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(54) **Yarn twist retention member on an open-end spinning machine**

Garndrallauffangelement in einer Offenend-Spinnmaschine

Élément pour limiter la torsion dans un métier à filer à bout libre

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(56) References cited:  
**CS-B- 276 522** **DE-A- 19 924 633**  
**GB-A- 2 322 385**

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## Description

### Technical field

[0001] The invention relates to a yarn twist retention member on an open-end spinning machine comprising a part of a wall of a bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel, this section of the wall of the bent yarn delivery channel on the yarn twist retention member being provided with at least one yarn twist retaining means.

[0002] Such a yarn twist retention member is known from DE 19924633 A1

### Background art

[0003] There is known (for instance from the DE 36 09 114) a yarn twist retention member on a open-end spinning machine made as an independent body comprising a part of a wall of a bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel, said body being inserted into a piece containing the remaining part of the bent section of the bent yarn delivery channel and, as the case may be, also the whole remaining part of the bent yarn delivery channel. On said section of the wall of the bent yarn delivery channel, the yarn twist retention member is fitted with a couple or a three-member configuration of transverse rounded protrusions serving as yarn twist retention means on which the yarn, while being delivered out of the spinning rotor, is bent and the yarn twist retained due to its friction on said protrusions.

[0004] The drawback of this embodiment of the yarn twist retention member consists in the complicated yarn twist retention member production with difficult shape of its surface with the rounded protrusions. If the yarn twist retention member is to be produced by moulding plastic materials, the difficulty consists in the mould production due to the small dimensions and articulated shape with rounded protrusions.

[0005] The patent CS No. 276 522 discloses a yarn delivery funnel fitted in its cavity, through which the yarn passes while being delivered, with a twist braking segment fitted with two run-up surfaces. The upper part of the braking segment contains a wedge-shaped groove whose bottom lies outside the axis of the yarn delivery funnel.

[0006] The drawback of this arrangement consists in the housing of a separate braking segment in the cavity of the yarn delivery funnel where it must be seated relatively tightly so that it is not easily exchangeable. Another drawback consists also in a relatively small length of the wedge-shaped groove in the braking segment so that the retention effect exerted by such a braking segment is correspondingly limited.

[0007] The retention effect of the yarn twist achieved by the patent CS No. 276 522 has been increased by the arrangement according to the patent CS No. 276

436 according to which the braking segment seated in the yarn delivery funnel is supplemented by an analogous braking segment inserted into the initial part of the cavity of the yarn delivery tube.

5 [0008] In spite of the increase in the retention effect, the drawback of the arrangement described in the patent CS 27 436 consists in the difficult exchangeability of the braking segments after they have got worn and in the necessarily tight seating of the braking segments in the respective part of the spinning unit of an open-end spinning machine, rendering the exchangeability still more difficult.

10 [0009] The invention aims at creating a yarn twist retention member marked by simple design, easy exchangeability, and high yarn twist retention capacity.

### Principle of the invention

[0010] The aim of the invention has been achieved by a yarn twist retention member on an open-end spinning machine whose principle consists in that the yarn twist retention means is made as a longitudinal groove in a part of the wall of a bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel, the walls of the longitudinal groove being situated symmetrically to each other along the longitudinal symmetry plane of the bent section of the bent yarn delivery channel.

20 [0011] Such yarn twist retention member is simple in design, simply exchangeable, and highly efficient in the yarn twist retention.

[0012] In one preferred embodiment, the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel has the profile of the letter "V". In another preferred embodiment, each of the walls of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel has the profile consisting of a pair of mutually inclined sections. In still another preferred embodiment, the profile of the walls of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel is a convex one. In still another preferred embodiment, the profile of the walls of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel is a concave one.

30 [0013] All these embodiments of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel are reliable and simple.

35 [0014] To achieve the optimum yarn twist retention ability for various materials to be processed and/or for their mixtures, it is advantageous for the walls of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent

section of the bent yarn delivery channel to have a surface roughness between  $R_a$  16 and  $R_a$  0,1.

**[0015]** To optimize the friction between the yarn in process of delivery and the walls of the longitudinal groove made in the part of the wall of the bent section of the yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel, it is advantageous for the walls of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel to have in the length direction of the longitudinal groove at least two different surface roughness values  $R_a$ .

