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(54) **Paper or cardboard core for winding reels of paper, coardboard, plastic materials or the like.**

(57) Paper or cardboard core for winding reels of paper, cardboard, plastic materials or the like, of the type produced by means of the spiral winding and glueing of a plurality of paper or cardboard strips which partially overlap one another. At least one of the strips, proximate to the outer surface of the core, is made of a moisture-proof material.

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The present invention relates to a paper or cardboard core for winding reels of paper, cardboard, plastic materials or other materials in sheets which are wound in reels.

Reel cores are known which are constituted by a plurality of strips of paper or cardboard which are wound in a spiral, glued together and partially overlapped: said cores have different diameters, thicknesses and lengths according to requirements.

The strips constituting the core are glued with various types of adhesive products, both organic (such as for example starches, dextrans, polyvinyl alcohol, latexes, resins of all kinds) and inorganic (such as for example sodium silicate).

The adhesive products used are usually dispersed in an aqueous solution, and at the end of the core forming operations, a certain amount of residual water remains in said core; in order to allow the adhesive to perform its function and in order to allow the core to have the required strength characteristics, part of this water must be eliminated by evaporation.

Water evaporation must occur in strictly controlled conditions, in order to avoid the inflection of said core. In fact, if the drying of the core is not uniform along its entire surface, tensions will arise due to the shrinkage of the more moist paper; said tensions will cause the curving of said core with camber values which depend on the characteristics of non-uniformity in the distribution of the moisture on the surface of the core.

Cores which are not perfectly straight (with camber values higher than certain values) cannot be used, since during the winding of the paper they would be affected by oscillations which are proportional to the deformation of the core, with consequent vibration, change in paper winding tension and probable breakage of the paper itself.

After the cores have been dried correctly to residual moisture values comprised between values considered optimum, deformation problems may still arise during transport and storage; one must in fact bear in mind that paper is a highly hygroscopic material which tends to reach an equilibrium with ambient moisture, and that the cores are packed in large bundles having a usually parallelepipedal shape; the surface of the outer cores of said bundles which is directed outward is subject to evaporation or to absorption of moisture more than the core surface which is directed toward the inside of the bundle.

If the core has been dried beyond the values of equilibrium with the moisture of the place in which it is stored, the core absorbs moisture, but this usually does not create great problems; if instead the storage place is drier than one in which the core would be in equilibrium, said core loses more moisture in the exposed regions than in the regions

toward the inside of the bundle, and this will cause the inflection of said core.

It is evident that these drawbacks create greater problems in the presence of very long cores, with reels of considerable weight, and when the reels are wound or unwound on high-speed machines.

In relation to what has been described above, suppliers of cores of this type are unable to ensure that the cores have camber values lower than certain values (e.g. 2 mm per meter), since they must take into account not only the accuracy of production and drying but also the subsequent conditions of transport and storage.

The technical aim of the present invention is to obviate the above problems, i.e. to provide a paper or cardboard core for winding reels of paper, cardboard, plastic materials or the like which maintains its geometric and mechanical characteristics unchanged and independent of the moisture characteristics of the environment in which it will be placed.

Within the scope of this technical aim, an object of the present invention is to achieve the above aim with a simple structure which is relatively easy to produce, safe in use and relatively modest in cost.

This aim and these objects are all achieved by the present paper or cardboard core for winding reels of paper, cardboard, plastic materials or the like, of the type produced by means of the spiral winding and glueing of a plurality of paper or cardboard strips which partially overlap one another, characterized in that at least one of said strips, proximate to the outer surface of the core, is made of a moisture-proof material.

Further peculiarities will become apparent and evident from the following detailed description.

The core according to the invention, in a preferred embodiment, is constituted by a certain number of paper strips (20 to 40) which partially overlap one another, are wound in a spiral and glued together with glues of various kinds, using conventional automatic winding machines.

The obtained core has a length which can even exceed three meters and is suitable to support reels which can reach weights in excess of 4.5 tons.

