

May 28, 1963

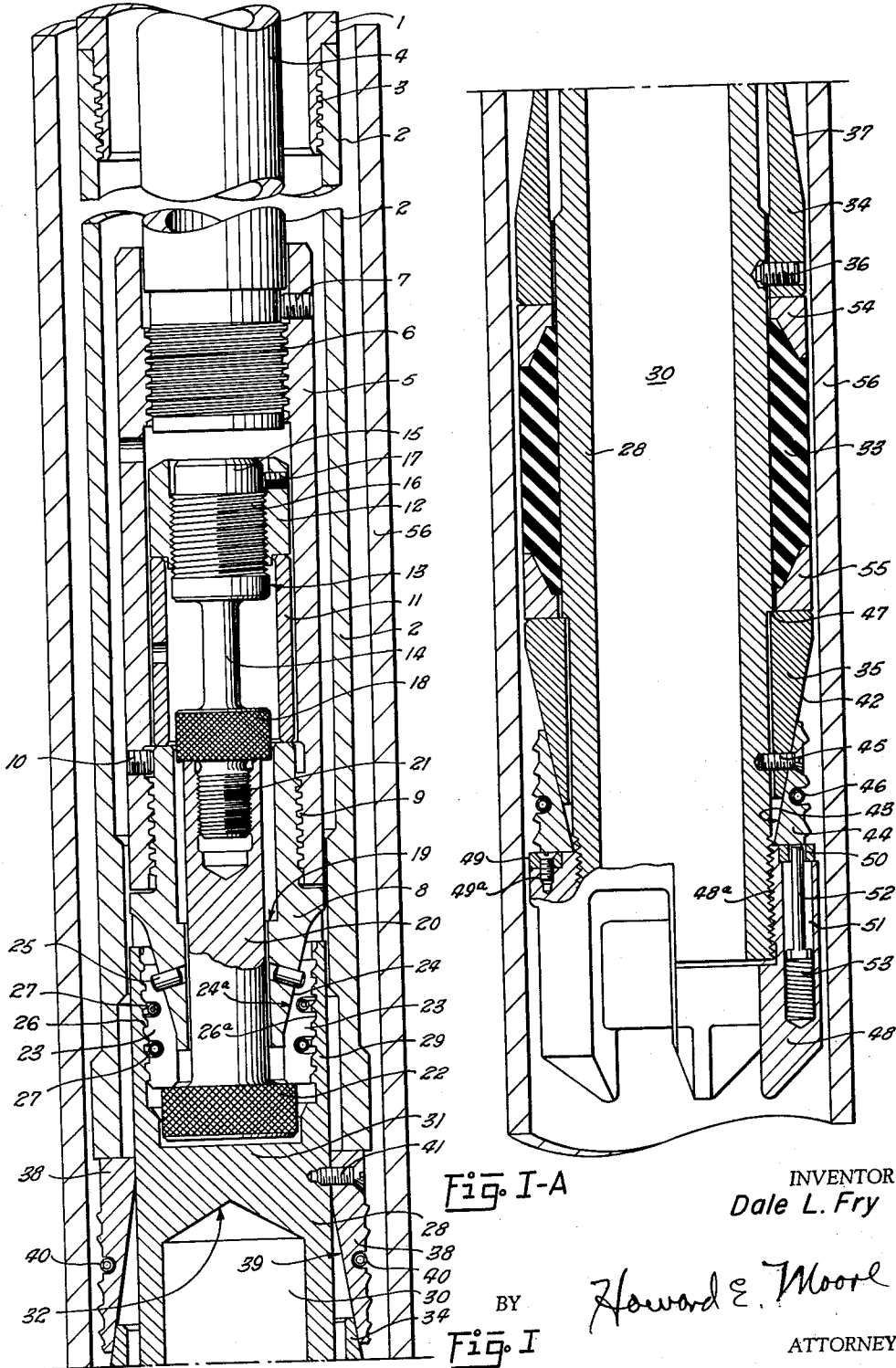
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3,091,293

