March 5, 1963 W. G. GREEN 3,079,999

OIL WELL SERVICE TOOL ASSEMBLY

Filed May 10, 1957 4 Sheets-Sheet 1

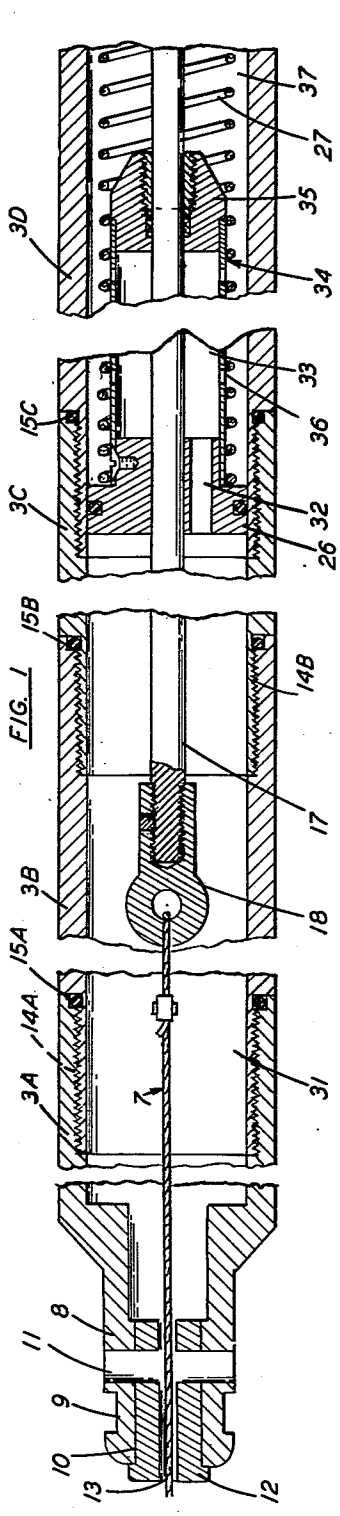


FIG. 1

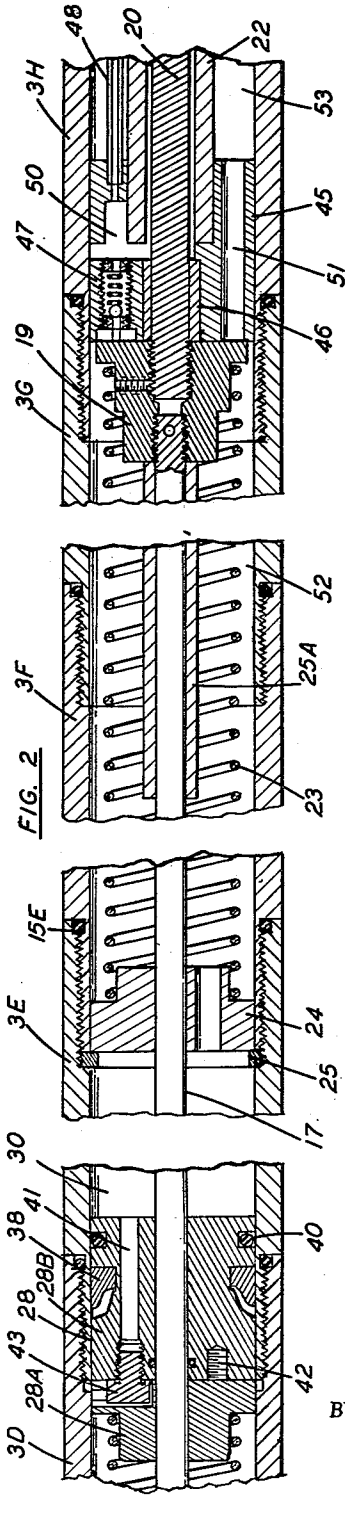


FIG. 2

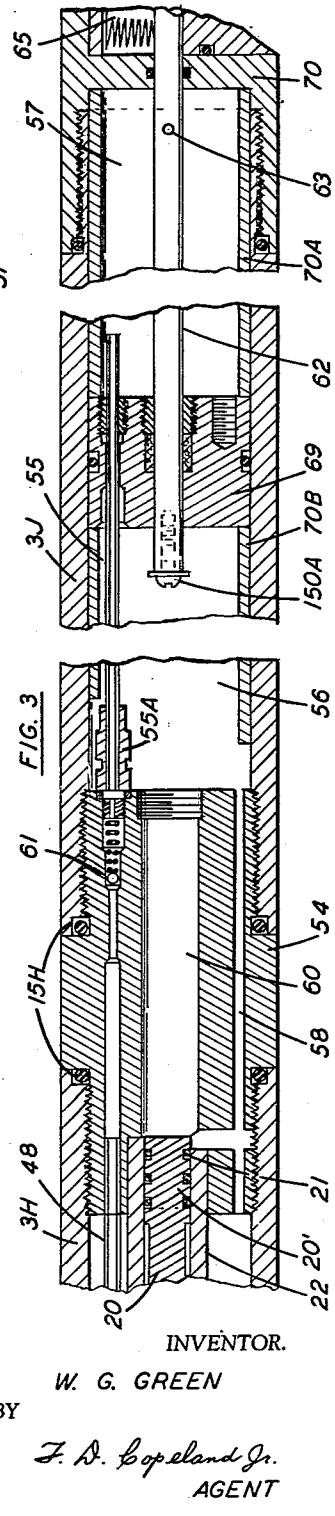


