

Sept. 15, 1959

D. D. WEBB ET AL

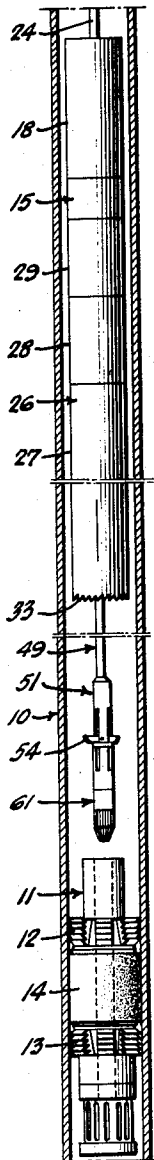
2,904,114

WELL BORE PACKER REMOVING TOOL

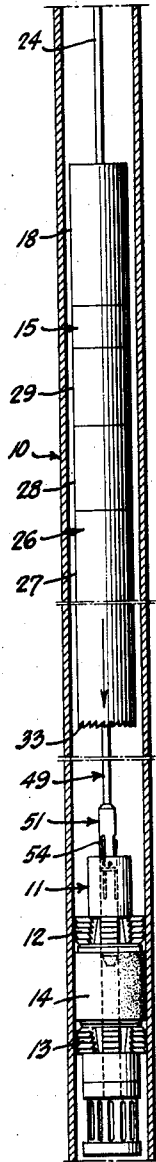
Filed Nov. 3, 1958

2 Sheets-Sheet 1

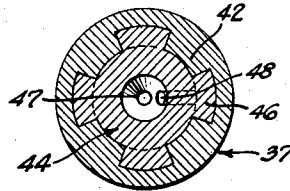
*Fig. 1.*



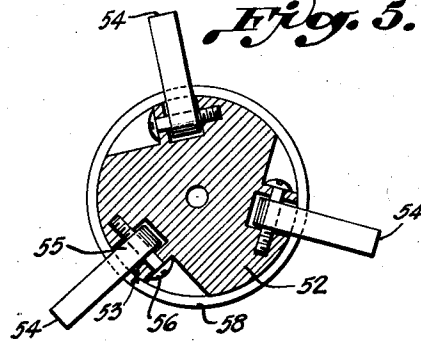
*Fig. 2.*



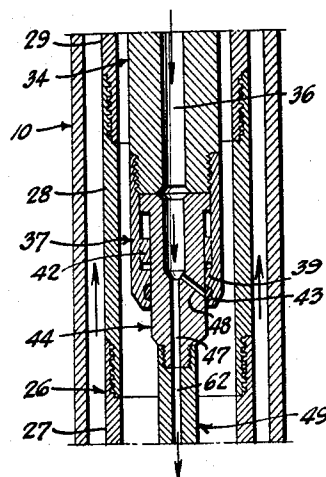
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