**[0016]** To optimize the friction conditions between the yarn in process of delivery and the walls of the longitudinal groove while introducing the yarn free end into the spinning rotor during the spinning-in and during the delivery of the yarn in process of formation, it is according to one preferred embodiment advantageous if the walls of the longitudinal groove made in the part of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel have at their width portions adjacent to the bottom of the longitudinal groove a surface roughness  $R_a$  superior to the surface roughness  $R_a$  of the portions more distant from the bottom of the longitudinal groove.

**[0017]** In still another preferred embodiment, to optimize the friction conditions between the yarn in process of delivery and the walls of the longitudinal groove while introducing the yarn free end into the spinning rotor during the spinning-in and during the delivery of the yarn in process of formation, it is advantageous if the surface roughness  $R_a$  of the walls of the longitudinal groove of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel is superior to that of the wall of the bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel.

**[0018]** In all the described embodiments, the yarn twist retention member according to the invention has high yarn twist retention capacity on the yarn being spun while at the same time being very sensitive to the yarn surface suffering no damage from it. The yarn twist retention member according to the invention substantially improves the quality of the spun yarn as compared with the yarn twist retention members according to the background art when used under comparable technological parameters.

### Description of the drawings

**[0019]** The invention is schematically shown in the drawing in which Fig. 1 is an example of the overall arrangement of the yarn twist retention member and of the delivery tube in the spinning unit body, Fig. 2a is a lateral view of the yarn twist retention member, Fig. 2b is a view of the yarn twist retention member from the side of the inner side of the bent section of the bent yarn delivery

channel, and Figs. 3a to d are examples of embodiment of the yarn twist retention member.

### Examples of embodiment of the invention

**[0020]** The retention member **1** of the yarn **2** twist on an open-end spinning machine is a component of the spinning unit of an operating unit of the open-end spinning machine which machine comprises at least one row of operating units, each of which equipped with a site for a sliver can and a spinning unit related thereto with well-known mechanisms for processing the sliver band into the yarn **2** in a spinning rotor **3**. At its outlet from the spinning rotor **3** the yarn **2** intended to be delivered from the spinning rotor **3** and to be wound on a not represented bobbin passes through a delivery funnel **4** of the yarn **2** and further on through a bent delivery channel **5** of the yarn **2** in whose bent section **50** the retention member **1** of the yarn **2** twist is situated.

**[0021]** The bent delivery channel **5** of the yarn **2** can be made in various ways, for instance, as shown in Fig. 1, so that a first body **6**, comprising a part of the wall of the bent yarn delivery channel constituting the outer side **500** of the bent section **50** of the bent yarn delivery channel **5** houses seated therein the yarn **2** twist retention member **1** comprising a part of the wall of the bent yarn **2** delivery channel **5** constituting the inner side **501** of the bent section **50** of the bent yarn **2** delivery channel **5** fitted with the yarn **2** twist retention member **1**. The thus created bent section **50** of the bent yarn **2** delivery channel **5** has related thereto one end of a direct delivery tube **7** of the yarn **2** whose the other end defines the position of the outlet site of the yarn **2** from the spinning unit. In another example of embodiment, the bent yarn **2** delivery channel **5** can be produced in such a manner that the first body **6** containing a part of the wall of the bent yarn **2** delivery channel **5** constituting the outer side **500** of the bent section **50** of the bent yarn **2** delivery channel **5** and the delivery tube **7** of the yarn **2** are made as a single common body in which there is seated the yarn **2** twist retention member **1** comprising a part of the wall of the bent yarn delivery channel **5** constituting the inner side **501** of the bent section **50** of the bent yarn **2** delivery channel **5**. With one of suitable methods, the yarn **2** twist retention member **1** is secured in its operative position against unwanted loosening. On the side where the yarn **2** enters the bent yarn delivery channel **5**, the bent yarn **2** delivery channel **5** can be in a suitable way equipped with a one-piece inlet ring **51** or with a two-piece inlet ring **51** whose one part (see Figs. 1, 2a, 2b) is made for instance on the yarn **2** twist retention member **1** and whose the other part is made on said first body **6** in which the yarn **2** twist retention member **1** is seated.

