

Feb. 7, 1961

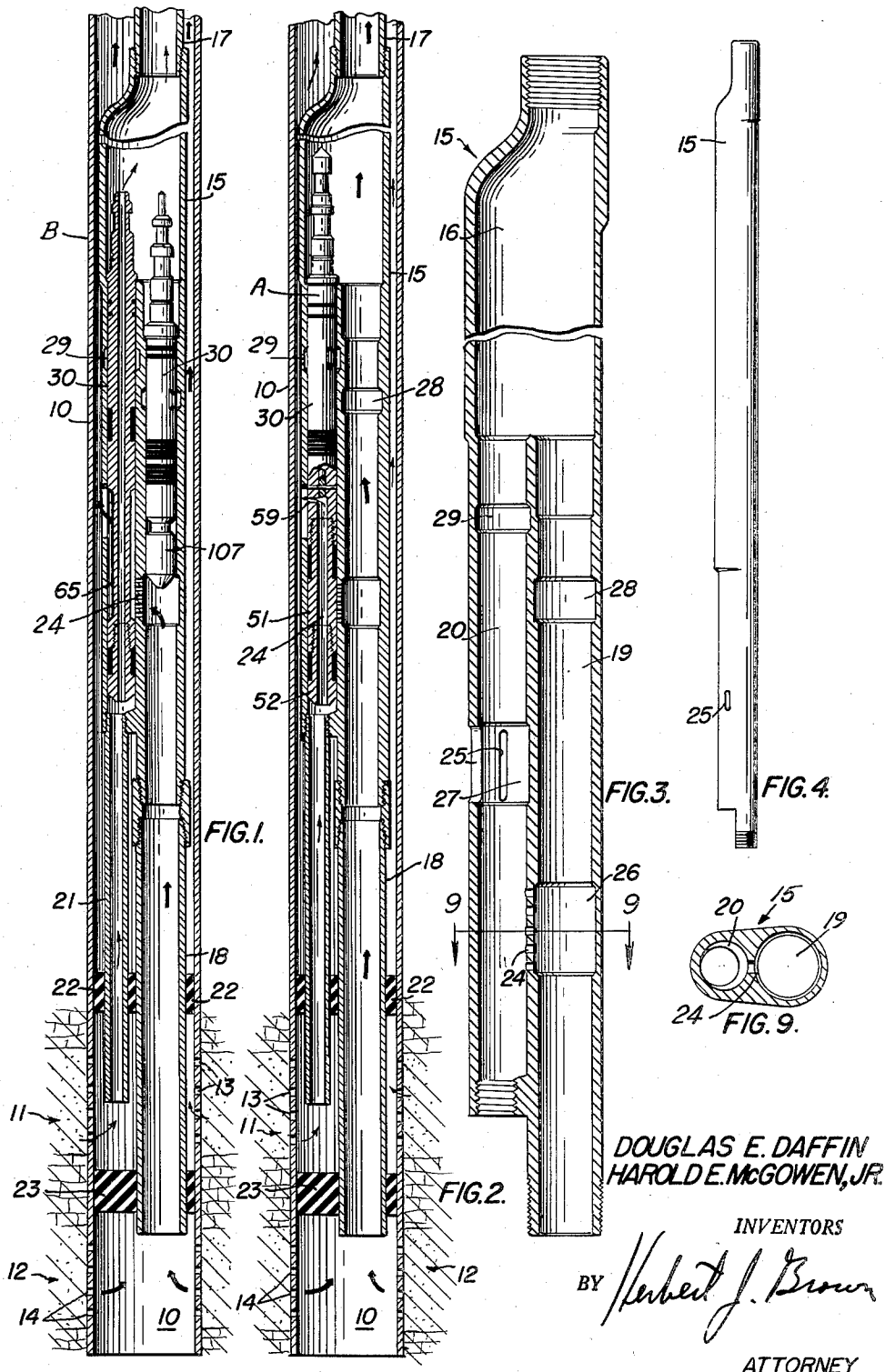
D. E. DAFFIN ET AL

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CROSSOVER APPARATUS FOR OIL AND GAS WELLS