PLUGGING DEVICE FOR WELLS

Filed July 10, 1959

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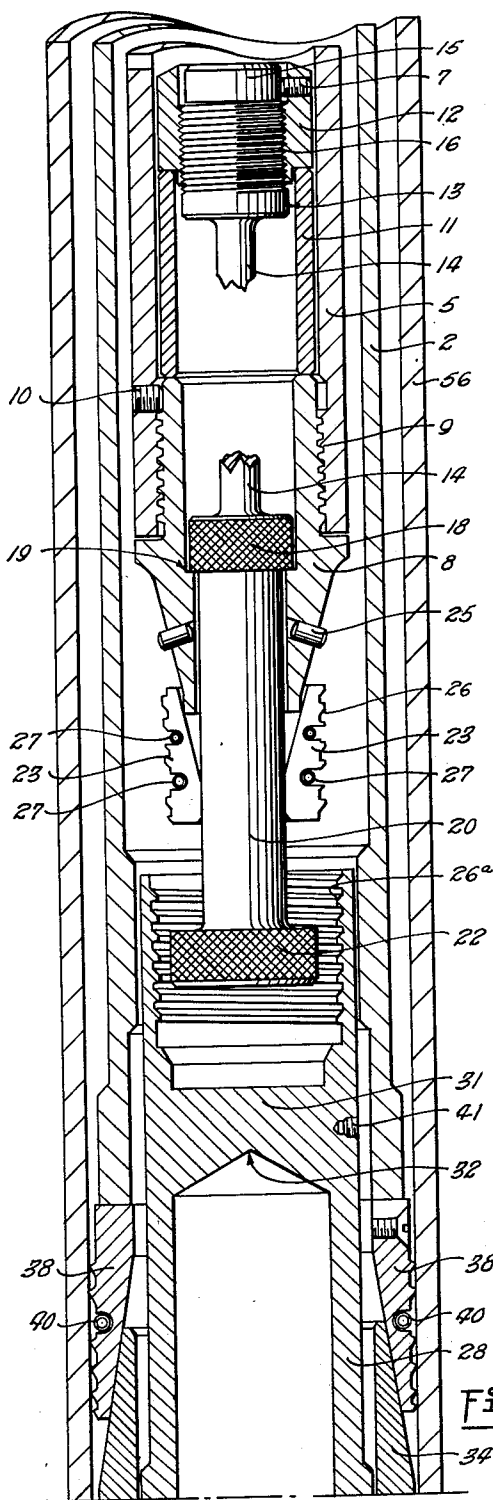
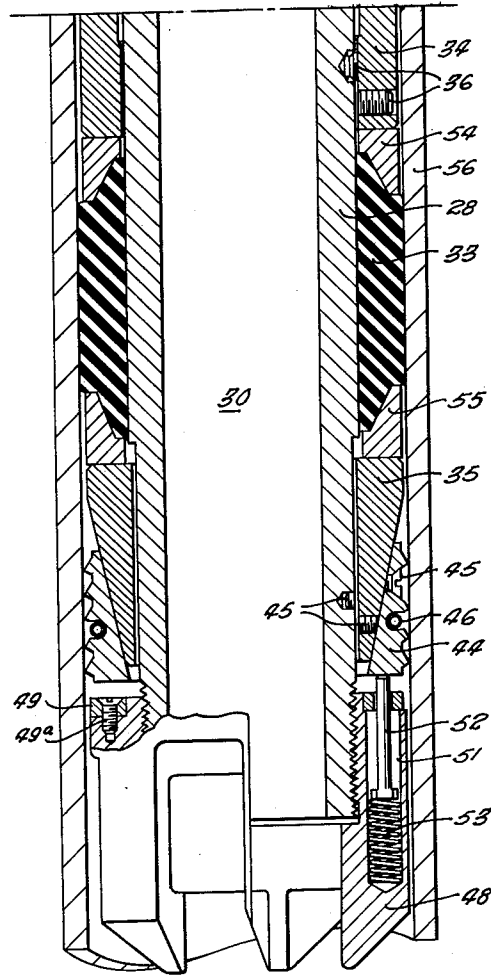