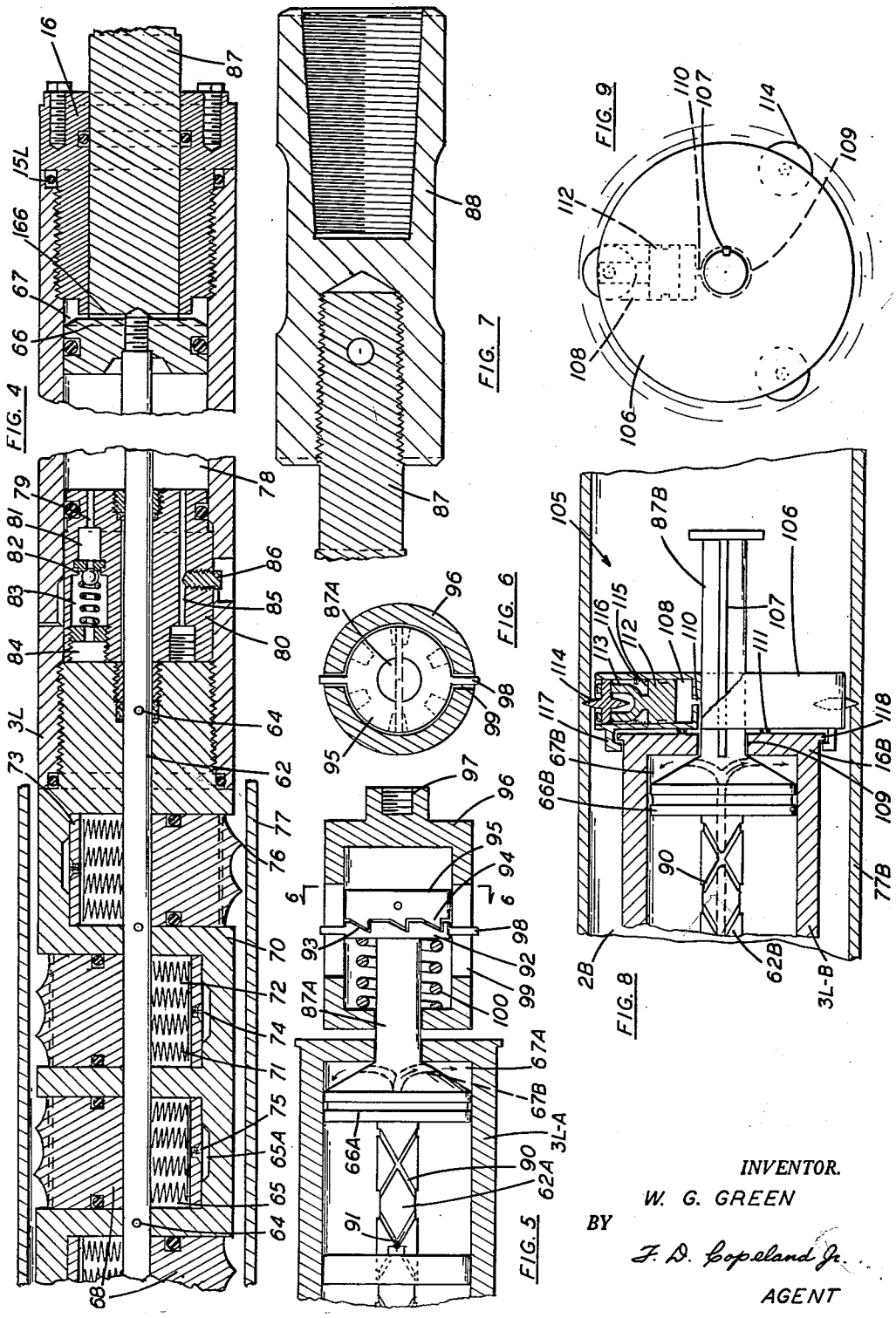
FIG. 3

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FIG. 10

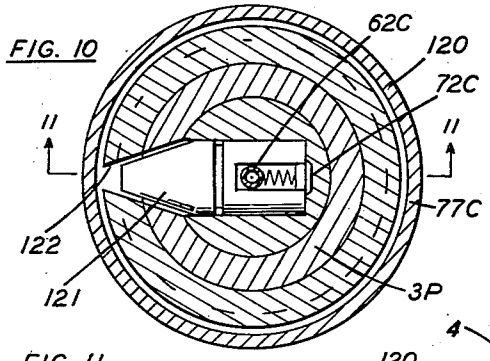


FIG. 11

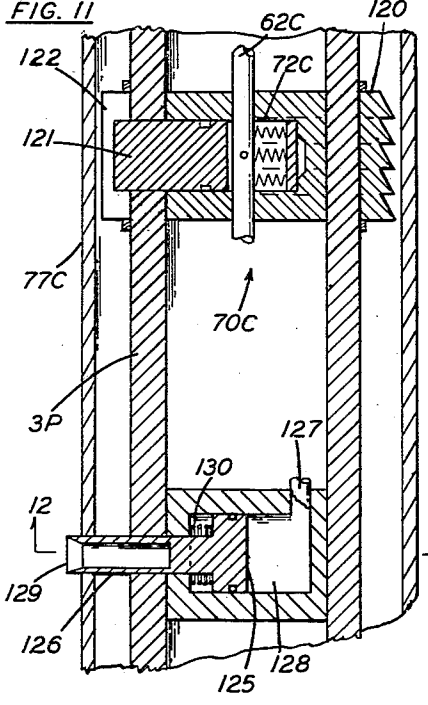
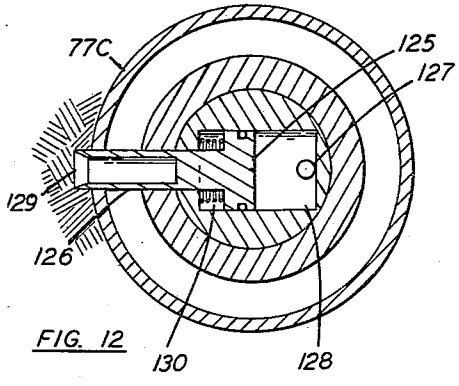


