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(54) **CORE FOR A SPINNING BOBBIN AND METHOD OF PRODUCING THE CORE**

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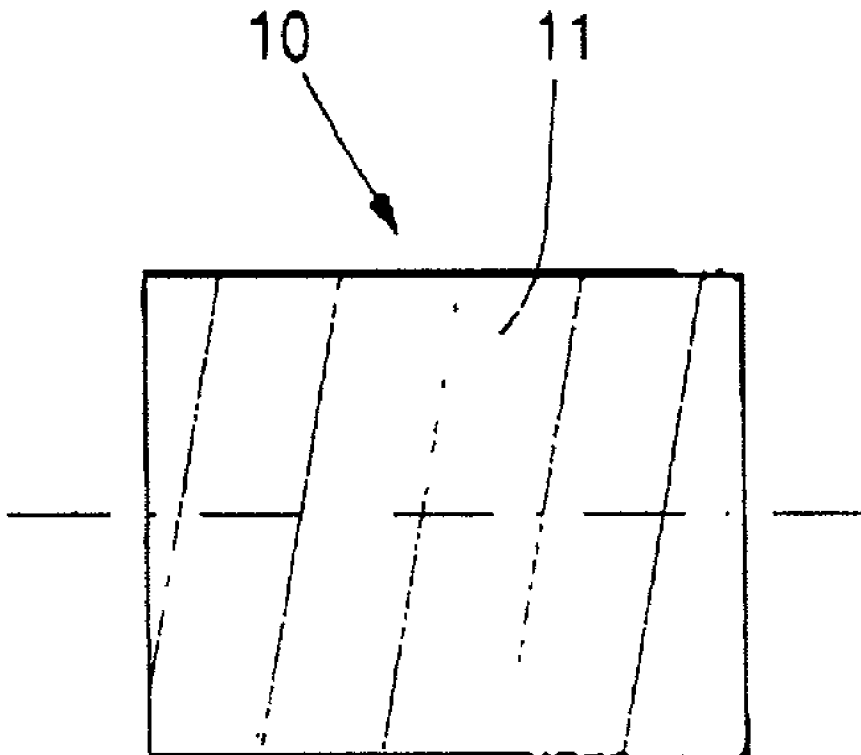
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(57) **ABSTRACT**

The invention relates to a core (10) for a spinning bobbin and for receiving a windable material. The core (10) consists of wound strip material (11). Adjacently lying portions of the strip material (11) overlap one another. Production is performed by winding on a winding mandrel (14).



