Dec. 16, 1930. F. STONE ET AL 1,785,152

OVERSHOT

Filed May 25, 1929 2 Sheets-Sheet 1

Fig. 2.

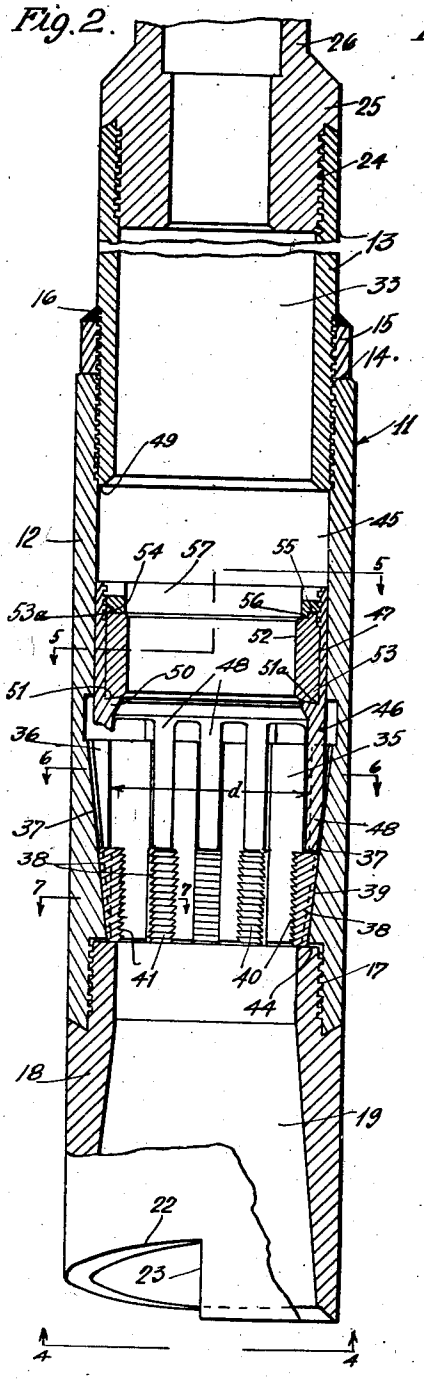


Fig. 3.

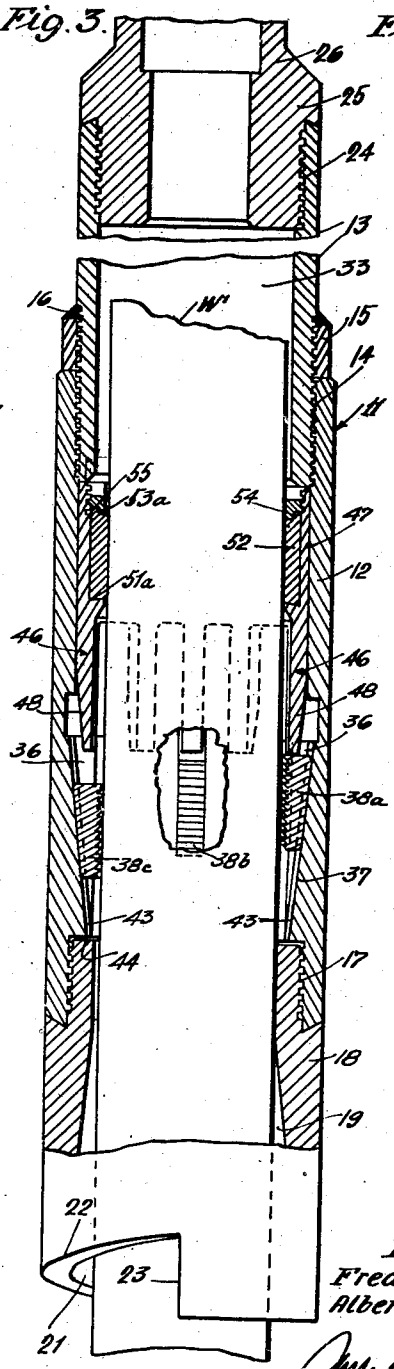
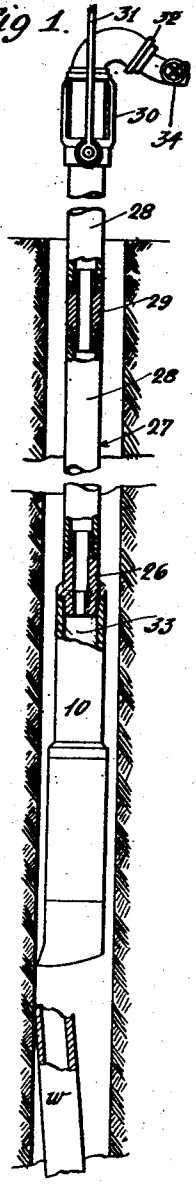


Fig 1.



