A fishing tool for fishing sucker rods from a subterranean well. A body of the tool is a machined top piece, a machined barrel piece and normally a machined bottom piece that all thread together. The bottom piece preferably retains a curved cast metal slip movable within grooves milled internally into the body. The slip moves upward to admit a rod into the tool and moves downward to capturing the rod in the tool. A lower end of a side opening provided in the barrel piece is level with an upper shoulder of the slip when the slip is at its lowest position so that the rod engages and is retained by both in the tool. The upper shoulder of the slip can optionally be provided with teeth. The bottom piece can be replaced with a bell and the top piece 16 can be replaced by a prior art fishing tool.
SUCKER ROD FISHING TOOL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a fishing tool for fishing sucker rods, tubings, pipe, pumps, plungers, plugs, tubing stops, packers, tools, anchors, obstructions, etc. from downhole in a subterranean well, such as but not limited to an oil producing, gas producing, injection or disposal well. More specifically, the fishing tool of the present invention is strong enough to retrieve up to 12,000 feet of rod at once, is designed to reduce stress on the tool so that it can be reused multiple times, is serviceable because it can be disassembled and repaired in the field, and is versatile since it can be combined with bells, adapters and other existing types of rod fishing equipment and accessories to successfully retrieve a wide range of items from subterranean wells.

2. Description of the Related Art

Prior art fishing tools generally are of three types: tools that are ose shock, tools that are tensioned or tools that are traps. An example of an ose shock tool can be found in U.S. Patent No. 1,869,861 issued to O’Bannon. These tools are designed to telescope over the part left in the well and interlock therewith to permit withdrawal of the part from the well by the tool. One problem with the ose shock tool is that they are designed to catch only on specific shaped items and therefore are limited in the types of items with which they can interlock. Also, the proper size of the tool must be used for the item to be fished. When the item shape and size is unknown, the operator must play a guessing game to find a tool that is the proper size to work. This often results in the several different sizes of items having to be run into the well before the proper size of the tool can be found. This is expensive in terms of time and manpower to try again and again to get the proper size of the tool for the situation. Furthermore, the tools have a tendency of slipping open when hardened, hard lined, brass, out of round or worn couplings are being fished. Lastly, the tools generally last for only one or two uses and become worn easily.

The second type is a bit type tool. The biting type of tool is also known as a slip tool which should not be confused with the ose shock tool type. An example of a bit type tool can be found in U.S. Patent Nos. 1,620,382 and 1,620,383 issued to O’Bannon. These tools are designed to receive the part left in the well within biting members, such as collets, which can be moved inward to bite into the part to attach the tool to the part in order to permit withdrawal of the part from the well by the tool. One problem with the bit type tools is that they are attempting to bite into a hard surface and therefore can slip. Also, the teeth of the bit type tool are only designed to catch the round rod body section of a sucker rod, and not the other items such as the head, wrench flat, pin shoulder, pin thread or coupling. Furthermore, the teeth on the slips generally last only for one or two uses before becoming worn off. Therefore the slips need to be replaced often between uses.

The third type is a trap type tool. These trap type tools have a mechanism that traps the part inside the tool so that the part is captured therein and can be removed from the well with the tool. An example of a trap type tool is a trap, issued in U.S. Patent No. 1,634,935 to Donnelly. In that patent, a hinged lift is provided within the tool so that after a shoulder of the part passes the lift, the lift springs back downward and traps the part within the tool. The lift of this invention is weak. Also, the tool is limited on the sizes of rods it can catch, limited on where it can catch the rod. The tool can become wedged and therefore limits the amount of pressure that this tool can exert when pulling an item from a well.

Another example of a trap type tool is taught in U.S. Patent No. 1,720,692, to Reynolds et al. This invention employs a slip which is pushed upward within the tool as the item enters the tool and then slides back downward below a shoulder of the item as the item moves upward and away from the slip through an opening provided in the sides of the tool. By sliding under the shoulder of the item, the slip traps the item within the tool as the tool is raised within the well, thereby allowing the item to be removed from the well by the tool.

