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US5431752	Friction welding of .gamma. titanium aluminide to steel body with nickel alloy connecting piece there between ABB SCHWEIZ
EP1002935	TiAl-rotor of a turbomachine and method of manufacturing ABB
EP-455005	High temperature alloy for engine components, based on modified titanium aluminide. ABB ABB TURBO SYSTEMS ALSTOM
EP-464366	Process for producing a work piece from an alloy based on titanium aluminide containing a doping material. ABB
EP-581204	Heat-resistant material. ABB
DE4304481	High-temperature alloy based on alloyed gamma-titanium aluminide and use of this alloy ABB RESEARCH CENTER
US5286443	High temperature alloy for machine components based on boron doped TiAl ALSTOM

Friction welding of .gamma. titanium aluminide to steel body with nickel alloy connecting piece there between

US5431752

- **Patent Assignee**
  ABB SCHWEIZ
- **Inventor**
  BROGLE ERWIN
  STAUBLI MARKUS
  NAZMY MOHAMMED Y
  GAUSMANN DIETER
- **International Patent Classification**
  B23K-020/12 F01D-005/02 F04D-025/04 F04D-029/02
- **US Patent Classification**
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- **Publication Information**
  US5431752 **A 1995-07-11 [US5431752]**
- **Priority Details**
  1993US-08150888 1993-11-12

- **Fampat family**

US5431752	A	1995-07-11	[US5431752]

- **Abstract:**
  (US5431752)
  The component comprises a body (5) composed of an alloy based on a gamma -titanium aluminide, a steel body (2) and a connecting piece (4) composed of a nickel-base alloy. The gamma -titanium aluminide body (5) and the steel body (2) are rigidly joined together by means of the connecting piece (4). The joint between the gamma -titanium aluminide body (5) and the connecting piece (4) is produced by friction welding. The nickel-base alloy has a nickel content of less than 65 percent by weight. This achieves the result that the friction-welding joint of the gamma -titanium aluminide body (5) to the connecting piece (4) can be produced at comparatively low temperatures. During the friction welding, the risk of crack formations in the embrittlement-prone gamma -titanium aluminide body (5) is therefore appreciably reduced.

Claims

(US5431752)

What is claimed is:

1.

A process for producing a component comprising a body composed of an alloy based on a gamma-titanium aluminide, a steel body and a connecting piece composed of a nickel-base alloy, by means of which connecting piece the gamma-titanium aluminide body and the steel body are rigidly joined to one another, the joint between the gamma-titanium aluminide body and the connecting piece being produced by friction welding, the method comprising steps of:

selecting a nickel-base alloy containing less than 65 percent by weight of nickel, less than 30 percent by weight of iron and 3 to 7 percent by weight of niobium;

first rotating the gamma-titanium aluminide body and the connecting piece against one another during friction welding under a rubbing pressure which does not exceed a first limit value, and

subsequently welding the gamma-titanium aluminide body and the connecting piece together at relative rest with respect to one another under an upsetting pressure, which does not exceed a second limit value which is higher than the first limit value, to form a diffusion layer containing at least titanium and aluminum.

2. The process as claimed in claim 1, wherein the nickel-base alloy contains between 10 and 30 percent by weight of iron.

3. The process as claimed in claim 1, wherein the connecting piece spaces the gamma-titanium aluminide body and the steel body apart by approximately 10 to 30 mm.

4. The process as claimed in claim 1, wherein the component is the rotor of a turbocharger wherein the gamma-titanium aluminide body comprises a turbine wheel of the rotor and the steel body comprises a shaft of the rotor.

5. The process as claimed in claim 1, wherein the rubbing pressure during the rotation of the gamma-titanium aluminide body and the connecting piece against one another is increased in steps up to the first limit value.

6. The process as claimed in claim 1, wherein the first limit value is approximately 200 N/mm2.

7. The process as claimed in claim 1, further comprising friction welding the steel body to the connecting piece prior to the friction welding of the gamma-titanium aluminide body to the connecting piece.

8. The process as claimed in claim 1, wherein the component is heated to approximately 600 (degree) C. for at least 1 hour.

9. The process as claimed in claim 2, wherein the nickel-base alloy contains between 15 and 25 percent by weight of iron.

