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(54) Title: METHOD AND MANUFACTURE OF CORES

(57) Abstract: A core for paper reels in particular is extruded from waste fibrous materials, for example sawdust, and resin which are blended and compressed into a tube of low porosity, high integrity, and excellent core strength at substantially reduced cost.

METHOD AND MANUFACTURE OF CORES***TECHNICAL FIELD OF THE INVENTION***

This invention relates to a core for use in the paper industry and a method of manufacture thereof.

5 BACKGROUND ART

In order to sell a reel of paper or board, it is necessary to wind a continuous sheet thereof onto a core comprising a hollow tube of standardised internal diameter and having a strong wall. This facilitates transport and handling to and by the customer.

Currently, cores are produced by gluing wide strips of Kraft Paper and winding
10 many layers onto a mandrel. The external diameter of the mandrel forms the internal diameter of the core. Core crush strength must conform to SABS and in certain cases, international standards.

Cores made by this method are costly. It is therefore an object of this invention to provide a core comprising an alternative material and manufactured according to a
15 different method, which is significantly less expensive to produce than traditional cores.

In this specification, the term "moulded" is taken to mean "extruded" as well.

DISCLOSURE OF THE INVENTION

According to the invention, a core for paper reels or board comprises a tube of compressed, blended fibrous material and resin.

20 In the preferred form of the invention, the tube is formed by extrusion. A conical counter rotating twin screw extruder is the preferred extruder for the tube; although a single screw extruder may be used.

In this form of the invention, it is preferred to use wood fibre of moisture content between 0,5 and 1,0% by mass, the fibre preferably comprising sanding dust of particle size less than or equal to 200 mesh. Alternatively, particle board, MDF waste and other suitable fibrous waste may be used.

5 The resin used preferably comprises a polyethylene, polyvinylchloride, polypropylene, polystyrene or acrylonitrile / butadiene / styrene resin, singly or in combination. Urea formaldehyde resin may not be used because the amount of heat generated is too high.

The ratio of fibre to resin may vary up to a maximum of 70: 30 fibre to resin.

10 According to a second aspect of the invention, a method of manufacture of a core as described above includes the steps of:

heating a mixture of fibre and resin in a predetermined ratio by
mass,
to melt the resin;
15 mixing the melted resin and fibre under pressure to encapsulate the
fibre in the resin;
and extruding the molten mixture into the profiling tool to form the
core, and curing the core in a cooling chamber.

The core is then cut to length by a flying saw. The process may include prior steps
20 of passing the fibrous waste through a hammer mill to reduce it to flour sized at 200 mesh
or smaller. The flour may then be dried in a vacuum drier to achieve the desired moisture
content.

In this form of the invention, the preferred extruder comprises a conical counter
rotating twin screw extruder, as it has been found to be useful in efficiently plasticising the
25 wood fibre together with good pressure generation, resulting in the wood fibre being
encapsulated with melted plastic.

The twin screw extruder described above generates sufficient pressure to extrude a core of density in excess of 800 Kg / m³ and inhibits the porosity characteristics of wood fibre by coating it with plastic. The result is a product which has improved porosity, integrity (it is moulded so no delamination can occur) and cost of production (in that the wood fibre is waste material), in comparison to the traditional paper wound core.

Also in the preferred form, the inner and outer walls of the core may be ribbed or corrugated to allow the paper or board to adhere to the outer walls and reel in wind equipment to exit traction by gripping the inside wall.

In addition, the rate of production by this method may reach 730 kg/hour.

10 The cores produced by this process are particularly suited to indoor use or in conditions of low atmospheric moisture content.

The cores produced by this method are particularly suited to outdoor use or in high atmospheric moisture content environments.

CLAIMS:

1. A core for reels of sheet material and in particular, paper characterised in that it comprises a tube of compressed, blended fibrous material and resin.
2. A core according to claim 1 characterised in that the tube is formed by extrusion.
- 5 3. A core according to claim 2 characterised in that a conical counter rotating twin screw extruder is used to extrude the tube.
4. A core according to claim 2 characterised in that a single screw extruder is used to extrude the tube.
5. A core according to claim 1 characterised in that the fibrous material comprises
10 wood fibre having a moisture content of 0,5 to 0,1 % by mass.
6. A core according to claim 5 characterised in that the wood fibre comprises sanding dust of particle size less than or equal to 200 mesh.
7. A core according to claim 1 in which the fibrous material comprises particle board.

8. A core according to claim 1 in which the fibrous material comprises MDF waste.
9. A core according to claim 1 characterised in that the resin comprises a polyethylene, polyvinylchloride, polypropylene, polystyrene and/or acrylonitrile/butadiene/styrene resin, singly or in combination.
- 5 10. A core according to claim 1 characterised in that the ratio of fibre to resin is less than or equal to 70:30 fibre to resin.
11. A method of manufacture of a core according to claims 1 to 10 characterised in that it includes the steps of :
- 10 heating a mixture of fibre and resin in a predetermined ratio by mass to melt the resin;
- mixing the melted resin and fibre to encapsulate the fibre in the resin, extruding the molten mixture into a profiling tool to form the core, and curing the core in a cooling chamber.
12. A core according to claim 11 characterised in that the core is cut to length using a 15 flying saw.
13. A core according to claim 11 characterised in that it includes prior steps of milling the fibrous material using a hammer mill to obtain a particle size of 200 mesh or less, and drying the milled material.

14. A core according to claim 11 characterised in that a conical counter rotating twin screw extruder is used to extrude the molten mixture.

15. A core according to any of the above claims in which the inner and/or outer walls of the core are ribbed or corrugated.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 B65H75/10 B29D23/00 B29C47/00		
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Electronic data base consulted during the international search (name of data base and, where practical, search terms used) WPI Data, EPO-Internal, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	---	3
X	EP 1 035 061 A (WWJ L L C) 13 September 2000 (2000-09-13) paragraph '0008! paragraph '0017! paragraph '0029! table 2 page 11, line 21 - line 38 page 12, line 6 - line 7 claims 1,11; figure 1	1, 2, 4-11
Y	---	15
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
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