

FP:("Baoji Titanium Industry Co Ltd")

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1. [107649531](#) MACHINING METHOD OF TITANIUM ALLOY LARGE-DIAMETER SEAMLESS THIN-WALL PIPE CN - 02.02.2018Int.Class [B21C 37/06](#) Appl.No 201710951657.X Applicant BAOJI TITANIUM INDUSTRY CO., LTD. Inventor FENG QIUYUAN

The invention discloses a machining method of a titanium alloy large-diameter seamless thin-wall pipe. The machining method comprises the steps that a titanium alloy casting ingot is heated and subject to heat preservation, blooming forging to form a bar billet is achieved, the bar billet is machined to obtain a hollow tubular billet, the hollow tubular billet is heated and subject to radial forging, a tube billet is obtained, and after annealing, turning is carried out to obtain a titanium alloy pipe with the outer diameter being phi 133 mm to phi 219 mm, the wall thickness ranging from 6 mm to 8.5 mm and the length larger than 3000 mm. According to the method, the titanium alloy casting ingot is machined into the pipe with the diameter larger than 120 mm and the wall thickness ranging from 6 mm to 8.5 mm, the pipe room temperature mechanical property is good, and compared with a traditional extrusion rolling machining method, the method is simple and short in flow, the obtained pipes good in surface quality, high in size precision, and uniform in wall thickness. The method is low in production cost, the obtained titanium alloy pipe can be used for fields of ships, petroleum, chemical engineering, ocean engineering and the like, and the machining blank of the domestic titanium alloy large-diameter seamless thin-wall pipe is filled up.

2. [204195059](#) SLAG REMOVER CN - 11.03.2015Int.Class [B23K 26/142](#) Appl.No 201420622467.5 Applicant BAOJI TITANIUM INDUSTRY CO., LTD. Inventor HOU YULONG

The utility model discloses a slag remover. The slag remover comprises a slag removing head, wherein the end of the slag removing head is provided with an air blowing port, the tail of the slag removing head is provided with an air inlet, the top of the end of the slag removing head is closed, the air blowing port is an oblique opening, and the opening inclines towards the tail of the slag removing head; the air inlet is connected with an air storage tank through an air pipe and an air pressure adjusting device; the slag removing head stretches into a metal pipe, blows out pressurized oxidizing protection gas towards a pipe orifice and instantly removes molten slag, generated at the cutting position at a high temperature, on the inner edge of the pipe orifice and splashed molten slag in the cutting process out of the pipe; in the cutting process, workers can obviously see blown sparks, and no cutting molten slag is left in the pipe; moreover, the slag remover can cooperate with a gas puff port outside the pipe to pressurize and directly apply non-oxidizing protection gas to the cutting position and eliminate the cutting molten slag generated on the outer edge of the pipe orifice; it is guaranteed that the inside and outside of the pipe orifice are not oxidized and are free of molten slag and burrs, so that the cutting or welding quality is obviously improved.

3. [106392490](#) MACHINING METHOD FOR LARGE-SIZED FINE-GRAINED PURE-TITANIUM BAR CN - 15.02.2017Int.Class [B23P 15/00](#) Appl.No 201611030121.6 Applicant BAOJI TITANIUM INDUSTRY CO., LTD. Inventor YUE XU

The invention provides a production method of a pure-titanium large-sized fine-grained bar. The production method comprises the following steps: carrying out billet forging on a pure-titanium cast ingot for 2-3 heating numbers on a forging press to obtain a primary forging stock; carrying out intermediate forging on the primary forging stock for 2-3 heating numbers to obtain a semi-finished forging stock; and carrying out forming forging on the semi-finished forging stock for 2-4 heating numbers, annealing and carrying out peeling treatment to obtain the pure-titanium large-sized bar of which the diameter is phi 150-phi 280 mm and the length is 2,500-5,000 mm. By control and optimization of process parameters such as forging ratio and forging temperature, a microstructure of the produced pure-titanium large-sized bar is even and fine, and can be above class 5 in GB/T6394. The bar is excellent in mechanical property and good in batch stability. The structure and the performance of the produced large-sized bar can meet requirements in a GB/T13810 standard to a bar with the diameter of phi 90 mm.