10. The process as claimed in claim 5, wherein the rubbing pressure in a first step is up to 150 N/mm2.

11. The process as claimed in claim 10, wherein the rubbing time in the first step is not more than 60 s and the total rubbing time is not more than 120 s.

12. A process for producing a component comprising a body composed of an alloy based on a gamma-titanium aluminide, a steel body and a connecting piece composed of a nickel-base alloy, by means of which connecting piece the gamma-titanium aluminide body and the steel body are rigidly joined to one another, the joint between the gamma-titanium aluminide body and the connecting piece being produced by friction welding, the method comprising steps of:

selecting a nickel-base alloy containing

first rotating the gamma-titanium aluminide body and the connecting piece against one another during friction welding under a rubbing pressure which does not exceed a first limit value, and

subsequently welding the gamma-titanium aluminide body and the connecting piece together at relative rest with respect to one another under an upsetting pressure, which does not exceed a second limit value which is higher than the first limit value, to form a diffusion layer containing at least titanium and aluminum.

13. The process as claimed in claim 12, wherein the connecting piece spaces the gamma-titanium aluminide body and the steel body apart by approximately 10 to 30 mm.

14. The process as claimed in claim 12, wherein the component is the rotor of a turbocharger wherein the gamma-titanium aluminide body comprises a turbine wheel of the rotor and the steel body comprises a shaft of the rotor.

15. The process as claimed in claim 12, wherein the rubbing pressure during the rotation of the gamma-titanium aluminide body and the connecting piece against one another is increased in steps up to the first limit value.

16. The process as claimed in claim 12, wherein the first limit value is approximately 200 N/mm2.

17. The process as claimed in claim 12, further comprising friction welding the steel body to the connecting piece prior to the friction welding of the gamma-titanium aluminide body to the connecting piece.

18. The process as claimed in claim 12, wherein the component is heated to approximately 600 (degree) C. for at least 1 hour.

19. The process as claimed in claim 15, wherein the rubbing pressure in a first step is up to 150 N/mm2.

20. The process as claimed in claim 19, wherein the rubbing time in the first step is not more than 60 s and the total rubbing time is not more than 120 s.

TiAl-rotor of a turbomachine and method of manufacturing
EP1002935

- **Patent Assignee**
  ABB
- **Inventor**
  NAZMY MOHAMED
- **International Patent Classification**
  B23K-020/12 B23K-035/00 F01D-005/02
- **CPC Code**
  B23K-020/12/9; B23K-035/00/5 F01D-005/02/5;

- **Publication Information**
  EP1002935 **A1 2000-05-24 [EP1002935]**
- **Priority Details**
  1998EP-0811152 1998-11-20

- **Fampat family**

EP1002935	A1	2000-05-24	[EP1002935]

- **Abstract:**
  (EP1002935)
  Titanium-aluminium rotor for flow machine, especially turbocharger, has intermediate part with section of nickel or cobalt based alloy at end connected to turbine wheel and section of steel The rotor (1) has a turbine wheel (6) exposed to high temp. and made of an alloy based on a gamma-titanium aluminide, a bearing shaft with a steel body (2) and a cylindrical intermediate part (4) via which the turbine wheel and steel body are rigidly connected by friction welding. The intermediate part consists of a nickel or cobalt based alloy on its end connected to the turbine wheel, and has at least two rigidly connected cylinder sections (40,41), of which one (40) is made of the alloy and the other (41) from steel of lower thermal conductivity than the steel body.

Claims

(EP1002935)

Claims machine translated from German

1. Rotor for a Fluid-flow Machine, in particular for a Turbocharger, with high Temperatures a suspended Turbine (5) from an Alloy on the Basis of a gamma Titanaluminids, a Camp Wave with a Steel Body (2) and a cylindric Distance Piece (4), over which the Turbine (5) and the Steel Body (2) is rigidly connected, whereby the Connection between the Turbine (5) and the Distance Piece (4) by Friction Welding is manufactured, and whereby the Distance Piece (4) at its with the Turbine (6) connected End from Nickel or a cobalt basis alloy exists, by the fact characterized that the Distance Piece (4) from at least two rigidly connected Cylinder Sections (40, 41) is developed, by those first (40) from Nickel or cobalt basis alloy and second (41) of a Steel is formed with one opposite the Steel of the Steel Body (2) small Heat Conductivity.

