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L. A. WATERS ET AL

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METHOD AND APPARATUS FOR RUNNING AND TESTING AN
ASSEMBLY FOR SEALING BETWEEN WELLHEAD CONDUITS

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Fig. 1

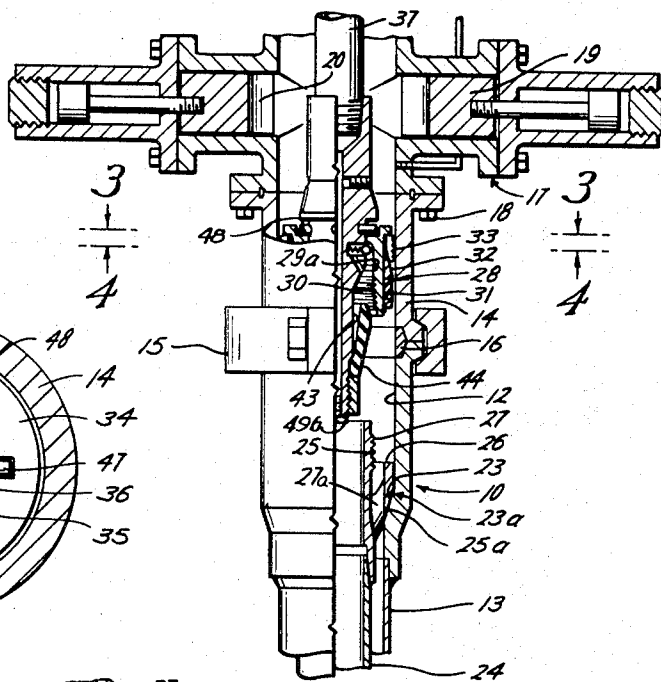


Fig. 3

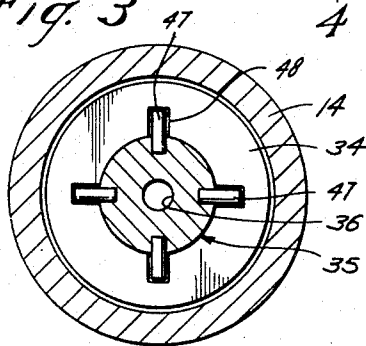


Fig. 2

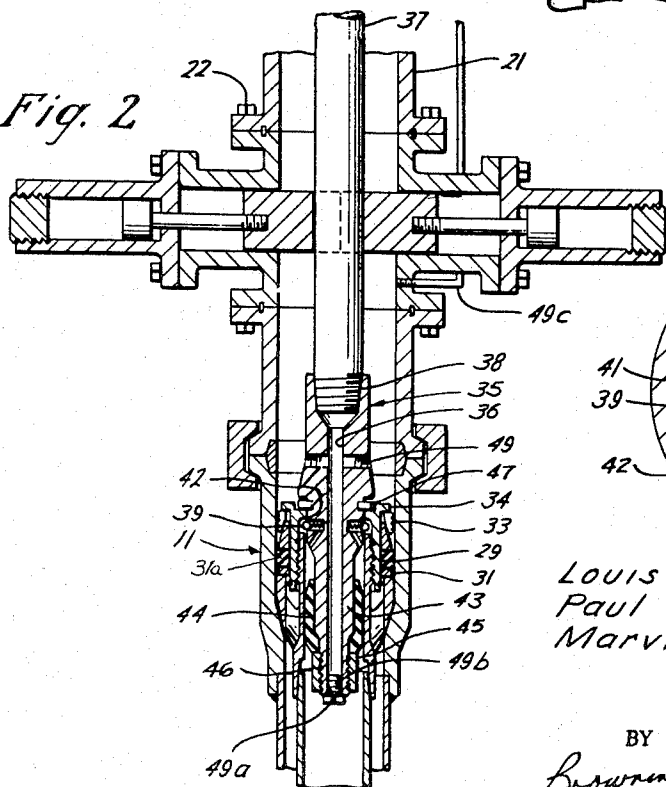
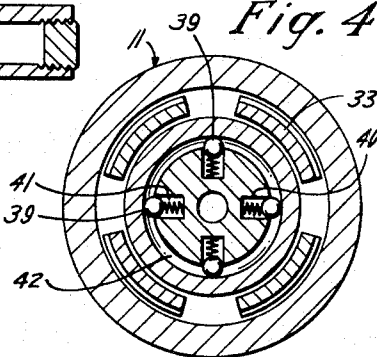