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OVERSHOT

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Fig. 5.

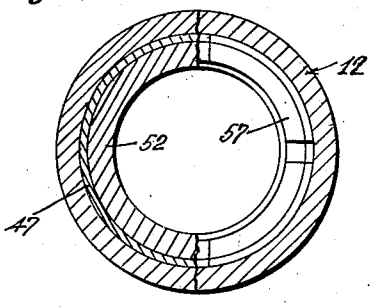


Fig. 6.

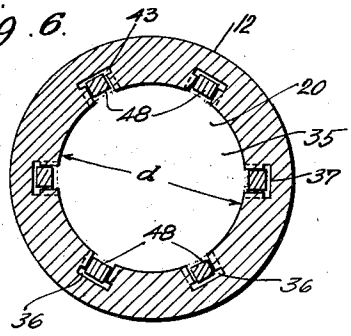


Fig. 8.

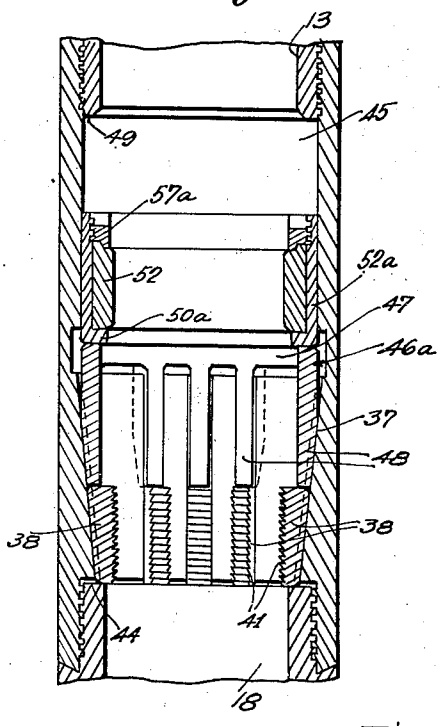


Fig. 7.

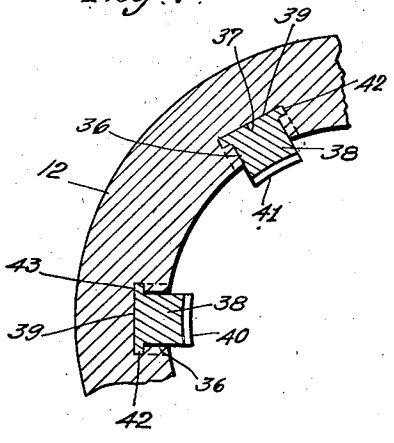
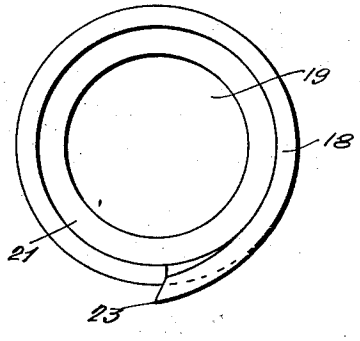


Fig. 4.



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Patented Dec. 16, 1930 1,785,152

UNITED STATES PATENT OFFICE

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OVERSHOT

Application filed May 25, 1929. Serial No. 365,910.

This invention relates generally to tools for recovering "lost" well casing, drill stems, tools and the like from deep well bores. It is more particularly concerned with that type of fishing tool known as an overshot by reason of the fact that it is of tubular or barrel construction adapted to fit over work.

It is the general object of the invention to provide an overshot which is not only sure and effective as a grappling tool but one which is so fashioned that it is well adapted to stand the terrific pulling strains to which it is subjected after it has caught hold on the fish. These features of sure-catching and great strength are secured without unduly enlarging any of the parts, it being realized that extreme compactness is necessary in order that the tool may be fully efficient under all working conditions.

