March 26, 1963 F. L. LE BUS, SR 3,082,831

COMBINED WASH-OVER AND WELL TUBING RETRIEVER APPARATUS

Filed March 23, 1960 2 Sheets-Sheet 1

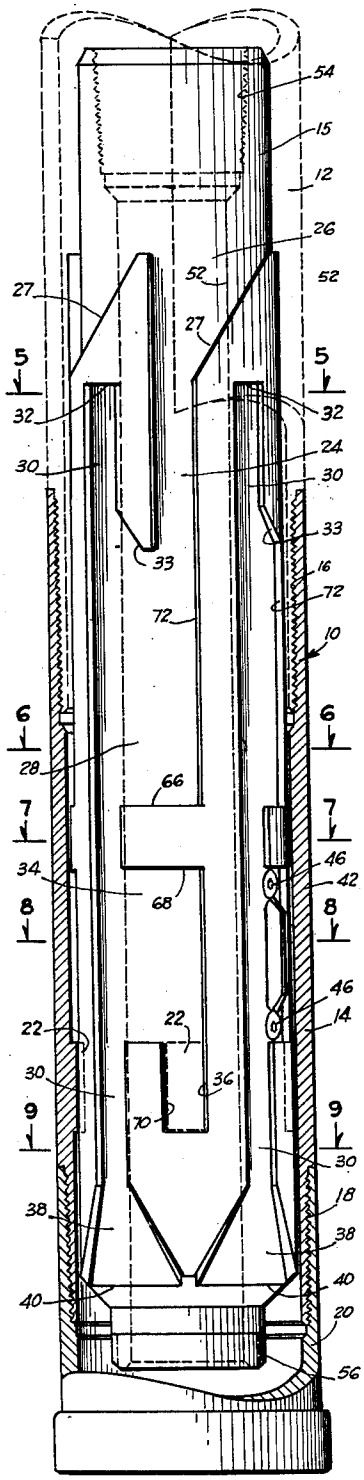



Fig. 1

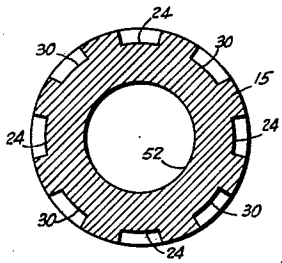



Fig. 5

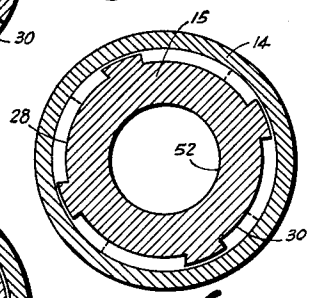



Fig. 6

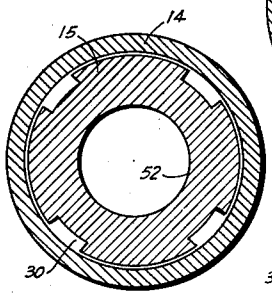



Fig. 7

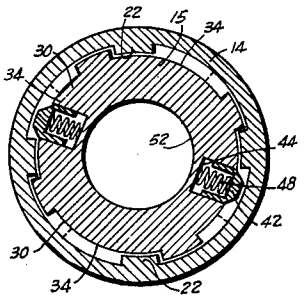



Fig. 8

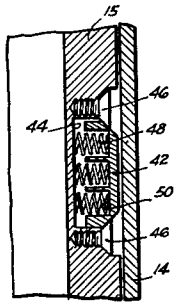



Fig. 10

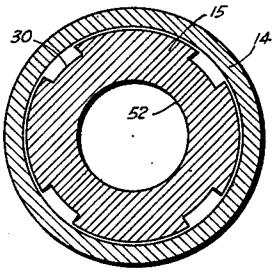



Fig. 9

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COMBINED WASH-OVER AND WELL TUBING RETRIEVER APPARATUS

Filed March 23, 1960 2 Sheets-Sheet 2

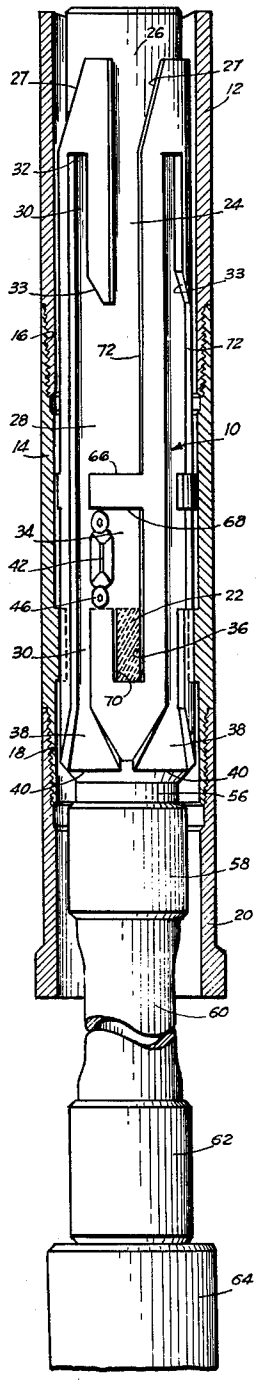



Fig. 2

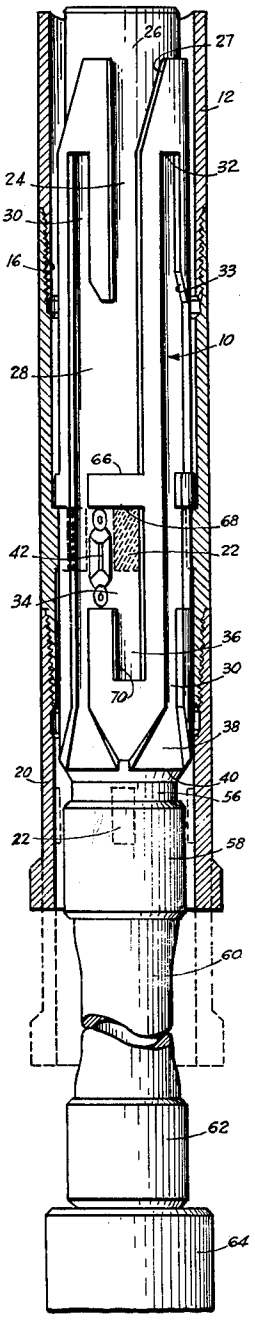



Fig. 3

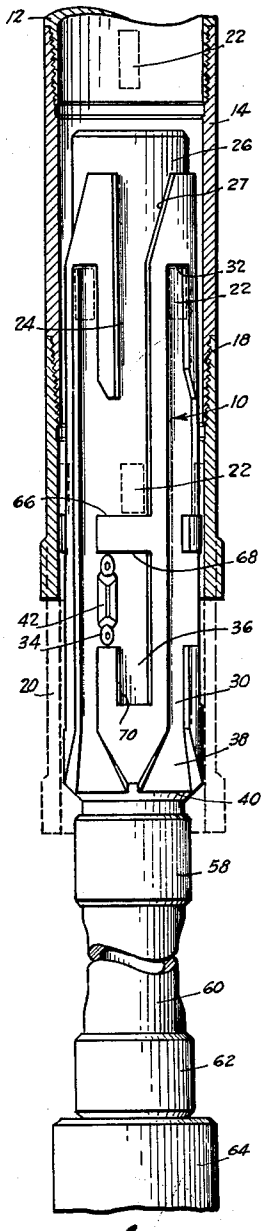



Fig. 4

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# 3,082,831
# COMBINED WASH-OVER AND WELL TUBING RETRIEVER APPARATUS

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5 Claims. (Cl. 175—315)

This invention relates to improvements in apparatus for pulling stuck well tubular members from a well bore, and more particularly, but not by way of limitation, to a combined retrieving and reaming apparatus for dislodging stuck well tubing, packers, and the like, from a well bore.

In the production of petroleum products from a well bore, the well tubing may become corroded, or otherwise damaged, and it is often desirable to pull the tubing from the bore for replacement or repair. When the tubing is set in the well bore, a packer is normally disposed there around in the proximity of the bottom of the bore for packing off the lower portion of the bore from the upper portion thereof. In the pulling of removal of the well tubing from the bore, the packing member frequently will fail to collapse for release from the side walls of the bore, and the portion of the well tubing secured thereby may become stuck or lodge in the well bore. It is usually necessary to remove the upper portion of the tubing from the bore in order that a wash-over string or reaming apparatus may be utilized for loosening of the stuck tubing. When the tubing has been dislodged, it is then usually necessary to remove the wash-over string to install a milling tool to ream over the fish or packer and retrieve the loosened packer with a suitable fishing apparatus. All this requires two or three trips into the well with the fishing string.

