(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 570 238 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.03.2013 Bulletin 2013/12

(21) Application number: **11009399.4**

(22) Date of filing: **28.11.2011**

(51) Int Cl.:
B24D 3/00 *(2006.01)* ***B24D 7/04*** *(2006.01)*
B24D 18/00 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **19.09.2011 KR 20110094058**

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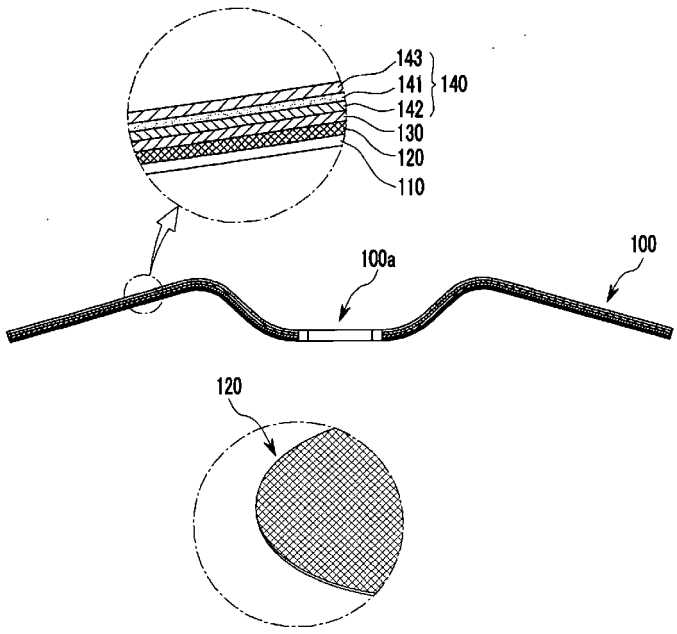
(54) Eco-friendly abrasios product for grinder and method of manufacturing the same

(57) An exemplary embodiment of the present invention provides an eco-friendly abrasion product (100) for a grinder, comprising a base layer (110) formed by performing chemical-resistance processing on at least one face of paper; at leas one reinforcement layer (120) formed on the base layer and weaved using natural textile yarn coated with thermosetting resin; a molding layer (130) disposed on the reinforcement layer and thermally compressed and fixed so that the molding layer has a central depression flat unit configured to have a fixing hole formed therein, an extension unit forwardly protruded from the central flat unit, and an external circumferential unit inclined from a front end to a rear of the extension unit; and an abrasive layer (140) combined on the molding layer, wherein the base layer, the reinforcement layer, the molding layer, and the abrasive layer are sequentially laminated from a rear surface to a front surface.

FIG. 3



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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to and the benefit of Korean Patent Application No. 10-2011-0094058 filed in the Korean Intellectual Property Office on September 19, 2011, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

(a) Field of the Invention

[0002] The present invention relates to an eco-friendly abrasion product for a grinder and a method of manufacturing the same and, more particularly, to an eco-friendly abrasion product for a grinder which is no need for an additional back and is eco-friendly and which has less shaking, and a method of manufacturing the same.

(b) Description of the Related Art

[0003] In general, a grinder assembly 10 is used to make smooth the surface of a metal processed product or a structure. The grinder assembly 10, as shown in FIG. 1, includes driving means 2, a grinder 1 equipped with a shaft 3 coupled to the driving means 2, and a soft abrasion disk 5 detachably coupled to the shaft 3 of the grinder 1 by means of fixing means 6 and 7 with a support plate 4 interposed between the soft abrasion disk 5 and the shaft 3.

[0004] As described above, in the conventional grinder assembly 10, the reason why the abrasion disk 5 is formed separately from the support plate 4 is that the abrasion disk 5 needs to be rapidly replaced because the service life span of the abrasion disk 5 is at most only 1 minute as compared with working hours for grinding a working subject.

[0005] Furthermore, fiber products are chiefly used as the abrasion disk 5. In this case, a pad (i.e., the support plate 4) for supporting the abrasion disk 5 is required because the abrasion disk 5 is very flexible.

[0006] That is, to replace the abrasion disk 5 that is flexible and required to be rapidly replaced and the support plate 4 for supporting the abrasion disk 5 together is uneconomic. For this reason, only the abrasion disk 5 is replaced.

[0007] If the soft abrasion disk 5 and the support plate 4 are separately formed as described above, however, there are problems in that the abrasion disk 5 and the support plate 4 are not easily combined because the abrasion disk 5 is commonly molded in a flat form and the support plate 4 is commonly molded in a predetermined form and shaking may occur at the time of rotation because the support plate 4 does not uniformly pressurize the rear of the abrasion disk 5.

[0008] Furthermore, there are problems in that a worker may feel uneasy owing to such shaking at the time of rotation and a safety accident may be caused because the fixing means 6 and 7 for fixing the abrasion disk 5 and the support plate 4 becomes loose.

[0009] There is a problem in that the abrasion disk 5 is broken by force because the abrasion disk 5 has weak tensile strength and small elongation. In addition, if the abrasion disk 5 is made of fiber material, the shape of the abrasion disk 5 is curled because the abrasion disk 5 is sensitive to temperature or humidity. Furthermore, there are problems in that the abrasion performance and abrasion durability of the abrasion disk 5 are deteriorated because the rotation stability and durability of the abrasion disk 5 are deteriorated under high load and high RPM working conditions.

[0010] In order to improve the grinding ability of the abrasion disk 5 in a high load and a high RPM, the support plate 4 needs to be made of hard material. If the support plate 4 is made of metal, etc., a worker's wrist is overstrained because weight is increased. If the support plate 4 is made of light metallic material, such as aluminum, there are problems in that a cost rises and static electricity or heat is generated when the support plate 4 is rotated. The static electricity or heat makes poor a worker's working environment.