The work-gripping jaws and all actuating mechanism therefor necessarily are mounted in the bore of the overshot barrel. Yet the wall of the barrel which supports the jaw and actuating mechanism, remembering that the jaws must move radially to and from the work-gripping position, cannot be of excessive thickness, for it must pass between the work and the wall of the bore within which the work rests. Furthermore, the outside diameter of the barrel is necessarily restricted, in some cases, by the diameter of the casing through which the tool is lowered toward the fish.

In our tool the jaws have a relatively wide range of radial projection and retraction and yet this is accomplished without unduly reducing the thickness of the barrel wall by which they are supported, or otherwise weakening the structure.

As a further feature we have so fashioned the jaws and their mounting that the radially and circumferentially directed strains imposed on the jaws by the reaction of the work are efficiently transmitted to the body or barrel member. The jaws, throughout their movement, preferably have full bearing against the barrel walls so there is no tendency to distort them, a characteristic which is not found in usual overshots and the lack of which has led to many failures in these usual devices.

We have determined that by far the most efficient way of grappling a fish on its outer peripheral face is to utilize a plurality of angularly spaced jaws, which jaws are mounted for movement individually into and out of operative position. We have so fashioned the present overshot, but in utilizing these individually movable jaws or slips, we find that, due to irregularities of the work, etc., the jaws are not always pushed to the same position when the work is introduced to the bore barrel, and consequently when the pulling strain is placed upon the tool the jaws grip the pipe at points spaced longitudinally thereon, instead of all gripping the work in the same horizontal plane. As is well known, it is of advantage to have all the jaws gripping equally and we have therefore provided means for evening up the jaws so they grip the work evenly and tend to hold said work centered within the barrel bore.

As a preferred means for evening the slips we utilize a propeller which is actuated by the application of hydraulic pressure thereto, the fluid being passed to the propeller through bores of the fishing stem and overshot barrel. The action of this evener may be discussed to better advantage in the following detailed description, it being noted that the evener may be utilized as a propeller to force the jaws firmly into engagement with the work whether or not the propeller is first called upon to "even" the jaws.

It is often necessary to release an overshot from a fish for reasons that will be set forth in the body of the specification, and to accomplish this release we have fashioned the work-gripping slip teeth in the form of threads. The slips are held from movement circumferentially of the barrel so, after the slips have been initially somewhat loosened from the work, they may be rotated by barrel rotation in a manner to cut threads through the wall of the work and thus, in effect, the slips thread their way upwardly clear of said work, whereupon the entire tool may be lifted. The characteristics which permit of such an operation without loosening the threaded

joints of the fishing stem will be set forth in the following detailed specification, wherein other objects and novel features of the invention will be made apparent. Reference will be had to the accompanying drawings, in which:

Figure 1 is a conventional sectional view through a bore hole, showing therein a "fish" and an embodiment of my invention. The overshot is shown in elevation except for its upper portion which, together with a tool joint immediately thereabove, is shown in longitudinal medial section.

Fig. 2 is a longitudinal medial section through an embodiment of my invention, the wedge slip being shown in their position of full radial projection.

Fig. 3 is a view generally similar to Fig. 2 but showing additionally work in the tool bore. The slips are shown in work-gripping positions.

Fig. 4 is a bottom plan view of Figure 2, showing the end of the bowl, only.

Fig. 5 is a section on the broken line 5—5 of Fig. 2.

Fig. 6 is a section on line 6—6 of Fig. 2.

Fig. 7 is an enlarged fragmentary section on line 7—7 of Figure 2; and

Fig. 8 illustrates a variational embodiment of the invention.

The overshot generally indicated at 10 is made up of a barrel or tubular body member 11 which, for purposes of manufacture and assembly is made up of a plurality of tubular sections. However, it is to be noted that the invention, considered broadly, is in no way limited to this particularity of barrel make-up.

Barrel 11 may be considered as including a tubular slip socket or shell 12 having a tubular extension 13 threaded thereinto at 14. A stop collar 15 is threaded and then welded at 16 onto extension 13, shell 12 being threaded into tight end engagement with said collar.