Fig. 4



Louis A. Waters
Paul E. Helfer
Marvin R. Jones
INVENTORS

BY
Browning, Simms, Hyer
& Eickelrodt
ATTORNEYS

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METHOD AND APPARATUS FOR RUNNING AND TESTING AN ASSEMBLY FOR SEALING BETWEEN WELLHEAD CONDUITS

Louis A. Waters, Paul E. Helfer, and Marvin R. Jones, Houston, Tex., assignors to Cameron Iron Works, Inc., a corporation of Texas

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This invention relates to an improved method and apparatus for running an annular assembly into a space between wellhead conduits for sealing thereacross and then testing the assembly for leakage. In one of its aspects, it relates to a method and apparatus especially well suited for running and testing the seal assembly shown and described in a copending application entitled "Wellhead Apparatus," Serial No. 179,400, filed March 13, 1962, by Marvin R. Jones, and assigned to the assignee of the present application.

In this earlier application, a well casing is suspended within and sealed off with respect to the bore of a casing head by means of a casing hanger made up of a separate mandrel and sealing assembly. The mandrel, which is connected to the upper end of the well casing and seated on a bowl in the bore of the casing head, provides flowways which connect the space beneath it with the space above it. In this manner, upon landing of the mandrel to suspend the casing, and as the casing is cemented within the well bore by the circulation of cement downwardly therethrough, the returns are free to pass upwardly through the flowways. As explained in the earlier application, such an arrangement is especially well suited for use in underwater wells, since it does not require side outlets for the returns in the casing head. Instead, the returns, upon passage through the flowways, will flow upwardly to the water level through the annular space between the cementing pipe connected to the hanger mandrel and the conductor extending upwardly from the casing head.

Upon completion of the cementing operation, an annular seal assembly is lowered into the space between the casing hanger mandrel and bore of the casing head for sealing thereacross. When so disposed, the assembly is manipulated by means of the tool on which it was run into the space so as to anchor it with respect to one or both of the mandrel and bore. In the particular embodiment of the seal assembly shown in the aforementioned patent application, this manipulation of the running tool is also operative to expand a normally collapsed seal ring of the assembly into sealing engagement with the bore of the casing head.

At any rate, when the seal assembly is so anchored and disposed for sealing across the space between the hanger mandrel and casing head bore, it is necessary to test the seal in order to determine if it will hold the desired pressure. For this purpose, it has been the practice to release the running tool from the seal assembly and pull it from within the wellhead and then run a test tool into the well casing for sealing with respect thereto. The rams of a blowout preventer connected above the casing head are then closed about a tubular conductor on which the test tool is run to isolate a portion of the wellhead above the seal assembly, and pressure fluid is introduced in the isolated wellhead portion for testing the seal. Even when the test is successful in the sense that the seal assembly holds the desired test pressure, this requires two trips into and out of the wellhead—one for running the sealing assembly and another for running the test tool.

In the event the seal assembly does not hold the de-

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sired pressure, it is then necessary to pull the test tool and run another tool, which may be the same one upon which the seal assembly was run, for either further manipulating the seal assembly to tighten the expandable seal ring, or, if necessary, releasing the seal assembly from its anchored relation with respect to one or both of the mandrel and bore and, when required, permitting the seal ring to be collapsed in order that the seal assembly may be pulled from within the wellhead. This, of course, results in a repetition of the procedure above mentioned—i.e., the running of a further seal assembly as well as the rerunning of the tool for testing same. Furthermore, even if the seal assembly can be further manipulated to hold the desired pressure, this can only be determined by an additional run of the test tool.

An object of this invention is to provide a method and apparatus for running and testing a seal assembly of this general type with only one trip into and out of the wellhead.

Another object is to provide a single tool for running such a seal assembly into sealing position within the wellhead, testing it while so disposed, and then either permitting it to remain within the wellhead, in the event the test is successful, or retrieving it from within the wellhead in the event the test is unsuccessful.