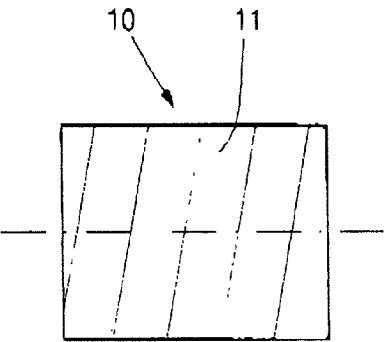


Fig. 1

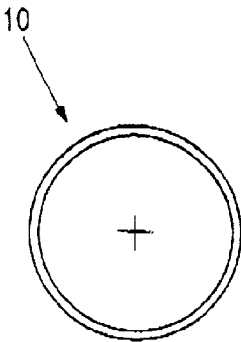


Fig. 2

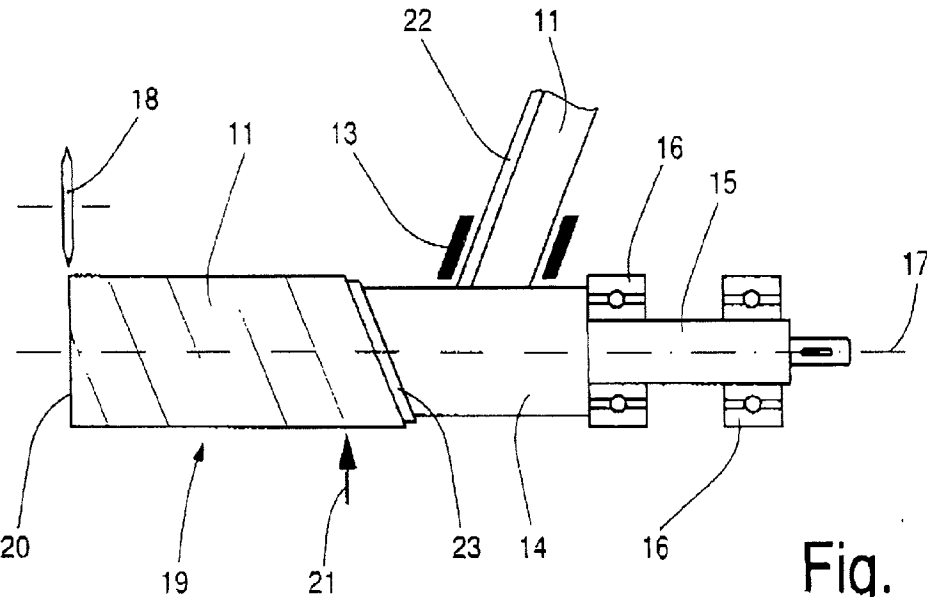


Fig. 3

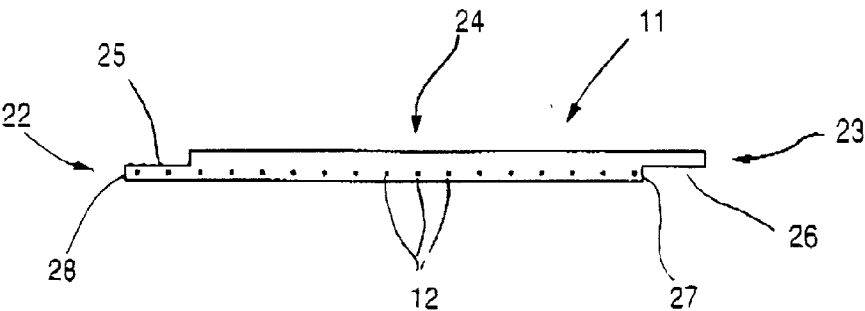


Fig. 4

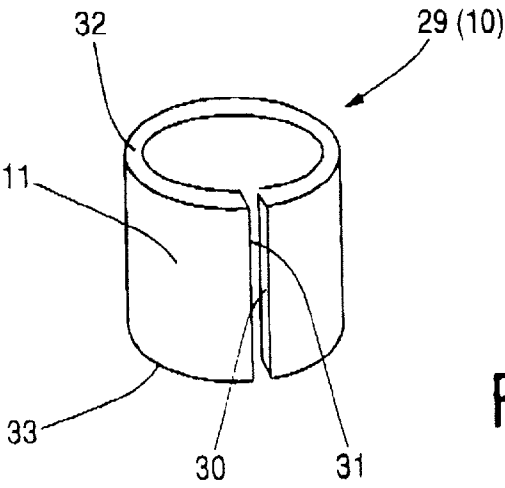


Fig. 5

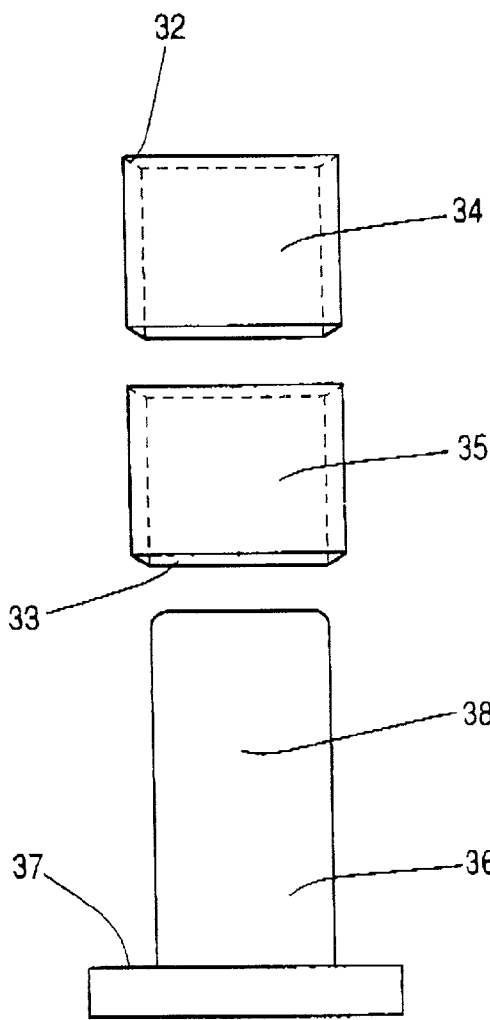


Fig. 6

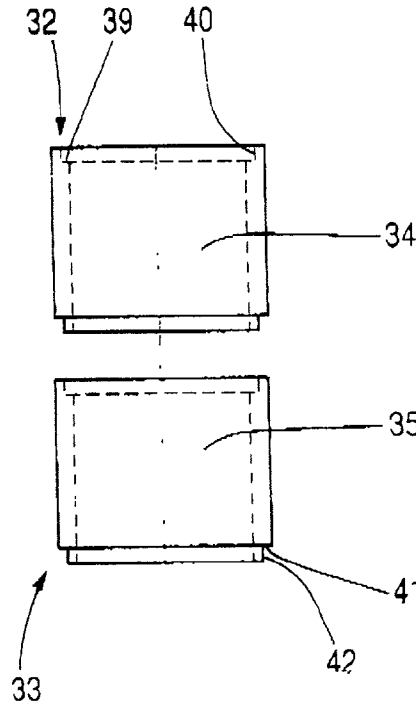


Fig. 7

CORE FOR A SPINNING BOBBIN AND METHOD OF PRODUCING THE CORE

DESCRIPTION

[0001] The invention relates to a core for a spinning bobbin and for receiving a windable material and relates to a method of producing the core.

[0002] Yarns, woven fabrics, threads or filaments and the like are wound onto spinning bobbins during production. The spinning bobbins have a solid core, around which the material to be wound is wound. The invention is concerned with the construction and production of a spinning bobbin core of this type.

[0003] The object of the invention is to provide a spinning bobbin core which can be produced in a simple way.

[0004] A core according to the invention for a spinning bobbin is obtained from the features of Patent Claim 1. Flat strip material in particular, for instance made of plastic, is wound in a suitable way and thus forms the core. The strip material, for instance a flat belt, is preferably wound spirally and/or helically. Construction from a strip material permits production which is simple and extremely flexible with regard to diameters and lengths.

[0005] Adjacent lying portions of the strip material—the latter is also referred to as winding strip—are advantageously permanently joined to one another, for instance by welding or adhesive bonding. A spiral arrangement of the strip material and welding of the same results in extremely high strength, not inferior to that of a seamless tube.

[0006] Adjacent lying portions of the strip material preferably overlap one another. This further increases the strength and possibility of permanently joining the adjacent lying portions.

