(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 August 2012 (30.08.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/115599 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/TR2012/000035

(22) International Filing Date:
17 February 2012 (17.02.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2011/01633 18 February 2011 (18.02.2011) TR

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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— *of inventorship (Rule 4.17(iv))*

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) Title: PRESTRESSED MANUFACTURING AND METHOD OF HIGH STRENGTH COMPOSITE UPPER AND LOWER STRUCTURAL COMPONENTS

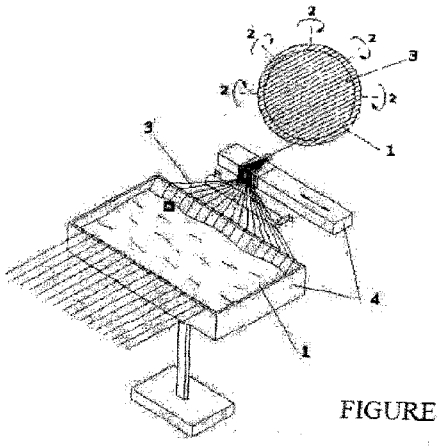

FIGURE 3

(57) Abstract: Our invention relates to a production method developed in order to increase the strength of the planar plate products such as lower structural components and transport pallets made of composite material dough and SMC or BMC. By our invention, these problems are completely eliminated and it becomes possible to produce safe and economical products in compliance with the standard by providing increase of the strength on manufacture of lower structural components like manholes, grates, covers and so on. and meeting the technical values that the product standard requires. For the method invented, first of all a carcass structure (1) is generated depending on the product shape to be produced and then glass fiber (3) is winded on this carcass structure (1), through the winding axis (2) which are determined by the help of fiber winding machine (4).

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DESCRIPTION

PRESTRESSED MANUFACTURING AND METHOD OF HIGH STRENGTH COMPOSITE UPPER AND LOWER STRUCTURAL COMPONENTS

Our invention relates to a production method developed in order to increase the strength of the planar plate products such as lower structural components and transport pallets made of composite material dough and SMC or BMC.

Nowadays, products that are especially determined in TS 1478 EN 124 standard, steel casting, lamellar graphite cast iron, spheroidal graphite cast iron, malleable casting heavy metals and alloys of light metals, alloys of cast and composite material dough (SMC) is made of unsaturated polyester resin and glass fiber. While preparing the raw material, a variety of glass fiber mesh is used for reinforcing purpose. Existing products are manufactured in large volumes (thick sections) to provide the standard, hence weight and economic disadvantages occurs.

When manufacturers of upper and lower structural components produce the products by existing methods in accordance with the standard, they have no economically competitive opportunities and when they put the low-strength products on the market, they subject to intense customer complaints and reklamation.

By our invention, these problems are completely eliminated and it becomes possible to produce safe and economical products in compliance with the standard by providing increase of the strength on manufacture of lower structural components like manholes, grates, covers and so on. and meeting the technical values that the product standard requires.

Provided that the mentioned products are better in respect of volume, weight and economically it is ensured to produce high resistant products against tensile strength,

tensile modulus, bending under load, impact resistance, durability losing and especially the vertical impact loads specified in the standards, even on thin sections.

The raw material supported by different winding methods is produced in the desired properties by applying pre-strain during the production and using glass fiber which is generated from composite material dough (SMC-BMC) and all kinds of polymers as raw material.

Brief Description of the Figures

Details of our invention are shown in the enclosed figures and the list of the parts enumerated on the figures are given below.

Figure 1: Representation of winding axes on planar products.
Figure 2: Representation of winding axes on cylindrical and prismatic products.
Figure 3: Application of the method of bias on planar products.
Figure 4: Application of the method of bias on cylindrical and prismatic products.
Figure 5: Representation of detail generated for the application of bias.
Figure 6: Representation of detail generated for the application of bias.

The parts in the figures are numbered individually and the number equivalents are given below:

1 - Frame structure
2 - Winding axis
3 - Glass fiber
4 - Fiber winding machine
5 - Fiber slots

Detailed Description of The Invention

The method developed based on the figures which brief descriptions were presented above, enables to product the products specified in TS 1478 EN 124 and annexes, transportation palettes and flat products in superior strength. This method can be

applied to the products made of especially composite material dough (SMC-BMC), unsaturated polyester resin and glass fibers and all kinds of polymers.

