CLAIMS

WHAT IS CLAIMED IS:

1. A control line assembly for a surface wellhead, comprising:

a main housing assembly having an end selectively mounted to the wellhead;

a stem in the housing assembly;

a penetrating end on the stem extending through a passage in the wellhead; and

a metal seal ring located at the penetrating end for sealingly engaging a tubing hanger installed within the wellhead when energized.

2. The assembly of claim 1, further comprising:

a radial projection extending from the stem; and

a cylinder adapted to be pressurized via hydraulic fluid, wherein the hydraulic fluid exerts a distributed force on the radial projection of the stem to force the stem forward to thereby energize the metal seal ring at the penetrating end against the tubing hanger.

3. The assembly of claim 1, further comprising a recess formed on the exterior end of the stem that indicates when metal seal ring on the penetrating end of the stem is set against the tubing hanger, the recess located on the stem such that recess is visible.

4. The assembly of claim 1, further comprising:

a lockout piston adapted to be pressurized via hydraulic fluid, the lockout piston initially maintaining the locking ring off the mating profile of the stem during setting of metal seal ring;

a locking ring that circumscribes a portion of the stem, the locking ring having a toothed inner profile for lockingly engaging the mating profile of the stem to lock the stem in place.

5. The assembly of claim 4, wherein a spring is located within the main housing assembly and interfaces with the split locking ring to drive the locking ring forward into mating engagement with the mating profile of the stem after the lockout piston is depressurized.

6. The assembly of claim 1, wherein the penetrating end comprises a bellows-like structure.

7. The assembly of claim 6, wherein a mating profile is formed on an outer surface of the stem.

8. A well completion system, comprising:

a wellhead having a body with a bore and a sidewall, the wellhead having at least one horizontal wellhead passage extending through the sidewall;

a tubing hanger located within the bore of the wellhead having a hanger passage,

a control line assembly comprising:

a main housing assembly having an end selectively mounted to the wellhead;

a stem in the housing assembly;

a penetrating end on the stem extending through a passage in the wellhead; and

a metal seal ring located at the penetrating end for sealingly engaging a tubing hanger installed within the wellhead when energized.

9. The system of claim 8, further comprising:

a radial projection extending from the stem; and

a cylinder adapted to be pressurized via hydraulic fluid, wherein the hydraulic fluid exerts a distributed force on the radial projection of the stem to force the stem forward to thereby energize the metal seal ring at the penetrating end against the tubing hanger.

10. The system of claim 8, further comprising a recess formed on the exterior end of the stem that indicates when metal seal ring on the penetrating end of the stem is set against the tubing hanger, the recess located on the stem such that recess is visible.

11. The system of claim 8, further comprising:

a lockout piston adapted to be pressurized via hydraulic fluid, the lockout piston initially maintaining the locking ring off the mating profile of the stem during setting of metal seal ring;

a locking ring that circumscribes a portion of the stem, the locking ring having a toothed inner profile for lockingly engaging the mating profile of the stem to lock the stem in place.

12. The system of claim 11, wherein the stem in the housing assembly is connected to a hydraulic source.

13. The system of claim 8, further comprising a secondary metal seal ring concentric with the stem for sealing between the stem and the main housing assembly.

14. The system of claim 13, wherein

at least one horizontal and at least one vertical hanger passage intersectingly communicate;

the horizontal hanger passage registers with the horizontal wellhead passage; and

the vertical hanger passage communicates with a lower surface of the tubing hanger;

15. The system of claim 14, further comprising:

a key located at a lower portion of the tubing hanger; and

a recess formed in the wellhead bore for receiving the key;

wherein,

the key is outwardly biased by at least one spring; and

the key is received by the recess when the at least one horizontal hanger passage is aligned with the horizontal wellhead passage.

16. The system of claim 14, wherein the at least one horizontal hanger passage has an exit point on the tubing hanger located above a tubing hanger entry point of the at least one vertical hanger passage.

17. A method of controlling a device in a wellbore, comprising:

providing control line assembly:

a main housing assembly having an end selectively mounted to the wellhead;

a stem in the housing assembly;

a penetrating end on the stem extending through a passage in the wellhead; and

a metal seal ring located at the penetrating end for sealingly engaging a tubing hanger installed within the wellhead when energized;

contacting a sealing end of the penetrating end with a control passage in the wellhead so that the passage in the stem registers with the control passage and defines an interface between the sealing end and the wellhead;

sealing the interface by maintaining a contact force on the stem; and

flowing a control fluid through the passage in the stem and into the control passage.

18. The method of claim 17, further comprising:

pressurizing a cylinder circumscribing the stem to force the stem forward to energize the metal seal ring.

19. The method of claim 17, further comprising:

setting a secondary metal seal ring to effect a seal between the main housing assembly and the stem.

20. The method of claim 17, further comprising:

pressurizing a lockdown piston to maintain the locking ring off the mating profile of the stem during energizing of the metal seal ring.

