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C. C. BROWN

2,902,093

WELL APPARATUS AND METHODS OF RUNNING SAME IN A WELL BORE

Filed May 9, 1955

3 Sheets-Sheet 1

Fig. 1

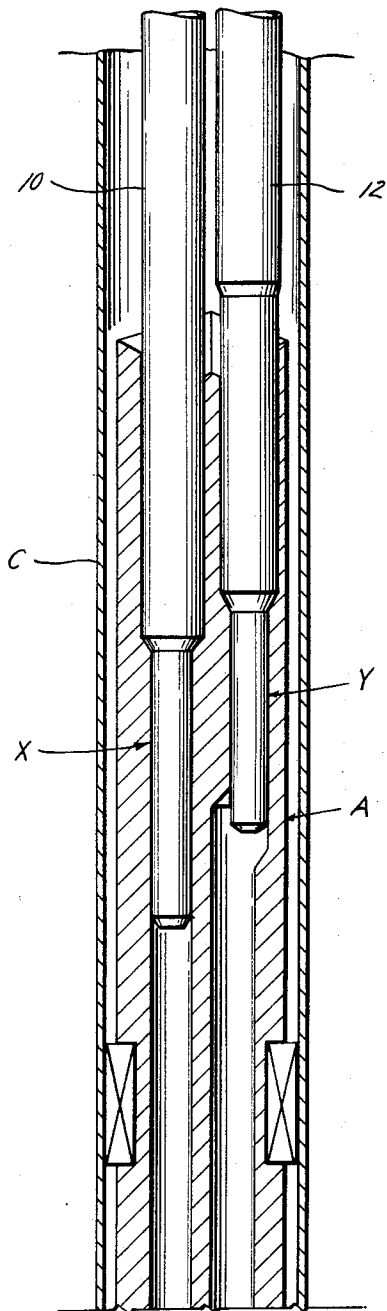
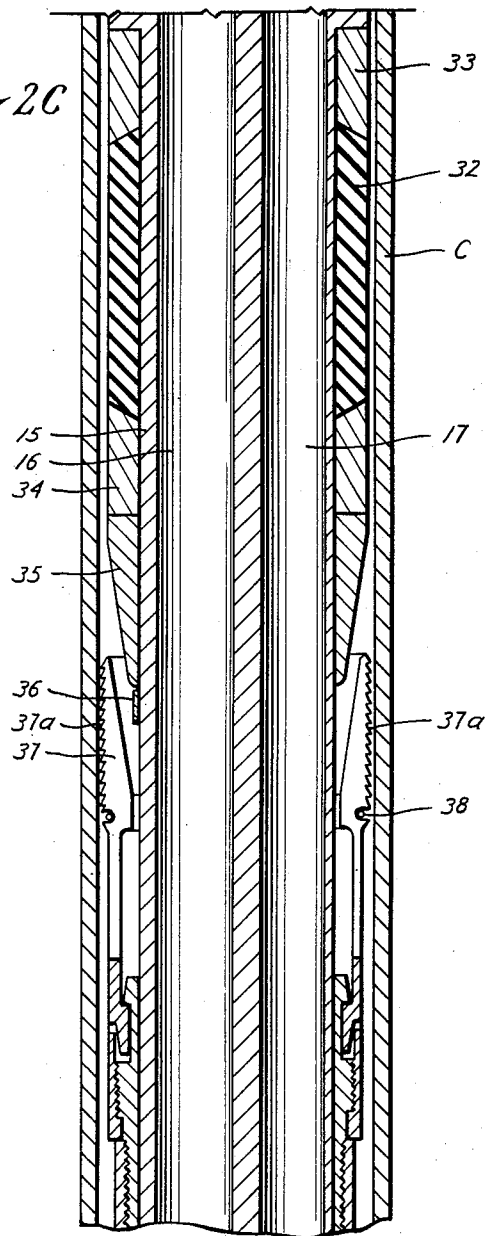


