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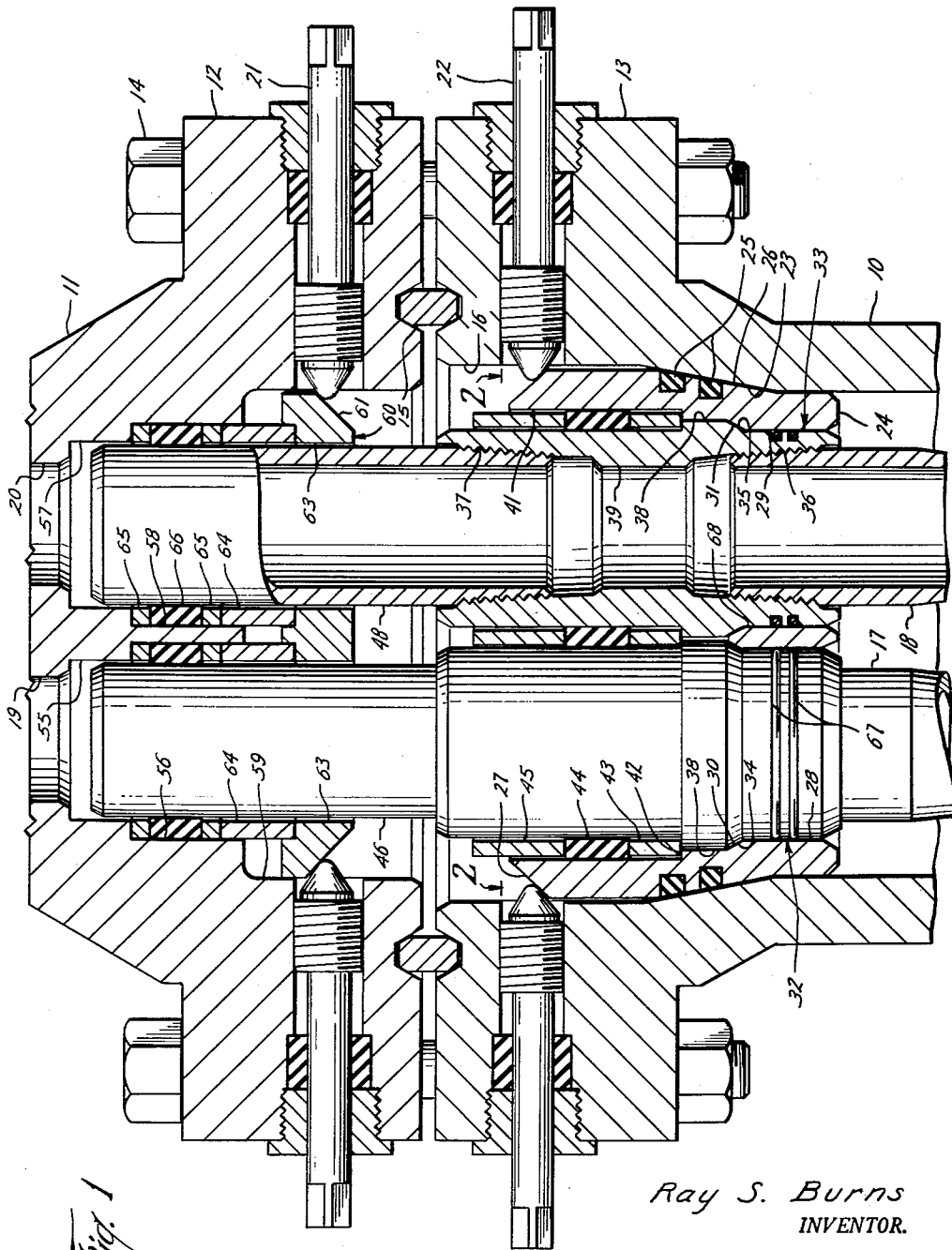
R. S. BURNS

3,011,804

DUAL WELL COMPLETION APPARATUS

Filed July 9, 1956

6 Sheets-Sheet 1



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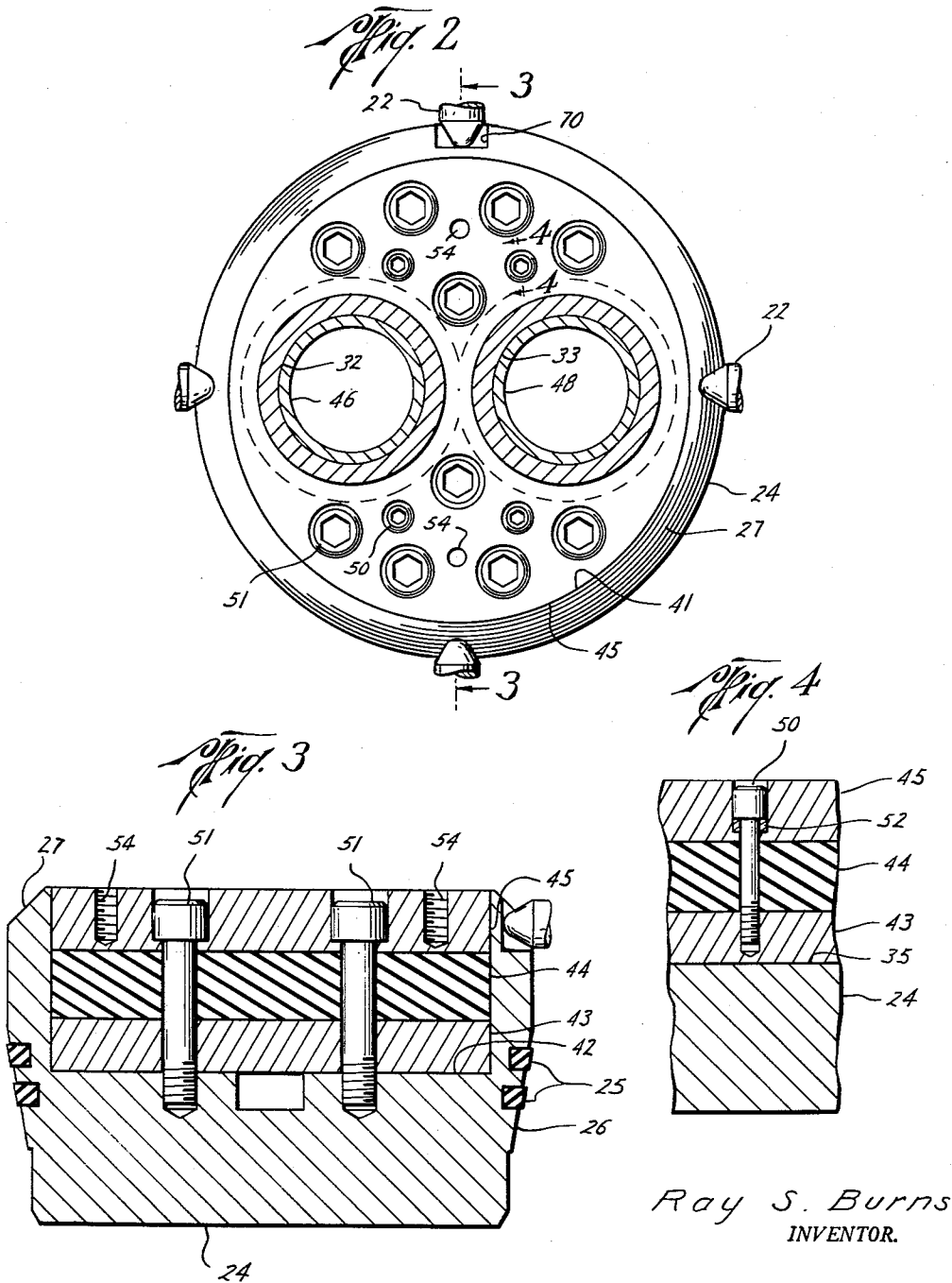
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DUAL WELL COMPLETION APPARATUS

