CLAIMS

WHAT IS CLAIMED IS:

1. A subsea assembly for carrying fluids from a subsea wellbore comprising:

   an outer tubular inserted in an opening of the wellbore;

   a hanger mounted on a lower end of the outer tubular;

   a casing string depending from the hanger into the wellbore; and

   an axially expandable and contractable member provided along a portion of the casing string.

2. The subsea assembly of claim 1, wherein the expandable and contractable member comprises a uni-body tubular having a wall formed to axially expand and contract a greater amount per linear increment than the casing.

3. The subsea assembly of claim 1, wherein the axially expandable and contractable member has a wall with a series of slots along the wall length alternatingly formed about the wall inner circumference and about the wall outer circumference, each slot lying in a plane substantially perpendicular to an axis of the member.

4. The subsea assembly of claim 1, wherein the expandable and contractable member comprises annular foldable segments coaxially stacked along an axis of the member.

5. The subsea assembly of claim 4, wherein the foldable segments have an "S" shaped cross section, wherein the segment outer and inner diameter can vary along the member axis length.

6. The subsea assembly of claim 1, wherein the expandable and contractable member has a wall with a bellows like shape.

7. The subsea tubular assembly of claim 1, wherein the expandable and contractable member has a wall with a helix forming a corrugated pattern along a surface of the wall.
8. The subsea assembly of claim 1, further comprising a support sleeve circumscribing at least a portion of the expandable and contractable member.
9. The subsea assembly of claim 1, wherein the outer tubular comprises a conductor pipe mounted in a wellhead housing set on the sea surface.
10. The subsea assembly of claim 1, wherein the outer tubular comprises a conductor pipe mounted to the sea surface and the hanger is below a mudline on the seafloor.
11. A subsea assembly for carrying fluids from a subsea wellbore comprising:

a wellhead assembly comprising a production tree mounted on a wellhead housing

a hanger mounted within the wellhead housing;

a casing string depending from the hanger into the wellbore; and

an axially expandable and contractable member provided along a portion of the casing string.
12. The subsea assembly of claim 11, wherein the expandable and contractable member comprises a uni-body tubular having a wall formed to axially expand and contract a greater amount per linear increment than the casing string.
13. The subsea assembly of claim 11, wherein the axially expandable and contractable member has a wall with a series of slots along the wall length alternatingly formed about the wall inner circumference and about the wall outer circumference, each slot lying in a plane substantially perpendicular to an axis of the member.
14. The subsea assembly of claim 11, wherein the expandable and contractable member comprises annular foldable segments coaxially stacked along an axis of the member.

15. The subsea assembly of claim 11, wherein the expandable and contractable member has a wall with a bellows like shape.

16. The subsea assembly of claim 11, further comprising a support sleeve circumscribing at least a portion of the expandable and contractable member.

17. A subsea assembly for carrying fluids from a subsea wellbore comprising:

a conductor pipe supported by the sea floor and projecting a distance into the wellbore;

a mudline hanger mounted within the conductor pipe;

a casing string depending from the hanger into the wellbore; and

an axially expandable and contractable member provided along a portion of the casing string.

18. The subsea assembly of claim 17, wherein the expandable and contractable member comprises a uni-body tubular having a wall formed to axially expand and contract a greater amount per linear increment than the casing string.

19. The subsea assembly of claim 17, wherein the axially expandable and contractable member has a wall with a series of slots along the wall length alternatingly formed about the wall inner circumference and about the wall outer circumference, each slot lying in a plane substantially perpendicular to an axis of the member.

20. The subsea assembly of claim 17, wherein the expandable and contractable member comprises annular foldable segments coaxially stacked along an axis of the member.

21. A compensating casing sub mechanically coupleable between a tubular member and a second member, comprising:

a tubular body having an axis;

a first end secureable to the tubular member; and

a series of compressible segments integrally formed in the body circumscribing the axis and sequentially arranged along a length of the body to enable the body to be compressed between the tubular member and the second member to absorb thermal expansion of the tubular member.

22. The compensating casing sub of claim 21, wherein the second member is secured to a wellhead member and compression of the compensating casing sub reduces stress between the second member and the wellhead member due to thermal expansion of the tubular member.