Fig. 2C



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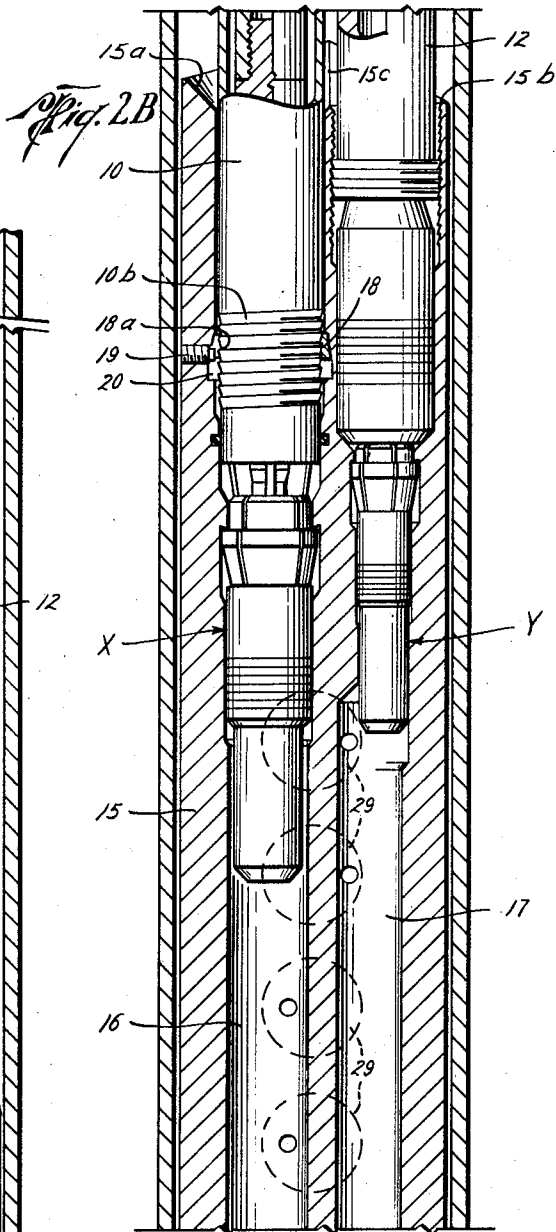
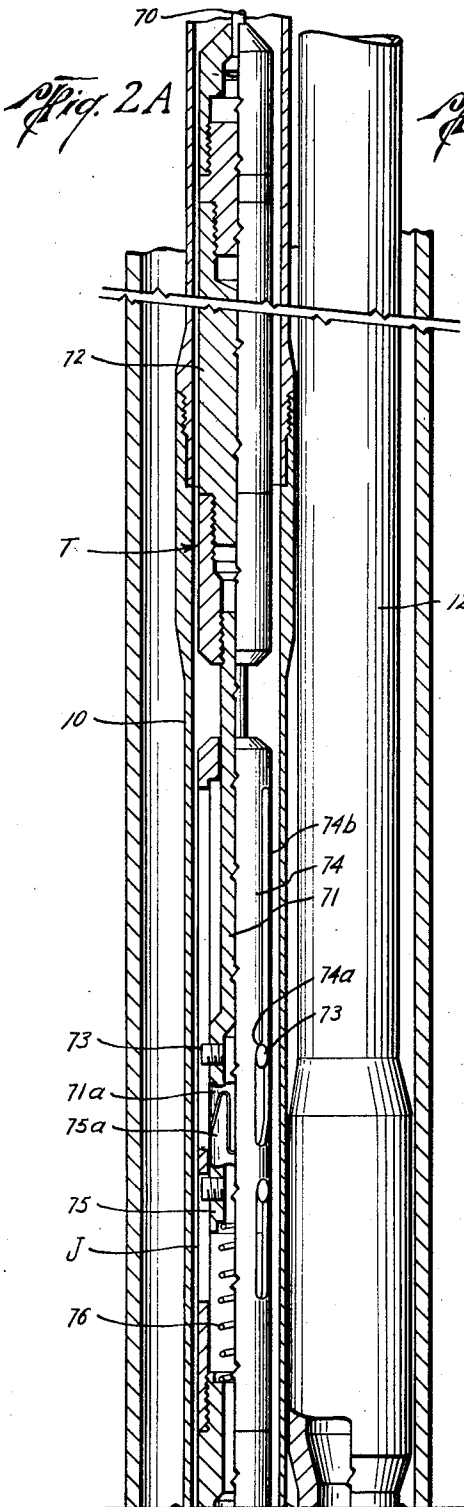
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3 Sheets-Sheet 2