A still further object is to provide a tool of the character described in the foregoing object which also enables the seal assembly to be manipulated for anchoring it with respect to one or both of the wellhead conduits, such as the hanger mandrel and casing head bore previously described, and, if necessary, releasing it from such anchored relation, whereby the assembly may be pulled with the tool in the event of an unsuccessful test.

Still another object is to provide a tool of the character above described which is of compact and inexpensive construction.

In the drawings, wherein like reference characters are used throughout to designate like parts:

FIG. 1 is a view, partly in elevation and partly in vertical section, of a running and testing tool constructed in accordance with the present invention and attached to a seal assembly during lowering of said assembly between the bore of a casing head and a casing hanger mandrel seated within such bore;

FIG. 2 is a vertical sectional view similar to FIG. 1, but in which the seal assembly has been run on the tool into the space for sealing thereacross and anchored with respect to both the casing hanger mandrel and the bore of the casing head, and further wherein the rams of a blowout preventer connected above the casing head have been closed upon the tubular conductor from which the running tool is suspended so as to isolate a portion of the wellhead above the seal assembly preparatory to testing same;

FIG. 3 is a cross-sectional view of the running tool and a portion of the seal assembly, as seen along broken line 3-3 of FIG. 1; and

FIG. 4 is another cross-sectional view of the running tool and part of the seal assembly, as seen along broken line 4-4 of FIG. 1.

As more fully shown and described in the aforementioned copending application, the wellhead shown in FIGS. 1 and 2, and designated in its entirety by reference character 10, including a casing head 11 having a bore 12 therethrough and connected at its lower end to the upper end of an outer well casing 13. As well known in this art, the well casing extends downwardly from the wellhead into the well bore. On the other hand, the upper end of the casing head 11 is connected to and sealed with respect to the lower end of a spool 14 by means of a coupling 15 or the like and a seal ring 16 held there-

between. A blowout preventer 17 is connected to the upper end of the spool 14 by bolts 18 extending through their adjacent flanges, and these parts may also be sealed with respect to one another in any suitable manner, such as by means of conventional ring gaskets.

The blowout preventer 17 has rams 19 which are movable between the open positions of FIG. 1 and the closed positions of FIG. 2. In the latter position, recess 20 on the inner ends of the rams are adapted to seal about a pipe within the bore of the preventer so as to close same, as will be described more fully hereinafter. As shown in FIG. 2, a conductor 21 is connected to the upper end of the blowout preventer by means of bolts 22 and extends therefrom to the upper end of the wellhead, which, in the case of an underwater well, may be a considerable distance. Each of the spool, blowout preventer, and conductor has a bore therethrough providing a continuation of the bore 12 through the casing head so as to pass well tools which may be received in the casing head bore.

There is a conical seat 23 within the casing head bore upon which a casing hanger mandrel 23a has been seated to suspend an inner well casing 24 within the outer well casing 13. More particularly, and again as more fully shown and described in the aforementioned copending applications, the mandrel 23 includes an inner tubular portion 25 and an outer portion 25a having a conical surface conforming to the seat 23 and an upper supporting surface 26 at the lower end of an annular space between the upper end of tubular mandrel portion 25 and the bore 12 of the casing head. This annular space is connected to the annular space beneath the mandrel portion 25 and between well casings 13 and 24 by means of flowways 27a formed in the mandrel between ribs connecting its inner and outer portions 25 and 25a.

In the use of this apparatus, the mandrel 23a is lowered through the bore of the wellhead and into seated position by means of a conventional running tool (not shown) adapted to be made up with threads 27 about the upper end of tubular portion 25a of the mandrel. As described in the aforementioned patent application, these threads are preferably of the "easy" type, so that the running tool threads may be broken out from them upon rotation in a direction opposite to that for making them up without unthreading the connections of the string on which the running tool is suspended. At any rate, when the mandrel has been run and seated, and its running tool has been retrieved from within the wellhead, a seal assembly 28 is run into the wellhead for disposal within the annular space previously described between the mandrel and bore of the casing head. That is, after the inner well casing 24 has been run and cemented in place, as previously described, it is necessary to seal off the flowways 27a through the mandrel 23a and thus the annular space between the well casings 13 and 24. Although the running and testing tool to be described is particularly well suited for running and testing this particular seal assembly in connection with the space between this particular casing hanger mandrel and casing head, it is contemplated that such tool may have other uses and that, in a broad sense, the upper end of the tubular portion 25 of the mandrel and the bore 12 of the casing head provide spaced wellhead conduits between which this or another seal assembly is to be disposed for sealing thereacross.

