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(54) **Abutment joint for paper reel cores**

(57) An abutment joint for end-to-end joining of paper reel cores, the abutment joint comprising a first conical surface (4) formed on the outer surface of one core (2) and a second conical surface (3) formed on the inner surface of the other core (1), whereby said first conical surface and said second conical surface abut against

each other in the joint, wherein at least one protrusion (6) is formed at least on one conical surface and at least one groove (5) is formed at least on the other conical surface to form an interlocking joint between the cores.

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Description

[0001] The invention relates to end-to-end joining of paper reel cores. In more detail the invention relates to a shape of the joint used in said joining.

[0002] In paper industry, a paper web is conventionally wound up during different finishing operations on a core made from a plurality of spirally overlappingly wound plies of narrow strips of board. Prior to their winding into a core, the board strips are glued, conventionally using a sodium silicate solution. The finished core length must be exactly matched with the width of the paper web exiting from a slitter and being wound on the core. Furthermore, the core must be flawless to avoid problems in co-operation of the reels with the spindles of winder equipment employed in the final use and/or finishing of the paper.

[0003] A used core presents a waste problem, since only a part of such used cores can be reused for manufacturing core board. Consequently, while effort has been made to find possibilities of recycling cores, also this approach involves problems. The most essential problem is the damage caused to the core ends. Conventionally, methods of overcoming this drawback have been sought from reworking of core sections. A basic goal of reworking is to remove the damaged portion from the core end and then to join the thus reworked core end with the end of another core section similarly reworked so as to form a continuous core master that can be severed to desired lengths for reuse. One type of joining method and apparatus of this kind has been described in the international publication WO 00/03868.

[0004] In the known solutions, conical surfaces are first made on the surfaces of the cores to be joined so that on one core a conical surface is formed on the inner surface of the core and on the other core a conical surface is formed on the outer surface of the core. Glue is then applied either to the conic surface of one core or both cores, and the cores are then pushed end to end so that the formed conical surfaces abut against each other. This is repeated to form a continuous core master from pieces which core master is severed to cores of desired lengths for reuse.

[0005] In the above described method and apparatus for joining cores, the glue to be used must be fast drying in order immediately to obtain a sufficiently strong joint for the cores to be joined using continuously operating joining equipments.

[0006] It is not possible to obtain a sufficiently fast drying glue without sacrificing its other properties. Furthermore, in using such a fast-drying glue, reaction time of glue on the surface of the core will be relatively short impairing the quality and stability of the joint.

[0007] In the present invention, on working the conical surfaces of the cores to be joined, a protrusion is formed at the nose of one conic surface, and a complementary groove is formed at the roof of the other conical surface, whereby, after adding glue, said protrusion and said

groove form an interlocking (form-fit) joint between the cores,. This interlocking joint supports the joint directly after joining the mating surfaces enabling so the use of glues drying more slowly and having improved reactivity with the mating surfaces. This enables to obtain a longitudinal joint of improved stability and improved quality.

[0008] More specifically the longitudinal end-to-end joint of cores according to the invention is characterized in what is defined in the characterizing part of claim 1.

[0009] The invention will next be described in more detail with reference to the appended drawing in which

[0010] Figure 1 shows an embodiment of joining surfaces formed according to the invention.

[0011] In the embodiment of in Fig. 1 the cores to be joined are shown in cross section. A conical surface 3 is formed on the inner surface of the core 1 and a conical surface 4 is formed on the outer surface of the core 2, by means of which conical surfaces the cores are joined in an abutting manner against each other. A protrusion 6 is formed on the conical surface 4 at the nose of the core 2, the protrusion 6 projecting from the conical surface approx. 2 - 3 mm. The length of the protrusion from the core end is approx. 5 mm. Correspondingly, a groove 5 complementary to said protrusion of the core 2, is formed at the inner edge of the conical surface 3 of the core 1.