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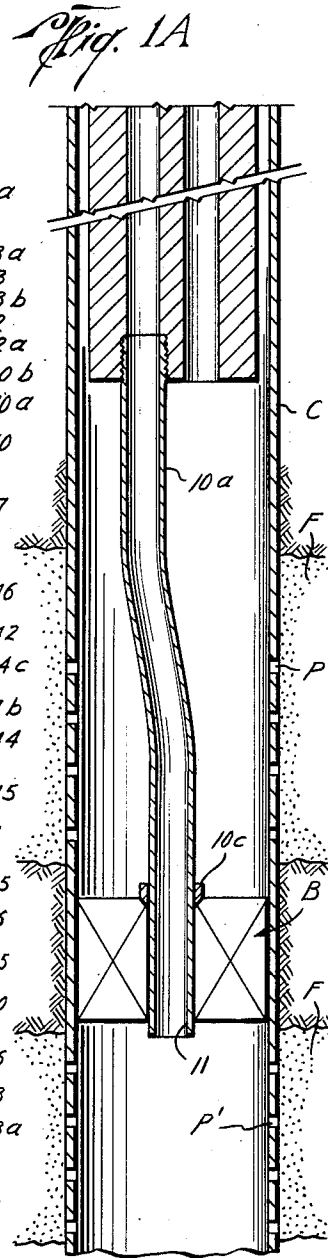
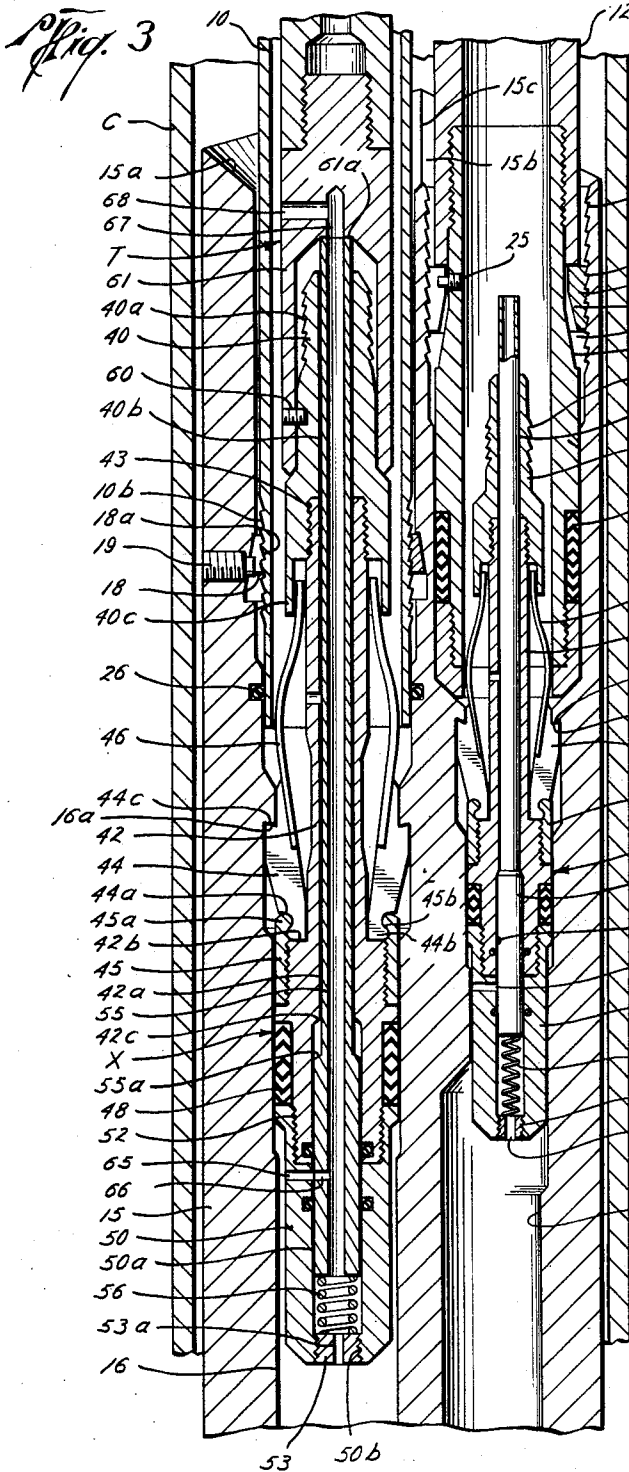
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WELL APPARATUS AND METHODS OF RUNNING SAME IN A WELL BORE

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3 Sheets-Sheet 3



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2,902,093

WELL APPARATUS AND METHODS OF RUNNING SAME IN A WELL BORE

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Application May 9, 1955, Serial No. 506,785

13 Claims. (Cl. 166—46)

This invention relates to new and useful improvements in well apparatus and to methods of running the apparatus into a well bore.

The apparatus of this invention is adapted to be positioned in a well pipe and is provided with a body having first and second longitudinal passages therethrough, the first passage being in communication with a tubing string detachably connected to said body, the second passage being in communication with a second tubing string, there being a fluid flow control means for controlling fluid flow from said first passage to the first tubing string, and coating means in the first passage and on the control means for releasably latching the control means in the first passage while the tubing string is connected and including means for detaching the first tubing string while the control means is latched in the first passage. The method of controlling fluid flow comprises the steps of setting a first well packer within the well bore, lowering a second well packer in the well bore on a first string of tubing to position the second packer in spaced relation above the first packer, thereafter lowering a second tubing string into the bore and connecting the same to the second packer, then establishing communication between the area below the first packer and one of the tubing strings, establishing communication between the other tubing string and the area between the packers, and then positioning a detachable flow control means in one of the tubing strings to control the fluid flow therethrough.

In my copending application, Serial No. 504,512, filed April 28, 1955, I have disclosed a well apparatus and method having many of the purposes and advantages of the present invention, but the second well packer is adapted to be lowered into and removed from the well bore on only one of the tubing strings. In the present invention, however, means are employed for closing or controlling fluid flow through either or both of the tubing strings.

Another object of this invention is to provide a new and improved well apparatus having an upper well packer and a lower well packer, with a plurality of fluid conductors connected to the upper well packer and extending to the surface of a well, wherein one or more flow control means, such as a plug or choke, are adapted to be positioned in either or both fluid conductors for closing off or controlling fluid flow therethrough, and wherein the upper portion of either or both of the fluid conductors is detachable from the portion therebelow in which the flow control means is positioned.

Another object of this invention is to provide a new and improved method wherein a plurality of well packers are set in a well bore or casing so as to direct fluid flow from a plurality of well formations to a well apparatus positioned in the well bore or casing, and having a plurality of fluid conductors therewith, and to also provide for the control of the fluid flow from such formations through the fluid conductors by inserting a choke in either or all of the fluid conductors to restrict the fluid flow through such conductor in which the choke is inserted, or

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by inserting one or more chokes in one or all of the fluid conductors to close off fluid flow through such conductors.

Still another object of this invention is to include in the apparatus means for releasably latching thereto one or more flow control means, such as a plug or a choke, for closing or controlling fluid flow through either or both of the tubing strings.