2. Rotor according to claim 1, by the fact characterized that the Steel of the second Cylinder Section (41) high and the Steel of the Steel Body (2) are low-alloy.

3. Rotor according to claim 2, by the fact characterized that at Ambient Temperature the thermal Conductivity of the Steel of the second Cylinder Section (41) smaller 20 W/m K and the Steel of the Steel Body (2) more largely 30 W/m K.

4. Rotor after one of the claims 1 to 3, by the fact characterized that the second Cylinder Section (41) exhibits at least two connected Disks.

High temperature alloy for engine components, based on modified titanium aluminide.

EP-455005

- **Patent Assignee**
  ABB ABB TURBO SYSTEMS ALSTOM
- **Inventor**
  NAZMY MOHAMED DR
  STAUBLI MARKUS
- **International Patent Classification**
  C22C-014/00
- **US Patent Classification**
  PCLO=420418000 PCLO=420418000 PCLX=148407000 PCLX=148421000 PCLX=420421000
- **CPC Code**
  C22C-014/00

- **Publication Information**
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- **Priority Details**
  1990CH-0001523 1990-05-04
  1990CH-0001524 1990-05-04
  1990CH-0001616 1990-05-11
  1991US-07695406 1991-05-03
  1992US-07981479 1992-11-25
  1993US-08145227 1993-11-03

- **Fampat family**

EP0455005	A1	1991-11-06	[EP-455005]
US5207982	A	1993-05-04	[US5207982]
JPH05230568	A	1993-09-07	[JP05230568]
SU1839683	A3	1993-12-30	[SU1839683]
RU1839683	C	1993-12-30	[RU1839683]
US5342577	A	1994-08-30	[US5342577]
EP0455005	B1	1995-09-13	[EP-455005]
AT127860	T	1995-09-15	[ATE127860]
DE59106459	D1	1995-10-19	[DE59106459]

- **Abstract:**
  (US5207982)
  Abstract in publication language, translation not available Die Hochtemperaturlegierung ist für mechanisch und thermisch hochbeanspruchte Bauteile von Maschinen bestimmt. Sie basiert im wesentlichen auf dotiertem TiAl und weist folgende Zusammensetzung auf: Tix Ely Mez Al1-(x+y+z) , wobei El = B, Ge oder Si und Me = Co, Cr, Ge, Hf, Mn, Mo, Nb, Pd, Ta, V, W, Y, und/oder Zr bedeuten und gilt: (cf schema 1 seite 0)

Claims

(US5207982)

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1.

A high temperature alloy for a component subjected to high mechanical stress in thermal equipment, based on doped TiAl, having the composition Tix Ely Mez Al1-(x+y+z), in which El=Si and Me=Hf, Mo, Ta and/or W and

2. The alloy of claim 1, wherein Me comprises Ta or W.

3. The alloy of claim 1, wherein Me comprises Hf and at least one of Mo, ta and W.

Process for producing a work piece from an alloy based on titanium aluminide containing a doping material.

EP-464366

- **Patent Assignee**
  ABB
- **Inventor**
  NAZMY MOHAMED DR
  STAUBLI MARKUS
- **International Patent Classification**
  B22D-021/00 B30B-005/02 C22C-014/00 C22F-001/18
- **US Patent Classification**
  PCLO=148671000 PCLX=148670000 PCLX=420418000
- **CPC Code**
  C22C-014/00 C22F-001/18/3;

- **Publication Information**
  EP0464366 **A1 1992-01-08 [EP-464366]**
- **Priority Details**
  1990EP-0112734 1990-07-04

- **Fampat family**

EP0464366	A1	1992-01-08	[EP-464366]
JPH04232234	A	1992-08-20	[JP04232234]
US5190603	A	1993-03-02	[US5190603]
EP0464366	B1	1994-11-30	[EP-464366]
DE59103639	D1	1995-01-12	[DE59103639]

- **Abstract:**

(US5190603)
The process is used to produce a workpiece from a dopant-containing alloy based on titanium aluminide. With this process it is intended to produce a workpiece having high resistance to oxidation and to corrosion, high heat stability and adequate ductility. This is achieved by the following process steps: - Melting the alloy, - Casting the melt to give a casting, - Cooling the casting to room temperature and removing its skin and its scale layer, - Hot isostatic pressing of the descaled casting at a temperature between 1200 and 1300 DEG.C and a pressure between 100 and 150 MPa, - Cooling the casting which has been subjected to hot isostatic pressing, - Heating the cooled casting to temperatures of 1050 to 1200 DEG.C, - Isothermally working the casting once or repeatedly at this temperature for shaping and improving the microstructure, - Cooling the worked casting to room temperature and - Processing of the worked casting with removal of material to give the workpiece. <IMAGE>

Claims

(US5190603)

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1.