23. The compensating casing sub of claim 21, wherein the compressible segments are defined by slots alternatingly formed about an inner circumference and an outer circumference of the body.

24. The compensating casing sub of claim 21, wherein the compressible segments form a bellows-like configuration.

25. The compensating casing sub of claim 21 wherein the compressible segments are defined by a series of slots along the wall length alternatingly formed about the wall inner circumference and about the wall outer circumference, each slot lying in a plane substantially perpendicular to the member axis.

26. The compensating casing sub of claim 21 comprising a support sleeve circumscribing at least a portion of the compressible segments.

CLAIMS

WHAT IS CLAIMED IS:

1. A subsea assembly for carrying fluids from a subsea wellbore comprising:

an outer tubular inserted in an opening of the wellbore;

a hanger mounted on a lower end of the outer tubular;

a casing string depending from the hanger into the wellbore; and

an axially expandable and compensating member provided along a portion of the casing string having a wall with undulations that comprise a series of slots along a length of the wall alternatingly formed about an inner circumference and about an outer circumference of the wall, each slot lying in a plane substantially perpendicular to an axis of the compensating member, the slots defining a series of cantilevers along a length of the body that are bendable when the body is axially compressed and that are bendable when the body is axially elongated, so that when casing above the compensating member is supported in tension the body transmits the tension to the casing below the compensating member.

2. The subsea assembly of claim 1, wherein the compensating member axially expands and contracts a greater amount per linear increment than the casing string.

3. The subsea assembly of claim 1, wherein the cantilevers in the wall comprise annular foldable segments coaxially stacked along an axis of the compensating member.

4. The subsea assembly of claim 3, wherein the foldable segments have an "S" shaped cross section.

5. The assembly of claim 1, wherein the slots in the wall comprise helical grooves.

6. The subsea assembly of claim 1, further comprising a support sleeve circumscribing at least a portion of the compensating member and that is free of the tension transmitted through the compensating member.

7. The subsea assembly of claim 1, wherein the outer tubular comprises a conductor pipe mounted in a wellhead housing set on the sea surface.

8. The subsea assembly of claim 1, wherein the outer tubular comprises a conductor pipe mounted to the sea surface and the hanger is below a mudline on the seafloor.

9. A subsea assembly for carrying fluids from a subsea wellbore comprising:

a wellhead assembly comprising a production tree mounted on a wellhead housing

a hanger mounted within the wellhead housing;

a casing string depending from the hanger into the wellbore; and

a compensating member that is axially expandable and contractible provided along a portion of the casing string and having a body with a wall that includes undulations comprising a series of slots along a length of the wall alternatingly formed about an inner circumference and about an outer circumference of the wall, each slot lying in a plane substantially perpendicular to an axis of the compensating member, the slots defining a series of cantilevers along a length of the body that are bendable when the body is axially compressed and that are bendable when the

body is axially elongated, so that when casing above the compensating member is supported in tension the body transmits the tension to the casing below the compensating member.

10. The subsea assembly of claim 9, wherein the compensating member further comprises a set of threads on each end of the body for connecting to upper and lower sections of the casing string wherein the wall has a greater thickness between the inner and outer diameter surfaces than portions of the body containing the threads.

11. A compensating casing sub mechanically coupleable between a tubular member and a second member, comprising:

a tubular body having a steel wall and an axis;

a first end adapted to be affixed to an end of the tubular member;

a second end adapted to be affixed to an end of the second member;

a series of compressible segments integrally formed in the wall of the body circumscribing the axis and sequentially arranged along a length of the body to enable the body to be compressed between the tubular member and the second member to absorb thermal expansion of the tubular member; and wherein

the compressible segments are defined by a series of helical slots along a length of the wall alternatingly formed about an inner circumference and about an outer circumference of the wall, each helical slot lying in a plane substantially perpendicular to an axis of the compensating member, the helical slots defining a series of cantilevers along a length of the body that are bendable when the body is axially compressed and bendable when the body is axially elongated.

12. The compensating casing sub of claim 11, wherein the second member is adapted to be secured to a wellhead member and compression of the compensating casing sub reduces stress between the second member and the wellhead member due to thermal expansion of the tubular member.