Another object of the invention is to provide a new and improved method having all of the advantages of the invention identified in my copending application, and in addition thereto, including the step of releasably latching one or more flow control means such as a plug or a choke to the apparatus to close or control fluid flow through either or both of the tubing strings.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

Figures 1 and 1A are views, partly in section and partly in elevation, which together diagrammatically illustrate the apparatus of this invention as positioned in a well pipe or casing, with Figure 1 illustrating the upper portion thereof and Figure 1A illustrating the lower portion thereof.

Figures 2A, 2B and 2C are views, partly in elevation and partly in section, which illustrate the details of the upper portion of the apparatus of this invention.

Figure 3 is an enlarged sectional view of the portion of the apparatus illustrated in Figure 2B.

In the drawings, the letter A (Figure 1) designates generally the dual string well packer of the apparatus of this invention which is adapted to be positioned in a well bore or casing C above a second well packer B (Figure 1A). The well packer A has one tubing string which extends to the surface of the well and another tubing string 12 which also extends to the surface of the well. A lower tubing section 10a extends downwardly from the packer or apparatus A and has a shoulder or stop 10c thereon which rests upon the lower packer B to limit the downward movement of the apparatus A in the well bore. The packer B is of the type which is adapted to be set in the well bore or casing C on a setting tool which is removable from the casing to leave the open bore 11 of the packer B for receiving the lower portion of the lower tubing section 10a (Figure 1A). The packer A is set in engagement with the well bore or casing C by a manipulation of the tubing string 10, but as will be more evident hereinafter, the packer A can be a fluid-set packer. After the packer A has been set, then the tubing string 12 is lowered into position in the well casing C and is connected to the packer A by a suitable removable connection. With the packers A and B thus set and the dual strings 10 and 12 connected, well operations can be conducted with respect to the upper formation F and the lower formation F' which are in fluid communication with the interior of the casing C by reason of the perforations P and P', so that fluid communication is established from the formation F to the tubing string 12 and from the formation F' to the tubing string 10. The foregoing briefly-described apparatus and method are more fully described in my above-referred to patent application, Serial No. 504,512, and in addition thereto this invention has means for releasably connecting a flow control means, such as a choke or plug X, in the well apparatus or packer A at the upper end thereof for closing off or controlling fluid flow from the formation F' to the tubing string 10. Also, another flow control means or de-

vice such as a choke or plug Y is positioned in the well apparatus or packer A for closing off or controlling fluid flow from the formation F to the tubing string 12, as will be more fully explained hereinafter.

The apparatus A is illustrated in Figures 2A, 2B and 2C to show only upper portion thereof which includes the improved construction of this invention. Thus, the apparatus or packer A includes a body 15 (Figures 2B and 2C) which has longitudinal bores or passages 16 and 17 extending from the upper end thereof to the lower end thereof. The tubing string 10 is connected in said bore or passage 16 and the tubing string 12 is connected in said bore or passage 17. The lower end of the tubing string 10 has external threads 10b thereon which are ordinarily in threaded engagement with threads 18a on the inner surface of the split-ring nut 18 during the lowering of the apparatus A into the well bore or casing C. The tubing string 10 is releasable from the nut 18 by a rotation of the string 10 to the right, assuming the threads 18a and 10b are right-hand threads, but such tubing string 10 cannot be released by a nonrotative longitudinal movement thereof while the threads 18a and 10b are connected. It will be noted that a pin 19 is threaded through the body 15 and extends into the split or longitudinal slot of the annular nut 18 so that the tubing string 10 can be re-inserted into the upper end of the bore or passage 16 by a nonrotative downward longitudinal movement thereof relative to the nut 18. As the nut 18 is engaged by the threads 10b, it is moved downwardly in the annular recess 20 and by reason of its split portion, the nut 18 is expanded or moved outwardly so as to permit the threads 10b to slide downwardly relative to the nut 18, without requiring any rotation thereof to effect the engagement of the threads 10b and 18a. Of course, as previously mentioned, upon an upward nonrotative pull on tubing string 10, the string 10 cannot be disconnected from the nut 18 because the nut 18 is carried upwardly with the string until it is wedged within the upper inclined portion of the recess 20. It should be noted that the upper end 15a of the body 15 is inclined downwardly and inwardly at approximately a 45° angle towards the upper end of the passage 16 so as to effect a guiding of the lower end of the tubing string 10 back into the upper end of the bore or passage 16 upon the re-insertion of the string 10, if such is desired.

As previously mentioned, the apparatus A is ordinarily lowered into the well bore or casing C on the tubing string 10 so that only one tubing string is required for the positioning of the packer A in the well bore or casing C, and thereafter the tubing string 12 is lowered separately or independently into the casing C and is guided into the upper end of the passage 17 by the inclined upper end or surface 15b of the body 15 which upper end 15b is inclined or sloped at about 45° downwardly and inwardly towards the upper end of the passage 17. The inclined portions 15a and 15b form a ridge or edge 15c therebetween. For connecting the tubing string 12 to the body 15, the tubing string 12 has an annular groove or recess 22 with an inclined surface 22a formed at the lower portion thereof and a split-ring nut 23 having external threads 23a thereon positioned in such recess 22. The nut 23 is adapted to be expanded outwardly upon contact between the inner surface 23b and the inclined surface 22a of the recess 22. The nut 23 is retained against rotational movement with respect to the tubing string 12 by means of a pin 25 which is threaded in the tubing string 12 and extends into the split or slot of the split-ring nut 23. The upper end of the bore 17 is provided with internal threads 17a which are adapted to engage with the threads 23a of the nut 23 as the tubing string 12 is lowered into the bore or passage 17. As the threads 23a initially engage the upper portion of the threads 17a, the nut 23 is caused to move to the upper portion of the recess 22 so that it is in a retracted position for permitting the downward sliding movement of

the nut 23 relative to the threads 17a. With the threads 23a and 17a thus connected (Figure 3), the tubing string cannot be removed by a nonrotative upward longitudinal movement, but can be removed by a rotation of the tubing string 12 to the right, assuming the threads 17a and 23a are left-hand threads.