Prior art mousetrap tools have several problems. First, because this type of tool is welded together, the barrel of this type of tool is weak and can not withstand large lateral strains such as those imposed on it when the slip and the item being pulled are wedge between the walls of the barrel. Also, the top of this type of tool is also welded to the barrel portion and this creates another weak area where the tool will break. A further problem with this type of tool is that the side opening provided in the barrel of the tool is located above the shoulder of the slip, causing the item to create a sideways pull and torque moment on the tool as the item is pulled. This torque moment imposes stress on the tool that causes the barrel of the tool to split open and fail. Still a further problem with this tool is that it can not be made in the sizes that are needed in the field. The geometry of the tool makes the walls too thin to hold the weight and tension of the rod string being pulled from the well. The rod string is also known as simply the rod, as working string, wire line tool string, or as tool string. A further problem with the tool is the way in which the slip is retained within the barrel of the tool. The slip is retained by shoulders that project into the barrel of the tool and retain the slip therein. There are two ways in which these shoulders are constructed, both of which are described in the Reynolds et al. patent. The first way is to mill slots into the interior surface of the barrel and then weld key stock into the slots to form the shoulders. The other way is to roll over the edges of two halves of the metal that will form the two halves of the barrel and then weld the two halves together to form the barrel with the rolled over edges forming the internal shoulders inside the barrel. The problem with these shoulders is that they can become bent and can prevent the slip from moving up and down within the barrel of the tool. When this happens, the tool is unable to attach to a rod and can not fish rod out of the well. Because the shoulders of prior art tools are either welded within the tool or formed as an integral part of the barrel of the tool, once they become damaged, they can not be economically repaired or replaced. This results in the tool no longer being functional and the tool must then be discarded.

Because of all these weaknesses in this tool, it generally will only be a single use tool and it can only pull approximately 5,000 pounds of force without breaking.

The present invention is a trap tool that addresses the problems found in prior art fishing tools. The design of the present tool is much stronger, has less stress concentrations, and no bending moments or torque when pulling. The present invention has increased wall thickness, is made of single pieces of metal that are threaded together or otherwise removably connected together instead of being welded together, and is designed to create a straight upward pull on the tool instead of a sideways force when pulling an item out of a well. Therefore, it can retrieve up to approximately 12,000 feet of...
rods at a time without breaking or withstand approximately 40,000 pounds of tension. The present tool is durable, reusable, reliable, has a long service life.

[0011] The cross sectional geometry design of the present invention allows for critical sizes to be made and allows a variety of sizes to be offered. In fact, nine sizes of the invention will be made available to the purchasing public. This allows the invention to be constructed so that it can fish ¼ inch to ½ inch SHF or slim hole couplings in 2¾ inch tubing which is not possible with prior art tools. Slim hole couplings have the same outside diameter as the shoulder on the sucker rod whereas standard couplings have outside diameters that are larger than the shoulder of the sucker rod.

[0012] The present invention is a catch-all design that does not require the use of multiple sizes of sockets, such as required by overshot socket types of fishing tools. The present tool eliminates the need for oversized tools, sockets, grapples and overshots.

[0013] Further, this tool will catch hard lined couplings, fiberglass, worn or out of round couplings. This tool is provided with a thread bottom end so that a variety of sizes of bells or adaptors can be employed with the tool. This tool can fish three rods from a well when an optional bottom piece with lip guide is used with the tool that assists in feeding the rods into the tool. The lip guide also allows the fishing tool to be utilized in horizontal wells. In horizontal wells the lip guide will guide the broken rod into the tool by rotating the tool from the surface. The lip will catch the rod and pull it over to the center of the fishing tool.

[0014] The design of the present tool allows it to be made with a smaller outer diameter which allows it to fit through cramped or bend tubing or tubing that is filled with scale or debris. Also the smaller diameter allows for fluid to more freely flow around the outer diameter of the tool. The design of the present tool allows the tool to be screwed apart so that additional features can be added to the tool and each part of the tool can be replaced or repaired in the field. Because the present tool is constructed of parts that thread together, the top portion of the tool can be removed and the tool can be attached to another tool, such as for example the O’Hammon biting type tool previously discussed, so that the two tools can be employed together, when it is desirable to do so.

[0015] Some operators will leave this fishing tool in the tubing during pumping. This is generally done when a rod is parted and the tool is deployed to fish the parted rod. Then, for some reason such as a stuck insert pump, time constraints, or for other reasons the tool is left in the tubing whilehitched onto the broken rod and the well is simply put back on to production with the tool being utilized as a coupler to mend the parted rod. Then the tool is retrieved the next time the well is pulled or when the tubing and or sucker rods must be pulled. This type of use will occur with this tool.

[0016] The present invention is also economical because it is reusable, field servable, and it is competitively priced. The present invention is also economical because it can produce a cost savings of approximately $10,000 to $30,000 per job on a deep well.