For the method invented, first of all a carcass structure (1) is generated depending on the product shape to be produced and then glass fiber (3) is winded on this carcass structure (1), through the winding axis (2) which are determined by the help of fiber winding machine (4). Amount and frequency of the winding increases or decreases depending on the the resistance values expected from the product. Carcass structures (1) can be planar, cylindrical or prismatic depending on the product shape and can be made of wood, metal, plastic, etc. as the material type. If there is a risk of slipping during winding the glass fibers (3) on carcass structure (1), fiber slots (5) are open on the carcass structure (1).

The carcass structure (1) which the winding process was completed is supported by SMC, BMC dough or by a different but compatible filling material to complete the overall volume of the product and then the process is completed by pressing at high temperature under pressure.

While ensuring the integrity of the carcass structure (1) winded by the pressing process and the material dough, before hardening of the product, windings generate a pre-strain due to thicknesses. Combined with the effect of this pre-strain and winding, a pre-strain is generated in every way. Thus, the hardened product can have superior strength values according to known methods.

In this method, products having desired strength values under control can be produced by using the properties such as number of windings, winding angle, resin absorbing property of the fiber (3), winding of the fiber (3) under variable tension, resin properties and properties of the material which the windings are made of. Depending on the product to be produced, winding axis (2) is applied in the range of 1-360 degrees and at least one ea.

The winding process on the carcass construction (1) can be made with specially manufactured fiber winding machines (4) or manually.

(For example, the sample product is produced by winding three windings in four different axes by an angle of 30 degrees on a metal ring carcass construction (1) by the fiber winding machine (4) under fixed tension, low-speed winding and prepared using resin mixture having slow-hardening property, pressing for 30 minutes at 145 °C under 350 bar pressure.)

CLAIMS

1. Is prestressed manufacturing and method of high strength composite upper and lower structural components and the speciality is that; it is the method of glass fiber (3) winding through the winding axis (2) which are determined by the help of fiber winding machine (4) on a carcass structure (1) generated depending on the product shape.

2. Is the carcass structure (1) metioned in Claim 1 and the speciality is that; it can be planar, cylindrical or prismatic depending on the product shape and can be made of wood, metal, plastic, etc. as the material type and has fiber slots (5) on it when needed.

3. Is the winding axis (2) metioned in Claim 1 and the speciality is that; it is in the range of 1-360 degrees and at least one ea.

4. Is prestressed manufacturing and method of high strength composite upper and lower structural components metioned in Claim 1 and the speciality is that; increase or decrease of the amount and frequency of the glass fiber (3) winding depending on the the resistance values expected from the product.

5. Is prestressed manufacturing and method of high strength composite upper and lower structural components metioned in Claim 1 and Claim 4 and the speciality is that; it is supporting the carcass structure (1) which the winding process was completed by SMC, BMC dough or by a different but compatible filling material to complete the overall volume of the product and then completing the process by pressing at a certain pressure, temperature and time (under present process conditions).

6. Is prestressed manufacturing and method of high strength composite upper and lower structural components metioned in Claim 1, Claim 4 and Claim 5 and the speciality is that; it is the winding process on the carcass construction (1) by a specially manufactured fiber winding machine (4) or manually.