Filed July 2, 1956

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Feb. 7, 1961

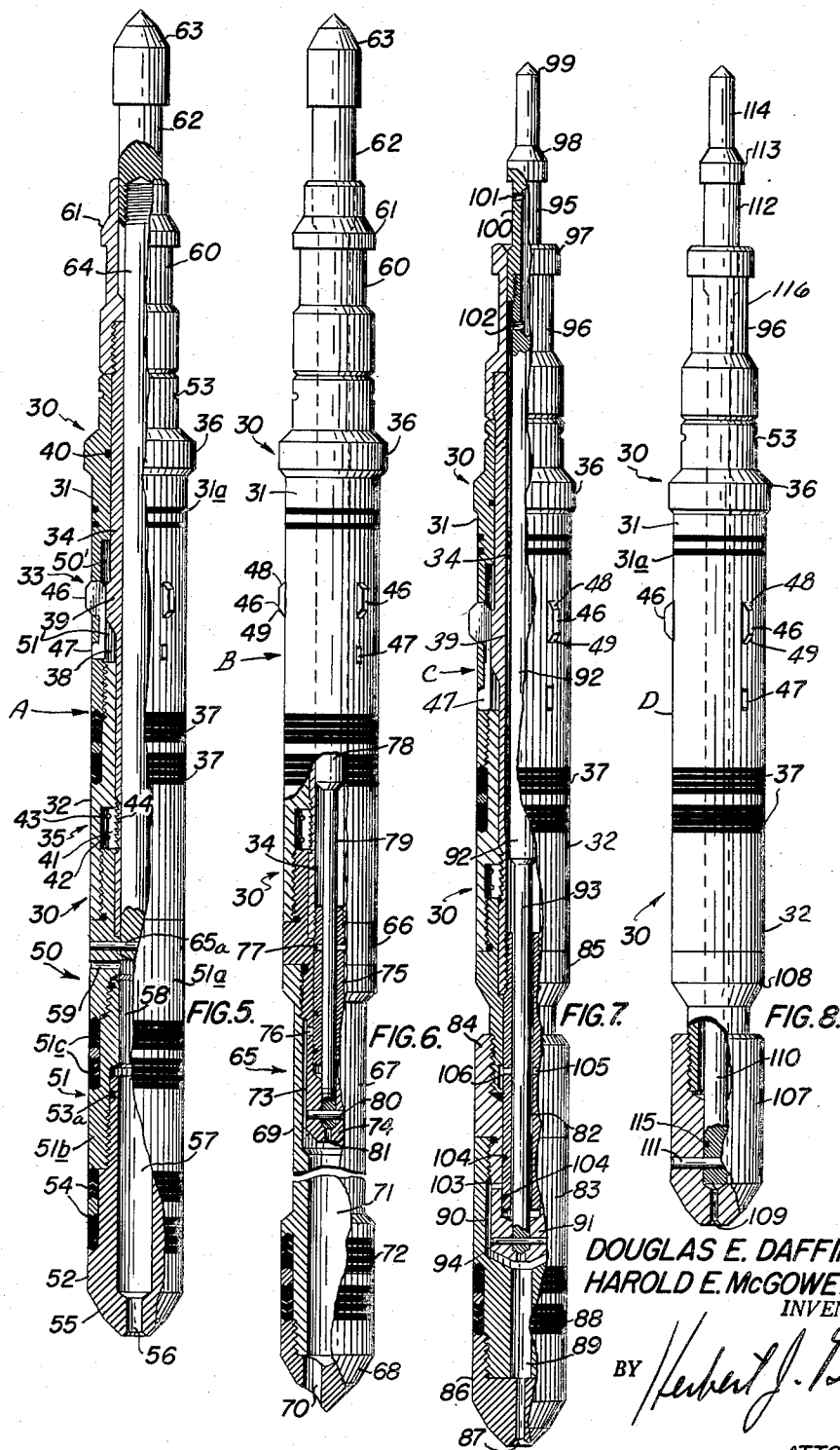
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2 Sheets-Sheet 2



1

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CROSSOVER APPARATUS FOR OIL AND GAS WELLS

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9 Claims. (Cl. 166—115)

This invention relates to crossover apparatus for use in oil and gas wells.

The present application is a continuation-in-part of our application Ser. No. 579,931, filed April 23, 1956, now Patent No. 2,846,014, dated Aug. 5, 1958.

The primary object of the invention is to provide crossover apparatus for dually completed oil and gas wells, which apparatus is capable of preventing commingling of production from the two producing zones.

