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3,083,768

APPARATUS FOR MULTIPLE ZONE WELL PRODUCTION

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2 Sheets-Sheet 1

**Fig. 1.**

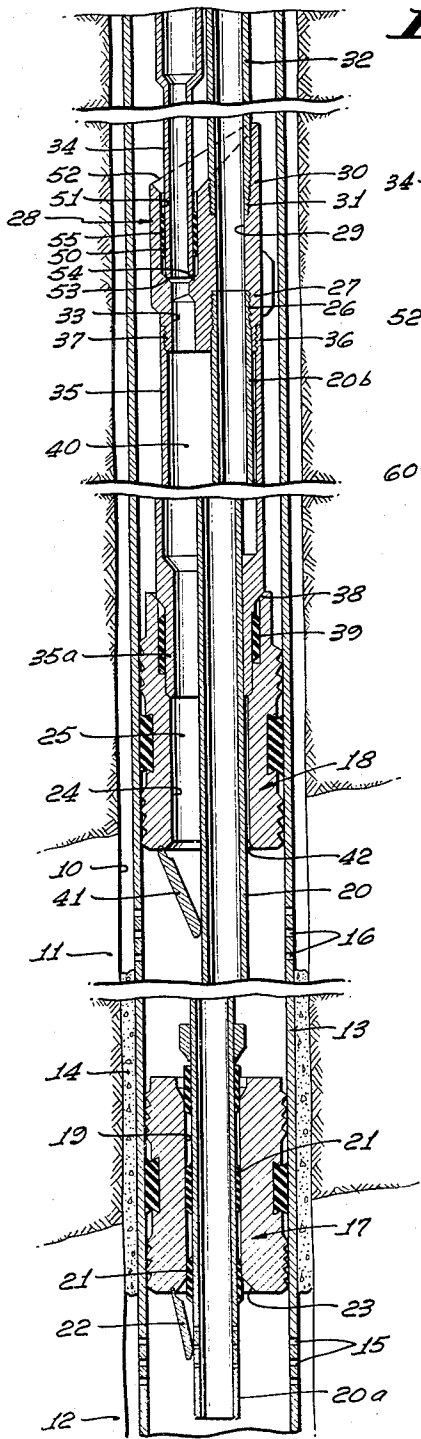


**Fig. 2.**

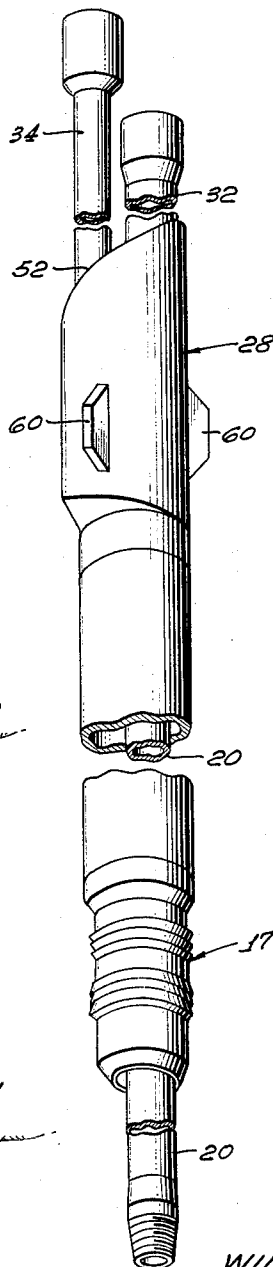
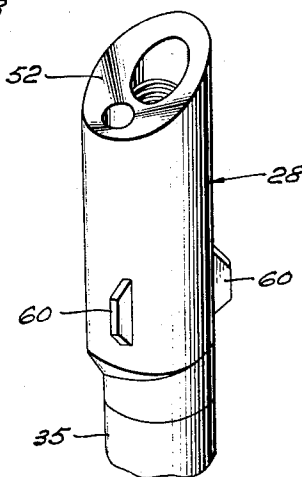