[0007] In one embodiment of the invention, edges of the strip material lying opposite one another are made thinner than a central region of the same, the thinner edges of adjacent lying portions overlapping one another. This makes it possible to form the core with a continuous thickness in spite of regions overlapping one another. Weight is also saved. A uniform thickness or wall thickness of the core is obtained in particular if the edges overlapping one another, taken together, have a thickness corresponding to the non-overlapping regions, for instance the central region.

[0008] The strip material preferably has a flat, rectangular cross section. In particular, the edges are of a stepped form, to permit overlapping. Edge offsets or steps have a thickness which corresponds to half the thickness otherwise of the strip material. Different thicknesses in the region of the edges lying opposite one another are also conceivable. What is important is that the edges overlapping one another, taken together, have a thickness corresponding to the non-overlapping regions.

[0009] The strip material is advantageously reinforced, for instance by embedded tension-bearing elements, in particular made of high strength fibres such as aramid or steel for example. The tension-bearing elements are also arranged in the region of the edges of the strip material, at least in the region of one of the edges lying opposite one another, so that

when the edges are overlapped there are reinforcements over the entire length of the core. This is not obligatory, however.

[0010] According to a further idea of the invention, the strip material is annularly wound. An endless ring is formed from an endless portion of the strip material by winding with only one lap. In this case, ends of the strip material abutting one another are joined to one another.

[0011] A core with a longer dimension in the axial direction is formed by permanently joining a number of rings.

[0012] The method according to the invention is obtained from the features of Patent Claim 15, if appropriate in conjunction with the subsequent subclaims.

[0013] The strip material is advantageously continuously wound spirally and/or helically and thus forms the core extending in the direction of a winding axis.

[0014] The strip material is preferably wound onto a winding mandrel, for instance onto a motor-driven winding mandrel. The core produced is hollow and can be pulled off the winding mandrel after completion.

