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### (54) CABLE TIE AND METHOD TO PRODUCE A CABLE TIE

KABELBINDER UND VERFAHREN ZUR HERSTELLUNG EINES KABELBINDERS

COLLIER DE SERRAGE ET PROCÉDÉ DE FABRICATION D'UN COLLIER DE SERRAGE

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## Description

**[0001]** The present invention relates to a cable tie and to a method for producing a cable tie.

**[0002]** In particular, the present invention relates to a cable tie made of plastic material of the type comprising: a ribbon, i.e. a strip having an elongated flat shape, and a strip locking head stably connected to an end of the strip and comprising, in turn, a structure defining a strip locking passage, and strip locking means which are arranged adjacent to the strip locking passage, so as to allow the coupling of a free end of the strip in the locking passage in a first direction, and prevent the extraction of the strip from the locking passage in a second direction opposite to the first direction.

**[0003]** In particular, the strip locking means typically comprise a tooth or metallic locking plate, which is driven/fixed into the locking head by means of an ultrasound fixing/welding process so as to protrude into the locking passage.

**[0004]** In the production of cable ties of the type described above, it is known the need to improve the mechanical performance of the cable tie while maintaining the dimensions thereof unchanged in order to increase the traction forces which can be exerted on the tie during the step of wiring, e.g. by means of automatic or semi-automatic wiring guns, but ensuring however the integrity and hold of the tie itself during such an operation and upon the completion of the same.

**[0005]** Indeed, studies carried out by the applicant demonstrated that the cable ties of the type described above, being about 1.05 mm thick and about 3.5 mm wide; about 1.2 mm thick and about 4.5 mm wide; about 1.4 mm thick and about 7.5 mm wide, are adapted to be ripped and/or torn, i.e. are subject to collapsing and uncoupling of the strip from the locking head, when the strip itself is subjected to a traction force opposite to the locking force exerted by the metallic plate on the strip and equal to about 200 Newton, 400 Newton and 650 Newton, respectively.

**[0006]** Indeed, from the aforesaid studies, it arises that the following technical drawbacks occur by applying a traction force higher than the threshold limits indicated above on the strip of the above-described ties:

- shearing/tearing of the strip by the locking plate;
- plastic deformation of the strip, with consequent loosening of the locking of the tie on the objects;
- deformation and/or rotation of the metallic plate about its fixing point on the locking head, with consequent opening of the tie.

**[0007]** WO2004044871 discloses a tie-type security seal comprising a body of thermoplastic material with a passage therethrough, a metallic insert element that is fixed in the passage and has at least one opening therewith, as well as a locking tooth. An elongated strip of thermoplastic material is integral, at one end, with the

body and has another free end for insertion through the passage in a first direction where it is locked by the tooth against removal from the cavity in the opposite direction, the body and strip having been manufactured by a plastic injection operation.

**[0008]** EP1258432 discloses a two piece cable tie having an improved metal locking device anchoring system wherein the cable tie includes a strap including a first end and a free end and a locking head secured to the first end of the strap that defines a strap accepting channel in the head having a strap entry end and a strap exit end. The locking head further includes a metal locking device receiving cavity adjacent to and open toward the strap exit end of the locking head and a mounting slot having an inner support wall, an outer support wall and a support slot communicating the mounting slot with the receiving cavity.

**[0009]** The applicant conducted an in-depth study with the objective of identifying a solution which specifically allows to:

- make a cable tie structured so as to improve the mechanical performance of the known ties, so as to ensure integrity and hold thereof when subjected to traction forces higher than those shown above;
- provide a method for making a cable tie, which method is simple and rapid to be implemented and which meets the aforesaid needs.

**[0010]** It is thus the object of the present invention to provide a solution which allows to achieve the objectives indicated above.

**[0011]** This object is achieved by the present invention in that it relates to a cable tie and to a method for producing a cable tie, as defined in the appended claims.