[0011] Particularly, a back pad including glass fiber is used instead of the support plate 4 in order to increase durability. In this case, glass fiber burrs, generated by friction when the abrasion disk 5 is rotated, are harmful to the human body of a worker.

SUMMARY OF THE INVENTION

[0012] The present invention has been made in an effort to provide an eco-friendly abrasion product for a grinder having advantages of not requiring an additional support plate, improving grinding performance and abrasion durability because sufficiently durable material rarely deteriorated by rupture or breakage even in a high RPM and a high load is used, enabling economic and simple fabrication, being eco-friendly without the use of glass fiber, etc., and not requiring additional cooling means, and a method of manufacturing the same.

[0013] An exemplary embodiment of the present invention provides an eco-friendly abrasion product for a grinder, comprising a base layer formed by performing chemical-resistance processing on at least one face of paper; at leas one reinforcement layer formed on the base layer and weaved using natural textile yarn coated with thermosetting resin; a molding layer disposed on the reinforcement layer and thermally compressed and fixed so that the molding layer has a central depression flat unit configured to have a fixing hole formed therein, an extension unit forwardly protruded from the central flat unit, and an external circumferential unit inclined from a front end to a rear of the extension unit; and an abrasive layer combined on the molding layer, wherein the base layer, the reinforcement layer, the molding layer, and the

abrasive layer are sequentially laminated from a rear surface to a front surface.

[0014] Another exemplary embodiment of the present invention provides a method of manufacturing an eco-friendly abrasion product, comprising the steps of simultaneously supplying a base fabric material formed by performing chemical-resistant processing on at least one face of paper through a first supply roll, a reinforcement layer fabric material weaved using natural textile yarn coated with thermosetting resin through a second supply roll, and a molding layer fabric material weaved using thermal compression fixing fiber through a third supply roll,

forming a laminated fabric material through a medium of thermosetting resin included in the reinforcement layer fabric material and the molding layer fabric material by passing the base fabric material, the reinforcement layer fabric material, and the molding layer fabric material between a pair of contact rollers simultaneously and then applying heat and pressure, forming a disk-shaped pattern, preliminarily cut using iron impressions, in the laminated fabric material passing through the pair of contact rollers, separating the disk-shaped pattern from the laminated fabric material by passing the preliminarily cut disk-shaped pattern between a pair of molds, recovering small pieces of the laminated fabric material using a recovery roller, hardening a green abrasion product molded between the pair of molds by cooling, and combining abrasives with production adhesives on the green abrasion product and coating an outer side of the green abrasion product with coating adhesives.

[0015] As described above, according to an exemplary embodiment of the present invention, a support plate and several abrasion disks need not to be additionally used for a grinding task for the subject of grinding because the subject of grinding has only to be directly coupled to a grinder by means of one eco-friendly abrasion product for a grinder.

[0016] Furthermore, according to an exemplary embodiment of the present invention, the eco-friendly abrasion product for a grinder is molded in a predetermined form so that the eco-friendly abrasion product efficiently faces the subject of grinding when a grinder is rotated and thus grinding efficiency is increased. Accordingly, the eco-friendly abrasion product for a grinder is rarely deteriorated by rupture or breakage even in a high RPM and a high load and abrasion performance and abrasion durability can be improved because the reinforcement layer is made of durable material.

[0017] Furthermore, according to an exemplary embodiment of the present invention, the eco-friendly abrasion product for a grinder is economic because cheap hemp can be used and can be simply fabricated because the base layer and the molding layer can be combined by thermosetting resin coated on natural fiber forming the reinforcement layer.

[0018] Furthermore, according to an exemplary embodiment of the present invention, the eco-friendly abrasion product for a grinder is eco-friendly because glass fiber, etc. is not used, and it may not take additional cooling means into consideration because the reinforcement layer basically has a netting thread structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is an exploded perspective view of a conventional grinder assembly.

FIG. 2 is an exploded perspective view of a grinder assembly using an eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention.

FIG. 3 is a lateral view of the eco-friendly abrasion product for a grinder according to the exemplary embodiment of the present invention.

FIG. 4 is a graph for illustrating the grinding performance and grinding durability of the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention.

FIG. 5 is a flowchart for illustrating a method of manufacturing the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention.

FIG. 6 is a schematic diagram for illustrating an apparatus for manufacturing the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0020] Hereinafter, some exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings. It is to be noted that in assigning reference numerals to respective constituent elements in the drawings, the same reference numerals designate the same constituent elements although the constituent elements are shown in different drawings. Furthermore, in describing the present invention, a detailed description of the known functions and constructions will be omitted if it is deemed to make the gist of the present invention unnecessarily vague.

[0021] FIG. 2 is an exploded perspective view of a grinder assembly using an eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention, and FIG. 3 is a lateral view of the eco-friendly abrasion product for a grinder according to the exemplary embodiment of the present invention.

[0022] As shown in FIGS. 2 and 3, the eco-friendly abrasion product 100 for a grinder according to the exemplary embodiment of the present invention includes a base layer 110 formed by processing at least one face of paper in order to increase abrasion and chemical resistance, a reinforcement layer 120 of at least one layer formed on the base layer 110 and weaved using natural fiber in a netting thread tissue form, a molding layer 130

disposed on the at least one reinforcement layer 120, thermally compressed and fixed, and configured to include a central depression flat unit 100b having the fixing hole 100a formed therein, an extension unit 100d protruded forwardly from a central flat unit 100c, and an external circumferential unit 100e inclined from the front to the rear of the extension unit 100d, and an abrasive layer 140 formed on the molding layer.

[0023] In the eco-friendly abrasion product 100, the base layer 110, the reinforcement layer 120, the molding layer 130, and the abrasive layer 140 are sequentially laminated from the front (i.e., a part close to a grinder) to the front (i.e., a part close to a grinding face).

