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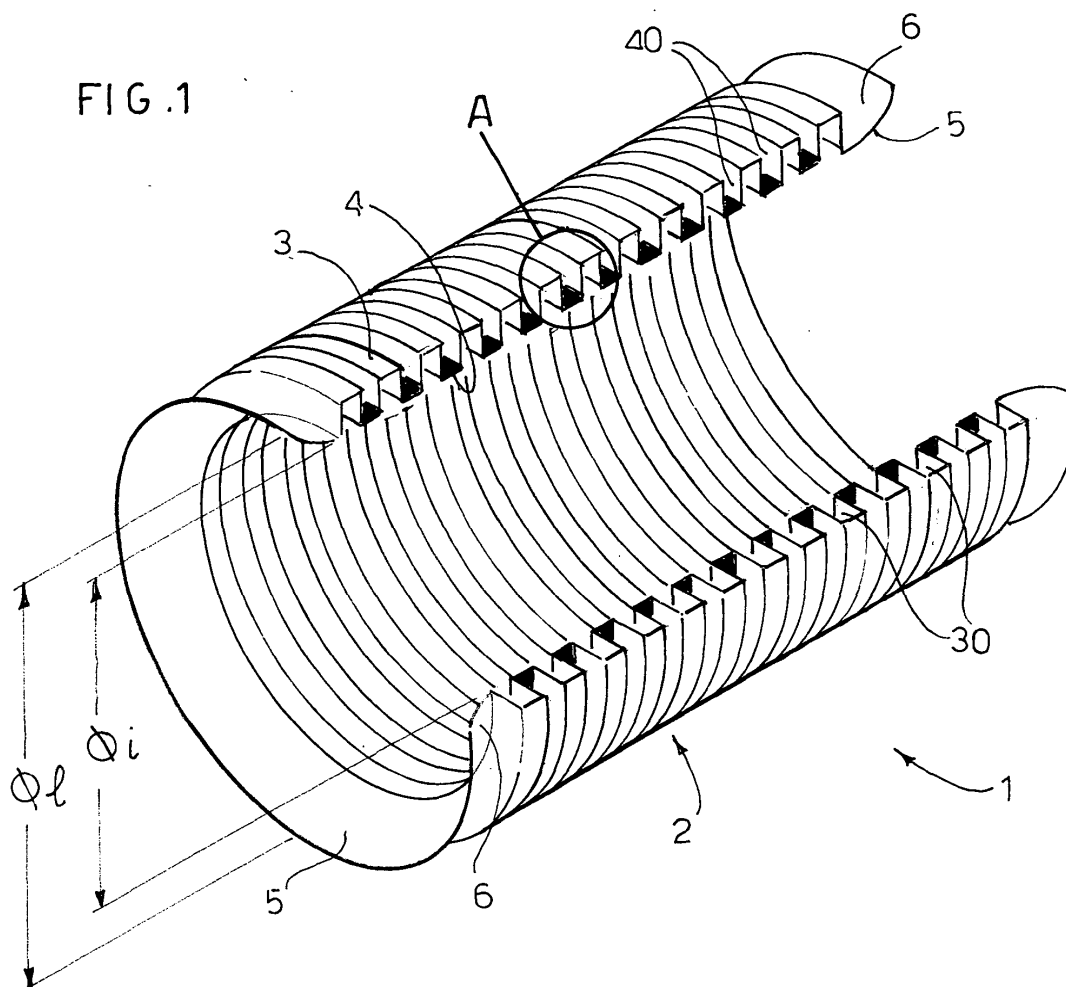
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(54) **Core for rolls of sheet material**

(57) A core (1) is described for rolls of sheet material comprising a corrugated side wall (2), so as to be able

to obtain cores with a reduced thickness of material and which at the same time ensure an adequate stiffness and resistance to deformations.



Description

[0001] The present invention refers to a core for rolls of sheet material, in particular stretch film for packaging, such as LLDPE (linear low density polyethylene) film.

[0002] At present rolls of sheet material are generally wound on tubular cores made of cardboard or plastic, mainly of PVC (polyvinyl chloride).

[0003] The cores of the prior art have some drawbacks.

[0004] In fact, in order to be able to support the roll adequately, such cores are of great thickness with the result of an excessive waste of material, of a high core weight and of consequent transport problems.

[0005] PVC cores, besides being very expensive, have the drawback of not being compatible with other materials making up the roll, such as, for example, polyethylene; consequently they present known recycling problems.

[0006] Cardboard cores also present recycling problems because of the high silicate content. In addition, cardboard cores cannot be used in open environments because they suffer rapid deterioration due to damp.