Another object of the invention is to provide crossover apparatus for oil and gas wells capable of selectively producing from one or the other of two formations through either the casing annulus or the well tubing.

Another object of the invention is to provide crossover apparatus so constructed and arranged that tools, pressure bombs, perforating guns and other devices may be lowered into the well casing below the well tubing without commingling the zones or affecting the flow of the upper zone even though such devices require full tubing opening when lowered through the tubing on a flexible line.

A further object of the invention is to provide means to effect blanking off either producing zone without disturbing the normal flow of the other zone.

When working over the lower zone of a dually completed well by permanent type well completion methods, it is desirable that circulating fluids do not come in contact with the upper producing formation. Heretofore, with present workover equipment and methods, when an extension of small tubing was retrieved with wire line tools, the upper producing horizon was exposed to whatever circulating fluids were present in the well bore. Oftentimes these fluids may be injurious to an open formation and cause damage or loss of production to a producing horizon. Such damage to a reservoir is costly to repair and oftentimes irreparable and is therefore obviously undesirable.

It is therefore an object of this invention to provide a dual completion apparatus whereby an upper producing zone may be blanked off in the apparatus and be isolated from circulating fluids during workover interims. A conductor parallel to the tubing string from the production packer to the dual apparatus is a means to accomplish this purpose.

Another object of this invention is to provide a dual completion apparatus whereby the upper producing horizon may be blanked off through the tubing zone and not interfere with workover operations of the lower zone. Circulating fluids may enter from the casing and flow in between the plug of the upper zone and plug assembly of the upper portion of the side pocket apparatus, and be directed annularly of a suspended workover pipe hanging from a packed off extension hanger in the dual completion apparatus. Flow, of course, can be reversed.

Still another object of this invention is to provide a crossover apparatus whereby an upper producing zone may be worked over by permanent type well completion methods with the extension tubing and packoff assembly positioned in the crossover apparatus and where

2

circulating fluids may be circulated either through the crossover assembly or, by passing the apparatus, through the parallel flow conductor and through the upper bypass production packer. The crossover assembly can accomplish a dual purpose where circulating fluids may be directed as above, or if desired, the circulating fluids may be directed within the apparatus below a plug to the tubing and above another plug blocking flow through the parallel conductor and be directed through connecting ports of the two nipples and thence around the annulus of the extension pipe and tubing. Likewise, circulating fluids may be reversed in both instances. In order to perform workover operations in the upper producing horizon it is necessary that the lower formation be blanked off after a removable flow conductor seated in the crossover apparatus has been removed, and before upper workover procedures begin. This purpose can be accomplished through the crossover assembly.

In accordance with our invention we provide a crossover apparatus for use in dual completion wells comprising an elongated hollow body having vertically disposed parallel tubular receivers therein adapted to latchably receive flow controlling inserts. The hollow body is adapted to connect at its upper end with the lower end of a string of tubing at a level above an upper production zone and tubular extensions are connected to the respective receivers at the lower ends thereof. One of the tubular extensions extends to an upper production zone and another extension to a lower production zone. Packers are provided in the well above and below the upper production zone and around said tubular extensions. The parallel receivers include a port or ports between the receivers and an outlet port in one of the receivers. Flow controlling inserts are adapted to be received and snugly fit within the tubular receivers and coacting means are provided carried by the receiver and inserts for releasably latching the inserts in the receivers.

The invention will be more readily understood by reference to the accompanying drawings and the following detailed description, in which a specific embodiment of the invention is set forth by way of illustration rather than by way of limitation to the specific details therein set forth.

In the drawings:

Figure 1 is a broken vertical sectional view of crossover apparatus in accordance with the invention installed in a length of well casing, and showing an arrangement for producing a lower zone through the casing annulus and the upper zone through the well tubing.

Figure 2 is a vertical sectional view similar to Figure 1, but showing an arrangement for flowing production from a lower zone through the well tubing and flowing production from the upper zone through the casing annulus.

Figure 3 is a broken vertical sectional view of a special tubing section providing the housing or body of the present invention and showing the location of the parallel insert receivers, one of which receivers is offset with reference to the axis of the well tubing.

Figure 4 is an elevation on a reduced scale of the housing or body illustrated in Figure 3.

