This invention relates to new and useful improvements in well production apparatus and is particularly directed to multiple production packer assemblies.

An object of this invention is to provide a new and improved well packer assembly wherein production can be obtained from three well formations at the same time while using such packer assembly.

An important object of this invention is to provide a triple production packer which includes three packer units adapted to be longitudinally spaced from each other in a well bore for sealing off three formations in a well from each other, with such triple production packer having fluid passage means therein for obtaining separate flow from each of the formations to the surface of the well simultaneously through the triple production packer.

Another object of this invention is to provide a triple production packer wherein three packer units are employed, each of the lower two packer units having an open bore therethrough and each being set in position in a well bore, the upper packer unit being set in position in the well bore and having a fluid passage control means associated with the upper packer unit and extending through the bores of the lower packer units to control the passage of fluid to the surface of the well, whereby flow of well fluid from three separate formations is obtained through the triple production packer to the surface of the well.

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:

Figure 1 is a diagrammatic view illustrating the position of the two lower packer units in a well bore;

Figure 2 is a diagrammatic view illustrating the triple production packer of this invention after the upper packer unit is positioned in the well bore but prior to the setting thereof;

Figure 3 is a view similar to Figure 2, but illustrating the upper packer unit in a set position;

Figures 4A-4L are views, partly in section and partly in elevation, which illustrate the triple production packer of this invention in detail, with Figure 4A being the uppermost portion of the packer and Figure 4L being the lowermost portion of the packer and with the intermediate portions being consecutively designated 4B, 4C, 4D, 4E, 4F, 4G, 4H, 4I, 4K;

Figure 5 is a horizontal sectional view taken on line 5-5 of Figure 4A; and

Figure 6 is a horizontal sectional view taken on line 6-6 of Figure 4A.

In the drawings, the numeral 10 designates the well bore or casing into which the triple production packer of this invention is adapted to be lowered for simultaneously producing from three formations, A, B and C. The triple production packer includes a lower packer unit X, an intermediate packer unit Y and an upper packer unit Z, each of which is adapted to seal with the wall of the well bore or casing 10 to seal off fluid flow between the well formations A, B and C. The packer units X and Y are preferably of the known type which is adapted to be lowered and set in sealing position in the well casing 10 on a tool which is removable from the packer units X and Y after the packer units are set. As will be explained in detail, the upper packer unit Z includes therein with the flow-passage means for directing the fluid flow from the well formations A, B and C are placed in position in the well bore or casing 10 so that simultaneous production from such formations can be obtained, and separate outlets from each of the formations are also obtained at the surface of the well.

In Figures 4J, 4K and 4L, the lower packer unit X includes an upper seal cup 15 and a lower seal cup 16, each of which is formed of a resilient, elastic material such as rubber and each of which is substantially cylindrical in construction. The upper seal cup 15 has an annular outer lip 15a, which is adapted to contact and seal with the lower casing or bore 10, while an inner annular lip 15b is adapted to contact and seal with a tubular flow pipe 20, as will be explained. The lower seal cup 16 is also formed with an outer annular lip 16a and an inner annular lip 16b, each of which extends downwardly instead of upwardly as do the lips 15a and 15b. It will be apparent that fluid pressure from below the packer unit X will cause the seal cup 16 to expand into tight sealing engagement between the well casing 10 and the tubular flow pipe 20, respectively. The same action occurs with the sealing cup 15, except that the sealing is effected by a fluid pressure from above the packer unit X. Between the upper seal cup 15 and the lower seal cup 16, there is mounted an anchoring means or slips 21, which are adapted to engage the well casing 10 in gripping contact therewith. The slips 21 are mounted in a slip housing 22, which is cylindrical in construction and which has windows or openings 22a to permit the slips 21 to move radially or laterally into and out of engagement with the well casing 10. The inner or rear surface of the slips 21 is formed with an upper downwardly and inwardly inclined surface 21a and a lower upwardly and inwardly inclined surface 21b. An upper slip expander 23 is connected to the upper seal cup 15 and extends into the slip housing 22, with the outer conical surface 23a of the slip expander 23 being adapted to move relative to the upper inclined surface 21a of the slips 21 and in contact therewith for urging the slips 21 laterally outwardly into engagement with the casing 10. The connection between the slip expander 23 and the upper seal cup 15 is preferably made with a plurality of hook segments 24, which are formed on the seal cup 15 and which interfit with a hook ring 25. A lower slip expander 26 is similarly connected to the lower seal cup 16 by hook segments 27 mounted on the cup 16 and an annular hook ring 28 connected to the expander 26. The expander 26 is also connected upwardly from the cup 16 and into the slip housing 22 and has an outer tapered or conical surface 26a, which is adapted to engage with the tapered or inclined surface 21b of the slips 21 for expending the slips 21 in a relative movement of the expander 26 relative thereto.