[0007] Furthermore, cores according to the prior art often require additional plastic bushes, which are placed at the end of the core to allow the user to grip the core avoiding burning his/her hands because of sliding friction with the smooth surface of the core. Obviously the bushes add to the cost of the core.

[0008] The object of the present invention is to overcome the drawbacks of the prior art, providing a core for rolls of sheet material that is practical, inexpensive, simple to produce and at the same time able to ensure good stiffness and mechanical resistance to deformation.

[0009] Another object of the present invention is to provide such a core for rolls of sheet material that is compatible with the web of the roll and at the same time recyclable.

[0010] These objects are achieved in accordance with the invention with the characteristics listed in appended independent claim 1.

[0011] Advantageous embodiments of the invention are apparent from the dependent claims.

[0012] The core for rolls of sheet material according to the invention comprises a corrugated side wall. In this manner it is possible to save on the thickness of the material, which forms the core, at the same time ensuring an adequate stiffness and resistance to deformation of the core.

[0013] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non limiting embodiment thereof, illustrated in the appended drawings, in which:

- Figure 1 illustrates a partially broken off perspective view of a core for rolls of sheet material according to the invention, and

- Figure 1A is an enlarged view of the detail enclosed in the circle A of Figure 1.

[0014] Figure 1 illustrates a core 1, substantially tubular, hollow on the inside and comprising a corrugated side wall 2. The corrugated side wall 2 has a plurality of annular ribs 3 which protrude radially outward alternating with a plurality of annular ribs 4 which protrude radially inward. The outer ribs 3 define annular spaces 30 inside the core 1 and the inner ribs 4 define annular spaces 40 outside the core 1.

[0015] With reference to Figure 1A, the outer ribs 3 and the inner ribs 4 have a substantially rectangular profile in axial section and the longitudinal dimension \underline{a} of the outer ribs 3 is substantially equal to the longitudinal dimension \underline{a} of the inner ribs 4. In this manner, the corrugated wall 2, seen in axial section, takes on a substantially square wave pattern. Purely by way of non limiting example, the longitudinal size \underline{a} of each rib 3, 4 of the corrugated wall 2 can vary in the range from 3.4 mm to 3.8 mm. It is clear that the greater the density of ribs (3, 4) distributed over the length of the core 1, the smaller the longitudinal size \underline{a} of the ribs and the greater the resistance to deformation of the core 1.

[0016] The length of the core 1 can be variable, according to requirements.

[0017] The thickness \underline{s} of the corrugated side wall 2 of the core is fairly small. By way of example, the thickness \underline{s} of the corrugated side wall 2 can range from 5 mm to 7 mm, depending upon some parameters, such as the material used, the core stiffness required and the density of the ribs (3, 4).

[0018] Two bush portions 5 are formed at the ends of the core 1. Each bush portion is defined by a substantially curved profile 6 on the outer side surface of the core 1. The bush portions 5 are of such a shape as to facilitate gripping of the core manually by the user.

[0019] The core 1 has an inside diameter ϕ_i defined by the inner ends of the inward protruding ribs 4 and an outside diameter ϕ_e defined by the outer ends of the outward protruding ribs 3.

[0020] The inside diameter ϕ_i is chosen according to the type of winding mandrel on which the core 1 is mounted. The outside diameter ϕ_e , on the other hand, is chosen according to the stiffness, to the hardness and to the resistance of the material used to produce the core 1 and according to the overall weight of the roll which is wound on the core 1. Obviously, a great difference between the outside diameter ϕ_e and the inside diameter ϕ_i causes a weakening of the ribs 3 and 4 of the corrugated wall; on the other hand, a small difference between the outside diameter ϕ_e and the inside diameter ϕ_i causes a strengthening of the ribs 3 and 4 of the corrugated wall.

[0021] Purely by way of non-limiting example, the inside diameter ϕ_i can vary from 20 mm to 80 mm. In the present invention four intermediate values for the diameter ϕ_i , are preferably chosen, namely 25 mm, 38 mm,

50 mm and 76 mm.

[0022] In accordance with the inside diameter ϕ_i , the outside diameter ϕ_e , on the other hand, can vary according to the values set out in the table below:

ϕ_i (mm)	ϕ_e (mm)
25	34 - 37
38	47 - 50
50	59 - 63
76	85 - 95

[0023] In any case it should be noted that the core 1 according to the invention, thanks to the corrugated part 2, ensures a resistance to deformation and stiffness comparable with those of a conventional core having a considerably larger thickness, with a considerable saving in material for production of the core 1.