Threadably connected at 17 with the lower end of shell 12 is a bowl 18, the bore 19 of which communicates with the bore 20 of said shell 12. Bowl 18 may have any characteristics which render it suitable to the particular fishing job in hand, there being provided a plurality of interchangeable bowls with each barrel. It will be understood that the present invention is in no way limited to use with a particular bowl attached thereto.

The bowl illustrated has a flaring mouth 21 and is cut away spirally at 22 to leave a vertically extending edge 23 which may or may not be pressed radially outward as in Figure 4 to give it "wall-hook" characteristics. The described formation of the bowl is such that, when the stem is rotated, it tends to straighten up inclined work W so it is centered with and in a position to enter slip socket bore 20 as the overshot is lowered.

The upper end of extension 13 is internally threaded at 24 to take threaded pin 25 of tubular sub 26 whereby detachable connection is made to fishing stem 27. Stem 27 is made up of a plurality of pipe lengths 28 coupled together by tubular tool joints such as 29, and at the upper end stem is a swivel conventionally shown at 30. Said swivel has a bail 31 whereby the stem is vertically controlled from above by usual hoisting tackle (not shown) and includes a hose connection 32 whereby fluid may be passed under pressure from a pump (not shown) to the bore of the fishing stem and thence through the bore of sub 26 to the bore 33 of extension 13. In hose connection 32, there is conventionally illustrated a valve 34 whereby fluid pressure may be controlled, though it will be understood that this valve is normally found directly at the pressure side of the pump.

The bore 20 of slip socket 12 has a portion 35 of reduced diameter "*d*", and sunk in the defining wall of this portion is a plurality of angularly spaced, longitudinally extending ways 36. The bottom walls 37 of these ways or grooves incline inwardly and downwardly and therefore, since the ways each open at one side to bore 35, the slip socket may be considered as having certain opposite walls which converge inwardly and downwardly.

Mounted for individual vertical reciprocation through ways 36 are wedge slips 38, each of said slips having a face 39 which is angled complementary to and in engagement with a corresponding wall 37, and an opposite wall 40 upon which are preferably formed work-gripping formations 41, these formations here being illustrated in the form of parallel upwardly pointing teeth which are cut transversely of the slip body and at an angle of other than 90° with respect to the major axis of each slip, thus giving the teeth thread-like characteristics for purposes which will be set forth.

While any suitable means may be employed for retaining the wedge slips in ways 36 and guiding said slips in a direction parallel to walls 37 during upward slip movement, we have shown a preferred means in the form of lateral tongues 42 (Fig. 7) on the slips 38, said tongues being adapted to ride through complementary ways 43 provided at each side of and opening into ways 36.

Because of the characteristics given above, it will be seen that vertical slip reciprocation is necessarily accompanied by translation of said slips radially with respect to the barrel or slip socket. When the slips are at the limit of their downward movement, as determined by their contact with the upwardly facing end shoulder 44 of bowl 18, teeth 41 are projected radially inward into bore 35, this being their position of full projection or full operative position.

On the other hand, when the slips are moved vertically upwardly they also move radially outwardly towards their fully retracted position. When the slips are in their uppermost position as determined by means which will be described and as is the case of the slip 38*a* in Figure 3, teeth 41 project slightly or not at all into bore 35.

Considering the slips together as a ring of gripping elements, and considering the ring as being movable vertically, it will be seen that the work gripping ring may be thought of as a radially and expansible and contractible one, the expansion and contraction of which is caused by vertical reciprocation thereof through the slip socket.

It will be noted that the slips contact throughout their vertical extent with barrel walls 37 and that this engagement is maintained throughout vertical movement of the slips. By reason of this full engagement the slips are fully backed by the relatively strong body or barrel wall in all their positions of adjustment, this arrangement not only effecting proper transmission to the body of radially outwardly directed strains imposed on the jaws by the reaction of the work, but also preventing any tendency of the slips to bend or rock either horizontally or vertically, about a point of engagement with the barrel, a tendency which almost always results in slip failure through fracture or distortion.

It will also be noted that the slips are so mounted in ways 36 that they are held from rotation about their axes and also from movement circumferentially of the barrel. The rectangular cross sectional characteristics of the slips lends great resistive strength to their bodies and their square, full-bearing interfit with the complementary ways does much to reduce slip or socket wall wear, which would otherwise soon develop into harmful looseness. This interfit also lends such strength to the tool that it may be used for carrying out fishing operations not possible of accomplishment with other tools.