**[0012]** The present invention will now be described with reference to the accompanying drawings, which show a non-limitative embodiment thereof, in which:

- figure 1 is a plan view of a cable tie made according to the present invention;
- figure 2 is a perspective bottom view of a portion of the cable tie shown in figure 1;
- figure 3 shows an enlargement of the portion of the cable tie, in which the locking insert incorporated in the locking head is shown with a dashed line;
- figure 4 is a longitudinal section I-I of a portion of the cable tie shown in figure 2;
- figure 5 is a cross section taken along II-II of a portion of the cable tie shown in figure 2;
- figure 6 is a perspective view of the locking insert; whereas
- figures 7-9 schematically show a forming mould for the cable tie, in an equal number of operative steps of the injection molding procedure included in the method provided by the present invention.

**[0013]** With reference to figures 1-5, number 1 indi-

cates as a whole a cable tie structured so that, in use, it is operable to be closed as a loop to bind/fix objects to one another, such as for example electric wires, tubular pipes or similar elements.

**[0014]** Cable tie 1 comprises a flexible ribbon having an elongated flat shape, i.e. a strip. 2, and a strip locking head 3 stably connected to an end of the strip 2 and comprising a structure defining a strip locking channel, i.e. passage 4, and strip locking means which are arranged adjacent to the strip locking passage 4, so as to allow the coupling of strip 2 in the strip locking passage 4 in a first direction K1, and prevent the extraction of strip 2 from the locking passage 4 in a second direction K2 opposite to the first direction K1.

**[0015]** In the example shown in figures 1 and 4, strip 2 extends along a first longitudinal axis A and has a pre-determined thickness s.

**[0016]** Strip 2 has a rectangular elongated shape, a distal end 2a stably fixed to the body of the strip locking head 3, and a free end 2b shaped so as to be coupled, in use, to the locking head 3.

**[0017]** With reference to figure 4, the strip locking head 3 centrally has a through opening/ locking channel, i.e. locking passage 4 having an inlet portion 4a, within which the free end 2a of strip 2 is able to be engaged, and an outlet portion 4b, from which the free end 2b of strip 2 is adapted to protrude when strip 2 is engaged in the locking passage 4.

**[0018]** In the examples shown in the accompanying figures, the locking channel/passage 4 extends along a second axis B substantially orthogonal to the first longitudinal axis A, has a transversal portion substantially complementary to the transversal portion of strip 2, preferably, but not necessarily, rectangular and is developed on a middle line M orthogonal to the first axis A.

**[0019]** The strip locking means of the strip locking head 3 comprise a locking insert 5, which is provided with an annular plate 6 stably incorporated in the body of the strip locking head 3 between the inlet portion 4a and the outlet portion 4b of the locking passage 4.

**[0020]** The locking insert 5 is further shaped so as to have a pair of fins/teeth indicated hereinafter as flexible/elastic locking plates 7, which stick out from the inner edge of the annular plate 6 towards each other so as to at least partially protrude within the locking passage 4.

**[0021]** The locking insert 5 is further shaped so that the locking plates 7 are aligned with each other and with the longitudinal axis A so that, in use, when strip 2 is engaged in the locking passage 4, the two free ends 7a of the locking plates 7 abut on the two larger faces/surfaces 2c of strip 2, so as to allow the strip to slide within the locking passage 4 in the first direction K1, while clamping the larger faces/surfaces 2c of strip 2 when a traction force towards the second direction K2 is applied thereon.

**[0022]** The locking insert 5 is interposed within the locking head 3 between a lower discoid portion 3a and an upper discoid portion 3b, both shaped so as to centrally

have the inlet portion 4a and the outlet portion 4b of the locking passage 4, respectively.

**[0023]** The fins or locking plates 7 of the locking insert 5 are arranged on opposite sides of the middle line M, on respective planes, which are inclined with respect to the second axis B of the locking passage 4 and which intersect at the outlet portion 4b of the locking passage 4.