As previously pointed out, the packer unit X is of the known type adapted to be set in position in the well casing by lowering therein on a suitable support such as a wire line, and in that connection a latching device 30 is utilized. It will be understood that the packer unit
X may be set in numerous ways and by any known method so long as the packer unit X provides for a sealing contact with the well casing 10, with an opening or bore through the packer unit being provided for the reception of the tubular pipe 20. Thus, the details of the particular packer unit X form no part of this invention, except as a unit in the entire packer or packer assembly. It should also be understood that, although the packer unit X is shown in Figures 4I, 4K and 4L in a released position, it is actually set in gripping and sealing contact with the well casing 10 prior to the insertion of the tubular pipe 20.

The intermediate packer unit Y is shown in quarter-section in Figure 4E, 4F and 4G and is substantially identical with the packer unit X. Thus, the packer unit Y has an upper seal cup 115 with an outer sealing lip 115a and an inner sealing lip 115b. The lower seal cup 116 includes an outer sealing lip 116a and an inner sealing lip 116b. It will be observed that the thickness of the sealing cups 115 and 116 is slightly less than the thickness of the sealing cups 15 and 16 to provide for a slightly increased external diameter of the tubular pipe 20 at the portion above and in the vicinity of the intermediate packer unit Y. The unit Y also includes slips 121, an upper slip expander 123 and a lower slip expander 125 and a latching device 126 and 130 in the packers X and Y; however, it should be pointed out that in the packer unit Y the upper hook segments 124 extend inwardly from the inner surface of the upper sealing cup 115 to provide a shoulder upon which an annular shoulder 20a on the tubular flow pipe 29 (Figure 4E). The intermediate packer unit Y also includes an additional packing sleeve 31, which is also formed of resilient, elastic material such as rubber and has hook segments 32 which connect with a hook ring 33.

In Figures 4A–4D, inclusive, the upper packer unit Z is illustrated with its connections to the flow passage assembly. The upper packer Z (Figure 4C) includes an annular resilient, elastic sleeve 35, which is formed of rubber or any similar elastic material, and which surrounds a tubular flow pipe 36, which, as will be explained, is actually a continuation of the tubular flow pipe 20. An upper support ring 37 is mounted at the upper end of the packing sleeve 35 by screws or bolts 38 or any similar securing means. A similar lower ring or collar 40 is connected to the lower end of the packing sleeve 35 by screws or bolts 41. The packing sleeve 35 is of the type that is adapted to be expanded into sealing contact between the well casing 10 and the external surface of the flow pipe 36 upon a compression of the sleeve 35 by a movement of the rings or collars 37 and 40 toward each other.

