Claims:

1. A tubular connector having an axis and comprising:

a pin having a bore and external threads;

an external flange on the pin having an abutment shoulder on one side and a pin transition shoulder on an opposite side and facing in an opposite direction from the abutment shoulder, the pin transition shoulder being in a plane perpendicular to the axis, the pin having a cylindrical portion with a smaller outer diameter than an outer diameter of the external flange adjoining the pin transition shoulder;

a box having a bore with internal threads that engage the external threads of the pin, the box having a rim that abuts the abutment shoulder;

the box having a cylindrical portion opposite the rim that is of smaller outer diameter than a portion of the box containing the internal threads, defining a box transition shoulder that is in a plane perpendicular to the axis; and

an annular undercut recess located on at least one of the transition shoulders at a junction with the cylindrical portion joining said at least one of the transition shoulders.

2. The tubular connector of Claim 1, wherein the undercut recess has a partially elliptical profile in cross section.

3. The tubular connector of Claim 1, wherein the undercut recess when viewed in cross section is a continuous U-shaped curve with an axial depth greater than a radial width.

4. The tubular connector of Claim 1, wherein each of the transition shoulders has one of the undercut recesses.

5. The tubular connector of Claim 1, wherein:

the undercut recess is located on the transition shoulder of the external flange; and

the undercut recess has an axial depth that is less than one-half an axial thickness of the external flange.

6. The tubular connector of Claim 5, wherein the external flange has a lesser axial thickness measured between the undercut recess and the abutment shoulder than measured at the outer diameter of the external flange.

7. The tubular connector of Claim 1, wherein:

when viewed in cross section, the undercut recess has an inner curved wall, an outer curved wall, and a curved base joining the inner curved wall with the outer curved wall; and wherein

the inner curved wall is flush with the cylindrical portion adjoining said at least one transition shoulder.

8. The tubular connector of Claim 1, wherein the undercut recess has a radial width that is less than one-half a radial width of the transition shoulder on which it is located.

9. A tubular connector, comprising:

a pin having a bore, an axis, and external threads;

an external flange on the pin having an upward facing abutment shoulder on an upper side for abutment by a rim of a box, and a pin transition shoulder on a lower side, the pin transition shoulder being in a plane perpendicular to the axis; and

an annular undercut recess formed in an inner diameter portion of the transition shoulder, the undercut recess being continuously curved in cross-section and having an axial depth greater than a radial width.

10. The tubular connector of Claim 9, wherein the undercut recess has a partially elliptical profile in cross section.

11. The tubular connector of Claim 9, wherein the undercut recess when viewed in cross section is a continuous U-shaped curve.

12. The tubular connector of Claim 9, wherein the undercut recess has an axial depth that is less than one-half an axial thickness of the external flange.

13. The tubular connector of Claim 9, wherein the external flange has a lesser axial thickness measured between the undercut recess and the abutment shoulder than measured at an outer diameter of the external flange.

14. The tubular connector of Claim 9, wherein:

when viewed in cross section, the undercut recess has an inner curved wall, an outer curved wall, and a curved base joining the inner curved wall with the outer curved wall; wherein

the pin has a cylindrical portion adjoining the transition shoulder; and

the inner curved wall is flush with the cylindrical portion.

15. The tubular connector of Claim 9, wherein the undercut recess has a radial width that is less than one-half a radial width of the transition shoulder.

16. A tubular connector having an axis and comprising:

a pin having a bore and external threads;

an external flange on the pin having an abutment shoulder on one side and a pin transition shoulder on an opposite side and facing in an opposite direction from the abutment shoulder, the pin transition shoulder being in a plane perpendicular to the axis and joining a cylindrical portion of the pin having a smaller outer diameter than an outer diameter of the external flange;

a box having a bore with internal threads that engage the external threads, the box having a rim that abuts the abutment shoulder;

the box having a cylindrical portion opposite the rim that is of smaller outer diameter than a portion of the box containing the internal threads, defining a box transition shoulder that is in a plane perpendicular to the axis; and

an annular undercut recess located on an inner diameter portion of each of the transition shoulders.

17. The tubular connector of Claim 16, wherein each of the undercut recesses when viewed in cross section is a continuous U-shaped curve with an axial depth greater than a radial width.

18. The tubular connector of Claim 16, wherein:

when viewed in cross section, each of the undercut recesses has an inner curved wall, an outer curved wall, and a curved base joining the inner curved wall with the outer curved wall; and wherein

the inner curved wall is flush with the cylindrical portion adjoining the transition shoulder.

19. The tubular connector of Claim 16, wherein each of the undercut recesses has a radial width that is less than one-half a radial width of the transition shoulder on which it is located.

20. The tubular connector of Claim 16, wherein the undercut recess in the transition shoulder of the box has a same inner and outer diameter as the undercut recess in the transition shoulder of the pin.