**[0024]** The strip locking head 3 is further shaped so as to have a pair of protrusions 8 within the inlet portion 4a, underneath the locking plates 7, each protrusion having a saw toothed end 8a arranged in contact with a respective plate 7 and defining, along with the plate 7 itself, a stop ratchet 12 capable of preventing the backward motion of strip 2 within the locking passage 4 in the second direction K2.

**[0025]** In the example shown in figures 1-5, the locking insert 5, i.e. annular plate 6 and plates 7 of the cable tie 1 are advantageously made of flexible, elastic metallic material, while the body of the locking head 3 and the strip 2 are made of plastic material or the like, such as for example thermoplastic material.

**[0026]** In particular, the locking insert 5, i.e. annular plate 6 and plates 7 may be obtained by means of a stamping/shearing process of a small plate made of metallic material.

**[0027]** The upper discoid portion 3b of the locking head 3 has two seats 10, which are arranged on opposite sides of the middle line M over the two saw toothed ends 8a of protrusions 8. and are dimensioned so that each accommodates a tooth or locking plate 7 therein.

**[0028]** Each seat 10 is obtained on the upper discoid portion 2b so as to be closed at one end towards the outer peripheral edge of the upper discoid portion 2b and open at the top and at the opposite end, so as to communicate with the outlet portion 4b of the locking passage 4. Each seat 10 is further dimensioned so as to allow the locking plate 7 to partially bend inside, so as to space apart the free end 4a and the free end 4a of the other locking plate 7 when engaging strip 2 in the strip locking passage 4.

**[0029]** In the example shown in figures 1-5, each protrusion 8 extends within the strip locking passage 8 parallel to axis B, has a substantially rectangular cross section, and is dimensioned to have a transversal width with respect to the second axis B smaller than the width of the corresponding seat 10. Each protrusion 8 is further dimensioned so as to have a transversal width smaller than or equal to the width of the respective locking plate 7.

**[0030]** With reference to the example shown in figures 4 and 6, the free ends of the locking plates 7 advantageously have square edges and at least partially protrude into the locking passages 8 so as to have a distance d which approximates by defect the thickness s of strip 2.

**[0031]** In the example shown in figure 6, each locking plate 7 is inclined with respect to the laying plane of the annular plate 6 by an angle  $\alpha$  between 85 and 120°. Each locking plate 7 is preferably inclined with respect to the annular plate 6 by an angle of 90°.

**[0032]** In the example shown in figure 3, the locking head 2 has a transversal section of circular/elliptic shape, while the locking insert 5 is shaped so as to have an outer peripheral edge of substantially circular/elliptic shape having dimensions which approximate by defect corresponding dimensions of the locking head 3, so that the latter completely contains the locking insert 5 therein.

**[0033]** In the example shown in figure 1, the free end 2b of strip 2 has a substantially triangular shape and has two rectangular cavities on the larger surfaces 2c, having a width which approximates by excess the width of the blocking plates 7.

**[0034]** The method for producing the above-described cable tie 1 is described below.

**[0035]** The method essentially includes implementing an injection molding procedure for the tie in which the locking insert 5 is incorporated in the strip locking head 3.

**[0036]** With reference to figures 7-9, the method includes arranging a tie forming mould 15, which comprises two metallic casings 16 and 17, which are intended to abut against each other and are structured so as to form, in the middle of the contact surface between the casings 16 and 17, at least one closed impression 18 shaped so as to negatively trace the shape of one or more cable ties 1 of the above-described type.

**[0037]** The method essentially includes:

- cyclically abutting the metallic casings 16 and 17 against each other by means of a casing actuation press (not shown), so as to cyclically form the closed impression 18 which negatively traces the shape of the cable ties 1 to be produced; and
- at each cycle, injecting plastic material in liquid state into the closed impression 18 of the forming mould 15 in a controlled manner through an injection device (not shown).