The lower ring or collar 40 is threaded to a tubular connector 42 therebelow, which, in turn, is threaded to a tubular flow port member 43 having one or more laterally extending flow ports 43a therethrough (Figure 4D). The upper end of the flow pipe 20 has an annular enlargement 44, which is connected to the flow port member 43 by a tubular coupling 48. It can therefore be seen that the packing sleeve 35 of the packer unit Z is connected to the upper end of the flow pipe 20, through the members 40, 42, 43, 44 and 45. Since the pin 46 connects the pipe 36 with the connector 42, which is in turn connected to the pipe 20 through members 43, 44 and 45, the packer unit Z is in effect a continuation of the connector 42 and is connected to the outer tubular safety joint section 50 thereabove. The outer safety joint section 50 is connected to an inner tubular safety joint section 51 by a shear pin 52a, which is normally prevented from shearing during the lowering of the packer unit Z by the flow passage control assembly into the well by reason of the contact of the upper end 50a of the outer safety joint sleeve 50 with an outwardly extending annular shoulder 51a on the inner safety joint 51. The upper end of the inner safety joint section 51 is connected to a hydraulic hold-down housing 55, which has a plurality of radial or lateral openings 57a therein for positioning casing gripping members 53, which are in the form of cylindrical pistons having gripping teeth 58a on the outer surface for engaging with the wall of the well casing 10 when a sufficient fluid or hydraulic pressure is exerted on the inner or outer surface 58b thereof.

Normally, the casing gripping members 53 of the hydraulic hold-down means are maintained in a retracted position by springs 54 or any similar resilient means. The upper end of the hydraulic hold-down housing 52 is welded or otherwise secured to a fluid control housing 55 positioned thereabove. The fluid control housing section 56, 57 and 58 forms therein (Figures 4A and 5). The actual relative positions of these passages 56, 57 and 58 are shown in Figure 5, but in Figure 4A the passage 56 has been revolved 30° in a clockwise direction (as viewed from Figure 5 or the top of Figure 4A) for clarity of illustration.

The flow passage 56, 57 and 58 have connected therewith tubing strings 59 and 60, respectively, which extend to the surface of the well and are mounted in any suitable manner in the well head apparatus. The flow passage 57, however, is shown as open at its upper end and communicates with the interior of the casing 10, whereby fluid flow therefrom passes upwardly through the casing and then is discharged at the upper end of the casing through any suitable apparatus. However, if desired, a third tubing string (not shown) may be connected to the passage 57 to conduct flow upwardly to the surface.

Within the flow passage housing 55, a boved passage 55a is provided, which is in fluid communication with the flow passage 56, and is provided with a threaded connection to an inner flow pipe 65. The housing 55 has an enlarged bore below the bore 55a, which is designated 55b and which is in fluid communication with the longitudinally extending annular annular shoulder 51a. The intermediate flow pipe 66 has a threaded connection with an intermediate flow pipe 65. It will be evident that because of the threaded connection of the inner pipe 65 in the smaller bore 55a fluid communication between the flow passages 56 and 57 is prevented, whereby intermingling of fluid in the flow pipes 65 and 66 is thereby prevented.

The flow passage 53 communicates with the area exterior of the flow pipe 66 by means of a flow passage 67 in the housing 55, which, in turn, communicates with the bore 52a of the hold-down housing 52. The bore 52a of the housing 52 is of a greater internal diameter than the external diameter of the intermediate flow pipe 66, so that fluid may flow therebetween and be discharged upwardly through the passages 67 and 58 to the tubing string 60.

The intermediate flow pipe 66 extends downwardly from its threaded connection in the enlarged bore 55b to a point just below the flow ports 43a (Figure 4D). An annular portion of the intermediate flow pipe 65 is located on the inner surface of the flow port member 43 and is retained in position by a collar 71 therebelow, which is threaded on the inner surface of the member 43, whereby the seal ring or packing 70 maintains a fluid seal between the external surface of the intermediate flow pipe 66 and the flow port member 43 below the port or ports 43a. The inner pipe 65 extends from its threaded connection
with the smaller bore 55a downwardly through the upper packer unit Z and through the intermediate packer unit Y, with the lower end being below the ports 73 in the outer flow pipe 20 (Figure 4H). The lower end of the inner flow pipe 65 carries an annular seal ring or packing 74, which is maintained in position by an annular packing nut 75, so that a fluid seal is obtained between the external surface of the inner flow pipe 65 and the inner surface of the inner flow pipe 70 below the ports 73. As previously pointed out, the outer flow pipe 20 actually is connected through various members to the flow passage housing 55, and it extends downwardly from the outer flow pipe extension 36 to a point below the lower packer unit X (Figure 4L). The outer flow pipe 20 is provided with perforations or openings 76, which extend therethrough for permitting fluid to enter the bore or interior of the outer flow pipe 20.

