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PAINT ROLLER



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This invention relates to a paint roller comprising a roller main body and a handle member on which the roller main body is removably installed.

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As a prior paint roller, there is a paint roller disclosed in JP, 02-172563, A. This paint roller is manufactured by a method so-called "a paper core roller manufacturing method". This paper core roller manufacturing method comprises, as shown in Fig. 6, the steps of

- 10 1) making a continuous paper tube 112 by spirally winding four or five kraft papers 111 in which phenolic resin is impregnated for increasing thickness and strength of a paper tube on a mandrel 100 and applying a bonding agent to the kraft papers 111;
- 2) passing the continuous paper pipe 112 through a drying furnace for
- 15 going solid of the continuous paper pipe 112 and drying the bonding agent;
- 3) applying a bonding agent to the continuous paper pipe 112 and spirally winding a pile fabric sheet 114 on the surface of the continuous paper pipe 112; and
- 4) cutting the continuous paper pipe 112 on which the pile fabric sheet
- 20 114 at a specific length by a cutter device 115.

There is another method comprising the steps of cutting a paper pipe 112 at a specific length (approximately 2 m) after manufacturing the continuous paper pipe 112, drying the cut paper pipes in a drying furnace at specific

25 temperature (approximately 160 °C) in a specific time (approximately 2 hours), winding a pile fabric 114 to the cut paper pipe, cutting the cut paper pipe at a desired length, and finishing it by raising a nap by a wire brush.

Accordingly, a basic construction of the prior paint roller is, as shown in Fig.

30 7, constituted of a roller main body 116 manufactured by the above steps, a

handle member 10 and a roller main body fixing portion 9 for attaching the roller main body 116 to the handle member 10 rotatably and removably.

5 In the method for manufacturing a paint roller with the above construction, the progress for drying a resin impregnated in the paper pipe is necessary by using the paper pipe, so that there are any problems such that manufacturing cost becomes high and workability is bad.

10 Furthermore, in the past, a resin impregnated into the kraft paper is generally made of a phenolic resin (a heat-curable resin), so that there is an environmental problem such that formaldehyde is generated at burning the phenolic resin. Furthermore, there is a problem such that the pile fabric is come away from the paint roller because the bonding agent is eroded by an organic solvent easily.

15 Therefore, the present invention is to provide a paint roller which can be manufactured easily, shortened manufacturing time and has high performance of solvent resistance.

20 Therefore, the present invention is a paint roller constituted of a roller main body and a handle member which is removably and rotatably installed to said roller main body, wherein the roller main body comprises a core portion formed by spirally winding a thermoplastic sheet on a mandrel; a coating for bonding which is formed by ejecting melted thermoplastic material onto the
25 core portion, thickness of said coating for bonding being varied by an amount of the ejected thermoplastic material; and a paint impregnation portion which is formed by spirally winding a sheet with a construction for impregnating paint onto the core portion via the coating for bonding.

30 Accordingly, because the paint roller is formed by the steps of forming the

core portion by spirally winding the thermoplastic sheet, forming the coating for bonding with a specific thickness by ejecting the melted thermoplastic material onto the core portion, fixing the sheet with the construction for impregnating paint onto the core portion via the coating for bonding, the strength of the core portion and performance of the solvent resistance can be increased. Moreover, the thickness and the strength of the core portion can be varied easily by adjusting the ejected amount of the melted thermoplastic material.

Furthermore, it is desirable that the roller main body is formed by the method comprising the steps of: forming a continuous core portion by spirally winding the thermoplastic sheet on the mandrel; forming the coating for bonding with a specific thickness by ejecting the melted thermoplastic material onto the continuous core portion; forming a continuous roller main body by spirally winding the sheet with the construction for impregnating paint onto the continuous core portion via the coating for bonding; and cutting the continuous roller main body at a specific length.

Besides, it is desirable that the handle member is constituted of a roller main body install portion and a handle member extending perpendicularly to the roller main body install portion; wherein the roller main body install portion is constituted of: a fixing portion which is installed removable to the core portion of the roller main body; and a rotation support member for supporting the fixing portion rotatably.