**[0022]** The yarn **2** twist retention means is made as a longitudinal groove **8** situated in the part of the wall of the bent yarn **2** delivery channel **5** constituting the inner side **501** of the bent section **50** of the bent yarn **2** delivery

channel 5. The walls 80 of the longitudinal groove 8 are situated mutually symmetrical along the longitudinal symmetry plane of the bent section 50 of the bent yarn 2 delivery channel 5 and the area of their mutual contact forms the bottom 82 of the longitudinal groove 8. In the example of embodiment shown in Fig. 2a, the longitudinal groove 8 situated in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 is shaped as the letter "V". In another example of embodiment shown in Fig. 2b, each of the walls 80 of the longitudinal groove 8 made in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 is shaped as a pair of mutually inclined sections 81. In still another example of embodiment shown in Fig. 2c, the walls 80 of the longitudinal groove 8 in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 have convex-shaped profile. In still another example of embodiment shown in Fig. 2d, the walls 80 of the longitudinal groove 8 in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 have concave-shaped profile. In a not illustrated example of embodiment, the walls 80 of the longitudinal groove 8 in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 have another suitable profile, including asymmetrical profiles, for instance that of an asymmetrical letter "V". The width of the longitudinal groove 8 of the yarn 2 twist retention member 1 or the value of the angle formed between the walls 80 of the longitudinal groove 8 of the yarn 2 twist retention member 1 used in a specific case can be chosen either in accordance with the thickness of the yarn 2 to be produced or it (the width, the angle) can be the same for each of the thickness values of the yarn to be produced, or it is possible to use the embodiment shown in Fig. 2b in which the walls 80 of the longitudinal groove 8 are broken so that one longitudinal groove 8 can serve two width values.

[0023] In view of the production techniques applicable to the production of the longitudinal groove 8, the bottom of the longitudinal groove 8, i.e., the contact section of the walls 80 of the longitudinal groove 8, can be made either as a sharp or as a rounded transition.

[0024] The surface roughness of the walls 80 of the longitudinal groove 8 in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 lies between  $R_a$  16 and  $R_a$  0,1. The surface roughness of the walls 80 of the longitudinal groove 8 can be either constant along the whole of the wall length or it can assume at least two different values in the length direction of the longitudinal groove 8. The surface roughness of the walls 80 of the longitudinal groove 8 in the part of

the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 also can be superior to the surface roughness of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5. The greater surface roughness  $R_a$  of the walls 80 of the longitudinal groove 8 as compared with the surface roughness  $R_a$  of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 facilitates the introduction of the yarn free end into the spinning rotor during the spinning-in operation because it reduces the yarn friction in the bent section 50 of the bent yarn 2 delivery channel 5 during its contact with the walls of the bent yarn 2 delivery channel 5. After the completion of the spinning-in process, the yarn is under the action of its delivery introduced into the longitudinal groove 8 marked by higher surface roughness  $R_a$  of the walls 80 of the longitudinal groove 8 with the effect for the yarn 2 twist to be efficiently retained by the retention member 1.

[0025] The surface roughness  $R_a$  of the walls 80 of the longitudinal groove 8 in the part of the wall of the bent yarn 2 delivery channel 5 constituting the inner side 501 of the bent section 50 of the bent yarn 2 delivery channel 5 also can be either constant along the whole of the wall width or it can assume a different, as a rule a superior, value at the portion adjacent to the bottom 82 of the longitudinal groove 8 as compared with the portion more distant from the bottom 82 of the longitudinal groove 8. This can be applied in analogy also to the other examples of embodiment of the longitudinal groove 8 whether or not shown.

## Claims

1. A yarn twist retention member on an open-end spinning machine comprising a part of a wall of a bent yarn delivery channel forming the inner side of the bent section of the bent yarn delivery channel (5), this section of the wall of the bent yarn delivery channel on the yarn twist retention member being provided with at least one yarn twist retaining means, **characterized by** that the yarn (2) twist retention means is made as a longitudinal groove (8) in a part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5), the walls (80) of the longitudinal groove (8) being situated symmetrically to each other along the longitudinal symmetry plane of the bent section (50) of the bent yarn (2) delivery channel (5).
2. A yarn twist retention member as claimed in Claim 1, **characterized by** that the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the

bent section (50) of the bent yarn (2) delivery channel (5) has the profile of the letter "V".