**Fig. 3.**



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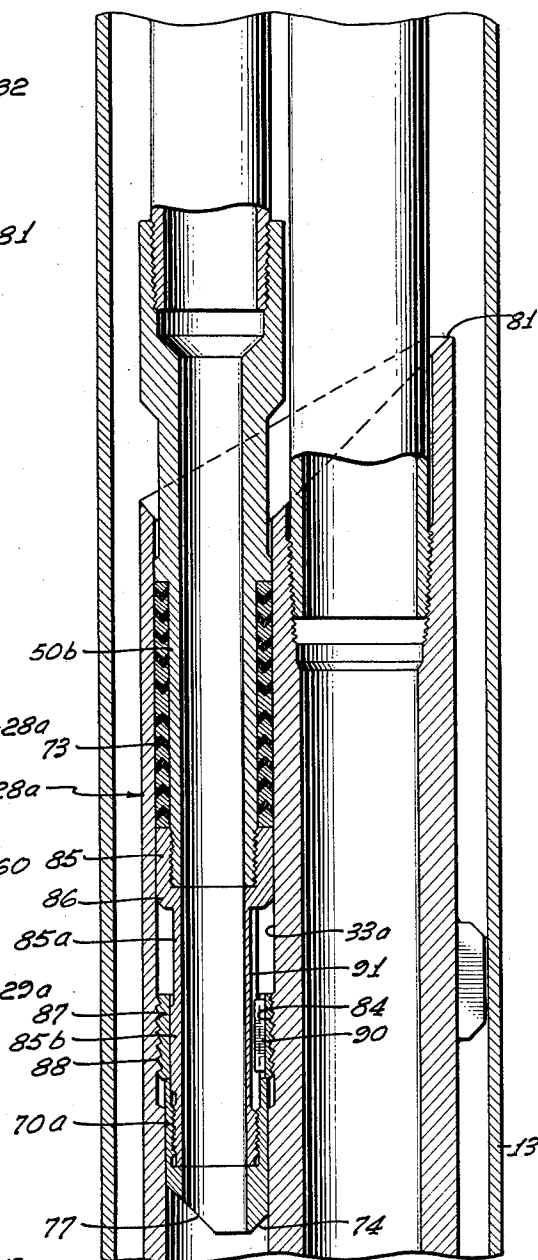
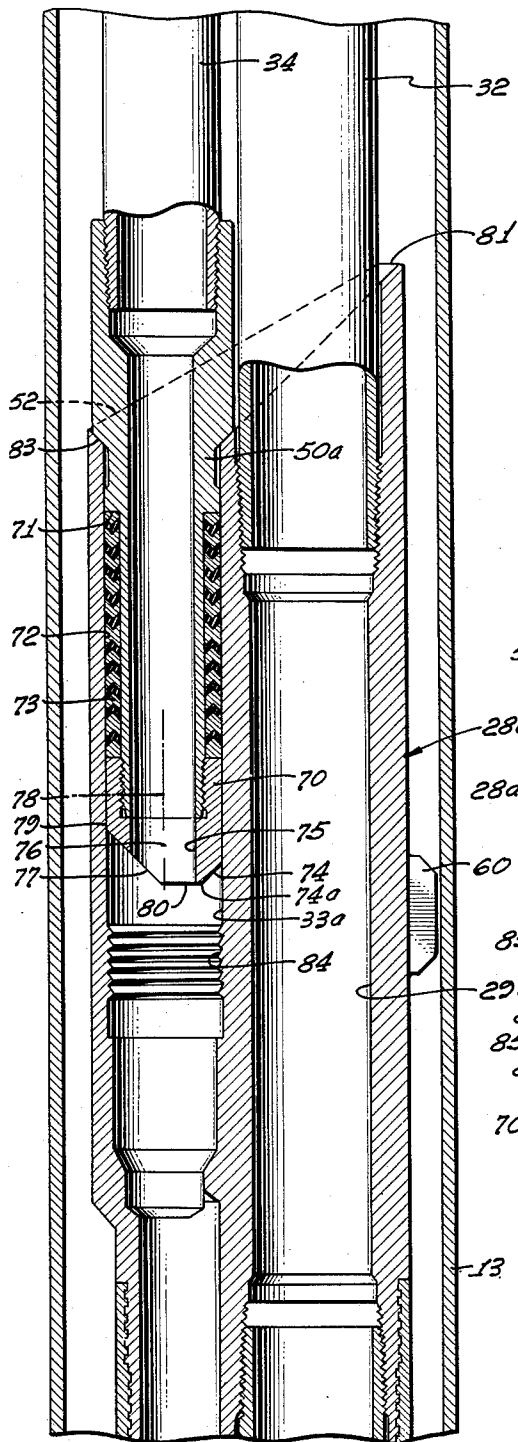
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FIG. 4.

FIG. 5.



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## APPARATUS FOR MULTIPLE ZONE WELL PRODUCTION

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19 Claims. (Cl. 166—114)

The present invention relates to subsurface well tools, and more particularly to apparatus for conveying fluids from a plurality of longitudinally spaced producing zones in a single well bore to the top of the latter.

An object of the present invention is to provide multiple zone production apparatus adapted to convey the well production from different producing zones in a cased well bore through separate tubular strings in the well bore extending to its upper end and arranged alongside one another, in which the formation pressures and the well production itself are prevented from acting on the casing above the uppermost producing zone, thereby preventing the well casing from being subjected to pressures that might be relatively high, and to the corrosive and other deleterious actions of the well bore fluid itself.