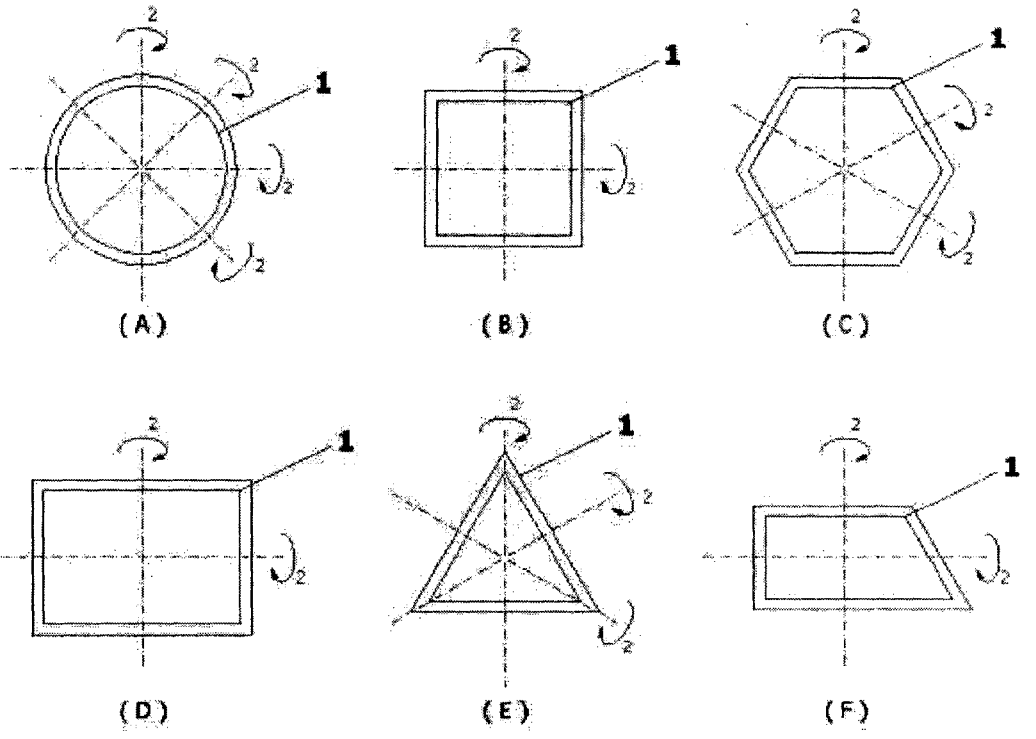

FIGURE 1

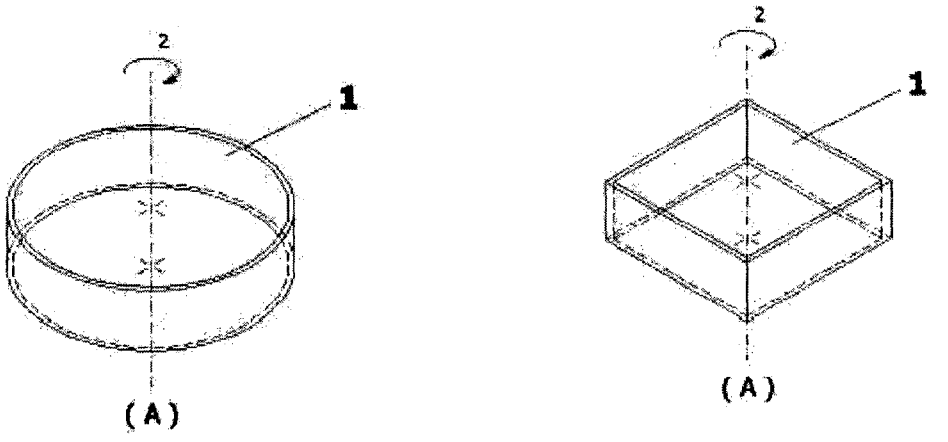

FIGURE 2

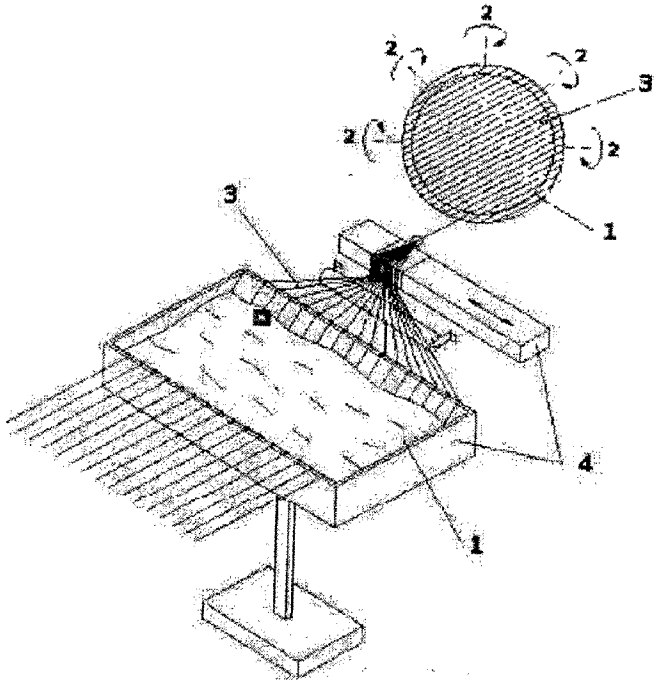

FIGURE 3