Mounted for vertical reciprocation within the larger portion 45 of bore 20 is a tubular propeller or evener 46. This evener is in the form of a ring-like body portion 47 having a nice sliding fit within bore 45, and having depending therefrom a plurality of angularly spaced fingers 48, there being one finger for each groove or way 36. During reciprocation of the evener or propeller, fingers 48 play longitudinally through ways 36. When there is no work within the barrel bore the slips 38 are in their lowermost position, resting on shoulder 44, and evener 46 is in its lowermost position, as indicated in Figure 2, the lower ends of fingers 48 resting on top the corresponding slips 38. The upward limit or evener movement is established by the downwardly facing shoulder 49 formed by the end of extension 13, and when the evener is at this upper limit it allows the slips to raise sufficiently to cause them to be fully radially retracted.

Spaced from the upper end of ring 47 is an internal annular flange 50, which presents an upwardly and inwardly inclining shoulder 51 forming an annular groove 51*a*, a ring 52 of rubber or any other suitable compressible material resting on the shoulder 51. The lower end of packing ring 52 inclines downwardly and outwardly to form an annular lip 53 which is in complement with shoulder 51 and is taken in groove 51*a*; while the upper end of ring 52 has an annular extension or lip 53*a* which has an inner inclined wall 54. Lip 53*a* is taken within a complementary groove 55 formed between the inner peripheral wall of ring 47 and the flange 56 on follower ring or gland 57 which has threadable connection at 57*a* with the inner wall of ring 47.

With the diameter of work W known, ring 57 threaded downwardly to longitudinally compress and hence radially inwardly expand packing ring 52 until its bore diameter is substantially equal to or less than the outside diameter of the work. The packing assembly may thus be considered one which is adjustable to vary its effective work-taking diameter. The fit of lips 53 and 53*a* in grooves 51*a* and 55, respectively, holds the ends of the packing ring from being pulled radially out of position during adjustment thereof and also during its movement with respect to the work, as will hereinafter appear.

The tool in the condition of Figure 2 is lowered through the bore hole until it is determined by measurement that work W has been reached by slips 38. With the work of known diameter, one chooses an overshot in which the internal, contracted diameter of the ring of slips is such that when said slips strike the upper end W′ of the work they will be pushed upwardly and hence will be moved radially outward toward a position of retraction, this retractive movement continuing until the work is admitted between the slips. Propeller or evener 46 is moved upwardly by the slips and the weight, alone, of said evener as applied to the slips through fingers 48 has a tendency to cause the slips to move evenly, for it tends to hold down any slip which may be trying to force its way upwardly faster than the other slips. Furthermore, since downwardly acting fluid pressure is normally maintained within the bore of the barrel, such fluid pressure acts against the upper end of the evener with a tendency to hold it down, thus assisting in holding certain of the slips from being pushed upwardly more rapidly than others.

As soon as it is determined by measurement that the slips should have taken hold,

the driller exerts a slight upward pull on stem 27, this action tending to engage the slips tightly with the work by reason of angular faces 37 and 39, and also to lift said work. If the weight indicator (not shown) shows no additional weight during this test pull, the driller knows the fish has not been caught and he proceeds to lower the tool to a slightly greater depth, and then repeats the test pull-up. When the weight indicator shows the work has been engaged, the driller lowers away the overshot a distance which will assure him that the work has passed upwardly through the bore of packing ring 52. The instant the work passes through this bore the fluid passageway through the overshot barrel is restricted and the fluid pressure on top of evener 46 is accordingly increased with a consequent greater tendency to hold the slips from uneven upward movement.

Due to uneven surface characteristics of the work or to other causes, it sometimes happens that during the lowering of the barrel over the work the slips move upwardly unequal distances in spite of the action of the evener. Such a condition is shown in exaggerated form in Figure 3 wherein slip 38*a* is at its uppermost position, having pushed evener 46 upwardly until it has contacted with shoulder 49, slip 38*b* has not been moved up quite so far, and slip 38*c* has had even less upward movement. It will be obvious that it is undesirable to have the slips in this uneven condition when a pull is exerted upon the barrel. To insure that the slips are pressed evenly into engagement with the work, additional hydraulic pressure may be applied through the bore of stem 27 and hence through the barrel bore about the upper end of the evener, which end, in the illustrated embodiment, is made up of the upper ends of rings 47 and 57, where they extend radially into the barrel bore and thus are exposed to the pressure between extension 13 and work W. This pressure forces the evener downwardly and hence directly pushes slip 38*a* downwardly or, in other words, acts directly against the highest slip. It then progressively acts upon the rest of the slips in the order of their position until it has crowded all the slips evenly into engagement with the work and has centered the work within the barrel bore.