Another object of the invention is to provide multiple zone production apparatus adapted to be run in a well bore on a first tubular string to the desired location therein to subsequently conduct production from a lower zone to the top of the well bore, after which a second tubular string is run in the well bore alongside the first tubular string to a desired location to conduct the production from an upper zone to the top of the well bore, assurance being had that the second tubular string will be finally assembled appropriately in the remainder of the multiple zone apparatus while the latter is in the well bore.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of several forms in which it may be embodied. Such forms are shown in the drawings accompanying and forming part of the present specification. These forms will now be described in detail, for the purpose of illustrating the general principles of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

FIGURE 1 is a somewhat diagrammatic longitudinal section through one form of the apparatus disposed in a cased well bore;

FIG. 2 is an isometric projection of a portion of the apparatus disclosed in FIG. 1;

FIG. 3 is an isometric projection of the upper portion of the apparatus disclosed in FIG. 1;

FIG. 4 is an enlarged longitudinal section through a modified form of apparatus adapted to be embodied in the organization disclosed in FIG. 1;

FIG. 5 is a view similar to FIG. 4 of another modified form of apparatus.

As disclosed in the drawings, a well bore 10 has been drilled through a plurality of longitudinally spaced producing zones 11, 12, and a well casing 13 has been run in the well bore, suitable cement 14 being deposited around the casing between the upper and lower zones 11, 12 to

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prevent fluids from migrating externally of the casing between such zones, cement 13 also being deposited around the casing immediately above the upper zone 11 to prevent fluid from the upper zone or from regions in the well bore thereabove from communicating with each other. The casing 13 has a lower set of openings or perforations 15 establishing communication with the lower zone 12, and an upper set of openings or perforations 16 establishing communication between the interior of the casing and the upper zone 11.

A suitable barrier or well packer 17 is set in packed-off condition in the well casing between the upper and lower perforations 16, 15, as adjacent the lower perforations, and an upper packer or barrier 18, of any suitable type, is set in packed-off condition in the well casing above and preferably adjacent the upper perforations 16. Each of the packers may be of any type desired. As an example, they may be of the type disclosed in United States Patent No. 2,189,703, which can be anchored in packed-off condition in a well casing against longitudinal displacement in both directions therewithin. The lower packer 17 has a central passage 19 of a diameter sufficient to permit a tubing member 20 to extend therethrough, there being suitable seal elements 21 on the exterior of the tubing member that will seal with the inner wall of the packer 17, to prevent flow of fluid through the lower packer around the tubing. Instead, the production from the lower zone 12 entering the well casing through the lower perforations 15 will pass into the tubing string 20 and will be conveyed therethrough in an upward direction. This tubing string 20, when disposed in the well packer, engages a flapper valve 22 suitably pivotally carried on the well packer, to displace it to one side out of engagement with a companion seat 23 on the well packer.

The tubing string 20 also extends through the central passage 24 of the upper packer 18, which packer has a much greater diameter than the passage 19 through the lower packer, to permit a relatively large space 25 to exist between the exterior of the tubing and the wall of the well packer 18. This tubing string 20 extends upwardly to the desired extent, its upper end being constituted as a threaded pin 26 threadedly secured to a companion threaded box 27 in a dual head 28 having a first longitudinal passage 29 therein communicating with the tubing 20 therebelow. The upper portion of this passage 29 is constituted as a threaded box portion 30 of the head adapted to receive the lower threaded pin 31 of a first tubular string 32 that extends upwardly in the well casing to the top of the hole. It is by means of the first tubular string 32 that the dual head 28 and the tubing 20 depending therefrom are lowered in the well casing 13.

The first longitudinal passage 29 through the dual or multiple passage head 28 is disposed to one side of the head, which has a second longitudinal passage 33 extending therethrough on its other side, which is adapted to receive a second tubular string 34 which can be disposed alongside and in generally parallel relation to the first tubular string, and extend to the top of the hole. This second passage 33 opens in a downward direction into an outer tubing 35 in which the other or inner tubing 20 is disposed, the outer tubing having an upper threaded box 36 receiving a threaded pin portion 37 on the multiple head that is disposed outwardly of the longitudinal passages 29, 33.

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The lower portion 35a of the outer tubing 35 is piloted into the upper packer 18 to the extent determined by engagement of a lower shoulder 38 on the tubing with the upper portion of the upper packer, there being a suitable sealing element 39 between the outer tubing 35a and the packer 18 to prevent fluid passing upwardly through the larger passage 24 in the upper packer from leaking externally around the outer tubing string 35. The outer tubing string 35 has a substantially greater diameter than the inner tubing string 20, to provide a large space 40 therebetween through which fluid can flow. Such fluid will flow from the upper zone 11 through the casing perforations 16 into the casing between the packers 17, 18, and thence upwardly into the lower end of the packer passage 24 and the outer tubing 35.