Figure 5 is an enlarged elevation and broken sectional view of an insert A for use in the offset receiver as illustrated in position in Figure 2.

Figure 6 is an elevation and broken sectional view of a bypass insert B for use in the offset receiver as illustrated in Figure 1.

Figure 7 is an enlarged elevation and broken sectional view of an insert C for blanking or closing the communicating port between the two receivers.

Figure 8 is an enlarged and broken sectional view of

an insert D for plugging the upper end of the receiver in line with the well tubing, and

Figure 9 is a transverse section taken on line 9—9 of Figure 3.

An exemplary embodiment of the invention is shown in Figures 1 and 2 wherein the well casing 10 extends downwardly from the earth's surface through upper and lower production zones 11 and 12. The casing 10 is perforated at 13 and 14 to admit well fluids which are raised to the earth's surface.

The present invention includes a special tubing section providing a housing or body 15 (see Figs. 2 and 3) for the present apparatus, such body having the same general configuration as the special tubing section illustrated and described in U.S. Patent No. 2,679,903, issued June 1, 1954, to Harold E. McGowen, Jr., one of the present joint inventors, and Howard H. Moore Jr. The body 15 is elongated and hollow, and is of greater internal cross sectional area than the internal cross sectional areas of the ends thereof, and includes a laterally offset portion or pocket 16 for receiving and coacting with a suitable kickover tool such as illustrated and described in the referred to patent and now in extensive use by the industry. The upper end of the body 15 is threadedly connected with the lower end of the well tubing 17 whereas the lower end of the body is threadedly connected with a tubing extension 18, shown only in Figures 1 and 2. The lower portion of the body 15 is provided with vertically disposed parallel inline and offset tubular receivers 19 and 20 for various fluid flow controlling devices, inserts or plugs, to be more fully described hereinafter, the tubular receiver 19 being referred to as the "inline receiver" and the receiver 20 being referred to as the "offset receiver," the inline receiver 19 being in axial alignment with the well tubing 17 and the tubing extension 18 and the receiver 20 being laterally offset with respect to the well tubing and being located beneath the pocket 16. The diameter of the inline receiver 19 is substantially full opening, that is, of nearly the same inside diameter as the tubing 17, for permitting relatively large tools and instruments to be lowered there-through, and through the tubing extension 18, into the lower portion of the well casing 10. A pipe extension 21 is threadedly connected and communicates with the lower end of the offset receiver 20, which pipe extension extends into the upper producing zone 11. It is to be understood that the relative extending lengths of the tubing extension and the pipe extension may be reversed within the scope and spirit of the invention; that is, the pipe extension 21 could extend to the lower producing zone 12 and the tubing extension 18 could extend to the upper zone 11. Upper and lower packers 22 and 23 are provided in the casing 10 above each producing zone, and as illustrated, the upper packer 22 seals off the casing around the tubing extension 18 and pipe extension 21, whereas the lower packer 23 seals off the casing around the tubing extension only. If the relative lengths of the extensions 18 and 21 were reversed, then the lower packer would receive the pipe extension 21 only.

A communicating port 24 in the form of multiple perforations is provided between the insert receivers 19 and 20, and an outlet port 25 in the form of multiple vertical slots is provided in the receiver 20. Lower annular recesses 26 and 27 are provided in the walls of the receivers 19 and 20 at the ports 24 and 25 to accommodate lateral flow in connection with inserts to be described. Similarly, upper annular recesses 28 and 29 with beveled shoulders at each end thereof are provided in the upper portion of the receivers 19 and 20 for accommodating a locking mechanism to be described.

The body assemblies 30 of all four inserts A, B, C and D illustrated in Figures 5 through 8 are identical, and each includes an upper body portion 31, a lower body portion 32, locking dogs 33, a shouldered tubular sleeve 34 for actuating and holding the dogs 33 in their ex-

panded positions, and a frangible holding device 35 for holding the sleeve 34 in its down position. The two body portions 31 and 32 are of the same outside diameter and are threadedly connected with each other. The upper body portion 31 is provided with a shoulder 36 near its upper end for supporting the insert in its receivers 19 or 20. Ring wipers 31a are provided around each upper body portion 31 beneath its shoulder 36, and chevron type ring seals 37 are provided between the upper and lower body portions 31 and 32.