INVENTORS

DERREL D. WEBB  
PAUL H. TEEL

BY

*Simon A. Nelson*

ATTORNEY

**Sept. 15, 1959**

D. D. WEBB ET AL

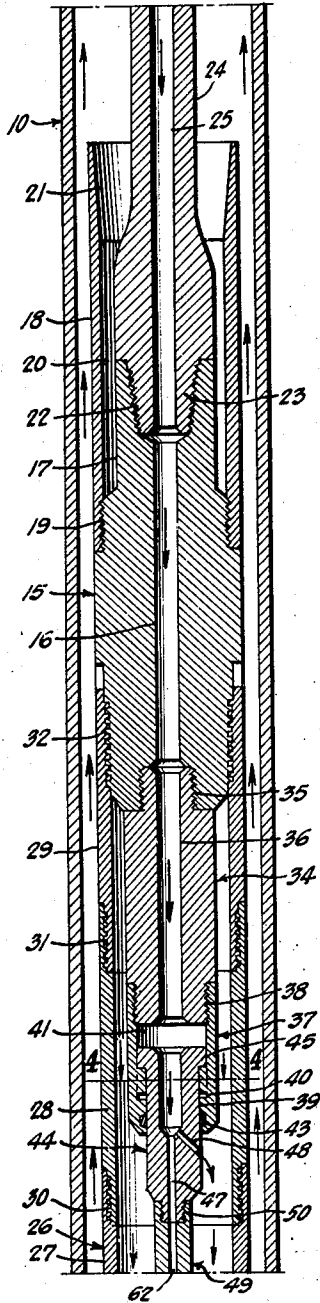
**2,904,114**

# WELL BORE PACKER REMOVING TOOL

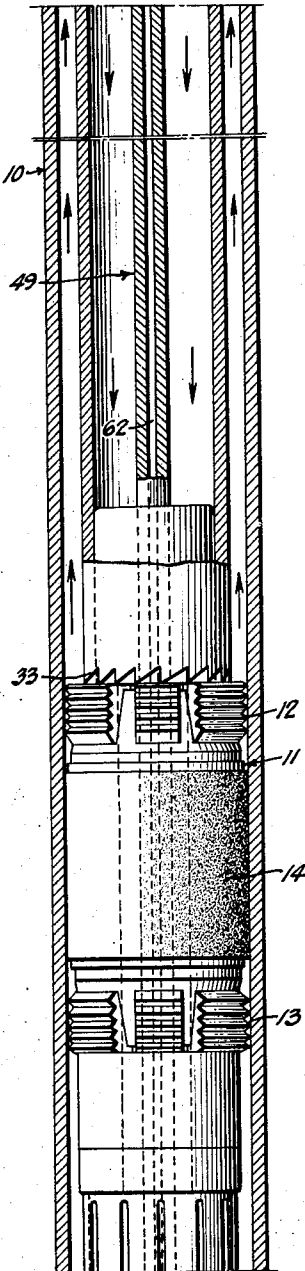
Filed Nov. 3, 1958

2 Sheets-Sheet 2

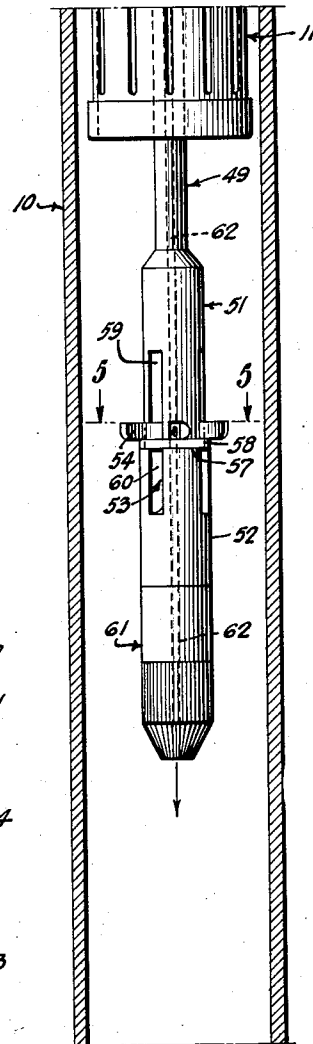
*Fig. 3a.*



*Fig. 3b.*



*Fig. 3c.*



INVENTORS

DERREL D. WEBB  
PAUL H. TEEL

BY

Almon S. Nelson

ATTORNEY

1

2,904,114

## WELL BORE PACKER REMOVING TOOL

Derrel D. Webb and Paul H. Teel, Houston, Tex., assignors to Houston Engineers, Inc., Houston, Tex., a corporation of Texas

Application November 3, 1958, Serial No. 771,521

12 Claims. (Cl. 166—103)

This invention relates to well equipment and more particularly to a tool for removing a packer from the bore of a well.

In the operation of wells, such as those producing oil and gas, it has become relatively common practice to install packers in the bores of the wells in order to divide the same into two or more zones or sections and such packers are normally installed in a substantially permanent manner in that no means is provided for permitting release of the packer and removal of the same to the surface. Conventional packers of the type here under consideration normally utilize a plurality of upper and lower tapered slips which operate to engage the inner wall of a well casing to securely hold the packer in place therein against a relatively high pressure and in addition, the packer is provided with a yieldable packing member which is expanded into engagement with the inner wall of the well casing to prevent flow of fluid by the packer. Normally the packer is installed in the well by use of a special tool which permits placing the packer in the desired location and thereafter expanding the slips as well as the packing member into engagement with the inner wall of the well casing to securely fix the packer in place, after which the installing tool is withdrawn. Thereafter the packer remains in place permanently or until such time as it is necessary to remove the same, which removal may become necessary for a variety of reasons which are not here important.