A process for producing a workpiece from an alloy containing dopant and based on titanium aluminide, comprising the following process steps:

melting the alloy into a melt;

casting the metal into a cast body;

cooling the cast body to room temperature and removing casting skin and scale layer on the cast body;

subjecting the descaled cast body to high-temperature isostatic pressing at a temperature between 1,200 (degree) and 1,300 (degree) C. and a pressure between 100 and 150 MPa;

cooling the isostatically pressed cast body;

heating the cooled cast body to 1,050 (degree) to 1,200 (degree) C.;

deforming the cast body one or more times for the purpose of molding and structure improvement the high-temperature deformation being carried out by isothermal deformation of the cast body in the temperature range between 1,050 (degree) and 1,150 (degree) C. at a deformation rate of EPSILON =5 * 10-5 s-1 to 10-2 s-1 until a deformation of EPSILON =1.6 is reached where

ho =original height of the workpiece, and h=height of the workpiece after deformation;

cooling the deformed cast body to room temperature;

and

machining the deformed cast body to produce a workpiece by material removal.

2. The process as claimed in claim 1, wherein a TiAl alloy doped with at least one of the elements Zr, V, Cr, Si, Y, W, B or Ge is subjected to the following additional process steps:

melting the alloy in a vacuum or protective-gas induction furnace;

annealing the cast body under a protective gas or in vacuo at a temperature between 1,000 (degree) and 1,150 (degree) C.;

inserting the cast body, after removing the casting skin and the scale layer, in a soft-steel capsule and sealing the filled steel capsule in an airtight manner;

subjecting the sealed cast body to high-temperature isostatic pressing;

heating the sealed cast body at 10 (degree) -50 (degree) C./min to 1,050 (degree) to 1,150 (degree) C.;

and

heating the sealed cast body at 1,050 (degree) -1,150 (degree) C., for 5 to 20 min.

3. The process as claimed in claim 1, wherein the high-temperature deformation is carried out as follows:

upsetting in the longitudinal direction by 50% decrease in height;

upsetting in a first transverse direction by 30% decrease in cross section;

upsetting ni a second transverse direction by 30% decrease in cross section;

upsetting in the longitudinal direction by 20% decrease in height;

cooling the deformed cast body at 300 (degree) C./h to below 500 (degree) C.;

tempering the deformed cast body at 800 (degree) C. for 1 h;

and

cooling the deformed cast body to room temperature.

4. The process as claimed in claim 1, wherein the workpiece is forged essentially isothermally and has the shape of a gas turbine bucket after the isothermal forging.

5. The process as claimed in claim 1, wherein the workpiece is forged essentially isothermally and, after the isothermal forging, is subjected to a further high-temperature deformation process with up to 40% decrease in cross section.

6. The process as claimed in claim 1, wherein the alloy has one of the following compositions below

Al=48 atomic %

Zr=3 atomic %

B=0.5 atomic %

Ti=48.5 atomic %

or

Al=48 atomic %

V=3 atomic %

Si=0.5 atomic %

Ti=48.5 atomic %

or

Al=48 atomic %

Cr=3 atomic %

Ti=49 atomic %

or

Al=48 atomic %

Y=3 atomic %

B=0.5 atomic %

Ti=48.5 atomic %

or

Al=48 atomic %

Ge=3 atomic %

Ti=49 atomic %.

or

Al=48 atomic %

W=3 atomic %

Ge=0.5 atomic %

Ti=48.5 atomic %

7.

The process as claimed in claim 5, wherein the high-temperature deformation process comprises a hot rolling.