Fig. II-A

Fig. II
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3 Sheets-Sheet 3

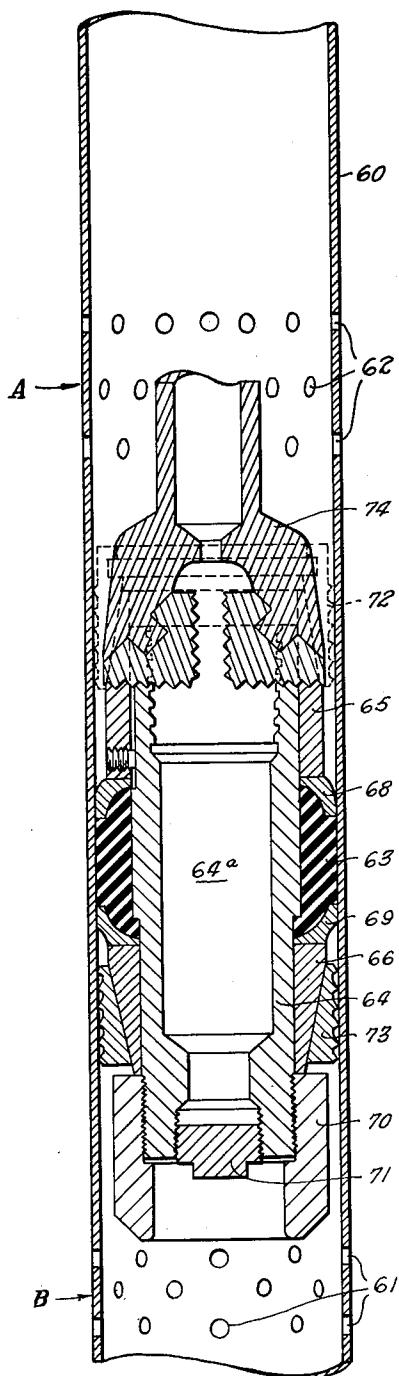


Fig. III

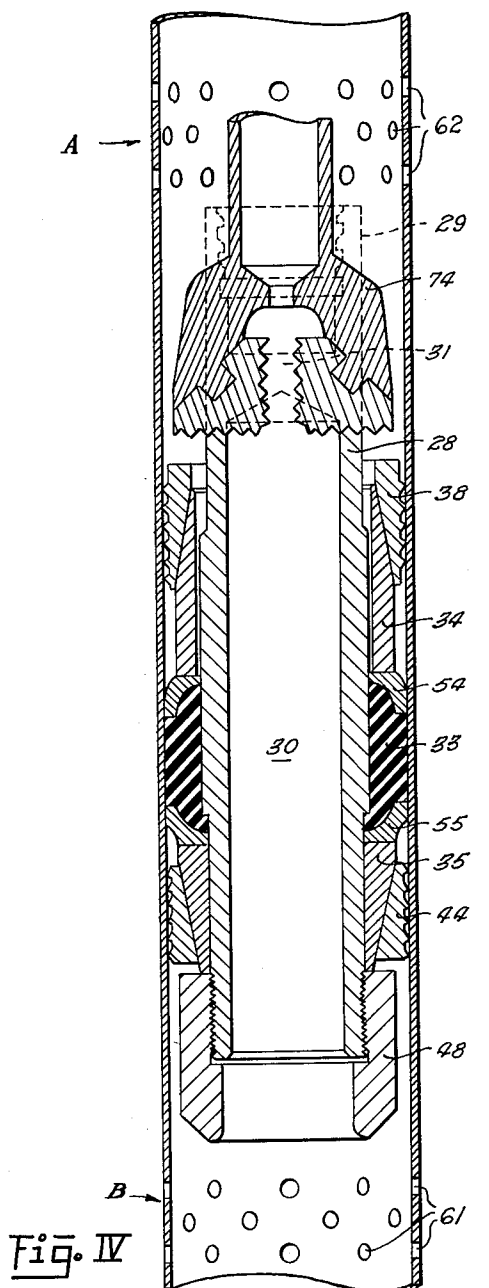


Fig. IV

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1

3,091,293

PLUGGING DEVICE FOR WELLS

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8 Claims. (Cl. 166—123)

This invention is concerned with a type of packer used in an oil or gas well, commonly known as a bridge plug, and is particularly concerned with a drillable bridge plug which is expanded and set in the casing of a well to provide a seal to isolate a productive formation therebelow from the area of the casing above the plug for the purposes hereinafter described.

The parts of the plug are made of drillable material so that the plug may be drilled up by a drill bit to open up the bore of the casing, after tests or treating operations have been made of a productive formation in the well above the plug.

The particular form of drillable bridge plug herein disclosed is of the type adapted to be run into the well on a wire line, and to be set in the well by a pressure setting device, or "gun," such as disclosed in Baker et al. Patents Nos. 2,637,402 and 2,640,546. A suitable form of adapter assembly for detachably connecting the bridge plug to the pressure setting device is disclosed herein, certain features of which, in combination with the plug, are also believed to be novel.

Other types of adapter assemblies for detachably connecting the setting device to the plug could be employed with the novel plug construction herein disclosed.

It will also be understood that the specific improvement in the bridge plug herein described and claimed would have utility and application in other types of drillable bridge plugs, commonly known in the art, which are run into the well on a tubing string.

The improvements in the bridge plug herein described are particularly applicable for use in wells which employ high pressure gas or compressed air as a circulating fluid during drilling procedure. However, it would be advantageous in any well where the conditions hereinafter related exist.

After such wells have been drilled to the desired depth the casing is run and set in the well bore, extending through all of the productive formations.

In drilling out a bridge plug, a drill bit is lowered into the casing on a drill string and is rotated against the bridge plug to progressively drill it up. Thus the upper slips and the upper end of the body of the bridge plug have heretofore been cut away while the bore of the mandrel is still closed at the lower end.

The zone of production below the bridge plug is open, but it is sealed off and isolated in the casing by the set bridge plug thereabove. Therefore, the static bottom hole pressure of the productive formation is confined below the plug and is exerted upwardly against the plug, which in many cases exceeds the weight of the entire drill string employed in drilling out the bridge plug.