SUMMARY OF THE INVENTION

[0017] The present invention is a fishing tool for fishing sucker rods, tubing, pipe, pumps, plungers, plugs, tubing steps, packers, tools, anchors, obstructions, etc. from downhole in a subterranean well. The tool functions by trapping a broken sucker rod or other item to be fished out of the well within a barrel part of the tool’s body by means of a combination of a movable slip provided within the barrel part and a side opening provided in the barrel part. The body of the tool is constructed of parts that are each machined from single pieces of metal stock and provided with threads so that the pieces can be secured together to form the body. The body is comprised of a top piece and a barrel piece, and normally also is provided with a bottom piece. A slip, preferable constructed of cast metal, is movably retained within the body. The slip serves to hold the rod within the barrel piece of the tool so that the rod or other item to be fished out of the well can be removed from the well by the tool.

[0018] The top piece of the body of the tool is constructed of a solid metal stock and is provided with male threads on its top end for securing the tool to a rod string and with male threads on its bottom end for securing the top piece to the barrel piece of the tool. The top piece is also provided with a fluid channel extending from the bottom of the top piece to a flattened wrench flat on the top piece in order to provide fluid communication through the top piece. The purpose of the channel is to allow liquids that are trapped either above or below the top piece to move through the channel as the tool is raised and lowered within the well tubing of the well.

[0019] The barrel piece of the body is constructed of hollow tube stock. The barrel piece is provided with female threads on its top end for securing the barrel piece to the male threads provided on the bottom end of the top piece and provided with female threads on its bottom end for securing the barrel piece to the bottom piece. Internally the barrel is machined to provide two parallel, longitudinally oriented grooves in which the slip is movably retained within the barrel. The slip is inserted into the barrel with ears of the slip inserting in the longitudinal grooves before the bottom piece of the body is secured to the barrel piece so that the bottom piece then captures the slip within the barrel portion when the bottom piece is attached to the barrel piece. Because the bottom piece secures the slip within the barrel, in order to replace the slip, the bottom piece is unthreaded from the barrel piece and then the slip can readily be removed from the barrel and replaced, if desired.

[0020] The barrel piece is provided with a side opening that extends down and terminates on its lower end so that its lower end is level with the upper shoulder of the slip when the slip is at its lowest position. The position of the lower end of the side opening relative to the upper shoulder of the slip at its lowest position is important for the proper function of the tool because it insures that when a rod is attached to the tool, the pulling force is directed vertically on the tool and there is no sideways pull on the tool.

[0021] The body is normally also provided with a bottom piece, although, the bottom of the barrel piece can optionally be welded shut to permanently retain the slip within the longitudinal grooves and the bottom of the barrel piece can be internally beveled instead of being provided with female threads at its bottom end.

[0022] However, the normal configuration is to have a bottom piece attached at the bottom end of the barrel piece. The bottom piece is also constructed of hollow tube stock. The top end of the bottom piece is provided with male threads for engaging the female threads provided on the bottom end of the barrel piece in order to secure the bottom piece to the barrel piece. The bottom end of the bottom piece is enlarged
externally to help in centering the tool within the tubing and is beveled internally to aid in feeding rod into the barrel of the tool.

Optionally, the bottom piece can be replaced by one of several sizes of existing bells. The bell can either be threaded directly onto the female threads provided on the bottom end of the barrel piece if the bell is provided with male threads that are compatible therewith, or alternately, can be secured to the barrel piece with an appropriate adaptor. The bell serves to guide the tool through larger size pipe interiors such as larger tubing sizes or production casing. The bell serves to guide the ported rod into the tool and allows the tool to stay centered in the pipe.

The slip is in a half moon shape, with its externally facing wall convex in shape and its internally facing wall concave in shape. Two ears are provided on the external surface of the slip for movable engagement with the longitudinal grooves provided internally within the barrel, as previously described. The bottom edge of the slip is beveled on its internally face in a half moon configuration to provide for smooth engagement of the slip with the rod as the rod enters the tool and pushes the slip upward. The top end of the slip is provided with a square shoulder against which an expanded surface of the rod or other item to be pulled will engage the slip as the tool is raised, as will be further described herein.

An optional slip can be employed instead of the standard slip. The optional slip is provided with a serrated or toothed shoulder on its top end instead of a square shoulder.