3. A yarn twist retention member as claimed in Claim 1, **characterized by** that each of the walls (80) of the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) has the profile consisting of a pair of mutually inclined sections (81). 5
4. A yarn twist retention member as claimed in Claim 1, **characterized by** that the profile of the walls (80) of the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) is a convex one. 10
5. A yarn twist retention member as claimed in Claim 1, **characterized by** that the profile of the walls (80) of the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) is a concave one. 15
6. A yarn twist retention member as claimed in any of Claims 1 to 5, **characterized by** that the walls (80) of the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) have a surface roughness between  $R_a$  16 and  $R_a$  0,1. 20
7. A yarn twist retention member as claimed in Claim 6, **characterized by** that the walls (80) of the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) have at least two different values of surface roughness  $R_a$ . 25
8. A yarn twist retention member as claimed in Claim 6, **characterized by** that the walls (80) of the longitudinal groove (8) made in the part of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) have at their width portions adjacent to the bottom (82) of the longitudinal groove (8) a surface roughness  $R_a$  superior to the surface roughness  $R_a$  of the portions more distant from the bottom (82) of the longitudinal groove (8). 30
9. A yarn twist retention member as claimed in Claim 6, **characterized by** that the surface roughness  $R_a$  of the walls (80) of the longitudinal groove (8) in the part of the wall of the bent yarn (2) delivery channel 35

(5) forming the inner side (501) of the bent section (50) of the bent yarn (2) delivery channel (5) is superior to that of the wall of the bent yarn (2) delivery channel (5) forming the inner side (501) of the bent section of the bent yarn (2) delivery channel (5).

#### Patentansprüche

1. Der Garndrallauffänger an einer Offenend-Spinnmaschine, der den Teil der Wand des gebogenen Abzugkanals des Garns beinhaltet, die die Innenseite des gebogenen Teils des gebogenen Abzugkanals des Garns bildet, wobei dieser Teil der Wand des gebogenen Abzugkanals des Garns an dem Garndrallauffänger mit mindestens einem Garndrallauffangelement versehen ist, **dadurch gekennzeichnet, dass** das Garndrallauffangelement mit der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2) gebildet ist, die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bildet, wobei die Wände (80) der Längsrille (8) gegeneinander symmetrisch nach der Symmetrieebene des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) situiert sind. 40
2. Der Garndrallauffänger nach Anspruch 1, **dadurch gekennzeichnet, dass** die Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bildet, das Profil in der "V"-Form hat. 45
3. Der Garndrallauffänger nach Anspruch 1, **dadurch gekennzeichnet, dass** jede der Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, das mit dem Paar der gegeneinander geneigten Abschnitte (81) gebildete Profil hat. 50
4. Der Garndrallauffänger nach Anspruch 1, **dadurch gekennzeichnet, dass** die Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, das konvexe Profil haben. 55
5. Der Garndrallauffänger nach Anspruch 1, **dadurch gekennzeichnet, dass** die Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, das konkave Profil haben.

6. Der Garndrallauffänger nach irgendwelchem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, die Oberflächenrauheit im Bereich von  $R_a$  16 bis  $R_a$  0,1 ausweisen. 5
7. Der Garndrallauffänger nach Anspruch 6, **dadurch gekennzeichnet, dass** die Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, in der Richtung der Länge der Längsrille (8) mindestens zwei unterschiedliche Werte der Oberflächenrauheit  $R_a$  ausweisen. 10
8. Der Garndrallauffänger nach Anspruch 6, **dadurch gekennzeichnet, dass** die Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, an dem Teil deren Breite, der zum Boden (82) der Längsrille (8) anliegt, größere Oberflächenrauheit  $R_a$  als an jenem Teil deren Breite ausweisen, der vom Boden (82) der Längsrille (8) mehr entfernt ist. 20
9. Der Garndrallauffänger nach Anspruch 6, **dadurch gekennzeichnet, dass** die Wände (80) der Längsrille (8) in dem Teil der Wand des gebogenen Abzugkanals (5) des Garns (2), die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bilden, eine größere Oberflächenrauheit  $R_a$  als die Wand des gebogenen Abzugkanals (5) des Garns (2) ausweisen, die die Innenseite (501) des gebogenen Teils (50) des gebogenen Abzugkanals (5) des Garns (2) bildet. 25 30 35 40