The inside diameter of the upper body portion 31 is larger than the inside diameter of the lower body portion 32, and the lower inside diameter of the upper body portion is provided with a cylindrical annular recess 38 to accommodate a circular shoulder 39 on the sleeve 34 whereby the sleeve is arranged for limited longitudinal movement in said recess. The upper and lower ends of the sleeve 34 are of different diameters for sliding contact within the upper and lower body portions 31 and 32, and a ring wiper 40 is provided within the upper body portion for sliding contact with said sleeve. The holding device 35 mounted in the lower body portion 32 is conventional and is not herein described in detail except to point out that said device is generally comprised of a toothed segment 41 within a recess 42 and is provided with springs 43 for urging said segment inwardly so that the teeth thereof engage corresponding teeth 44 in one side of the sleeve 34.

The dogs 33 are circumferentially spaced from each other within the recess 38, and have outwardly directed projections 46 and 47 at their upper and lower ends, respectively. The projections 46 and 47 are received in openings, not numbered, in the upper body portion 31, and the upper projections 46 of the dogs are adapted to extend outwardly and into the annular recesses 28 or 29 of the receivers 19 or 20. The upper and lower outer edges of the upper dog projection 46 are beveled as at 48 and 49 for coaction with upper and lower beveled surfaces, not numbered, in recesses 28 and 29 in the receivers 19 or 20. The dogs 33 are also beveled at 50' their upper inner corners for coaction with a downwardly facing beveled surface 51' at the lower end of the circular shoulder 39 on the sleeve 34. The upper end of the upper body portion 31, above the shoulder 36, is provided with recesses 53 to accommodate shear pins in the socket of a running tool, not shown.

Referring now to the insert A shown in Figure 5 and illustrated in operating position in Figure 2, there is a cylindrical extension 50 threadedly engaged in the bottom end of the lower body portion 32, and which cylindrical extension includes upper and lower extension body portions 51 and 52, both of the same outside diameter as the insert body portions 31 and 32. The upper body portion of the extension 51 is comprised of separate upper and lower parts 51a and 51b threadedly secured to each other with ring seals 51c therebetween. The extension bodies 51 and 52 are threadedly secured to each other and include a sealing ring 53a therebetween for preventing fluid from migrating through the threads when the insert assembly is under pressure. The outer periphery of the lower extension body portion 52 is provided with chevron type seals 54 therearound. The lower body extension 52 is tapered, as at 55, on its lower end for guiding the assembly into the offset receiver 20 when lowered on a wire line through the well tubing 17 and moves laterally into the pocket 16 by a shifting tool as hereinbefore referred to (see Patent No. 2,679,903). There is an aperture 56 in the lower end of the lower extension 52 which communicates with a passage 57 therethrough. There is another passage 58 through the upper body extension 51 which communicates with a lateral port 59 in the side of that body thereof. As shown in Figure 2, the port 59 communicates with the outlet port 25 in the side of the special tubing section body 15. Thus, fluid from the upper zone 11 flows through the casing perforations 13 up-

5

wardly through the pipe extension 21, through the insert body extension 50 and outwardly of the tubing section body 15 at 25, and thence upwardly through the casing annulus as shown by light arrows in Figure 2.

The upper end of the sleeve 34 is provided with a sleeve adapter 60 which is threadedly secured on the upper end of said sleeve. A beveled flange 61 is provided around the upper end of the sleeve adapter 60 for engaging a pulling tool when withdrawing the insert from the receiver 20. The upper end of the sleeve adapter 60 is axially recessed to receive the lower end of a prong adapter 62, the upper end of which is tapered at 63 and flanged as at 63a for coaction with an additional pulling tool, not shown. A cylindrical prong 64 is threadedly connected with the lower end of the prong adapter 62 and extends downwardly through the sleeve 34 into the upper end of the cylindrical body extension 50. The purpose of the prong 64 is to relieve pressures when withdrawing the insert assembly.