One limitation of the present invention is that it is not able to catch on a straight rod if the rod is parted more than ten inches above a rod coupling. However, the present invention can be coupled with an existing biting type fishing tool, such as an O'Bannon slip socket, in order to additionally catch those types of breaks. As previously stated, the biting type of tool is also known as a slip socket.

In order to attach a biting type fishing tool such as the O'Bannon device to the present invention, first the top piece of the present invention is removed from the barrel piece and then the bottom piece of an O'Bannon type combination overshot socket device is removed from its top piece. Next, the barrel piece of the present invention is attached to the top piece of the O'Bannon type device. The barrel piece of the present invention may be attached to the top of piece of the O'Bannon type device either by directly threading the two parts together if their threads are compatible, or alternately, by employing an adaptor to secure them together if their threads are not compatible.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a side view of a fishing tool for fishing sucker rods out of a well constructed in accordance with a preferred embodiment of the present invention.

FIG. 2 is a front view of the tool taken along line 2-2 of FIG. 1.

FIG. 3 is an enlarged view of the top piece of the tool associated with numeral 3 of FIG. 1 shown removed from the tool.

FIG. 4 is a front view of the top piece of the tool taken along line 4-4 of FIG. 3.

FIG. 5 is a top view of the top piece of the tool taken along line 5-5 of FIG. 3.

FIG. 6 is a bottom view to the top piece of the tool taken along line 6-6 of FIG. 3.

FIG. 7 is a cross sectional view taken along line 7-7 of FIG. 4.

FIG. 8 is a cross sectional view taken along line 8-8 of FIG. 4.

FIG. 9 is a side view of the barrel piece of the tool associated with numeral 9 of FIG. 1 shown removed from the tool.

FIG. 10 is a front view of the barrel piece of the tool taken along line 10-10 of FIG. 9.

FIG. 11 is a side view of the bottom piece of the tool associated with numeral 11 of FIG. 1 shown removed from the tool.

FIG. 12 is a bottom view of the tool taken along line 12-12 of FIG. 11.

FIG. 13 is a cross sectional view of the bottom piece of the tool taken along line 13-13 of FIG. 11.

FIG. 14 is a front view of the slip of the tool associated with numeral 14 of FIG. 2 shown removed from the tool.

FIG. 14A is a perspective view of the slip of FIG. 14.

FIG. 14B is a perspective view of an alternate slip.

FIG. 15 is a top view of the slip taken along line 15-15 of FIG. 14.

FIG. 16 is a cross sectional view of the slip taken along line 16-16 of FIG. 14.

FIG. 17 is a cross sectional view taken along line 17-17 of FIG. 10.

FIG. 18 is a cross sectional view taken along line 18-18 of FIG. 10.

FIG. 19 is a cross sectional view taken along line 19-19 of FIG. 10 with the slip shown in outline to indicate where it would normally be located.

FIG. 20 is a cross sectional view taken along line 20-20 of FIG. 10.

FIG. 21 is a side view similar to FIG. 11 of an alternate bottom piece of the tool.

FIG. 22 is a bottom view of the alternate bottom piece of the tool taken along line 22-22 of FIG. 21.

FIG. 23 is a cross sectional view of the alternate bottom piece of the tool taken along line 23-23 of FIG. 21.

FIG. 24 is a side view of a bell for optional replacement of the bottom piece of the tool.

FIG. 25 is a cross sectional view of the bell taken along line 25-25 of FIG. 24.

FIGS. 26-31 are perspective views of the steps involved in engaging a broken rod string located within a well with the tool.

FIG. 32 is a perspective view of the tool of FIG. 1.

FIG. 33 is an enlarged view of a section of rod string to be fished with the tool.

FIG. 34 is a top view of the broken rod string taken along line 34-34 of FIG. 33.

FIG. 35 is an enlarged side view of a tool that is constructed without a bottom piece.
FIG. 36 is an enlarged view of the tool and broken rod string from within circle 36 of FIG. 31.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to drawings and initially to FIGS. 1, 2, 26 and 32, there is illustrated a fishing tool 10 for fishing sucker rods 12, tubing, pipe, etc. from downhole in a well 14. The body of the tool 10 is constructed of parts or pieces 16, 18 and 20 that are each machined from single pieces of metal stock and provided with threads so that the pieces 16, 18, and 20 can be secured together to form the body of the tool 10. As shown in FIGS. 1 and 2, the body is comprised of a top piece 16 and a barrel piece 18, and normally also is provided with a bottom piece 20. A slip 22, preferable constructed of cast metal, is movably retained within the body, as will be more fully described hereinafter. The slip 22 serves to hold the rod 12 within the barrel piece 18 of the tool 10 so that the rod 12 or other item to be fished out of the well 14 can be removed from the well 14 by the tool 10.