The inner tubing string 20, when disposed through the packers 18, 17, will engage and hold a flapper valve head 41, pivotally carried by the lower portion of the upper packer 18, to one side of a companion valve seat 42 on the lower end of the upper packer. When the inner tubing string 20 is withdrawn, both the upper and the lower flapper valve heads 22, 41 can move upwardly into engagement with their respective seats 23, 42 to prevent the production from both the upper and lower zones 11, 12 from passing upwardly through the packers.

The inner tubing 20 is secured to the lower portion of the dual head 28, which is also true of the outer tubing 35, the inner tubing and outer tubing being of an adequate length so as to allow the lower end 35a of the outer tubing to be disposed within and in a coaxial relation to the upper packer passage 24. The upper portion 20b of the inner tubing is arranged eccentrically of the outer tubing 35, which should be of a length to allow the inner tubing 20 to deflect sufficiently toward the axis of the outer tubing 35 and pass through the upper packer 18, and to assume a coaxial position within the passage 19 through the lower packer 17. As an example, if the inner tubing 20 is two and one-half inches in diameter, and the well casing 13 is seven inches in outside diameter, the outer tubing string 35 can be of the order of about fifteen to twenty feet, and will provide a corresponding length of inner tubing 20 between the head 28 and packer 18 capable of deflecting sufficiently from its upper end 20b toward the axis of the outer tubing 35 and pass through the upper passage 24.

The well packers 17, 18 have been installed in appropriate position in the well casing 13, and the dual head 28, with the inner and outer tubing strings 20, 35 attached thereto, is then lowered in the well casing on the first tubular string 32, that extends to the top of the hole, until the inner tubing 20 passes through both passages 24, 19 in the packers 18, 17, shifting their flapper valves 41, 22 from their respective seats 42, 23 to passage opening position. The combination of tubings will come to rest when the shoulder 38 on the outer tubing 35 engages the upper end of the upper packer 18, at which time its lower portion 35a will be appropriately sealed in the upper packer, and the seal elements 21 on the inner tubing will be appropriately sealed within the lower packer passage 19.

The second tubular string 34 is then run in the well casing down alongside the first tubular string, its lower end 50 being adapted to be received in a counterbore or box 51 in the upper portion of the head and the second longitudinal passage 33. To insure appropriate guiding of the lower end 50 of the second tubular string 34 into this bore or box, the upper end 52 of the head 28 is inclined, being funnel or frusto-conical in shape, the surface 52 diverging in an upward and outward direction, and being formed about the axis of the second passage 33 as a conic axis. Thus, the guiding surface 52 will be inclined in a downward direction from the first passage 29 toward the second passage 33, and any point along the surface 52 which is engaged by the lower end 53 of the second tubular string 34 will guide such lower end down-

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wardly toward and into the second passage 33, the second tubular string 34 coming to rest when its lower end 53 engages a companion stop or seat 54 in the passage. The lower portion or mandrel 50 of the second tubular string may be provided with a suitable sealing element 55 adapted to engage the inner wall of the counterbore 51, and prevent leakage between the tubing 50 and such wall.

It is evident that the production from the lower zone 12 will pass through the lower perforations 15 and into the inner string of tubing 20, flowing upwardly there-through into the first longitudinal passage 29 of the multiple head, and thence upwardly into the first tubular string 32 to the top of the hole. The production from the upper zone 11 can pass through the upper perforations 16 in the casing, flowing around the inner tubing 20 into the passage 24 through the upper packer and into the outer string of tubing 35, which is in communication with the second longitudinal passage 33 through the dual head 28, the fluid flowing from such passage into the second tubular string 34 to the top of the well bore. By virtue of the arrangement disclosed, the pressure from the lower zone 12 is prevented from being imposed on the well casing 13 above the lower packer 17, whereas the pressure from the upper zone 11 is prevented from being imposed on the casing above the upper packer 18. The production from each zone will pass through its own individual string of tubing to the top of the hole, and will not come into contact with any portion of the casing above the lower packer 17, in the case of the lower zone production, and above the upper packer 18, in the case of the upper zone production. Not only is lack of contact assured, but the formation pressure is also prevented from acting on the well casing. These factors insure long life of the casing, since any corrosive substances in the producing fluid are prevented from contacting the casing.

The harmful effects of the well bore fluid interiorly of the well casing and above the upper well packer are imposed only upon the tubing strings 32, 34 themselves and the head 28 and its associated tubular members, which, if need be, can be removed from the well casing and reconditioned or replaced readily.

For facilitating the coaxial disposition of the multiple head 28 and the outer tubing 35 attached thereto within the well casing 13, to insure the insertion of the pilot portion 35a of the outer tubing into the upper packer 18, the head 28 may be provided with casing centering devices 60 in the form of circumferentially spaced lugs, or the like, welded or otherwise suitably secured to the exterior of the head. These lugs 60 will tend to space the main portion of the head 28 from the wall of the casing, to hold it in a substantially coaxial position, while at the same time they provide ample clearance space between the head 28 and the wall of the well casing to facilitate longitudinal movement of the apparatus through fluid that might be present in the well casing.

