, 1955 3 Sheets-Sheet 1

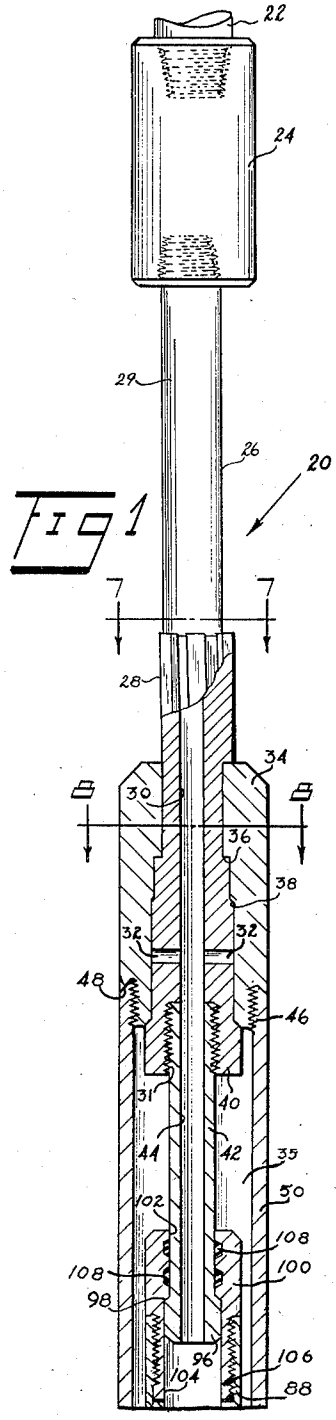


Fig 1

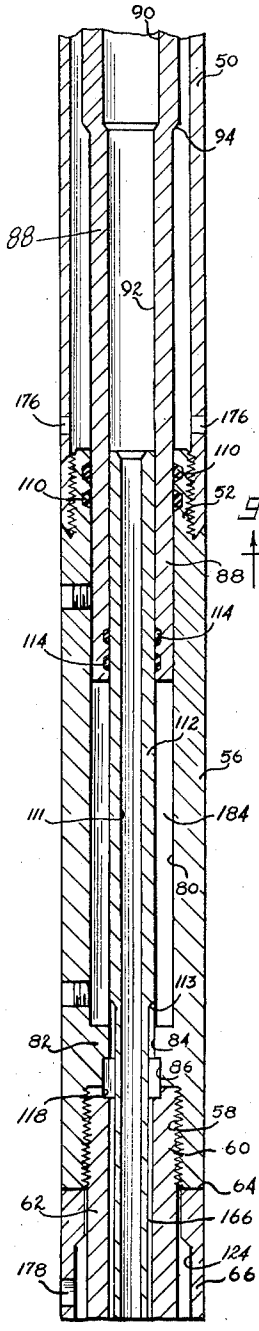


Fig 2

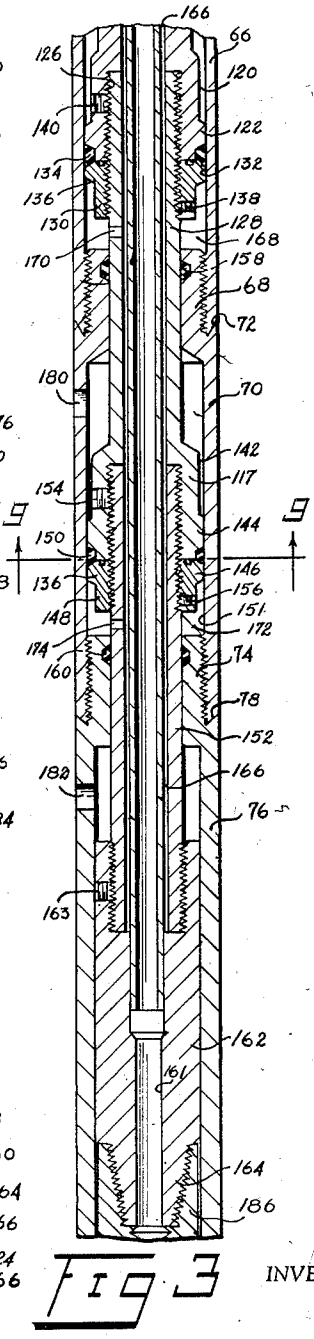


Fig 3

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Jan. 7, 1958 D. D. WEBB 2,818,926