From the foregoing it will be evident that the flow control or flow passage assembly basically comprises the housing 55 having the passages 56, 57 and 58 therein; the downwardly extending conductors 65, 66 and the conductor formed by the pipes 36, 42, 45 and 20 are attached to the housing and coact to provide the means for establishing communication between the producing areas and the passages in the housing. When the apparatus is employed for controlling flow from only two zones instead of three, one of the passages in the assembly, one of the conductors, as well as one of the packers, may be omitted.

Although the safety joint shown in Figure 4B is not essential to the device, since it could be replaced with a tubular extension connected between the hydraulic hold-down housing 52 and the outer flow pipe extension 36, it is very desirable to have the safety joint in the device because, should the packers become stuck in the well casing 10 after use, the inner pipe 65, the intermediate pipe 66 and all of the device above the safety joint, including the packer units X and Y, may be removed or so provided to provide an open bore in the outer tubular pipe 20, so that a fishing operation can be performed to effect the removal of the upper packer unit Z and the outer pipe 20 attached thereto, and thereafter the intermediate packer Y and the lower packer unit X can be removed. As previously mentioned, the safety joint includes an inner tubular section 50 and an inner tubular section 51, which are ordinarily connected together by a shear pin 52. The inner tubular section 51 is formed with a T-shaped slot 51b in its external surface (Figure 7) into which fits an inwardly extending pin or lug 50b. Thus, in the event that the packers become stuck in the well bore below the housing 55 on the tubing strings 59 and 60, the housing 55 can be turned to the left or counter-clockwise (as viewed from top of Figure 4B) by turning the tubing strings 59 and 60 at the surface of the well, so as to move the pin 50b into the open longitudinal portion 51c of the slot 51b, whereby the inner tubular section 51 is separated and completely released from the outer tubular section 50 as the housing 55 is raised in the well casing. As such inner tubular member or section 51 is raised away from the outer section 50, the housing 55 carries therewith the inner flow pipe 65, the intermediate flow pipe 66 and all other parts attached thereto, including the hold-down means or gripping members 53. Thus, it can be seen that the only thing remaining in the well would be the outer tubular pipe 20 and the packer units X, Y and Z, which can be readily removed by conventional fishing tools.

In the operation or use of the triple production packer of this invention, the lower packer unit X is first set in position in the well casing 10 (Figure 1), and thereafter the intermediate packer unit Y is set in position in the casing 10, such packer being blanked and, if necessary, lowered or retracted from the well to leave only the packer units X and Y in the well casing 10 with the open bore through each of them. It will be observed that such packer units X, Y and Z are so positioned therethrough that the lower packer unit X is below the lower well formation A and below the second well formation B, while the intermediate packer unit Y is above the second well formation B and below the upper well formation C.