Heretofore in the removal of packers from a well bore, it has been common practice to simply lower a conventional rock drill bit on the lower end of a drill string and to drill or grind out the entire packer. This results in the chips or other material resulting from the drilling operation falling down the well to the top of a lower packer or to the bottom of the well which will result in plugging the bore and in the event there is a lower packer in the well, these chips and other material further complicate removal of the lower packer. This method of removing packers is a slow and tedious job and also necessitates removing the chips and other material falling into the well as the result of the drilling operation before removal operations on a lower packer can be commenced. Since wells in which packers have been installed are normally relatively deep, the use of fishing or other tools to recover chips or other parts which may have fallen into the well and become lodged in a lower packer requires considerable time since one or more trips of the fishing tool into the well are necessary and such trips require considerable time where the well is relatively deep.

It is accordingly an object of the invention to provide a tool for releasing and removing a well bore packer in a single operation.

A further object of the invention is the provision of a tool for removing well bore packers which precludes the deposit of chips or other foreign material in the well.

A still further object of the invention is the provision of a tool for removing well bore packers which operates to cut away the retaining slips and packing element and

2

to remove the remaining portion of the packer in the single unit from the well.

Another object of the invention is the provision of a tool for removing well bore packers, including means for cutting away the retaining slips and packing element and also including means for preventing deposit of chips or other foreign material resulting from the packing operation in the well, such chips being either removed from the well or deposited in a junk basket provided on the tool.

A further object of the invention is the provision of a tool for removing well bore packers, including means to cut a central hole entirely through the packer to permit engagement thereof by a fishing tool forming a part of the removing tool to permit removal of the packer as a unit from the well.

A still further object of the invention is the provision of a tool for removing well bore packers including means for cutting away the retaining slips and packing element of the packer and for cutting a central hole through the packer, together with means for supplying a flushing fluid to convey chips and other debris upwardly out of the well or into a junk receiving basket provided on the tool.

Another object of the invention is the provision of a tool for removing well bore packers from wells and in which means is provided for directing a flushing fluid solely through a passage at the lower end of the tool or to divide the flow of such flushing fluid between such passage and a port intermediate the length of the tool.

A further object of the invention is the provision of a tool for removing well bore packers from wells including means for cutting away the retaining slips and packing element and a fishing tool for engaging the packer to remove the same as a unit from the well there being means provided to permit disengagement of the fishing tool from the packer in the event the same becomes jammed in the well bore during removal therefrom.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

Fig. 1 is a side elevational view of a packer removing tool constructed in accordance with this invention and showing a well casing in cross section, as well as a packer to be removed, installed in the casing, and with the packer removing tool in position prior to engaging the packer;

Fig. 2 a view similar to Fig. 1, and with a portion of the removing tool engaging the packer for the initial operation of cutting a hole therethrough;

Fig. 3a a longitudinal sectional view showing a well casing and the packer removing tool of this invention in place therein and particularly showing the sleeve valve for controlling the operation of a flushing fluid delivery port with the port open for delivery of fluid therefrom;

Fig. 3b a sectional view of another portion of the tool of this invention and showing the annular cutter sleeve in engagement with the retaining slips preparatory to commencing the cutting operations;

Fig. 3c a sectional view showing the lower portion of the packer removing tool of this invention with the fishing tool and cutting tool disposed below the packer and with the dogs of the fishing tool in position to engage the packer for removal thereof from the bore of the well;

Fig. 4 a sectional view taken substantially on the line 4—4 of Fig. 3a;

Fig. 5 a sectional view taken substantially on the line 5—5 of Fig. 3c and showing the manner of mounting the dog on the fishing tool; and