[0024] It is preferred that the base layer 110 be made of paper, including latex of about 25 to 30% and having basis weight of 80-100g/m2 and a thickness of about 0.1-0.2 mm, in order to provide some degree of elasticity and abrasion resistance to the eco-friendly abrasion product 100 and to prevent the infiltration of chemicals.

[0025] The reinforcement layer 130 has strength (g/den) of 5.5-6.5, and recovery of 65% of a shear upon extension of 2.7-3.7% and of elongation of 2% because it includes natural fiber, preferably, include a cellulose molecular structure, has good abrasion resistance, good dimension stability, and a low absorption ration, and it is thus stable against an organic solvent. It is preferred that the reinforcement layer 130 be fabricated by impregnating jute into adhesives including an organic solvent, such as phenol resin, and then weaving the jute after dry in order to improve durability.

[0026] At the time of the weaving, the jute may be weaved in a plain weave form in order to form a netting thread tissue and may be weaved in a dual weaving so that warp and weft overlap with each other in a 3x3 form. If the jute including at least two single layer structures is impregnated into phenol resin, etc. and then heated and compressed, abrasion performance and long grinding durability can be provided to the abrasive layer 140 because the abrasive layer 40 can be sufficiently supported.

[0027] A type of fiber, the thickness of fiber, a weaving density, the number of weaving, etc. may be selected in various ways according to the use of an abrasion product, the grain size of abrasives, a type of the subject of grinding, and an abrasion working environment. If the dimension of the eco-friendly abrasion product according to an exemplary embodiment of the present invention is 5 inches, the thickness of the eco-friendly abrasion product may be 0.3 cm to 0.5 cm in order to provide shape stability.

[0028] The abrasive layer 140 may be made of aluminum oxide, silicon carbide, zirconia alumina oxide, ceramic, garnet, artificial diamond, flint, emery, crocus (iron oxide powder), granuals solely or may be made of a mixture of abrasives of them.

[0029] The abrasives have different performance according to a type of the subject of grinding, the degree of abrasion of the subject of grinding, and luminance.

[0030] In order to combine the base layer 110, the reinforcement layer 130, and the molding layer 120, thermosetting adhesives coated on the natural textile yarn circumference of the reinforcement layer 120 and thermosetting adhesives included in the molding layer may be used as adhesive.

[0031] The molding layer 130 is fabricated by impregnating one or more of polyester, cotton, and textile yarn of polyester + cotton into a mixed solution of the thermosetting adhesives and latex and then performing a heat setting process. Accordingly, the molding layer 130 has increased tensile strength of about 58%, a maximum displacement of about 46%, and improved dimension stability, as compared with commonly weaved fiber.

[0032] The molding layer 130 can be easily molded in a predetermined form by applying heat and pressure thereto because it includes the mixed solution of the thermosetting adhesives and the latex. The molding layer 130 preferably may maintain the predetermined shape after heat setting.

[0033] The abrasive layer 140 is formed by adhering abrasives 141 to the molding layer 130 with production adhesives 142 interposed therebetween and coating coating adhesives 143 on the outer side of the abrasives 141.

[0034] If the amount of coating of each of the production adhesives 142 and the coating adhesives 143 is too much, a crack phenomenon may occur. If the amount of the production adhesives 142 is smaller than a standard, problems such as shattering or napping occur in the abrasives 141. If the amount of the coating adhesives 143 is smaller than a standard, grinding durability is deteriorated. In order to avoid the problems, it is preferred that when the entire product thickness is 3.6-4.0 mm, the thickness of the base layer 110 be about 0.1-0.014 mm, the thickness of the reinforcement layer 120 be 1.8 to 2 mm by folding two sheets of flax fabric materials, the thickness of the molding layer 130 be 0.7 to 0.8 mm, the thickness of the production adhesives layer 142 be 0.2 to 0.25 mm, the thickness of the abrasives layer 141 be 0.5 to 0.63 mm, and the thickness of the coating adhesives layer 143 be 0.35 to 0.40 mm.

[0035] The thermosetting resin may include one or more, selected from the group consisting of polyurethane, acryl, and epoxy resin, and a durability reinforcement combiner composed of 2 liquid type synthetic resin, including a mixture of a hardening accelerant and a solvent.

[0036] The eco-friendly abrasion product 100 for a grinder includes the central depression flat unit 100b configured to have the fixing hole 100a formed therein, the extension unit 100d protruded forwardly from the central flat unit 100c, and the external circumferential unit 100e backwardly inclined from the front end of the extension unit 100d. The external circumferential unit 100d inclined from the front end of the extension unit 100d is backwardly inclined at an angle of 6 to 8°.

[0037] If the external circumferential unit 100d inclined from the front end of the extension unit 100d is backward-

ly inclined at an angle of 6 to 8 ° as described above, grinding performance and a life span can be improved because the external circumferential unit 100d rotates and pressurizes an inclined grinding surface and thus increases a contact area. Experiments showed that the fixing means 6 and 7 did not hinder grinding if the eco-friendly abrasion product 100 for a grinder of about 5 inches was fixed to the shaft 3.

[0038] However, the illustrated numeral values are preferred examples when a specific grinder was used. If another type of a grinder is used or the dimension of the fixing means 6 and 7 is changed, proper numerical values of the abrasion product 100 may be changed.

[0039] The grinding performance and grinding durability of the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention are described in detail below with reference to FIG. 4.

[0040] FIG. 4 is a graph for illustrating the grinding performance and grinding durability of the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention.

[0041] Sanding results of comparing the grinding performance and durability of the abrasion product according to the present invention with the grinding performance and durability of the existing abrasion product of the applicant under the same conditions are summarized below in the form of the graph so that a difference in the performance between the conventional product and the product according to the present invention becomes clear..