Thereafter, the rest of the triple production packer of this invention is lowered in the well casing 10, as illustrated diagrammatically in Figure 2 so that the parts are then in the position shown in Figures 4A-4L, except that the lower packer unit X and the intermediate packer unit Y are in the set position, in which case the slips 21 of the lower packer unit X and the slips 121 of the intermediate packer unit Y are in gripping engagement with the well casing to prevent movement thereof. The downward travel of the outer tubular flow pipe 20 is stopped when the annular shoulder 20a thereon contacts the annular abutment provided by the locking segment 124 on the intermediate packer unit Y (Figure 4E). During such lowering it will be appreciated that the upper packer unit Z is in its retracted position (Figures 2 and 4C). The shear pin 46 prevents the packer unit Z from being set during the lowering operation. When the upper packer unit Z and its connected flow passages or pipes are in the position shown in Figure 2, with the packer Z being above the upper well formation C, a downward force is applied to the flow passage housing 55, which is transmitted to the outer pipe extension 36 to hereby shear or sever the shear pin 46 to thereby permit movement of the inner pipe 65, the intermediate pipe 66 and the outer tubular extension 36 downwardly relative to the outer tubular pipe 20, since the pipe 20 is supported on the seal provided by the locking segments 124. Such downward movement results in the contact of the lower annular shoulder 50c at the lower end of the outer safety joint section 50 with the upper annular end or shoulder 37a of the retaining ring or collar 37 on the upper end of the packer sleeve 35. When such contact of the shoulders 50c and 37a occur, continued downward movement of the tubular extension 36 relative to the outer pipe 20 results in the application of a compressive force to the sleeves 35 to distort or expand the same into sealing engagement with the well casing 10 and the outer surface of the tubular extension 36. It will be observed that, during such downward movement, the by-pass openings 48 move below the seal sleeve 35 and are thereby closed, but it will be appreciated that, prior to the actual shearing of the shear pin 46, the by-pass passages 48 direct the fluid flow through the outer tubular pipe 20 upwardly between such pipe 20 and the intermediate pipe 66 for discharge through the openings 48 to thereby permit the lowering of the pipe 20 and the apparatus connected thereto into its position shown in Figure 2.

When the packer Z has thus been expanded or set in sealing contact with the well casing 10 and the tubular extension 36, then all of the packer units X, Y and Z are in sealing position, and the well formation A, B and C are sealed off from each other (Figure 3). The necessary well head apparatus is then connected at the surface of the well to the tubing strings 59 and 60 so as to close the casing, except for the discharge from the casing through the passage 57 in the device. The mud pressure on the well is then released to permit the formation to flow, so that well fluid then flows from the well formation A through the perforations or openings 76 in the outer flow pipe 20 upwardly through the inner pipe 65 to the bore 55a and passage 57 for delivery through the tubing string 59 to the surface of the well. The well fluid from the well formation B flows through the opening 73 into the annular space between the outer flow pipe 20 and the inner flow pipe 65 for transmission to the bore 55a and the passage 57, whereby it is delivered to the casing above the tool for discharge at the surface of the well from the usual control apparatus.
The well formation C discharges its fluid into the ports 43a for fluid flow upwardly through the bore 52a of the hold-down housing 52, the flow passages 67 and 58 and thence to the tubular 43b for upward fluid discharge to the surface of the well. It will thus be apparent that each of the formations is produced through the packer device of this invention, and the fluid from each of the three formations is carried to the surface of the well through separate outlets, so that there is no intermingling or mixture of the well fluids from the several formations.

As the fluid from the upper formation C flows through the bore 52a as the hold-down housing 52, the fluid pressure acting on the inner surfaces 53b of the casing gripping members 53 of the hydraulic hold-down means acts to urge such members 53 outwardly against the action of the springs 54, so that they engage the well casing 10. This prevents the inadvertent release of the upper packer unit Z in the event that the pressure in formation C becomes excessive to the point of tending to lift the upper packer unit Z and its associated parts. It will be evident that the inner surfaces 53b of the members 53 are exposed to the pressure from the well formation C, while the external surfaces of said members 53 are exposed to the pressure from the well formation B, which pressure, as has been explained, is conducted through passage 57 into the area above the well packer. So long as the pressure from formation B acting against the exterior of the slips is greater than the pressure from area C, the slips would of course be retracted but at such time this same pressure would be tending to hold the upper packer downwardly. Therefore, it is only when pressure from formation C exceeds the pressure from formation B that the hold-down members 53 are necessary and at such time the differential across the slips will cause them to engage with the casing 10.