Fig. 6 a fragmentary sectional view showing the sleeve valve in position to close the flushing fluid delivery port. With continued reference to the drawing, there is

3

shown in Fig. 1 a well casing 10 in which has been installed a conventional well bore packer 11, which packer includes upper retaining slips 12, lower retaining slips 13 and a centrally located yieldable packing member 14. The slips 12 and 13 may be serrated as shown, in order to bite into and firmly engage the inner wall surface of the casing 10 in order to hold the packer 11 in place, the upper slips 12 operating to prevent upward movement of the packer 11 and the lower slips 13 operating to prevent downward movement of the packer 11. The packing member 14 firmly engages the inner wall surface of the casing 10 in order to prevent fluid flow upwardly or downwardly in the casing 10 by the packer 11.

As stated above, the packer 11 is installed in the casing 10 by a special tool which operates to expand the slips 12 and 13, as well as the packing member 14 into engagement with the inner wall surface of the casing 10 and normally the packer 11 is permanently installed in the well. Since it is frequently necessary to remove a packer from a well bore, the tool of this invention has been developed to expeditiously accomplish this purpose.

With particular reference to Figs. 3a, 3b and 3c, the packer removing tool of this invention may well comprise an elongated body member 15 having an axial passage 16 extending therethrough and a reduced upper portion 17 provided thereon. A sleeve 18 of substantially the same diameter as the body member 15 may be screw threadedly secured as at 19 to the body member 15 and extend above the upper reduced portion 17 in spaced concentric relation thereto to provide an annular space 20 which serves as a junk basket to receive chips or other debris which is not carried upwardly out of the well by the flow of flushing fluid. In order to facilitate entry of such chips or debris into the space 20 the upper end of the sleeve 18 may be beveled as at 21. A threaded socket 22 is provided in the upper end of the upper portion 17 of the body member 15 to threadedly receive a threaded connecting member 23 on the lower end of a drill string 24 and it is to be noted that the drill string 24 is provided with a passage 25 which communicates with the passage 16 in the body member 15.

An elongated cutter sleeve 26 of substantially the same diameter as the body member 15 may comprise a plurality of sections of tubing 27, 28 and 29 threadedly secured together as at 30 and 31 and threadedly secured to the body member 15 as at 32. While the cutter sleeve 26 is shown and described as comprising a plurality of tubular sections, if desired such cutter sleeve may be made in a single piece, but in order to facilitate changing of the length of such sleeve for various applications thereof, the use of threaded sections is more convenient and is to be preferred. The lower end of the lowermost section 27 of the cutter sleeve 26 is provided with cutting teeth 33 which provides an annular cutter, the purpose of which will be later described.

A tubular member 34 is secured by screw threaded means or the like 35 to the lower end of the body member 15 within the cutter sleeve 26 and the passage 36 in the tubular member 34 communicates with the passage 16 in the body member 15. A sleeve valve and coupling member 37 is threadedly secured at 38 to the lower end of the tubular member 34 and the sleeve valve and coupling member 37 is provided at the lower end with an inturned flange 39 providing an upwardly facing shoulder 40 which serves to define an elongated annular recess 41 disposed between the lower end of the tubular member 34 and the flange 39 within the sleeve valve 37. As best shown in Fig. 4, the sleeve valve and coupling member 37 is provided with splines 42 projecting into the recess 41 and the purpose of such splines will presently appear. Also provided on the flange 39 is packing means 43, the purpose of which will be presently described.

An elongated spindle coupling element 44 is slidably received in the sleeve valve and coupling member 37 in engagement with the packing means 43 and the coupling

4

element 44 is provided at the upper end thereof with an outturned flange 45 disposed in the recess 41 in the sleeve valve and coupling member 37 and, as shown in Fig. 4, the coupling element 44 is provided with splines 46 meshing with the splines 42 on the sleeve valve and coupling member 37 in order to prevent relative rotation between such sleeve valve and coupling member and the coupling element 44. The splines 42 and 46 permit relative sliding movement between the coupling member 37 and coupling element 44 within the limits determined by the lower end of the tubular member 34 and the shoulder 40 on the flange 39 and as stated above, the splines prevent relative rotation between the coupling member 37 and the coupling element 44. An axial bore 47 extends through the coupling element 44 and such bore communicates with the passage 36 in the tubular member 34. A radial port 48 in the coupling element 44 communicates with the axial bore 47 therein. While a single port 48 has been shown, it is to be understood that a plurality of such ports may be provided if this is desirable and the operation of the two would be the same regardless of the number of such ports provided.