In gas or air drilled wells, as indicated above, the weight of the drill string constitutes the only counteracting force to the zone pressure, because such wells are not mudded down or filled with fluid prior to testing. As a result of the foregoing, when the upper slips of the bridge plug are drilled away by the drill bit, while the bore of the bridge plug mandrel is still closed at the lower end, the greater pressure below the bridge plug, in many instances, acts on the bridge plug, to such an extent as to cause the upward movement of the partially drilled bridge plug, exerting the upwardly acting force on the drill bit to such an extent as to cause the bending or cork-screwing of the drill string,

2

and, in some cases, causing the entire tubing string, bit and partially drilled plug, to be blown out of the well, resulting in damage to equipment, delay in well completion, property damage and danger to human lives.

The invention comprehended in this application is primarily intended to overcome the above recited problem, by placing the closure or partition in the bore of the mandrel of the bridge plug at the upper end thereof so that it is disposed above the upper end of the upper slips when the bridge plug is set, thereby permitting the closure or partition to be penetrated and broken by the drill bit before the upper slips are drilled out, so as to permit equalization of pressure across the bridge plug prior to drilling out and releasing the upper set of slips.

It is, therefore, a primary object of this invention to provide a drillable bridge plug with means for equalizing the pressure thereacross before any of the anchoring devices therefor are released by drilling procedure.

Another object of the invention is to provide a drillable bridge plug wherein the tubular mandrel or support therefor has a bore therethrough which is closed above all anchoring devices therefor when the bridge plug is set in the casing.

Still another object of the invention is to provide such a bridge plug which may be run into the well on a wire line and is attached to the pressure setting device by means of a novel adapter assembly.

Still another object of the invention is to provide a combination of adapter assembly and bridge plug for detachably connecting the bridge plug to a pressure setting device, wherein the holding member which holds the latch dogs therein in engagement with the packer mandrel is positively released from the latch dogs by an upward movement and does not depend upon gravity for its disengagement or release. Thereby the danger of the holding members becoming inoperative by reason of foreign material collected thereabout is eliminated.

A still further object of the invention is to provide a drillable bridge plug wherein the bore therethrough is closed by a partition across said bore at a position above the uppermost anchoring members therefor when the plug is set in the casing.

A general object of the invention is to provide a drillable bridge plug which may be drilled out without the danger of same being moved up the hole or exerting upward force against the drilling string by reason of confined formation pressure therebelow.

Other and further objects of the invention will become apparent upon reading the detailed specification herein-after following, and by referring to the drawings annexed hereto.

In the drawings a suitable embodiment of the invention is shown wherein:

FIGURES I and IA are cross-sectional, elevational views showing a bridge plug constructed in accordance with the invention, attached to the adapter assembly, which in turn is suspended to a pressure setting device (not shown), such bridge plug and adapter assembly being shown as they would appear while being lowered into the well casing;

FIGURES II and IIA are cross-sectional, elevational views showing the drillable plug set in the well, and showing the adapter assembly after it has been released from the bridge plug by the actuation of the pressure setting device;

FIGURE III is a cross-sectional, elevational view, shown diagrammatically, of a conventional drillable bridge plug of the type heretofore used, showing a drill bit which has cut away the upper slips thereon to release the upper slips while the bore of the mandrel of the bridge plug is still closed by a closure member or plug at the lower end thereof;

FIGURE IV is a diagrammatic view of a bridge plug constructed in accordance with the invention disclosed herein, showing a drill bit which has cut away the partition or closure member at the upper end of the bore of the mandrel, to thereby permit equalization of pressure across the bridge plug, while the upper slips are still anchored against the wall of the casing.

Numeral references are employed to designate the various parts shown in the drawings, and like numerals designate like parts throughout the various figures of the drawings.

Referring first to FIGURES I and IA, the bridge plug and adapter assembly are shown in assembled position as they would appear while being lowered into the well casing, the said adapter assembly and bridge plug being suspended to, and operatively connected to, a pressure setting device (not shown) of the type shown in the aforesaid Baker patents.

Such a pressure setting device includes a piston connected to a piston rod within a cylinder, which piston is movable downwardly by an explosive charge. The piston rod is connected by a cross-over arrangement, shown in said patents, to a sleeve, commonly referred to as a "cross-link sleeve" which in turn is connected to a setting sleeve, engaged with the upper ends of the upper slips of the packer or bridge plug with which it is employed. Thus, the downward movement of the piston and piston rod exerts a downward force on the upper slips to set same against the wall of the casing.

A setting mandrel is attached to the cylinder of the pressure setting device by a cross-over arrangement whereby the upward movement of the cylinder causes upward movement of the setting mandrel, which in turn is attached to the support or mandrel of the bridge plug through a frangible member, constituting a part of the adapter assembly.