WELL TOOL ANCHOR RELEASE

Filed March 4, 1955 3 Sheets-Sheet 2

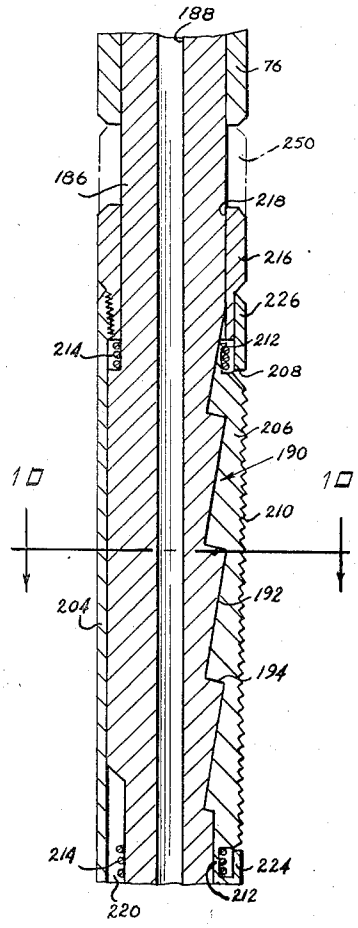


Fig 4

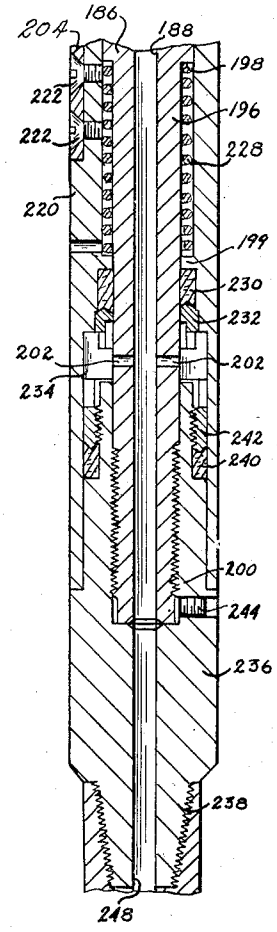


Fig 5

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Jan. 7, 1958 D. D. WEBB 2,818,926

WELL TOOL ANCHOR RELEASE

Filed March 4, 1955 3 Sheets-Sheet 3

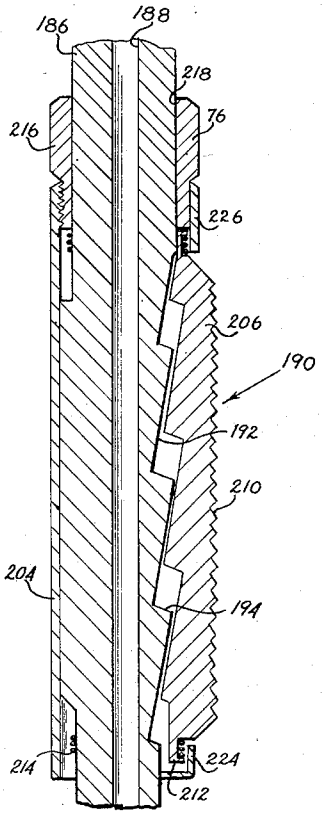


Fig 6

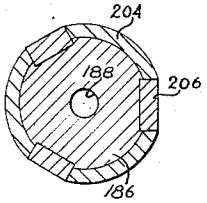


Fig 10

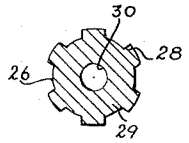


Fig 7

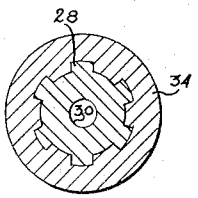


Fig 8

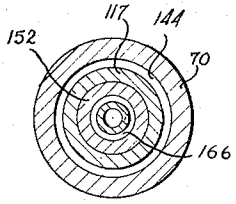


Fig 9

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United States Patent Office 2,818,926 Patented Jan. 7, 1958

2,818,926

WELL TOOL ANCHOR RELEASE

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Application March 4, 1955, Serial No. 492,251

7 Claims. (Cl. 166—212)

This invention relates to tool means and more particularly to a means for releasing anchored tools associated with drilling operations such as pulling, releasing, cutting, and any other well operation which requires anchoring of the tool.

