USE OF STAINLESS STEEL RIVETS WITH TITANIUM PLATING

The present invention relates to joining members by rivets, and joining titanium plating with rivets in particular.

SUMMARY OF THE INVENTION

Briefly, and according to its major aspects, the present invention is the use of stainless steel rivets to join a first member made of titanium material to a second member made of steel or titanium. The first member is preferably titanium alloy and the second member is preferably carbon steel or titanium alloy. The stainless steel rivet is preferably cold drawn and is made of 316 stainless.

A feature of the present invention is that it does not interact galvanically with either the first material or the second material.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention is a method for joining a first material made of titanium material to a second material made of titanium material or carbon steel using stainless steel rivets. It is also a composition including, in combination, two members, a first member made of titanium material and a second member made of titanium material or carbon steel, joined by at least one stainless steel rivet.

The first material is made of titanium material which is defined herein to include titanium and titanium alloys. In particular, titanium alloy Ti-6Al-4V (also

known as Grade C-5 per ASTM B367 and "titanium alloy" per AMS 4985) is preferred. The second material is either titanium material of the same sort as the first material or a different titanium material, such as a different alloy of titanium, or carbon steel. Both ASTM B367 and AMS 4985 are hereby incorporated in their entirety by reference. The rivets are stainless steel, preferably AISI 300 series such as 303 and 316 stainless steel, and most preferably AISI 316. AISI 316 requirements are herein incorporated in their entirety by reference. Also, preferably the rivets are cold drawn for strength, most preferably in accordance with ASTM A479, which is incorporated herein by reference.

A composition according to the present invention includes a first member riveted using at least one rivet to a second member.

A method according to the present invention includes the steps of:

(a) providing a first member made of the first material in a cleaned condition, free of dirt, dust, grease, oil, and other foreign substances;

(b) providing a second member made of the second material in a clean condition, free of dirt, dust, grease, oil and other foreign substances;

(c) forming a hole in the first and the second member where they are to be joined by rivets;

(d) providing a stainless steel rivet;

(e) aligning the hole in said first member with the hole in the second member;

(f) placing the stainless steel rivet into said aligned holes; and

(g) upsetting said rivet.

It will be apparent to those skilled in the art of riveting materials to join them that many substitutions and modifications can be made to the foregoing preferred embodiment without departing from the spirit and scope of the present invention defined by the appended claims.

WHAT IS CLAIMED IS:

1. A composition, comprising:

a first member made of titanium material;

a second member made of titanium material or carbon steel;

at least one rivet joining said first member to said second member, said at least one rivet being made of stainless steel.

2. The composition as recited in claim 1, wherein said first material is a first titanium alloy and said second material is a second titanium alloy.

3. A method for joining to members, said method comprising the steps of:

(a) providing a first member made of titanium material;

(b) providing a second member made of titanium material or carbon steel;

(c) forming a first hole in said first material and a second hole in said second material;

(d) aligning said first and said second holes;

(e) providing a rivet made of stainless steel;

(f) placing said rivet in said aligned first and second holes; and

(g) upsetting said rivet to join said first member to said second member.

4. The method as recited in claim 3 wherein said first material is a first titanium alloy and said second member is a second titanium alloy.