When the pressure setting device is actuated by igniting the powder charge therein, downwardly acting force is exerted on the upper slips and upwardly acting force is exerted on the plug mandrel to thereby expand the slips and elastic sleeve to set and seal the plug. Upon continued exertion of such upward force a frangible member in the adapter assembly is broken, allowing the holding members therein to release the inwardly movable latch dogs from the plug mandrel, to thereby permit the gun and the adapter assembly to be removed from the well, leaving the bridge plug set therein.

The numeral 1 indicates the cross link sleeve, which is operatively connected to the piston rod in the pressure setting device, as explained above, so that upon the firing of the pressure setting device a downward acting force is exerted against such cross link sleeve.

The cross link sleeve 1 is threadedly engaged to the tubular setting sleeve 2 by means of companion threads 3. The setting sleeve 2 extends about, and embraces, the adapter assembly, hereinafter described, and the lower end thereof engages the upper ends of the upper slips 38, so that the downward force exerted through the cross link sleeve 1 is transferred through the setting sleeve 2 to the upper slips 38. A tubular setting mandrel 4 is operatively attached at its upper end to the cylinder of the pressure setting device (not shown), so that the upward force exerted by the upward movement of the cylinder of the pressure setting device is transferred to the setting mandrel 4, thereby exerting an upward pull thereon.

The setting mandrel 4 is threadedly attached to the tubular adapter coupling 5 by means of companion threads 6, and is held against rotation, after being attached thereto, by a set screw 7.

The releasing sub or holding member 8 is attached to the lower end of the adapter coupling 5 by companion thread 9, and the members 5 and 8 are held against relative rotation, after being threadedly engaged, by means of a set screw 10.

A tubular force transmission sleeve 11 is disposed in-

side the adapter coupling 5, between the releasing sub 8 and the tension nut 12. The frangible tension member, generally indicated at 13, has a frangible weakened mid-portion 14 and an enlarged upper head 15, and is attached to the tension nut 12 by means of companion threads 16. The tension nut 12 and tension member 13 are held against relative rotation, after being threadedly engaged, by a set screw 17.

An enlarged stop head 18 is made integral with the frangible tension member 13. The stop head 18 is arranged to lodge upon, and become suspended to, an annular shoulder 19 inside the releasing sub 8, when the frangible mid-portion 14 is broken, to permit retrieval of the lower fragment of the tension member 13 and the releasing stud 20, suspended thereto, when the pressure setting device and adapter assembly, suspended thereto, are withdrawn from the well.

The releasing stud 20 is threadedly connected to a threaded extension 21 on the lower end of the tension member 13.

The releasing stud 20 has an enlarged head 22 on the lower end thereof, which is engaged with the lower ends of the latch segments or dogs 23, so as to exert an upwardly acting force against the latch dogs when the pressure setting device is actuated. The stem of the releasing stud 20 freely extends through the releasing sub 8 so that when the weakened mid-portion 14 of the frangible tension member 13 is broken, the releasing stud 20 is free to move downwardly with relation to the releasing sub 8 until the head 18 comes into engagement with the shoulder 19, at which point the releasing stud 20 is suspended to the releasing sub 8 so that it may be retrieved from the well with the adapter assembly.

There are a plurality of the latch members or dogs 23 (there being four in this embodiment) spaced about the releasing sub 8, said releasing sub 8 and latch dogs 23 having corresponding tapered surfaces 24 and 24a thereon, which are in engagement, when in assembled position, as shown in FIGURE I.

Drive pins 25 are provided about the releasing sub 8, such drive pins extending between the edges of the latch dogs 23. The drive pins 25 space the latch dogs apart and also provide a free, unattached driving connection between the releasing sub 8 and the latch dogs, whereby the latch dogs 25 may be threaded, by rotation of sub 8, into engagement with the bridge plug mandrel 28 upon assembly.

Upon assembly of the adapter assembly with the bridge plug, the latch dogs 23 are threadedly engaged with the upper end 29 of the bridge plug mandrel 28 by means of the tapered companion threads 26 and 26a. The threads 26 and 26a have inclined surfaces thereon which will permit the threads to become disengaged without rotation when the releasing sub 8 moves out of engagement with the dogs 23 to permit the dogs to move inwardly, upon the breaking of the weakened portion 4 of frangible tension member 13, in the manner herein-after explained.

For purpose of urging the latching dogs 23 inwardly out of threaded engagement with the mandrel 28, when the releasing sub 38 is moved out of engagement therewith, a pair of greater springs 27 are extended thereabout. The garter springs 27 are extended as shown in FIGURE I but are retracted as shown in FIGURE II.