Referring now to FIGS. 3, 4, 5, 6, 7, and 8, the top piece 16 of the body is constructed of a solid metal stock and is provided with male threads 24 on its top end 26 for securing the tool 10 to a rod string 12 and with male threads 28 on its bottom end 30 for securing the top piece 16 to the barrel piece 18 of the tool 10. The top piece 16 is also provided with a fluid channel 32 extending from the bottom end 30 of the top piece 16 to a flattened wrench flat 34 on the top piece 16 in order to provide fluid communication through the top piece 16. The purpose of the channel 32 is to allow liquids that are trapped either above or below the top piece 16 to move through the channel 32 as the tool 10 is raised and lowered within the well 14.

Referring to FIGS. 9, 10, 17, 18, 19 and 20, the barrel piece 18 of the body is constructed of hollow tube stock. The barrel piece 18 is provided with female threads 35 on its top end 38 for securing the barrel piece 18 to the male threads 28 provided on the bottom end 30 of the top piece 16 and provided with female threads 40 on its bottom end 42 for securing the barrel piece 18 to the bottom piece 20. Internally the barrel piece 18 is machined to provide two parallel, longitudinally oriented grooves 44 in which the slip 22 is movably retained within the barrel piece 18. These grooves 44 are milled with a rounded radius 46 at each of the edges, as shown in FIG. 20. The rounded radius 46 is employed instead of a pointed or squared off edge because this reduces the stress concentration at this point, thereby allowing the tool 10 to be stronger. The slip 22 is inserted into the barrel piece 18, with matching rounded ears 48 of the slip 22 inserting in the longitudinal grooves 44 before the bottom piece 20 of the body is secured to the barrel piece 18 so that the bottom piece 20 then captures the slip 22 within the barrel piece 18 when the bottom piece 20 is attached to the barrel piece 18. Having the bottom piece 20 also makes the tool 10 stronger by eliminating a shear plane of a weld at this point.

Because the bottom piece 20 secures the slip 22 within the barrel piece 18, in order to replace the slip 22, the bottom piece 20 is unhpartial from the barrel piece 18 and then the slip 22 can readily be removed from the barrel piece 18 and replaced, if desired. The barrel piece 18 is provided with a side opening 56. As shown in FIGS. 18 and 19, the walls adjacent to the side opening 56 are parallel with each other, thus allowing a rod coupling to move outward through the side opening 56, as will be more fully described hereinafter.

The side opening 50 extends down and terminates on its lower end 52 so that its lower end 52 is level with an upper shoulder 54 of the slip 22 when the slip 22 is at its lowest position. The slip 22 is shown in its lowest position in FIGS. 1, 2, 26, 27, 28, 30, 31, and 36. The position of the lower end 52 of the side opening 50 relative to the upper shoulder 54 of the slip 22 when the slip 22 is at its lowest position is important for the proper function of the tool 10 because it insures that when a rod 12 is attached to the tool 10, the pulling force exerted on the tool 10 is directed vertically on the tool 10 and there is no sideways pull on the tool 10.

Referring to FIGS. 11, 12, and 13, the body is normally also provided with a bottom piece 20 that attaches at the bottom end 42 of the barrel piece 18. The bottom piece 20 is also constructed of hollow tube stock. Male threads 56 are provided on the top end 58 of the bottom piece 20 for engaging the female threads 40 provided on the bottom end 42 of the barrel piece 18 in order to secure the bottom piece 20 to the barrel piece 18. The bottom end 60 of the bottom piece 20 is enlarged externally to help in centering the tool 10 within the well casing or the well 14 and is provided with a internal bevel 62 to aid in feeding rod 12 into the barrel piece 18 of the tool 10.

Optionally, as illustrated in FIGS. 21, 22 and 23, an alternate bottom piece 20A can be employed that has a lip guide 64 provided in the bevel 62 of the bottom end 60 to facilitate guiding the rod 12 into the tool 10, particularly when the rod 12 is bent or when the well 14 is filled with debris or scale. The optional lip guide 64 provides the tool 10 with the ability to rotate over the parted rod 12. This is valuable because in most cases the parted rod 12 is up against the side of the inner wall of the tubing 100. Sometimes it is freely against the wall and can easily move to the center when the tool 10 sits over it to catch it. But sometimes the parted rod 12 is bent or kinked over to the side of the wall, thereby making it more difficult to side over to the center. The lip guide 64 provides a gripping surface to rotate the rod 12 over toward the center so that it can more easily enter the tool 10.