The drilling of oil and water wells is a highly technical art involving complex and elaborate machinery as well as costly tools and allied accessories. This is particularly true in the case of oil wells wherein the well bore, which might extend many thousands of feet into the earth, must be lined with comparable amounts of expensive pipe or casing for efficient operation. A common difficulty in the process of drilling and operating an oil well is the lodging or sticking of pipes, liners, packings, or other elements within the bore hole. Naturally when such a condition occurs, the lodged article must be retrieved before the drilling operation can properly proceed.

Also, in many instances, a well is drilled that eventually requires the use of liners, packers, and the like, and in which pipe frequently becomes stuck. In this latter case it is highly desirable to retrieve the many items that have become firmly lodged in the well.

In both of the foregoing described instances well known anchor and fishing tool combinations are employed to engage the lodged object or previously installed casing. The fishing tool operates or functions to engage the lodged object, while the anchor portion of the tool anchors the tool within the well while the fishing tool is operated.

In many instances the anchor slips become so firmly seated within the well casing that it may be impossible to withdraw the tool by means of the surface equipment. Obviously, in such a situation the anchor slips must be freed before the tool, including the fishing tool portion and lodged object, can be withdrawn by the surface equipment.

The problem of properly and efficiently releasing the anchor slips has long been recognized in the art and many efforts have been made to solve this problem. Representative of one such solution and considerable advance in the art is the disclosure of United States Letters Patent No. 2,595,014 issued to L. W. Smith, et al. The Smith patent uses impact forces to release the anchor slips from their wedged condition within the well casing. Such impact forces can be relatively severe and result in the failure of the tool assembly within the well casing thereby further complicating the retrieving operation.

The present invention embodies certain novel details of construction and function over the Smith and similar patents wherein the ultimate in efficiency and ease is attained in the operation of retrieving lodged objects from well bores. This efficiency is attained by providing an anchor for any of the previously mentioned tools wherein a novel means is embodied to positively and easily release the anchor slips should they become lodged. The easy release of the anchor slips is attained by combining the action of the weight of the fishing string with a trapped fluid media to exert a positive steady releasing force on the anchor slips so that the tool either can be released for withdrawal or can be repositioned to continue operation.

It will be readily seen as the following detailed description proceeds that the present novel invention guarantees maximum efficiency in operation and circumvents any possibility of tool failures during the releasing and withdrawing operation.

It is therefore a primary object of the present invention to provide anchor release means which in no way requires either a pull from the surface or pump pressure.

Another object of the present invention is to provide a well grappling tool having an anchor assembly with novel means for releasing the anchor assembly to permit withdrawal of the tool from the well.

Yet another object of the present invention is to provide well grappling tools having anchor assemblies for anchoring the tools in wells with novel fluid means for releasing the anchor assembly to permit withdrawal of the tools from wells.

An additional object of the present invention is to furnish a well grappling tool having an anchor assembly for securing the tool in a well during a grappling operation with novel fluid means for exerting a steady releasing pressure on said anchor assembly to release said assembly and permit withdrawal of the tool from said well.

Still another object of the present invention is to provide a well grappling tool actuated by a drill string and having an anchor assembly for securing the tool within the well during a grappling operation with novel fluid means actuated by the weight of the drill string to impart a steady releasing pressure on the anchor assembly to permit withdrawal of the tool from the well.

A further object of the present invention is to provide a well grappling tool actuated by a drill string and having an anchor assembly for securing the tool within a well with a trapped fluid which exerts a releasing pressure on said anchor assembly whereby said tool can be withdrawn from the well.

An additional object of the present invention is to provide a tool having an anchor assembly with a trapped fluid media pressurized by the mechanical application of the weight of a drill string controlling the tool to exert a releasing pressure on the anchor assembly.

Another object of the present invention is to provide a grappling tool having an anchor assembly for securing the tool within a well with a simple, inexpensive means for releasing the anchor assembly by means of a high, steadily applied releasing force which avoids failure of the tool during releasing operations.

As stated previously, it is a primary object of the present invention to provide an anchor releasing means for a grappling tool. A grapple has been used as one example, this being for illustrative purposes only, inasmuch as the anchor release means of this invention is capable of employment with any tool which requires anchoring for its normal operation.