Heat-resistant material.
EP-581204

- **Patent Assignee**
  ABB
- **Inventor**
  SINGHEISER LORENZ DR
- **International Patent Classification**
  C22C-001/00 C22C-014/00 C22C-021/00 C22C-021/02
- **US Patent Classification**
  PCLO=148421000 PCLX=420418000 PCLX=420421000
- **CPC Code**
  C22C-014/00; C22C-021/00; C22C-021/02; F05C-2201/021

- **Publication Information**
  EP0581204 **A1 1994-02-02 [EP-581204]**
- **Priority Details**
  1992DE-4224867 1992-07-28

- **Fampat family**

EP0581204	A1	1994-02-02	[EP-581204]
DE4224867	A1	1994-02-03	[DE4224867]
JPH06184684	A	1994-07-05	[JP06184684]
US5393356	A	1995-02-28	[US5393356]

- **Abstract:**
  (US5393356)
  Abstract in publication language, translation not available Die Erfindung betrifft einen mehrphasigen hochwarmfesten Werkstoff mit einer intermetallischen Basislegierung vom Typ gamma -TiAl, der insbesondere für den Einsatz in Wärmekraftmaschinen, wie Verbrennungsmotoren, Gasturbinen, Flugtriebwerken vorgesehen ist, mit einem Gehalt an Aluminium von 30 bis 40 At-% sowie an Silicium von 0,1 bis 20 At-% und einem Gehalt an Niob von 0,1 bis 15 At-%, Rest Titan.

Claims

(US5393356)

I claim:

1. A high temperature-resistant material with inter-metallic compounds in the titanium/aluminum system, comprising an aluminum content of from 45 to 48 atom %, a niobium content of from 0.5 to 3 atom %, a chromium content of from 0.5 to 3 atom %, a silicon content of from 0.1 to 2 atom %, an oxidation resistance-enhancing element selected from the group consisting of, in atom %, 0.5 to 3 tantalum, 0.5 to 3 molybdenum, 0.5 to 3 tungsten, 0.5 to 3 vanadium, 0.1 to 1 boron, 0.01 to 1 carbon, 0.01 to 1 nitrogen, 0.01 to 1 yttrium, 0.01 to 1 cerium, 0.01 to 1 erbium, and 0.01 to 1 lanthanum, and a remainder of titanium;

said yttrium, cerium, lanthanum and erbium summing to a total of no more than 2 atom %;

and

said niobium, chromium, silicon, tantalum, molybdenum, tungsten, vanadium, boron, carbon, and nitrogen summing to a total of no more than 10 atom %.

2. The high-temperature-resistant material according to claim 1, including from 0.05 to 2 atom % of hafnium.

3. The high temperature-resistant material according to claim 1, wherein the material is produced by mechanical alloying.

4. In a heat engine, a high temperature-resistant material with inter-metallic compounds in the titanium/aluminum system, comprising an aluminum content of from 45 to 48 atom %, a niobium content of from 0.5 to 3 atom %, a chromium content of from 0.5 to 3 atom %, a silicon content of from 0.1 to 2 atom %, an oxidation resistance-enhancing element selected from the group consisting of, in atom %, 0.5 to 3 tantalum, 0.5 to 3 molybdenum, 0.5 to 3 tungsten, 0.5 to 3 vanadium, 0.1 to 1 boron, 0.01 to 1 carbon, 0.01 to 1 nitrogen, 0.01 to 1 yttrium, 0.01 to 1 cerium, 0.01 to 1 erbium, and 0.01 to 1 lanthanum, and a remainder of titanium;

said yttrium, cerium, lanthanum and erbium summing to a total of no more than 2 atom %;

and

said niobium, chromium, silicon, tantalum, molybdenum, tungsten, vanadium, boron, carbon, and nitrogen summing to a total of no more than 10 atom %.

5. In an internal combustion engine, a high temperature-resistant material with inter-metallic compounds in the titanium/aluminum system, comprising an aluminum content of from 45 to 48 atom %, a niobium content of from 0.5 to 3 atom %, a chromium content of from 0.5 to 3 atom %, a silicon content of from 0.1 to 2 atom %, an oxidation resistance-enhancing element selected from the group consisting of, in atom %, 0.5 to 3 tantalum, 0.5 to 3 molybdenum, 0.5 to 3 tungsten, 0.5 to 3 vanadium, 0.1 to 1 boron, 0.01 to 1 carbon, 0.01 to 1 nitrogen, 0.01 to 1 yttrium, 0.01 to 1 cerium, 0.01 to 1 erbium, and 0.01 to 1 lanthanum, and a remainder of titanium;

said yttrium, cerium, lanthanum and erbium summing to a total of no more than 2 atom %;

and

said niobium, chromium, silicon, tantalum, molybdenum, tungsten, vanadium, boron, carbon, and nitrogen summing to a total of no more than 10 atom %.