[0042] Materials and conditions used in experimental examples are as follows.

[Sanding condition]

[0043]

1 Type and size of an abrasion product: 5 inches (12.7 cm) disc
2 The subject of grinding: SUS-304
3 Sanding load: 2kgf
4 Sanding time: 20 times by two minutes, a total of three times
5 Sanding rotation speed: 13,000 rpm
6 Sanding condition: dry abrasion
7 Abrasion product for sanding comparison
A: Common fiber product (the existing abrasion product VA113 P36 of the applicant)
B: Common fiber product (the existing abrasion product VZ133 P36 of the applicant)
C: Abrasion product according to the present invention (grain size P36)

[0044] As shown in FIG. 4, as a result of the sanding graph drawn three times for the eco-friendly abrasion product C according to the exemplary embodiment of the present invention and the common abrasion products A and B, it can be seen that the amount of grinding of the eco-friendly abrasion product C according to the exemplary embodiment of the present invention continues although the sanding number is increased, as compared with the common abrasion products A and B.

[0045] FIG. 5 is a flowchart for illustrating a method of manufacturing the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention, and FIG. 6 is a schematic diagram for illustrating an apparatus for manufacturing the eco-friendly abrasion product for a grinder according to an exemplary embodiment of the present invention.

[0046] As shown in FIGS. 5 and 6, the method of manufacturing the eco-friendly abrasion product for a grinder according to the exemplary embodiment of the present invention includes supplying a base fabric material 11 formed by performing chemical-resistant processing on at least one face of paper through a first supply roll 101, a reinforcement layer fabric material 12 weaved using natural textile yarn coated with thermosetting resin through a second supply roll 102, and a molding layer fabric material 13 weaved using thermal compression fixing fiber through a third supply roll 103 at steps S10, S20, and S30, and forming a laminated fabric material 14 through the medium of thermosetting resin included in the reinforcement layer fabric material 12 and the molding layer fabric material 13 by passing the base fabric material 11, the reinforcement layer fabric material 12, and the molding layer fabric material 13 between a pair of contact rollers 104 and 104' at the same time and then applying heat and pressure at step S40.

[0047] A flat and flexible disk-shaped pattern 14a partially cut by iron impressions 105 and 105' is formed in the laminated fabric material 14 passing through the pair of contact rollers 104 and 104' at step S50.

[0048] The iron impressions 105 and 105' include knifes for cutting and forming a predetermined shape at the time of pressurization. Automation is possible and a work can be performed more efficiently because the knife 105a is partially formed and the disk-shaped pattern 14a can be moved with it maintained in the laminated fabric material 14.

[0049] When the laminated fabric material 14 in which the disk-shaped pattern 14a preliminarily cut by the iron impressions 105' and 105 is formed is disposed between a pair of molds 106 and 106', the upper mold 106' is downwardly pressurized, so that the cut disk-shaped pattern 14a is separated from the laminated fabric material 14a. Accordingly, the pair of molds 106 and 106' may have a predetermined shape, including a central depression flat unit configured to have a fixing hole formed therein, an extension unit forwardly protruded from the central flat unit, and an external circumferential unit inclined from the front end to the rear of the extension unit at an angle of 6 to 8° .

[0050] To this end, the pair of molds 106 and 106' have relevant shapes, and the lower mold 106' from among the pair of molds 106 and 106' is replaced a buffer mold

107. The lower mold 106' is cooled and hardened to form a green abrasion product 100' at step S70.

[0051] The lower mold 106' may further include cooling means, and the green abrasion product 100' may be removed from the lower mold 106' and used as the buffer mold 107.

[0052] Small pieces of the laminated fabric material are recovered by a recovery roller 109' at step S60. The recovery speed of the recovery roller 109' can be controlled according to the supply speeds of the first, second, and third supply rollers 101, 102, and 103 and the speeds of the iron impression 105 and the upper mold 106 in order to adjust the working speed.

[0053] The abrasives are combined with the production adhesives on the green abrasion product 100', and the outer side of green abrasion product 100' is coated with coating adhesives at step S80.

[0054] The molding layer fabric material 13 may be impregnated into a mixed solution of thermosetting adhesives, including denatured phenol and polysiloxane (5-50% contents), and latex in textiles weaved using one or more of polyester, cotton, and polyester + cotton.

[0055] It is preferred that the impregnated weaved fiber be pulled 3-10% in an inclination direction and then thermally fixed for 30 to 180 seconds through a heat setting apparatus at a temperature of 150-230 °C in order to increase tensile strength of about 50% or higher.

[0056] It is preferred that the thermosetting resin be coated in thickness of 500-1,500 μ m using a wet film thickness gauge. The thermosetting resin includes one or more selected from the group consisting of polyurethane, acryl, and epoxy resin and 2 liquid type synthetic resin formed of a mixture of a hardening accelerant and a solvent. The thermosetting resin may have improved durability by passing it through a dry furnace of 100-110°C for 1 - 2 minutes in order to volatize the solvent.

[0057] It is preferred that the natural textile yarn of the reinforcement layer include one or more of bast fiber, including linen, ramie, hemp, and jute; leaf fiber, including Manila hemp, Saisal hemp, New Zealand Hemp, and aloe fiber; and fruit fiber, including coir (coconut fiber).

[0058] While some exemplary embodiments of the present invention have been described with reference to the accompanying drawings, those skilled in the art may change and modify the present invention in various ways without departing from the essential characteristic of the present invention. Accordingly, the disclosed embodiments should not be construed to limit the technical spirit of the present invention, but should be construed to illustrate the technical spirit of the present invention. The scope of the technical spirit of the present invention is not limited by the embodiments, and the scope of the present invention should be interpreted based on the following appended claims. Accordingly, the present invention should be construed to cover all modifications or variations induced from the meaning and scope of the appended claims and their equivalents.