The pulling tool is first lowered through the well tubing 17, offset by means of a kickover tool as described in Patent No. 2,679,903, and further lowered to engage the prong adapter 62. The prong 64 is initially held in place by means of a shear pin 65a through the upper extension body 51. When the prong is removed pressure differentials are relieved by reason of axial flow of fluids through the entire remaining extension assembly. After the prong is removed another pulling tool is lowered to engage the flange 61 of the sleeve adapter 60. Raising the sleeve adapter causes the sleeve 34 to move upwardly and relieve the dogs 33, and by reason of the beveled upper outer corners 48 the dogs recede into the recess 38. Conversely, when the insert assembly is lowered into place, the sleeve 34 is initially raised, and after the insert comes to rest in the offset receiver 20 further downward movement and jarring by means of the wire line cause the sleeve to move down further and at the same time move the dogs 33 outwardly whereby the upper projections 46 thereof extend into the circular recess 38, thus locking the assembly in place.

Referring now to the insert B shown in Figure 6 and illustrated in position in Figure 1, a cylindrical extension 65 is secured to the lower end of the body assembly 30 and is comprised of an upper adapter 66 threadedly secured in the lower end of the lower insert body portion 32, an intermediate body portion 67 which is of reduced outside diameter intermediate its ends, and a tapered lower end 68. Other than the reduced diameter referred to, the extension 65 is of the same outside diameter as the insert body assembly 30. Ports 70 are provided in the lower tapered end 68 and communicate with a passage 71 extending through the intermediate body portion 67. Chevron type seals 72 are provided around the lower end of the intermediate body portion 67 and are retained by means of the tapered lower end 68. The upper end of the passage 71 is enlarged as at 73 to accommodate an extension 74 on the lower end of the adapter 66, and which extension slidably receives a sleeve extension 75 threadedly secured in the lower end of the first described sleeve 34. A relief port 76 is located in one side of the adapter extension 74, and a relief port 77 is similarly provided in the sleeve extension 75.

The prong 78 of this form of insert is different from the previously described prong 64 in that the lower end of the prong is of reduced diameter, as at 79, and extends downwardly through the sleeve extension 75 and into the adapter extension 74 where it is frangibly secured by means of a shear pin 80 extending through the latter. A port 81 in the lower end of the adapter extension 74 provides communication therethrough and through the sleeve extension 75 when the prong 78 is moved. The sleeve adapter 60, flange 61 therearound, prong adapter 62 and prong adapter flange 63 are identical with those previously described in connection with Figure 5 and therefore carry the same reference numerals.

6

Installing and removing the insert B illustrated in Figure 6 is the same as described in connection with the insert shown in Figure 5. By reason of the length of the intermediate extension body portion 67, the portion thereof of reduced diameter 69 coincides with the communicating port 24 whereby fluids from the lower producing formation 12 enter the casing through perforations 14 and flow upwardly through the tubing extension 18, the communicating port 24 around the referred to reduced diameter, outwardly through the outlet port 25, and thence upwardly through the casing annulus. During this operation the prong 79 is removed to provide passage through the remaining insert assembly. Also, during this operation a short blanking plug D, to be described in detail and illustrated in Figure 8, is inserted in the upper end of the inline receiver 19 and cuts off the flow of fluid through the upper portion of the inline receiver to the well tubing. Thus, the two flows from the producing zones 11 and 12 are opposite those illustrated and described in connection with Figure 2. In view of its operation, the insert B illustrated in Figure 6 will hereinafter be referred to as the bypass insert.

The insert C illustrated in Figure 7 is for use in the inline receiver 19 and is for closing the communication port 24 between the two receivers. This insert includes the previously described body assembly 30, dogs 33, sleeve 34 and their coacting parts. The sleeve 34 includes a sleeve extension 82 which extends into an intermediate extension body portion 83 which, in turn, is connected with an upper body portion 84. An adapter 85 connects the upper body portion 84 with the lower body portion 32 of the body assembly 30. The lower body portion 86 is provided with a port 87 therethrough, and chevron type packing 88 is provided between the intermediate body portion 83 and said lower body portion. The intermediate body portion 83 has an axial passage 89 therethrough, the upper end 90 of which is enlarged to receive a depending extension 91 of the intermediate body portion 84, and which enlargement is of sufficient size to provide an annulus therearound.