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6 Sheets-Sheet 2



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6 Sheets-Sheet 3

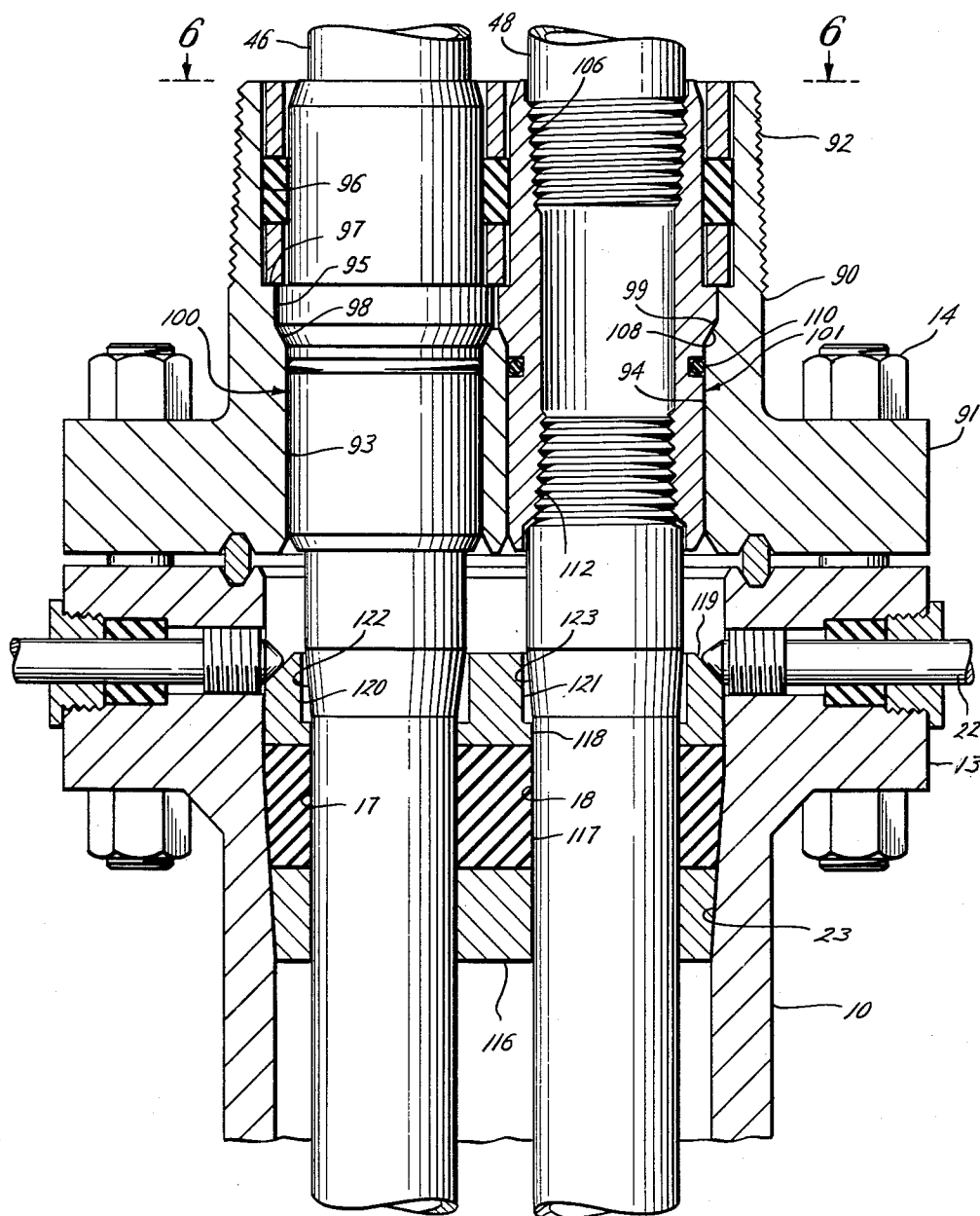


Fig. 5

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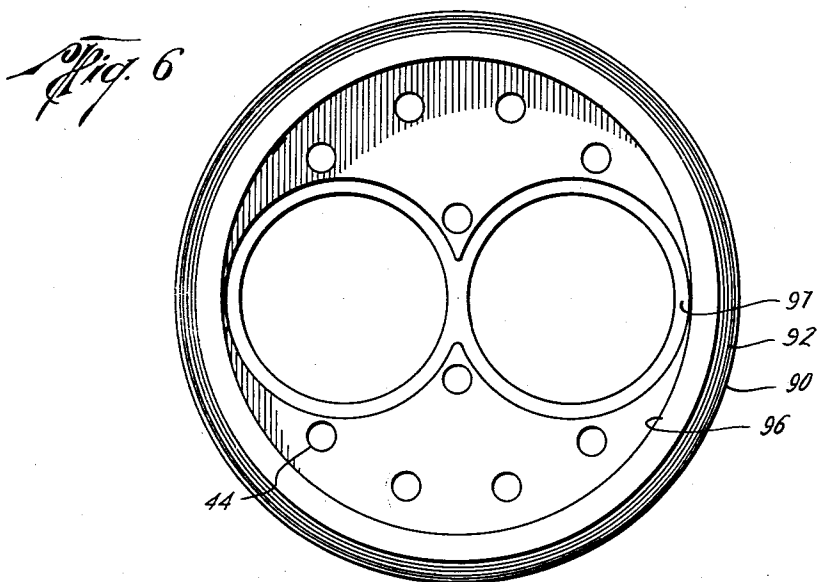
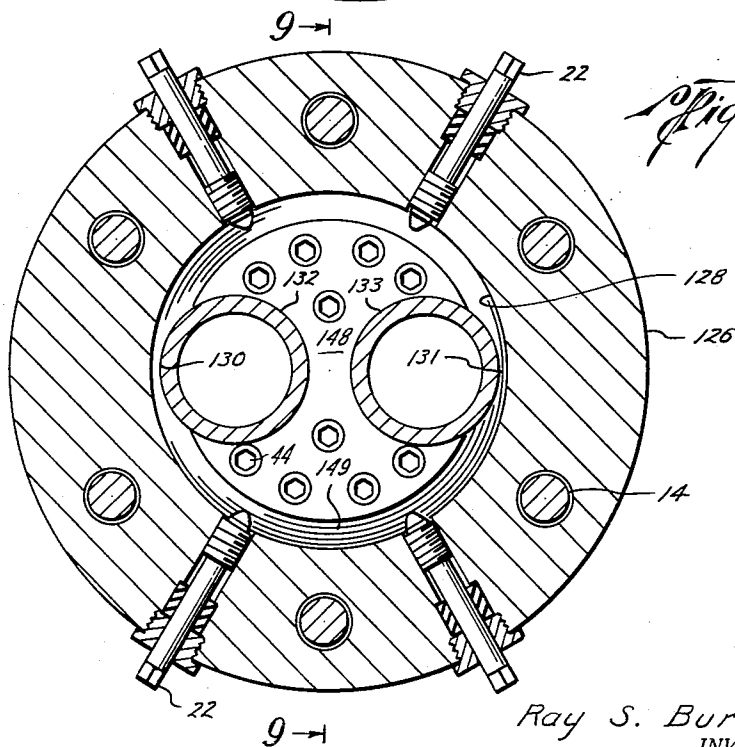
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Filed July 9, 1956

6 Sheets-Sheet 4



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DUAL WELL COMPLETION APPARATUS