With the arrangement heretofore described, the first longitudinal head passage 29, and the inner tubing string 20 can have a full inside diameter or full opening throughout their length, in order to prevent any restriction to flow or fluid therethrough, or the passage therethrough of other apparatus that it might be desired to run through the tubing strings 32, 20 and into the well casing below the lower end of the tubing 20.

In the form of invention disclosed in FIG. 4, the multiple passage head 28a is somewhat longer than the head 28 illustrated in FIGS. 1 to 3, inclusive, to provide longer first and second longitudinal passages 29a, 33a therein. This head has the same upper and lower portions as the other head, as well as the centering lugs 60, and is connectible to the first tubular string 32, and the inner and outer strings of tubing 20, 35 in the same manner as the other form of invention. However, the lower portion of the second tubular string 34 and the

second longitudinal passage 33a contain certain differentiating features.

As shown in FIG. 4, the lower portion 50a of the second tubular string 34 is constituted as a tubular mandrel having a lower generally cylindrical guide 70 threadedly secured thereto. This guide has substantially the same outside diameter as the inside diameter of the second passage 33a, the mandrel portion immediately above the guide being reduced in diameter to provide a downwardly facing shoulder 71 opposed to the upper end of the guide, defining an elongate peripheral groove 72 carrying a sealing ring assembly 73 adapted to seal against the periphery of the reduced diameter mandrel portion and the inner wall of the second passage 33a. The lower end 74 of the guide 70 is beveled or tapered in a downward and inward direction, such taper being formed in a lathe, with the lower end 74a of the taper extending no further inwardly than the inner surface 75 of the central passage 76 through the guide. However, the guide 70 is cut away at a substantial angle to the vertical, which, for example, may be forty-five degrees, to provide a tapered flat surface 77, extending from the axis 78 of the guide in an upward and outward direction to its periphery 79. The lower tapered surface 77 lies in an inclined plane, with its uppermost end extending upwardly a substantial distance above the upper end of the other bevel or taper 74.

The tapered guide or shoe portion 70 of the mandrel 50a is provided to prevent the second tubular string 34 from hanging up on the head guide 52 at its outermost portion. Assuming that the second tubular string 34 is lowered in the well casing, the lower end 80 of the shoe, which is disposed at right angles to the axis 78 of the mandrel, may come to rest on the upper edge 81 of the guide. Accordingly, the guide or shoe would not engage the frusto-conical tapered surface 52 on the dual head, which would otherwise steer it into the second passage 33a. However, should the shoe 70 come to rest on the outer edge 81 of the guide, then the turning of the second tubular string 34, as to the right, would cause the lower end 80 of the guide to ride off the edge and the tapered portion 77 of the guide to engage the edge 81. The coaction between this tapered portion 77 and the edge 81 of the guide deflects the shoe 70 inwardly against the frusto-conical or funnel-shaped surface 52 of the head, resulting in its downward movement into the second passage 33a, the mandrel 50a moving downwardly into this passage to the extent limited by engagement of an upper shoulder 83 on the mandrel with the head surface 52.

The dual head disclosed in FIG. 4 also has a left-hand internal thread 84 in its second passage which is not used in conjunction with the specific mandrel and shoe arrangement illustrated in FIG. 4. However, it is used in conjunction with the device shown in FIG. 5.

The dual head 28a disclosed in FIG. 5 is substantially the same as the one shown in FIG. 4. The mandrel 50b consists of the upper portion carrying the seal rings 73, to which the lower tubular portion 85 is secured to hold the seal rings 73 in place on the upper portion. This lower portion has a shoe 70a threadedly secured thereto, which may also have the same tapered guide features 74, 77 described above in connection with FIG. 4. The shoe 70a is spaced longitudinally below an outwardly directed flange portion 86 of the lower mandrel section 85, to accommodate an externally threaded latch sleeve 87 which is split and which is expansible and contractible. The threads 88 on the latch sleeve are companion to the tapered threads 84 on the dual head in the second passage 33a.

The latch sleeve 87 may occupy an upper position on the lower mandrel section 85 opposite a reduced diameter mandrel portion 85a, which will permit the latch sleeve 87 to contract and ratchet freely over the internal threads

84 in the head. When the mandrel 50b is elevated in the second passage 33a, after the sleeve has moved into the internally threaded portion 84 of the second passage, a larger diameter mandrel portion 85b moves within the sleeve to hold it in threaded engagement with the internal threads. An upward pull can now be taken on the second tubular string 34, to maintain it in tension, the second tubular string being prevented from moving out of the head 28a by engagement of the upper end of the shoe 70a with the latch sleeve 87 and by virtue of the threaded engagement of the latch sleeve with the internal threads 84 in the dual head.