As shown in FIGS. 1 and 2, the seal assembly 28 includes a sleeve 29 having threads 30 on the lower end of its inner diameter for making up with the easy threads 27 on the hanger mandrel. A gland nut 31 is carried about the sleeve to support a seal ring 31a thereabove, and a conical expander 32 above the seal ring 31a supports anchoring slips 33 about its downwardly and outwardly tapering outer surface. As can be seen from a comparison of FIGS. 1 and 2, as the sleeve threads 30 are made up with mandrel threads 27, the lower end of the sleeve 29 moves downwardly into the upper end of the space be-

tween the inner and outer portions 25 and 25a of the mandrel and nut 31 seats on supporting surface 26 of the outer mandrel portion 25a.

There is a flange 34 extending outwardly from the upper end of the seal assembly sleeve 29 above the anchoring slips 33, so that, as the sleeve continues to make up with the portion 25 of the mandrel, the flange will bear upon the anchoring slips to force downwardly against the expander 32. The expander is in turn forced downwardly against the upper end of the seal ring 31a, so that, by virtue of its support from the nut 31 resting upon supporting surface 26, such seal will expand from the normally collapsed position shown in FIG. 1 to the position shown in FIG. 2 for sealing tightly between the seal assembly sleeve 29 and bore 12 of the casing head. At the same time, the anchoring slips 33 will move downwardly and outwardly along the expander 32 into anchoring relation with respect to the casing head bore.

Thus, upon complete makeup of the seal assembly with respect to the casing hanger mandrel, it is anchored both by the engagement of threads 30 with threads 27 as well as by biting of the teeth of slips 33 into the bore of the casing head. Also, as described in the aforementioned copending application, an O-ring 29a is carried by the sleeve 29 above threads 30 so as to seal against the mandrel portion 25 above threads 27 when the seal assembly is fully made up with the mandrel. This seal, together with the expanded seal ring 31a, will therefore seal across the space between such mandrel portion and the bore of the casing head.

This making up of the seal assembly with respect to the hanger mandrel is responsive to rotation of the seal assembly sleeve in one direction—for example, the right in looking down upon the assembly. As described in the aforementioned copending application, however, the anchoring of the seal assembly to both the hanger mandrel and bore of the casing head, as well as the expansion of the seal ring 31a, may be released upon rotation of the seal assembly sleeve in the opposite direction—for example, to the left. That is, as will be appreciated from the foregoing, initial reverse rotation of the seal assembly sleeve relative to the mandrel will relieve the downward force on the anchoring slips 33 and the seal ring 31a and further rotation will release the threads 30 from the threads 27 so that the seal assembly may, if desired, be retrieved from within the wellhead. As previously noted, this may be necessary in the event the seal assembly will not hold the desired test pressure.

The tool of the present invention is not only capable of running the seal assembly 28 into sealing position and manipulating it in such a manner as to anchor it within the space across which it seals, but is also capable of testing the seal assembly for leakage and then, depending on whether or not the test is successful, either releasing the assembly and retrieving it from the wellhead with the tool or detaching from it to permit it to remain in sealing position within the wellhead as the tool is retrieved. For this purpose, and as shown in FIGS. 1 and 2, such tool comprises a body 35 having a chamber 36 with an open upper end for connection with the lower open end of a tubular conductor 37. More particularly, the open upper end of the chamber 36 is threaded to receive the threads 38 about the lower end of the conductor 37, so that the tool body is suspended from such conductor for running with it within the wellhead bore. The tubular conductor may, of course, be raised and lowered as desired by well known hoisting apparatus disposed at the upper end of the wellhead.