FIG. 12



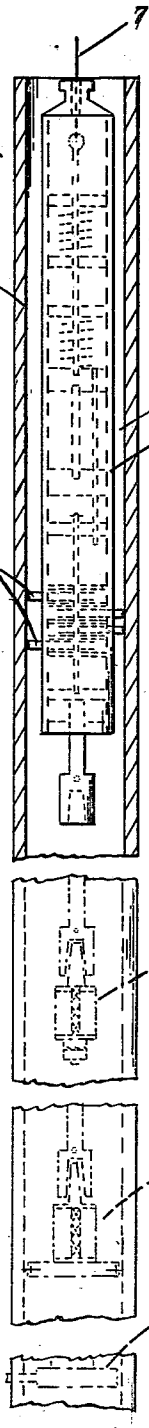
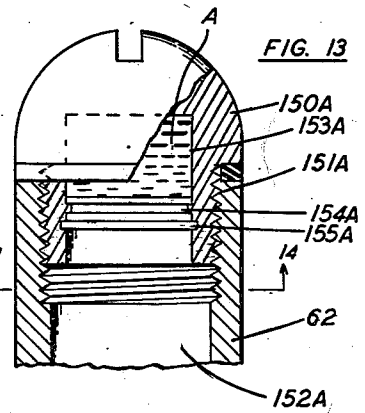


FIG. 15

FIG. 13



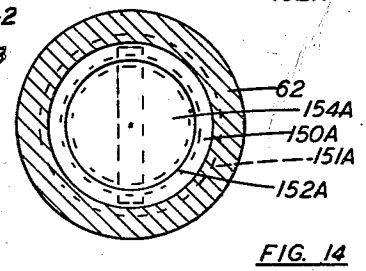


FIG. 14

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OIL WELL SERVICE TOOL ASSEMBLY

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FIG. 16

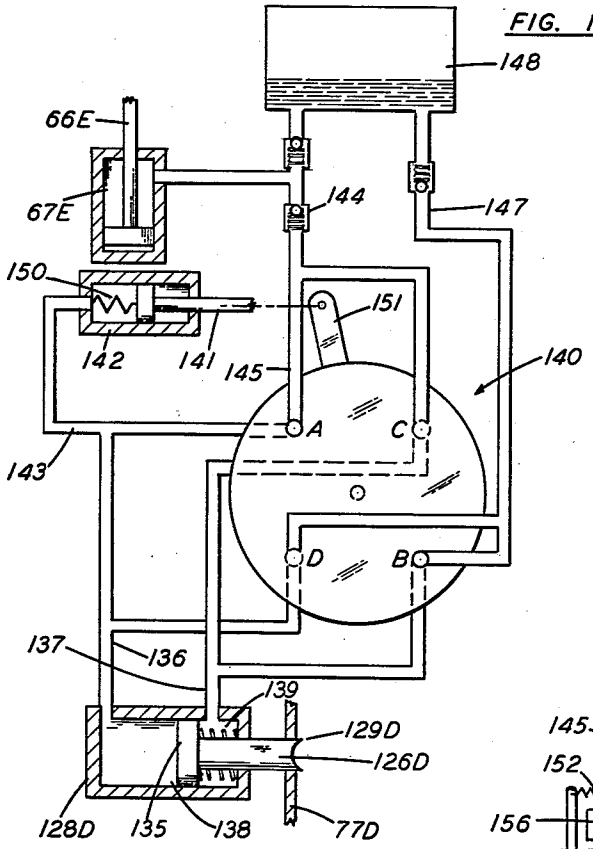
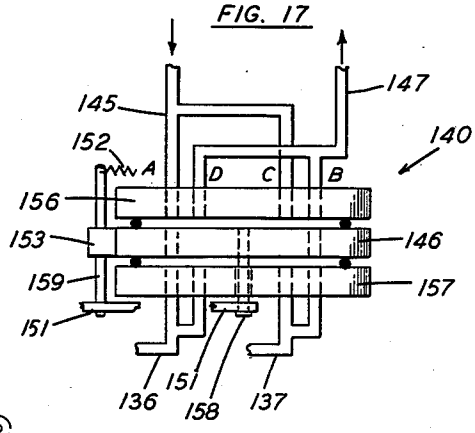


FIG. 17



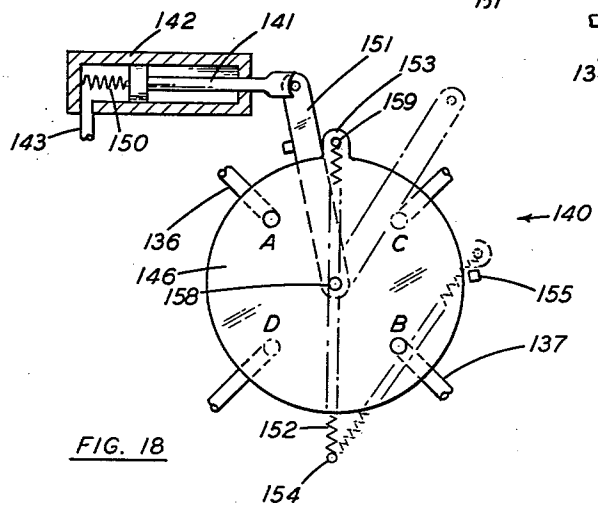


FIG. 18

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United States Patent Office

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OIL WELL SERVICE TOOL ASSEMBLY

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Filed May 10, 1957, Ser. No. 658,325
15 Claims. (Cl. 166—177)

This invention relates generally to differential force tools and is particularly adapted for use in but not limited to that class of tools known as oil well servicing equipment, which tools are lowered into a well bore to perform a specific operation a substantial distance below the surface.

The primary object of this invention is to provide a long thin tool for applying a differential force between stationary and movable parts of the tool when the latter is operating in extremely close lateral quarters.

Another object is to provide a long thin tool for applying impact forces between a stationary and a rotary movable part of the tool by the application of an input force in a longitudinal direction only.

A further object is to provide a tubular tool of this type in which the movable part thereof is equipped with a cutting tool.

A still further object is to provide a tubular tool of this type in which the movable part is equipped with a laterally projecting perforating tool.