Though the upward pull on the barrel is mainly depended upon for tightly engaging the slips with the work (by reason of angular faces 37 and 39) we may also utilize the evener for depressing and hence forcing the slips into tighter engagement with the work even though there be no necessity of evening them, and hence member 46 may be considered broadly as a propeller for moving the slips longitudinally of the barrel and hence radially with respect thereto into work-gripping position.

Due to the tight fit of the packing ring about the work, there is no appreciable fluid pressure loss between said work and propeller 46, it following that pressure is effectively applied to said propeller and also that a certain amount of fluid may be forced downwardly through the bore of the work rather than around said work. This passage of fluid through the work bore allows circulation to be continued through said work, which circulation tends to free the fish from débris in the bore hole and thus aids in the fishing operation, as is well understood by those skilled in the art.

While we have specified the use of packing ring 52, it will be realized that this packing is not essential to the invention, considered broadly, for the bore of the evener may be of a sufficiently close fit about the work to allow it to function as described above. Therefore, though the use of the packing increases the efficiency of the tool somewhat and is a desirable and novel feature, it will be understood that such of my claims as do not call for this packing member are not to be considered as limited to the inclusion thereof.

In view of the fact that the slips are mounted for individual movement and have individual and ample backing by the barrel, once the slips have been tightly engaged with the work, the barrel may be raised or rotated without dislodging the slips from the work and without imposing strains on the jaws or their mountings which cannot be effectively resisted thereby. The full, straight sided engagement of the slips with the barrel walls does much to give the tool this capacity of rigidity when the jaws are contracted.

In the event the fish cannot be pulled without overstraining the fishing string, it is desirable to detach the fish from the work, withdraw it from the well, then circulate oil about the fish to loosen up the sand, and then regrapple said fish.

In order to release the tool from the fish, the propeller is relieved from hydraulic pressure, the barrel is relieved from pulling strain, and the tool is "rocked" or oscillated slightly to loosen up the grip of teeth 41 on the work. This rocking may be done without fear of slip breakage because of the described manner in which the slips are backed up by the barrel walls.

The drilling string is then rotated right handedly, so the threaded couplings between stem sections may not be broken, assuming the couplings are made up with right-handed threads. With the same assumption of right hand joint threads, teeth 41 are cut as left hand threads so this right hand rotation of the stem and barrel rotates the slips in a direction to cause their teeth to cut threads upwardly through the work wall and thus, in effect, unscrew the overshot from the fish.

Of course, if the drilling stem lengths are coupled by left hand threads, as is the case in some special fishing strings, teeth 41 will be given the characteristics of right hand threads so that when said stem is rotated left handedly the slips will cut their way out without tending to loosen the stem joints. In certain of the claims we have specified these right and left hand threads, but it will be understood this is not limitative on the claims but is done merely to point out relative characteristics of the threads on the wedge slips and stem couplings.

From a consideration of Figure 7 it will be seen that the slips are well backed up on both sides by the barrel so that this rotational movement of the barrel is imparted to the slips without likelihood of breaking said slips or breaking away the defining walls of ways 36.

In Figure 8 we have shown a slightly modified variation wherein all parts similar to corresponding parts in the views just described are given the same reference numerals. The only difference in this variation over the preferred embodiment resides in the fact that the propeller or evener 46*a* is made up of two parts, fingers 48 depending from the relatively short ring portion 47 and packing ring 52 being carried in a cup-like member 52*a* which rests on top ring 46*a*. Flange 50*a* on cup 52*a* corresponds to flange 50 on ring 47, and the follower ring or gland 57*a* is threaded into the bore of cup 52*a* just as ring 57 was threaded into ring 47. The characteristics of the packing ring and the members which clamp it are the same as those described in connection with the other view, and the assembly operates just as does the other assembly.