These and other objects will become readily apparent from the following detailed description and appended claims when read in conjunction with the attached drawings, wherein:

Fig. 1 is a fragmentary sectional view of the uppermost portion of the pulling and/or anchor releasing tool of the present invention;

Figs. 2, 3, and 4 are sectional views of successive portions of the tool of the present invention, showing the fluid passages and piston arrangements;

Fig. 5 is a sectional view of the lowermost portion of the tool of the present invention;

Fig. 6 is a sectional view similar to that shown in Fig.

4, but showing the anchor slips of the tool in an expanded position;

Fig. 7 is a sectional view taken substantially along the line 7—7 of Fig. 1 showing further details of the by-pass mandrel;

Fig. 8 is a sectional view taken substantially along the line 8—8 of Fig. 1 showing the splined relation between the by-pass mandrel and the tool;

Fig. 9 is a sectional view taken substantially along the line 9—9 of Fig. 3 showing further details of one of the pistons of the present invention; and,

Fig. 10 is a sectional view taken substantially along the line 10—10 of Fig. 4 showing further details of the mounting of the anchor slips of the present invention.

Turning now to the drawings, the details of the pulling and/or anchor release tool will now be particularly described.

The tool of the present invention, generally designated **20**, functions by virtue of the coaction of the weight of the fishing string **22**, threadedly secured to upper connector **24**, with the action of a novelly trapped fluid pressure media within the tool **20**. The weight of the fishing string **22** causes an activation of the trapped fluid media through suitable ports to react on pistons, to be described, to cause releasing of the anchor slips. The relatively great weight of the fishing string exerts a tremendous force on the trapped fluid to cause an extremely high steady releasing pressure upon the trapped fluid media to effect the aforedescribed releasing action as will now be described in detail.

As clearly seen in Fig. 1, the upper end of tool **20** is provided with a connector member **24** threadedly, or otherwise suitably, connected to the upper end of slidable mandrel **26**. Connector **24** is also provided with means, such as threads, for connection to a well-known fishing string, fragmentarily indicated at **22** in Fig. 1. Mandrel **26** is provided with external splines **28** thereon, for a purpose to be particularly described hereinafter. The portion of mandrel **26** above splines **28** is cylindrical, as indicated at **29**. Mandrel **26** is also provided with an axially extending bore **30** which connects with transversely extending ports **32** for a purpose to be described.

Mandrel **26** is slidably mounted in upper cap member **34** which is provided with internal shoulders **36** and **38** for abutment with corresponding shoulders on mandrel **26**, as clearly seen in Fig. 1. When mandrel **26** is in its uppermost or retracted position, the ports **32** in mandrel **26** are closed off by the surrounding walls of cap **34**, for a purpose to be described.

The lower end of mandrel **26** is provided with an enlarged boss **40** which in turn is provided with an internally threaded bore **31** coaxial with bore **30**, for threadedly receiving the upper end of wash pipe **42** which also has an axially extending bore **44** which is in alignment and connects with bore **30**.

The lower end of cap **34** is provided with a threaded portion **46** which terminates in a circumferential shoulder **48**. Cap **34** is threadedly mounted on the upper end of cylindrical barrel portion **50** so that the upper end of barrel **50** abuttingly engages circumferential shoulder **48**.

The lower end of barrel portion, or by-pass cylinder **50**, which is internally threaded is mounted on threaded portion **52** of driver cylinder **56**, which forms an operative part of the chamber in which the trapped fluid media is initially contained.

The lower end of driver cylinder **56** is provided with an internally threaded bore **58** which threadedly receives the partially threaded elongate upper portion **60** of upper piston **62**, the details of which are to be particularly described hereinafter. The uppermost end **64** of upper fluid cylinder **66**, which is slidably mounted on upper piston **62**, abuts the lower end of driver cylinder **56**, as clearly seen in Fig. 2. The lower end of upper cylinder **66** is internally threaded to receive threaded portion **68** of lower cylinder **70** and abuttingly engages the circumferential shoulder **72** of lower cylinder **70**. Lower fluid cylinder **70** is similarly internally threaded for connection to threaded portion **74** of drain sleeve **76**, and similarly abuttingly engages circumferential shoulder **78** of drain sleeve **76**, as seen in Fig. 3. Thus it will be seen that upper cylinder **66**, lower cylinder **70**, and drain cylinder **76** constitute what may be termed a release cylinder.