It will be observed that an annular O-ring or seal 26 is provided in the upper end of the bore 16 for sealing engagement with the external surfaces of the tubing string 10 to prevent fluid flow around the tubing string 10 from the bore 16. Similarly, a seal ring 27 of the chevron type or any other suitable sealing means is provided on the lower portion of the tubing string 12 for sealing engagement with the internal surface of the bore 17 to prevent fluid flow from the bore or passage 17 around the tubing string 12.

The body 15 may be provided with hydraulic hold-down members 29 (Figure 2B) which are schematically illustrated.

Below the hold-down members 29, the body 15 has a reduced external diameter for receiving an annular packing element 32 which is formed of rubber or other resilient elastic material which is adapted to be distorted or expanded laterally or radially outwardly into sealing engagement with the interior of the pipe or casing C. Such packing element 32 is confined between retaining rings 33 and 34, all of which are held against downward movement (Figure 2C) on a slip expander 35 which is likewise held against downward movement by a block 36 which is attached to the body 15 immediately below the expander 35.

Slips 37 are disposed a predetermined distance below the slip expander 35 and such slips 37 are formed of a plurality of slip segments which are slidably mounted on the body 15 and which are held in a retracted position by an annular spring member 38. Thus, the teeth 37a of the slip segments 37 are normally retained out of contact with the inside of the casing C as it is lowered therein, but when the stop or shoulder 10c on the lower tubing section 10a (Figure 1A) has seated on the packer B, the slips 37 are stopped in their downward movement but the body 15 and the slip expander 35 still move downwardly relative to the slips 37 whereupon the expander 35 moves inside of the slips 37 to move same outwardly or radially into gripping engagement with the casing C. When the slips 37 are thus set, the slip expander 35 is, of course, also held against further downward movement by reason of its engagement with the interior of the slips 37. However, the downward movement of the body 15 continues relative to both the slips 37 and the expander 35 so as to apply a downward compressive force to the packing element 32 to expand same into sealing engagement with the casing C. Thus, the slips 37 and the packing element 32 are both set by the manipulation or lowering of the tubing string 10 or the tubing string 12, whichever is connected to the upper end of the body 15.

As previously pointed out, the improvement in this application resides in the provision of the method and apparatus wherein the chokes or plugs X and Y are positioned in the bores 16 and 17 of the apparatus A for closing off or controlling fluid flow through either one or both of such passages 16 and 17. The chokes or plugs X and Y are illustrated in Figures 2B and 3.

The flow control device X is illustrated in Figures 2A, 2B and 3 as it appears after initially being positioned in the upper end of the passage 16 and the lowering or setting tool T is still connected thereto. The flow control device X has a tubular body which includes an upper head section 40 which has threads 40a on the external surface thereof and which has a bore or central passage 40b extending therethrough. An intermediate section or central stem 42 is connected to the head section 40 by threads 43 or any other suitable connecting means, and such intermediate or central section 42 has a central passage or bore 42a therethrough which is a continua-

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tion of the passage or bore 40b of the head section 40. The intermediate section 42 has an annular laterally extending shoulder 42b upon which rest the lower ends of latching dogs or members 44. The dogs 44 are held in position of the intermediate section 42 by a retaining ring 45 which has a curved hook portion 45a which extends into a similarly-shaped recess 44a of the dogs 44 and also, a hook portion 44b extends into a similarly-curved recess 45b on the ring 45 below the hook portion 45a thereof so as to permit a limited pivotal movement of the latching dogs or members 44 relative to the ring 45. The dogs 44 have springs 46 connected thereto by any suitable means so that such dogs 44 are constantly urged outwardly to the extent permitted by the pivotal connection with the ring 45, but the dogs 44 can be pivoted or swung inwardly from the position shown in Figure 3 to retract same to a smaller diameter for passing through smaller sections of pipe, as will be more evident hereinafter. Each of the dogs 44 has an inclined latch surface 44c which is adapted to fit below an annular latching shoulder 16a within the upper end of the passage 16. The upper ends of the springs 46 extend between the external surface of the intermediate section 42 and the internal surface of a downwardly depending annular flange 40c on the upper head section 40.

