CLAIMS:

Claim 1: A method of closing an open end (111A) of a receptacle (110) having a wall (119) with an inner wall surface (124) defining an inner diameter (122) that defines a receptacle axis, the method comprising:

(a) providing an end element (112) defining an end element axis, the end element comprising:

an external portion (128) having at least one external portion diameter (130) greater than the inner diameter (122) of the receptacle (110);

an internal portion (132) formed for at least partial engagement thereof with the wall (119), the internal portion (132) comprising a body element (138), and at least one projecting element (140) extending radially from the body element relative to the end element axis (X) of the end element (112), said at least one projecting element comprising the engagement part (152) of the heated layer (L), said at least one projecting element (140) at least partially defining at least one recess (141) located adjacent thereto;

(b) providing at least one heating element (144), for heating the internal portion (132);

(c) providing an inert atmosphere covering the internal portion (132) and a preselected part of the wall (119);

(d) energizing said at least one heating element (144), to heat at least one or more heated layers (L) of the internal portion (132) to a hot working temperature, at which the heated layer (L) is at least partially plastically deformable; and

(e) when the heated layer (L) is at the hot working temperature, engaging at least an engagement part (152) of the heated layer (L) with at least the preselected part of the wall (119), and subjecting one or both of the receptacle (110) and the end element (112) to an engagement motion relative to the other while the engagement part and the preselected part are engaged for plastic deformation thereof, to at least partially bond the heated layer (L) and the wall (119) of the receptacle (110) together to form a gastight container assembly (127), wherein the engagement

part (152) is at least partially moved into said at least one recess when said at least one projecting element is engaged with the preselected part of the inner wall surface for plastic deformation thereof.

Claim 2: A method comprising:

(a) providing a metal receptacle (1010) having a wall (1019) defining an open end (1011) and a receptacle axis (10Y) thereof;

(b) providing a metal end element (1012) defining an end element axis (10X) thereof, the end element (1012) comprising:

an internal portion (1032) formed for at least partial engagement thereof with at least one preselected part (1025) of the wall (1019), the internal portion (1032) comprising a body (1038) having an inner wall surface (1087) formed to fit over said at least one preselected part (1025) of an outer wall surface (1045) of the wall (1019), the internal portion (1032) additionally comprising a plurality of fins (1040) mounted to the inner wall surface (1087), each said fin (1040) comprising an engagement part (1052) thereof positioned distal to the inner wall surface (1087), for engagement with the outer wall surface (1045) of the receptacle (1010);

an external portion (1028) formed for covering the open end (1011) of the receptacle (1010) when the inner surface (1087) is positioned over said at least one preselected part (1025);

(c) providing at least one heating element (1048), said at least one heating element (1048) being positioned for heating the engagement parts (1052) of the fins (1040);

(d) providing at least one receptacle heating element (1044), for heating a heated wall layer (10L) of the receptacle wall (1019), the heated wall layer (10L) comprising at least one preselected part (1025) of the wall (1019);

(e) providing an inert atmosphere at least partially covering the end element (1012) and the open end (1011);

(f) energizing said at least one heating element (1048), to heat at least the engagement parts of the internal portion (1032) to a hot working temperature below the metal's melting temperature, at which the engagement parts of the internal portion (1032) are plastically deformable;

(g) energizing said at least one receptacle heating element (1044) to heat the heated wall layer (10L) to the hot working temperature, at which the heated wall layer (10L) and said at least one preselected part (1025) are plastically deformable; and

(h) when the heated layer (10L) and the engagement parts of the internal portion (1032) are at the hot working temperature, engaging the engagement parts with the heated layer (10L), and subjecting one or both of the receptacle (1010) and the end element(1012) to an engagement motion relative to the other while the engagement parts and the heated layer (10L) are engaged, for plastic deformation thereof, and urging the engagement parts and said at least one preselected part (1025) against each other, to at least partially metallically bond the heated layer (10L) and the engagement parts of the internal portion (1032) together to form a gastight sealed receptacle assembly (1017), wherein upon said at least one heating element (1048) being energized, the engagement parts (1052) are heated thereby to the hot working temperature, wherein the engagement parts (1052) are plastically deformable.

Claim 3: The method according to claim 2 in which, after the engagement parts (1052) and the heated wall layer (10L) are heated to the hot working temperature, one or both of the receptacle (1010) and the end element (1012) are subjected to a translocation motion to urge the engagement parts (1052) of the fins (1040) against said at least one preselected part (1025) of the wall (1019).

Claim 4: The method according to claim 3 in which, prior to subjecting one or both of the receptacle (1010) and the end element (1012) to the translocation motion, the receptacle (1010) and the end element (1012) are positioned relative to each other to align the end element axis (10X) and the receptacle axis (10Y).

Claim 5: The method according to claim 3 in which, when the engagement parts (1052) are engaged with said at least one preselected part (1025), the end element (1012) is subjected to the translocation motion, and urged in the axial direction onto the receptacle (1010).