Also, as illustrated in FIGS. 24 and 25, the bottom piece 20 can be replaced by one of several sizes of existing bells 66. The replacement bell 66 can either be threaded directly onto the female threads 40 provided on the bottom end 42 of the barrel piece 18 if male threads 68 provided on the bell 66 are compatible therewith, or alternately, can be secured to the barrel piece 18 with an appropriate adaptor (not illustrated). The bell 66 serves to guide the tool 10 through larger size pipe interiors such as larger tubing sizes or production casing. The bell 66 serves to guide the parted rod 12 into the tool 10 and allows the tool 10 to stay centered in the pipe. Typical bells sizes are available for 3½ inch tubing, 4½ inch casing and 5½ inch casing, but other customized bells sizes can be obtained for up to 8½ inch casing.

As illustrated in FIG. 35, alternately the tool 10 can be constructed without a bottom piece 20. In this optional configuration, an alternate barrel piece 18A is employed which has the longitudinal grooves 44 welded shut at the bottom end 42A of the alternate barrel piece 18A to permanently retain the slip 22 within the longitudinal grooves 44. Also, the bottom end 42A of the alternate barrel piece 18A is provided internally with a bevel 70 to guide the rod 12 into the tool 10 instead of being threaded.

Referring to FIGS. 14, 14A, 15 and 16, the slip 22 is in a half moon shape, with its externally facing wall 72 being convex in shape and its internally facing wall 74 being con-
cave in shape. Two ears 48 are provided on either edge of the external wall 72 of the slip 22 for movable engagement with the longitudinal grooves 44 provided internally within the barrel piece 18, as previously described and illustrated in FIG. 19. Also, the internal wall 74 of the slip 22 is provided at its bottom edge 76 with a half moon shaped bevel 78 to provide for smooth engagement of the slip 22 with the rod 12 as the rod 12 enters the tool 10 and pushes the slip 22 upward. As previously described, the upper shoulder 54 that is provided in the top end 80 of the slip 22 is square. The square shoulder 54 and provides a surface against which an expanded surface of the rod 12, or other item to be pulled, will engage the slip 22 as the tool 10 is raised after the rod 12 has entered the barrel piece 18 and after the slip 22 has moved back downward to its lowest position, as will be more fully explained hereafter.

[0070] As illustrated in FIG. 14B, an optional slip 22A can be employed instead of the standard slip 22. The optional slip 22A is similar to the standard slip 22 except it is provided with a serrated or toothed shoulder 54A on its top end 80A instead of a square shoulder 54. The purpose of the teeth 82 or serrations is to resist rotational slippage of the caught rod 12. To create the alternate slip 22A, teeth 82 are milled into a standard slip 22. The teeth 82 are added to allow the tool 10 to more easily be backed-off from downhole. Also, the teeth 82 allow the tool 10 to be more easily used when a rod off/off tool must be unslatched from downhole.

[0071] Some downhole pumps are not pulled out when the rods 12 are pulled out of the well 14. These types of pumps are called tubing pumps. They are installed on the bottom of the tubing 100 and are retrieved from the well 14 when the tubing 100 is retrieved. However, rods 12 are still used. But there is a tool on the bottom of the rod string 12 called a sucker rod on/off tool. This on/off tool latches onto the top of the pump when the rods 12 reach it and stay latched on until it is unlatched. To unlatch it, the work over rig operator must rotate the rod 12 which unlatches the rod on/off tool. In order for the sucker rod fishing tool 10 to be able to transfer this rotation to the rod on/off tool, it must resist rotational slippage between the tool 10 and the broken rod 12. The teeth 82 on the top end 80A of the alternate slip 22A help resist this slippage.

[0072] In some cases insert tubing pumps will become stuck in the tubing 100, i.e. in the seating nipple. Then the tool 10 may need to be backed off from. In this case the operator rotates the sucker rods 12 counter-clockwise to unscrew the rods 12, or clockwise when a back-off tool with left hand threads is utilized directly above the tool 10. The tool 10 will also need to resist this rotation in order to be backed off from.