CLAIMS

1. A control line assembly for a surface wellhead, comprising:

a main housing assembly having an end selectively mounted to the wellhead;

a stem in the housing assembly;

a penetrating end on the stem extending through a passage in the wellhead;

a metal seal ring located at the penetrating end for sealingly engaging a tubing hanger installed within the wellhead when energized;

a locking ring that circumscribes the stem and that is in selective restraining contact with the stem; and

a hydraulically actuated locking piston that is in engaging contact with the locking ring.

2. The assembly of claim 1, further comprising:

a radial projection extending from the stem; and

a cylinder adapted to be pressurized via hydraulic fluid, wherein the hydraulic fluid exerts a distributed force on the radial projection of the stem to force the stem forward to thereby energize the metal seal ring at the penetrating end against the tubing hanger.

3. The assembly of claim 1, further comprising a recess formed on the exterior end of the stem that indicates when metal seal ring on the penetrating end of the stem is set against the tubing hanger, the recess located on the stem such that the recess is visible.

4. The assembly of claim 1, wherein

the locking piston initially maintains the locking ring off of a mating profile of the stem during setting of the metal seal ring; and wherein the locking ring has a toothed inner profile for lockingly engaging the mating profile of the stem to lock the stem in place.

5. The assembly of claim 4, wherein the locking ring is split to define a split locking ring, and wherein a spring is located within the main housing assembly and

interfaces with the split locking ring to drive the locking ring forward into mating engagement with the mating profile of the stem after the lockout piston is depressurized.

6. The assembly of claim 1, wherein the penetrating end comprises a bellows-like structure.

7. The assembly of claim 6, wherein a mating profile is formed on an outer surface of the stem.

8. A well completion system, comprising:

a wellhead having a body with a bore and a sidewall, the wellhead having at least one horizontal wellhead passage extending through the sidewall;

a tubing hanger located within the bore of the wellhead having a hanger passage,

a control line assembly comprising:

a main housing assembly having an end selectively mounted to the wellhead;

a stem in the housing assembly;

a penetrating end on the stem extending through the horizontal wellhead passage in the wellhead;

a hydraulically actuated locking assembly comprising a locking ring that circumscribes the stem and that is in selective restraining contact with the stem, and a hydraulically actuated locking piston that is in engaging contact with the locking ring, the locking assembly being in selective securing engagement with the stem so that the stem is maintained in a setting position against the tubing hanger; and

a metal seal ring located at the penetrating end for sealingly engaging a tubing hanger installed within the wellhead when energized.

9. The system of claim 8, further comprising:

a radial projection extending from the stem; and

a cylinder adapted to be pressurized via hydraulic fluid, wherein the hydraulic fluid exerts a distributed force on the radial projection of the stem to force the stem

forward to thereby energize the metal seal ring at the penetrating end against the tubing hanger.

10. The system of claim 8, further comprising a recess formed on the exterior end of the stem that indicates when metal seal ring on the penetrating end of the stem is set against the tubing hanger, the recess located on the stem such that the recess is visible.

11. The system of claim 8, wherein

the lockout piston is initially maintaining the locking ring off of a mating profile of the stem during setting of metal seal ring;

wherein the locking ring has a toothed inner profile for lockingly engaging the mating profile of the stem to lock the stem in place.

12. The system of claim 11, wherein the stem in the housing assembly is connected to a hydraulic source.

13. The system of claim 8, further comprising a secondary metal seal ring concentric with the stem for sealing between the stem and the main housing assembly.

14. The system of claim 13, wherein

at least one horizontal and at least one vertical hanger passage intersectingly communicate with each other;

the horizontal hanger passage registers with the horizontal wellhead passage; and

the vertical hanger passage communicates with a lower surface of the tubing hanger;

15. The system of claim 14, further comprising:

a key located at a lower portion of the tubing hanger; and

a recess formed in the wellhead bore for receiving the key;

wherein,

the key is outwardly biased by at least one spring; and

the key is received by the recess when the at least one horizontal hanger passage is aligned with the horizontal wellhead passage.

16. The system of claim 14, wherein the at least one horizontal hanger passage has an exit point on the tubing hanger located above a tubing hanger entry point of the at least one vertical hanger passage.

17. A method of controlling a device in a wellbore, comprising:

providing a control line assembly:

a main housing assembly having an end selectively mounted to the wellhead;

a stem in the housing assembly;

a penetrating end on the stem extending through a passage in the wellhead; and

a metal seal ring located at the penetrating end for sealingly engaging a tubing hanger installed within the wellhead when energized;

contacting a sealing end of the penetrating end with a control passage in the wellhead so that a passage in the stem registers with the control passage and defines an interface between the sealing end and the wellhead;

sealing the interface by maintaining a contact force on the stem;

pressurizing a lockdown piston to maintain a locking ring off of the mating profile of the stem during energizing of the metal seal ring; and

flowing a control fluid through the passage in the stem and into the control passage.

18. The method of claim 17, further comprising:

pressurizing a cylinder circumscribing the stem to force the stem forward to energize the metal seal ring.

19. The method of claim 17, further comprising:

setting a secondary metal seal ring to effect a seal between the main housing assembly and the stem.