Furthermore, it is preferred that one end of the paint impregnation portion is at the same position as one end of the core portion, the other end of the paint impregnation portion is formed so as to extend from the other end of the core portion, the fixing portion of the roller main body install portion is inserted into an opening at one end of the core portion and fixed, and the other end of

the paint impregnation portion is turned from the other end of said core portion into the inner portion of the core portion and fixed

Moreover, it is preferred that the handle member is constituted of a roller main body install portion and a handle member extending perpendicularly to the roller main body install portion, wherein the roller main body install portion is constituted of: a fixing portion comprising a pair of fixing pieces which are positioned at both ends of the inner space of the core portion of the roller main body and a plurality of elastic members which are connected between the pair of the fixing pieces and are elastic in the radial directions thereof; and a rotation support member for supporting the fixing portion rotatably.

It is preferred that the melted thermoplastic material is ejected by an extruder.

Furthermore, it is preferred that the thermoplastic material is polypropylene or polyethylene.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Fig. 1 is a schematic view illustrating a method for manufacturing a paint roller according to the present invention;

Fig. 2 is a partial sectional view illustrating a roller main body of the paint roller;

Fig. 3 is a partial enlarged sectional view illustrating a first working mode of the paint roller;

Fig. 4 is a partial enlarged sectional view illustrating a second working mode of the paint roller;

Fig. 5 is a partial enlarged sectional view illustrating a third working mode

of the paint roller;

Fig. 6 is a schematic view illustrating a prior method for manufacturing; and
Fig. 7 is a perspective view illustrating a basic construction of the paint roller.

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Hereinafter, working modes according to the present invention are explained in reference to the drawings.

Fig. 1 illustrates a method for manufacturing a roller main body 4, namely "a
10 method for manufacturing a plastic core roller, according to the present invention.

The method for manufacturing comprises the steps of:

- 1) forming a continuous core portion 20' by spirally winding a sheet 1
15 made of polypropylene as a thermoplastic material onto a mandrel 2 rotated by a motor 50;
- 2) forming a coating for bonding 6A with a specific thickness by ejecting polypropylene 6 melted by an intense heat onto the continuous core portion 20' by an extruder 5;
- 20 3) forming a continuous roller main body 30' by forming a paint impregnation portion 30 due to spirally winding pile fabric sheet 3 which comprises pure wool or synthetic fiber, etc. onto the continuous core portion 20' on which the coating for bonding 6A is formed; and
- 4) cutting the continuous roller main body 30' at a specific length (for
25 instance, 3, 5, 6, 7, 9, 12 inches per one piece) to form a roller main body 4.
Besides, it is better that a finishing step for completing the paint impregnation portion 30 of the roller main body 4 by a wire brush is added after the above steps.

30 Note that it is better to use polyethylene instead of polypropylene as a

thermoplastic material.

According to the above, as shown in Fig. 2, the roller main body 4 which is constituted of the core portion 20 formed by spirally winding the polypropylene sheet 1, the coating for bonding 6A with the specific thickness formed on the core portion 20 and the paint impregnation portion 30 bonding to the core portion 20 via the coating for bonding 6a is formed.

When the coating for bonding 6A is formed by the melted polypropylene, thickness of the coating for bonding 6A is adjusted by controlling the quantity of polypropylene which is pushed out, so that thickness of the core portion 20 (20') can be adjusted easily and further strength of the core portion 20 can be adjusted.

An extruder used in manufacturing of a resin film can be used as a extruder of the melted polypropylene used in this embodiment.

The paint roller 8 is, as shown in Fig. 7, constituted of the roller main body 4 manufactured in the above progress, a handle member 10, a roller main body fixing portion 9 for installing the roller main body 4 to the handle portion 10 rotatably and removably.

Basically, the handle member 10 is constituted of a horizontally extending portion 10A on which the roller main body fixing portion 9 is installed rotatably and removably, a gripping portion 10B extending perpendicularly to the horizontal extending portion 10A and a connecting portion 10C between them.

In the paint roller shown in Fig. 3, the roller main body fixing portion 9 is constituted of a roller main body engaging portion 91 which engages the

inner surface of the core portion 20 and a bearing portion 92 which is located between the roller main body engaging portion 91 and the horizontally extending portion 10A and holds the roller main body engaging portion 91 to the horizontally extending portion 10A rotatably.