The prong 92 of insert C illustrated in Figure 7 differs from the previously described prongs 64 and 78 in that it is of sufficiently smaller diameter to be spaced from the sleeve 34; similarly, the prong extension 93 on the lower end thereof is of sufficiently smaller diameter whereby the same is spaced from the sleeve extension 82. The lower end of the prong is frangibly secured in the body extension 91 by means of a shear pin 94 therethrough. The upper end of the prong is threadedly secured to a prong adapter 95 which is slidably received in a sleeve adapter 96. The sleeve adapter is provided with a flange 97 therearound for engagement with a pulling tool, and the prong adapter 95 is similarly provided with a flange 98 therearound for engagement with another pulling tool for removing the prong 92 and thereby relieving pressure differentials when removing the insert assembly from its receiver 19. A pointed guide 99 is made an integral part of the upper end of the prong adapter 95 for guiding the pulling tool in place. A bypass port 100 is located in the upper end of the prong 92 and the lower end of the adapter 95 and whereby fluid may flow from the sleeve 34 outwardly into the upper portion of the body 15. Lateral ports 101 and 102 in the prong adapter 95 and prong 92 are a part of the bypass 100.

A port 103 in the upper body extension 91 communicates with the space around the prong extension 93 when the sleeve 34 is in its raised position. When the sleeve 34 is down a seal is effected by means of ring seals 104 above and below the port 103. It has been found that the function of the present insert is enhanced by placing a relief port 105 in the sleeve extension 82 intermediate the ends thereof, which port communicates with a small recess or chamber 106 in the lower end of the adapter 85.

Since the body or housing 15 of the present apparatus is usually filled with liquids when installed in a well, and by reason of the length of the communicating port blanking insert C described in connection with Figure 7, the insert assembly would have a piston action when being installed, except for the action of the bypass 100. The assembly is lowered on a wire line, preferably with a set of conventional jars located near the running tool, which running tool is connected with the upper end of the insert body assembly 30 by means of shear pins, previously described. The sleeve 34 is in its raised position during the installing operation, and when the assembly is jarred in place, that is, in the receiver 19, the sleeve 34 and sleeve extension 82 move downwardly to close the lateral port 103 in the body extension 91. When thus installed, the chevron packing 37 on the body assembly 30, and the chevron packing 88 on the extension body 81 are located above and below the communicating port 24, thereby blanking off the latter. As described in connection with the insert illustrated in Figures 5 and 6, the dogs 33 lock the insert assembly in the annular groove 28 in the inline receiver 19. When removing the assembly, and after the prong 92 has been removed by shearing the pin 94, the upward movement of the sleeve 34 and its circular shoulder 39 relieve the dogs 33 in the manner previously described. By reason of the described construction and its location, the insert C illustrated in Figure 7 will be hereinafter referred to as the communicating port blanking plug.

The insert D illustrated in Figure 8 is for closing or blanking the upper end of the inline receiver 19, which insert includes the previously described body assembly 30 including the sleeve 34, dogs 33 and shear pin recesses 53. A single body or guide 107 is connected with the lower end of the body assembly by means of an adapter 108. The lower end of the body or guide 107 includes a port 109 therethrough, and the guide diameter is of the same diameter as body assembly 30. This form of extension also includes a prong 110 which extends into the body 107 where it is frangibly connected by means of a shear pin 111. The upper end of the prong is provided with an adapter 112 which is identical with the last described prong adapter 95 except that there is no bypass port 100. The prong adapter includes a flange shoulder 113 identical with the shoulder 98 and also includes a pointed upper extension 114 identical with the pointed extension 99. A ring seal 115 is provided around the lower end of the prong 110 above the shear pin 111 to prevent fluid from passing around said prong when the insert is used in its blanking position. As in connection with the previously described inserts, the prong 110 is for relieving pressure differentials when removing the insert. Installation of the instant insert D is the same as described in connection with Figure 7 and the same is locked in place by means of the dogs 33. As before, the insert D is lowered by means of wire lines on a running tool, and the connection therewith is by means of shear pins which engage the recesses 53 in the upper end of the body assembly 30. The sleeve adapter 116 is identical with the sleeve adapter 96 described in connection with Figure 7 and has the same function and operation.

From the foregoing description, it will be apparent that either zone 11 or 12 may be produced either through the casing annulus or the well tubing 17 without removing the latter. Moreover, by installing the communicating port blanking plug C illustrated in Figure 7 in either the inline receiver 19 of the offset receiver 20, either production zone may be blanked off. It will also be apparent from the foregoing that commingling of the two zones does not take place as in the conventional practice of removing the tubing to install crossover equipment.

The invention is not limited to the exemplary construction herein shown and described, but may be varied within the scope of the appended claims.

