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(54) **CARD-CLOTHING WIRE**

KARDENGARNITURDRAHT

FIL POUR GARNITURE DE CARDE

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• **PATENT ABSTRACTS OF JAPAN vol. 11, no. 381**
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(HIROYUKI KANAI), 3 July 1987,

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Description

[0001] This invention relates to card-clothing wire and particularly, although not exclusively, relates to a method of re-clothing a part of a fibre processing apparatus, an assembly and a method of manufacturing an assembly.

[0002] A card-clothed taker-in roller of a fibre opening apparatus has a diameter which is very much less than that of the main carding cylinder of the apparatus. Consequently, the card-clothing wire of the taker-in roller wears much more quickly than the card-clothing wire of the main carding cylinder and, therefore, may need to be renewed two or three times during the lifetime of the wire of the main carding cylinder. With modern high production cards, the consequent loss of production is costly. There is a need for taker-in wire life to be at least equal to that of the main cylinder wire.

[0003] It is known to hard coat card-clothing wire using, for example, nickel-diamond coating, plasma arc spray coating and high velocity combustion coating techniques, in order to extend the lifetime of the wire. Such coating techniques are highly sophisticated and specialised and are used to coat wire that is already mounted on, for example, a taker-in roller.

[0004] At the present time, taker-in rollers with worn-out coated wire have to be returned by users to the manufacturer so that they may be re-clothed with new wire which is then coated. However, it may not be practicable for many users to return the rollers to the manufacturer for this coating treatment.

[0005] It is an object of the present invention to address the problems described above.

[0006] According to a first aspect of the present invention, there is provided a method of re-clothing a part of a fibre processing apparatus, the method using an assembly which comprises a length of card-clothing wire including a multiplicity of fibre engaging elements which have selected coated and non-coated surfaces, the method comprising winding wire from a support onto the part of the fibre processing apparatus in order to re-clothe said part.

[0007] Said support is suitably not a part of a fibre processing apparatus. Said support may simply comprise a circularly cylindrical drum. The diameter of said support may be in the range 30 cm to 100 cm, more preferably in the range 45 cm to 80 cm. The support may have a width in the range 10 cm to 300 cm, more preferably in the range 15 cm to 250 cm. Said support may be arranged to carry enough wire for more than one part of a fibre processing apparatus, for example more than one taker-in roller.

[0008] Said part of the fibre processing apparatus clothed in the method is preferably circularly cylindrical and may have a diameter in the range 4 cm to 60 cm, more preferably in the range 5 cm to 40 cm. Said part may have a width in the range 1.5 cm to 400 cm, more preferably in the range 90 cm to 160 cm. Said part may

be an opening roller for an open-end spinning machine or a taker-in roller for a carding machine. Preferably, said part is a taker-in roller for a carding machine.

[0009] The method may include an initial step of removing a length of card-clothing wire from the part of the fibre processing apparatus prior to the winding of coated wire from said support.

[0010] According to a second aspect of the invention, there is provided an assembly for use in a method according to the first aspect, the assembly comprising a length of card-clothing wire including a multiplicity of fibre engaging elements which have selected coated and non-coated surfaces, the wire being coiled around a support which is not a part of a fibre processing apparatus and being arranged to be removed therefrom for use in the method.

[0011] The invention according to the second aspect may include any feature described herein.

[0012] According to a third aspect of the present invention, there is provided a method of manufacturing an assembly as described according to said second aspect, the method comprising coiling a length of card-clothing wire having a multiplicity of fibre engaging elements around a support which is not a part of a fibre processing apparatus such that adjacent turns of the wire are juxtaposed and coating selected surfaces of the fibre engaging elements whilst leaving other surfaces thereof uncoated.

[0013] Preferably, substantially no coating material passes between adjacent turns of the wire during coating of the wire, in view of the juxtaposition of adjacent turns of the wire. Preferably, no solid material is interposed between adjacent turns of the wire. Preferably, adjacent turns of the wire abut one another.

[0014] Card-clothing wire includes a base which supports a multiplicity of fibre engaging elements in the form of teeth. In the method, the length of wire is suitably coiled around the support so that the base of the wire is closest to the support and the fibre engaging elements are spaced further away from the support. Furthermore, preferably adjacent elongate sides of the base are juxtaposed. Preferably, no solid material is interposed between adjacent elongate sides of the base. More preferably, adjacent elongate sides of the base abut one another so that substantially no coating material may pass between the sides during coating.

