

U.S. PATENT NO. 11,885,358 CLAIM LISTING

Claim 1:

Limitation 1(pre): “A blind fastener comprising”

Limitation 1(a): “a sleeve comprising a first sleeve end, a second sleeve end, a cavity extending from the first sleeve end to the second sleeve end; and”

Limitation 1(b): “a mandrel configured to be at least partially received by the cavity of the sleeve, the mandrel comprising”

Limitation 1(c): “a first mandrel end disposed adjacent to the first sleeve end and comprising an enlarged portion having a diameter greater than a diameter of the cavity,”

Limitation 1(d): “a second mandrel end comprising a pull region, and”

Limitation 1(e): “a shank region extending intermediate the first mandrel end and the second mandrel end,”

Limitation 1(f): “wherein the pull region comprises an axial length no greater than 4 times a diameter of the shank region and is configured to be engaged by an installation tool.”

Claim 2: “The blind fastener of claim 1, wherein the pull region comprises an axial length no greater than 3.8 times the diameter of the shank region.”

Claim 3: “The blind fastener of claim 1, wherein the pull region comprises an axial length no greater than 2 times the diameter of the shank region.”

Claim 4: “The blind fastener of claim 1, wherein the pull region comprises a taper extending from the shank region.”

Claim 5: “The blind fastener of claim 1, wherein the mandrel does not comprise a breakneck groove.”

Claim 6: “The blind fastener of claim 1, wherein the mandrel comprises a Rockwell hardness of at least HRC 25.”

Claim 7: “The blind fastener of claim 1, wherein the mandrel comprises a Rockwell hardness of at least HRC 43.”

Claim 8: “The blind fastener of claim 1, wherein the shank region comprises at least one of, a threaded region, an annular shoulder, and a groove.”

Claim 9: “The blind fastener of claim 1, wherein the pull region comprises at least one of a threaded region, an annular shoulder, and a groove.”

Claim 10: “The blind fastener of claim 1, wherein the sleeve is generally cylindrical and the mandrel is generally cylindrical.”

Claim 11: “The blind fastener of claim 1, wherein the blind fastener comprises at least one of a metal, metal alloy, and a composite material.”

Claim 12: “The blind fastener of claim 1, wherein the blind fastener is adapted to be installed in a bore in a structure, the bore having a diameter greater than the diameter of the enlarged portion.”

Claim 13: “The blind fastener of claim 12, wherein the sleeve further comprises a collar, the sleeve is configured to deform on a first side of the structure, and the collar is configured to swage onto the shank region on an oppositely disposed second side of the structure.”

Claim 14: “The blind fastener of claim 12, wherein the structure comprises at least one of a metal, a metal alloy, and a composite material.”

Claim 15: “The blind fastener of claim 12, wherein the structure is configured as at least one of an aerospace component, an automotive component, a transportation component, and a building and construction component.”

Claim 16:

Limitation 16(pre): “A method for fastening, the method comprising:”

Limitation 16(a): “inserting a first mandrel end of a blind fastener into a bore in a structure,”

Limitation 16(b): “the blind fastener comprising a sleeve comprising a first sleeve end, a second sleeve end, and a cavity extending from the first sleeve end to the second sleeve end, and”

Limitation 16(c): “a mandrel configured to be at least partially received by the cavity of the sleeve, the mandrel comprising,”

Limitation 16(d): “a first mandrel end disposed adjacent to the first sleeve end and comprising an enlarged portion having a diameter greater than a diameter of the cavity,”

Limitation 16(e): “a second mandrel end comprising a pull region, and”

Limitation 16(f): “a shank region extending intermediate the first mandrel end and the second mandrel end,”

Limitation 16(g): “wherein the pull region comprises an axial length no greater than 4 times a diameter of the shank region and is configured to be engaged by an installation tool;”

Limitation 16(h): “engaging a collet of the installation tool with the pull region of the blind fastener;”

Limitation 16(i): “after the inserting, forcibly contacting the second sleeve end of the blind fastener with an anvil of the installation tool and moving the pull region distal from the second sleeve end utilizing the collet of the installation tool; and”

Limitation 16(j): “deforming the sleeve on a first side of the structure, and swaging the second sleeve end onto the shank region on an oppositely disposed second side of the structure, thereby securing at least a portion of the blind fastener in the structure.”

Claim 17: “The method of claim 16, wherein the pull region comprises an axial length no greater than 3.8 times the diameter of the shank region.”

Claim 18: “The method of claim 16, wherein the pull region comprises a taper or reverse taper extending from the shank region.”

Claim 19: “The method of claim 16, wherein the mandrel does not comprise a breakneck groove.”

Claim 20: “The method of claim 16, wherein the blind fastener comprises at least one of a metal, a metal alloy, and a composite material.”