The present invention contemplates a novel fishing tool apparatus in combination with a wash-over string whereby the stuck tubing and fish or packer may be reamed or washed-over for freeing and retrieving thereof in one operation. The novel tool comprises a fish engaging mechanism disposed within a wash-over pipe and landing nipple in such a manner that the stuck tubing may be securely engaged by the tubular mandrel prior to any washing or reaming operation. After the engagement of the stuck fish, the landing nipple is released from the tubular mandrel then the landing nipple, wash-over pipe and milling tool are lowered and the reaming operation may be started and continued as desired for dislodging the tubing or the packer. In addition, the novel tool may be utilized as a jarring apparatus for facilitating release of the stuck fish after the reaming operation. Furthermore, the novel fishing apparatus may be utilized for retrieving stuck drill collars of a drill string in a similar manner as for the stuck tubing. The combined fishing and wash-over apparatus is unique in that it is of a simple construction having a minimum number of operating parts, thereby providing for an economical construction without any detriment to the efficient operation thereof.

It is an important object of this invention to provide a novel combined fishing and wash-over apparatus for retrieving a stuck fish in a well bore.

Another object of this invention is to provide a novel fishing apparatus for simultaneously dislodging a stuck fish and holding the fish for subsequent removal from a well bore.

It is another object of this invention to provide a combined fishing and reaming apparatus for retrieving a stuck fish wherein a make-up connection with the stuck fish may be made prior to any reaming thereof.

A further object of this invention is to provide a combined fishing and reaming apparatus which may be utilized for jarring the stuck fish to facilitate the release thereof.



Still another object of this invention is to provide a novel combined reaming and retrieving apparatus for recovering lodged well tubing wherein a combined right hand torque and downward vertical movement is maintained on the wash-over string to release the retrieving tool therefrom for independent reaming of the stuck tubing.

It is still a further object of this invention to provide a combined retrieving and wash-over tool for recovering lodged well tubing from a well bore wherein a combined right hand torque and a vertical upward movement is maintained on the wash-over string for removal of the dislodged tubing from the bore.

A still further object of this invention is to provide a novel combined fishing and wash-over apparatus which is simple and efficient in operation and economical and durable in construction.

Other objects and advantages of the invention will be evident from the following detailed description, read in conjunction with the accompanying drawings, which illustrate my invention.

In the drawings:

FIGURE 1 is a sectional elevational view depicting the tool made up in a wash-over string with portions shown in dotted lines for purposes of illustration.

FIGURE 2 is a sectional elevational view depicting a pull-out tool in the wash-over string and connected to a stuck fish.

FIGURE 3 is a view similar to FIG. 2 illustrating another operational position for the tool in solid lines and yet another position therefor in dotted lines.

FIGURE 4 is a view similar to FIG. 3 and depicting several additional positions for the tool.

FIGURE 5 is a sectional view taken on line 5—5 of FIG. 1.

FIGURE 6 is a sectional view taken on line 6—6 of FIG. 1.

FIGURE 7 is a sectional view taken on line 7—7 of FIG. 1.

FIGURE 8 is a sectional view taken on line 8—8 of FIG. 1.

FIGURE 9 is a sectional view taken on line 9—9 of FIG. 1.

FIGURE 10 is an enlarged sectional view of the latch members provided on the tool.

Referring to the drawings in detail, and particularly FIG. 1, reference character **10** generally indicates a retrieving or tubing pulling apparatus adapted to be interposed in a wash-over string **12**. The tool **10** comprises an outer sleeve or landing nipple **14** and an inner mandrel or tubular body **15** telescopically arranged therein. The nipple **14** is provided with an upper threaded portion **16** for engagement with the wash-over string **12** and a lower threaded portion **18** for receiving a suitable reamer **20**. A plurality of circumferentially spaced male lug members **22** are provided on the inner periphery of the nipple **14** for cooperation with the inner body **15** as will be hereinafter set forth.