An annular seal or ring 48 formed of chevron packing or any other similar sealing material is positioned below the ring 45 on the intermediate member and is held in position thereon by the lower section 50 of the body of the choke X which section 50 is threaded at threads 52 to the intermediate section 42. The lower section 50 has a central passage or bore 50a extending therethrough which is a continuation of the bores 40b and 42a, except that it is of an increased diameter, the purpose of which will appear hereinafter. The lower end of the section 50 has a removable insert 53 threaded into the threaded opening 50b of the lower body section 50, and such insert 53 has a choke opening or orifice 53a therethrough which, as will be more evident hereinafter, controls the quantity of fluid flow from the passage 16 to the tubing string 10. Also, it should be pointed out that if it is desired to completely close off fluid flow from the passage 16 to the tubing string 10, such insert 53 can be a solid plug in which case the apparatus X of Figure 3 would be a plug rather than a choke.

A control tube 55 extends longitudinally through the passages 40b, 42a and 50a of the body sections 40, 42 and 50 and is longitudinally slidable therein. A spring 56 in the lower end of the lower section 50 constantly urges the control tube 55 upwardly, but during the running in of the choke X, the control tube 55 is held in a lowered position by a running in or setting tool T (Figures 2A, 2B and 3) which is connected to the head section by a shear pin 60 and which has a cylindrical section 61 which fits about the head section 40 so that the lateral upper shoulder 61a thereof contacts the upper end of the control tube 55 to thus prevent the tube 55 from moving upwardly while the pin 60 is connected to the tool T. There is, of course, no connection between the cylindrical portion 61 of the tool T and the threads 40a of the head section 40, but the only connection of the tool T with the head section 40 is the shear pin 60 so that after the dogs 44 are latched in the position, shown in Figure 3, then the tool T is adapted to be removed by raising upwardly with a sufficient force to shear the shear pin 60, leaving the threads 40a exposed for threaded engagement by a retrieving tool (not shown).

In Figure 2A, the upper portion of the tool T is illustrated as being supported from a wire line 70 and as including a jar mechanism J which may be of any type for providing a jarring force to effect the shearing of the pin 60 upon the withdrawal of the tool T from the tubing string 10. With the jar device J of Figure 2A, the tension stem 71 which is connected through the upper portion 72 of the tool T to the wire line 70, has pins 73

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thereon which project through the tubular body 74 and are retained against upward movement by an inclined shoulder 74a formed in the longitudinal slot 74b. Preferably, there are a plurality of pins 73 and a slot 74b for each of the pins 73. As the line 70 is pulled upwardly, the pins 73 are prevented from sliding upwardly past the inclined surfaces 74a because the lower portion of the tension member 71 has downwardly extending lugs 71a which coact with upwardly extending lugs 75a mounted on a slidable cylinder 75 which is normally urged upwardly by a spring 76. Thus, as the upward force is applied to the wire line 70, the lugs 75a prevent the tension member 71 from turning sufficiently to permit the pin 73 to pass the shoulder 74a, until such time as the tension in the member 71 has built up to such an extent that it can force the member 75 downwardly against the spring 76 by a rotational movement between the lugs 71a and lugs 75a. At that time, the slidable member 75 is urged downwardly by the coaction between the lugs 71a and 75a so that the pins 73 move or rotate in a direction to move them from below the lateral surfaces 74a and to permit the upward movement of such pins 73 in the slots 74b. Of course, since a considerable force was developed in the releasing of the pins 73, the sudden force imparted to the body 74 from the upward movement of the pins 73 imparts a jarring force to the tool T and effects the shearing of the pin or pins 60. It will be recognized that any type of tool T could be utilized so long as it is capable of shearing the pin 60.

When the lowering or setting tool T is connected to the choke X to position same in latched engagement with the annular latching shoulder 16a, the control tube 55 is held in a downward or lowered position against the action of the spring 56 so as to keep the ports 65 in the lower body section 50 and 66 in the control tube 55 aligned so that fluid is adapted to flow through such ports into the interior of the control tube 55 and outwardly through bypass ports 67 and 68 in the tool T. Thus, during the lowering of the choke X into the well bore to position same in its latched position (Figure 3), a bypass of fluid is obtained to facilitate the lowering of the choke X. When the tool T has been removed from the choke X by an upward pull thereof to shear the pin 60, the spring 56 causes the control tube 55 to slide upwardly in the passages in which it is positioned so that the ports 65 and 66 are no longer aligned and the fluid flow then is from the passage 16 through the orifice or choke opening 53a to the tubing string 10. It will be observed that the control tube 55 has an annular shoulder 55a thereon which contacts an annular shoulder 42c to limit the upward movement of the control tube 55 relative to the body sections of the choke X after the setting or lowering tool T has been removed.

The choke Y is identical in construction with the choke X, except, as illustrated in Figure 3, the choke Y is of a smaller size than the choke X so as to fit within the bore 17, which is of a reduced size as compared to the size of the bore 16. The bore 17 is provided with an annular latch shoulder 17b which receives the inclined lateral edges 144c of the latch dogs 144. The choke X has an upper head section 140 which has an internal diameter or bore 140a and external teeth or threads 140b. The intermediate or stem section 142 corresponds with the section 42 of the choke X and is connected between the upper head section 140 and the lower section 150. The control tube 155 extends through the passages or bores of the sections 140, 142 and 150, and is urged upwardly by a spring or resilient member 156 so as to close the bypass of fluid from the ports 165 and 166 and to therefore cause all of the fluid from the bore 17 to pass through the choke opening or orifice 153a of the insert 153 and thence through the control tube 155 to the tubing string 12. Of course, the insert 153 can be a solid plug in which case the choke Y would close off all fluid flow from the passage 17 to the tubing string 12 and

would, therefore, serve as a plug instead of a choke in the same manner as explained above in connection with the choke X. The dogs 144 are retained on the intermediate section by the retaining ring 145 and the leaf springs 146 normally urge the dogs 144 outwardly, but the dogs 144 are adapted to swing inwardly so as to permit the choke Y to pass downwardly through the tubing string 12. It will be observed that the choke Y is illustrated with the setting tool therefor removed and with the control tube 155 in the raised position in which the choke is functioning to control the fluid flow from the passage 17 to the tubing string 12.