## Revendications

1. Le dispositif de rétention de la torsion du filé sur le métier à filer à extrémité ouverte du type à rotor contenant une partie de la paroi du canal de décalottage coudé du filé, constituant la face intérieure de la partie coudée du canal de décalottage coudé du filé, ladite partie de la paroi du canal de décalottage coudé du filé sur le dispositif de rétention de la torsion du filé étant munie d'au moins un moyen pour retenir la torsion du filé, **caractérisé en ce que** le moyen pour retenir la torsion du filé est constitué d'une rainure longitudinale (8) dans la partie de la paroi du canal de décalottage coudé (5) du filé (2) constituant la paroi intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé 45 50 55

(2), les parois (80) de la rainure longitudinale (8) étant situées symétriquement l'une par rapport à l'autre selon le plan longitudinal de symétrie de la partie coudée (50) du canal de décalottage coudé (5) du filé (2).

2. Le dispositif de rétention de la torsion du filé selon la revendication 1 **caractérisé en ce que** la rainure longitudinale (8) dans la partie de la paroi du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) a le profil en forme de la lettre "V".
3. Le dispositif de rétention de la torsion du filé selon la revendication 1 **caractérisé en ce que** chacune des parois (80) de la rainure longitudinale (8) dans la partie du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) a le profil constitué d'une paire des tronçons inclinés l'un par rapport à l'autre (81).
4. Le dispositif de rétention de la torsion du filé selon la revendication 1 **caractérisé en ce que** les parois (80) de la rainure longitudinale (8) dans la partie de la paroi du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) ont le profil convexe.
5. Le dispositif de rétention de la torsion du filé selon la revendication 2 **caractérisé en ce que** les parois (80) de la rainure longitudinale (8) dans la partie de la paroi du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) ont le profil concave.
6. Le dispositif de rétention de la torsion du filé selon l'une des revendications 1 à 5 **caractérisé en ce que** la rugosité de la surface des parois (80) de la rainure longitudinale (8) dans la partie du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) se situe dans la plage de  $R_a$  16 à  $R_a$  0,1.
7. Le dispositif de rétention de la torsion du filé selon la revendication 6 **caractérisé en ce que** les parois (80) de la rainure longitudinale (8) dans la partie de la paroi du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) ont au moins deux valeurs différentes de la rugosité de la surface  $R_a$  dans le sens de la longueur de la rainure longitudinale.

8. Le dispositif de rétention de la torsion du filé selon la revendication 6 **caractérisé en ce que** les parois (80) de la rainure longitudinale (8) dans la partie du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) ont, sur la partie de leur largeur adjacente au fond (82) de la rainure longitudinale (8), la rugosité de la surface  $R_a$  plus élevée que sur la partie de leur largeur plus distante du fond (82) de la rainure longitudinale (8).

9. Le dispositif de rétention de la torsion du filé selon la revendication 6 **caractérisé en ce que** les parois (80) de la rainure longitudinale (8) dans la partie du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2) ont la rugosité de la surface  $R_a$  plus élevée que celle de la paroi du canal de décalottage coudé (5) du filé (2) constituant la face intérieure (501) de la partie coudée (50) du canal de décalottage coudé (5) du filé (2).