6. In a gas turbine, a high temperature-resistant material with inter-metallic compounds in the titanium/aluminum system, comprising an aluminum content of from 45 to 48 atom %, a niobium content of from 0.5 to 3 atom %, a chromium content of from 0.5 to 3 atom %, a silicon content of from 0.1 to 2 atom %, an oxidation resistance-enhancing element selected from the group consisting of, in atom %, 0.5 to 3 tantalum, 0.5 to 3 molybdenum, 0.5 to 3 tungsten, 0.5 to 3 vanadium, 0.1 to 1 boron, 0.01 to 1 carbon, 0.01 to 1 nitrogen, 0.01 to 1 yttrium, 0.01 to 1 cerium, 0.01 to 1 erbium, and 0.01 to 1 lanthanum, and a remainder of titanium;

said yttrium, cerium, lanthanum and erbium summing to a total of no more than 2 atom %;

and

said niobium, chromium, silicon, tantalum, molybdenum, tungsten, vanadium, boron, carbon, and nitrogen summing to a total of no more than 10 atom %.

7. In an aircraft engine, a high temperature-resistant material with inter-metallic compounds in the titanium/aluminum system, comprising an aluminum content of from 45 to 48 atom %, a niobium content of from 0.5 to 3 atom %, a chromium content of from 0.5 to 3 atom %, a silicon content of from 0.1 to 2 atom %, an oxidation resistance-enhancing element selected from the group consisting of, in atom %, 0.5 to 3 tantalum, 0.5 to 3 molybdenum, 0.5 to 3 tungsten, 0.5 to 3 vanadium, 0.1 to 1 boron, 0.01 to 1 carbon, 0.01 to 1 nitrogen, 0.01 to 1 yttrium, 0.01 to 1 cerium, 0.01 to 1 erbium, and 0.01 to 1 lanthanum, and a remainder of titanium;

said yttrium, cerium, lanthanum and erbium summing to a total of no more than 2 atom %;

and

said niobium, chromium, silicon, tantalum, molybdenum, tungsten, vanadium, boron, carbon, and nitrogen summing to a total of no more than 10 atom %.

High-temperature alloy based on alloyed gamma-titanium aluminide and use of this alloy

DE4304481

- **Patent Assignee**
  ABB RESEARCH CENTER
- **Inventor**
  ROESLER JOACHIM DR
  TOENNES CHRISTOPH
- **International Patent Classification**
  C22C-014/00
- **CPC Code**
  C22C-014/00

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  DE4304481 **A1 1994-08-18 [DE4304481]**
- **Priority Details**
  1993DE-4304481 1993-02-15

- **Fampat family**

DE4304481	A1	1994-08-18	[DE4304481]

- **Abstract:**
  (DE4304481)
  The alloy is based on alloyed gamma-titanium aluminide. It contains the following alloy constituents, in atom per cent: titanium 42 - 52 aluminium 45 - 50 chromium 1 - 3 niobium 1 - 5 tantalum, rhenium and/or tungsten 1 - 5. The alloy is characterised at high temperatures (typically 750@C) by a high creep resistance and by good strength properties. It is preferably used as material for the manufacture of blades for gas turbines and turbochargers. <IMAGE>

Claims

(DE4304481)

Claim machine translated from German

1. High Temperature Alloy on the Basis of alloyed gamma Titanaluminid, which beside Titanium and Aluminum exhibits Niobium and Chrome as further Alloying Constituents at least, by the fact characterized that it contains the following Alloying Constituents beside unavoidable Impurities in Atomic Percent: 42-52 Titanium 45-50 Aluminum 1-3 Chrome 1-5 Niobium 1-5 Tantalum, Rhenium and/or Tungsten.