[0015] Preferably, selected parts of said exposed surfaces of the wire are coated. Thus, selected parts of the wire are preferably left uncoated.

[0016] The leading surface of a fibre engaging element of a length of card-clothing wire is a surface of the element which is arranged to initially contact the fibre to be processed. Preferably, at least part of the leading surfaces of fibre engaging elements of the wire are coated with said coating material. Preferably, substantially the whole area of the leading surfaces is coated with said coating material.

[0017] Said coating material is preferably arranged to

form a distinct layer on surfaces of the wire. Said coating material is preferably a wear resistant coating material. Preferred coating materials include metal carbides, for example tungsten carbide; metal oxides, for example aluminium oxide and chromium oxide; and metal nitrides, for example titanium nitride. The most preferred coating materials are tungsten carbide, titanium nitride and chromium oxide, with chromium oxide being especially preferred.

[0018] Any suitable process may be used for applying said coating material to the wire. Preferred processes are those in which the coating material can be directed towards selected parts of the wire, for example the leading surfaces of the fibre engaging elements of the wire. Preferably, the coating process involves spraying the coating onto the wire. A preferred process for coating the wire is plasma arc spray coating. In this process droplets of molten coating material, for example chromium oxide, are sprayed at selected parts of the wire. On impact with the wire, the droplets are flattened and then cool by transfer of heat from the droplets to the wire.

[0019] Said support used in the method is preferably cylindrical and is, more preferably, circularly cylindrical.

[0020] Specific embodiments of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a plan view of an assembly comprising card-clothing wire wound on a circularly cylindrical support drum;

Figure 2 is a side elevation of the assembly of Figure 1;

Figure 3 is a cross-section along line III-III of Figure 2;

Figure 4 is a side elevation of part of a length of card-clothing wire; and

Figure 5 is a cross-section through the wire of Figure 4.

[0021] Referring to the figures, the assembly 1 comprises metallic card-clothing wire 2 which has been wound on the support drum 4 and then coated with a hard coating in order to increase its durability and, therefore, extend its useful lifetime. The assembly 1 may be delivered to an end user, for example a mill, who can then re-clothe taker-in rollers using the coated wire in a relatively quick and efficient manner without the need for any specialised equipment. Thus, loss of production whilst taker-in rollers are being re-clothed followed by hard coating may be minimised with consequential potential monetary savings.

[0022] Further details are provided below.

[0023] The support drum 4 may be a wooden or metal drum having a diameter of the order of 60 cm and a width

of the order of 200 cm. The metallic wire 2 wound on the drum 4 may be standard carbon-steel card-clothing wire including a base 6 which carries saw-tooth shaped teeth 7. The length of wire wound on the drum may be in the range 300 to 4000m. Preferably the wire is deburred prior to winding on the drum 4 by suitable means, for example by mechanical brushing (burnishing) or by chemical or electrochemical treatments.

[0024] The wire 2 is wound around the drum 4 so that adjacent elongate sides 8 of the base 6 abut one another. When so disposed, the wire 2 may be coated using a suitable process.

[0025] Known coating processes include nickel-diamond coating, plasma arc spray coating and high velocity combustion coating.

[0026] A preferred coating process for use in the present invention is plasma arc spray coating. In this process, the surface to be coated is sprayed with melted droplets of coating material. Preferred coating materials include for example chromium oxide or aluminium oxide, tungsten carbide or titanium nitride coatings.

[0027] Coating materials are generally relatively costly and, accordingly, it is preferred to coat only selected parts of the wire, if possible. One advantage of arranging the wire on the drum with sides 8 abutting is that the abutting regions of the sides 8 cannot be coated with material during the coating process. Furthermore, it is possible in certain coating processes, for example in plasma arc spray coating, to coat selected parts of the wire, whilst leaving other parts uncoated.

[0028] Applicants co-pending U.K. patent application number 93 07548.9 (the contents of which are incorporated herein by reference) describes card-clothing wire in which leading surfaces of the teeth of the wire are treated so as to increase their coefficient of friction compared to other surfaces downstream of the leading surface.