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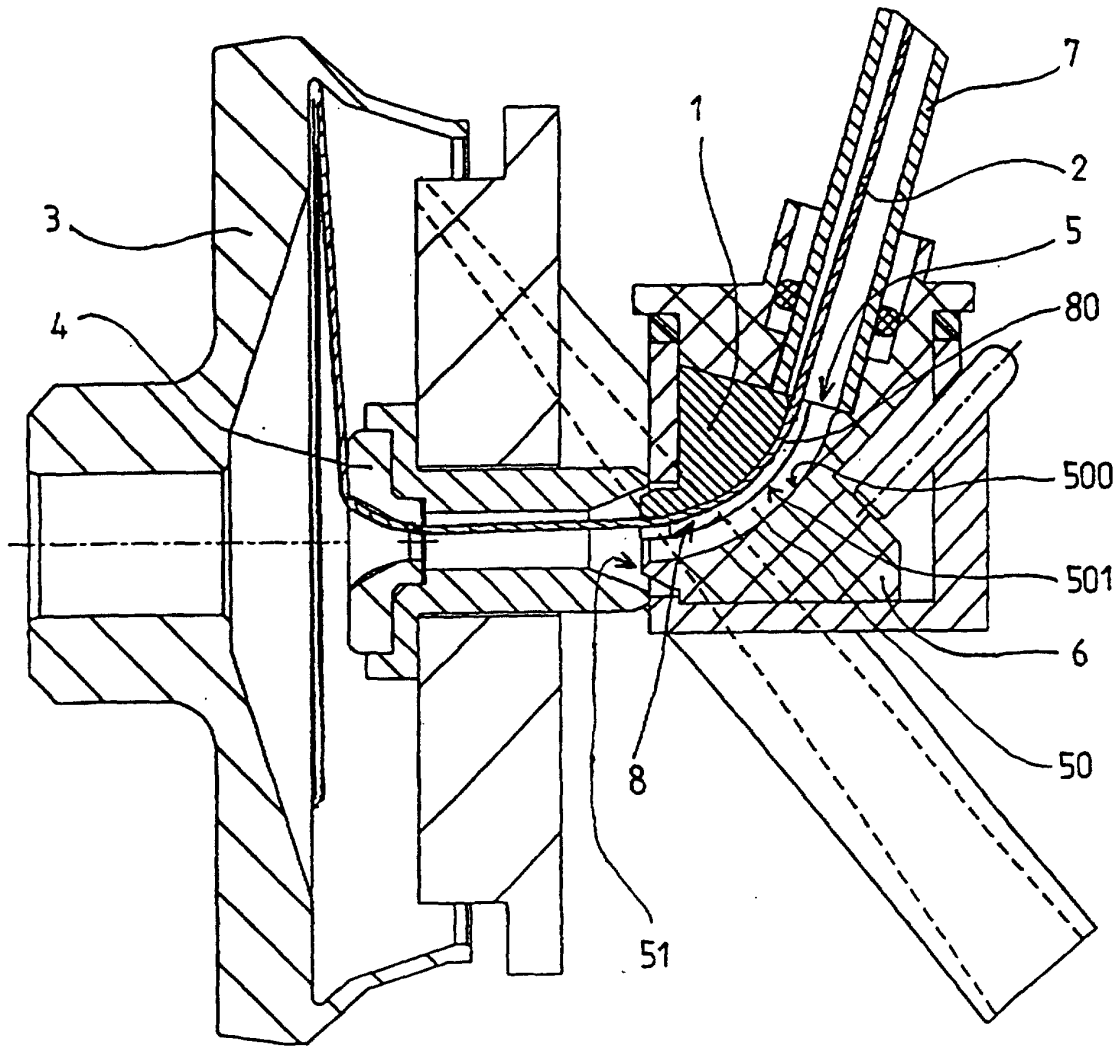


