CLAIMS

WHAT IS CLAIMED IS:

1. A pipe connection, comprising:

a pin having circumferentially extending external grooves;

a box having an annular base with an axis, cantilevered fingers joining the base and extending from the base in a first direction, the cantilevered fingers spaced around the axis and having free ends, each of the fingers having circumferentially extending internal grooves and an external thread having crests;

a collar having a plurality of turns of an internal thread on an inner side, each of the turns of the internal thread having an internal thread crest, wherein an axial dimension of each of the internal thread crests is greater than an axial dimension of each of the external threads crests; wherein

the box and the pin have a stab-in position in which the internal grooves are spaced radially outward from full engagement with the external grooves; and

rotating the collar relative to the pin and the box in a locking direction from the stab-in position to a locked position deflects the internal grooves of the fingers inward into full mating engagement with the external grooves.

2. The connection according to claim 1, wherein each of the crests of the internal thread faces toward the axis and in a second direction.

3. The connection according to claim 1, further comprising:

a stop shoulder that engages the collar while the collar is in the stab-in position and also in the locked position; and wherein

the stop shoulder prevents any axial movement of the collar relative to the box and the pin while rotating the collar from the stab-in position to the locked position.

4. The connection according to claim 1, wherein:

while the pin and the box are in the stab-in position, the crests of the external thread are located in roots of the internal thread and the crests of the internal thread are located in roots of the external thread; and

while the pin and the box are in the locked position, the crests of the internal thread are abutting the crests of the external thread.

5. The connection according to claim 1, wherein the internal thread comprises:

a first flank and a second flank separated by one of the crests of the internal thread, the second flank being closer to the base than the first flank and having a lesser depth than the first flank.

6. The connection according to claim 1, wherein each of the crests of the internal threads increase in diameter from turn to turn in a second direction from the free ends toward the base.

7. The connection according to claim 1, further comprising:

a release ring mounted to an inner side of the collar, the release ring having a conical portion that engages an inner side of each of the fingers adjacent the free ends; and

the box and the pin having a released position that is achieved in response to rotation of the collar relative to the pin and the box in a releasing direction from the locked position, the rotation of the collar in the releasing direction causing the collar and the release ring to move axially in the second direction and deflecting the fingers and the internal grooves outward from full mating engagement with the external grooves.

8. The connection according to claim 1, wherein:

a tangent line at a midpoint of each of the internal thread crests intersects the axis at an acute angle, the acute angle decreasing from turn to turn in the second direction.

9. The connection according to claim 1, wherein:

the external grooves are located on a conical surface of the pin;

the internal grooves are located on a conical surface of the box;

the external thread is located on a cylindrical surface circumscribed by the fingers; and

the internal thread is located on a cylindrical surface of the collar.

10. A pipe connection, comprising:

a pin having circumferentially extending external grooves;

a box having an annular base with an axis, deflectable fingers joining the base and extending in a first direction from the base, the fingers being spaced from each other by slits and having free first ends;

each of the fingers having circumferentially extending internal grooves on an inner side and a plurality of turns of an external thread on an outer side, each of the turns of the external thread having an external thread crest separated by an external thread root;

a cylindrical collar having a plurality of turns of an internal thread on an inner side, each of the turns of the internal thread having an internal thread root and an internal thread crest, the internal thread crests being curved in a concave shape such that a tangent line at a midpoint of the an internal thread crests intersects the axis at an acute angle, the acute angle decreasing from turn to turn in the second direction; wherein

the box and the pin have a stab-in position in which the internal grooves are spaced radially out of full engagement with the internal grooves, and the external thread crests are located in the internal thread roots;

the box and the pin are movable from the stab-in position to the locked position in response to rotation of the collar relative to the pin and the box in a locking direction; and

in the locked position, the external thread crests are in engagement with the internal thread crests, and the internal grooves are in full engagement with the external grooves.

11. The connection according to claim 10, wherein:

the collar is prevented from axial movement while being rotated in the locking direction from the stab-in position to the locked position.

12. The connection according to claim 10, wherein:

an axial dimension of each of the internal thread crests is greater than an axial dimension of each of the external threads crests.

13. The connection according to claim 10, wherein:

each of the internal thread crests is defined by an internal thread first flank and an internal thread second flank, with the internal thread root extending between the internal thread first flank and the internal thread second flank; and

the internal thread first flank has a greater depth than the internal thread second flank.

14. The connection according to claim 10, wherein:

a selected point on each of the internal thread crests is at the same distance from the axis, and the selected point becomes closer to a first tip of the crest of each of the turns from turn to turn in a second direction.

15. The connection according to claim 10, further comprising:

a release ring mounted to the inner side of the collar, the release ring having a conical portion that engages the inner side of each of the fingers adjacent the free ends; and

the box and the pin have a released position that is achieved by rotating the collar relative to the pin and the box in a releasing direction from the locked position, the rotation of the collar in the releasing direction causing the collar and the release ring to move in a second direction and deflecting the fingers and the internal grooves outward from full mating engagement with the external grooves.

16. A pipe connection, comprising:

a pin having circumferentially extending external grooves;

a box having an annular base with an axis and fingers joining and extending axially from the base, the fingers being spaced from each other by slits and having free ends;

each of the fingers having circumferentially extending internal grooves on an inner side and a plurality of turns of an external thread on an outer side, the external thread having a crest;

a cylindrical collar having a plurality of turns of an internal thread on an inner side;

each of the turns of the internal thread having a first flank separated from a second flank by a root and an internal thread crest, a tapered crest extending between tips of the first flank and the second flank, a radial distance from the axis to the tip of the first flank being less than a radial distance from the axis to the tip of the second flank of each of the turns, the radial distances from the axis to the tips of the first and second flanks increasing from one turn to the next turn in the second direction, wherein an axial dimension of the internal thread crests is greater than an axial dimension of the external threads crests; wherein

the box and the pin have a stab-in position in which the internal grooves are spaced radially out of full engagement with the internal grooves and the crests of the external thread are located between first flank and the second flank of the internal thread;

the box and the pin are movable from the stab-in position to the locked position in response to locking direction rotation of the collar relative to the pin and the box;

a stop on the box that prevents axial movement of the collar during the locking direction rotation from the stab-in position; and

in the locked position, the crests of the external threads are in abutment with the crests of the internal threads, the free ends of the fingers have deflected inward, and the internal grooves are in full engagement with the external grooves.

17. The connection according to claim 16, wherein:

the roots of each of the turns of the internal thread are located a same distance from the axis.

18. The connection according to claim 16, wherein:

the first flank of each of the turns of the internal thread has a greater dimension from the root to the tip of the first flank than the second flank.

19. The connection according to claim 16, wherein:

the internal thread is formed on a cylindrical surface of the collar; and

the external thread is formed on a cylindrical surface circumscribed by the fingers.