In the event it is desired to release and move the second tubular string 34 from the dual head 28a, it need merely be lowered and rotated to the right. It is to be noted that the leading end of the latch sleeve has a key 90 received within a longitudinal keyway 91 in the mandrel. Accordingly, such rotation of the second tubular string and the mandrel to the right will cause the left-hand threaded latch sleeve 87 to thread in an upward direction out of the threaded box 84 to disconnect the mandrel 50b from the dual head 28a, permitting the second tubular string 34 to be moved completely out of the second passage 33a and removed from the well casing.

The inventors claim:

1. In multiple zone well production apparatus: a well casing passing through upper and lower producing zones in a well bore and having upper and lower openings through which production from said upper and lower zones can flow into the well casing; lower barrier means in said casing between said upper and lower openings; upper barrier means in said casing above said upper openings; a head above said upper barrier means and having a plurality of longitudinal passages therethrough; a first tubular string communicating with one of said passages and extending to the top of the casing; a second tubular string communicating with the other of said passages and extending to the top of the casing; inner tubular means engaging said head and lower barrier means and extending through said upper barrier means to said one passage to conduct fluid from the lower zone into said first tubular string; and outer tubular means surrounding said inner tubular means and engaging said head and upper barrier means to conduct fluid from the upper zone into said other passage and second tubular string.

2. In multiple zone well production apparatus: a well casing passing through upper and lower producing zones in a well bore and having upper and lower openings through which production from said upper and lower zones can flow into the well casing; lower barrier means in said casing between said upper and lower openings; upper barrier means in said casing above said upper openings; a head above said upper barrier means and having a plurality of longitudinal passages therethrough; said head having means in one of said passages for securing a first tubular string to said head, said tubular string extending to the top of the casing; inner tubular means connected to said head and extending through said upper barrier means into engagement with said lower barrier means, said inner tubular means communicating with said one passage to conduct fluid from the lower zone into said first tubular string; outer tubular means surrounding said inner tubular means and secured to said head in communication with another of said passages, said outer tubular means being engageable with said upper barrier means to conduct fluid from the upper zone into said another passage; said head having a guide portion tapering downwardly from said one passage to said another passage; and a second tubular string extending to the top of the casing and engageable with said guide portion to be directed by said guide portion into said another passage.

3. In multiple zone well production apparatus: a well casing passing through upper and lower producing zones

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in a well bore and having upper and lower openings through which production from said upper and lower zones can flow into the well casing; lower barrier means in said casing between said upper and lower openings; upper barrier means in said casing above said upper openings; a head above said upper barrier means and having a plurality of longitudinal passages therethrough; a first tubular string communicating with one of said passages and extending to the top of the casing; a second tubular string communicating with the other of said passages and extending to the top of the casing; inner tubular means engaging said head and lower barrier means and extending through said upper barrier means to said one passage to conduct fluid from the lower zone into said first tubular string; and outer tubular means surrounding said inner tubular means and engaging said head and upper barrier means to conduct fluid from the upper zone into said other passage and second tubular string, said head having a guide portion tapering downwardly from one of said passages toward another of said passages, said guide portion being engageable by one of said tubular strings to direct it into said another of said passages.

4. In multiple zone well production apparatus as defined in claim 1; wherein said outer tubular means is disposed substantially coaxial of said casing; the upper portion of said inner tubular means being disposed eccentrically of the casing axis.

5. In multiple zone well production apparatus as defined in claim 3; wherein said outer tubular means is disposed substantially coaxial of said casing; the upper portion of said inner tubular means being disposed eccentrically of the casing axis.

6. In multiple zone well production apparatus: a head adapted to be disposed in a well bore and having a plurality of longitudinal passages therethrough; said head having means in one of said passages for receiving a first tubular string extending to the top of the well bore; said head having means in another of said passages for receiving a second tubular string extending to the top of the well bore; said head having an inclined guide portion tapering downwardly toward one of said passages to guide one of said tubular strings into said one passage when the head is disposed in the well bore; said one of said tubular strings having a shoe thereon provided with a passage opening through the lower end of the shoe, said shoe having a terminal flat tapered portion lying in a plane inclined in an upward and outward direction from a longitudinal plane passing through the shoe passage and parallel to the shoe axis.