The operation of the apparatus of this invention, and the carrying out of the method of this invention, involves the initial positioning of the packer B in the position illustrated in the Figure 1A and the subsequent positioning of the packer or apparatus A in its set position and thereafter the connection of the tubing string 12 to the upper end of the body 15. The apparatus A would then be functioning normally so that the production would be obtained from the formation F through the tubing string 12 and from the formation F' to the tubing string 10. To control the fluid flow through the passage 16, the choke X is lowered into the well bore or casing C by passing same downwardly through the tubing string 10 so that the choke X is guided into its position within the upper end of the passage 16. When the choke X reaches its position adjacent the latch shoulder 16a, the latching dogs 44 are moved outwardly by the leaf springs 46 to effect the latching connection by reason of the lateral latch shoulders 44c extending below the annular shoulder 16a. Also, the seal 48 effects a sealing engagement with the interior or inner surface of the passage 16. Thereafter, an upward pull or jar applied to the tool T by the wire line 70 or other support effects a shearing of the pin 60 and permits a removal of the tool T from the tubing string 10. The tubing string 10 then can be reconnected at the surface of the well so as to obtain production through the Christmas tree or other well head assembly (not shown), with the choke X serving to control the amount of production from the formation F' by reason of the restricted opening or choke opening 53a through which all of the fluid from the formation F' must pass as it flows upwardly to the tubing string 10.

If, for some reason, it is desired to remove the tubing string 10 after the choke X has been positioned in the passage 16, the tubing string 10 can be so removed by a rotation thereof to the right, assuming the threads 10b and 18a are left-hand threads, so that the fluid from the formation F' would pass through the choke X into the area of the casing C above the packer A. The tubing string 10 could be reconnected to the body 15 thereafter by lowering same downwardly into the well casing C, and the guide surface 15a at the upper end of the body 15 would guide the tubing string 10 into its latched position and it would be connected as previously explained, while the choke X is still in position.

Since the flow control means X is illustrated as a choke, the above operation has been described for such choke, but it will be understood that the operation is the same if the control means X is a plug, except that fluid flow above the plug would, of course, be closed off when the arms 44 are latched below shoulder 16a.

The operation and method is the same with respect to the choke or plug Y as explained above in connection with the choke or plug X. It should also be noted that either the control device X or Y can be removed while the tubing string 10 or 12, respectively, is still in position by the lowering of a special tool, which is well known in the art. For removing the control device X, the special removal tool has a sleeve for sliding over the flexible springs 46 to collapse same and to cause the dogs 44 to retract to move the shoulders 44c inwardly out of latched engagement with the shoulder 16a. Also, such special tool includes a latching means for connection to the

threads 40a so that an upward lifting will effect the removal thereof without disturbing the tubing strings 10. The special tool for removing the control means Y is of the same construction and would operate in the same manner as the tool for removing the control means X.

It should be particularly pointed out that both the well formations F and F' can be closed off against fluid flow by the insertion of the control devices X and Y as plugs into the passages 16 and 17 so that thereafter the tubing strings 10 and 12 can be completely removed from the bore or casing C, if desired.

The foregoing disclosure and description of the invention is illustrative and explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. A well apparatus adapted to be positioned in a well bore which traverses an upper producing zone and a lower producing zone, said apparatus including an upper well packer assembly located above the upper producing zone and a lower well packer disposed below said upper zone and above said lower zone, said upper packer assembly including a body having a first longitudinal passage extending therethrough and also having a second longitudinal passage extending therethrough, an annular packing element mounted on said body and sealing with the wall of the well bore in which the assembly is disposed, means extending between one of said longitudinal passages and the lower packer to establish communication between said one of the longitudinal passages and the area below the lower packer whereby fluid from the lower producing zone below said lower packer may flow to said one passage, the said other of said longitudinal passages having its lower end in communication with the area between the packers whereby fluid from the upper producing zone may enter said other passage, a first tubing string connected with the body in communication with one of the longitudinal passages and extending to the surface, a second tubing string, means releasably connecting said second tubing string with the body in communication with the other of said longitudinal passages and extending to the surface, said second tubing string being adapted to be run into the well separately of the first string and said upper packer assembly and connected with said other longitudinal passages, a wire line type flow control means adapted to be lowered by means of a flexible line through one of the tubing strings and into the longitudinal passage in said body communicating therewith, and means in said last mentioned passage for releasably connecting said flow control means therein, whereby when desired the flow control means may be removed by means of a flexible line.

2. A well apparatus as set forth in claim 1, wherein the releasable connecting means between the second tubing string and the other of said longitudinal passages in the body is disposed above the means for releasably connecting a flow control means in said other passage whereby the second tubing string may be disconnected from the body and removed from the well without disturbing the flow control means mounted in said other passage.