And a still further object is to provide a tubular tool of this type in which the movable part is equipped with a sampling chamber.

And another object is to provide a longitudinal tubular tool for inserting in a pipe of slightly larger diameter than the tool and for cutting the pipe in two by the application of a vertical input force to the tool.

And yet another object is to provide an oil well servicing tool for inserting in a well tubing for applying a series of quick jarring forces to another tool stuck in the tubing by the application of an input pull in an upward direction only, and converting this input force into rotary motion before applying it to the stuck tool as a repetitive jarring force.

An additional object is to provide a tool for engaging and removing stuck equipment in which an input pull force in an upward direction only is converted into a greatly increased upward force combined with a spring activated repetitive jarring force on the stuck equipment.

And still another object is to provide an oil well servicing tool for inserting in a well bore or tubing for the purpose of pulling another tool which is stuck therein, which servicing tool includes safety provisions to permit its removal from the well even though the stuck tool cannot be retrieved.

These and other objects and advantages will be apparent from an examination of the following specification and drawing in which:

FIG. 1 is a side elevational sectional view of the topmost section of the oil well tool body of this invention.

FIG. 2 is a side elevational sectional view of the next successive section of the oil well tool body of FIG. 1.

FIG. 3 is a continuation of the tool body of FIGS. 1 and 2.

FIG. 4 is a continuation of the prior views and shows the lowermost section of the tool body of this invention.

FIG. 5 is a fragmentary side elevational sectional view of the lower end of a modified tool body of the preceding figures and showing the tool body operatively connected to a jarring device to assist in pulling another tool which is stuck in the well bore.

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 5.

FIG. 7 is a continuation of the piston of the device in FIG. 4 when the tool body is operatively connected to a rod socket.

FIG. 8 is a fragmentary section similar to that of FIG. 5 in which the tool body is operatively connected to a pipe cutting device.

FIG. 9 is an end view of the cutting device of FIG. 8.

FIG. 10 is a cross sectional plan view of the modified holding device shown on the tool body of FIG. 11.

FIG. 11 is a modified tool body employing a perforating tool unit which may be used with either tool body.

FIG. 12 is a cross sectional view taken along the lines 12—12 of FIG. 11.

FIG. 13 is an enlarged detail view of the safety device employed to permit recovery of the tool assembly of this invention should the latter become stuck in a well bore.

FIG. 14 is cross sectional view taken along the lines 14—14 of FIG. 13.

FIG. 15 is a cross sectional view through a well tubing showing the installation therein of the tool assembly of this invention.

FIG. 16 is a partly schematic diagram of the hydraulic perforator circuit.

FIG. 17 is a side elevational view of the valve unit detached from the hydraulic system of FIG. 16.

FIG. 18 is a plan view of the rotary valve of FIG. 17 but with the top plate removed for clarity of illustration, and with the second valve position shown in phantom outline.

Reference is herein made to the applicant's co-pending patent application of which this application is a continuation in part, entitled: "Fishing Tool Assembly," Serial No. 634,647, filed January 17, 1957, now Patent No. 2,978,030.

Referring now more partciularly to the characters of reference on the drawing, it will be observed that in FIG. 15 the complete tool assembly indicated generally at 2 consists basically of a tool body 3 which is held in place in the well bore tubing 4 by means of a holding piston assembly 5 and which tool body supports and applies a differential operating force to a tool unit indicated in phantom at 6. This entire assembly 2 may be raised and lowered in the well bore by means of a wire line 7 and after holding assembly 5 has engaged the inner surface of tubing 4, the wire line 7 may be further operated to actuate the tool units 6, 6A or other tool units.

The tool body 3 is constructed in several separable housing sleeve sections 3A, 3B, etc., to facilitate manufacture and assembly. The topmost section 3A includes a socket head 8 having wrench flats 9 and having an axial bore 10 and a transverse hole 11 communicating with one another. A hardened bushing plug 12 having a wire line opening 13 is inserted into bore 10 to both centrally guide the wire line 7 and resist the wear that the vertical motion of the wire line would normally impart to the more expensive socket head 8. Section 3A is threadedly attached at 14A to the next successive housing section 3B and the connection at 14A is sealed by O ring 15A. Section 3B is similarly connected at 14B to section 3C with O ring 15B therebetween and so on down the line to 3L to which the bottommost plug and bushing 16 is attached. A relatively long pull rod 17 extends axially through the sleeve sections 3A—3G and is attached at its upper end to a wire line engaging eye 18 and at its lower end to a cap 19 which itself is attached to a small diameter piston 20 having a piston head 20' with O rings 21. Piston 20 reciprocates in an axially extending cylinder 22 in direct response to the upward pull of wire line 7 and the downward return force of compression spring 23 which seats at its lower end on cap 19 and at its upper end seat 24; the latter being normally held up against retainer ring 25

in section 3E. A stop sleeve 25A is disposed about the pull rod 17 and is adapted to engage the cap 19 and the seat 24 to limit upward movement of the pull rod relative to the housing. The upper end of rod 17 is guided and supported in an element 26 fixed to the upper end of the section 3C which also acts as the upper spring seat for balance spring 27. The lower end of spring 27 anchors on a moving element 28 which is movable longitudinally relative to the housing sleeve sections and to the pull rod 17 and functions as a single piece, but for convenience of installation is made in two parts 28A and 28B; its primary function being to maintain a balanced pressure on the fluid F trapped in cavity 30, and its secondary functions being to guide rod 17 and to seal out the well bore fluid F which usually fills the cavity 31 extending to transverse hole 11. Element 26 is provided with a longitudinal hole 32 which opens into cavity 33 of strainer unit 34 which terminates at plug 35. Strainer 34 includes a series of small holes 36 so that any fluid passing into cavity 37 from cavity 31 will be relatively clear and free of foreign matter which might deter operation. To further reduce the chances of foreign matter passing to the valves and other precision parts of this tool assembly, a sand catcher 38 has been installed on element 28. The movable element 28 does not permit fluid to pass by during operation due to O rings 40, however it includes a liquid passage hole 41 to permit its passage through liquid for removal when top part 28A is removed and a threaded pull rod is engaged in hole 42. Hole 41 is normally closed by a threaded plug 43 which may be readily removed during disassembly.