7. In multiple zone well production apparatus: a head adapted to be disposed in a well bore and having a plurality of longitudinal passages therethrough; said head having means in one of said passages for securing a first tubular string to said head extending to the top of the well bore and adapted for lowering said head in the well bore and for conducting well production through said one passage and first tubular string to the top of the well bore; said head having means in another of said passages for receiving a second tubular string extending to the top of the well bore; said head having a guide portion tapering downwardly from said one passage to said another passage to guide the second tubular string to said another passage after said head has been lowered in the well bore on the first tubular string; said second tubular string having a shoe thereon provided with a passage opening through the lower end of the shoe, said shoe having a terminal flat tapered portion lying in a plane inclined in an upward and outward direction from a longitudinal plane passing through the shoe passage and parallel to the shoe axis.

8. In multiple zone well production apparatus: a well casing passing through upper and lower producing zones in a well bore and having upper and lower openings through which production from said upper and lower zones can flow into the well casing; lower barrier means

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in said casing between said upper and lower openings having a lower central passage therethrough; upper barrier means in said casing above said upper openings and having an upper central passage therethrough substantially larger in diameter than said lower passage; a head above said upper barrier means and having a plurality of longitudinal passages therethrough; a first tubular string communicating with one of said longitudinal passages and extending to the top of the casing; a second tubular string communicating with the other of said longitudinal passages and extending to the top of the casing; inner tubular means engaging said head and releasably engaging the lower barrier means in communication with said lower central passage and extending through said upper central passage to said one longitudinal passage to conduct fluid from the lower zone into said first tubular string; and outer tubular means surrounding said inner tubular means and engaging said head and releasably engaging the upper barrier means in communication with said upper central passage to conduct fluid from the upper zone into said other longitudinal passage and second tubular string.

9. In multiple zone well production apparatus: a well casing passing through upper and lower producing zones in a well bore and having upper and lower openings through which production from said upper and lower zones can flow into the well casing; lower barrier means in said casing between said upper and lower openings having a lower central passage therethrough; upper barrier means in said casing above said upper openings and having an upper central passage therethrough substantially larger in diameter than said lower passage; a head above said upper barrier means and having a plurality of longitudinal passages therethrough; a first tubular string communicating with one of said longitudinal passages and extending to the top of the casing; a second tubular string communicating with the other of said longitudinal passages and extending to the top of the casing; inner tubular means secured to said head and releasably engaging the lower barrier means in communication with said lower central passage and extending through said upper central passage to said one longitudinal passage to conduct fluid from the lower zone into said first tubular string; and outer tubular means surrounding said inner tubular means and secured to said head and releasably engaging the upper barrier means in communication with said upper central passage to conduct fluid from the upper zone into said other longitudinal passage and second tubular string.

10. A well apparatus adapted to be positioned in a well bore including a lower packer anchored and in sealing engagement with the wall of the bore therein between a lower well formation and an upper well formation, an upper packer within said well bore located above the upper formation for sealing with the wall of the well bore, said packers each having a longitudinal bore extending therethrough, a well assembly including, a body having a pair of longitudinal passages extending therethrough, a tubular extension on the body extending downwardly from said body and in fluid communication with one of the longitudinal passages in said body, an inner conductor communicating with the other of said longitudinal passages in the body and extending downwardly through the body extension to project downwardly therebelow and through the bore of the lower packer, a first tubing string connected to the body and in fluid communication with one of the passages therein, means sealing the lower portion of the inner conductor with the bore of the lower packer, whereby fluid from the area below the lower packer is directed through the inner conductor to that longitudinal passage in communication with said inner conductor, the inner conductor being of such length that when the lower portion of said inner conductor is within the bore of the lower packer, the lower end of the tubular extension is disposed within the bore of the upper packer, means sealing the tubular extension with the bore of the upper packer whereby fluid from

the area between the packers is directed through the extension and to the longitudinal body passage in communication with said extension, a second tubing string adapted to be lowered into the well bore after the assembly is positioned therein, and means for attaching said second tubing string within that longitudinal passage of the body which is not in fluid communication with the first tubing string.

11. A well assembly adapted to be positioned in a well bore which has a lower well packer provided with a longitudinal bore anchored therein between a lower well formation and an upper well formation and also having an upper well packer provided with a longitudinal bore disposed within the well bore above said upper well formation, said well assembly including, a body having two longitudinal passages extending therethrough, a first tubing string connected to said body and in fluid communication with one of said longitudinal passages for lowering said well apparatus into the well bore, a second tubing string, means for attaching the second tubing string to said body after said body is in said well bore, said second tubing string being in fluid communication with the other of said passages when attached to said body, a first tubular member on said body depending therefrom and adapted to extend into the bore of said upper well packer when the assembly is in position in the bore, said tubular member being in fluid communication with one of said passages, sealing means between said first tubular member and the bore of the upper packer, a second tubular member on said body in fluid communication with the other body passage and adapted to extend through the bore of said lower well packer, and means sealing between said second tubular member and the lower well packer.

12. The structure set forth in claim 10, wherein said attaching means which connects the second string to the body includes releasable means whereby the second tubing string is removable from the well bore independently of the first string and the upper packer.