At least one of the strips, proximate to the outer surface of the core, is made of an impermeable or moisture-proof material, and in this manner the evaporation or absorption of moisture through the outer surface of the core is prevented; elimination of the glueing water occurs, in this case, through the inner surface of said core.

It is possible to moisture-proof the surface of the internal hole of the core as well, and in this case the excess glueing water is eliminated

through the thickness of said core.

Good practical results have been obtained by moisture-proofing the penultimate outer strip of the core and the second strip starting from the inside, but it is also possible to moisture-proof one or more strips in any position of the core.

The moisture-proof strip can be constituted by a film of plastic material, or by a film of plastic material coupled to a sheet of paper or cardboard or also coupled between two sheets of paper or cardboard; the film can advantageously be made of polyethylene; the strip can also be made of polythene-reinforced paper.

The moisture-proof strip provided in another embodiment is constituted by paper treated so as to be moisture-proof at the source, such as pergamin, parchment and impregnated paper.

As regards the glues or adhesives and the machines used for the manufacture of the core, they can be of any kind; obviously, preference will be given to adhesives and machines which produce a core with small amounts of residual glueing water to be evaporated.

The strip can also be made of paper or cardboard with one or both surfaces treated with spray-on or sprinkle paints or resins or other products.

Finally, the strip may be constituted by a thin film of metallic material, possibly coupled to paper or cardboard. It is stressed that whereas for conventionally manufactured cores it is difficult to ensure a camber of less than 2 mm/m, cores manufactured according to the invention can ensure cambers of less than 0.5 mm/m, regardless of the ambient conditions in which the core will be stored.

In a specific embodiment which has been found to achieve good results, 38 layers of paper strips having a weight of 48 grams per square metre are wound in a spiral and glued together by means of sodium silicate adhesive, while the moisture-proof strip is constituted by polyethylene paper. After 6 or 7 days of drying time at a temperature of 30 degrees centigrade, the finished core is obtained which can support reels of paper weighing up to 5 tons.

It has thus been observed that the invention achieves the intended aim and objects.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent ones.

In practice, the materials employed, as well as the shapes and dimensions, may be any according to the requirements without thereby abandoning the scope of the protection of the following claims.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole pur-

pose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

## Claims

1. Paper or cardboard core for winding reels of paper, cardboard, plastic materials or the like, of the type produced by means of the spiral winding and glueing of a plurality of paper or cardboard strips which partially overlap one another, characterized in that at least one of said strips, proximate to the outer surface of the core, is made of a moisture-proof material.
2. Core according to claim 1, characterized in that said moisture-proof material is a sheet of plastic-like material.
3. Core according to claim 1 and as an alternative to claim 2, characterized in that said moisture-proof material is a sheet of plastic-like material coupled to a sheet of paper or cardboard.
4. Core according to claim 1 and as an alternative to claims 2 and 3, characterized in that said moisture-proof material is a sheet of plastic-like material coupled between two sheets of paper or cardboard.
5. Core according to claims 2, 3 and 4, characterized in that said plastic-like material is polyethylene.
6. Core according to claim 1 and as an alternative to claims 2, 3, 4 and 5, characterized in that said moisture-proof material is a metallic sheet.
7. Core according to claim 1 and as an alternative to claims 2, 3, 4, 5 and 6, characterized in that said moisture-proof material is a sheet of paper which has one surface moisture-proofed with paints or resins.
8. Core according to claim 1 and as an alternative to claims 2, 3, 4, 5, 6 and 7, characterized in that said moisture-proof material is constituted by paper treated during manufacture, such as parchment, pergamin or impregnated paper.



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## EUROPEAN SEARCH REPORT

Application Number

EP 92 11 3097

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-3 170 489 (M.B.CUNNINGHAM) * column 7, line 29 - column 8, line 75 * ---	1	B65H75/10
A	DE-U-8 705 042 (PAUL & CO INH. K. KUNERT & SÖHNE GMBH & CO) * page 5 * ---	1,3,5	
A	DE-A-3 413 619 (DVG DEUTSCHE VERPACKUNGSMITTEL GMBH) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65H B31C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04 NOVEMBER 1992	Examiner GOODALL C.J.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			