The packer mandrel 28 has a bore 30 therewith which is closed near its upper end by a partition or wall 31, constituting a closure member. Above the wall 31 is an upward extension 29 of the mandrel 28, having female threads 26 on the inner side thereof coinciding with male threads 26a on the latching dogs 23. The upper extension 29 provides a recess and engagement portion for the latching dogs 23.

The partition 31 includes a conical recess on the lower side thereof which provides a thin wall portion 32 to

permit the drill bit to more quickly cut through the partition for equalization of pressure thereacross.

A packer sleeve 33, made of resilient material, such as rubber or plastic composition, is slidably disposed about the mandrel 28 and confined between the expander heads 34 and 35. The expander heads 34 and 35 are separated from the packer sleeve 33 by back-up rings 54 and 55.

The back-up rings 54 and 55 are made of lead or other similar deformable material, which expands outwardly into engagement with the wall of the casing 56 to confine the rubber of the packer sleeve 33 against excessive flow between the well casing wall and the expander heads 34 and 35.

The expander heads 34 and 35 have tapered surfaces 37 and 42, respectively thereon, which are in slidable engagement with the tapered surfaces 39 and 43, respectively, on the inner sides of the upper and lower slip segments 38 and 44.

The upper expander head 34 is attached to the mandrel 28 by means of a shear pin 36.

The upper slip segments 38 are attached to the mandrel 28 by shear screws 41, there being one shear screw for each slip segment.

The lower slip segments 44 are secured to the expander head 35 and to the mandrel 28 by means of shear screws 45, there being one shear screw for each of said slip segments. Normally there are four slip segments at the upper end and four slip segments at the lower end of the drillable bridge plug assembly. The upper and lower slip segments constitute anchoring members for the plug.

A guide shoe 48, commonly called a "junk pusher," is threadedly attached at 48a to the lower end of the mandrel 28. The upper end of guide shoe 48 provides an upwardly facing shoulder thereon against which the slip segments 44 are positioned.

A plurality of recesses 51 are provided in the guide shoe 48, there being one such recess under each slip segment 44. Around the upper side of the guide shoe 48 is positioned a ring 49 which is attached to the shoe by a plurality of screws 49a. The ring 49 has a plurality of holes 50 therein, one of said holes coinciding with each of the recesses 51. A guide pin 52 is disposed in each of the recesses 51, each of which is arranged to movably extend through one of the holes 50. The guide pins 52 are urged outwardly of the holes 50 by coil springs 53 therebelow. The function of such guide pins will be described hereinafter in connection with the description of the setting of the bridge plug.

The operation and function of the adapter assembly and drillable bridge plug in setting the plug is described as follows:

The bridge plug and adapter assembly are assembled in the manner and position illustrated in FIGURES I and IA, and as described in detail hereinbefore. As so assembled the adapter kit is attached to a pressure setting device (not shown) of the type indicated hereinbefore, which in turn is suspended to a wire line (not shown) and is run into the well to the desired level where the bridge plug is to be set.

The pressure setting assembly is then energized by igniting the pressure producing charge therein, which causes the piston therein to move downwardly, which in turn exerts a downwardly acting force on cross-link sleeve 1 through the piston rod attached to the piston. This in turn exerts a downwardly acting force on the setting sleeve 2 which force is transmitted to the upper slip segments 38. Such force is sufficient to break the shear screws 41, causing the slip segments 38 to move downwardly and outwardly along the tapered surface 37 of the expander head 34 and into anchored engagement with the wall of the well casing.

The counter-acting upward movement of the cylinder of the pressure setting device exerts an upwardly acting

force on the setting mandrel 4, which force is transmitted through the adapter assembly to the bridge plug mandrel 28.

As shown herein, such upwardly acting force is transmitted to the adapter coupling 5, which in turn transmits such force through the releasing sub 8, the compression sleeve 11, the head 12, the frangible tension member 13, the releasing stud 20, the head 22, and the latch dogs 23 to the mandrel 28.

Such upwardly acting force breaks the shear pin 36, releasing the mandrel 28 from the upper expander head 34. The mandrel 28 is then free to move upwardly, exerting a pull through the guide shoe 48 to the lower slip segments 44. This breaks the shear screws 45, releasing the lower slip segments 44 from the expander head 35, permitting the springs 53 to relax and push the guide pins 52 rapidly outwardly through the passages 50 and thereby move the slip segments 44 upwardly into anchored engagement with the wall of the well casing 56. The lower ends of the slip segments 44 are moved above the lower end of the expander head 35, so that continued movement of the mandrel 28 exerts upwardly acting force against the lower end of the expander head 35 and there-through to the resilient packer sleeve 33. This shortens and radially expands the packer sleeve 33, into sealing engagement with the wall of the well casing 56.