[0015] The strip material is advantageously supplied stationarily in a fixed position—in relation to the direction of the winding axis. In this case, a free end of the wound core continuously travels in the direction of the winding axis. If a winding mandrel of finite length is used, the free end “grows” over and beyond a free end of the winding mandrel.

[0016] According to a development of the method according to the invention, portions of a defined length are severed from the free end of the wound core. If the winding rate remains the same, the length of the wound core is dependent on the time which has elapsed. In an automatic system, this makes programmed control possible in a simple way.

[0017] A cutting device provided for severing the portion of a defined length travels in the direction of the winding axis during the severing operation or is taken along parallel to it. The travelling rate is preferably 50 mm/min and in this case corresponds to the increase in length of the core brought about by the strip material being supplied and wound. In this way, extremely exact and straight cuts can be made. Temporary coupling of the cutting device to the core is also possible, for instance by gripping elements which are released after a finished core has been cut off and, following a pushing-back movement, once again securely hold the newly growing core and travel along with it.

[0018] Preferred exemplary embodiments of the invention are explained in more detail below with reference to the drawing, in which:

[0019] FIG. 1 shows a wound core in side view,

[0020] FIG. 2 shows the core according to FIG. 1 in cross section,

[0021] FIG. 3 shows a core during production in side view,

[0022] FIG. 4 shows a cross section through a winding strip with tension-bearing elements used for the production of the core,

[0023] FIG. 5 shows a core comprising a single ring, the ends of which have not yet been joined to one another,

[0024] FIG. 6 shows a pulled-apart representation of two rings on a mandrel for the forming of a core, and

[0025] FIG. 7 shows a pulled-apart representation of two rings for the forming of a core.

[0026] FIG. 1 shows a core 10 for a spinning bobbin and for receiving a windable material, for instance a fibre or a woven fabric. A construction comprising a helically wound material can be easily seen. This is referred to in the present case as strip material 11.

[0027] The core 10 is of a hollow form similar to a tube, see FIG. 2. The inside diameter is, for example, 300 mm; the length of the core is, for example, 350 to 400 mm.

[0028] The strip material similar to a flat belt consists of thermoplastic material and is preferably produced by extrusion or in some other continuous process and may be reinforced. FIG. 4 shows tension-bearing elements 12 which are embedded in the strip material 11, extend in the direction of the strip material and preferably run parallel adjacent to one another at equal intervals. Wires, high-strength fibres and the like come into consideration as tension-bearing elements.

[0029] A device for producing a spinning bobbin core according to the invention is sketched in FIG. 3. The strip material 11 is supplied by means of a stationary or fixed guiding unit 13 to a winding mandrel 14 and comes to bear against the latter. The winding mandrel 14 is mounted on a shaft 15, which is supported by suitable bearings 16 for absorbing transverse forces and is driven in a way not shown. The guiding unit 13 is located directly ahead of the point where the strip material 11 runs onto the winding mandrel 14.

[0030] The guiding unit 13 has the effect that the strip material 11 is supplied to the winding mandrel 14 not exactly transversely with respect to the winding axis 17 but at a small angle. The angle is dependent on the width of the strip material 11 and is chosen precisely such that portions of the strip material 11 directly neighbouring one another come to lie adjacent to one another without intermediate spaces as a result of the winding operation on the winding mandrel 14. In this case, the strip material is wound around the winding mandrel 14 helically or spirally in the manner of a screw thread.

[0031] The wound package 19 produced in this way is continuously advanced by the supplied strip material 11 and may be of virtually any desired length. A core 10 with the desired length is expediently severed from the wound package 19 by an adjustable cutting device 18. The said wound package slides on the winding mandrel 14, so that a free end 20 travels in the direction of the winding axis 17.

[0032] The winding mandrel 14 may be provided with forward-driving devices (not shown), for example caterpillar take-offs, arranged in the direction of the winding axis 17, in order to permit the described travelling movement of the wound package 19 on the winding mandrel 14.

[0033] The winding mandrel 14 extends not quite up to the working area of the cutting device 18 and has a constant cross section over its length. In an embodiment not shown, the cross section of the winding mandrel 14 narrows in the direction of the cutting device 18. This prevents the wound package 19 from seizing on the winding mandrel 14 if the

strip material 11 shrinks. The winding mandrel 14 is preferably then formed in a slightly conical way.