4. [204195058](#) PRECISE LASER CUTTING DEVICE FOR WELDED TITANIUM PIPE CN - 11.03.2015Int.Class [B23K 26/14](#) Appl.No 201420621443.8 Applicant BAOJI TITANIUM INDUSTRY CO., LTD. Inventor HOU YULONG

The utility model discloses a precise laser cutting device for a welded titanium pipe. The precise laser cutting device for the welded titanium pipe comprises an operating platform, a laser cutting system, an oxidation protecting system, a rotary feeding system and a feeding and discharging system. According to the precise laser cutting device for the welded titanium pipe, non-contact laser cutting is adopted, oxidation protection of the cut portion is achieved through non-oxidation protective gas such as inert gas in the laser cutting process, in this way, the problem of deformation of a cut pipe orifice of the welded titanium pipe is effectively solved, and the cut pipe orifice is smooth and free of burrs and oxidation. Compared with a scrap-free rotary cutting method and a cutting method adopting a disk saw, the machining and cutting efficiency is improved by over two times, the actual product delivery quality is guaranteed, and the quality problems such as deformation of the pipe orifice are solved completely. In addition, the manufacturing cost of the whole device is only about a quarter that of a laser head rotary cutting device, and actual application and popularization of the precise laser cutting device are facilitated.

5. [204194503](#) TITANIUM WELDING PIPE SELF-LUBRICATING ROLLING FORMING DEVICE CN - 11.03.2015Int.Class [B21D 5/12](#) Appl.No 201420621517.8 Applicant BAOJI TITANIUM INDUSTRY CO., LTD. Inventor HOU YULONG

The utility model discloses a titanium welding pipe self-lubricating rolling forming device which comprises a plurality of rolling rollers arranged in a linear mode. The rolling rollers are self-lubricating rolling rollers. Each self-lubricating rolling roller comprises a left clamp and a right clamp which are oppositely arranged at the two ends of a power shaft, wherein a middle clamping piece is clamped between the left clamp and the right clamp, the middle clamping piece and the power shaft are connected and can rotate at the same speed, and the left clamp and the right clamp are connected with the power shaft through rolling bearings respectively. According to the titanium welding pipe self-lubricating rolling forming device, the self-lubricating rolling rollers are obtained through skillful separation and combination of the rolling rollers, the left clamps and the right clamps can freely rotate around the power shaft and rotate under the drive of a formed titanium pipe when clamping the formed titanium pipe, so that same-speed rotation and relative rest are achieved; scratches caused by differential rotation of titanium welding pipes driven by the left and right clamps and the middle clamping pieces are avoided. The

scratches are obviously reduced compared with the traditional way of changing rolling roller materials or coating rolling roller surfaces, surface scratches produced in the actual production are reduced, and the effect is remarkable.

6. [106513457](#) PREPARATION METHOD FOR NEAR-BETA TITANIUM ALLOY DISC SPRING

CN - 22.03.2017

Int.Class [B21C 37/02](#) Appl.No 201610985545.1 Applicant BAOJI TITANIUM INDUSTRY CO., LTD. Inventor FENG QIUYUAN

The invention relates to a preparation method for a near-beta titanium alloy disc spring. The method includes the steps that a near-beta titanium alloy cast ingot is subjected to cogging forging, hot rolling and cold rolling and is then machined into a finished sheet with the thickness not larger than 1.5 mm, grinding, acid pickling and other surface processing are conducted after solid-solution heat treatment, and the finished sheet is cut into a test panel through a water cutter; and the disc spring of the corresponding thickness is manufactured after the test panel is subjected to punching blank making, machining deburring, mold processing forming, heat treatment, surface cleaning and forced pressing processing. The prepared titanium alloy disc spring has the beneficial effects of being small in density, high in strength, good in tenacity, high in buffer vibration absorption capacity and excellent in corrosion resistance, can be used for replacing a steel disc spring and can obviously reduce the weight; and corrosion prevention processing does not need to be conducted on the surface, the machining cost is low, and the preparation method is expected to be widely applied in the fields of aviation, aerospace, automobile industry, chips and warships, ocean engineering and the like.

7. [101967581](#) TITANIUM ALLOY WITH THIN SHEET LAYER MICROSTRUCTURE AND MANUFACTURING METHOD THEREOF

CN - 09.02.2011

Int.Class [C22C 14/00](#) Appl.No 200910012757.1 Applicant Institute of Metal Research, Chinese Academy of Sciences Inventor Liu Jianrong

The invention provides a titanium alloy with a thin sheet layer microstructure and a manufacturing method thereof. The titanium alloy is characterized in that: 1) a certain amount of Si element is added into the alloy so that Ti5Si3 or Ti2Si type silicide can be dissolved out from the alloy under a certain condition; 2) controlling the adding amount of alloying elements, namely Zr, Sn and beta stable elements, which affect the dissolving temperature of the silicide so as to guarantee that the alpha + beta/beta transformation temperature of the titanium alloy is lower than the dissolving temperature of the silicide; 3) fully deforming the alloy at the temperature of below the dissolving temperature of the silicide, and finally properly deforming the alloy in the alpha + beta phase area over 1 to 2 fire, wherein the primary beta crystallite dimension of the alloy after thermal treatment is less than 200 mu m and the alloy has a thin sheet lamellar structure. The invention also provides a titanium alloy component and a corresponding smelting, hot working and heat treatment process. The thin sheet layer titanium alloy of which the primary beta crystallite dimension of the alloy after thermal treatment is less than 200 mu m can be prepared by the process. The titanium alloy has relatively high strength and plastic toughness matching, is a high-strength, high-toughness and high-temperature resistant titanium alloy material and is expected to be well popularized and applied in the field of aerospace.