After the packer sleeve 33 has been expanded and sealed against the wall of the casing, and the upper and lower slip segments are anchored in engagement with the well casing 56, continued upward exertion of force by the pressure setting assembly on the head 12 causes the weakened mid-portion 14 of the frangible tension member 13 to be broken, causing release of sub 8 and rapid movement thereof upwardly out of holding engagement with the latch dogs 23. The latch dogs 23 are thus free to move inwardly out of threaded engagement with mandrel 28 by reason of the retraction of the garter springs 27. This releases the adapter assembly from the bridge plug and the same may be retrieved from the well on the pressure setting assembly by withdrawing the wire line therefrom. The lower fragment of the tension member 13 and the releasing stud 20, suspended thereto, are caught on the shoulder 19, as hereinbefore explained, so that all parts of the adapter assembly may be removed from the well, leaving no fragments therein. FIGURE II shows the adapter assembly released from the bridge plug.

One of the unique features of the adapter assembly, hereinbefore described, is that the holding means 8 is positively released from the latching dogs by upwardly acting force. Previous adapter assemblies have employed a frangible element to which a holding member was attached for holding the latch dogs in engagement with the packer mandrel, and the disengagement of the holding means depended upon gravity for movement out of holding position with relation to the latch dogs. Therefore, in many instances, well mud and foreign material therein settled or caked about the holding member to such an extent that it would not fall free of the latch dogs, thereby preventing disengagement of the adapter assembly from the packer assembly or bridge plug.

In the adapter assembly hereinbefore described such could not occur because the holding member and latch dogs are in a protected position inside the recess provided by the extension 29 at the upper end of the mandrel, and the holding device 8 is positively moved out of engagement with the latch dogs by an upwardly acting force. It does not depend upon gravity for its release.

As hereinbefore recited, one of the unique advantages of this invention is that it permits the equalization of pressure across the bridge plug before drilling away the upper slips.

By way of illustration and emphasis of the advantages and importance of such feature, there is shown schematically in FIGURE III a conventional type of bridge plug hereinbefore used by the industry which is shown in set

position in the casing 60. Such bridge plug is set between the two zones of productions A and B, communication with which is provided by the perforations 61 and 62 in the wall of the casing 60.

As explained above, the normal procedure is to perforate the lower formation B, test same and then set the bridge plug thereabove before perforating the upper formation A. After the upper formation A has been perforated and tested the bridge plug is drilled out in order to complete the well.

The conventional bridge plug shown in FIGURE III includes a resilient sleeve 63 disposed about a tubular mandrel 64. The tubular mandrel 64 has a bore 64a therein which is closed at its lower end by a threaded plug 71. It will be noted that the closure member 71 is below both sets of slips 72 and 73.

The packer sleeve 63 is confined between the upper and lower expander heads 65 and 66 which co-act with upper and lower slips 72 and 73, respectively, to set the packer in the casing. The packer sleeve 63 is prevented from undue extrusion past the expander heads 65 and 66 by deformable back-up rings 68 and 69. A guide shoe 70 is provided on the lower ends of the plug assembly.

A conventional cone type drill bit, for drilling out the bridge plug, is indicated generally at 74. The drill bit 74 would be suspended to and rotated on a drill string extending from the surface.

It will be noted that the drill bit 74 has drilled down to a sufficient extent to entirely drill away the upper slip segments 72, which are shown in broken lines. It will be readily seen that only the lower slip segments 74 are in anchoring engagement with the casing 60, and that the upper end of the bridge plug is not anchored. It will also be noted that the plug 71 closes the bore 64a through the mandrel 64. It will be apparent that the continued rotation of the bit against the plug after the upper slips have been drilled up will cause the upper end of the packer to twist from side to side in a gyratory fashion, thus permitting it to work free of anchored engagement from the casing 60. It therefore becomes, in effect, a free piston, slidably and sealingly engaged with the casing. If the pressure in the lower zone B is greater than the pressure above the packer, which is most likely the case, it will be readily seen that the bridge plug may be forced upwardly against the drill bit by such pressure, and such force is often great enough to bend or corkscrew the drill string above the drill bit, and in some instances, the drill bit and the drill string have been blown out of the hole, causing serious damage to property and personnel.

This undesirable effect is remedied by the present invention, as illustrated schematically in FIGURE IV.

In such view it will be noted that the bore 30 of the mandrel 28 is open to a point above the upper slips 38 when the bridge plug is set in the well. The partition 31, which is shown in broken lines, is entirely above the upper slips 38 when the bridge plug is set. As shown, the drill bit 74 has drilled away the upward extension 29 of the mandrel 28, and has drilled through the partition 31, so as to open up the bore 30 of the mandrel 38, permitting communication through such bore between the casing sections above and below the bridge plug, thereby equalizing the pressure thereacross, while both sets of slips are still in anchored engagement with the casing 60, thereby preventing any possibility of damage to the drilling string, or a blowout of the drilling string, by reason of upwardly acting force exerted against the bridge plug, as in previous constructions.