[0034] The cutting device 18 is taken along with the travelling free end 20 during the cutting operation, in order to permit cuts precisely transversely with respect to the winding axis 17.

[0035] After the cutting, the free end 20 or the peripheral cut face of the wound package 19 and/or the corresponding cut face of the severed core 10 are subjected to post-treatment. The aim is to seal and/or smooth the cut faces, in particular any reinforcements or tension-bearing elements 12 present. For this purpose, the cut faces are exposed to heat. Welding can preferably be performed as hot-plate welding, with hot air or as ultrasonic welding.

[0036] The strip material 11 coming to lie on the winding mandrel 14, or the laps thereof neighbouring one another, are permanently joined to one another. For this purpose, in FIG. 3 a welding unit 21 is arranged approximately opposite the guiding unit 13. Lateral edges 22, 23 of the strip material 11 are welded directly to one another or permanently joined to one another in some other way. This increases the strength of the core 10 produced. Releasable joining is advantageous if the strip material 11 is to be reused, for instance for cores of different diameters and/or lengths.

[0037] It is preferred for the surface of the core 10 to be of a planar form in the direction of the winding axis 17. Nevertheless, the portions of the strip material 11 neighbouring one another are to be joined well to one another. For this purpose, the cross section of the strip material 11 (FIG. 4) is formed in a special way. The edges 22, 23 are each made thinner than the strip material 11 in a central region 24, preferably in each case half as thick. This allows the lateral edges 22, 23 to overlap one another and nevertheless form a planar surface of the core 10.

[0038] According to FIG. 4, the strip material 11 has a flat, rectangular cross section with edge offsets 25, 26. These come to lie on one another in the wound core 10. The welding or joining by the welding unit 21 takes place on the lateral edge 23 receiving the following strip material 11, to be precise in a region in which the reduced thickness of the lateral edge 23 begins, in FIG. 4 on a step end face 27 facing the offset 26. An outer end face 28 angled away from the offset 25 comes to lie against the said end face 27.

[0039] Instead of the stepped configuration shown in FIG. 4, the strip material 11 may also have a cross section tapering to a point on each side. What is important is the suitability for a surface of the finished core 10 that is as planar as possible, with preferably partial overlapping of the strip material 11.

[0040] The already described reinforcement by the tension-bearing elements 12 is preferably not arranged over the entire cross section of the strip material 11. Rather, the tension-bearing elements 12 are present only in the central region 24 and in one of the two lateral edges 22, 23. In FIG. 4, no tension-bearing elements are arranged in the lateral edge 23. As a result, this leads to the finished core 10 having tension-bearing elements at equal intervals from one another over its entire length. To elevate the joins between the neighbouring laps of the strip material 11, however, both lateral edges 22, 23 may also be provided with tension-bearing elements 12. It is likewise possible for the lateral

edges **22, 23** to be recessed to accommodate the tension-bearing elements **12**. This may be appropriate in particular in the case of relatively thick tension-bearing elements in relation to the thickness of the lateral edges.

[0041] The strip material preferably has a width of 120 mm. Instead of a single flat belt, it may also be divided, so that a number of part-belts, for instance 3 part-belts, running adjacent to one another and each with a width of 40 mm, are used for the production of the core **10**. Then, the part-belts coming to lie adjacent to one another also have to be welded to one another on the winding mandrel **14**. Production with part-belts prevents possible twisting and bulging of an undivided, relatively wide belt.

[0042] FIG. 5 shows a strip material curved or wound into a ring **29**. Free ends **30, 31** still have to be joined to one another, preferably by welding or adhesive bonding. In the simplest case, the ring **29** forms the core **10**. Its extent in the axial direction is then dependent on the width of the strip material **11** used, here preferably up to approximately 120 mm.

[0043] For forming longer cores, a number of rings **29** are arranged adjacent to one another in the axial direction and are joined to one another in the region of peripheral end faces **32, 33**. This also preferably takes place by welding or adhesive bonding. Particularly suitable welding methods are hot-plate welding and ultrasonic welding.

[0044] For the joining of two rings **34, 35**, they are preferably pulled onto a mandrel **36**, which may be motor-driven—by analogy with the representation in FIG. 3. A vertical alignment of the mandrel **36** is advantageous. The lower ring **35** then comes to lie on a peripheral shoulder **37** of the mandrel.