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6 Sheets-Sheet 5

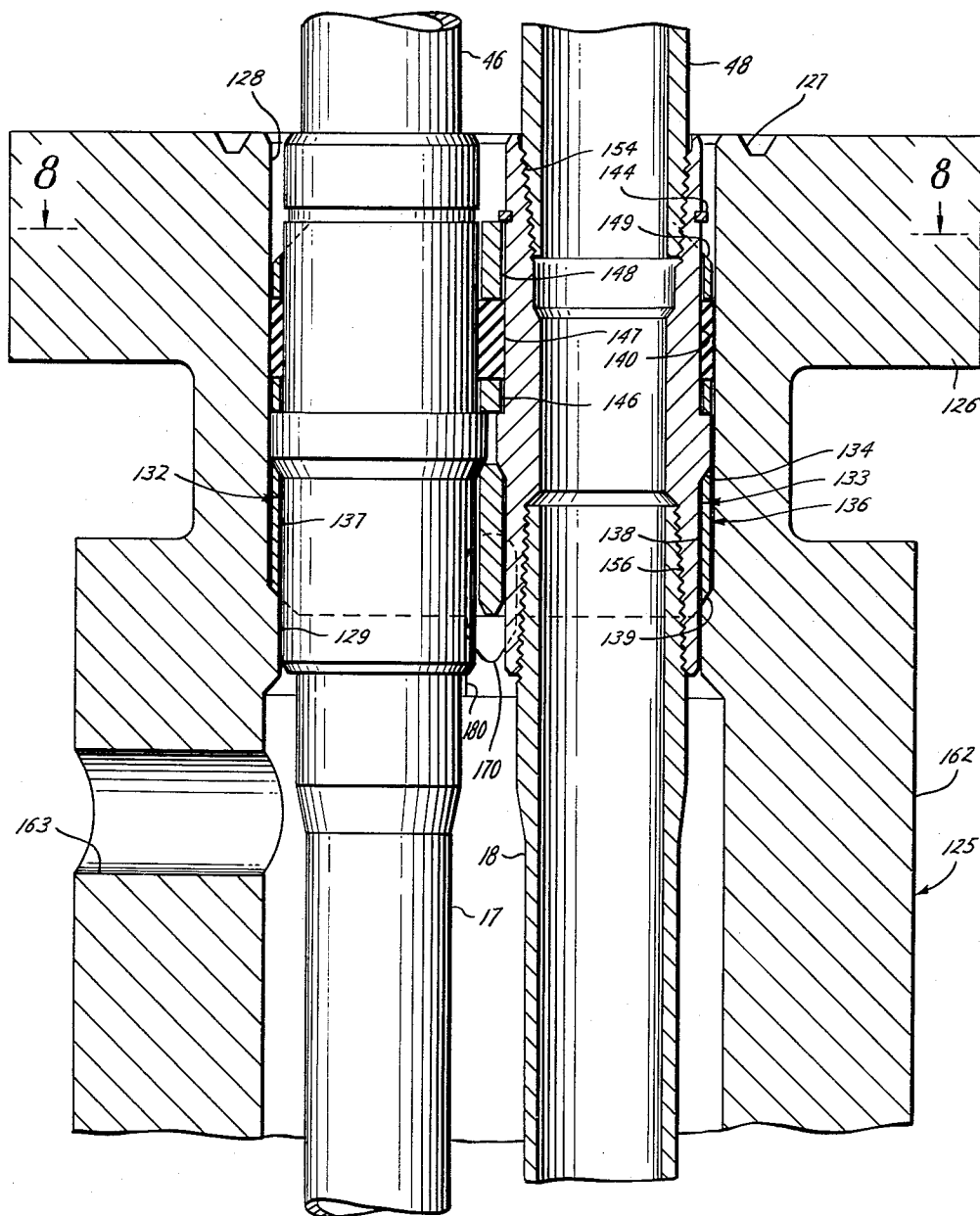


Fig. 7

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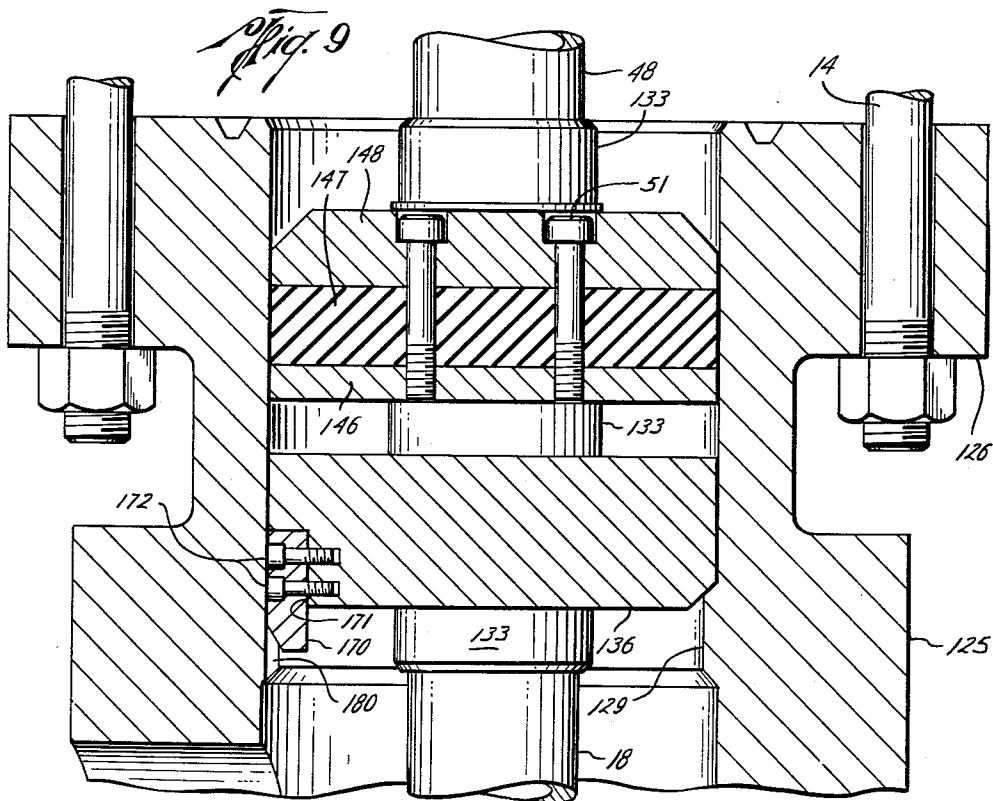
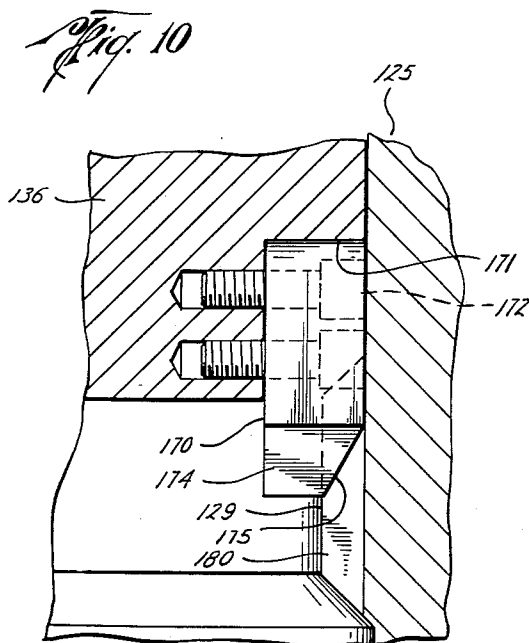
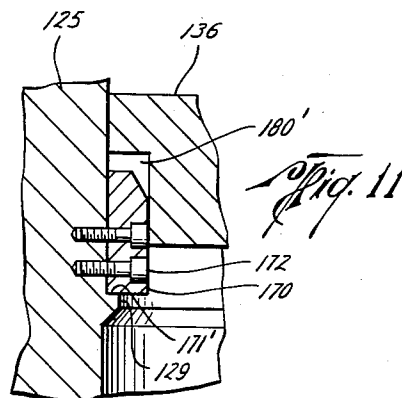
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DUAL WELL COMPLETION APPARATUS

Filed July 9, 1956

6 Sheets-Sheet 6



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3,011,804

DUAL WELL COMPLETION APPARATUS

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Filed July 9, 1956, Ser. No. 596,789

7 Claims. (Cl. 285-137)

This invention pertains to multiple-completion trees, that is, to multiple-completion trees for wells wherein all production passages are identically supported and are themselves identical. In the apparatus provided according to the invention the production strings are independently operated and yet are in close proximity one to the other in the equipment.

A principal object of the invention is to provide multiple-completion well apparatus wherein adjacent completion means are separated only by the space occupied by the supporting means therefor.

Another object of the invention is to provide such apparatus having dependable means for sealing around the bores and tubing hangers, and having adequate support for the sealing means between the bores.