The seal assembly 28 is releasably attached to the body of the running and testing tool by means of a plurality of spring-pressed balls 39 received within sockets 40 about the tool body, as best shown in FIG. 4, and pressed outwardly against reduced inner ends of the sockets by means of springs 41 disposed between the back ends of the balls and the inner ends of the sockets. Thus, and

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again as best shown in FIG. 4, the balls 39 are normally urged to a position in which they protrude outwardly from the sockets to engage beneath an inwardly extending annular flange 42 about the upper end of the seal assembly sleeve 29. More particularly, these balls may be pressed inwardly against the force of the springs 41 to permit them to be moved beneath the flange 42 so as to support the seal assembly in the manner shown in FIGS. 1 and 2 for running with the tool and tubular conductor into the bore of the wellhead.

When so supported, the seal assembly sleeve is spaced from the reduced lower portion 43 of the tool body 35, so that, as the seal assembly is lowered into the space between the hanger mandrel and the casing head bore, the threads 30 on the seal assembly body are free to make up with the threads 27 on the hanger mandrel and the reduced lower end 43 of the body is free to move downwardly inside of the portion 25 of the mandrel. In this way, an upwardly facing cup-type packer 44 carried about the lower portion 43 of the tool body is free to slide downwardly into mandrel portion 25 for sealing against downwardly directed pressure above it. As shown in FIGS. 1 and 2, the packer 44 is removably supported about the tool body by means of a nut 45 threadedly connected to a lowermost extension 46 on the lower end 43 of the tool body.

As best shown in FIG. 3, the tool body 35 also carries a series of spaced-apart torque fins 47 which project from it for reception within radially extending grooves 48 formed in the upper end of the seal assembly sleeve 29. More particularly, and as will be obvious from the drawings, the torque pins are lined up with the grooves 48 as the seal assembly is releasably attached to the tool body 35 by forcing of the spring-pressed balls 39 beneath the flange 42. Of course, the vertical spacing of the spring-pressed balls and the torque pins will hold the torque pins down within the grooves 48 until such time that the tool body is released from attachment to the seal assembly by forcing of the spring-pressed balls 39 from beneath the flange 42.

Upon rotation of the tubular conductor 37 so as to rotate the tool body 35, the torque pins 47 will, of course, manipulate the seal assembly sleeve 29 by transmitting torque thereto. Thus, for example, when the seal assembly 28 has been run into the space between the hanger mandrel and the casing head bore, the tool body may be rotated to the right so as to apply a right-hand torque to the seal assembly body for connecting the threads 30 with the threads 27 on the tubular portion 25 of the hanger mandrel. As previously noted, this making up of the threads 30 and 27 not only anchors the seal assembly with respect to the hanger mandrel, but also expands the seal ring of the seal assembly into engagement with the casing head bore 12 and anchors the seal assembly with respect to such bore.

When the seal assembly is fully made up with the hanger mandrel, as above described, the packer 44 will be disposed within the inner well casing 24 to seal between the tool body 35 and such well casing, as shown in FIG. 2. At this time, the rams 19 of the blowout preventer 17 may be moved from the open position of FIG. 1, in which they permitted the seal assembly to be run through the bore of the wellhead, to the closed position of FIG. 2 in which they seal about the tubular conductor 37 and thus across the annular space between the bore of the wellhead and the tubular conductor. At this time, the annular portion of the wellhead between the tool body 35 and the bore of the wellhead, as well as between the blowout preventer rams 19 and the seal provided by the seal assembly, is isolated from the remainder of the wellhead.

As shown in FIGS. 1 and 2, there are a series of ports 49 in the tool body connecting the chamber 36 therein with the exterior of the body above the sealing engagement of packer 44 with inner mandrel portion 25.

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There is also a port 49a in the lower end portion of the tool body which connects the chamber 36 with the body exterior below the seal between the packer and said mandrel portion. When the tool is used to test in the manner illustrated, the port 49a is closed by a plug 49b so that pressure fluid which is conducted downwardly through the conductor 37 and into the chamber 36 of the tool body will be directed outwardly through the ports 49 into the isolated wellhead portion. When such fluid is pressured up to the desired level, the operator can observe whether or not the isolated space holds pressure.

