

restrict the upward pressures of a kick a blowout results, potentially shooting tubing, oil and gas up the wellbore, damaging the rig, and leaving well integrity in question.

SUMMARY OF THE INVENTION

[0009] In accordance with ~~an~~ a first aspect, there is provided a blowout preventer assembly comprising a containment structure, wherein the containment structure comprises a unitary lower housing with a plurality of lower housing bifurcated retainer lugs disposed circumferentially about an attachment end of the lower housing, wherein the lower housing further includes a plurality of internal fluidly interconnected cylinders; a plurality of annular pistons and glands engaging the plurality of fluidly interconnected cylinders in the lower housing; a one piece energizing ring having a bowl in one end portion, wherein the energizing ring is operationally disposed circumferentially about a portion of the lower housing and in engagement with the plurality of annular pistons; an upper housing having an integral structure with a plurality of upper housing bifurcated retainer lugs for interlace quarter turn engagement with the lower housing plurality of bifurcated retainer lugs, wherein the upper housing further includes an inner ceiling with a spherical, concave shaped main bore for accommodating a main seal positioned over the bowl portion, wherein the lower housing and upper housing operationally enclose the one piece energizing ring, annular pistons, glands and seal; and a plurality of bottom plates for sealing the lower housing from an outside environment.

[00010] In ~~another~~ accordance with a second aspect, there is provided a blowout preventer comprising a lower housing having a unitary generally cylindrical shaped structure with a plurality of lower housing bifurcated retainer lugs; an upper housing having an integral structure with a plurality of upper housing bifurcated retainer lugs for interlace quarter turn engagement with the lower housing bifurcated retainer lugs; a plurality of internal fluidly interconnected cylinders configured in a plane surface of the integral structure, wherein each internal fluidly interconnected cylinder includes a dedicated cylinder fluid channel disposed therein a portion of a cylinder wall; a center column defining a center bore for accommodating a well pipe, wherein the center column comprises a plurality of seals; and a flange mounting portion disposed at a distal end of the center column.

[00011] In ~~yet another aspect~~ an embodiment, ~~there is provided a~~ the blowout preventer according to the second aspect further comprising comprises an energizing ring having a generally cylindrical, one-piece integral structure having a bowl shaped surface

~~WHAT IS CLAIMED IS:~~CLAIMS

1. A blowout preventer assembly comprising:
 - a containment structure, wherein the containment structure comprises:
 - a unitary lower housing with a plurality of lower housing bifurcated retainer lugs disposed circumferentially about an attachment end of the lower housing, wherein the lower housing further includes a plurality of internal fluidly interconnected cylinders;
 - a plurality of annular pistons and glands engaging the plurality of fluidly interconnected cylinders in the lower housing;
 - a one piece energizing ring having a bowl in one end portion, wherein the energizing ring is operationally disposed circumferentially about a portion of the lower housing and in engagement with the plurality of annular pistons;
 - an upper housing having an integral structure with a plurality of upper housing bifurcated retainer lugs for interlace quarter turn engagement with the lower housing plurality of bifurcated retainer lugs, wherein the upper housing further includes an inner ceiling with a spherical, concave shaped main bore for accommodating a main seal positioned over the bowl portion, wherein the lower housing and upper housing operationally enclose the one piece energizing ring, annular pistons, glands and seal; and
 - a plurality of bottom plates for sealing the lower housing from an outside environment.
2. The blowout preventer assembly of claim 1, wherein the plurality of internal fluidly interconnected cylinders each further comprise a dedicated cylinder fluid channel disposed therein a portion of a cylinder wall of each internal fluidly interconnected cylinder, wherein the cylinder fluid channel permits hydraulic fluid interconnectivity of each internal fluidly interconnected cylinder.
3. The blowout preventer assembly of claim 1, wherein the lower housing comprises an open port and close port for accommodating hydraulic connections for providing and relieving hydraulic fluid to cause the annular pistons to force the energizing ring in a direction to open or close the main seal.