Turning back now to Figs. 1 and 2, the terminal details of the tool of the present invention will now be described.

As seen in Fig. 2, driver cylinder **56** is provided with an enlarged axially extending bore **80** extending from the upper end of driver cylinder **56** and terminating in shouldered portion **82**. Shouldered portion **82** in turn is provided with coaxial bores **84** and **86** which are communicate with each other and bores **80** and **118**, respectively, as shown in Fig. 2.

Slidably mounted within bore **80** of driver cylinder **56** is a tubular driver piston **88** having upper and lower coaxial bores **90** and **92** in connection with each other and extending therethrough. The external surface of driver piston **88** is formed with integral shouldered portion **94**. The lower end of wash pipe **42** is provided with an enlarged cylindrical portion **96**, having a shoulder **98**, which is slidably received within bore **90** of driver piston **88**.

Packing gland **100** is provided with coaxial through bores **102** and **104** defining an internal shoulder therebetween, and externally threaded portion **106**. Bore **104** is of the same diameter as bore **90** of driver piston **88** so that cylindrical portion **96** is retained within bore **90** when portion **106** of gland **100** is threadedly mounted within the upper end of piston **88**. The smooth cylindrical portion above enlarged portion **96** of wash pipe **42** is slidably received in bore **102** of gland **100**. The abutting engagement of shoulder **98**, of wash pipe **42**, with the internal shoulder of gland **100** prevents the total withdrawal of wash pipe **42** from gland **100**. Bore **102** of gland **100** is provided with axially spaced packing gland grooves **108** for the mounting of packings, which prevents the leakage of fluid past gland **100** and wash pipe **42**, as will hereinafter appear.

As clearly seen in Fig. 2, the upper end of bore **80** of driver cylinder **56** is provided with axially spaced circumferential packing grooves **110** for mounting packings, which prevent the leakage of fluid between driver cylinder **56** and driver piston **88**.

As also clearly seen in Fig. 2, driver piston **88**, which is the uppermost of three pistons, is slidably mounted on elongate tubular circulating sleeve **112** having a bore **111**. The lower end of driver piston **88** is provided with axially spaced circumferential packing grooves **114** which mount packings, which prevent the leakage of fluid between driver piston **88** and circulating sleeve **112**.

Turning now to Figs. 2 and 3, the details of construction of hollow or tubular upper and lower pistons **62** and **117** will now be particularly described. As heretofore described, upper piston **62** is provided with a partially threaded elongate top cylindrical portion **60**. This top portion **60** is partially counterbored as at **118** the same diameter as bore **86**, for a purpose to be described. Top portion **60** is integral with larger cylindrical bottom portion **120**. Upwardly from the lower end of cylindrical portion **120**, as viewed in Fig. 3, is a cylindrical shoulder **122** having substantially the same diameter as bore **124** of upper cylinder **66** for slidable mounting therein. Piston **62** is provided with an internally threaded bore **126** for receiving the upper threaded part of elongate cylindrical portion **128** of lower piston **117**. Also threadedly mounted on the threaded part of portion **128** is an internally threaded packing gland nut **130**, having a shoulder **132** similar in size to shoulder **122**, which cooperates with the lower end of piston **62** and shoulder **122** to form a circumferential packing groove **134** to mount a packing to prevent leakage of

fluid between piston 62 and bore 124 of upper cylinder 66. The upper face of nut 130 mounts a seal 136 to form a fluid seal between nut 130 and the adjacent lower end of piston 62. Nut 130 is fixedly retained in place by means of lock or set screw 138, while lock screw 140 fixedly secures piston 62 on upper portion 128 of lower piston 117.

Lower piston 117 is similar in construction to piston 62 having an enlarged cylindrical portion 142 from which a shoulder 144 projects, which defines with shoulder 146 of gland nut 148 a packing groove 150 for mounting a packing, and slidable within bore 151 of lower cylinder 70. Lower piston 117 and gland nut 148 are threaded on cylindrical tubular connector mandrel 152 and held in fixed assembled relation thereon by set screws 154 and 156, respectively.