Another object of the invention is to provide such apparatus each pipe string of which is independent in operation.

Another object of the invention is to provide such apparatus the elements of which are readily and easily installed in proper rotational or azimuthal alignment.

Another object of the invention is to provide multiple bore well completion apparatus which is compact and safe.

Other objects, uses, advantages, and improvements of the invention will appear from the following description of preferred embodiments thereof, reference being made to the accompanying drawings, of which:

FIGURE 1 is a side elevation, partly in vertical section and partly broken away, of an embodiment wherein dual pipes are hung in the tubing head;

FIGURE 2 is a horizontal section taken at line 2-2 of FIGURE 1;

FIGURE 3 is a partial vertical section taken at line 3-3 of FIGURE 2;

FIGURE 4 is a partial vertical section taken at line 4-4 of FIGURE 2;

FIGURE 5 is a view similar to FIGURE 1 of a second embodiment;

FIGURE 6 is a horizontal section taken at line 6-6 of FIGURE 5;

FIGURE 7 is a view similar to FIGURES 1 and 5 of a third embodiment;

FIGURE 8 is a horizontal section taken at line 8-8 of FIGURE 7;

FIGURE 9 is a vertical section taken at line 9-9 of FIGURE 8 through the hanger body alignment means;

FIGURE 10 is an enlarged vertical section of the alignment means of FIGURE 9; and,

FIGURE 11 is a vertical section similar to FIGURE 10 showing a modified alignment means.