<Description of symbols>

[0059]

100: Eco-friendly abrasion product
110: Base layer
120: Reinforcement layer
130: Molding layer
140: Abrasive layer

[0060] While this invention has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

Claims

1. An eco-friendly abrasion product for a grinder, comprising:

   a base layer formed by performing chemical-resistance processing on at least one face of paper;
   at leas one reinforcement layer formed on the base layer and weaved using natural textile yarn coated with thermosetting resin;
   a molding layer disposed on the reinforcement layer and thermally compressed and fixed so that the molding layer has a central depression flat unit configured to have a fixing hole formed therein, an extension unit forwardly protruded from the central flat unit, and an external circumferential unit inclined from a front end to a rear of the extension unit; and
   an abrasive layer combined on the molding layer,
   wherein the base layer, the reinforcement layer, the molding layer, and the abrasive layer are sequentially laminated from a rear surface to a front surface.

2. The eco-friendly abrasion product of claim 1, wherein the external circumferential unit inclined from the front end to the rear of the extension unit is inclined to a plane at an angle of 6 to 8 ° .

3. The eco-friendly abrasion product of claim 1, wherein the thermosetting resin comprises one or more, selected from a group consisting of polyurethane, acryl, and epoxy resin, and 2 liquid type synthetic resin including a mixture of a hardening accelerant and a solvent and connects the base layer, the reinforcement layer, and the molding layer, thereby improving durability.

4. The eco-friendly abrasion product of claim 1, wherein natural textile yarn of the reinforcement layer comprises one or more of bast fiber, including linen, ramie, hemp, and jute; leaf fiber, including Manila hemp, Saisal hemp, New Zealand Hemp, and aloe fiber; and fruit fiber, including coir (coconut fiber).

5. A method of manufacturing an eco-friendly abrasion product, comprising the steps of:

simultaneously supplying a base fabric material formed by performing chemical-resistant processing on at least one face of paper through a first supply roll, a reinforcement layer fabric material weaved using natural textile yarn coated with thermosetting resin through a second supply roll, and a molding layer fabric material weaved using thermal compression fixing fiber through a third supply roll;
forming a laminated fabric material through a medium of thermosetting resin included in the reinforcement layer fabric material and the molding layer fabric material by passing the base fabric material, the reinforcement layer fabric material, and the molding layer fabric material between a pair of contact rollers simultaneously and then applying heat and pressure;
forming a disk-shaped pattern, preliminarily cut using iron impressions, in the laminated fabric material passing through the pair of contact rollers;
separating the disk-shaped pattern from the laminated fabric material by passing the preliminarily cut disk-shaped pattern between a pair of molds;
recovering small pieces of the laminated fabric material using a recovery roller;
hardening a green abrasion product molded between the pair of molds by cooling; and
combining abrasives with production adhesives on the green abrasion product and coating an outer side of the green abrasion product with coating adhesives.

6. The method of claim 5, further comprising the steps of:

impregnating the molding layer fabric material into a mixed solution of thermosetting adhesives, including denatured phenol and polysiloxane (5-50% contents), and latex in textiles weaved using one or more of polyester, cotton, and polyester + cotton; and
pulling the impregnated weaved fiber 3-10% in an inclination direction and then thermally fixing the impregnated weaved fiber for 30 to 180 seconds through a heat setting apparatus at a temperature of 150-230°C in order to increase tensile strength of about 50% or higher.

7. The method of claim 6, wherein the thermosetting resin is coated in thickness of 500-1,500 μm using a wet film thickness gauge.

8. The method of claim 6, wherein the thermosetting resin includes one or more selected from the group consisting of polyurethane, acryl, and epoxy resin and 2 liquid type synthetic resin formed of a mixture of a hardening accelerant and a solvent, and the thermosetting resin passes through a dry furnace of 100-110°C for 1 - 2 minutes in order to volatize the solvent.

9. The method of claim 6, wherein the natural textile yarn of the reinforcement layer include one or more of bast fiber, including linen, ramie, hemp, and jute; leaf fiber, including Manila hemp, Saisal hemp, New Zealand Hemp, and aloe fiber; and fruit fiber, including coir (coconut fiber).

10. The method of claim 6, wherein the pair of molds is formed to have a central depression flat unit configured to have a fixing hole formed therein, an extension unit forwardly protruded from the central flat unit, and an external circumferential unit inclined from a front end to a rear of the extension unit at an angle of 6 to 8° .