It will be understood that the drawings and description are to be considered merely as illustrative of and not restrictive on the broader claims appended hereto, for various changes in design, structure and arrangement may be made without departing from the spirit and scope of said claims.

We claim:

1. In a fishing tool, a barrel adapted to take work within its bore, there being a slip socket in the barrel bore and having downwardly and inwardly converging walls, a plurality of wedge slips mounted in the slip socket for bodily individual movement along said walls longitudinally of the barrel and hence radially with respect thereto, means for introducing fluid under pressure to said bore, said slips being movable downwardly and hence radially inwardly with respect to the barrel under the influence of hydraulic pressure applied through the barrel bore.

2. In a fishing tool, a barrel adapted to take work within its bore, a plurality of work gripping members within the barrel bore, said members being arranged individually for axial and radial movement with respect to the barrel to and from work gripping position, said members being individually movable axially of the barrel from work gripping position by virtue of introduction of the work to the barrel bore, and means for applying hydraulic pressure to the members then to move them individually into work gripping position.

3. In a fishing tool, a barrel adapted to take work within its bore, a plurality of work gripping members within the barrel bore and bodily movable individually axially and radially with respect to the barrel to and from work gripping position, said members being individually movable from work gripping position by virtue of introduction of the work to the barrel bore, and means actuated by the application of hydraulic pressure through said barrel bore then to move all said members intc work gripping position.

4. In a fishing tool, a barrel adapted to take work within its bore, a plurality of work gripping members within the barrel bore and movable individually with respect to the barrel to and from work gripping position, and an evener applied to said members and adapted, under hydraulic pressure applied thereto through the barrel bore, to engage said members evenly with the work.

5. In a fishing tool, a barrel adapted to take work within its bore, there being a slip socket in the barrel bore and having downwardly and inwardly converging walls, a plurality of wedge slips mounted in the slip socket for individual bodily movement along said walls longitudinally of the barrel and hence radially with respect thereto, work gripping faces on said slips in the form of threads, and means limiting movement of the slips circumferentially of the body, means for introducing fluid under pressure to said bore, said slips being movable downwardly and hence radially inwardly with respect to the barrel under the influence of hydraulic pressure applied through the barrel bore.

6. In combination with a fishing string made up of a plurality of sections coupled by right hand threads, a fishing tool coupled to the string and embodying a barrel adapted to take work within its bore, a plurality of work gripping members within the barrel bore, said members being arranged for individual movement radially and longitudinally with respect to the barrel to and from work gripping position, work gripping faces on said slips in the form of left hand threads, means limiting individual movement of the members circumferentially of the body, and means for applying hydraulic pressure to the members to move them into work gripping position.

7. In a tool of the character described, a barrel adapted to take work within its bore,

there being a slip socket in the barrel bore and having downwardly and inwardly converging walls, a plurality of wedge slips mounted in the slip socket for individual movement along said walls longitudinally of the barrel and hence radially with respect thereto, and a single propeller movable longitudinally of the barrel and adapted, during such movement in one direction, to coact with all of said slips to move them longitudinally of the barrel.

8. In a tool of the character described, a barrel adapted to take work within its bore, there being a slip socket in the barrel bore and having downwardly and inwardly converging walls, a plurality of wedge slips mounted in the slip socket for individual movement along said walls longitudinally of the barrel and hence radially with respect thereto, and an evener movable longitudinally of the barrel and adapted, during such movement in one direction, to coact with the several slips to engage them evenly with the work.

9. In a tool of the character described, a barrel adapted to take work within its bore, there being a slip socket in the barrel bore and having downwardly and inwardly converging walls, a plurality of wedge slips mounted in the slip socket for individual movement along said walls longitudinally of the barrel and hence radially with respect thereto, a connection between each slip and the body holding said slips in facial engagement with said walls during longitudinal movement of the slips, and means within the barrel adapted to be actuated by fluid pressure applied thereto to move all said slips downwardly.

10. In a tool of the character described, a barrel adapted to take vertically extending work within its bore, there being a slip socket in said bore and there being a plurality of vertically extending and angularly spaced grooves sunk in the defining wall of the socket, the bottom walls of said grooves inclining inwardly and downwardly, and the upper ends of the grooves opening only to the barrel bore, a plurality of wedge slips mounted one each in said grooves for movement along their bottom walls, longitudinally of the body and hence radially with respect thereto, means for holding said slips within their respective grooves during such movement, and an annular member detachably held within the barrel bore below the slips across the grooves and presenting an upwardly facing shoulder adapted to limit downward movement of all the slips.