Claim 6: The method according to claim 3 in which the end element (1012) is subjected to the engagement motion before the engagement parts (1052) are engaged with said at least one preselected part (1025) of the wall (1019).

Claim 7: The method according to claim 5 in which the end element (1012) is subjected to the engagement motion while the end element (1012) is subjected to the translocation motion.

Claim 8: The method according to claim 2 in which the end element (1012) is rotated relative to the receptacle (1010) about the end element axis (10X) to provide the engagement motion.

Claim 9: The method according to claim 2 in which the end element (1012) is moved in the axial direction relative to the receptacle (1010) while the engagement parts (1052) are at least partially engaged with said at least one preselected part (1025) to provide the engagement motion.

Claim 10: The method according to claim 2 in which one or both of the end element (1012) and the receptacle (1010) are subjected to the translocation motion until a planar engagement surface (1042) of the end element (1012) engages an end (1015) of the receptacle (1010) that defines the open end (1011).

Claim 11: The method according to claim 10 in which the outer surface (1045) comprises a bevelled surface (1095) positioned at the end (1015) of the receptacle (1010), for engagement of the bevelled surface (1095) by the engagement parts (1052) as the end element (1012) is moved onto the receptacle (1010).

Claim 12: The method according to claim 2 in which:

the wall (1119) of the receptacle (1110) comprises a stop surface (1192);

the body (1138) comprises an end surface (1194) located at an end (1191) thereof that is distal to the external portion (1128), and the internal portion (1132) comprises a plurality of fins (1140B) mounted on the end surface (1194), wherein, when the internal portion (1132) is positioned on the end portion (1189) and the external portion (1128) engages the end (1115) of the receptacle(1110), the end surface (1194) fits over the stop surface (1192), and the fins (1140B) that are mounted to the end surface (1194) are pressed therebetween;

the method additionally comprising:

providing at least one supplementary end element heating element (1148B), for heating the engagement parts (1152) of the fins (1140B);

providing at least one receptacle heating element (1144), for heating a heated wall layer (11L) of the wall (1119), the heated wall layer (11L) comprising at least one preselected part (1125) of the wall (1119) that includes the stop surface (1192);

energizing said at least one heating element (1148B), to heat the engagement parts (1152) of the fins (1140B) to the hot working temperature, at which the engagement parts (1152) thereof are plastically deformable;

energizing said at least one receptacle heating element (1144) to heat the heated wall layer (11L) to the hot working temperature, at which the heated wall layer (11L) and said at least one preselected part (1125) are plastically deformable; and

when the heated layer (11L) and the engagement parts (1152) are at the hot working temperature, engaging the engagement parts (1152) with the heated layer (11L), in said at least one preselected part (1125) and subjecting one or both of the receptacle (1110) and the end element (1112) to an engagement motion relative to the other while the engagement parts (1152) and the heated layer (11L) are engaged, for plastic deformation thereof, and urging the engagement parts (1152) and said at least one preselected part (1125) together, to at least partially metallically bond the

heated layer (11L) and the engagement parts (1152) together to form a gastight sealed receptacle assembly (1117).

Claim 13: A method comprising [Figs. 13A, 13B]:

(a) providing a metal receptacle (1210) having a wall (1219) defining an open end (1211) and a receptacle axis (12Y) thereof, the receptacle (1210) comprising an outer wall surface (1245) thereof, and a plurality of fins (1240) extending from a preselected portion (1247) of the outer wall surface (1245) [0263], [0264];

(b) providing a metal end element (1212) formed to cover the open end and defining an end element axis (12X) thereof, the end element (1212) comprising:

an external portion (1228);

an internal portion (1232) comprising a body (1238) having an inner wall surface (1287) wherein, when the end element (1212) is positioned to cover the open end (1211) with the external portion (1228), one or more preselected parts (1225) of the body (1238) are engaged with engagement parts (1252) of the fins (1240) [0263], the engagement parts (1252) being located distal to the outer wall surface (1245) before the end element (1212) is positioned to cover the open end (1211) [0269];

(c) providing at least one heating element (1248), said at least one heating element (1248) being positioned for heating the preselected parts (1225) of the body (1238) [0271];

(d) providing at least one fin heating element (1244), for heating the engagement parts (1252) of the fins (1240); [0270]

(e) providing an inert atmosphere that covers the open end (1211) of the receptacle (1210) and the fins (1240), and the end element (1212); [0270]

(f) with said at least one heating element (1248), heating the one or more preselected parts (1225) of the body (1238) to a hot working temperature, at which the preselected parts (1225) are plastically deformable; [0271]

(g) with said at least one fin heating element (1244), heating the engagement parts (1252) of the fins (1240) to the hot working temperature, at which the engagement parts (1252) are plastically deformable; [0270] and

(h) when the engagement parts (1225) are at the hot working temperature and the one or more preselected parts are at the hot working temperature, engaging the engagement parts (1252) with the one or more preselected parts (1225), and subjecting one or both of the end element and the receptacle to an engagement motion relative to the other while the engagement parts (1252) and the one or more preselected parts (1225) are engaged, for plastic deformation thereof, and urging the engagement parts (1252) and the one or more preselected parts (1225) together, to at least partially metallically bond the engagement parts (1252) and the one or more preselected parts (1225) together, to form a gastight sealed receptacle assembly (1217).