Referring now to the drawings in detail, preferred embodiments of the invention are shown in FIGURES 1-4, 5-6, and 7-11. The embodiments differ only in the means by which the hanger means is supported in the equipment, and in its location in the equipment. In the embodiment of FIGURES 1-4, the hanger body is supported on a conical shoulder formed in the tubing head; in the embodiment of FIGURES 5-6 the hanger body is not separate but is formed within an adapter flange above the tubing head; in the embodiment of FIGURES 7-11, the hanger body is supported similarly to the embodiment of FIGURES 1-4, the assembly being some-

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what more compact. In addition to the embodiments shown, other embodiments are realized through combination of the forms shown, the features of which may be intercombined as desired to form a tool embodying the invention, the invention not being limited to dual completion equipment but adaptable as well to equipment having three or more completion strings. In the case where the hanger support is formed in the adapter, a second hanger means may be added as shown in FIGURE 5 to provide additional support for the well pipes, the tool being useful with or without the second hanger means as desired.

The invention includes a novel pipe suspension means which enables a plurality of pipes to be suspended in close proximity one to another. Each embodiment of the invention has hanger means having a plurality of pipe-receiving bores therethrough within which are supported coupling means from which the well pipes are suspended. Following the principles disclosed by this invention, the adjacent pipe receiving bores must be separated one from another only by a radial distance equal to the sum of the radial supporting areas around the adjacent bores. By this arrangement, the couplings which support the well pipes may be immediately adjacent and touching, so that there is no wasted space between the pipes, and the equipment can be inherently of smaller size than equipment requiring supporting means between the bores. The novel arrangement also includes common sealing means around all of the bores which is supported by a supporting plate, or junk ring, which provides support between and around the bores for the packing means.

Referring now to FIGURES 1-4 of the drawings, there is shown the upper portion of a tubing head 10 and the lower portion of a tubing head 11 or dual bore valve, or other dual equipment. The tubing head adapter is connected above the tubing head in the usual way, the tubing head adapter having lower flange 12 and the tubing head having upper flange 13 through which a plurality of bolts 14 are passed to make the connection. Other well head or well completion elements may replace the tubing head and tubing head adapter described, that is, the invention may be incorporated at any point in the above-ground well equipment. A standard metal ring joint gasket 15 is received in grooves at the flange faces to seal around the connection between the flanges. The tubing head 10 has an axial opening 16 down through which are received the two pipes or tubing strings 17 and 18, which serve as flow path means from the well.

As will appear from the description of the preferred embodiment, each side of the apparatus is like the other side, that is, the apparatus is symmetrical about its vertical center, and each of the bores and connected tubing strings thereof is independent of the other as to installation and operation, the latter property making the apparatus versatile in use and adaptable to varying service.

The tubing head adapter 11 has two straight parallel vertical bores 19 and 20 therethrough which are positionable in alignment above the tubing strings 17 and 18, respectively. The flanges 12 and 13 are each provided with a plurality of lockscrews, lockscrews 21 being in flange 12 and lockscrews 22 being in flange 13, which may be screwed into the interior openings of the tubing head adapter and tubing head. Suitable grooves are provided in the elements received within the tubing head adapter and tubing head at the joint therebetween so that the rotational alignment of the elements with a lock screw 22 can be used to determine when the tubing strings and bore are in alignment. The lock screws 22 also provide means for holding down the tubing strings and hanger body, thereby providing blowout protection.

The tubing head 10 has an interior downwardly converging conical shoulder 23 upon which is supported a hanger body 24. Suitable packing rings 25 are provided around the hanger body at its conical seat portion 26 which rests upon conical shoulder 23 to provide a seal around the hanger body. Above and below the conical support portion, the tubing head and hanger body have complementary cylindrical surfaces so that the hanger body fits closely within the upper opening of the tubing head, the upper surface of the hanger body having a conically beveled portion 27 at which the inner ends of the lock screws 22 contact or engage the body and in which the aligning grooves heretofore mentioned are provided. The hanger body 24 has two parallel bores 28 and 29 through its lower portion which terminate upwardly in conically formed seats 30 and 31, respectively, which are adapted to support identical couplings 32 and 33 at oppositely formed seats 34 and 35 on the couplings. The couplings 32, 33 are disposed, respectively, in each bore 28, 29 of the hanger body 24. Each coupling has a lower threaded socket 36 into which is screwed one of the pipes 17 and 18, so that the pipes are supported from the couplings. Each coupling also has an upper threaded socket 37, into which the lower ends of pipe nipples 46, 48, are screwed. Each coupling has an outwardly formed shoulder 38, the lower sides of the shoulders being conical to provide seats 34, 35, and the upper sides of the shoulders being perpendicular to the coupling walls. The couplings have axial bores 39 providing a flow passage through each coupling between the upper and lower sockets of the couplings. Above bores 28 and 29 the hanger body has a single large axial circular bowl-shaped opening 41 which extends above both of the bores 28 and 29 to the top of the hanger body. The opening 41 has a diameter such that the upper ends of both bores 28 and 29 are overlapped thereby to form a shoulder 42 at the bottom of opening 41 around both of the bores 28 and 29. Shoulder 42 presents a flat upwardly facing surface having the two bore openings therein, and a circular steel plate 43, or junk ring, is supported thereon. The plate 43 serves as means for supporting a sealing element 44 of elastomeric material and an upper steel plate 45 which serves as means for compressing the sealing element. The two plates 43 and 45 and the element 44 are circular and fit closely within bowl-shaped opening 41, and each has a pair of circular openings adapted to fit closely around the upper ends of the couplings 32, 33, around which they are disposed. The upper sides of coupling shoulders 38 coincide with the shoulder 42 so that the lower plate 43 rests both upon shoulder 42 and the coupling shoulders 38. A plurality of cap screws or bolts 50 pass through holes provided in plate 45, gasket 44, and are screwed into tapped holes in plate 43. A plurality of larger cap screws or bolts 51 pass through holes provided in plate 45, gasket 44, plate 43, and are screwed into tapped holes in shoulder 42. The heads of bolts 50 and 51 are received in recesses in plate 45 so that the heads do not project above the upper surface of plate 45. The bolts 50 hold the two plates and the gasket together as a unit, and the bolts 51 hold down and compress the unit on shoulder 42, at the same time serving as means for holding down the two couplings at shoulders 38 thereof. The compression of gasket 44 between plates 43 and 45 to form a seal around the body opening 41 and around the tubing strings 17 and 18 is achieved by screwing down on bolts 50 or bolts 51 or both sets of bolts. Preferably, the bolts 51 are used in compressing the gasket, and the bolts 50 are caused to loosen as indicated at 52 in FIGURE 4, where the head of the bolt 50 is shown spaced from the bottom of the recess in which it is received.