4. The blowout preventer assembly of claim 3, wherein hydraulic fluid flows through the close port to the glands, wherein each gland further comprises a plurality of longitudinal gland channels traversing the diameter of the gland and a circumferential channel about the circumference of the gland, wherein each of the longitudinal gland channel and the circumferential channels combine in design and function to accommodate the hydraulic fluid flow to responsively effectuate movement of the piston and energizing ring in a direction to cause the seal to close.

5. The blowout preventer assembly of claim 1, wherein the plurality of internal fluidly interconnected cylinders has a first inner diameter for properly accommodating an outer diameter of the annular piston and a second larger inner diameter for accommodating an outer diameter of the gland, such that the juncture of the first inner diameter and the second inner diameter form a stop lip.

6. The blowout preventer assembly of claim 5, wherein the gland is positionally retained within a distal portion of each internal fluidly interconnected cylinder by the stop lip.

7. The blowout preventer assembly of claim 6, wherein the gland further comprises a gland test plug cavity for accommodating an isolation and test plug, wherein the isolation and test plug provides on-site operational pressure testing on an individual internal fluidly interconnected cylinder or an annular piston.

8. The blowout preventer assembly of claim 1, wherein the inner diameter dimensions of well pipe that can be accommodated range from about 5 ½ inches to about 21 ¼ inches.

9. The blowout preventer assembly of claim 1, wherein a high pressure functioning capacity can range from 3,000 psi to 20,000 psi.

10. A blowout preventer comprising:
- a lower housing having a unitary generally cylindrical shaped structure with a plurality of lower housing bifurcated retainer lugs;
 - an upper housing having an integral structure with a plurality of upper housing bifurcated retainer lugs for interlace quarter turn engagement with the lower housing bifurcated retainer lugs;
 - a plurality of internal fluidly interconnected cylinders configured in a plane surface of the integral structure, wherein each internal fluidly interconnected cylinder includes a dedicated cylinder fluid channel disposed therein a portion of a cylinder wall;
 - a center column defining a center bore for accommodating a well pipe, wherein the center column comprises a plurality of seals; and
 - a flange mounting portion disposed at a distal end of the center column.
11. The blowout preventer of claim 10, wherein the lower housing has a machined upper seat about an inner circumference portion for position and retainment of an upper housing.
12. The blowout preventer of claim 10, wherein the lower housing has a machined upper shoulder disposed on an end portion of a lower housing column wall, wherein the machined upper shoulder accommodates and positions for retainment of an adapter ring.
13. The blowout preventer of claim 10, wherein each cylinder fluid channel is an internally machined slotted thoroughfare in the cylinder walls such that each cylinder fluid channel permits flow of pressurized hydraulic fluid between the plurality of internal fluidly interconnected cylinders.
14. ~~A~~ The blowout preventer of claim 10 further comprising:
- an energizing ring having a generally cylindrical, one-piece integral structure having a bowl shaped surface opening machined into a first end portion of the energizing ring; and
 - a plurality of bifurcated heel shaped mounting elements machined into a second end portion of the energizing ring.

15. The blowout preventer as in claim 14, wherein each bifurcated heel shaped mounting element has a plurality of threaded connections for accommodating a removably attached annular piston on each bifurcated heel shaped mounting element.
16. The blowout preventer as in claim 14, wherein the energizing ring comprises a retainer lip formed at an inner diameter portion.
17. The blowout preventer as in claim 16, wherein the retainer lip engages for positional retainment, an upper shoulder seal.
18. The blowout preventer as in claim 14, wherein the generally cylindrical, one-piece integral structure has an internal diameter cavity formed for positionally and operationally mating with and around a lower housing center column portion.
19. The blowout preventer as in claim 14, wherein the energizing ring further comprises a plurality of seal channels for accommodating sealing elements.
20. The blowout preventer as in claim 14, wherein the energizing ring is manufactured from 4130 steel.