As clearly seen in Fig. 3, the upper end of the internal bore of lower cylinder 70 is provided with a circumferential groove 158 for a packing to prevent leakage between portion 128 of piston 117 and portion 68 of lower cylinder 70.

The upper end of drain sleeve 76 is provided with an internal circumferential groove 160 for a packing to prevent the leakage of fluid between portion 74 of sleeve 76 and connector mandrel 152. The lower end of connector mandrel 152 is threadedly received in a threaded opening in the upper end of lower tool connector 162, having a bore 161, and secured therein by set screw 163. The lower end of lower tool connector 162 is provided with a pipe threaded portion 164 for connection to the anchor slip assembly, to be described.

As clearly seen in Figs. 2 and 3, circulating sleeve 112 extends through bores 84, 86, and 118, upper and lower pistons 62 and 117, respectively, and terminates partially through connector mandrel 162. The outside diameter of the circulating sleeve is cut down or reduced from a point just above bore 84, as indicated at 113, throughout its remaining length to its lower end to define a fluid passage 166 between circulating sleeve 112 and pistons 62 and 117 and connecting mandrel 152, for a purpose to be described.

Pressure chamber 168 beneath upper piston 62 is connected to passage 166 by means of aperture 170 while pressure chamber 172 is connected to passage 166 by means of aperture 174.

By-pass apertures 176 extend through the walls of by-pass cylinder 50 just above drain cylinder 56. Apertures 178, 180, and 182 also extend through the walls of upper cylinder 66, lower cylinder 70, and drain sleeve 76, as clearly seen in Figs. 2 and 3, for a purpose to be described.

It should be noted here that between the lower end of drive piston 38 and shoulder 32 there is a trapped fluid chamber 184—see Fig. 2.

Threadedly secured to portion 164 of tool connector 162 is an anchor slip mandrel 186 having an axially extending bore 188, therethrough—see Fig. 4. Equally spaced about the periphery of anchor mandrel 186 are three groups of anchor activating wedge steps, generally indicated by the reference numeral 190 and defined by oblique surfaces 192 and surfaces 194 perpendicularly disposed thereto. The lower end of anchor mandrel 186 is formed with a reduced diameter portion 196 (see Fig. 5) defining a shoulder 198 and a threaded end 200, for a purpose to be described. Apertures 202 extending transversely to the axis of anchor mandrel 186 open into bore 188.

Mounted in coaxial surrounding relation to anchor mandrel 186 is a tubular anchor slip retention member 204 which serves to retain stepped anchor slips 206 on activating wedge steps 190, as will be more particularly described.

Member 204 is provided with three circumferentially spaced slots 208 which permit the slips 206 mounted on wedge steps 190 to extend therethrough. The exposed

surface 210 of each slip 206 is toothed or serrated, as clearly seen in Fig. 4, for its well-known gripping function, while the ends of slips 206 are shouldered as at 212 for mounting retention and retracting springs 214. Lock nut 216 having a bore 218 is slidably mounted on anchor mandrel 186 and is threadedly connected to the upper end of member 204. Lock sleeve 220 is secured to the lower end of member 204 as by screws 222. As clearly seen in Fig. 4, lock sleeve 220 has upper tongue portions 224 extending into lower slots in the slips which serve to retain the lower end of slips 206 in the slots. The upper shoulders 212 of slips 206 fit under and are retained by elements 226 secured to member 204.

Coil spring 228 is mounted between shoulder 198 on reduced diameter portion 196 and shoulder 199 of lock sleeve 220. Packings 230 are mounted beneath shoulder 199 and are retained therein by packing nut 232. Space 234 is provided beneath packing nut 232. Fishing tool connector 236 having a threaded portion 238 is threadedly mounted on threaded end 200 of anchor mandrel 186 and serves to mount packings 240 and packing nut 242 between lock sleeve 220 and fishing tool connector 236, as clearly seen in Fig. 5. Set screw 244 serves to retain fishing tool connector 236 on mandrel 186. Fishing tool connector 236 has a bore 248 extending therethrough in communication with bore 188.

What may be termed an elongated body member is formed by the cap 34, barrel 50, driver cylinder 56, piston 62, means connecting the piston 62 to mandrel 152, tool connector 162, anchor slip mandrel 186, and lower tool connector 236.