When it is desired to remove the triple production packer from the well casing 10, the flow of well fluid from the well formations may first be stopped by pumping heavy drilling mud into the well casing and the tubing strings 59 and 60. Then the tubing strings 59 and 60 are raised to lift the flow passage housing 55 upwardly. Since the fluid flow through the ports 43a has been stopped, the hydraulic hold-down members 53 are released and do not prevent the upward movement of the assembly. The raising of the housing 55 raises the outer tubular extension 36 so as to cause the shoulder 47a to contact the shoulder 48a (Figure 4C) to move the released upper packer unit Z and the outer flow pipe 20 completely so as to leave only the intermediate packer unit Y and the lower packer unit Z in the casing 10. Thereafter, the intermediate packer unit Y can be removed in a known manner with any known retrieving tool. After the intermediate packer unit Y is removed, then the lower packer unit X is removed in the same manner as the intermediate packer Y.

In the event that the raising of the housing 55 through the tubing strings 59 and 60 does not release the upper packer unit Z, then the safety joint (Figure 4B) described above, can be actuated to apply a jarring force to attempt to release such upper packer unit Z, and, if the jarring action fails to release the packer unit Z, then the safety joint can be disconnected by turning the housing 55 to permit the removal of the inner tubular section 51 of the safety joint from the outer tubular section 50 of the safety joint, whereby everything is removed from the casing 10, except the upper packer unit Z, the outer tubular pipe 20 and the packer units X and Y. Such parts can be then removed with a conventional fishing tool.

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, without departing from the spirit of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A well production apparatus including, a lower packer unit adapted to be set within a well and having a bore extending therethrough, an intermediate packer unit adapted to be set within the well at a point above the lower unit and also having a bore extending therethrough, a first flow conductor extending downwardly in the well bore, a flow control assembly connected with the first flow conductor and adapted to be lowered into the well below said conductor, an upper packer unit mounted upon the flow control assembly and adapted to be set within the well at a point above the intermediate packer, said control assembly having a tubular flow conduit extending downwardly from the upper packer unit and projecting through the bores of the intermediate and lower packer units in sealing engagement therewith when the upper packer unit is in set position whereby said packer units seal off from each other three distinct fluid producing areas within the well, a second flow conductor connected with and extending upwardly from the flow control assembly to the well surface, a first passage means within the flow control assembly for establishing communication between one of the fluid production areas sealed off by the three packer units and the first flow conductor, a second passage means in the control assembly for establishing communication between the second of said producing areas and the second flow conductor, a third passage means in the control assembly for establishing communication between the third of said producing areas and the area in the well bore above the uppermost packer unit, whereby the flow from each area is conducted to the surface without intermingling with the flow from the other areas.

2. A well production apparatus including, a lower packer unit adapted to be set within a well and having a bore extending therethrough, an intermediate packer unit adapted to be set within the well at a point above the lower packer unit and also having a bore extending therethrough, a first flow conductor extending downwardly in the well bore, a flow control assembly connected with the first flow conductor and adapted to be lowered into the well below said conductor, an upper packer unit mounted upon the flow control assembly and adapted to be set within the well at a point above the intermediate packer, said control assembly having a tubular flow conduit extending downwardly from the upper packer unit and projecting through the bores of the intermediate and lower packer units in sealing engagement therewith whereby said packer units seal off from each other three distinct fluid producing areas within the well, a second flow conductor connected with and extending upwardly from the flow control assembly to the well surface, a first passage means within the flow control assembly for directing the flow from the area below the lower packer unit to one of the flow passages, additional means in said assembly for directing flow from the area between the intermediate and lower packer units to the second flow passage, and means also in the flow control assembly for directing the flow from the area between the intermediate and upper packer units to the third passage.