In practice it is advisable for the driller to drill through the thinner wall section 32 of partition 31 and then discontinue drilling for a sufficient length of time to allow the pressure to equalize across the plug. This prevents any possibility of the pressure differential across the bridge plug still being great enough at the time the upper

slips are drilled away and released to cause an upwardly acting force exerted against the bridge plug.

It will be apparent that there has been provided a construction for a bridge plug in which the pressure may be equalized thereacross before releasing the upper slips from engagement with the casing; and an adapter assembly used in conjunction therewith in which the latching members are maintained in protected position inside the mandrel; and in which the holding member for the latch members is positively released, thus assuring disengagement of the latch dogs from the mandrel.

It will be understood that other and further forms of the invention may be devised without departing from the spirit and scope of the appended claims.

I claim:

1. In a drillable bridge plug, a tubular support; upper and lower anchor members on the support arranged to be expanded into engagement with a well casing; expander members disposed on the support for expanding the anchor members outwardly into engagement with the casing; a closure member closing the bore through the support and located above the anchor members when the anchor members have been expanded into engagement with the casing; an upwardly extending portion of the support extending above the closure member; and threads arranged interiorly of the extension, arranged to receive exteriorly threaded latching segments of a running tool.

2. In a drillable bridge plug, a tubular support; upper and lower anchor members on the support arranged to be expanded into engagement with a well casing; expander members disposed on the support for expanding the anchor members outwardly into engagement with the casing; a closure member closing the bore through the support and located above the anchor members when the anchor members have been expanded into engagement with the casing; an upwardly extending portion of the support extending above the closure member; and means arranged interiorly of the upwardly extending portion to disengageably attach a running tool.

3. In a drillable bridge plug, a tubular support; upper and lower anchor members carried on the support arranged to be expanded into engagement with a well casing; expander means arranged on the support to move the anchor members outwardly into engagement with the well casing; and a closure member closing the bore of the support, which closure member is initially disposed below the upper ends of the upper anchor members, but is movable with the support to a position above the upper ends of said anchor members when the support is moved upwardly to expand the anchor members into engagement with the well casing.

4. A combination running tool and drillable bridge plug including, a tubular support; upper and lower anchor members disposed about the support and arranged to be expanded into engagement with a well casing; expander means carried by the support for expanding the anchor members into engagement with the casing; a closure member closing the bore of the support and positioned above the upper anchor members when the said anchor members have been expanded; a tubular extension of the support above the closure member; internal threads in the tubular extension; a plurality of latch members having external threads thereon adapted to mate with the threads in the extension, said latch members being movable inwardly out of threaded engagement with the tubular extension; an adapter assembly including means holding the latch members in threaded engagement with the tubular extension; frangible means supporting the holder member in engagement with the latch members; and means for exerting an upward force on the frangible means to break same to thereby release the holding member from the latch members.

5. The combination called for in claim 4 wherein the frangible means includes a breakable stud having a weakened mid-portion.

6. The combination called for in claim 4 including an annular shoulder in the holding member, an enlarged head on the frangible member arranged to engage the shoulder to permit retrieval of the lower fragment of the frangible member with the holding member; and an enlarged head on the lower end of the frangible member engageable with the latch members to transmit an upward pull on the support.

7. In combination with a drillable bridge plug having a tubular body with upper and lower expandable anchor members thereon and expander members for expanding the anchor members into engagement with a well casing, a setting mandrel disengageably attached to the upper end of the body and arranged to exert an upward force on the body; a setting sleeve embracing the setting mandrel and the upper end of the body, and contacting the upper ends of the upper anchoring members, said setting sleeve being arranged to exert a downward force on the upper anchor members to expand same; and a closure member closing the bore of the body above the upper anchor members when the upper anchor members are set against the wall of the casing.

8. A combination running tool and well packer including, a tubular support; upper and lower anchor members disposed about the support and arranged to be expanded into engagement with the well casing; expander means carried by the support for expanding the anchor members into engagement with the casing; a closure member

closing the bore of the support and positioned above the upper anchor members, when the said anchor members have been expanded; a tubular extension of the support above the closure member; a plurality of latch members; interengageable attachment means in the tubular support and on the latch members for disengageably attaching the latch members to the support, said latch members being movable inwardly out of engagement with the tubular extension; an adapter assembly including means holding the latch members in engagement with the tubular extension; frangible means supporting the holding means in engagement with the latch members; and means for exerting an upward force on the frangible means to break same to thereby release the holding means from the latch members.

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