[0029] In a preferred embodiment of the present invention, the leading surfaces 10 of the teeth 7 of wire 2 are coated whilst side surfaces 12 and/or rear surface 14 and/or land 15 may be left uncoated.

[0030] The assembly 1 including suitably coated wire 2 may be delivered to an end user, for example a mill, for use in re-clothing a taker-in roller. The re-clothing process is relatively straightforward and simply comprises winding wire 2 from drum 4 onto the taker-in roller and then securing the wire in position. No additional specialist tools or apparatus are required in order to re-clothe the taker-in roller with the coated wire.

[0031] The diameter of the taker-in roller may be of the order of 250 mm. It will be appreciated that the diameter of the taker-in roller is significantly less than the diameter of the drum 4 from which wire 2 is withdrawn. It might be expected that wire 2 would be put under such stress during the winding on the taker-in roller that the coating would crack or otherwise become damaged. However, this is unlikely to be the case, in view of the fact that parts of the wire that are deformed the most

during the step of winding the wire on the taker-in roller are left uncoated, due to the abutment of sides 8 of the wire during the coating process. Furthermore, since, in the preferred embodiment, only the leading surface 10 is coated, there is a negligible likelihood of the coating being adversely affected.

[0032] It should be appreciated that although the invention has been described with reference to a taker-in roller, the invention may be used to re-clothe any kind of relatively small diameter card-clothed roller, for example an opening roller of an open-end spinning machine.

[0033] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0034] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0035] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0036] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A method of re-clothing a part of a fibre processing apparatus, the method using an assembly (1) which comprises a length of card-clothing wire (2) including a multiplicity of fibre engaging elements (7) which have selected coated (10) and non-coated (12, 14, 15) surfaces, the method comprising winding wire from a support (4) on to the part of the fibre processing apparatus in order to re-clothe said part.
2. A method according to Claim 1, wherein at least part of leading surfaces (10) of fibre engaging elements of the wire (2) are coated with said coating material.
3. A method according to Claim 2, wherein parts (12, 14, 15) of said fibre opening elements (7) other than said leading surfaces (10) are substantially uncoat-

ed.

4. A method according to any preceding claim, wherein the part clothed in the method has a diameter in the range 4 to 60cm.
5. A method according to any preceding claim, wherein the part clothed in the method is a taker-in roller for a carding machine.
6. A method according to any preceding claim, comprising an initial step of removing a length of card-clothing wire from said part prior to the winding of wire from said support (4).
7. A method according to any preceding claim, wherein said support (4) includes enough wire for clothing more than one part of a fibre processing apparatus.
8. An assembly (1) for use in a method according to any of Claims 1 to 7, the assembly (1) comprising a length of card-clothing wire (2) including a multiplicity of fibre engaging elements (7) which have selected coated (10) and non-coated (12, 14, 15) surfaces, the wire being coiled around a support (4) which is not a part of a fibre processing apparatus and being arranged to be removed therefrom for use in the method.
9. An assembly according to Claim 8, wherein said support (4) carries enough wire (2) for clothing more than one part of a fibre processing apparatus in a method according to any of Claims 1 to 7.
10. An assembly according to Claim 9, wherein the diameter of said support (4) is in the range 30 cm to 100 cm.
11. A method of manufacturing an assembly (1) according to any of Claims 8 to 10, the method comprising coiling a length of card-clothing wire (2) having a multiplicity of fibre engaging elements (7) around a support (4) which is not a part of a fibre processing apparatus such that adjacent turns of the wire are juxtaposed and coating selected surfaces of the fibre engaging elements whilst leaving other surfaces thereof uncoated.
12. A method according to Claim 11, wherein substantially no coating material passes between adjacent turns of the wire during coating of the wire.
13. A method according to Claim 11 or Claim 12, wherein no solid material is interposed between adjacent turns of the wire.
14. A method according to any of Claims 11 to 13, wherein adjacent turns of the wire abut one another.