3. A well production apparatus as set forth in claim 1, together with a detachable connection between the flow control assembly and the upper packer unit whereby the flow control assembly and the first and second flow conductors connected therewith may be removed from the well bore independently of the upper packer unit and its depending conduit.

4. A well production apparatus as set forth in claim 2, together with a detachable connection between the flow control assembly and the first and second flow conductors connected therewith may be removed from the.
Well bore independently of the upper packer unit and its depending conduit.

A well production apparatus including, a lower packer unit having a bore extending therethrough, an intermediate packer unit also having a bore extending therethrough and spaced above the lower packer, a first flow conductor adapted to be run into the well, a combined upper packer unit and flow control assembly connected with said first flow conductor and the area below the lower packer to seal therewith to set the upper packer unit above the intermediate packer unit, said combined flow control assembly and upper packer unit having a downwardly extending flow conduit which projects through the bores of the intermediate and lower packers in sealing engagement therewith, a second flow conductor connected with and extending from the flow control assembly to the surface, and passage means independent of each other in said control assembly for directing flow from the areas sealed off by the packer units to the first and second conductors and to the area in the well bore above the upper packer unit.

6. A well production apparatus including, a lower packer unit adapted to be set within a well to seal with the wall thereof, said packer having a bore therethrough, a flow conductor adapted to be run into the well to extend therein, a combined flow control assembly and upper packer unit set in the well bore above said lower packer, means communicating said inlet with the flow control assembly, said conduit having a second inlet which is located intermediate the packers for admitting fluid from the area between the packers, means communicating the second inlet with flow control assembly, means extending from the flow control assembly for bringing flow to the surface, means for conducting flow to the surface, means for conducting fluid from the upper end of the depending outer conduit and upper packer unit set in the well bore above said lower packer, means for conducting the fluid to the surface, means for conducting fluid from one of the fluid inlets and the flow conductor, and a second passage means in the flow control assembly establishing communication between the other fluid inlet and the means for conducting flow to the surface, whereby flow from said first area below the lower packer and the second area between the packers may occur simultaneously and without intermingling.

7. A well production apparatus including, a lower packer unit having a bore extending therethrough and adapted to seal with the wall of the well, a first flow conductor, a flow control assembly connected with the conductor, an upper packer unit mounted on the control assembly and adapted to be set at a point above the lower packer unit, said upper packer unit having an outer flow conduit depending therefrom and projecting through the bore of the lower packer unit in sealing engagement therewith, said outer flow conduit having a fluid inlet located below the lower packer unit for conducting fluid upwardly therefrom from the area below the lower packer unit, said flow control assembly having flow conduit connected therewith and extending partially within the upper packer unit and the depending outer flow conduit and which has sealing engagement with the bore of said depending outer conduit whereby flow from the lower end of the depending outer conduit is directed into the inner conduit, said depending conduit having a fluid inlet between the upper and lower packer units for directing flow from the area between the packer units into said depending conduit above the seal with the inner conduit, means for conducting the fluid from the inner conduit to the surface, a first passage means in the control assembly establishing communication between the inner conduit and the upper packer unit set in the well bore, means for conducting the fluid to the surface, means for conducting fluid from the upper end of the depending outer conduit to the surface and a second passage means in the control assembly establishing communication between said outer conduit and the last named means for conducting fluid to the surface.

8. A well production apparatus as set forth in claim 7, together with a detachable connection between the flow control assembly and the upper packer unit whereby the flow control assembly and inner conduit may be removed with the flow conductor independently of the upper packer unit and its depending conduit.