[0024] The core 1 according to the invention is preferably produced by extrusion of plastic materials. PE (polyethylene)-based materials and particularly LLDPE (linear low density polyethylene) are advantageously used. In this manner the core 1 is compatible with LLDPE films, thus even if it is in contact with some coils of the LLDPE film it is completely recyclable without any need to separate the two products.

[0025] Said PE core 1 presents the further advantage of also being able to be used outdoors and in damp environments since it does not suffer damp.

[0026] By way of example, the corrugated core 1 according to the invention weighs about 90 g compared with the 300 g of a conventional cardboard core and with the 480 g of a conventional PVC core. As a result, the corrugated core 1 according to the invention costs about one-third with respect to the conventional cardboard core and about one-ninth with respect to the conventional PVC core.

[0027] Numerous variations and modifications of detail within the reach of a person skilled in the art can be made to the present invention without thereby departing from the scope of the invention as set forth in the appended claims.

Claims

1. A core (1) for rolls of sheet material, **characterised in that** it comprises a corrugated side wall (2).
2. A core (1) according to claim 1, **characterised in that** said corrugated side wall (2) comprises a plurality of annular ribs (3) protruding radially outward, alternating with a plurality of annular ribs (4) protruding radially inward.
3. A core (1) according to claim 2, **characterised in**

that said outward protruding ribs (3) define respective annular spaces (30) inside said core (1) and said inward protruding ribs (4) define annular spaces (40) outside said core (1).

4. A core (1) according to claim 2 or 3, **characterised in that** said outer ribs (3) and said inner ribs (4) have a substantially rectangular profile in axial section, so that said corrugated wall (2) has a substantially square wave shape in axial section.
5. A core (1) according to any one of the preceding claims, **characterised in that** the thickness (s) of said corrugated side wall (2) is comprised in the range from 5 mm to 7 mm.
6. A core (1) according to claim 4 or 5, **characterised in that** the longitudinal size (a) of said outer ribs (3) is substantially equal to the longitudinal size (a) of said inner ribs (4).
7. A core (1) according to claim 6, **characterised in that** the longitudinal size (a) of said outer ribs (3) and of said inner ribs (4) is comprised in the range from 3.4 mm to 3.8 mm.
8. A core (1) according to any one of the preceding claims, **characterised in that** said corrugated wall (2) has an inside diameter (ϕ_i) comprised between 20 mm and 80 mm.
9. A core (1) according to claim 8, **characterised in that** said inside diameter (ϕ_i) is chosen between the following values: 25 mm, 38 mm, 50 mm and 76 mm.
10. A core (1) according to any one of the preceding claims, **characterised in that** said corrugated wall (2) has an outside diameter (ϕ_e) comprised between 34 mm and 95 mm.
11. A core (1) according to any one of the preceding claims, **characterised in that** it comprises, at least at one of its ends, a bush (5) defined by a substantially arched profile (6) to allow manual gripping by the user.
12. A core (1) according to claim 11, **characterised in that** said bush (5) is made integral and in a single piece with said corrugated side wall (2).
13. A core (1) according to any one of the preceding claims, **characterised in that** it is produced by extrusion of plastic material.
14. A core (1) according to claim 13, **characterised in that** it is made of PE (polyethylene)-based material.

15. A core (1) according to any one of the preceding claims, **characterised in that** it is used for winding sheets of stretch packaging material, such as LLDPE (linear low density polyethylene).