11. In a fishing tool, a barrel adapted to take vertically extending work within its bore, a plurality of angularly spaced work gripping members in the body bore, said members being individually movable vertically through the bore and, by virtue of their vertical movement in opposite directions, being radially movable into and out of work-gripping position, and a propeller movable vertically through the barrel bore and engaging the upper ends of the individual members, the upper end of the propeller extending radially into the barrel bore whereby fluid under pressure in said bore acts against said upper end to force the propeller downwardly and thus tend to move said gripping members downwardly.

12. In a fishing tool, a barrel adapted to take vertically extending work within its bore, a plurality of angularly spaced work gripping members in the body bore, the members being spaced below the upper end of the barrel whereby the work may extend upwardly through the barrel bore to a point above said members, said members being movable vertically through the bore and, by virtue of their vertical movement in opposite directions, being radially movable into and out of work-gripping position, and a tubular propeller movable vertically through the barrel bore and engaging the upper ends of the individual members, the bore of the propeller being adapted to take the work where it projects above the gripping members, and packing means between the outer periphery of the work and the inner periphery of the propeller.

13. In a fishing tool, a barrel adapted to take vertically extending work within its bore, a plurality of angularly spaced work gripping members in the body bore, the members being spaced below the upper end of the barrel whereby the work may extend upwardly through the barrel bore to a point above said members, said members being movable vertically through the bore and, by virtue of their vertical movement in opposite directions, being radially movable into and out of work-gripping position, and a tubular propeller movable vertically through the barrel bore and engaging the upper ends of the individual members, the bore of the propeller being adapted to take the work where it projects above the gripping members and a packing ring between the outer periphery of the work and the inner periphery of the propeller, said ring being adjustable prior to the entry of the work thereto to vary the diameter of its work taking bore.

14. In a tool of the character described, a barrel adapted to take vertically extending work within its bore, there being a slip socket in said bore and there being a plurality of vertically extending and angularly spaced grooves sunk in the defining wall of the socket, the bottom walls of said grooves inclining inwardly and downwardly, a plurality of wedge slips mounted one each in said grooves for movement along their bottom walls longitudinally of the body and hence radially with respect thereto, and a

vertically movable slip propeller in said barrel bore above the slips, said propeller embodying a ring-like body member and a plurality of depending fingers adapted to engage, one each, said slips at their upper ends and to work through said grooves when said propeller is moved vertically.

15. In a slip propeller for tools of the character described, a ring shaped body member, an internal annular flange on said member, a packing annulus of compressible material in the bore of the member and end-seated on said flange, a follower in the bore of the member and engaging the opposite end of the packing annulus, and a connection between said member and follower whereby the follower is adapted to be moved towards said flange to clamp the annulus between said flange and follower.

16. In a slip propeller for tools of the character described, a ring shaped body member, an internal annular flange on said member, a packing annulus of compressible material in the bore of the member and end-seated on said flange, a follower in the bore of the member and engaging the opposite end of the packing annulus, and a connection between said member and follower whereby the follower is adapted to be moved towards said flange to clamp the annulus between said flange and follower, said follower and flange being undercut on their opposed faces, and the ends of said annulus having longitudinal extensions entered in said undercuts.

17. In combination, a barrel adapted to take vertically extending work within its bore with annular clearance, a ring-shaped body member within and concentric with the bore of said barrel, an internal annular flange on said member, a packing annulus of compressible material in the bore of the member and end-seated on said flange, said packing annulus being adapted to take the work snugly within its bore, a follower in the bore of the member and engaging the opposite end of the packing annulus, and a connection between said member and follower whereby the follower is adapted to be moved towards said flange to clamp the annulus between said flange and follower.

In witness that we claim the foregoing, we have hereunto subscribed our names this 1st day of May, 1929.

FREDERICK STONE.
ALBERT L. STONE.

CERTIFICATE OF COKRECTION.

Patent No. 1,785,152. Granted December 16, 1930, to

FREDERICK STONE ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, line 91, claim 4, before the word "movable" insert the word bodily, and in the same line before "with" insert axially and radially; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of March, A. D. 1931.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)