FIG. 1

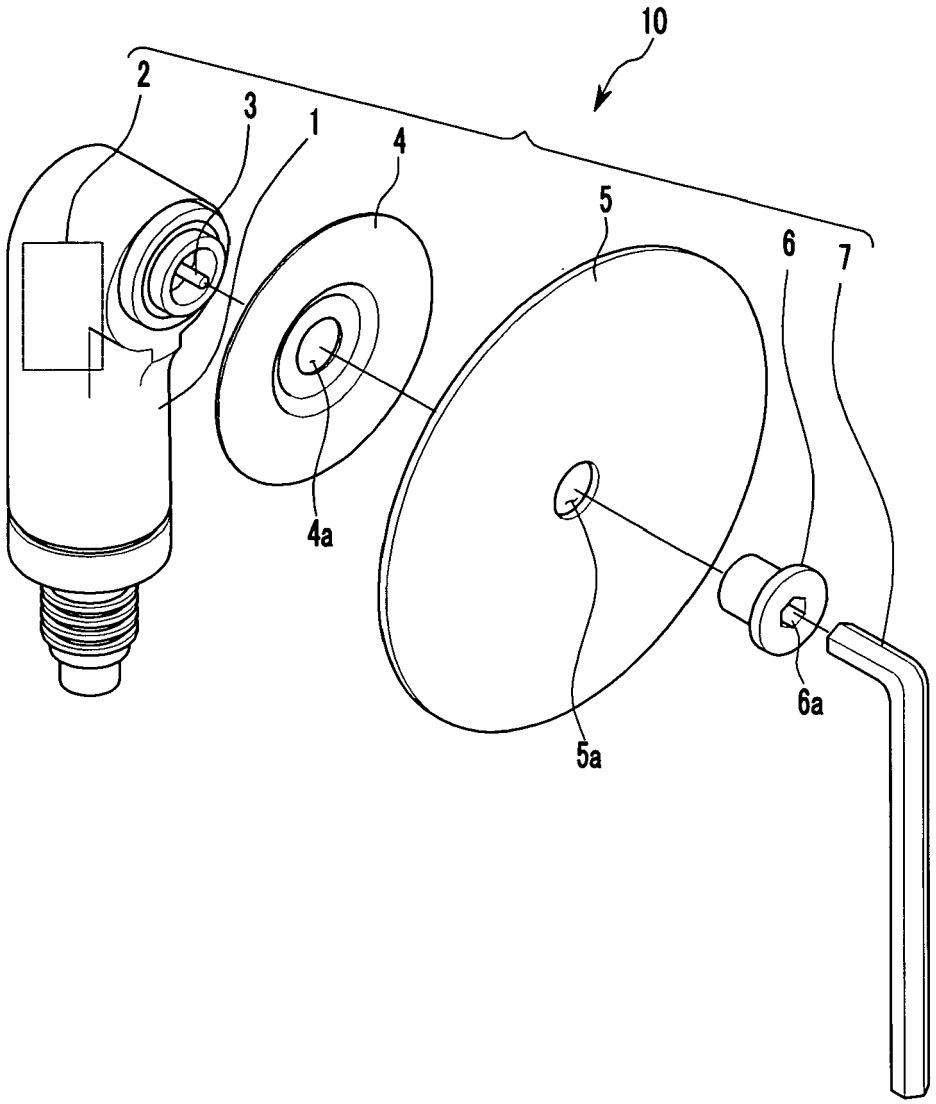


FIG. 2

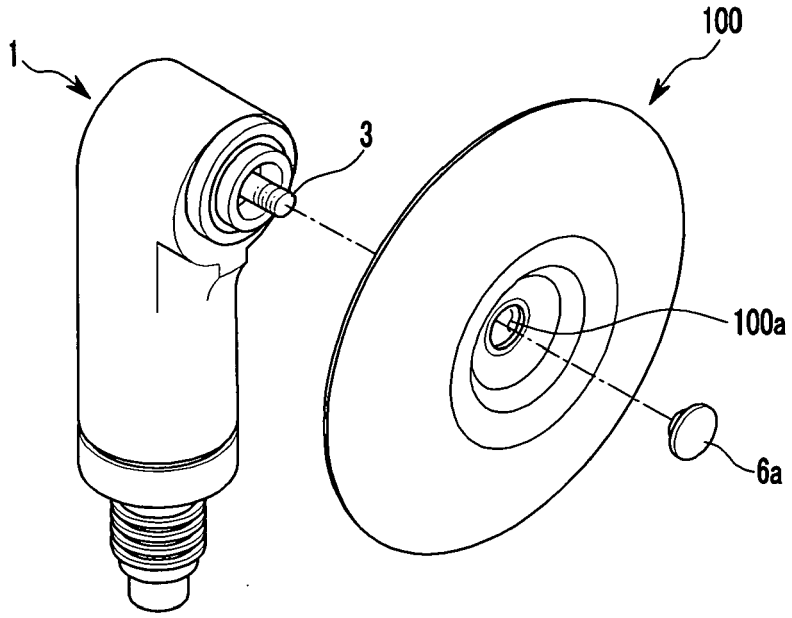


FIG. 3

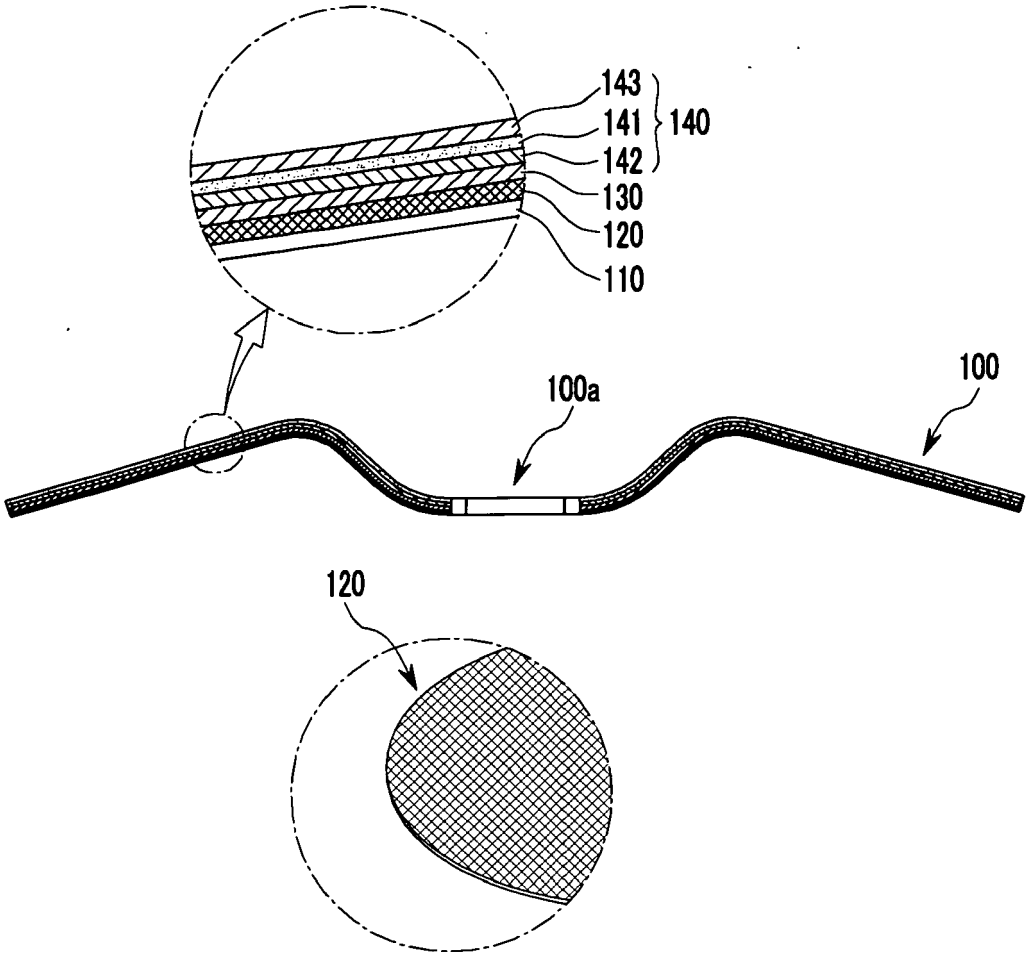


FIG. 4

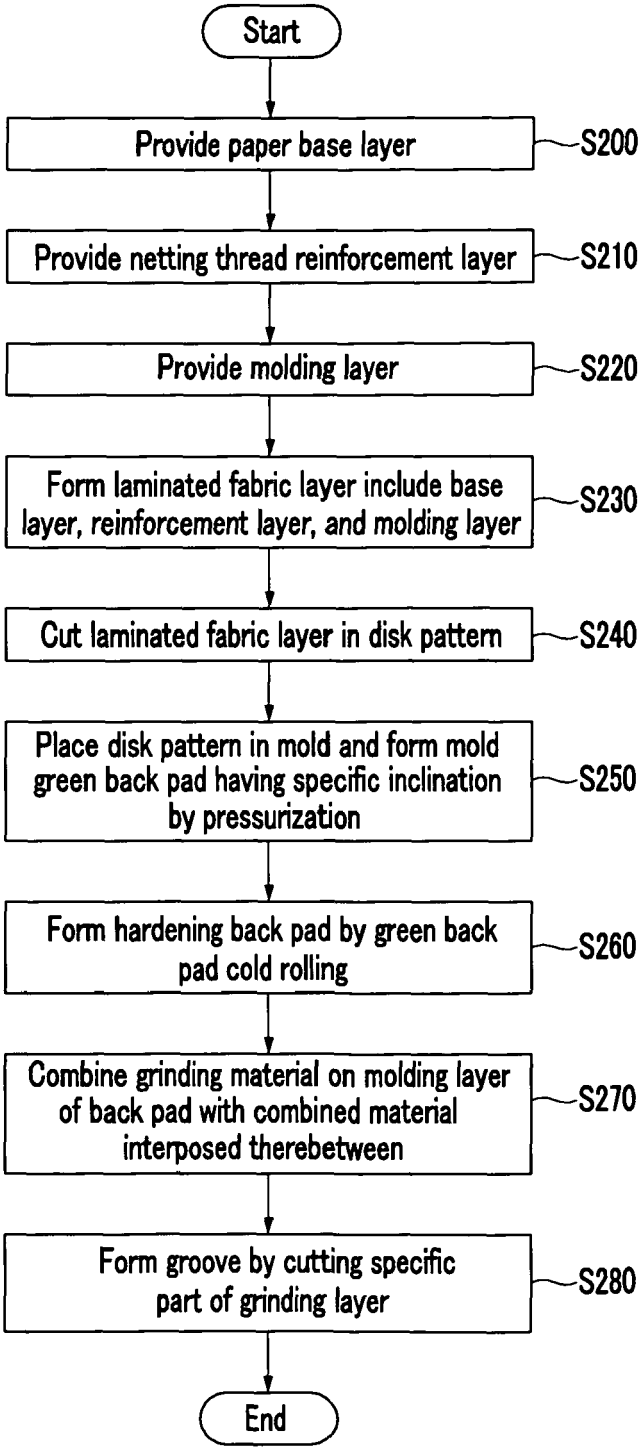

Start
Provide paper base layer
S200
Provide netting thread reinforcement layer
S210
Provide molding layer
S220
Form laminated fabric layer include base layer, reinforcement layer, and molding layer
S230
Cut laminated fabric layer in disk pattern
S240
Place disk pattern in mold and form mold green back pad having specific inclination by pressurization
S250
Form hardening back pad by green back pad cold rolling
S260
Combine grinding material on molding layer of back pad with combined material interposed therebetween
S270
Form groove by cutting specific part of grinding layer
S280
End