In some cases, however, the operator may not wish to introduce the test pressure through the conductor 37. In particular, he may wish to leave the conductor open to the inner casing 24. For this purpose, the plug 49b may be removed from port 49a and the side ports 49 may be closed by suitable plugs (not shown). As a result, the chamber 36 will be closed intermediate its upper end and the seal provided by packer 44 so that it will contain test pressure in the isolated wellhead space above the seal assembly. Test pressure is then introduced into such portion from a source outside the wellhead bore, as by means of a "kill line" 49c extending from the upper end of the wellhead for connection with the bore of the blowout preventer 17 beneath the rams thereof.

If, in either such use of the tool, the test pressure is not held in the isolated wellhead space, the operator knows that the seal assembly 28 may be leaking. He may therefore further rotate the tubular conductor to impose additional torque on the seal assembly sleeve 29 so as to tighten up the seal provided by ring 31a. If upon further testing pressure fluid continues to leak from the space, the operator will prepare to retrieve the seal assembly for repair or replacement.

For this latter purpose, and upon discontinuing the test pressure and opening of the blowout preventer rams 19, the operator need only reverse the direction of rotation of the tubular conductor 37 so as to in turn reverse the direction of torque for manipulating the seal assembly. That is, as previously described, a left-hand torque transmitted to the seal assembly sleeve by means of the torque pins 47 will break the threads 30 out from the threads 27, which will in turn not only release the seal assembly sleeve 29 from the hanger mandrel, but also release the slips 33 from anchored relation with respect to the bore of the casing head as well as the expanded seal ring 31a from sealing engagement with such bore. Thus, complete breaking out of the threads 30 from the threads 27 will enable the operator to pull the seal assembly with the tool and conductor 37 from within the space between the hanger mandrel and casing head bore. Thus, it is important to note that the running and testing tool of this invention is of such construction that, in the event the test is unsuccessful, it enables the operator to selectively release the seal assembly from the space between the hanger mandrel and casing head bore and then raise it from the wellhead bore, without releasing the attachment of such seal assembly to the tool.

On the other hand, in the event the test is successful in that there is no leakage from the isolated space, the operator need merely jar upwardly on the tubular conductor 37 so as to lift the spring-pressed balls 39 from beneath the flange 42 on the upper end of the seal assembly body 29. That is, this novel tool construction enables a release of the attachment of the sealing assembly to the tool without releasing the seal assembly from sealing and anchored position within the space within the annular mandrel and casing head bore.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus and method.

It will be understood that certain features and subcombinations are of utility and may be employed without ref-

erence to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A tool for use in running an annular seal assembly into the space between inner and outer conduits within a wellhead and then testing the seal assembly for leakage, comprising a body adapted to be suspended from the lower end of a tubular conductor for lowering the body into the wellhead, said body having a chamber therein with an open upper end for connection with the lower open end of the tubular conductor when suspended therefrom and a port connecting the chamber with the exterior of the body, means on the body for attaching the seal assembly thereabouts so that said assembly may be lowered with the body into the space between the conduits for sealing thereacross, and means about the body below the attaching means thereon for sealing between the body and the inner conduit when the seal assembly has been so lowered into said space, whereby a seal may be established between the conductor and the outer conduit above the sealing means about the body to isolate a portion of the wellhead above the seal assembly and pressure fluid may be introduced into said wellhead portion to test the seal assembly, said attaching means being releasable from the seal assembly to permit the body to be raised with the tubular conductor upon successful completion of the test.

2. A tool of the character defined in claim 1, wherein said port connects with the exterior of the body above the sealing means thereabout and the lower end of the body is closed to direct pressure fluid received within the chamber through said conductor into said isolated portion of the wellhead.

3. A tool of the character defined in claim 1, wherein said port connects the chamber in the body with the exterior of the body beneath the sealing means thereabout and the body is imperforate between the sealing means and upper end thereof so as to contain pressure fluid introduced into the wellhead portion.