The inner body **15** is provided with a plurality of circumferentially spaced longitudinally extending female splines or grooves **24** each having an upper end **26** thereof open to receive one of the lugs **22** therein. A tapered or helical shoulder **27** is provided in communication with the open end **26** of each of the grooves **24** for facilitating disposition of the lugs **22** therein. Each of the grooves **24** extends into communication with a substantially horizontally disposed groove **28** which in turn communicates with a longitudinal groove **30** having the upper end thereof closed by a shoulder **32**. A tapered shoulder **33** is provided at the upper edge of the groove **28** and extends between the groove **30** and the groove **24** for a purpose as will be hereinafter set forth. The sets of

grooves 24, 28 and 30 cooperate to provide upwardly extending female J-slots for the inner body 15. The closed groove 30 extends downwardly into communication with a lower horizontally disposed groove 34 which is provided with a lower pocket portion 36. In addition, the groove 30 extends downwardly below the horizontal groove 34 into a flared groove portion 38 having the lower end 40 thereof open. The grooves 30, horizontal grooves 34, and pockets 36 cooperate to provide inverted or downwardly extending female J-slots for the inner body 15. The groove 30 forms the short leg of the upper upright J-slot and the long leg of the inverted J-slot and, in addition, provides a passageway permitting communication therebetween.

At least one of the horizontal grooves 34 is provided with a spring urged latch member 42. It is preferable to provide two oppositely disposed latches 42 as shown in FIG. 8, but not limited thereto. The latch 42 is disposed in a recess portion 44 (FIG. 10) provided in the body 15, and is retained therein by a plurality of keeper screws 46. The latch 42 is constantly urged radially outward by a plurality of springs 48 having one end anchored in the recess 44 and the oposite end anchored in a pocket portion 50 provided in the latch 42. The latch 42 is normally in an extended or outwardly extending position for blocking the entrance or exit to the horizontal passageway 34 for a purpose as will be hereinafter set forth.

A centrally disposed longitudinally extending bore 52 is provided in the inner body 15 for a fluid passageway therethrough. The upper end of the body 15 is preferably provided with a threaded box portion 54 and the lower end thereof is provided with a threaded pin member 56 for engaging the upper coupling 58 (FIGS. 2, 3 and 4) of a stuck fish or tubing 60. The tubing 60 is normally provided with a collar member 62 having an external packer member 64 secured therebelow, as is well known.

It will be apparent that a horizontal shoulder 66 closes the lower end of each of the grooves 24 and forms the lower edge of the horizontal groove 28. In addition, a horizontal shoulder 68 is provided at the upper edge of the second horizontal groove 34 for a purpose as will be hereinafter set forth.

*Operation*

When the tubing 60 has become lodged within a well bore (not shown) for any reason, the upper portion of the tubing is normally removed from the well, leaving the lodged portion therein. In order to dislodge the fish, it is usually necessary to ream the stuck tubing for freeing thereof whereby it may be retrieved. The combination retrieving tool 10 and wash-over pipe or string 12 are lowered into the bore whereby the pin connection 56 may be engaged with the stuck tubing coupling member 58. In order to lock the inner body 15 within the nipple 14 whereby the combined tool may be lowered into the well bore, the wash-over string is lowered over the body 15 for simultaneously lowering the nipple 14 whereby the lugs 22 will enter the open ends 26 of the grooves 24. It will be apparent that the tapered shoulders 27 will guide the lugs 22 into the grooves for facilitating the telescoping operation. The wash-over string is preferably lowered sufficiently over the body 15 for telescoping the nipple 14 thereover whereby the lugs 22 engage the shoulder 66 at the bottom of the grooves 24. A right hand rotation may then be imparted to the wash-over string for moving the lugs 22 through the horizontal grooves 28 and into the vertical or longitudinal grooves 30 adjacent thereto. The nipple 14 is then lowered slightly with respect to the body 15 and a left hand rotation is imparted to the nipple for moving the lugs 22 into the horizontal grooves 34.

It will be apparent that a sufficient left hand torque must be applied to overcome the pressure or force of the springs 48 whereby the latches 42 may be depressed for permitting the lugs to move into the grooves 34. When the lugs 22 are fully disposed within the grooves 34, as shown in dotted lines in FIG. 3, the latches 42 will be disengaged therefrom and will be moved outwardly into the extended position therefor by the springs 48. The latches 42 thus retain the lugs 22 within the groove 34 and substantially preclude any accidental disengagement of the lugs or movement thereof into the groove 30 during the lowering of the combined tool into the well bore. As the wash-over string 12 is lowered within the bore, the lugs 22 will engage the shoulder 68 for suspending the inner body 15 within the nipple 14 as shown in dotted lines in FIG. 3.