8. [101701298](#) MANUFACTURE METHOD OF NUCLEAR GRADE ZIRCONIUM-NIOBIUM ALLOY CAST INGOT

CN - 05.05.2010

Int.Class [C22C 1/03](#) Appl.No 200910218566.0 Applicant Baoji Titanium Industry Co., Ltd. Inventor Cheng Yahui

The invention relates to the field of a manufacture method of a nuclear grade zirconium-niobium alloy cast ingot, adopting the following technical scheme: firstly, forming a pure niobium bar and sponge zirconium into zirconium-niobium master alloy scraps by the steps of pressing an electrode block, firstly smelting, secondly smelting and thirdly smelting, and the like; using the zirconium-niobium master alloy scraps and the sponge zirconium to form the zirconium-niobium alloy cast ingot by the steps of materials mixing, materials distributing, electrodes manufacturing and vacuum self-consumable electric arc smelting; and detecting that the zirconium-niobium alloy cast ingot has no defects such as components segregation and niobium impurity, and the like, to complete the manufacture of the nuclear grade zirconium-niobium alloy cast ingot. The nuclear grade zirconium-niobium alloy cast ingot has even components, has no metallurgical defects such as niobium impurity, and the like, has high raw materials yield, saves the production cost to a certain degree, and voids the waste.

9. [102049495](#) PRODUCTION METHOD OF ZIRCONIUM AND ZIRCONIUM ALLOY FLAT INGOT

CN - 11.05.2011

Int.Class [B22D 21/06](#) Appl.No 201010596267.3 Applicant Baoji Titanium Industry Co., Ltd. Inventor Chen Feng

The invention relates to a production method of zirconium and a zirconium alloy flat ingot, relating to a production method of large-scale industrial pure zirconium and a high-quality zirconium alloy flat ingot. The production method is characterized by comprising the following steps of, firstly, preparing raw materials; secondly, burdening and mixing the raw materials; thirdly, degassing; and fourthly, smelting. In the production method, the zirconium or the zirconium alloy flat ingot is obtained by a flat crucible by adopting electron beam cold hearth smelting. The production method provided by the invention has the advantage that a produced zirconium flat ingot has high surface quality, uniform and stable chemical compositions, low impurity element content, no segregation and high and low density inclusions of ZrO₂, WC and the like and high metallurgy quality. Compared with a conventional zirconium plate production technology, the produced zirconium flat ingot in the invention is easier to heat uniformly, and the method disclosed by the invention has the obvious advantages of short production flow, no forging, direct rolling, reduced pollution of gas elements in a forging and heating process, good produced plate profile, high yield, high production efficiency, lower cost and the like, is suitable for producing large-scale zirconium plates with low impurity element content and is more suitable for producing zirconium strips by adopting continuous milling.

10. [215404426](#) COMBINED DIE FOR PREPARING CONSUMABLE ELECTRODE BLOCK

CN - 04.01.2022

Int.Class [C22B 9/21](#) Appl.No 202120606217.2 Applicant BAOTI GROUP CO., LTD. Inventor CHEN FENG

A combined die for preparing a consumable electrode block comprises a first upper die, a first lower die, a second upper die, a second lower die and a main die, and a rectangular through hole is formed in the center of the main die; the first upper die and the first lower die are used in a matched mode, movably installed in the rectangular through hole at the same time and matched with the rectangular through hole, so that the lower end face of the first upper die, the upper end face of the first lower die and the rectangular through hole define a first die cavity with the approximately-circular section, and the axis of the first die cavity is perpendicular to the width direction of the rectangular through hole. The second upper die and the second lower die are used in a matched mode, movably sleeved with the rectangular through hole at the same time and matched with the rectangular through hole, so that the lower end face of the second upper die, the upper end face of the second lower die and the rectangular through hole define a second die cavity with the approximately-circular section, and the axis of the second die cavity is perpendicular to the length direction of the rectangular through hole. The utility model overcomes the defects in the prior art.