Referring now to FIGURE 2, a pair of upwardly opening tapped holes 54 partway through the upper plate 45 provide for attachment of means for lifting the sealing unit from the upper opening 41 of the hanger body. For example, a pair of eye bolts may be screwed into holes 54

after bolts 51 have been removed; the lower and upper plates 43 and 45 and the gasket 44 may then be lifted out as a unit, the bolts 50 holding the separate elements together. The sealing unit may likewise be lowered into the hanger body by means of holes 54 and the eye bolts.

A short conduit means or pipe nipple is screwed into the upper end of each coupling for sealing into the tubing head 11. Nipple 46 has lower exterior threads which are screwed into upper socket 37 of coupling 32, and nipple 48 has lower exterior threads which are screwed into upper socket 37 of coupling 33, only the threads of the latter nipple and socket being shown in FIGURE 1. In tubing head adapter 11, the bores 19, and 20 are enlarged at their lower ends, bore 19 having an upper enlarged recess 55 and a further enlarged recess 56 therebelow, and bore 20 having an upper enlarged recess 57 and a further enlarged recess 58 therebelow, a single larger axial circular opening 59 in the lower end of the tubing head adapter being provided in much the same manner as the opening 41 of hanger body 24, the opening 59 surrounding lower ends of the larger recesses 56 and 58 of both of the bores of the tubing head adapter. The upper ends of the pipe nipples 46 and 48 extend into the upper recesses 55 and 57, respectively, and means are provided for sealing around the nipples in the recesses 56 and 58. A supporting plate 60 is provided for holding the sealing means in place in the tubing head adapter. Plate 60 is of circular disc form and has its lower periphery beveled as at 61 to provide a contact surface for the inner ends of lock screws 21 which are provided in lower flange 12 of the tubing head adapter. Two non-concentric circular openings 62 and 63 permit the passage of nipples 46 and 48 through plate 60, and these openings have recesses around their upper ends into which the lower edges of identical steel rings 64 are received. The rings 64 extend upwardly from the recesses into the lower part of recesses 56 and 58, thereby serving as means for retaining packing means within recesses 56 and 58. Above each ring 64 there is provided a narrow steel packing retainer ring 65, a gasket ring 66, and a second narrow steel ring 65, all of which fit snugly around the nipples 46 and 48 and within recesses 56, 58, the upper end of recesses 56, 58 limiting the upward movement of the upper rings 65. The gasket rings 66 are compressed between the pairs of narrow steel rings 65 by rings 64 when the latter are forced upwardly by plate 60 when the lock screws 21 are screwed against bevelled surface 61 of plate 60. Very effective seals are thereby achieved around nipples 46 and 48 within tubing head adapter 11 and nipples 46 and 48 are satisfactorily connected with the respective tubing head adapter bores 19 and 20.

Below the conical shoulders 34 and 35 of couplings 32 and 33, a plurality of packing rings 67 are received in suitable grooves around each of the couplings to provide an additional seal where the couplings pass through bores 28 and 29 of hanger body 24. These lower seals, as well as the seal provided by the sealing rings 25 around the exterior of the hanger body, serve as temporary sealing means during installation of the apparatus, and contribute to the safety of the apparatus.

The azimuthal aligning groove 70 in hanger body 24 is shown in FIGURE 2. The groove may be of any suitable shape to receive the inner tip of one of the lock screws 22 and thereby align the hanger body in the tubing head 10. The groove 70 shown in FIGURE 2 is of rectangular horizontal section and extends downwardly from conical surface 27 of the hanger body to a level beneath the level of the lock screws 22 shown in FIGURE 1 of the drawings. When hanger body 24 is set in place in tubing head 10, to achieve proper azimuthal alignment the hanger body is rotated until the lock screw 90° from a horizontal line through the bore axes engages groove 70 determining the proper alignment. After the alignment has thus been determined, the bolt holes of flanges 12 and 13 will be in

alignment, and bores 19 and 20 of adapter 11 will be in alignment with tubing strings 17 and 18.

Referring to FIGURE 1, the conical shoulders 30, 31 meet tangentially between the bores 28 and 29, on a diameter through the axes of both bores. Below that point, the web 68 separating the bores has a minimum thickness. That minimum web thickness is equal to the sum of the radial components of the shoulders 30 and 31 or, better stated, the sum of the radial components of the coupling shoulders 34, 35. That is, the web thickness between the bores is equal to the sum of the widths of the coupling shoulders which are seated around the tops of the bores, so that the coupling shoulders of couplings in adjacent bores touch tangentially, and the couplings are therefore as close together as possible. This novel structure is possible only with coupling suspension of the well pipes. If slips instead of couplings are used in suspending the well pipes, the web between the bores must have greater strength than is provided by the present arrangement. In the case of slip supports, a large component of the weight of the suspended pipes is directed radially outwardly from the pipes because of the slow taper necessary with slips. To provide the necessary radial support for the slips, the wall thickness of the bowl must not be as thin as the above-described minimum thickness at any point. Additional material must be provided between the slip tapers of adjacent bores to provide that strength. The conical shoulders 30, 31, around the tops of adjacent bores 28 and 29, have very steep tapers, shown as approximately 45°, and, in fact, need have no taper at all. That is, shoulders 30 and 31 may be horizontal at their upper surfaces. The steep 45° taper is unnecessary and is shown in the preferred embodiments only because of the centering action of the taper which makes it slightly easier to insert the couplings into the lower bores of the hanger body. A steep taper, such as the 45° shown, results in very little radial thrust at the point of support of the couplings, and this outward radial thrust is further diminished over that of slip suspension because the couplings are each one integral piece instead of being in peripheral sections as are slips. In addition, further improvement over slip suspension is found in the fact that the axial space required for supporting the pipes is less with no taper or a taper substantially 45° than when the taper must be very slow. Comparing the present suspension with slip suspension, it is readily seen that a very much shorter space is required for the coupling suspension than for the slip suspension, and as a direct consequence, the entire apparatus may be of shorter vertical length than any apparatus including slips, thereby making the apparatus lighter in weight and easier to handle, and less costly to manufacture.