[0073] Referring to FIGS. 33 and 34, there is illustrated a section of a typical rod string 12 showing a connection of an upper rod 12U to a lower rod 12L via a rod connector or coupling 12C. The coupling 12C shown in FIG. 33 is a standard coupling since its outside diameter is greater than the outside diameter of the shoulders 90 and 92 of the sucker rod. Beginning at the top of FIG. 33 and moving downward, the upper rod 12U is provided with a rod portion 84, an enlarged diameter bead 86, a reduced diameter wrench flat 88, and an enlarged diameter shoulder 90. The female threaded rod coupling 12C attaches to male threads (not illustrated) provided on a lower end of the upper rod 12U so that the coupling 12C abuts the enlarged diameter shoulder 90 of the upper rod 12U when the upper rod 12U is threaded together with the coupling 12C, as shown in the FIG. 33.

[0074] Still referring to FIG. 33, and moving below the coupling 12C, the lower rod 12L is likewise provided with a male threads (not illustrated) provided on the upper end of the lower rod 12L and with an enlarged diameter shoulder 92 that abuts the coupling 12 when the lower rod 12L is threaded into the coupling 12C, as shown in FIG. 33. The lower rod 12L then has a reduced diameter wrench flat 94, an enlarged diameter bead 96 and a rod portion 98. This illustration of this section of rod string 12 is provided to help illustrate the enlarged areas 86, 90, 12C, 92 and 96 on a broken rod string 12 that can be caught by the present tool 10.

[0075] Depending on where the break in the rod string 12 occurs, the shoulder 54 of the slip 22 on the present invention can engage an upper or lower bead 86 or 96 of a rod 12, an upper or lower shoulder 90 or 92 of a rod 12, or a rod coupling 12C. One limitation of the present tool 10 is that it can not engage the rod portion 84 or 98 of the rod 12. However, if the rod 12 parts at the rod portion 84 of the rod 12 within ten inches or less distance from above the rod coupling 12C the present tool 10 can still retrieve it at any of the aforementioned locations 86, 90, 92, or 12C. However, as is discussed hereafter, the present tool 10 can be attached with other existing fishing tools to address this limitation.

[0076] Referring again to FIGS. 25, 27, 28, 29, 30, 31, and 36, the steps involved in fishing a rod 12 from a well 14 with the present tool 10 are illustrated. FIG. 26 illustrates the tool 10 being lowered within the well tubing 100, casing or open hole and approaching the upper end 102 of a broken rod string 12 that is to be fished out of the well 14.

[0077] FIG. 27 shows the tool 10 lowered further so that there is initial engagement of the upper end 102 of the broken rod string 12 with the bottom piece 20 of the tool 10. This illustration shows how the internal bevel 62 in the bottom piece 20 guides the broken rod string 12 into the tool 10.

[0078] FIG. 28 shows the tool 10 being lowered still further so that the tool 10 telescoped receives the broken rod string 12 within the tool 10. This figure also shows the initial engagement of the upper end 102 of the broken rod string 12 with the slip 22.

[0079] FIG. 29 shows the tool 10 lowered further, the broken rod string 12 received further into the tool 10, and the slip 22 being pushed upward within the barrel piece 18 of the tool 10 by the broken rod string 12.

[0080] FIG. 30 shows the broken rod string 12 moving into the side opening 50 provided in the barrel piece 18 which allows the slip 22 to slide downward within the barrel piece 18 past enlarged area or areas 86, 96, 90, 92, or 12C of the broken rod string 12 until the slip 22 is located at its lowest possible position within the tool 10. Once the slip 22 has moved into this position, the tool 10 is then ready to be raised.

[0081] Another way that the tool 10 can catch a broken rod string 12 will be described. When the rod 12 enters the tool 10, it pushes the slip 22 upward to the uppermost position of the slip 22, i.e. at the top end of the grooves 44. As the tool 10 travels further downward within the well 14, the rod 12 travels upward within the tool 10 and along the slip 22. The rod 12 then exits the side opening 50 as the tool 10 continues moving downward. The tool 10 continues to move downward until the broken upper end 102 of the rod 12 contacts the top piece 16. When the rod 12 contacts the top piece 16, the tool 10 stops moving downward which signals the operator to begin raising the tool 10 within the well 14. At this point the slip 22 is either located at its lowest most position or is still at the top end of the grooves 44. If the slip 22 is still located at the top end of the
What is claimed is:

1. A sucker rod fishing tool for fishing sucker rod out of a well comprising:
   a top piece, said top piece provided with threads on its top end for threadable engagement with a means for moving the top piece into and out of a well,
   a hollow barrel piece, said barrel piece provided with threads on its top end for threadable engagement with threads provided on a bottom end of said top piece, said barrel piece provided with a side opening,
   a curved slip slidably captured within said hollow barrel piece so that said slip can move longitudinally within the barrel piece,
   a bottom end of the side opening in the barrel piece being level with a top shoulder provided on the slip when the slip is located at its lowest position in the barrel piece so that an object being lifted by the tool will engage the top shoulder of the slip and the bottom end of the side opening in the barrel piece resulting in a downwardly exerted pulling force on the tool.