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Thus, as the roller main body 4 is rotatably and removably held to the horizontally extending portion 10A of the handle member 10, the roller main body 4 can be rotated before and behind by moving the gripping portion 10B of the handle member 10 before and behind.

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In the paint roller 8 shown in Fig. 4, the roller main body fixing portion 9 is provided with a pair of cylindrical blocks 9a, 9b which are positioned at both ends of an inner space of the core portion 20, respectively, and a plurality of holding members 40 curved so as to expand in outer directions thereof and communicate between the pair of cylindrical blocks 9a, 9b, the pair of the cylindrical blocks 9a, 9b being rotatably held on the horizontal extending portion 10A by unshown bearing portions which are provided on the pair of the cylindrical portions 9a, 9b.

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20 The paint roller 8 shown in Fig. 5 is such that one end 30A of the paint impregnation portion 30 is turned from one end of the core portion 20 into an inner portion of the core portion 20 and fixed by fixing pieces 30B, the roller main body fixing portion 9 being installed from another end of the core portion 20. The roller main body fixing portion 9 in this embodiment, comprises a pair of cylindrical blocks 9a, 9b positioned in the inner space of the core portion 20 and a plurality of holding members 40 curved so as to expand in outer directions thereof and communicate between the pair of cylindrical blocks 9a, 9b, the pair of the cylindrical blocks 9a, 9b being rotatably held on the horizontal extending portion 10A by unshown bearing portions which are provided on the pair of the cylindrical portions 9a, 9b.

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As explaining the above, according to this invention, the following effects are achieved:

- 1) according to use of a thermoplastic sheet instead of a paper in which
5 resin is impregnated, it is not necessary to dry the paper to be solid, so that the manufacturing progress can be shorten, as a result, the manufacturing cost can be reduced;
- 2) the thermoplastic (polypropylene, polyethylene) melted at a high temperature sets quickly at a normal temperature, so that the manufacturing
10 time can be shortened, as a result, the manufacturing cost can be reduced;
- 3) according to use of thermoplastics, the bonding portion is difficultly eroded by the organic solvent, so that durability of the bonding portion can increase; and
- 4) as applying amount of the thermoplastics (thickness of the film) can
15 be changed, thickness of the core portion can be adjusted freely.

CLAIMS

1. A paint roller constituted of a roller main body and a handle member which is removably and rotatably installed to said roller main body, said roller main body being formed in a method comprising the steps of:

forming a continuous core portion by spirally winding said thermoplastic sheet on the mandrel;

forming a bonding coat by ejecting a melted thermoplastic material onto said continuous core portion;

forming a continuous roller main body by spirally winding a sheet with a construction for impregnating paint onto said bonding coat; and

cutting said continuous roller main body at a specific length to form said paint roller main body; characterized in that

said bonding coat is formed by ejecting said melted thermoplastic material such as melted high-temperature polypropylene or polyethylene in a film shape by an extruder, and

thickness of said bonding coat can be arranged by the quantity of said thermoplastic material ejected by said extruder.

2. A paint roller according to claim 1 characterized in that:

said handle member comprises a roller main body install portion and a handle member extending perpendicular to said roller main body install portion,

wherein said roller main body install portion is constituted of:

a fixing portion which is installed removably to said core portion of said roller main body; and

a rotation support member for supporting said fixing portion rotatably.

3. A paint roller according to claim 2 characterized in that:
 - one end of said paint impregnation portion is at the same position as one end of said core portion,
 - the other end of said paint impregnation portion is formed so as to extend from the other end of said core portion,
 - said fixing portion of said roller main body install portion is inserted from the one end of said core portion and fixed, and
 - the other end of said paint impregnation portion is turned from the other end of said core portion into the inner portion of the core portion and fixed.
4. A paint roller according to claim 1 characterized in that:
 - said handle member comprises a roller main body install portion and a handle member extending perpendicular to said roller main body install portion, wherein said roller main body install portion is constituted of:
 - a fix portion comprising a pair of fixing pieces which are positioned at both ends of the inner space of said core portion of said roller main body and a plurality of elastic members which are connected between said pair of said fixing pieces and are elastic in the radial direction thereof; and
 - a rotation support member for supporting said fixing portion rotatably.
5. A paint roller according to any one of preceding claims, further comprising a step of putting a finish on the surface of an impregnating paint portion of the paint roller main body by a brush with needle pins.