15. A method according to any of Claims 11 to 14, wherein the length of wire (2) is coiled around the support (4) so that the base (6) of the wire (2) is closest to the support and the fibre engaging elements (7) are spaced further away from the support. 5
16. An assembly used in a method according to any of Claims 1 to 7, the assembly comprising a length of card-clothing wire (2) including a multiplicity of fibre engaging elements (7) which have selected coated (10) and non-coated (12, 14, 15) surfaces, the wire being coiled around a support (4) and being removed therefrom in the method. 10

Patentansprüche

1. Verfahren zum erneuten Beziehen eines Teils eines Faserbearbeitungsgeräts unter Verwendung eines Aufbaus (1), der eine Länge Kardengarniturdraht (2) mit einer Vielzahl Fasereingriffselemente (7) umfasst, die ausgewählte beschichtete (10) und unbeschichtete (12, 14, 15) Oberflächen aufweisen, wobei das Verfahren den Schritt Abwickeln von Draht von einem Träger (4) auf das Teil des Faserbearbeitungsgeräts umfasst, um das Teil zu beziehen. 20
2. Verfahren nach Anspruch 1, bei dem zumindest teilweise Vorderflächen (10) von Fasereingriffselementen des Drahts (2) mit dem Beschichtungsmaterial beschichtet sind. 25
3. Verfahren nach Anspruch 2, bei dem von den Vorderflächen (10) verschiedene Teile (12, 14, 15) der Faseröffnungselemente (7) im Wesentlichen unbeschichtet sind. 30
4. Verfahren nach einem der vorangehenden Ansprüche, bei dem das im Verfahren bezogene Teil einen Durchmesser im Bereich von 4 bis 60 cm hat. 35
5. Verfahren nach einem der vorangehenden Ansprüche, bei dem das im Verfahren bezogene Teil eine Vorreißwalze für eine Karde ist. 40
6. Verfahren nach einem der vorangehenden Ansprüche, das vor dem Abwickeln von Draht von dem Träger (4) den Anfangsschritt Entfernen einer Länge Kardengarniturdraht von dem Teil umfasst. 45
7. Verfahren nach einem der vorangehenden Ansprüche, bei dem der Träger (4) genug Draht aufweist, um mehr als ein Teil eines Faserbearbeitungsgeräts zu beziehen. 50
8. Aufbau (1) zur Verwendung in einem Verfahren gemäß einem der Ansprüche 1 bis 7, der eine Länge

Kardengarniturdraht (2) mit einer Vielzahl Fasereingriffselemente (7) umfasst, die ausgewählte beschichtete (10) und unbeschichtete (12, 14, 15) Oberflächen aufweisen, wobei der Draht um einen Träger (4) gewickelt ist, der nicht Teil eines Faserbearbeitungsgeräts ist, und so angeordnet ist, dass er sich von diesem zur Verwendung in dem Verfahren entfernen lässt.

9. Aufbau nach Anspruch 8, bei dem der Träger (4) genug Draht (2) trägt, um in einem Verfahren nach einem der Ansprüche 1 bis 7 mehr als ein Teil eines Faserbearbeitungsgeräts zu beziehen. 55
10. Aufbau nach Anspruch 9, bei dem der Durchmesser des Trägers (4) im Bereich von 30 cm bis 100 cm liegt. 60
11. Verfahren zur Anfertigung eines Aufbaus (1) gemäß einem der Ansprüche 8 bis 10, mit den Schritten Wickeln einer Länge Kardengarniturdraht (2) mit einer Vielzahl Fasereingriffselemente (7) um einen Träger (4), der nicht Teil eines Faserbearbeitungsgeräts ist, so dass aneinander angrenzende Wicklungen des Drahts nebeneinander liegen, und Beschichten ausgewählter Oberflächen der Fasereingriffselemente, während andere Oberflächen davon unbeschichtet bleiben. 65
12. Verfahren nach Anspruch 11, bei dem während des Beschichtens des Drahts im Wesentlichen kein Beschichtungsmaterial zwischen aneinander angrenzenden Wicklungen des Drahts hindurchgeht. 70
13. Verfahren nach Anspruch 11 oder Anspruch 12, bei dem zwischen aneinander angrenzenden Wicklungen des Drahts kein festes Material gebracht wird. 75
14. Verfahren nach einem der Ansprüche 11 bis 13, bei dem aneinander angrenzende Wicklungen des Drahts gegeneinander stoßen. 80
15. Verfahren nach einem der Ansprüche 11 bis 14, bei dem die Länge Draht (2) so um den Träger (4) gewickelt wird, dass sich der Fuß (6) des Drahts (2) am nächsten zum Träger befindet und die Fasereingriffselemente (7) von dem Träger weiter beabstandet sind. 85
16. Aufbau, der in einem Verfahren gemäß einem der Ansprüche 1 bis 7 verwendet wird und der eine Länge Kardengarniturdraht (2) mit einer Vielzahl Fasereingriffselemente (7) umfasst, die ausgewählte beschichtete (10) und unbeschichtete (12, 14, 15) Oberflächen aufweisen, wobei der Draht um einen Träger (4) gewickelt ist und von diesem im Verfahren entfernt wird. 90