3. A well apparatus as set forth in claim 1, together with means for releasably connecting the first tubing string with said one of the longitudinal passages in the body, a second wire line type flow control means adapted to be lowered by means of a flexible line through the other of said tubing strings and into the other of said longitudinal passages communicating therewith, and means in said other passage for releasably connecting said second flow control means in its passage whereby when desired said flow control means may be removed by a flexible line.

4. A well apparatus as set forth in claim 1, together with means for releasably connecting the first tubing

string with said one longitudinal passage in the body, a wire line type second flow control means adapted to be lowered by means of a flexible line through the other of said tubing strings and into the other of said longitudinal passages communicating therewith, and means in said other passage for releasably connecting said second flow control means in its passage whereby when desired said flow control means may be removed by a flexible line, the releasable connection between each tubing string and its associated passage in the body being located in said associated passage above the means which releasably connects each flow control means in its respective passage, whereby each tubing string may be disconnected from the body and removed from the well without disturbing the flow control means which is mounted in the passage from which the tubing string was removed.

5. A well apparatus as set forth in claim 1, wherein the flow control means is a choke for permitting a predetermined volume of flow therethrough.

6. A well apparatus as set forth in claim 1, wherein the flow control means is a plug which completely closes flow through the passage.

7. A well apparatus as set forth in claim 1, together with means for releasably connecting the first tubing string with said one longitudinal passage in the body, a second wire line type flow control means adapted to be lowered by means of a flexible line through the said other of said tubing strings and into the said other of said longitudinal passages communicating therewith, and means in said other passage for releasably connecting said second flow control means in its passage whereby when desired said second flow control means may be removed by a flexible line, said first and second flow control means each having a restricted choke bore therethrough to allow a predetermined flow therethrough.

8. A well apparatus as set forth in claim 1, together with means for releasably connecting the first tubing string with said one longitudinal passage in the body, a second wire line type flow control means adapted to be lowered by means of a flexible line through the said other of said tubing strings and into the said other of said longitudinal passages communicating therewith, and means in said other passage for releasably connecting said second flow control means in its passage whereby when desired said second flow control means may be removed by a flexible line, said first and second flow control means each comprising a closure plug for closing all flow through the passages in which said plugs are mounted.

9. In a well apparatus, a packer assembly including an elongate body having a first longitudinal passage extending entirely therethrough and having a second longitudinal passage also extending entirely therethrough, an annular packing element mounted on the exterior of the body for sealing with the wall of a well bore into which the assembly is lowered, a first tubing string adapted to be releasably connected to the upper portion of the body in communication with the first longitudinal passage, means on said tubing string and in said longitudinal passage for releasably connecting said tubing string to said body, a second tubing string adapted to be releasably connected to the upper portion of the second longitudinal passage, means on said second tubing string and in said second longitudinal passage for releasably connecting said tubing string to said body, means in said first passage for receiving and releasably attaching a flow control means to said body, and means in said second passage for receiving and releasably attaching a second flow control means to said body.

10. A packer assembly as set forth in claim 9, wherein the means in each passage for releasably attaching each flow control means to said body is spaced below the releasable connecting means in said passage for connecting the tubing string to the passage, wherein each tubing string

may be detached and removed without disturbing a flow control means which is mounted in the passage.

11. The method of positioning a flow control assembly in a two zone cased well wherein the assembly consists of a lower packer, apparatus for running the lower packer, an upper packer having a pair of longitudinal passages extending therethrough, a tubular extension extending downwardly from the upper packer and in fluid communication with one of said passages, and a flow control device releasably connectable in one of said passages, said method comprising, running said lower packer in the well on said running apparatus and landing the lower packer between the two zones, detaching the running apparatus from the lower packer and removing it from the well, detachably connecting a first tubing string in one passage of said upper packer and lowering said upper packer into the well to a position where the upper packer is above the upper of said two zones and said tubular extension extends into the bore of the lower packer, landing said upper packer, lowering a second string of tubing into the well and detachably connecting said second string of tubing in the other passage of said upper packer and lowering said flow control device through one of said tubing strings into the passage communicating therewith and releasably connecting said flow control device in said passage.

12. The method as set forth in claim 11 wherein said flow control device closes flow through the tubing string through which the device has been lowered, and thereafter disconnecting said last mentioned tubing string from the upper packer and removing it from the well without disturbing the flow control device.

13. The method of positioning a flow control assembly in a two zone cased well wherein the assembly consists of a lower packer, apparatus for running the lower packer, an upper packer having a pair of longitudinal passages extending therethrough, a tubular extension extending downwardly from the upper packer and in fluid communication with one of said passages, and flow control devices releasably connectable in said passages, said method comprising, running said lower packer in the well on said running apparatus and landing the lower packer between the two zones, detaching the running apparatus from the lower packer and removing it from the well, detachably connecting a first tubing string in one passage of said upper packer and lowering said upper packer into the well to a position where the upper packer is above the upper of said two zones and said tubular extension extends into the bore of the lower packer, landing said upper packer, lowering a second string of tubing into the well and detachably connecting said second string of tubing in the other passage of said upper packer and lowering said flow control devices through said tubing strings into the passages communicating therewith and releasably connecting said flow control devices in said passages.

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