Further advantage of the coupling suspension of this invention resides in the sealing means, or pack-off shown in the preferred embodiments. The junk ring 43, or lower plate shown in FIGURES 1, 3, 4, provides support for the sealing element 44 around both of the couplings, and of particular importance, provides support for the sealing element between the bores to the same extent as elsewhere around the bores. In the case of slip-type suspension, no such pack-off support is possible, since the tops of the slips present no uniform upper surface on which the junk ring can be set in place, and further, because of the large axial lengths of the slips, space is not available within the tubing head for a multi-layer pack-off or sealing means without making the entire assembly of a cumbersome, unwieldy length. Comparison will show that the coupling suspension and pack-off occupy no more axial length within the tubing head than does the slip suspension alone without any pack-off provision.

Summarizing, the coupling suspension permits the pipe or tubing strings to be closer together in the well than does slip suspension; the pack-off and coupling suspension occupy the same or less space than the slip suspen-

sion with no pack off means whatsoever; and, no radial support need be provided for the coupling suspension while considerable radial support is required for the slip suspension.

Referring now to FIGURES 5-6, there is shown a second embodiment of the invention. A tubing head adapter 90 is bolted above tubing head 10 by means of lower flange 91 thereof. Adapter 90 has upper exterior threaded formation 92 by means of which an upper flange (not shown) may be secured thereto or connection otherwise made, and has bores 93 and 94 enlarging into upper opening 95, at the upper portion of which is provided packing recess 96 having lower shoulder 97, and therebelow, around the upper ends of bores 93 and 94, conical shoulders 98 and 99, respectively, upon which are supported a pair of couplings 100, 101. Each of the identical couplings 100, 101 is very similar to the couplings 32, 33 of FIGURES 1-4, the vertical dimensions of the couplings 100, 101 being somewhat different than are shown for couplings 32, 33. Couplings 100, 101 can be identical with couplings 32, 33, only obvious modifications thereof being required, similar obvious modifications also being required to tubing head adapter 90. The pipe nipples 46 and 48 are in this embodiment screwed into upper coupling sockets 106 of the couplings 100, 101. Couplings 100, 101 have downwardly facing exterior conical shoulders 108, and circular grooves for receiving packing rings 110, which latter provide temporary seals around the nipples during installation. The shoulder 108 of each coupling seats on and the coupling is supported by one of the shoulders 98 and 99. Couplings 100, 101 have lower threaded sockets 112 for threadingly receiving well pipes or tubing strings 17 and 18, which are thereby supported in the well. The azimuthal alignment of the bolt holes of flanges 13 and 91 to receive bolts 14 is the only rotational alignment necessary to this embodiment of the invention. The nipples 46 and 48 are inherently aligned with tubing strings 17 and 18, respectively, by the direct connections therewith through the couplings 100 and 101.

The embodiment shown in FIGURES 5-6 may also be provided with a second hanger and seal means comprising a lower plate 116, a packing element 117 and an upper plate 118. Lower plate 118 has an upper beveled surface 119 which is contacted or engaged by the inner ends of lockscrews 22 to hold down the elements 116-118 and to compress packing element 118 to form a seal. Elements 116-118 have alignable dual bores which fit closely about pipes 17 and 18 and upper plate 118 is provided with recesses 120, 121 within which are received the enlarged upper portions 122, 123 of pipes 17 and 18.

Referring now to FIGURES 7-11 of the drawings, there is shown a third embodiment of the invention. Upon comparison with the embodiment of FIGURES 1-4, it will be seen that this embodiment is much the same as to arrangement of the elements, the principal difference being in the compactness of the embodiment of FIGURES 7-11. The tubing head 124 has a smaller size flange 126 than the flange 13 of tubing head 10, for the same size of well pipes or tubing strings installed and supported therein. This feature of the third embodiment has the advantage of permitting the use of standard size upper completion equipment rather than the oversize completion equipment conventionally used for dual completion wells. It should be noted that very efficient use of the smaller tubing head opening is required to achieve this result.

Tubing head 125 has upper flange 126 providing connecting means with the upper well head equipment. The flange face has a circular groove 127 for receiving the lower side of a standard steel joint gasket such as gasket 15 of FIGURE 1. An axial circular opening 128 through tubing head 125 has an inwardly protruding annular shoulder 129 upon which the hanger body is supported. The shoulder 129 is recessed at opposite sides at 130,

131, to provide sufficient room for the identical hanger couplings 132, 133, therewithin. The couplings 132, 133, are of tubular shape and have outwardly formed downwardly facing annular shoulders 134, which seat upon upper conical surfaces of the hanger body 136. The hanger body 136 is in the form of a circular disc and has two bores 137, 138 to receive the hanger couplings 132. The side walls of the hanger body are very thin adjacent the bores. The hanger body has a conical surface 139 at its lower edge which seats upon tubing head shoulder 129, the bores 137, 138, partially intersecting surface 139. Above shoulders 134, each hanger coupling has a packing recess designated as 140. Above the packing recesses a groove is provided around each hanger nipple to receive a steel snap-ring 144, the ring being removed from coupling 132 to show the groove in FIGURE 7. The snap rings serve as means for holding the pack off means on the couplings during assembly of the hanger body. The pack off means comprises lower steel element 146, packing element 147 of elastomeric material, and upper steel element 148 having beveled upper surface 149, intersected by the coupling openings. The pack-off elements are formed as circular discs having alignable openings for snugly receiving the couplings 132, 133. Lockscrews 22 through flange 126 engage surface 149 of the upper steel element 148 to compress the packing element and form a seal between couplings 132, 133, and the interior of opening 128 as in the embodiments already described.

