

6. A method as claimed in claim 3 wherein the treatment is performed in equipment at a high vacuum.

7. A method as claimed in claim 3 wherein the treatment is performed in equipment with accurate temperature control so as to obtain a long and uniform temperature profile.

8. A method as claimed in claim 4 wherein the treatment is performed in equipment with accurate temperature control so as to obtain a long and uniform temperature profile.

9. A method for producing an integral continuous, uniformly distributed nitride layer having a high degree of purity in the surface of titanium or titanium alloys or objects consisting of titanium or titanium alloys, which nitride layer has a hardness of approximately 2000 HV_{0.05} and improves the friction and wear properties, as well as the corrosion-proof and biocompatibility properties of the titanium or titanium alloys in that the nitride layer is depleted of alloy metals from titanium alloys, comprising the steps of subjecting the untreated objects for 3-16 hours in a vacuum furnace with an atmosphere of extremely pure nitrogen gas at a treatment temperature of 650°-1000° C. and a pressure

below atmospheric pressure, the temperature only fluctuating by at most 7 degrees C. within a length of 50 cm and 3 degrees C. within a length of 30 cm over the heating zone, after which the temperature is reduced, and wherein the thickness of the nitride layer, being between 0.5 and 10 μm, and being governed by controlling the treatment time and temperature, and wherein prior to treatment with the pure nitrogen gas the untreated objects are heated under partial vacuum to the treatment temperature, while being subjected to a high flow of nitrogen in order to remove from the surface contamination layers and impurities which are desorbed during the heating process, the treatment step being performed in equipment with accurate temperature control whereby the temperature only fluctuates a few degrees over the heating zone with a uniform temperature profile and long heating zone in which the gas phase is activated before the nitration occurs, and wherein the treatment is performed using nitrogen gas of extreme purity, said equipment used in the treatment step having the highest gas tightness with leakage not above 2±0.5 hPa/M³s, torr/m³ per hour.

* * * * *

25

30

35

40

45

50

55

60

65