CLAIMS

1. A tubular connector having an axis and comprising:

a pin having a bore, an axially extending cylindrical portion, and external threads;

a box having a bore with internal threads that engage the external threads of the pin, the box having a rim on an end of the box;

the box having a cylindrical portion opposite the rim that is of smaller outer diameter than a portion of the box containing the internal threads;

a transition shoulder on at least one of the box or pin, the transition shoulder being in a transition shoulder plane perpendicular to the axis and having an outer diameter that is larger than the cylindrical portion of said box or pin adjoining the transition shoulder; and

an annular undercut recess located on the transition shoulder at a junction with the cylindrical portion joining the transition shoulders, wherein, when viewed in cross section, the undercut recess has an inner curved wall that is flush with and parallel to the outer diameter of the cylindrical portion adjoining the transition shoulder; and

wherein an inner diameter of the bore of the at least one box or pin at the transition shoulder plane is in fluid communication with the cylindrical portion of the pin and the box.

2. The tubular connector of claim 1, wherein the undercut recess has a partially elliptical profile in cross section.

3. The tubular connector of claim 1, wherein the undercut recess when viewed in cross section is a continuous U-shaped curve with an axial depth greater than a radial width.

4. The tubular connector of claim 1, wherein the transition shoulder and the undercut recess are located on the box.

5. The tubular connector of claim 1, wherein:

the transition shoulder and the undercut recess are located on an the external flange of the pin; and

the undercut recess has an axial depth that is less than one-half an axial thickness of the external flange.

6. The tubular connector of claim 5, wherein the external flange has a lesser axial thickness measured between the undercut recess and the abutment shoulder than measured at the outer diameter of the external flange.

7. The tubular connector of claim 1, wherein:

when viewed in cross section, the undercut recess further comprises an outer curved wall, and a curved base joining the inner curved wall with the outer curved wall.

8. A tubular connector of claim 1, wherein the undercut recess has a radial width that is less than one-half a radial width of the transition shoulder on which it is located.

9. A tubular connector, comprising:

a box having a bore, an axis, and internal threads;

a rim on an end of the box, the box having a cylindrical portion opposite the rim that is of smaller outer diameter than a portion of the box containing the internal threads, defining a box transition shoulder for engagement with a tubing elevator, the box transition shoulder being in a transition shoulder plane perpendicular to the axis; and

an annular undercut recess formed in an inner diameter portion of the box transition shoulder, the undercut recess being continuously curved in cross-section and having an axial depth greater than a radial width, the undercut recess having an inner curved wall that is flush with and parallel to a cylindrical outer surface of the box at the plane of the box transition shoulder; and wherein

an inner diameter of the bore of the box at the transition shoulder plane is in fluid communication with a pin with external threads that engage the internal threads of the box.

10. The tubular connector of claim 9, wherein the undercut recess has a partially elliptical profile in cross section.

11. The tubular connector of claim 9, wherein the undercut recess when viewed in cross section is a continuous U-shaped curve.

12. The tubular connector of claim 9, wherein an inner diameter of the cylindrical portion of the box is smaller that an inner diameter of the portion of the box containing the internal threads, defining an internal shoulder, and wherein the undercut recess has an axial depth that is less than one-half an axial distance between the internal shoulder and the box transition shoulder.

13. The tubular connector of claim 9, wherein:

when viewed in cross section, the undercut recess further comprises, an outer curved wall, and a curved base joining the inner curved wall with the outer curved wall.

14. The tubular connector of claim 9, wherein the undercut recess has a radial width that is less than one-half a radial width of the box transition shoulder.

15. A tubular connector having an axis and comprising:

a pin having a bore, an axially extending cylindrical portion, and external threads;

a box having a bore with internal threads that engage the external threads, the box having a rim on an end;

the box having a cylindrical portion opposite the rim that is of smaller outer diameter than a portion of the box containing the internal threads, defining a box transition shoulder that is in a transition shoulder plane perpendicular to the axis; and

an annular undercut recess located on an inner diameter portion of the box transition shoulder, wherein when viewed in cross section, the undercut recess has an inner curved wall with a tangent line that is parallel with the outer diameter of the cylindrical portion adjoining the transition shoulder; and wherein

an inner diameter of the bore of the box or pin at the transition shoulder plane is in fluid communication with the cylindrical portion of the pin and the box.

16. The tubular connector of claim 15, wherein the undercut recess when viewed in cross section is a continuous U-shaped curve with an axial depth greater than a radial width.

17. The tubular connector of claim 15, wherein:

when viewed in cross section, the undercut recess further comprises an outer curved wall, and a curved base joining the inner curved wall with the outer curved wall; and wherein

the inner curved wall is flush with the cylindrical portion adjoining the box transition shoulder.

18. The tubular connector of claim 15, wherein the undercut recess has a radial width that is less than one-half a radial width of the box transition shoulder.

19. The tubular connector of claim 15, further comprising;

an external flange on the pin having a pin transition shoulder, the pin transition shoulder being in a plane perpendicular to the axis and joining a cylindrical portion of the pin having a smaller outer diameter than an outer diameter of the external flange; and

an annular undercut recess in the pin transition shoulder, wherein when viewed in cross section, the undercut recesses has an inner curved wall with a tangent line that is parallel with the outer diameter of the cylindrical portion adjoining the pin transition shoulder.