4. A tool for use in running an annular seal assembly into the space between inner and outer wellhead conduits, anchoring the seal assembly within the space, and then testing the seal assembly for leakage, comprising a body having a chamber therein with an open upper end and a port connecting the chamber with the exterior of the body, means on the body for connecting the open upper end of the chamber to the open lower end of a tubular conductor and supporting the body from the conductor for lowering through the blowout preventer and into the wellhead therebelow, means on the body for supporting the seal assembly in spaced relation thereabout so that the seal assembly may be lowered with the body into the space between the conduits for sealing thereacross, means on the body for manipulating the seal assembly to anchor it within said space, means carried by the body for sealing between it and the inner conduit upon anchoring of the seal assembly within said space, whereby a seal may be established between the conductor and the outer conduit above the sealing means about the body to isolate a portion of the wellhead above the seal assembly and pressure fluid may be introduced into said wellhead portion to test the seal assembly, means on the body for manipulating the seal assembly to release it from anchored position within said space to permit said assembly to be raised with the body and tubular conductor in the event the test is unsuccessful, said supporting means on the body being releasable from the seal assembly so that said body may be raised with said tubular conductor in the event the test is successful.

5. A tool of the character defined in claim 4, wherein

said port connects with the exterior of the body above the sealing means thereabout and the lower end of the body is closed to direct pressure fluid received within the chamber through said conductor into said isolated portion of the wellhead.

6. A tool of the character defined in claim 4, wherein said port connects the chamber in the body with the exterior of the body beneath the sealing means thereabout and the body is imperforate between the sealing means and upper end thereof so as to contain pressure fluid introduced into the wellhead portion.

7. A tool for use in running an annular seal assembly into the space between inner and outer wellhead conduits, anchoring the seal assembly within said space, and then testing the seal assembly for leakage, comprising a body adapted to be suspended from a tubular conductor for running the body into the wellhead, said body having a chamber therein with an open upper end for connection with the lower open end of the tubular conductor when suspended therefrom and a port connecting the chamber with the exterior of the body, means on the body for supporting the seal assembly in spaced relation thereabout so that said assembly may be run with the body into the space between the conduits for sealing thereacross, means on the body for transmitting torque in one direction to the seal assembly when so supported about the body so as to anchor said assembly with respect to one of said conduits within said space, means on the body for sealing between it and the inner conduit when the seal assembly is within said annular space, whereby a seal may be established between the conductor and the outer conduit above the sealing means about the body to isolate a portion of the wellhead above the seal assembly and pressure fluid may be introduced into said wellhead portion to test the seal assembly, means on the body for transmitting torque in the opposite direction to the seal assembly while said assembly remains supported from the body so as to release the assembly from anchored relation with respect to the one conduit and permit it to be pulled with said body from within the wellhead in the event the test is unsuccessful, said supporting means on the body being releasable from the seal assembly so that the body may be pulled from the wellhead independently of the seal assembly in the event the test is successful.

8. A tool for use in running an annular seal assembly into the space between inner and outer conduits within a wellhead, anchoring the seal assembly within said space, and then testing the seal assembly for leakage, comprising a body having a chamber therein with an open upper end, means on the body for suspending it from a tubular conductor for running into the wellhead therebelow and connecting the open upper end of the chamber within the body to the open lower end of the tubular conductor, means on the body for supporting the seal assembly in spaced relation thereabout to permit said assembly to be run with the body into the space between the conduits, means on the body operable, upon rotation of the body in one direction, to transmit torque to the supported seal assembly to anchor said assembly with respect to one of said conduits, means about the body for sealing between it and the inner well conduit when said seal assembly is anchored within said annular space, whereby a seal may be established between the conductor and the outer conduit above the sealing means about the body to isolate a portion of the wellhead above the seal assembly and pressure fluid may be introduced into said wellhead portion to test the seal assembly, and means on the body operable, upon rotation of the body in the opposite direction, to transmit torque to the supported seal assembly for releasing said seal assembly from anchored relation with respect to one of said conduits, whereby said seal assembly may be raised with the body and tubular conductor in the event the test is unsuccessful, said supporting means on the body being releasable from the seal assembly to permit said body to be raised with the tubular con-

ductor from within the wellhead in the event the test is successful.