Cap 19 abuts against the top side of pump head 45 when piston 20 has reached the lower end of its stroke. The packing 46 and check valve 47 in head 45 cause fluid pressurized by piston 20 in cylinder 22 to pass into conveyor tube 48 from port cavity 50. A by-pass channel 51 in head 45 allows the pressures in cavities 52 and 53 to balance. Tube 48 passes completely through cavity 53 and engages pump base 54 which is itself threaded to both sleeve sections 3H and 3J. A similar tube 55 secured to the pump base 54 by a fitting 55A carries fluid across cavity 56 and into the tube entrance cavity 57. The pump head is fixed relative to the sections 3H and 3G even though it is not connected to either because it is rigidly connected by means of cylinder 22 to the pump base 54 which is threaded into both sections 3J and 3H. Cylinder 22 may engage the parts 45 and 54 by press fit or other means. This construction permits piston 20 to move longitudinally through the cylinder 22 as the cap 19 and rod 20 move relative to the pump head 45. Pump base 54 includes a through channel 58 which permits pressures in cavities 53 and 56 to balance, and channel 58 also connects directly to cylinder discharge area 60 to permit equalization of pressure when piston head 20 has reached its lowermost stroke. A check valve 61 prevents the escape of back pressure from cavity 57 so that all of the pressure in cavity 57 must enter tube 62 through ports 63 from whence it passes longitudinally through the tube 62 until it can pass out through ports 64 into holding cylinders 65 and through output piston ports 166 into output cylinder 67. The two sets of opposed pistons 68 are operatively positioned in cylinders or lateral bores 65 of holding unit 70 and are retained therein in a normally retracted position by virtue of springs 71 which are located in the open slots 72 of the pistons and expand against both the center tube 62 and the back wall 73 of the pistons 68. A small axial hole 74 in screws 75 in the back walls 73 permits the pressurized fluid to enter the countersunk area 65A of the cylinder 65 so that an outward force may be applied to the piston and the circular ridge 76 may be made to forceably engage the side wall of the well tubing 77 to hold the entire tool assembly 2 in place in the well. Liners 70A and 70B are disposed on opposite sides of the tube guide bushing 69. The liner 70A below the guide bushing 69 engages the upper end of the holding unit 70 or the lower end of section 3J to maintain the guide bushing spaced a predetermined distance from the holding unit 70. The upper liner 70B limits upward movement of the tube guide bushing 69 by engaging the pump base 54.

As pressurized fluid is forced into cylinder 67, the output piston 66 is raised a small distance and under a much greater total force than the force developed by power input piston 20 which moves through a relatively long stroke in cylinder 22. As piston 66 is raised it applies pressure to the fluid F trapped in cavity 78 and thus forces the fluid through a small hole 79 in baffle plug 80 which is located adjacent the lower side of holding unit 70. While fluid or gas is being forced through hole 79 from cavity 78 into chamber 81, the upward movement of piston 66 is dampened, and when the pressure in chamber 81 is sufficient it raises check valve 82 to permit passage into a larger chamber 83 and into annular channel 84 and ultimately through channel 85 and out through choke 86 to the ambient well pressure surrounding tool assembly 2. The lower end shank 87 of piston 66 projects out through bushing plug 16 and beyond tool assembly 2 whereat it may engage a tool unit socket 88 which may engage a choke puller or other type tool (not shown).

In FIG. 3 it will be observed that a tube guide bushing 69 is installed inside section 3J intermediate between the pump base 54 and the holding unit 70. This bushing 69 is fixed relative to section 3J and tube 55, but will permit tube 62 to slide vertically therethrough.

By a slight modification of the piston as shown in FIG. 5, the upper projecting tube 62A is equipped with grooves 90 which align with a guide pin 91 secured to the housing 3L–A to cause the tube 62A and consequently piston 66A to turn in a clockwise direction when the latter is moving up the cylinder 67A. Curved ports 67B communicate with the interior of the tube 62A and the underside of the piston 66A to cause the flow of fluid beneath the piston to move it upwardly. In so rotating, the lower shank 87A carries its attached jar ring 95 in the direction necessary to cause its projecting tapered teeth 94 to ride up and over tapered tooth grooves 93 of the floating jar ring 92 so that at each instance that tooth 94 first engages a new groove 93 there is a sharp drop and a jar is imparted through rings 92, 95 and housing 96 to whatever type tool is engaged in threaded socket 97. Floating jar ring 92 has projecting lugs 98 which slideably engage slots 99 so that the ring 92 may move longitudinally against spring 100 in response to the movement imparted it by the piston jar ring 95, but may not rotate relative to housing 96. In the device shown in FIGS. 5 and 6, the central tube 62 of FIG. 4 has been replaced by a rotary tube 62A having grooves 90, and the shank 87 has been replaced by shank 87A to which is attached a jar ring 95 by means of a pin (not numbered). The housing section 3L of FIG. 4 has been replaced by the housing 3L–A of FIG. 5. The balance of the tool assembly 2 shown in FIGS. 1–4 remains unchanged. Likewise the housing 3L–B and tube 62B of FIG. 8 replace the corresponding parts of FIG. 4 and the balance of the tool 2B corresponds to the tool 2 of the other figures. The lower end of the housing 96 includes a threaded socket 97 which will permit a stud to join housing 96 and the tool socket 88 for operational purposes.