The couplings 132 have upper sockets 154 and lower sockets 156 for threaded connection with pipe nipples 46, 48, and well pipes or tubing strings 17, 18, the pipe nipples being sealed into dual bore well head equipment above the tubing head as before, and the tubing strings running into the well below the tubing head as before.

Tubing head 125 has a thickened lower wall portion 162. A lateral manifold passage 163 is provided through wall 162 to provide outlet means from the tubing head interior.

The azimuthal alignment means for this third embodiment is shown in FIGURES 7, 9, and 10. FIGURE 11 shows a modified form of the alignment means. Because of the compactness of this embodiment it is not feasible to use a lock screw and groove to determine the alignment. The lock screws 22 are at a level above the hanger body 136 and cannot make contact with the hanger body.

A key 170 is bolted into a recess 171 at the lower edge of hanger body 136 by a pair of bolts 172. Key 170 is tapped for the bolts and bolt head recesses are provided so that there will be no projections at the outer side of the key after the key is bolted in place in recess 171. The hanger body is tapped to receive the inner ends of the bolts as best shown in FIGURE 10. Key 170 is beveled at its lower end to make it easier to run the lower key end into a notch or slot, the bevels being indicated by 174 at opposite sides of the key and 175 at the outer side of the key. The inner side of the key is not bevelled. The key may be of any suitable shape other than the shape herein shown and described.

A vertical notch or slot 180 is formed through shoulder 129 which supports hanger body 136. The slot 180 is 90° removed around the tubing head from each of the recesses 130, 131, which are provided to allow insertion of the hanger couplings past shoulder 129. Slot 180 is rectangular in horizontal section, but may be formed otherwise suitably to receive the key. As it is being lowered into tubing head 125 during installation, hanger body 136 carrying key 170 is rotated until key 170 engages and enters the slot 180. The proper alignment of the hanger body is thereby easily and readily determined during installation so that the couplings, nipples, bores, bolt holes, and tubing strings will be in proper alignment.

The modified aligning means shown in FIGURE 11 is the counterpart of the aligning means of FIGURES 7, 9, and 10. In this modification, the recess into which the key 170 is bolted by the bolts 172, recess 171' is

formed in shoulder 129, the recess opening upwardly instead of downwardly as before, and being shallower so that key 170 protrudes from the recess inwardly as well as upwardly. The notch or slot 180' into which the tip of the key is received upon alignment is formed at the lower edge of the hanger body 136. When the hanger body is lowered into the tubing head for installation, the hanger body is rotated until slot 180' engages and receives the upper end of key 170 before it is set down on shoulder 129, thereby assuring proper alignment of all elements of the apparatus as before.

Briefly reviewing the description of the invention, embodiments wherein the hanger bowl or hanger body is supported in the tubing head are shown in FIGURES 1-4, and in FIGURES 7-11; and embodiment wherein the hanger supporting means is formed in a tubing head adapter above the tubing head is shown in FIGURES 5 and 6, the latter embodiment in one form including the lower hanger and seal means in the tubing head and in another form omitting the lower hanger and seal means.

While preferred embodiments of the invention have been shown and described herein, many modifications thereof may be made by a person skilled in the art without departing from the spirit of the invention, and it is intended to protect by Letters Patent all forms of the invention falling within the scope of the following claims.

I claim:

1. Well head apparatus for multiple completion wells, comprising a lower well head element having means therein for supporting a hanger, an upper well head element surmounting said lower well head element, said upper well head element having plural side-by-side flow path means vertically therethrough, a hanger disposed in said lower well head element on said supporting means thereof and having a plurality for vertical openings therethrough each having means therein for supporting a separate coupling means, a separate coupling means disposed in each of said vertical hanger openings on said supporting means a portion of said hanger means being relieved between adjacent openings thereof, each of said separate coupling means having a connection at the lower end thereof with a pipe in the well and supporting the pipe connected therewith, and a plurality of tubular nipple means each having connection with the upper end of one of said coupling means and extending from said connection into said upper well head element for providing flow thereto from one of said pipes in the well.

2. Well head apparatus for multiple completion wells, comprising a lower well head element having means therein for supporting a hanger, an upper well head element surmounting said lower well head element, said upper well head element having plural side-by-side flow path means vertically therethrough, a hanger disposed in said lower well head element on said supporting means thereof and having a plurality of vertical openings therethrough, each having means therein for supporting a separate coupling means, a separate coupling means disposed in each of said vertical hanger openings on said supporting means thereof, each of said separate coupling means having a connection at the lower end thereof with a pipe in the well and supporting the pipe connected therewith, and a plurality of tubular nipple means each having connection with the upper end of one of said coupling means and extending from said connection into said upper well head element for providing flow thereto from one of said pipes in the well; each of said vertical openings in said hanger being contiguous, throughout a portion of its periphery, with such others of said vertical openings in said hanger which are disposed adjacent thereto.

3. The combination of claim 2 wherein said upper well head element has the same plurality of flow path means vertically therethrough as said plurality of vertical openings in said hanger, each of said tubular nipple means providing fluid flow from one said supported well pipe to one said flow path means of said upper well head element.

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4. The combination of claim 3 having means for sealing around said separate coupling means within said supporting means of said lower element, means for sealing around each of said tubular nipple means within one of said vertical flow path means of said upper element, and means for rigidly supporting said sealing means at each point on the lower surface thereof.

5. The combination of claim 4 wherein each said separate coupling means has an annular seat therearound for seating on said supporting means of one of said vertical hanger openings to support one of said well pipes, said annular seats of adjacent coupling means being contiguous.

6. The combination of claim 5 wherein the laterally outer separate coupling means extend to the laterally outer wall of said hanger at a portion thereof.

7. The combination of claim 6 including means for

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azimuthal aligning of said hanger and said elements vertically aligned therewith with said lower well head element and with said upper well head element, whereby the flow paths of all elements of said apparatus are in vertical alignment.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,011,804

December 5, 1961

Ray S. Burns

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 35, after "head" insert -- adapter --;
column 8, line 35, for "for" read -- of --; line 38, after
"means" insert a comma.

Signed and sealed this 17th day of April 1962.

(SEAL)
Attest:

ESTON G. JOHNSON

Attesting Officer

DAVID L. LADD
Commissioner of Patents