9. A running and testing tool, comprising a body having a chamber therein with a closed lower end and an open upper end, means on the body about the open upper end of the chamber therein for connection to the lower end of a tubular conductor, an upwardly extending cup-type packer carried about the body, a port in the body connecting the chamber therein with the exterior of the body above the packer, a series of detents spaced apart about the body and spring pressed into positions protruding therefrom, and a series of torque pins carried from and spaced about the body for protruding therefrom.

10. A running and testing tool, comprising a body having a chamber therein with a closed lower end and an open upper end, means on the body about the open upper end of the chamber therein for connection to the lower end of a tubular conductor, an upwardly extending cup-type packer carried about the body, a port in the body connecting the chamber therein with the exterior of the body below the packer, a series of detents spaced apart about the body and spring pressed into positions protruding therefrom, and a series of torque pins carried from and spaced about the body for protruding therefrom.

11. A running and testing tool, comprising a body having a chamber therein with a closed lower end and an open upper end, means on the body about the open upper end of the chamber therein for connection to the lower end of a tubular conductor, an upwardly extending cup-type packer carried about the body, first port means in the body connecting the chamber therein with the exterior of the body above the packer, second port means in the body connecting the chamber therein with the exterior of the body below the packer, plugs for selectively closing one of the first and second port means, a series of detents spaced apart about the body and spring pressed into positions protruding therefrom, and a series of torque pins carried from and spaced about the body for protruding therefrom.

12. A method for running an annular seal assembly into the space between inner and outer wellhead conduits and then testing the seal assembly for leakage, comprising the steps of attaching the annular seal assembly about a running tool on the lower end of a tubular conductor, lowering the running tool on the tubular conductor into the wellhead to run the seal assembly into the space between the well conduits for sealing thereacross, establishing a lower seal between the running tool and the inner conduit and an upper seal between the tubular conductor and outer conduit so as to isolate a portion of the wellhead between the tubular conductor and outer conduit and intermediate the upper and lower seals, conducting pressure fluid into the isolated wellhead portion to test the seal assembly for leakage, and raising the tubular conductor to pull the tool from within the wellhead when the test is completed.

13. A method of the character defined in claim 12, including the step of releasing the tool from the seal assembly in the event the test is successful to permit the tool to be pulled independently of the seal assembly.

14. A method of the character defined in claim 12, including the step of maintaining the attachment of the seal assembly to the tool so as to pull the assembly with the tool in the event the test is unsuccessful.

15. A method for running an annular seal assembly into the space between inner and outer wellhead conduits, anchoring the seal assembly within the space, and then testing the seal assembly for leakage, comprising the steps of connecting a running tool having a packer thereabout to the lower end of a tubular conductor, attaching the annular seal assembly about the running tool, lowering the running tool on the tubular conductor into the wellhead to run the seal assembly into the space between the well conduits for sealing thereacross, manipulating the tool to anchor the seal assembly with respect to one of the conduits, establishing a seal between the tubular conductor and the outer conduit so as to isolate a portion of the wellhead between the conductor and outer conduit intermediate the packer and established seal, conducting pressure fluid into the isolated wellhead portion as to test the seal assembly for leakage, and releasing the tool from the seal assembly to permit the tool to be pulled from within the wellhead in the event the test is successful.

16. A method for running an annular seal assembly into the space between inner and outer wellhead conduits, anchoring the seal assembly within the space, and then testing the seal assembly for leakage, comprising the steps of connecting a running tool having a packer thereabout to the lower end of a tubular conductor, releasably attaching the annular seal assembly about the running tool, lowering the running tool on the tubular conductor into the wellhead to run the seal assembly into the space between the well conduits for sealing thereacross, manipulating the tool to anchor the seal assembly with respect to one of the conduits, establishing a lower seal between the running tool and the inner conduit and an upper seal between the tubular conductor and outer conduit so as to isolate a portion of the wellhead between the tubular conductor and outer conduit and intermediate the upper and lower seals, conducting pressure fluid into the isolated wellhead portion so as to test the seal assembly for leakage, and manipulating the tool to release the seal assembly from anchored relation with respect to the one conduit so that in the event the test is unsuccessful the seal assembly may be pulled with the tool and tubular conductor from within the wellhead.

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