Claims machine translated from German

1. High Temperature Alloy on the Basis of alloyed gamma Titanaluminid, which beside Titanium and Aluminum exhibits Niobium and Chrome as further Alloying Constituents at least, by the fact characterized that it contains the following Alloying Constituents beside unavoidable Impurities in Atomic Percent: 42-52 Titanium 45-50 Aluminum 1-3 Chrome 1-5 Niobium 1-5 Tantalum, Rhenium and/or Tungsten.
2. Alloy according to claim 1, by the fact characterized that it contains the following Alloying Constituents in Atomic Percent: 46-50 Titanium 45-50 Aluminum 1-3 Chrome 1-3 Niobium 1-3 Tantalum, Rhenium and/or Tungsten.
3. Alloy according to claim 1, by the fact characterized that it contains the following Alloying Constituents in Atomic Percent: approx. 46 Titanium approx. 48 Aluminum approx. 2 Chrome approx. 2 Niobium approx. 2 Tantalum.
4. Alloy after one of the claims 1 to 3, by the fact characterized that the Alloy is formed for Powder containing the Alloying Constituents by isostatic Consolidating of verdustem.
5. Alloy after one of the claims 1 to 4, by the fact characterized that it contains a Duplex Structure with of Lamellas an exhibiting, coarse-grained Structure Phase, produced by Thermal Treatment in the Temperature Range between 1200o C and 1400o C.
6. Alloy according to claim 5, by the fact characterized that the Duplex Structure with approx. the 1 - until is formed for approx. 4-hour Stops of the Alloy on a Temperature from approx. 1350 to approx. 1380o C.
7. Alloy after one of the claims 1 to 4, by the fact characterized that they produced for coarse-grained Structures with Lamella Structure from one by Thermal Treatment in the Temperature Range between 1200o C and 1400o C are formed.
8. Alloy according to claim 7, by the fact characterized that the coarse-grained Structure with approx. the 1 - until is formed for approx. 4-hour Stops of the Alloy on a Temperature from approx. 1380 to approx. 1400o C.
9. Use of the Alloy after one of the claims 7 or 8 in a thermally highly loaded Component of large Creep Stability, in particular in a Turbine Blade of a thermal Fluid-flow Machine.

High temperature alloy for machine components based on boron doped TiAl
US5286443

- **Patent Assignee**
  ALSTOM
- **Inventor**
  NAZMY MOHAMED
  STAUBLI MARKUS
- **International Patent Classification**
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- **US Patent Classification**
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  PCLX=420421000
- **CPC Code**
  C22C-014/00

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- **Priority Details**
  1990CH-0001523 1990-05-04
  1990CH-0001524 1990-05-04
  1990CH-0001616 1990-05-11
  1991US-07695406 1991-05-03
  1992US-07981479 1992-11-25

- **Fampat family**

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- **Abstract:**
  (US5286443)
  The high temperature alloy is intended for machine components subjected to high mechanical and thermal stress. It is essentially based on doped TiAl and has the following composition: TixElyMezAl1-(x+y+z), in which El=B, Ge or Si and Me=Co, Cr, Ge, Hf, Mn, Mo, Nb, Pd, Ta, V, W, Y, and/or Zr and: -0.46<=x<=0.54,-0.001<=y<=0.015for El = Ge and Me =-Cr, Hf, Mn, Mo, Nb,-Ta, V and/or W,-0.001<=y<=0.015for El = Si and Me =-Hf, Mn, Mo, Ta, V-and/or W,-0<=y<=0.01for El = B and Me =-Co, Ge, Pd, Y and/or-Zr,-0<=y<=0.02for El = Ge and Me =-Co, Ge, Pd, Y and/or-Zr,-0.0001<=y<=0.01for El = B and Me =-Cr, Mn, Nb and/or W,-0.01<=z<=0.04if Me = an individual-element,-0.01<=z<=0.08if Me = two or more-individual elements -and-0.46<=(x + y + z)<=0.54.-

Claims

(US5286443)

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1.

A high temperature alloy for a component subjected to high mechanical stress in thermal equipment, based on doped TiAl, having the composition

in which El=B and Me=Co, Cr, Mn, Nb, Pd, W, Y and/or Zr and

2. The alloy of claim 1, wherein Me comprises W and at least one of Cr and Nb.

3. The alloy of claim 1, wherein Me comprises Mn and at least one of Nb and Cr.

4. The alloy of claim 1, wherein Me comprises W and at least two of Cr, Nb and Mn.

5. The alloy of claim 1, wherein Me comprises all of W, Cr, Nb and Mn.

6. The alloy of claim 1, wherein Me comprises all of Mn, Cr and Nb.