An elongated spindle 49 is secured by the screw threaded means or the like 50 to the lower end of the coupling element 44 and a fishing tool 51 is secured to the lower end of the spindle 49. The fishing tool 51 may well comprise an elongated body 52 having a plurality of elongated radial slots 53 therein. Dogs 54 are pivotally mounted in the slots 53 intermediate the length thereof and as best shown in Fig. 5, the inner ends 55 of the dogs 54 may be positioned in the slots 53 and pivotally secured therein by suitable bolts or pins 56. A shoulder 57 is provided on the body 52 of the fishing tool 51 below the dogs 54 and seated on the shoulder 57 is a shear ring 58 and the purpose of such shear ring will be later described. In normal operation, the dog 54 will fold upwardly into the upper portion 59 of the slot 54 and will open downwardly to a horizontal position, as shown in Fig. 3c, where the dogs 54 will be supported in such horizontal position by the shear ring 58. However, in the event of an excessive downward load on the dogs 54, the same will move downwardly to shear the ring 58 which will permit the dogs 54 to move downwardly into the lower portion 60 of the slots 53. The reason for this manner of operation of the dogs 54 will become apparent during the description of the operation of the tool of this invention.

Secured to the lower end of the fishing tool 51 is a cutting tool 61 and an axial passage 62 extends through the spindle 49, the fishing tool 51, and the cutting tool 61, and this passage communicates with the bore 47 in the coupling element 44.

In the operation of the tool of this invention, it is assumed that the cutter sleeve 26 is secured to the body member 15 and that the cutting tool 61, fishing tool 51 and spindle 49 are secured to the body member 15 through the coupling element 44, the sleeve valve and coupling member 37 and the tubular member 34. With the body member 15 secured to the lower end 23 of a drill string 24, the tool is lowered into a well until the lower end of the cutting tool 61 engages the upper end of a packer 11 installed in the well. Should there be sand or other debris collected on the upper surface of the packer 11, movement of the tool downwardly after the lower end of the cutting tool 61 contacts such sand or debris, will operate to move the coupling element 44 upwardly in the sleeve valve and coupling member 37 to the position shown in Fig. 6, at which time the flange 39 and packing means 43 will cover the radial port 48 and flushing fluid traveling downwardly through the passage 25 in the drill string 24 and the tool will be discharged through the passage 62 in the lower end of the cutting tool 61 to flush the sand and debris from the top of the packer 11. Thereafter rotation of the drill string 24 and tool of this invention will result in the cutting tool 61 cutting a central hole entirely through the packer 11 at which time

5

the cutting tool 61 and fishing tool 51 will project below the packer 11 as shown in Fig. 3c. During the cutting operation of the cutting tool 61 through the packer 11, the dogs 54 will be disposed in the upper portions 59 of the slots 53 in the fishing tool 51 in order to permit the fishing tool 51 to follow the cutting tool 61 through the packer 11. When the fishing tool 51 passes below the packer 11 as shown in Fig. 3c, the dogs 54 will move outwardly to the horizontal position shown in this figure, for a purpose to be presently described.