Another tool unit for use in tool assembly 2 is the rotary pipe cutter unit 105 shown in FIGS. 8 and 9. In this unit, the piston shank 87B extends through a cutter housing 106 and is keyed thereto to rotate therewith by means of key 107. Housing 106 is circular in plan and is slightly smaller than the inside diameter of tubing 77B. At spaced radial locations, housing 106 includes a multiplicity of hydraulic cylinders 108 which are pressurized by fluid from cylinder 67B which passes through the annulus 109 which surrounds shank 87B and is directly channelled to cylinder 108 through port 110. A rotating seal 111 prevents leakage of fluid between housing 106 and the bottom 16B of tool assembly 2B. Each cylinder

108 includes a piston structure 112 which has a yoke 113 for rotatably supporting cutter wheels 114. Cutter piston 112 also includes a spring seat 115 against which compression spring 116 acts to return piston 112 to its retracted position after the fluid pressure is released. The bottom 16B is shown in FIG. 8 to be integral with sleeve section 3L, whereas it may be made detached for construction purposes as will also probably be required in the case of retainer 117 which rides over projecting lip 118 of the bottom member 16B. As pressure is introduced through tube 62B into cylinder 67B a portion of the fluid passes through annulus 109 and into cutter piston cylinder 108 so that cutter wheel 114 is forced to dig into the side wall of tubing 77B at the same time that housing 106 is made to rotate by the action of grooves 90 as previously described when piston 66B is moved upward.

A modified embodiment of the holding unit is seen in FIGURES 10 and 11 to comprise a toothed collar 120 which surrounds the tool assembly sleeve section 3P and a tapered nose piston 121 which operates outward from a position within sleeve section 3P to expand collar 120 by the forceful engagement with tapers 122 at the ends of collar 120, adjacent a radial split in the collar. The central tube 62C delivers pressurized fluid to the holding piston cylinder 72C in a similar manner as that described relative to FIG. 4.

An additional tool unit which may be adapted to and operated by the tool body 3 is shown in FIGS. 11 and 12 to be an outwardly expansible piston 125 having a relatively long partially hollow piston rod 126. When pressurized fluid is introduced through port 127 into cylinder 128, the sharp cutting edge 129 is forced through a tubing 77C and into the surrounding earth layer so that upon retraction of piston 125 by springs 130 or other means, a sample of the side wall material may be recovered and brought to the surface for examination.

In the event difficulty may be encountered in retracting the side wall sampler piston 125 or a similar perforating piston 135 there has been provided a hydraulic retracting system as shown in FIGS. 16–18. In this system, fluid lines 136 and 137 are connected to the expansion cylinder area 138 and the retraction cylinder area 139, respectively, of cylinder 128D in body section 3Q. A quick acting hydraulic valve 140 is connected to lines 136 and 137 so that after cutting edge 129D of piston rod 126D has penetrated the tubing 77D, the path of fluid immediately changes from line 136 to line 137 to apply a large retracting force on the piston. The actual control of valve 140 is through a valve tripping piston 141 operated from cylinder 142 which is supplied by fluid line 143 which is in communication with pulling piston cylinder 67E. When the pressure in cylinder 67E due to the upward movement of piston 66E exceeds the loading pressure of check valve 144, fluid is directed through line 145 to both input ports A and C of valve 140. However, since the center disk 146 of the valve is in the position shown in FIG. 18, fluid will only flow through port A and line 136 to the expansion cylinder area 138; line 137 then acts as a return line and directs fluid through port B and into return line 147 to reservoir 148. After piston 135 has completed its operation the pressure in area 138 will build up sufficiently to overcome the pressure of tension spring 171 and tripping piston 141 will move forward and carry valve lever 151 with it until the valve holding spring 152 has exceeded its dead center whereupon it will pull lug 153 toward its anchor 154 until the lug strikes a positioning stop 155. At this point the ports C and D of the top, bottom, and center disks 156, 157 and 146 will be in alignment and open, and ports A and B will be closed. Fluid will then flow through line 137 to apply pressure to the retracting area 139 of cylinder 128D. Lever 151 is journalled about its mounting pin 158 so that it must engage pin 159 in pull lug 153 before disk 146 will move, and then as soon as dead center has been passed the disk is free to quickly spring to its second position against stop 155. The valve disk is reset by hand after the tool assembly has been removed to the surface.

In order to avoid the possibility of having the tool assembly 2 stuck in the well bore tubing 77, the small threaded cap screw 150A at the upper end of tube 62 (FIG. 3) is equipped with two safety features as may be examined in FIGS. 13 and 14. The threads 151A are of such a dimension that an internal pressure in cavity 152A of tube 62 which exceeds the design load for maximum operating pressure will strip the threads and thereby open cavity 152A to the atmosphere so that the pressure in the holding unit 70 will be released and the holding pistons will retract and the tool assembly 2 may be withdrawn from the tubing 77 by means of wire line 7. In the event threads 151A can not be ruptured, there has been provided an additional means of releasing the pressure from cavity 152A; which comprises a hollow cavity 153A in screw 150A which is filled with an acid A which will eat through the metal of the screw in a predetermined period, such as 6 hours. By this arrangement, if the tool assembly 2 is stuck in the well and all pulling attempts fail, then it is just a matter of time before the acid eats through the screw, and the holding pistons release their grip. To retain the acid A in screw 150A, a plug 154A having an acid resisting O ring is seated in cavity 153A and is held in place by a retainer ring 155A and the back pressure of the acid A. When the acid A has finally eaten through screw 150A, the plug 154A will either be blown out or turned longitudinally in cavity 152A so that the pressure may by-pass it, and the plug itself may also be destroyed by the acid if it fails to blow out first.

From the foregoing description it will be readily seen that there has been produced a device which substantially fulfills the objects of the invention as set forth herein. The invention is not limited to the exemplary constructions herein shown and described, but may be made in many ways within the scope of the appended claims.