The operation of the novel pulling and/or anchor release tool of the present invention will now be particularly described.

As clearly seen in the drawings, the bores 30, 44, 90, 92, 111, 161, and 188 are all in connection and define a fluid passage for a circulating media such as water for circulating a wash or lubricating fluid in the tool, and in addition for developing pressure to set anchor slips 206 and activating the fishing tool, not shown. It will also be noted from the drawings that chambers 184, 168, and 172 are all connected by passages or bores 84, 86, 118, 166, 170, and 174 to define a closed fluid system from which a fluid media therein cannot escape. This later fluid system is filled with a lightweight fluid media such as a light oil, for a purpose which will appear.

Tool 20 is lowered into a well casing by means of pipe string 22 and surface equipment, not shown, whenever a lodged object is in the well and needs to be loosened or retrieved before drilling operations can continue. When the fishing tool strikes an object lodged in the casing, fluid pressure is applied through bores 30, 44, 90, 92, 111, 161, 188, and then through port 202 to expansible chamber 234. This fluid pressure reacts on the fishing tool, not shown, and results in the upward movement of sleeve 220 which upward movement forces slips 206 outwardly on wedge steps 190 to firmly engage the walls of the casing and thereby set the tool so that the fishing tool portion can be operated by the surface equipment to positively grapple the lodged object. Oftentimes the tool has to be repositioned to permit the fishing portion of the assembly to take a better grip on the object, and whether the tool has to be repositioned or has gripped the object, the anchor slips must be released before the assembly can be moved within the well casing. In many instances the anchor slips have been set so firmly within the casing that ordinary pull by the surface equipment is insufficient to release the slips without severe damage or failure of the tool.

In the aforedescribed condition wherein slips 206 are firmly wedged within the casing of the well bore, the fishing string 22 is lowered allowing the full weight of string 22 to depress mandrel 26 which in turn lowers wash pipe 42 connected thereto. Downward movement of mandrel 26 transmits the full weight of string 22

through the abutment of portion 40 with gland 100 to driver piston 88. Forceful downward movement of driver piston 88 is transmitted to the trapped fluid media in chamber 184. The pressure on the fluid media in chamber 184 is transmitted equally throughout the fluid media via passages 84, 86, 118, 166, and chambers 168 and 172. Pressure in chambers 168 and 172 reacts between piston 62 and cylinder 68 and piston 117 and drain sleeve 76, respectively. The result of the action of the pressurized fluid media is to force pistons 62 and 117 upwardly and consequently driver cylinder 56 and bypass cylinder 50, connector mandrel 152, lower tool connector 162, and anchor mandrel 186 connected thereto, and, at the same time, interconnected upper cylinder 66, slidable on portion 60, lower cylinder 70, and drain cylinder move downwardly.

As a result of the aforedescribed upward and downward movements of the aforementioned elements, the end of drain sleeve 76 abuts the top of slidable lock nut 216, as shown by phantom lines 250 (Fig. 4). Continued movement in the aforedescribed manner results in downward pressure being applied to slips 206 through nut 216 and upward pull on anchor mandrel 186 through the connection to pistons 62 and 117. As a result, the anchor slips 206, which were expanded for anchoring in the casing as shown in Fig. 6, can be retracted to their full depth, by means of springs 214, to the position shown in Fig. 4. In this manner by a very high steady pressure slips 206 can be easily and efficiently released from a wedged condition without failure, as might be the case where impact forces are employed to effect the releasing action. As an illustration of the tremendous even releasing pressures available in the present tool, assume a fishing string length of 3600 feet of 2 inch diameter tubing. The weight of such tubing would be 36,000 pounds the mechanical application of this weight through the trapped fluid media would result in a working force in the magnitude of 52,000 pounds effecting release of the slips. In the case of a fishing string of the same length but having a diameter of 2⅞ inches the magnitude of the releasing force would be in the order of 117,000 pounds. It can be readily appreciated that the steady and even application of forces of this magnitude will readily and easily and efficiently release the most firmly wedged anchor slips without any damage or failure due to sudden or abrupt application of impact forces.