FIG. 1



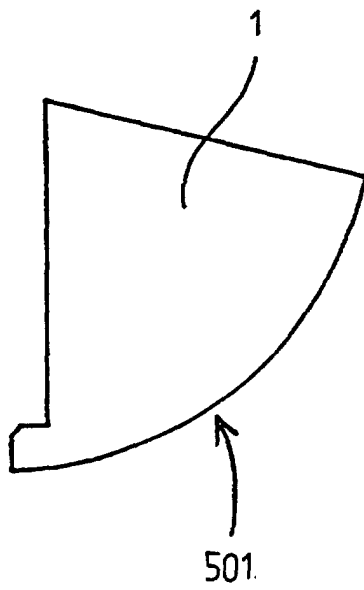


FIG. 2a

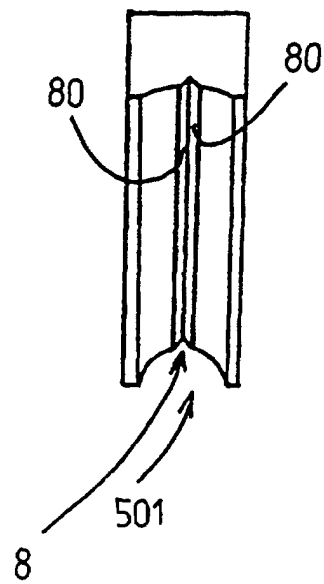


FIG. 2b

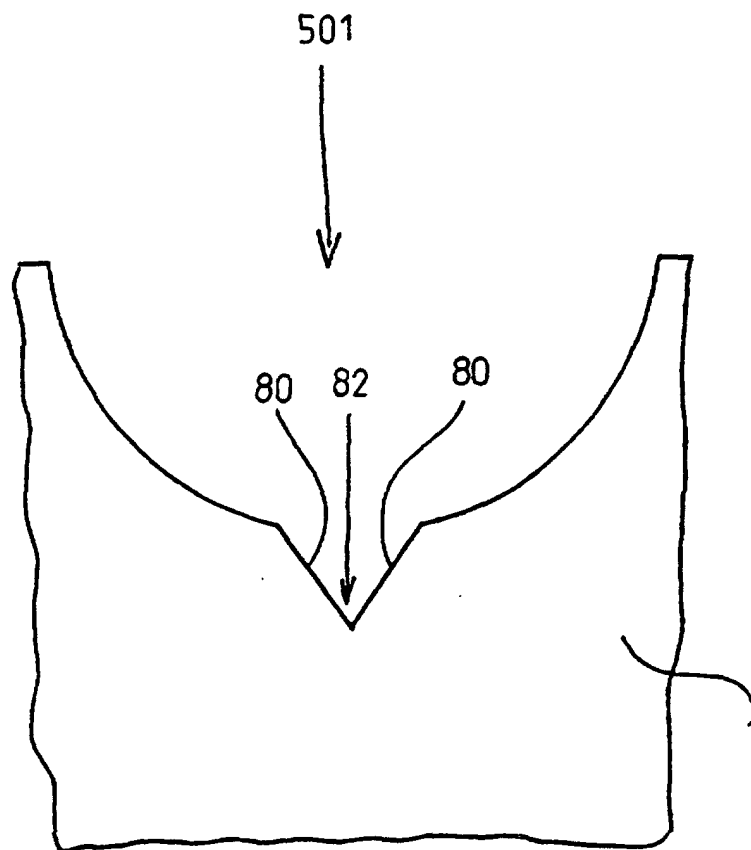