Upon completion of the central hole of the packer 11, the cutting teeth 33 on the lower edge of the cutter sleeve 26 will move into engagement with the upper slips 12 on the packer 11 and rotation of the cutter sleeve 26 will operate to cut away the slips 12 as well as the packing member 14 and the lower slips 13. Movement of the cutting tool 61 and fishing tool 51 below the packer 11 will result in downward movement of the spindle 49 and coupling element 44 with respect to the valve sleeve and coupling member 37 which exposes the radial port 48 as shown in Fig. 3a which will cause the flushing fluid flowing downwardly through the tool to be discharged through the radial port 48, as well as through the axial passage in the cutting tool 61. The flushing fluid discharging from the radial port 48 will operate to flush chips and other debris resulting from the cutting action of the cutters 33 on the cutter sleeve 26 and such chips and debris will flow upwardly between the well casing 10 and the cutter sleeve 26 and in the event the chips and debris are not carried to the top of the well by such fluid flow, the same will be deposited in the annular space 20 provided by the sleeve 18 at the upper end of the body member 15 of the tool of this invention.

Upon completion of the cutting operation by the teeth 33 on the cutter sleeve 26, the packer 11 will be freed from the inner wall surface of the well casing 10 and the packer 11 will move downwardly into engagement with the dogs 54 on the fishing tool 51. Thereafter, upward movement of the fishing tool 51 will result in removing the packer 11 from the well. If for any reason, however, the packer 11 becomes jammed in the well and it is not possible to remove the same therefrom, an upward pull on the fishing tool 51 will impose a sufficient load on the dogs 54 to shear the ring 53 thereby permitting the dogs 54 to move downwardly into the lower portions 60 of the slots 53 in the body 52 of the fishing tool 51 thereby permitting removal of the fishing tool 51 and cutting tool 61 upwardly through the central hole in the packer 11. Thereafter the cutting operation may be repeated to free the packer and permit removal thereof from the well. Normally, however, the packer 11 may be removed by the single operation described above.

It will, therefore, be seen that by the above described invention there has been provided a relatively simple, yet highly efficient packer removing tool which may be utilized to free the packer and remove the same from a well in a single operation and, at the same time, prevent the accumulation of chips or other debris in the well below the location of the packer to be removed and furthermore, there has been provided means to permit recovery of the packer removing tool in the event the packer becomes jammed in the well during removal thereof. Suitable flushing means controlled by operation of the device has been provided to assure removal of sand, chips and other debris from the well, both before and during the packer removing operation.

It will be obvious to those skilled in the art that various changes may be made in the art without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of

6

a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, a reduced upper portion on said body member, a sleeve secured to said body member and extending above said upper portion in spaced concentric relation thereto, a threaded socket in the upper end of said upper portion for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a tubular member secured to the lower end of said body member within said cutter sleeve and communicating with said passage, a sleeve valve and coupling member secured to the lower end of said tubular member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess, splines on said last named sleeve projecting into said recess and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, an outturned flange on the upper end of said coupling element disposed in said recess, splines on said coupling element meshing with the splines on said sleeve valve to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with said tubular member, a radial port in said coupling element communicating with said bore, said sleeve valve being movably downwardly with respect to said coupling element to close said port and said coupling element being movably downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and a shear ring surrounding said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear ring, an excessive downward load on said dogs serving to shear said ring and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

2. A tool as defined in claim 1 in which said cutter sleeve comprises detachably connected sections to facilitate changing the length of said cutter sleeve.

3. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, a reduced upper portion on said body member, a sleeve secured to said body member and extending above said upper portion in spaced concentric relation thereto, a threaded socket in the upper end of said upper portion for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a tubular member secured to the lower end of

said body member within said cutter sleeve and communicating with said passage, a sleeve valve and coupling member secured to the lower end of said tubular member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess, splines on said last named sleeve projecting into said recess and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, an outturned flange on the upper end of said coupling element disposed in said recess, splines on said coupling element meshing with the splines with said sleeve valve to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with said tubular member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said means to permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

4. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, a threaded socket in the upper end of said body member for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a tubular member secured to the lower end of said body member within said cutter sleeve and communicating with said passage, a sleeve valve and coupling member secured to the lower end of said tubular member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess, splines on said last named sleeve projecting into said recess and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, an outturned flange on the upper end of said coupling element disposed in said recess, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with said tubular member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to

open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely in the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

5. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, a threaded socket in the upper end of said body member for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a tubular member secured to the lower end of said body member within said cutter sleeve and communicating with said passage, a sleeve valve and coupling member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess, and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, an outturned flange on the upper end of said coupling element disposed in said recess, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with said tubular member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

6. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the

well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, a threaded socket in the upper end of said body member for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a tubular member secured to the lower end of said body member within said cutter sleeve and communicating with said passage, a sleeve valve and coupling member secured to the lower end of said tubular member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with said tubular member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slot and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said ports closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

7. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, a threaded socket in the upper end of said body member for connecting said body member to the lower end of a drill string to said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a sleeve valve and coupling member connected to the lower end of said body member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with the passage in said body member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the

lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

8. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, means for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a sleeve valve and coupling member connected to the lower end of said body member and comprising a sleeve having an inturned flange at the lower end providing an upwardly facing shoulder defining an elongated annular recess and packing means on said flange, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, and an axial bore extending through said coupling element and communicating with the passage in said body member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be provided between said port and the passage in said cutting tool.

9. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, means for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an

annular cutter, a sleeve valve and coupling member connected to the lower end of said body member, packing means in said sleeve, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with the passage in said body member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body below said dogs, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

10. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, means for connecting said body member to the lower end of a drill string with said passage communicating with a passage in the drill string, an elongated cutter sleeve removably secured to the lower end of said body, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a sleeve valve and coupling member connected to the lower end of said body member, packing means in said sleeve, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with the passage in said body member, a radial port in said coupling element communicating with said bore, said sleeve valve being movable downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof and shear means on said last named body, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position in engagement with said shear means, an excessive downward load on said dogs serving to shear said shear means and permit said dogs to move downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with

said port open the fluid flow will be divided between said port and the passage in said cutting tool.

11. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, means for connecting said body member to the lower end of a drill string with said passage communicating with a passage in said drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a sleeve valve and coupling member connected to the lower end of said body member, packing means in said sleeve, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with the passage in said body member, a radial port in said coupling element communicating with said bore, said sleeve valve being movably downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle and comprising an elongated body having a plurality of elongated radial slots therein, a dog pivotally mounted in each slot intermediate the length thereof, said dogs being movable upwardly within said slots and downwardly to a substantially horizontal projecting position, means to releasably support said dogs in a horizontal position, an excessive downward load on said dogs serving to move said dogs downwardly into said slots, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

12. A tool for removing a well bore packer of the type having upper and lower slips engaging the inner wall of a well casing to hold the packer in place and an intermediate packing member engaging the inner wall of the well casing to prevent flow of fluid by the packer, said tool comprising an elongated body member having an axial passage extending therethrough, means for connecting said body member to the lower end of a drill string with said passage communicating with a passage in said drill string, an elongated cutter sleeve removably secured to the lower end of said body member, cutting teeth on the lower end of said cutter sleeve to provide an annular cutter, a sleeve valve and coupling member connected to the lower end of said body member, packing means in said sleeve, an elongated spindle coupling element slidably received in said sleeve valve in engagement with said packing means, means to prevent relative rotation between said valve and said coupling element, an axial bore extending through said coupling element and communicating with the passage in said body member, a radial port in said coupling element communicating with said bore, said sleeve valve being movably downwardly with respect to said coupling element to close said port and said coupling element being movable downwardly with respect to said sleeve valve to open said port, an elongated spindle secured to the lower end of said coupling element, a fishing tool secured to the lower end of said spindle, packer engaging means on said fishing tool to engage and remove

**13**

the packer from the well, an excessive downward load on said packer engaging means serving to move the same out of engagement with the packer, a cutting tool on the lower end of said fishing tool and an axial passage extending through said spindle, said fishing tool and 5 said cutting tool and communicating with said bore, whereby with said port closed downward fluid flow from the passage in said drill string will be entirely through

**14**

the passage in said cutting tool and with said port open the fluid flow will be divided between said port and the passage in said cutting tool.

## References Cited in the file of this patent

## UNITED STATES PATENTS

|           |            |                |
|-----------|------------|----------------|
| 2,762,438 | Naylor     | Sept. 11, 1956 |
| 2,859,943 | Chadderdon | Nov. 11, 1958  |