9. The method of producing well fluids from a well having a trio of fluid producing zones which includes, setting a lower packer unit having a bore therethrough within the well bore above a first producing zone and below a second producing zone, setting an intermediate packer unit having a bore therethrough within the well bore above the second producing zone and below a third producing zone, thereafter lowering into the well on first and second flow conductors a combined flow control assembly and upper packer unit having a depending flow conduit means provided with a plurality of flow passages, setting said upper packer above the third producing zone and projecting said flow conduit means through the bores of the intermediate and lower packers to seal therewith when the upper packer is set, one of said passages in said flow conduit means establishing communication between the lower packer unit and the flow conductors, another of said flow passages in said flow conduit means establishing communication between the area between the intermediate and lower packers and the well bore above the upper packer unit, and a third one of said flow passages in said flow conduit means establishing communication between the area between the intermediate and upper packers and the second flow conductor.

10. A well production apparatus including, an upper packer unit, an intermediate packer unit, a lower packer unit, means for setting the packers within a well bore in spaced relation to separate a first, a second and a third producing zone, a flow control assembly within the well bore above said producing zone, a flow conduit connected with the flow control assembly and extending downwardly therefrom through and sealing with the interiors of all three packer units, said flow control assembly including a housing having three discharge passages in its upper portion, a first tubing string connected to one of the discharge passages, a second tubing string connected to the second discharge passage, the third discharge passage having its upper end in communication with the area within the well bore above the upper packer unit, an inner flow conduit disposed concentrically within the outer flow conduit and also depending from the control assembly, the outer conduit having an inlet for admitting well fluids from one of the producing zones into said conduit, passage means in the control assembly establishing communication between the outer conduit and one of the tubing strings or area above the upper packer unit, the inner conduit having an inlet for admitting well fluids from another of said tubing zones, passage means in the control assembly establishing communication between the inner conduit and the control assembly and outer conduit and the discharge passages, the third discharge passage having its upper end in communication with the area within the well bore above the upper packer unit, the inner conduit and second of the tubing strings or area above the upper packer unit depending upon which string or area the outer conduit communicates with, and a third passage means in the control assembly establishing communication between the third producing zone and the tubing string or area above the upper packer unit which is not in communication with either of the other two producing zones.

11. A well production apparatus as set forth in claim 10, together with a releasable connection between the control assembly and the well packer units, whereby said assembly including its housing and the depending inner and outer conduits may be removed independently of the well packer units.

12. A well production apparatus including a lower packer unit having a bore extending therethrough and set within the well bore, a combined flow control assembly and upper packer unit set in the well bore above said
lower packer unit, a first tubing string connected with said combined assembly and packer unit and extending to the surface, a downwardly extending flow conduit connected with said combined flow control assembly and upper packer unit, which conduit projects through the bore of the lower packer unit in sealing engagement therewith, said flow conduit having an inlet in its lower portion communicating with the area below the lower packer whereby well fluid is conducted upwardly to the flow control assembly, passage means in said assembly establishing communication between the flow conduit and the first tubing string, a second flow conduit projecting downwardly from the combined flow control assembly and upper packer unit and having an inlet which is in communication with the area between the packer units whereby flow from this area may enter said second flow conduit; a second well tubing connected with the flow control assembly and extending to the surface, and passage means in said assembly establishing communication between the second flow conduit and the second tubing string.

13. A well production apparatus as set forth in claim 12, together with a detachable connection between the flow control assembly and the upper packer unit whereby said flow control assembly may be removed from the well bore independently of said upper packer unit.

14. The method of producing well fluids from a plurality of fluid producing zones which includes, setting a lower packer unit having a bore therethrough within the well above a first producing zone and below a second producing zone, thereafter lowering on a first tubing string a combined flow control assembly and upper packer unit and setting said upper packer above the second producing zone, projecting a flow conduit which extends from the flow control assembly through the bore of the lower packer to seal therewith, establishing communication between the area below the lower packer unit through said flow conduit and through the packer unit to said first flow conductor, connecting a second tubing string to the flow control assembly, and establishing communication between the second string and the area intermediate the packers whereby flow from this area is conducted to the surface through said second string.

15. The method as set forth in claim 14 wherein the first and second tubing strings are connected with the combined flow control assembly and upper packer unit and are lowered simultaneously to position said assembly and said packer within the well bore.

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