What is claimed is:

1. A dual completion well apparatus of the character described comprising a string of well tubing extending into the well, spaced from the well, providing an annular space surrounding the tubing and extending to the top of the well, said well having upper and lower production zones below the string of tubing, a tubing section connected at its upper end to the lower end of the string of well tubing, and having an enlarged portion below its upper end of greater internal cross-sectional area than the internal cross-sectional area at its point of connection to the well tubing, said section comprising a hollow body member enclosing a pair of parallel tubular receivers for flow control inserts, one of said receivers being in line with and of substantially the same cross-sectional area as the well tubing, and the other receiver being laterally offset therefrom, said parallel receivers having inter-communicating port means, and outlet port means through one of said receivers extending to the exterior of the special tubing section and to said outer annular space, one of said receivers having a tubular extension extending to the upper production zone and the other having a separate tubular extension extending to the lower production zone, packing means surrounding said extensions above the upper production zone and below said inter-communicating and outlet port means and adapted to seal between the extensions and the surrounding well wall, other packing means surrounding the extension extending to the lower production zone and adapted to seal between said last named extension and the surrounding well wall, and being located between the upper and lower production zones, and latching portions in each of said tubular receivers adapted to coact with latching means carried by removable flow controlling inserts to releasably secure said inserts in said tubular receivers.

2. An apparatus as defined in claim 1 wherein the extension for the inline receiver extends axially from the inline receiver to the lower production zone and the extension for the offset receiver extends axially from the offset receiver to the upper production zone.

3. An apparatus as defined in claim 1 wherein both tubular receivers are of the same cross-sectional area.

4. An apparatus as defined in claim 1 wherein the port means inter-communicating the receivers is below the outlet port means.

5. In combination with an apparatus as defined in claim 4, a flow control insert adapted to be removably secured in the offset receiver, comprising a body portion adapted to snugly fit in said offset receiver, means on said body portion including a latching member coacting with said latching portion in said offset receiver for detachably securing the insert therein with its outer wall blocking said inter-communicating port means, said insert having an axial passage communicating at one end with said tubular extension, and at the other end with said outlet port means, whereby fluid from one production zone may flow through said extension and said axial passage and thence outwardly through said outlet port means to the annular space surrounding the well tubing.

6. In combination with the apparatus as defined in claim 4, a flow control insert adapted to be removably received in the offset receiver, comprising a body portion adapted to snugly fit in said offset receiver, and having an annular externally reduced portion intermediate its ends extending a distance greater than the distance between said inter-communicating and outlet port means, means on said body portion including a latch member coacting with the latching portion of said offset receiver for detachably retaining the insert in the receiver with the reduced portion providing an annular passage between the inter-communicating and outlet port means, said insert having an axial passage extending therethrough

and communicating at one end with one of the production zones through the extension of the offset tubular receiver and communicating at its other end with the portion of the special tubing above the recess and in communication with the well tubing above the special section, and means for blocking flow of fluid through the inline receiver to the tubing above the special tubing section.

7. In combination with the apparatus as defined in claim 4, a flow control insert adapted to be removably received in the offset receiver, comprising a body portion adapted to snugly fit in said offset receiver, and having an annular externally reduced portion intermediate its ends extending a distance greater than the distance between the inter-communicating and outlet port means, means on said body portion including a latch member coacting with the latching portion of said offset receiver for detachably retaining the insert in the receiver with the reduced portion providing an annular passage between said inter-communicating and outlet port means, said insert having an axial passage extending there-through and communicating at one end with one of the production zones through the extension of the offset tubular receiver and communicating at its other end with the portion of the special tubing above the recess and in communication with the well tubing above the special section, and means for blocking flow of fluid

through the inline receiver to the tubing above the special tubing section, said blocking means comprising a removable insert in said inline receiver.

8. The combination as set forth in claim 7 wherein the insert in said inline receiver terminates short of the port means connecting said receivers whereby fluid entering the extension of the inline receiver may pass through said inter-communicating port means and thence through said annular passage and through the outlet port means to said annular space surrounding the tubing.

9. The combination as set forth in claim 7 wherein the insert in the inline receiver includes a portion blocking the port means inter-communicating the two tubular receivers whereby flow from the production zone connected to the extension of the inline receiver is entirely cut off.

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