FIG. 5

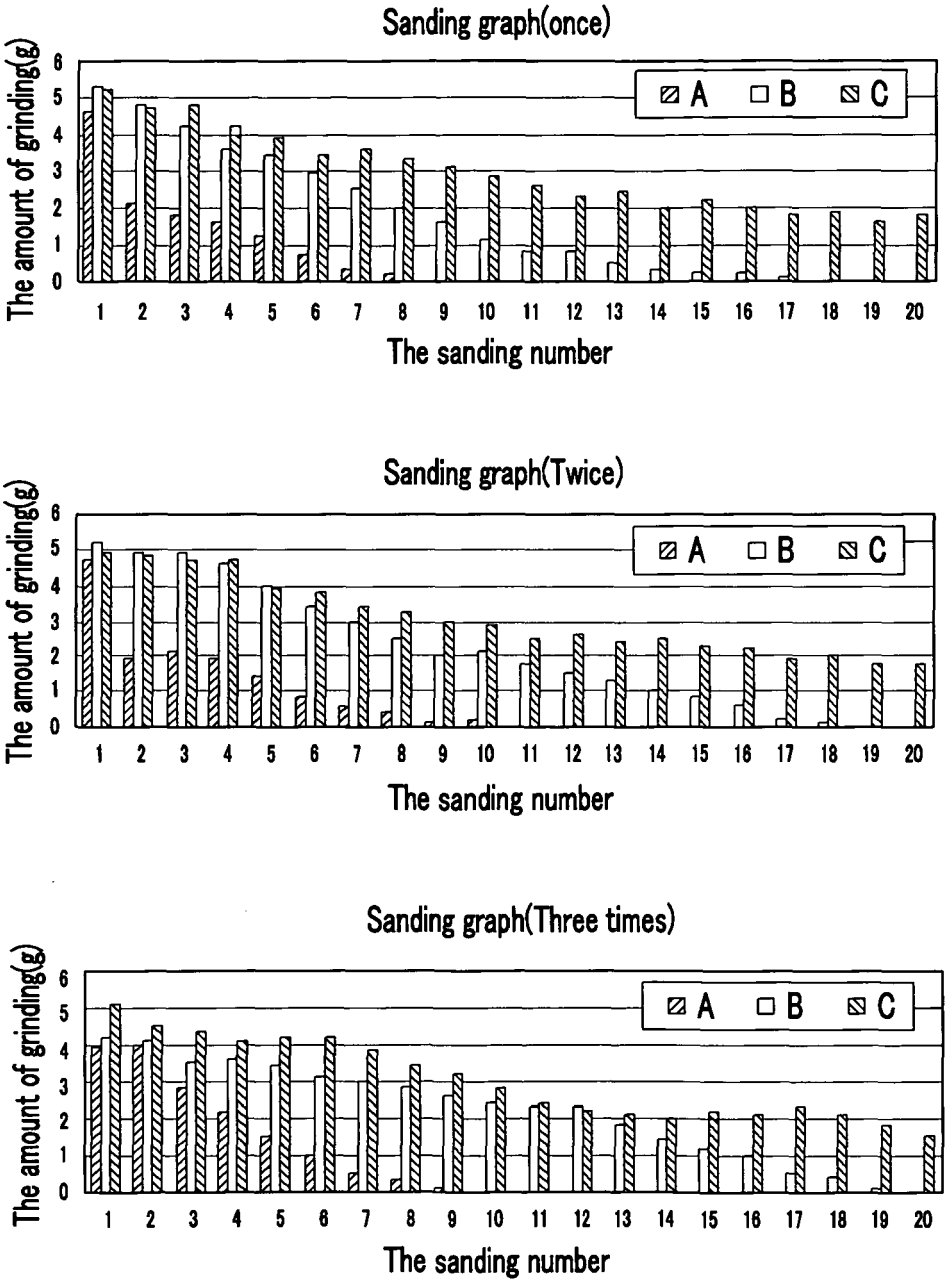
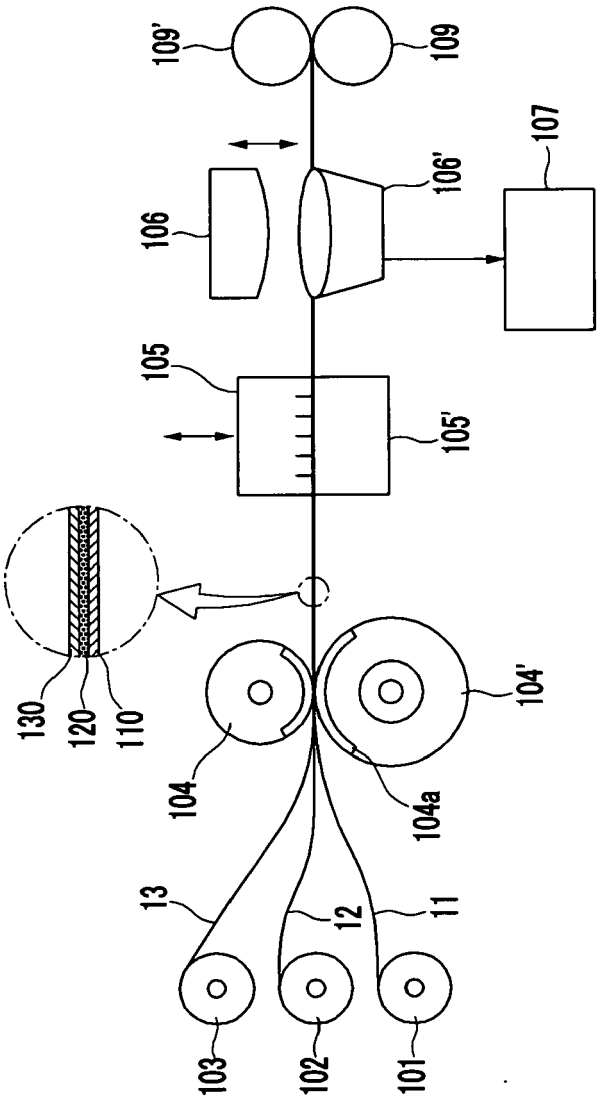

Sanding graph(once)
The amount of grinding(g)
0
1
2
3
4
5
6
A
B
C
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
The sanding number
Sanding graph(Twice)
The amount of grinding(g)
0
1
2
3
4
5
6
A
B
C
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
The sanding number
Sanding graph(Three times)
The amount of grinding(g)
0
1
2
3
4
5
6
A
B
C
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
The sanding number

FIG. 6


109'
109
107
106'
106
105
105'
130
120
110
104'
104
104a
13
12
11
103
102
101

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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