13. The structure set forth in claim 11, including coacting stop means on said first tubular member and said upper well packer for limiting the downward movement of said body and the tubular members relative to said upper well packer whereby said body is located in the well bore above said upper well packer.

14. The combination with a lower well packer set within a well bore and an upper well packer set in the well bore above said lower well packer, said lower well packer having a longitudinal open bore therethrough, said upper well packer having a longitudinal open bore therethrough of an enlarged diameter as compared with the size of the longitudinal open bore through the lower well packer; of a well assembly including, a body having a plurality of longitudinal passages therethrough, a plurality of tubing strings connected to the upper end of said body, each tubing string having fluid communication with one of said longitudinal passages in said body, an outer conductor in fluid communication with one of the passages depending from the body and adapted to extend through and seal with the bore of said upper well packer to establish communication between the area between the packers and one of the longitudinal passages in said body, and an inner conductor in fluid communication with another of said body passages also depending from the body and extending downwardly through and below the outer conductor, said inner conductor being adapted to extend through and seal with the bore of said lower packer to establish communication between the area below the lower packer and that longitudinal passage in said body in fluid communication with said inner conductor.

15. The structure set forth in claim 14, with means for attaching one of said tubing strings to said body after said body has been positioned in the well bore.

16. The method of positioning a flow control assembly in a two zone cased well which is provided with an upper tubular packer and a lower tubular packer which are positioned to separate production from the two zones and

wherein the flow control assembly consists of a body having a pair of longitudinal passages extending therethrough, a tubular extension extending downwardly from the body and in fluid communication with one of said passages, and an inner conductor communicating with the other of said longitudinal passages in said body and extending downwardly through the extension to project therebelow, said method comprising connecting a first tubing string with one of the passages in the body of said flow control assembly and lowering said assembly into the well bore, landing said assembly with said inner conductor extending into the bore of the lower packer and with the lower portion of the tubular extension positioned within the bore of the upper packer, sealing the inner conductor with the bore of the lower packer to direct flow from the area below the packer through the inner conductor and to the passage with which it communicates, sealing the tubular extension with the bore of the upper packer to direct flow from the area between said packers to the passage with which said extension communicates, and finally running a second tubing string into the well and connecting its lower end with that passage of the control assembly which is not connected to the first tubing string.

17. The method set forth in claim 16, with the additional step of subsequently removing one of the tubing strings, and thereafter removing the other tubing string to remove the flow control assembly from the well.

18. In well apparatus adapted to be positioned in a well bore including a lower packer anchored and in sealing engagement with the wall of the bore therein between a lower well formation and an upper well formation, an upper packer within said well bore located above the upper formation for sealing with the wall of the well bore, said packers each having a longitudinal bore extending therethrough, a well assembly including, a body having a pair of longitudinal passages extending therethrough, a tubular extension on the body extending downwardly from said body and in fluid communication with one of the longitudinal passages in said body, an inner conductor communicating with the other of said longitudinal passages in the body and extending downwardly through the body extension to project downwardly therebelow and through the bore of the lower packer, a first tubing string connected to the body and in fluid communication with one of the passages therein, means sealing the lower portion of the inner conductor with the bore of the lower packer, whereby fluid from the area below the lower packer is directed through the inner conductor to that longitudinal passage in communication with said inner conductor, the inner conductor being of such length that when the lower portion of said inner conductor is within the bore of the lower packer, the tubular extension is disposed within the bore of the upper packer, means sealing the tubular extension with the bore of the upper packer whereby fluid from the area between the packers is directed through the extension and to the longitudinal body passage in communication with said extension, a second tubing string adapted to be lowered into the well bore after the assembly is positioned therein, said body having means adapted to be engaged by said second tubing string for guiding said second tubing string within that longitudinal passage of the body which is not in fluid communication with the first tubing string.

19. In a well assembly adapted to be positioned in a well bore which has a lower well packer provided with a longitudinal bore anchored therein between a lower well formation and an upper well formation and also having an upper well packer provided with a longitudinal bore disposed within the well bore above said upper well formation, said well assembly including, a body having two longitudinal passages extending therethrough, a first tubing string secured to said body and in fluid communication with one of said longitudinal passages for lowering said well apparatus into the well bore, a second tubing string, said body having means adapted to be engaged by the second tubing string for guiding said second tubing

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string into fluid communication with the other of said passages after said body is in said well bore, a first tubular member on said body depending therefrom and adapted to extend into the bore of said upper well packer when the assembly is in position in the bore, said tubular member being in fluid communication with one of said passages, sealing means between said first tubular member and the bore of the upper packer, a second tubular member on said body in fluid communication with the other body passage and adapted to extend through the bore of said lower well packer, and means sealing between said second tubular member and the lower well packer.

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