Revendications

1. Procédé pour regarnir un élément d'un dispositif de traitement de fibres, le procédé utilisant un ensemble (1) qui comprend une longueur d'un fil (2) pour garniture de carde, fil comportant une multiplicité d'éléments (7) de prise des fibres qui ont des surfaces sélectionnées enduites (10) et non enduites (12, 14, 15), le procédé comprenant l'enroulement de fil venant d'un support (4) sur l'élément du dispositif de traitement de fibres de manière à regarnir ledit élément. 5
2. Procédé selon la Revendication 1, dans lequel une partie au moins de surfaces d'attaque (10) des éléments de prise des fibres du fil (2) sont enduites dudit matériau d'enduisage. 10
3. Procédé selon la Revendication 2, dans lequel les parties (12, 14, 15) desdits éléments (7) ouvreurs des fibres autres que lesdites surfaces d'attaque (10) sont essentiellement non enduites. 15
4. Procédé selon l'une quelconque des Revendications précédentes, dans lequel l'élément garni dans le procédé possède un diamètre compris entre 4 et 60 cm. 20
5. Procédé selon l'une quelconque des Revendications précédentes, dans lequel l'élément garni dans le procédé est un cylindre briseur pour une machine à carder. 25
6. Procédé selon l'une quelconque des Revendications précédentes, comprenant une étape initiale de retrait d'une longueur de fil pour garniture de carde dudit élément avant l'enroulement du fil venant dudit support (4). 30
7. Procédé selon l'une quelconque des Revendications précédentes, dans lequel ledit support (4) comprend suffisamment de fil pour garnir plus d'un élément d'un dispositif de traitement de fibres. 35
8. Ensemble (1) destiné à être utilisé dans un procédé selon l'une quelconque des Revendications 1 à 7, l'ensemble (1) comprenant une longueur d'un fil (2) de garniture de carde comportant une multiplicité d'éléments (7) de prise des fibres qui ont des surfaces sélectionnées enduites (10) et non enduites (12, 14, 15), le fil étant enroulé autour d'un support (4) qui n'est pas un élément d'un dispositif de traitement des fibres et étant disposé pour en être retiré pour être utilisé dans le procédé. 40
9. Ensemble selon la Revendication 8, dans lequel ledit support (4) porte suffisamment de fil (2) pour garnir plus d'un élément d'un dispositif de traitement 45
- de fibres dans un procédé selon l'une quelconque des Revendications 1 à 7.
10. Ensemble selon la Revendication 9, dans lequel le diamètre dudit support (4) est compris entre 30 cm et 100 cm. 50
11. Procédé de fabrication d'un ensemble (1) selon l'une quelconque des Revendications 8 à 10, le procédé comprenant l'embobinage d'une longueur de fil (2) de garniture de carde, fil ayant une multiplicité d'éléments (7) de prise des fibres, autour d'un support (4) qui n'est pas un élément d'un dispositif de traitement de fibres de telle façon que des spires adjacentes du fil soient juxtaposées, et l'enduisage des surfaces sélectionnées des éléments de prise des fibres tout en laissant d'autres surfaces de ceux-ci non enduites. 55
12. Procédé selon la Revendication 11, dans lequel substantiellement aucun matériau d'enduisage ne passe entre des spires adjacentes du fil pendant l'enduisage du fil.
13. Procédé selon la Revendication 11 ou la Revendication 12, dans lequel aucun matériau solide n'est interposé entre des spires adjacentes du fil.
14. Procédé selon l'une quelconque des Revendications 11 à 13, dans lequel des spires adjacentes du fil s'aboutent l'une contre l'autre.
15. Procédé selon l'une quelconque des Revendications 11 à 14, dans lequel la longueur de fil (2) est enroulée autour du support (4) de telle façon que la base (6) du fil (2) soit la plus proche du support et que les éléments (7) de prise des fibres soit d'avantage éloignés du support.
16. Ensemble utilisé dans un procédé selon l'une quelconque des Revendications 1 à 7, l'ensemble comprenant une longueur d'un fil (2) pour garniture de carde, fil comportant une multiplicité d'éléments (7) de prise des fibres qui ont des surfaces sélectionnées enduites (10) et non enduites (12, 14, 15), le fil étant enroulé autour d'un support (4) et étant retiré de celui-ci dans le procédé.