FIG. 3a

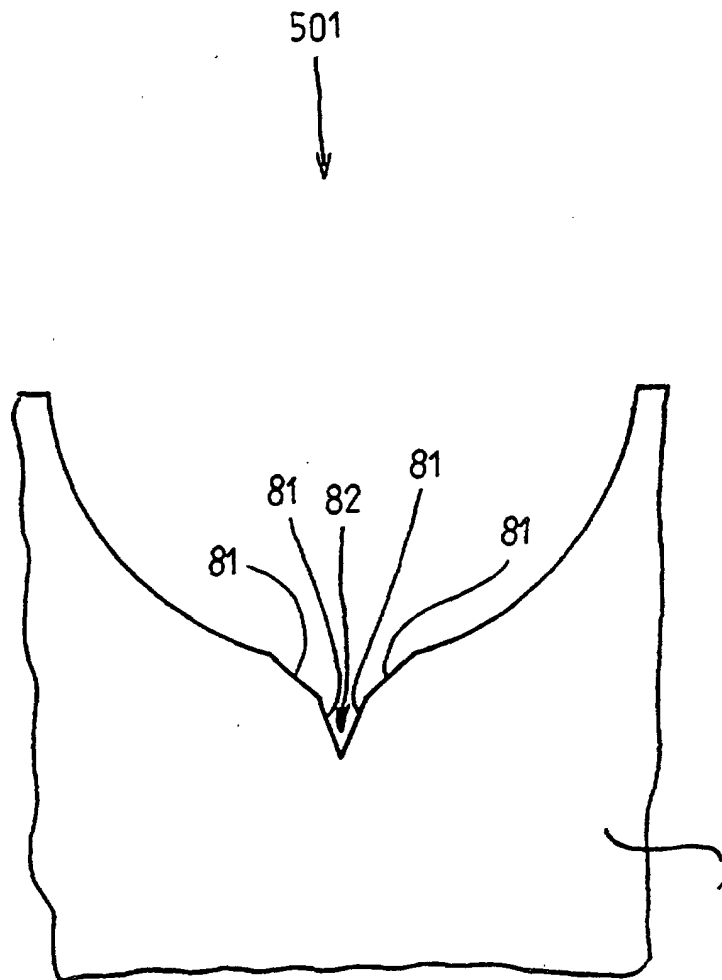


FIG. 3b

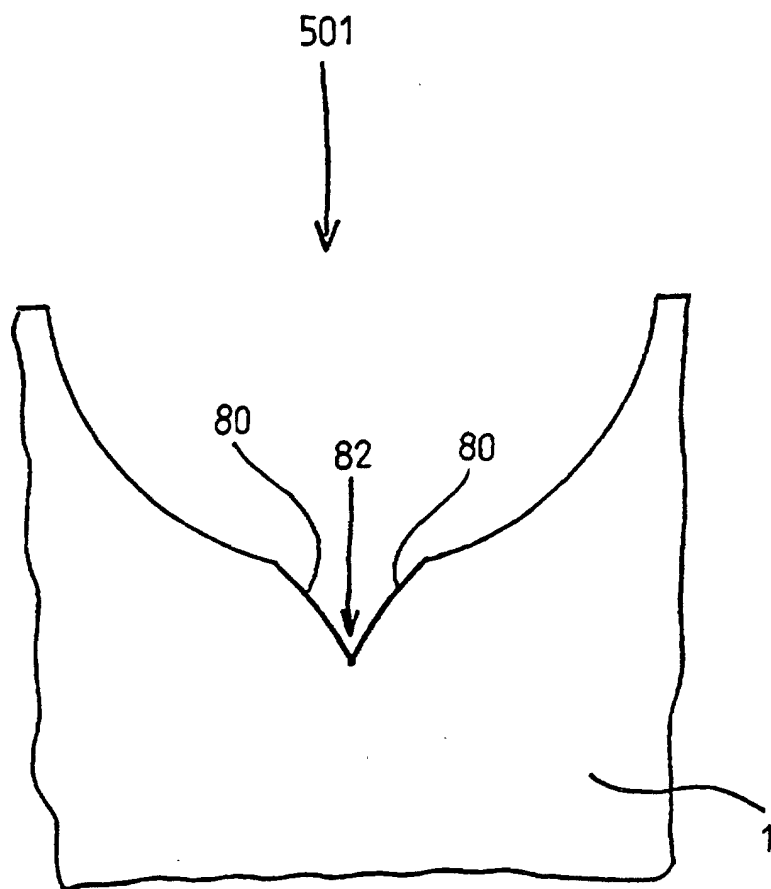


FIG. 3c

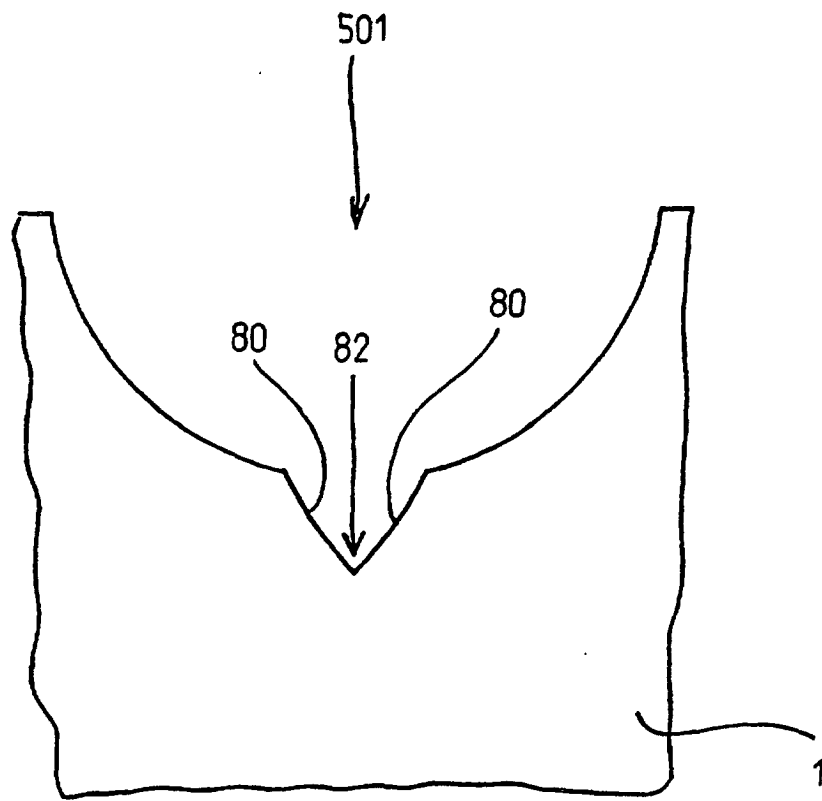


FIG. 3d