What is claimed is:

1. A tool assembly for performing an operation in a well bore comprising: a tubular body, pump means in said body including a movable power input piston in said body and operatively connected with a hydraulic pressure system within said body, a movable power output piston partly within said body but extending therefrom and also operatively connected with said hydraulic system in a manner to receive a mechanical advantage force in from the operation of said input piston, a side well perforating bit on the free end of said output piston, and means to reverse the direction of the application of mechanical force by said hydraulic pressure system to said output piston to retract said bit and output piston.

2. A tool assembly for performing an operation in a well bore comprising: a tubular body, pump means in said body including a movable power input piston in said body and operatively connected with a hydraulic pressure system in said body, a movable power output piston partly within said body but extending therefrom and also operatively connected with said hydraulic system in a manner to receive a mechanical advantage force in from the operation of said input piston, a side wall sampling unit on the free end of said output piston, and means to reverse the direction of movement of said piston by reversing the direction of application of mechanical force by said hydraulic system to said output piston.

3. A tool assembly for performing an operation in a well bore comprising: a tubular body, pump means in said body including a movable power input piston in said body and operatively connected with a hydraulic pressure system, a movable power output piston partly within said body but extending therefrom and also operatively connected with said hydraulic system in a manner to receive a mechanical advantage force in from the

operation of said input piston, a well servicing tool unit attached to the free end of said output piston, means associated with said output piston to cause it to rotate while said force is being applied, said well servicing tool unit being a pipe cutter, rotary blades on said cutter, and means operatively associated with said hydraulic system to apply lateral pressure to said blades to assist in the cutting operation.

4. An oil well tool assembly for lowering into a well bore having zero or greater pressure, comprising: a stationary generally hollow housing, a movable power input unit including an input piston operating within said housing, a movable power output unit including an output piston operating partly within and partly beyond said housing, a series of holding pistons extending from said housing, a tool unit operatively associated with the externally projecting end of said output piston, and a hydraulic system interconnecting all said pistons in such a manner that a series of forces applied to said input piston will result in a force of greater magnitude than said forces being applied on said holding pistons to hold said tool assembly in place in said well and on said output piston to operate said tool unit, said movable input unit operating entirely within said housing, a wire line being extendable into the housing and engageable with one end of said input piston whereby said tool assembly may be lowered into the well and whereby said piston may be operated from the surface of the well.

5. An oil well tool assembly for lowering into a well bore having zero or greater pressure, comprising: a stationary generally hollow housing, movable power input unit including an input piston operating within said housing, a movable power output unit including an output piston operating partly within and partly beyond said housing, a series of holding pistons extending radially from said housing, metal embedding means at the free ends of said pistons for holding purposes, a tool unit operatively associated with the externally projecting end of said output piston, a hydraulic system interconnecting all said pistons in such a manner that a series of forces applied to said input piston will result in a force of greater magnitude than said forces being applied on said holding pistons to hold said tool assembly in place in said well and on said output piston to operate said tool unit, said movable input unit operating entirely within said housing, a wire line extending ito the housing and engaging one end of said input piston whereby said tool assembly may be lowered into the well and whereby said input piston may be operated from the surface of the well, a cap at the lower end of said housing closing off the housing and forming a lower hydraulic pressure area between said cap and said output piston, a tube attached to said output piston and extending upward therefrom but terminating below said input piston, a channel between the interior of said tube and the lower hydraulic area, and means to introduce fluid into said tube after the fluid has been pressurized by said input piston whereby said output piston will be raised by the passage of pressurized fluid through said tube to the lower back side of said ouput piston.

6. An oil well tool assembly comprising: a stationary generally hollow housing, movable power input unit including an input piston operating within said housing, a movable power output unit including an output piston operating partly within and partly beyond said housing, a series of holding pistons extending from said housing, a tool unit operatively associated with the externally projecting end of said output piston, a hydraulic system interconnecting all said pistons in such a manner that a series of forces applied to said input piston will result in a force of greater magnitude than said forces being applied on said holding pistons to hold said tool assembly in place in said well and on said output piston to operate said tool unit, said movable input unit operating entirely within said housing, a wire line extending into the housing and engaging one end of said input piston whereby said tool assembly may be lowered into the well and whereby said piston may be operated from the surface of the well, a cap at the lower end of said housing closing off the housing and forming a lower hydraulic pressure area between said cap and said output piston, a tube attached to said output piston and extending upward therefrom but terminating below said input piston, a channel between the interior of said tube and the lower hydraulic area, means to introduce fluid into said tube after the fluid has been pressurized by said input piston whereby said output piston will be raised by the passage of pressurized fluid through said tube to the lower side of said output piston, and frangible means associated with said piston tube to automatically release the pressure in said pressure area when said output piston has exceeded a predetermined stroke.

7. An oil well tool assembly comprising: a stationary generally hollow housing, movable power input unit including an input piston operating within said housing, a movable power output unit including an output piston operating partly within and partly beyond said housing, a series of holding pistons extending from said housing, a tool unit operatively associated with the externally projecting end of said output piston, a hydraulic system interconnecting all said pistons in such a manner that a series of forces applied to said input piston will result in a force of greater magnitude than said forces being applied on said holding pistons to hold said tool assembly in place in said well and on said output piston to operate said tool unit, said movable input unit operating entirely within said housing, a wire line extending into the housing and engaging one end of said input piston whereby said tool assembly may be lowered into the well and whereby said piston may be operated from the surface of the well, a cap at the lower end of said housing closing off the housing and forming a lower hydraulic pressure area between said cap and said output piston, a tube attached to said output piston and extending upward therefrom but terminating below said input piston, a channel between the interior of said tube and the lower hydraulic area, means to introduce fluid into said tube after the fluid has been pressurized by said input piston whereby said output piston will be raised by the passage of pressurized fluid through said tube to the back side of said output piston, frangible means associated with said piston tube to automatically release the pressure in said pressure area when said output piston has exceeded a predetermined stroke, and emergency means to permit said pressure area to be evacuated in the event said automatic means does not operate.