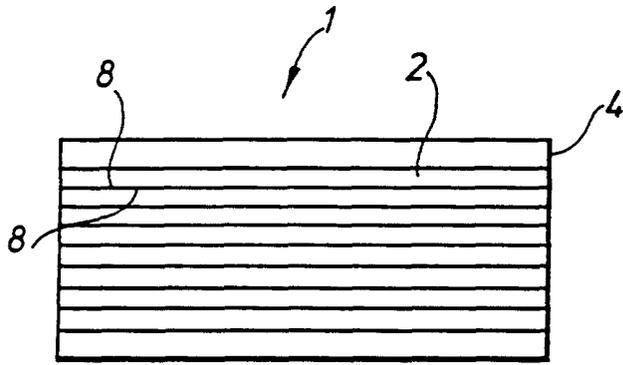


Fig. 1.

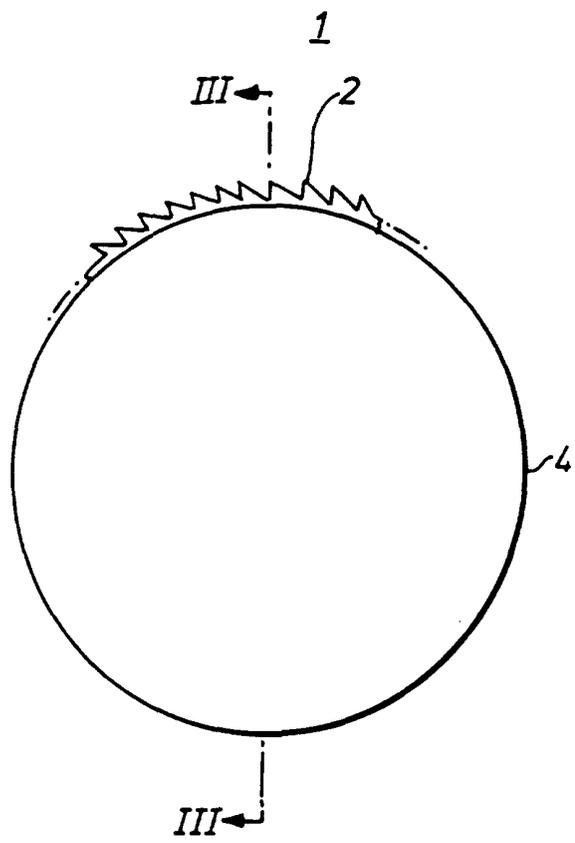


Fig. 2.

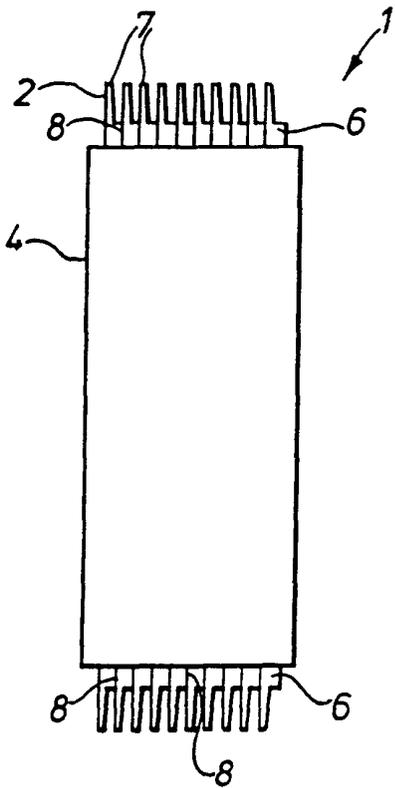


Fig. 3.