When the pin member 56 approaches or contacts the coupling member 58, downward movement of the body 15 will be precluded whereby the nipple 14 will move downwardly with respect thereto. This causes the lugs 22 to move into the pockets 36 as shown in dotted lines in FIGS. 1 and 2. A right hand torque is applied to the wash-over string 12, and the torque is transmitted to the inner body 15 by the contact of the lugs 22 with the vertical shoulder 70 of the pocket 36. Thus, the pin member 56 will be threadedly engaged with the coupling 58 for securing the retrieving tool 10 to the stuck fish 60.

When the pin 56 is fully threaded into the coupling 58, further right hand rotation of the body 15 is precluded due to the engagement thereof with the stuck fish, and in order to ream around the stuck fish for a freeing thereof, the wash-over string 12 is then raised slightly for lifting the lugs 22 out of the pockets 36 and into contact with the upper shoulder 68. A right hand torque is then imparted to the wash-over pipe for overcoming the force of the spring urged latches 42 causing a depressing thereof whereby the lugs 22 may be moved into the grooves 30. The wash-over string 12 is then lowered while maintaining a right hand torque, and the lugs 22 will move downwardly in the grooves 30 and into the enlarged or flared portion 38. A continued downward movement of the wash-over string 12 will move the lugs 22 out of the open end 40 of the flared recesses or grooves 38 whereby there will be no driving connection between the nipple 14 and inner body 15. In this position (not shown), the wash-over string 12 and reamer 20 may be operated in the usual manner for reaming around the stuck fish 60.

Usually sand and other mud deposits have accumulated around the tubing 60 above the packer, and it is desirable to ream out these deposits for facilitating the freeing of the stuck fish. It is also sometimes necessary to ream out the packer 64 in addition to the tubing for dislodging thereof before the tubing and packer can be removed or retrieved from the well bore.

When the operator has ascertained that sufficient reaming has taken place for removing or releasing the stuck fish, the wash-over string 12 is vertically raised within the bore whereby the lugs 22 are brought into the flared grooves 38. It will be apparent that the flared or tapered shoulders or sides of the grooves 38 facilitate the guiding of the lugs into the grooves 30. A continued upward pull on the wash-over string combined with a right hand torque will move the lugs upwardly in the grooves 30 until the lugs are brought into engagement with the upper shoulder 32 thereof as shown in dotted lines in FIG. 4. The right hand torque is preferably applied to the wash-over string to assure that the lugs 22 will not enter either of the horizontal grooves 28 or 34 during the upward movement of the pipe. With the lugs 22 in position against the shoulder 32, a continued upward pull on the wash-over pipe 12 will raise the inner body 15 and the stuck fish connected thereto for retrieving of the tubing 60 and packer 64.

The lodged tubing may not be completely loosened by the reaming operation, and if desired, the apparatus may be utilized as a jarring tool to assist in the loosening of the tubing. After the reaming operation, and with the lugs 22 in the upper position in the groove 30 against the shoulder 32, the wash-over string may be vertically reciprocated

while maintaining a right hand torque. The lugs and shoulders **32** will cooperate to provide a jarring action for facilitating the dislodging or freeing of the tubing.

In the event the reaming operation was not sufficient to loosen the stuck packer and tubing, the wash-over string may be lowered once again with a combined right hand torque for moving the lugs out the open end **40** of the grooves **30** whereupon the reaming operation may be continued for freeing of the stuck fish. However, if for some reason, the operator does not desire to re-ream, with the lugs in position against the shoulder **32**, the wash-over string is let down or lowered with a partial left hand rotation or torque until the lugs **22** are brought into contact with the tapered shoulder **33**. The contact of the lugs **22** with the shoulder **33** in combination with the left hand torque moves the lugs into the longitudinal grooves **24** and into a position adjacent the lower shoulder **66** thereof. A slight continued left hand torque will assure that the lugs **22** will be positioned adjacent the vertical shoulder **72** of the grooves **24** whereby the lugs **22** will be in alignment with the open ends **26** thereof. In this position, a vertical upward movement of the wash-over pipe will move the lugs **22** upwardly and out of the grooves **24** as shown in dotted lines in FIG. 4 and the wash-over string **12**, including the nipple **14** and the reamer **20**, may be removed from the well bore, leaving the inner body or spline stem **15** connected with the stuck tubing and packer. The driller or operator may then either re-enter the well bore with the same tool, or use any other suitable type of tool for loosening the stuck tubing, as desired. It will be apparent that the box member **54** of the body **15** facilitates removal of the stuck fish in this instance.