2. (canceled)

3. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
   said barrel piece provided with at least two parallel grooves milled into its interior wall; ears provided on said slip; said ears slidably retained within the parallel grooves as a means of movably retaining the slip within the barrel piece.

4. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 3 wherein said grooves and said ears on the slip are both provided with a rounded radius to reduce stress on the barrel piece.

5. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
   said top piece provided with a channel therethrough for allowing liquids to pass through the top piece as the top piece is moved into and out of a well.

6. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
   a bottom end of said barrel piece provided with an internal bevel to aid in admitting a sucker rod into the barrel piece, and a weld provided at a bottom end of the grooves to retain the slip therein.

7. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
   a bell removably attached to the bottom end of said barrel piece via, threads on its top end that threadably engage threads provided on a bottom end of said barrel piece, and said a bottom end of said bell provided with an internal bevel to aid in admitting a sucker rod into the barrel piece.

8. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
   a bottom edge of the slip provided with a bevel on its internal face, said bevel having a half moon configuration to provide for smooth engagement of the slip with a sucker rod as the rod enters the barrel piece and pushes the slip upward.

9. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
   a top end of said slip provided with teeth for engaging a sucker rod to prevent rotational slippage therebetween.

10. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 1 further comprising:
a bottom piece, said bottom piece provided with threads on its top end for threadable engagement with threads provided on a bottom end of said barrel piece, and said bottom end of said bottom piece provided with an internal bevel to aid in admitting a sucker rod into the bottom piece.

11. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 10 further comprising:
   said bottom end of said bottom piece provided with a lip guide to aid in admitting a sucker rod into the bottom piece.

12. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 10 wherein the top piece is made from a single solid piece of metal, the barrel piece is made from a single piece of metal tube, the bottom piece is made from a single piece of metal tube, and the slip is made from cast metal.

13. (canceled)

14. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 2 further comprising:
   a bottom piece, said bottom piece provided with threads on its top end for threadable engagement with threads provided on a bottom end of said barrel piece, and said bottom end of said bottom piece provided with an internal bevel to aid in admitting a sucker rod into the bottom piece.

15. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 14 wherein the top piece is made from a single solid piece of metal, the barrel piece is made from a single piece of metal tube, and the bottom piece is made from a single piece of metal tube.

16. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 15 further comprising:
   said bottom end of said bottom piece provided with a lip guide to aid in admitting a sucker rod into the bottom piece.

17. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 2 wherein the top piece is made from a single solid piece of metal and the barrel piece is made from a single piece of metal tube.

18. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 17 further comprising:
   said barrel piece provided with at least two parallel grooves milled into its interior wall for slidably retaining ears provided on said slip.

19. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 18 wherein said grooves and said ears on the slip are both provided with a rounded radius to reduce stress on the barrel piece.

20. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 2 further comprising:
   said top piece provided with a channel therethrough for allowing liquids to pass through the top piece as the top piece is moved into and out of a well.

21. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 2 further comprising:
   a bottom end of said barrel piece provided with an internal bevel to aid in admitting a sucker rod into the barrel piece, and a weld provided at a bottom end of the grooves to retain the slip therein.

22. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 2 further comprising:
   a bell, said bell provided with threads on its top end for threadable engagement with threads provided on a bottom end of said barrel piece, and said a bottom end of said bell provided with an internal bevel to aid in admitting a sucker rod into the barrel piece.

23. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 2 further comprising:
   a bottom edge of the slip provided with a bevel on its internal face, said bevel having a half moon configuration to provide for smooth engagement of the slip with a sucker rod as the rod enters the barrel piece and pushes the slip upward.

24. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 23 further comprising:
   a top end of said slip provided with teeth for engaging a sucker rod to prevent rotational slippage therebetween.

25. A sucker rod fishing tool for fishing sucker rod out of a well according to claim 23 wherein the slip is made from cast metal.

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