[0012] When the cores 1 and 2 of Fig. 1 are joined to each other, glue is first applied to one of the conical surfaces or to both conical surfaces 3 and 4. Then, the conical surface 4 of the core 2 is pushed into the core 1 so that the conical surfaces will abut against each other. When the cores are pushed together, the end edge of the core 2 will flex to enable the protrusion 6 to be inserted into the groove 5 and thus to form an interlocking joint between the core 1 and the core 2. This interlocking joint supports the formed core joint thus giving the glue more time to dry and to form a stable and good-quality glue joint between the cores.

[0013] In the solution according to the invention, the protrusion may be formed at any site of either of the surfaces of the cores to be joined. Preferably it is, however, formed adjacent to the end edge of the core to enable the protrusion to flex inwardly while being inserted into the complementary groove. If required, it is also possible to form a protrusion on both conical surfaces of the cores to be joined and complementary grooves on the opposite conical surface.

Claims

1. An abutment joint for end-to-end joining of paper reel cores, the abutment joint comprising a first conical surface (4) formed on the outer surface of one core (2) and a second conical surface (3) formed on the inner surface of the other core (1), whereby said first conical surface and said second conical surface abut against each other in the joint, **characterized in that**

at least one protrusion (6) is formed at least on one conical surface and at least one groove (5) is formed at least on the other conical surface to form an interlocking joint between the cores.

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2. The abutment joint according to claim 1, **characterized in that** the protrusion (6) is formed on the conical surface (4) formed on the outer surface of the core (2) and the groove (5) is formed on the conical surface (3) formed on the inner surface of the core (1). 10
3. The abutment joint according to claim 1 or 2, **characterized in that** the protrusion (6) is formed to the end of the core. 15
4. The abutment joint according to any of the preceding claims, **characterized in that** glue is applied on the conical surface (3, 4) of at least one of the cores. 20

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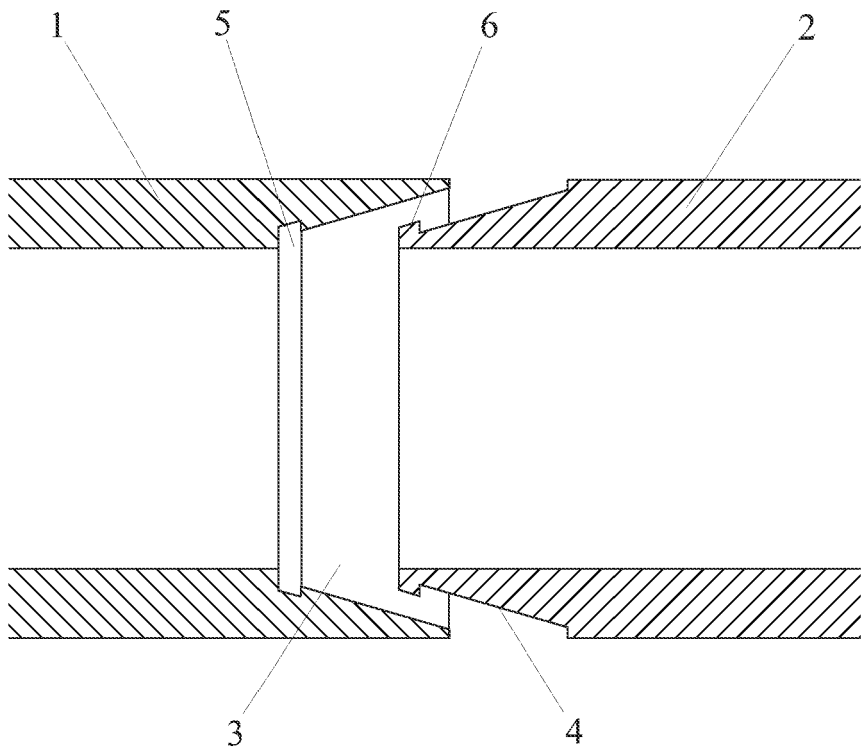


Fig. 1