During the operation, when mandrel 26 is depressed the ports 32 are exposed allowing the fluid in bore 30 to pass through ports 32 into chamber 35 and out of chamber 35 through ports 176 into the well casing. In this manner fluid pressure on the fishing tool is released during the withdrawal operation of the tool 20 from the well. If it is desired to drain the fluid in bore 30 and related passages from the tool 20, mandrel 26 can be depressed until splines 28 are beneath shoulder 36 of cap 34. The mandrel 26 is then rotated slightly which causes splines 28 to abut shoulder 36 and maintain the mandrel 26 in a depressed position thereby leaving bore 30, apertures 32, chamber 35, and passages 176 in connection to permit easy draining of the fluid therein. Once the fluid is drained, the mandrel 26 can be rotated until splines 28 realign with the spline grooves in cap 34 and then withdrawn to close apertures 32 and close off bore 30.

The invention may be embodied in other forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. A tool comprising an elongated hollow body member, means to slidably connect the upper end of said body member to the lower end of a pipe string, a freely movable driver piston mounted in the upper end of said body member, said driver piston having an upper end adapted to be contacted and moved by the lower end of said pipe string upon downward movement of said string, a circulating sleeve mounted in spaced relation to and within said body member, the lower portion of said driver piston extending into the space between said body member and circulating sleeve and fitting snugly therebetween, an inwardly extending shouldered portion on said body member, a first chamber formed by said body member, said circulating sleeve, the lower end of said driver piston and said shouldered portion, a release cylinder slidably mounted on said body member, a fixed piston on said body member, a second chamber formed by said body member and said release cylinder, said chamber being closed at its top by said piston and at its bottom by a second shouldered portion extending inwardly from said release cylinder, a slip cage, carrying slips, movably mounted on said body member below said release cylinder, said cage being adapted to be contacted and moved by said release cylinder upon downward movement thereof, a passage from said first chamber to said second chamber, a trapped fluid media substantially filling said passage and said chambers, whereby upon longitudinal movement of said string relative to said body said driver piston is contacted and caused to move downwardly, causing the fluid in said first chamber to move into said second chamber thereby moving said release cylinder upwardly and releasing said slips.

2. A tool as set forth in claim 1, wherein a multiplicity of second chambers is provided which successively communicate with said first chamber.

3. A tool as set forth in claim 1, wherein said string has a wash pipe attached to its lower end and wherein the lower end of said wash pipe has an enlarged portion slidably received in the bore of said driver piston, said driver piston having an inwardly extending shoulder at its upper end preventing withdrawal of said wash pipe from the bore of said driver piston.

4. A tool as set forth in claim 1, wherein said means to connect said string to said body member comprises a splined mandrel on the lower end of said string, slidably interfitted within a cap on said body member.

5. A tool as set forth in claim 1, wherein a continuous central fluid passage is provided that extends from the bore of said string through said driver piston, circulating sleeve, and the lower portion of said body member.

6. A tool as set forth in claim 5, wherein a port is provided in the lower portion of said body member, and wherein said port communicates with a third chamber located below said slip cage whereby fluid under pressure may be forced from said bore into said third chamber to move said cage upwardly and thus set said slips.

7. A tool adapted to be lowered into a well, comprising means to connect said tool to a tubular string, a barrel connected to said means, a driver cylinder connected to the lower end of said barrel, a freely movable driver piston mounted in said barrel having its lower portion extending into said driver cylinder, a circulating sleeve mounted in said driver cylinder in spaced relation thereto, thus forming a first chamber, said chamber being closed at its upper end by said driver piston, which fits snugly between said driver cylinder and said circulating sleeve and being closed at its lower end by a shouldered portion on said driver cylinder, a hollow cylindrical piston secured to the lower end of said driver cylinder, a release cylinder surrounding said driver cylinder piston, movable with respect to the same, and extending downwardly therefrom, said release cylinder having an inwardly extending shoulder, tubular means con-

nected to and extending downwardly from said last-named piston, a second chamber formed by said last-named piston, said release cylinder, said inwardly extending shoulder, and said tubular means, a slip cage mounted on said tubular means below said release cylinder, slips carried by said cage for movement therewith, a passage in said circulating sleeve extending from said first chamber to said second chamber, said chambers and passage being filled with a fluid, whereby upon release of said string the same moves downwardly due to its weight to engage said driver piston and force fluid from said first chamber to said second chamber which in turn causes said release cylinder to move downwardly, thereby causing said slip cage and slips to move downwardly to release the slips.

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