[0045] For joining the rings **34, 35**, a self-centring of the same is advantageous. This is achieved by corresponding formation of the peripheral end faces **32, 33**. According to FIG. 6, the end faces are bevelled in relation to a centre axis **38**. As soon as the rings **34, 35** bear against one another, they are centred in relation to one another.

[0046] FIG. 7 shows a modification in the formation of the peripheral end faces **32, 33**—approximately analogous to FIG. 4. The end faces are of a stepped form. The “receiving” end face **32** has an inner peripheral shoulder **39** with a neighbouring inner face **40**. Opposite this, the “entering” end face **33** is provided with an outer peripheral shoulder **41** and an outer face **42** offset inwards with respect to the said shoulder. With this formation, the rings **34, 35** can be inserted one into the other and subsequently permanently joined to one another. Specifically in the case of this configuration, there is no need for a mandrel as a centring aid.

1. Core **(10)** for a spinning bobbin and for receiving a windable material, characterized by a construction from wound strip material **(11)**.

2. Core according to claim 1, characterized in that adjacently lying portions of the strip material **(11)** are permanently joined to one another.

3. Core according to claim 1, characterized in that adjacently lying portions of the strip material **(11)** at least partially overlap one another.

4. Core according to claim 2, characterized in that edges **(22, 23)** of the strip material **(11)** lying opposite one another form the portions lying opposite one another.

5. Core according to claim 4, characterized in that the edges **(22, 23)** of the strip material **(11)** lying opposite one another are made thinner than a central region **(24)** of the same and in that the thinner edges **(22, 23)** at least partially overlap one another.

6. Core according to claim 1, characterized in that the strip material **(11)** has a flat, rectangular cross section.

7. Core according to claim 1, characterized in that the strip material **(11)** is reinforced.

8. Core according to claim 1, characterized in that the strip material **(11)** consists of least partially of plastic.

9. Core according to claim 1, characterized in that the strip material **(11)** is helically wound.

10. Core according to claim 1, characterized in that the strip material **(11)** is annularly wound.

11. Core according to claim 1, characterized in that a number of rings **(34, 35)** of strip material **(11)** are joined to one another, lying axially adjacent to one another, for the forming of the core **(10)**.

12. Core according to claim 11, characterized in that neighbouring rings **(34, 35)** have peripheral end faces **(32, 33)** positively engaging in one another and regions of the end face **(32)** of one ring **(34, 35)** bear against regions of the end face **(33)** of the neighbouring ring **(34, 35)**.

13. Core according to claim 12, characterized in that the end faces **(32, 33)** are peripherally profiled.

14. Core according to claim 12, characterized in that the end faces **(32, 33)** are peripherally stepped.

15. Method of producing a core **(10)** for a spinning bobbin, characterized in that the core **(10)** is produced by the winding method, a flat strip material **(11)** being wound and thus forming the core **(10)** extending in the direction of a winding axis **(17)**.

16. Method according to claim 15, characterized in that the strip material **(11)** is wound onto a winding mandrel **(14)**.

17. Method according to claim 15, characterized in that the strip material **(11)** is supplied for winding in a position fixed in relation to the direction of a winding axis **(17)** and in that a free end **(20)** of the wound core **(10)** travels in the direction of the winding axis **(17)**.

18. Method according to claim 17, characterized in that a cutting device **(18)** for severing at least portions of a defined length of the core **(10)** travels in the direction of the winding axis **(17)** during the severing operation.

19. Method according to claim 15, characterized in that portions of a defined length are severed from a free end of a wound package **(19)** produced by the winding for the forming of at least part of the desired core **(10)**.

20. Method according to claim 18, characterized in that cut faces produced by the severing of portions from a wound package **(19)** are smoothed.

21. Method according to claim 15, characterized in that the strip material **(11)** is wound with at least partial overlapping of neighbouring portions.

22. Method according to claim 21, characterized in that the strip material **(11)** is permanently joined in the region of the overlapping.

23. Method according to claim 15, characterized in that a number of rings **(34, 35)** of wound strip material **(11)** are joined to one another, lying adjacent to one another in the axial direction, for the forming of the core **(10)**.

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