It is to be understood that the novel retrieving and reaming apparatus may be utilized for recovering stuck drill collars, and the like, from a well bore, and is not limited to retrieving stuck tubing. However, in utilizing the tool for retrieving stuck drill collars, the lugs would be of a heavier and stronger construction than required for recovering stuck tubing. Furthermore, in the event the stuck fish is reamed free and begins to drop toward the bottom of the well bore, the lugs **22** will re-enter the grooves **30** and will engage the upper shoulder **32** thereof for precluding a loss of the fish. Tubing is normally positioned in the proximity of the bottom of the bore and thus, the falling thereof is not as great a problem as in the case of drill collars.

From the foregoing, it will be apparent that the present invention provides a combined reamer and retrieving apparatus wherein a stuck fish may be dislodged from a well bore and retrieved therefrom in one operation. The novel tool is so designed and constructed that the stuck tubing may be engaged prior to any reaming operation. The retrieving tool may be locked to the wash-over string by combined vertical and rotational movements for lowering of the combined tool into the bore for engagement with the stuck tubing. After the engagement of the retrieving tool with the tubing, a combined vertical and rotational movement of the wash-over string will disengage the retrieving body therefrom whereby the tubing may be reamed for a dislodging thereof. Upon loosening of the stuck fish, a combined vertical upward and right hand torque is maintained on the wash-over string for removal of the fish simultaneously with the combined tool. The novel tool is simple and efficient in operation and economical and durable in construction.

Changes may be made in the combination and arrangement of parts as heretofore set forth in the specification and shown in the drawings, it being understood that any modification in the precise embodiment of the invention may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:

1. In combination with a wash-over pipe having a reamer carried thereby, a retrieving tool for recovering a stuck fish, comprising an outer sleeve interposed in the wash-over pipe, an inner body telescopically disposed within the sleeve, means provided on the inner body for engaging the stuck fish, a plurality of male lugs provided on the inner periphery of the sleeve, a plurality of circumferentially spaced upright J-slots provided on the outer periphery of the inner body, each of said J-slots having one end thereof open for receiving a lug therein upon a downward movement of the wash-over pipe relative to the inner body, a plurality of circumferentially spaced inverted J-slots provided on the outer periphery of the inner body, a plurality of passageways provided on the inner body and extending between the short legs of the upright J-slots and the long legs of the inverted J-slots, the short leg of the inverted J-slots receiving the lugs therein in one position between the inner body and sleeve for locking the inner body for simultaneous vertical movement with the wash-over pipe, the inverted J-slots having one end thereof open for releasing the lugs from engagement with the upright J-slots upon a combined downward movement and right hand rotation of the wash-over pipe when said lugs are positioned in the long legs thereof to provide for independent movement of the wash-over pipe with respect to the inner body, and short legs of the upright J-slots receiving the lugs therein upon an upward movement of the wash-over pipe to provide for removal of the fish simultaneously with the retrieving tool and wash-over pipe.

2. In combination with a wash-over string having a reamer carried thereby, a retrieving tool for recovering a stuck fish, comprising an outer sleeve interposed in the wash-over string, an inner body telescopically disposed within the sleeve, means provided on the inner body for engaging the stuck fish, a plurality of spaced lugs provided on the inner periphery of the sleeve, a plurality of spaced upright J-slots provided on the outer periphery of the inner body and each having one leg thereof open upwardly for receiving one of the lugs therein, a plurality of inverted spaced J-slots provided on the outer periphery of the inner body and each having the long leg thereof open downwardly, a plurality of slots provided on the inner body and extending between the short legs of the upright J-slots and the long legs of the inverted J-slots, the short leg of the inverted J-slots receiving the lugs therein in one position between the inner body and sleeve for locking the inner body for simultaneous vertical movement with the wash-over pipe, means provided on the body for precluding accidental removal of the lugs from the short leg of the inverted J-slots, the inverted J-slots each having the long leg thereof open for releasing the lugs from engagement with the inverted J-slots upon a combined right hand rotational and vertical downward movement of the wash-over pipe when the lugs are positioned in the long leg to provide for independent movement of the wash-over pipe with respect to the inner body, and the short leg of the upright J-slots receiving the lugs therein upon a vertical upward movement of the wash-over pipe to provide for removal of the fish simultaneously with the retrieving tool and wash-over pipe.