Claim 14: The method according to claim 13 comprising [Figs. 14A, 14B]:

providing the receptacle (1310) with a plurality of fins (1340B) extending from a stop surface (1392) on the receptacle (1310) that is between an end portion (1389) and an intermediate portion (1390) of the receptacle (1310), the fins (1340B) comprising respective engagement parts (1352B) thereof that are distal to the stop surface (1392);

providing a metal end element (1312) comprising an internal portion (1332) having a body (1338) comprising an end surface (1394) located at an end (1391) thereof that is distal to the external portion (1328), the body (1338) comprising preselected parts (1325B) thereof that are contiguous with the end surface (1394);

providing at least one heating element (1348), for heating the first and second preselected parts (1325A, 1325B) of the body (1338);

providing at least one receptacle heating element (1344), for heating the first and second engagement parts (1352A, 1352B);

providing an inert atmosphere at least partially covering the end element(1312) and the open end (1311);

energizing said at least one heating element (1348), to heat the preselected parts (1325A, 1325B) of the body (1338) to a hot working temperature below the metal's melting temperature, at which the preselected parts (1325A, 1325B) are plastically deformable;

energizing said at least one receptacle heating element (1344) to heat the engagement parts (1352A, 1352B) to the hot working temperature, at which the engagement parts (1352A, 1352B) are plastically deformable; and

when the engagement parts (1352A, 1352B) and the preselected parts (1325A, 1325B) are at the hot working temperature, engaging the preselected parts (1325A, 1325B) with the engagement parts (1352A, 1352B) respectively and subjecting one or both of the receptacle (1310) and the end element (1312) to an engagement motion relative to the other while the engagement parts (1352A, 1352B) and the preselected parts (1325A, 1325B) are respectively engaged, for plastic deformation thereof, and urging the engagement parts (1352A, 1352B) and the preselected parts (1325A, 1325B) together respectively, to at least partially metallically bond the engagement parts (1352A, 1352B) and the preselected parts (1325A, 1325B) together respectively to form a gastight sealed receptacle assembly (1317).

Claim 15: A method according to claim 13 in which [Figs. 15A, 15B]:

the wall (1419) of the receptacle (1410) has an outer wall surface (1445A) that is formed to define an acute angle (Φ) relative to the receptacle axis (14Y), the wall (1419) additionally comprising a distal outer wall surface (1445B) and a stop surface (1492) located between the outer wall surface (1445A) and the distal outer wall surface (1445B);

the method additionally comprising:

providing the receptacle (1410) with a plurality of outer wall surface fins (1440A) mounted on the outer wall surface (1445A) and a plurality of stop surface fins (1440B) mounted on the stop surface (1492), each of the outer wall surface fins (1440A) and the stop surface fins (1440B) comprising an engagement part thereof located distal to the outer wall surface (1445A) and to the stop surface (1492) respectively;

providing a metal end element (1412) defining an end element axis (14X), the end element (1412) comprising an internal portion (1432) comprising a body (1438) having an inner wall surface (1487) formed to fit over the outer wall surface (1445A) and the outer wall surface fins (1440A) mounted thereon, and an end surface (1494) formed to fit over the stop surface (1492) and the stop surface fins (1440B) mounted thereon, the body (1438) comprising at least one preselected part (1425) thereof that is contiguous with the inner wall surface (1487), located for engagement with the engagement parts (1452) when the inner wall surface (1487) is positioned over the outer wall surface (1445A) of the receptacle (1410);

providing at least one fin heating element (1444), for heating the engagement parts (1452) of the outer wall surface fins (1440A) and the engagement parts (1452) of the stop surface fins (1440B);

providing at least one heating element (1448), for heating the preselected parts (1425) of the body (1438);

providing an inert atmosphere covering the receptacle (1410) and the end element (1412);

energizing said at least one fin heating element (1444) to heat the engagement parts (1452) to a hot working temperature, at which the engagement parts (1452) are at least partially plastically deformable;

energizing said at least one heating element (1448) to heat the preselected parts (1425) to the hot working temperature, at which the preselected parts (1425) are at least partially plastically deformable; and

when the engagement parts (1452) are at the hot working temperature and the preselected parts (1425) are at the hot working temperature, engaging the preselected parts (1425) with the engagement parts (1452) and subjecting one or both of the receptacle (1410) and the end element (1412) to an engagement motion relative to the other while the preselected parts (1425) and the engagement parts (1452) are engaged, for plastic deformation thereof, and urging the engagement parts (1452) and the preselected parts (1425) together, to at least partially metallically bond the engagement parts (1452) and the preselected parts (1425) together to provide a gastight sealed receptacle assembly (1417).