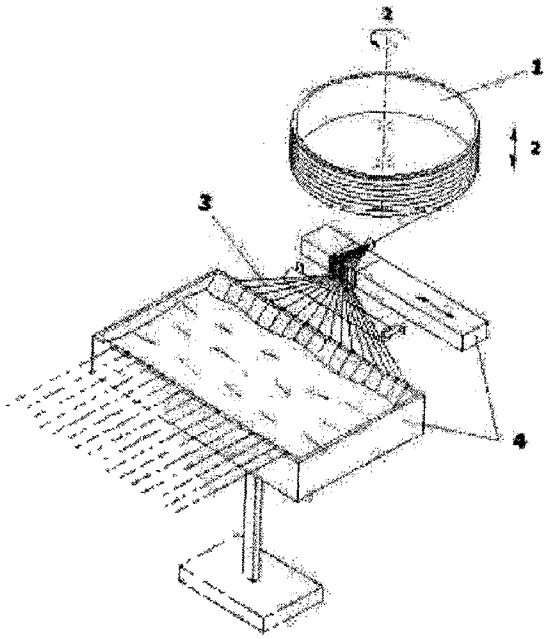

FIGURE 4

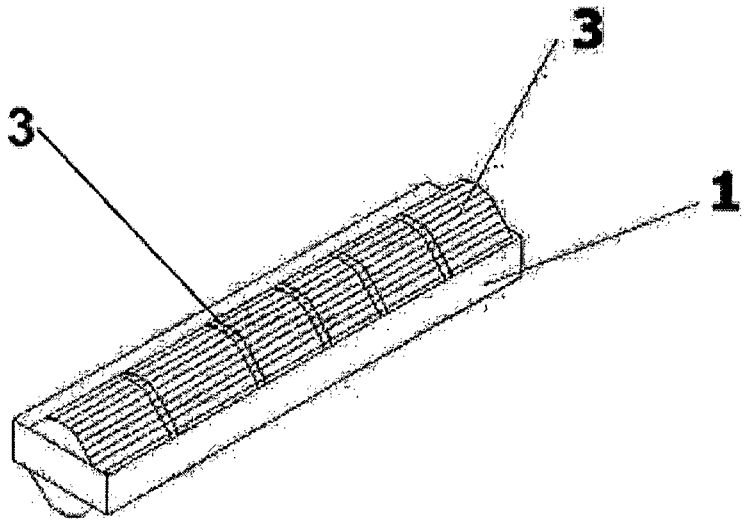

FIGURE 5

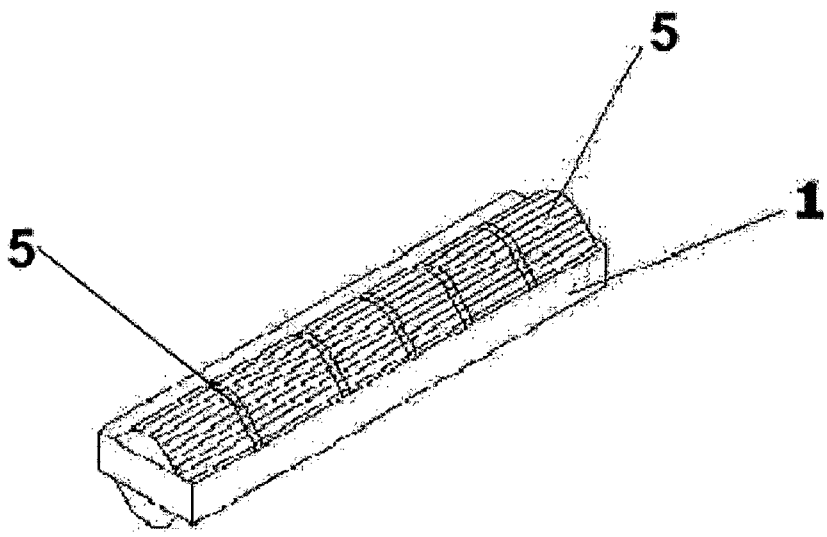

FIGURE 6