3. In combination with a wash-over string having a reamer carried thereby, a retrieving tool comprising an outer sleeve interposed in the wash-over string, an inner body telescopically arranged with respect to the sleeve, a plurality of spaced lugs provided on the inner periphery of the sleeve, a plurality of longitudinally extending grooves provided on the outer periphery of the body for receiving the lugs therein, a plurality of second longitudinal grooves interposed on the body between the first mentioned grooves and having the upper end thereof closed and the lower end thereof open, horizontal grooves provided on the body for communication between the adjacent pairs of said longitudinal grooves, a pocket provided on the body in communication with each of the second mentioned longitudinal grooves and spaced from the horizontal grooves for receiving the lugs therein in one relative position between the sleeve and body to provide simultaneous vertical movement of the body with the wash-over string, latch means

provided on the body for precluding accidental removal of the lugs from the pockets, means provided on the body for engaging the stuck fish, said lugs movable through the open lower ends of the second longitudinal grooves upon a downward movement of the wash-over string to release the inner body from engagement with the sleeve for independent movement of the wash-over string whereby the stuck fish may be reamed, said lugs movable into a position adjacent the upper closed end of the second longitudinal grooves upon a vertical upward movement of the wash-over string whereby the reamed fish may be removed simultaneously with the retrieving tool and wash-over string.

4. In combination with a wash-over pipe having a reamer carried thereby, a retrieving tool for recovering tubing lodged in a packer in a well bore comprising an outer sleeve interposed in the wash-over pipe, an inner mandrel telescopically arranged with the outer sleeve, means provided on the mandrel for engaging the lodged tubing, spline means carried by the sleeve and mandrel and comprising a plurality of spaced upright J-slots in open communication with a plurality of spaced inverted J-slots provided on the mandrel and a plurality of spaced lug members provided on the sleeve, said upright J-slots having one end open for receiving the lugs therein upon a downward movement of the sleeve with respect to the mandrel, said inverted J-slots having one end thereon open for releasing the lugs from engagement with the upright J-slots upon a combined downward movement and right hand rotation of the sleeve, said spline means cooperating between the mandrel and sleeve in one relative position therebetween for locking the mandrel to the sleeve for simultaneous rotational and vertical movement with the wash-over pipe, said spline means responsive to an upward vertical movement of the wash-over pipe and sleeve with a subsequent vertical downward and right hand rotational movement thereof for releasing the locking engagement between the sleeve and mandrel whereby the lodged tubing and packer may be reamed, and said spline means responsive to a combined vertical upward and right hand rotational movement of the wash-over pipe and sleeve for engaging the sleeve and mandrel in a second relative position therebetween for removal of the reamed tubing and packer simultaneously with the wash-over pipe and retrieving tool.

5. In combination with a wash-over pipe having a reamer carried thereby, a retrieving tool for recovering a stuck fish, and comprising an outer sleeve interposed in the wash-over pipe, an inner body telescopically disposed within the sleeve, means provided on the inner body for engaging the stuck fish, spline means carried by the sleeve and inner body and comprising a plurality of spaced upright J-slots in open communication with a plurality of spaced inverted J-slots provided on the mandrel and a plurality of spaced lug members provided on the sleeve, said upright J-slots having one end open for receiving the lugs therein upon a downward movement of the sleeve with respect to the mandrel, said inverted J-slots having one end thereon open for releasing the lugs from engagement with the upright J-slots upon a combined downward movement and right hand rotation of the sleeve, said spline means cooperating between the sleeve and inner body in one relative position therebetween for locking the inner body to the sleeve for simultaneous downwardly vertical and rotational movement with the wash-over pipe whereby the inner body may be connected to the stuck fish, said means movable to disengage the sleeve from the inner body to provide for independent movement of the wash-over pipe upon a combined right hand rotation and vertical downward movement of the wash-over pipe and sleeve whereby the stuck fish may be reamed, and said means responsive to a combined upward vertical movement and right hand rotation of the wash-over pipe and sleeve to provide an engagement between the sleeve and inner body in a second relative position therebetween for removal of the reamed fish simultaneously with the retrieving tool and wash-over pipe.

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