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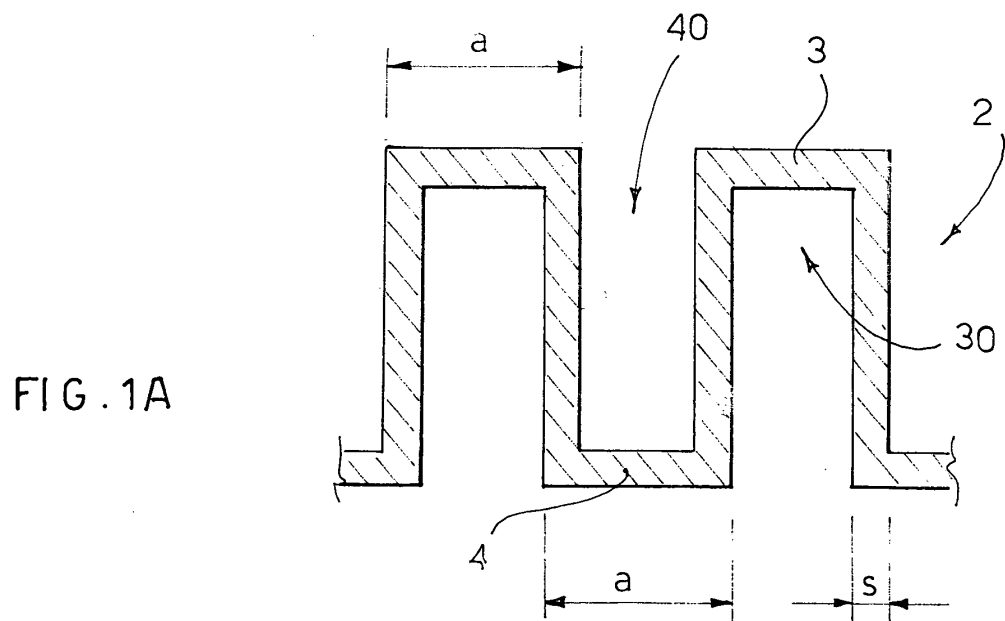
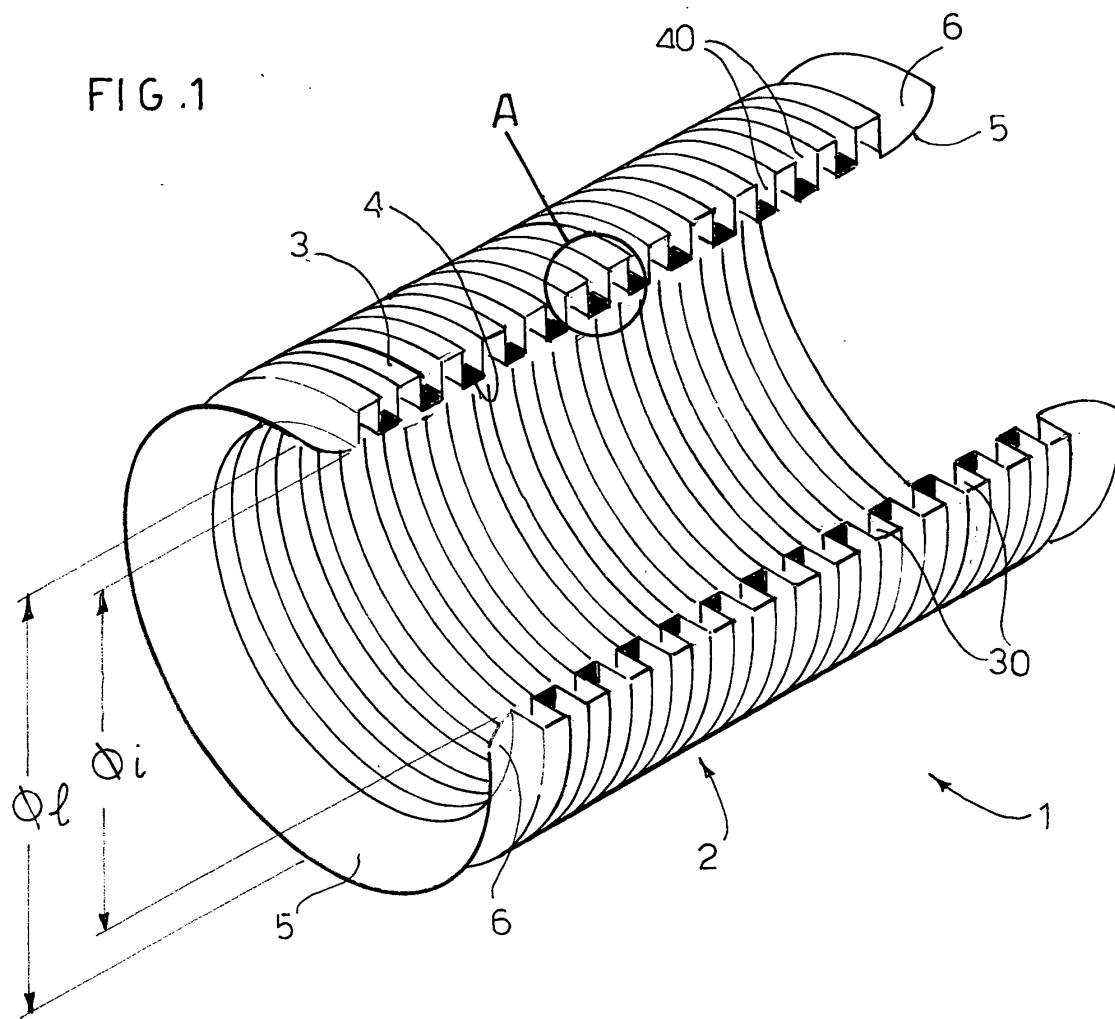
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European Patent
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Application Number
EP 04 42 5350

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 October 2004	Examiner Derrien, Y
CATEGORY OF CITED DOCUMENTS 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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