8. A well servicing tool assembly for performing an operation in a well bore tubing having a zero or greater pressure, comprising: a body, a stationary housing on said body, a movable section in said body, an hydraulic pumping system entirely within said body and operated exclusively by upward pulls on said movable section, a tool unit attached to the lower end of said movable section and activated by said pumping system thru said movable section, a series of staggered radially extending cylinders in said stationary housing and opening circumferentially thereof, holding pistons in said cylinders and adapted to move radially from said cylinders into binding engagement with said tubing in response to activation of said pumping system, means at the external ends of said pistons to bite into said tubing and prevent movement of said body in any direction, a flexible wire line attached to said movable section to permit operation of said hydraulic pumping system from the surface of said well, and means to release said holding pistons and permit said tool assembly to be removed from the well bore.

9. A well service tool assembly as in claim 8 wherein said last named means is operated by the movement of

said movable section to its maximum upper position, and safety means in said tool assembly to cause release of said holding pistons in the event the first named means becomes frozen.

10. A well tool for use in a well bore comprising: a tubular body; reciprocable pump means disposed within said body for limited longitudinal movement therein; means for attaching a line to said pump means to permit operation of said pump means from the surface to move the pump means upwardly in said body; biasing means in said body engaging said pump means for moving said pump means downwardly in said body; holding means mounted on said body for movement between retracted positions within said body and extended positions wherein said holding means engage said well to anchor said body against longitudinal movement in the well; tool operator means mounted in said body for limited movement relative to said body, said body having means for transmitting fluid pumped by said pump means to said holding means and to said operator means whereby said holding means is moved from retracted to expanded position upon movement imparted to said pump means and said tool operator means is moved relative to said body.

11. A well tool for use in a well bore comprising: a tubular body; reciprocable pump means entirely disposed within said body for limited longitudinal movement therein; means for attaching a line to said pump means to permit operation of said pump means from the surface to move the pump means upwardly in said body; biasing means in said body engaging said pump means for moving said pump means downwardly in said body; holding means mounted on said body for movement between retracted positions within said body and extended positions wherein said holding means engage said well to anchor said body against longitudinal movement in the well; tool operator means mounted in said body for limited movement relative to said body, said body having means for transmitting fluid pumped by said pump means to said holding means and to said operator means whereby said holding means is moved from retracted to expanded position upon movement imparted to said pump means and said tool operator means is moved relative to said body, said operator means being movable longitudinally relative to the body, said body and said tool operator means having coengageable means for imparting rotational movement to said operator means upon longitudinal movement of said operator means relative to said body, said operator means having a portion extending longitudinally outwardly of said body whereby well devices may be secured to said operator member to be actuated thereby upon longitudinal movement of said operator means relative to said body.

12. A well tool for use in a well bore comprising: a tubular body; reciprocable pump means mounted in said body for limited longitudinal movement therein; means for attaching a line to said pump means to permit operation of said pump means from the surface to move the pump means upwardly in said body; biasing means in said body engaging said pump means for moving said pump means downwardly in said body; holding means mounted on said body for movement between retracted positions within said body and extended positions wherein said holding means engage said well to anchor said body against longitudinal movement in the well; tool operator means mounted in said body for limited movement relative to said body, said body having means for transmitting fluid pumped by said pumping means to said holding means and to said operator means whereby said holding means is moved from retracted to expanded position upon movement imparted to said pump means and said tool operator means is moved relative to said body, said operator means being movable longitudinally relative to the body, said body and said tool operator means having coengageable means for imparting rotational movement to said operator means upon longitudinal movement of said operator means relative to said body, said operator means having a portion extending longitudinally outwardly of said body whereby well devices may be secured to said operator member to be actuated thereby upon longitudinal movement of said operator means relative to said body; and a cutting tool unit secured to said operator means and said body engageable with said operator means for rotation therewith.

13. A well tool for use in a well bore comprising: a tubular body; reciprocable pump means mounted in said body for limited longitudinal movement therein; means for attaching a line to said pump means to permit operation of said pump means from the surface to move the pump means upwardly in said body; biasing means in said body engaging said pump means for moving said pump means downwardly in said body; holding means mounted on said body for movement between retracted positions within said body and extended positions wherein said holding means engage said well to anchor said body against longitudinal movement in the well; tool operator means mounted in said body for limited movement relative to said body, said body having means for transmitting fluid pumped by said pumping means to said holding means and to said operator means whereby said holding means is moved from retracted to expanded position upon movement imparted to said pump means and said tool operator means is moved relative to said body, said operator means being movable laterally relative to the body, said operator means having perforating means attached thereto for perforating a well casing when said operator means is actuated by said fluid pumped by said pumping means.

14. A well tool for use in a well bore comprising a tubular body; reciprocable pump means mounted in said body for limited longitudinal movement therein; means for attaching a line to said pump means to permit operation of said pump means from the surface to move the pump means upwardly in said body; biasing means in said body engaging said pump means for moving said pump means downwardly in said body; holding means mounted on said body for movement between retracted positions within said body and extended positions wherein said holding means engage said well to anchor said body against longitudinal movement in the well; tool operator means mounted in said body for limited movement relative to said body, said body having means for transmitting fluid pumped by said pumping means to said holding means and to said operator means whereby said holding means is moved from retracted to expanded position upon movement imparted to said pump means and said tool operator means is moved relative to said body, said operator means having side well sampler means movable laterally outwardly when said operator means is actuated by said fluid.

15. A well tool comprising: a housing; pumping means mounted in said housing for limited longitudinal movement therein including a piston having means engageable by a wire line extending through one end of said body whereby said piston may be actuated by upward pulls imparted to said line at the surface; means biasing said piston downwardly in said housing; operator means movable longitudinally in said body including a piston having means extending outwardly of said body and movable longitudinally of the body by fluid pumped by said pumping means; and cooperable means on said body and said piston for rotating said piston when said piston is moved longitudinally relative to said body, said housing having means for transmitting fluid pumped by said pumping unit to said piston to cause said piston to move longitudinally relative to said body.

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