**[0038]** With reference to figures 7-9, the method for producing cable ties may include:

- opening the forming mould 15 so as to separate the two casings 16 and 17 (figure 7) from each other;
- positioning the locking insert 5 in the portion of the impression intended to form the strip locking head 3; the locking insert 5 may be positioned in the impression by means of an external handling member 45 (figure 8);
- abutting the casings 16 and 17 against each other, e.g. the movable casing towards the fixed casing, so as to close the forming mould 15; in particular, casings 16 and 17 may comprise a fixed casing and a casing moving from and to the fixed casing;
- injecting the plastic material in liquid state into the closed impression 18 so as to stably embed/incorporate the locking insert 5 within the locking head;
- separating the casings so as to open the forming mould;
- extracting cable tie 1 from the forming mould 15 by

means of the external handling member 45 (figure 9).

**[0039]** From the above, it is apparent that the method for producing cable ties may include an internally shaped mould so as to have a plurality of impressions, i.e. a comb of impressions arranged side-by-side so as to produce, at each injection cycle, a plurality of cable ties (figure 8). Here, at each injection cycle, a die (i.e. a strip of locking inserts 5 dimensioned so as to place each locking insert 5 at the portion of a corresponding impression intended to form the strip locking head 3) may be positioned in the mould.

**[0040]** The advantages that the present invention allows to obtain are apparent from the above description.

**[0041]** Firstly, the presence of protrusions with saw toothed ends inside the locking passage and underneath the teeth or locking plates cancels out any possible deformation and/or rotation of the plate about its fixing point on the locking head, thus ensuring the tie holding.

**[0042]** Furthermore, the structure of the locking insert in which the annular plate "embedded" in the locking head and its opposite metallic plates are used, allows the traction force which can be exerted on the strip when wiring to be significantly increased.

**[0043]** Moreover, in addition to advantageously eliminating a step of the production process which includes the sharpening of the ends, the use of plates with free ends having square, dull edges strongly reduces the possibility for the plates to cut the strip when locked.

**[0044]** In this case, the tests carried out by the applicant on the above-described tie proved that ties being about 1.05 mm thick and 3.5 mm wide; about 1.2 mm thick and 4.5 mm wide; about 1.4 mm thick and about 7.5 mm wide, may be subjected to a traction force of about 270 Newton, 400 Newton and 850 Newton, respectively.

**[0045]** Additionally, the method for producing the tie is highly rapid and simple as the incorporation of the locking insert in the tie occurs when molding the same, and does not thus require any additional step of fixing/welding the teeth onto the locking head.

**[0046]** It is finally apparent that changes and variations may be made to the tie and method described and shown above, without departing from the scope of the present invention as defined by the appended claims.

## Claims

1. A cable tie (1), comprising:

- a strip (2);
- a strip locking head (3) stably connected to an end of the strip (2) and comprising a strip locking passage (4) and strip locking means, which are arranged adjacent to said strip locking passage (4) so as to allow the coupling of a free end (2b) of the strip (2) into the strip locking passage (4) in a first direction (K1), and prevent the extrac-

tion of the strip (2) from the strip locking passage (4) in a second direction (K2) opposite to the first direction (K1); said strip locking head (3) and said strip (2) being made of plastic material and being molding in one piece by means of an injection molding procedure, wherein

said strip locking means comprising a metallic locking insert (5) which is incorporated in said strip locking head (3) during said injection molding procedure and comprises:

- an annular plate (6), which is stably incorporated in the strip locking head (3) in a position coaxial to the strip locking passage (4);
- a pair of locking plates (7), which sticks out from the annular plate (6) towards one another, so as to at least partially protrude within said strip locking passage (4);

#### characterised in that

said strip locking head (3) is shaped so as to have a pair of protrusions (8), which are arranged within the strip locking passage (4) underneath the corresponding locking plates (7) and each has a saw toothed end (8a) arranged in contact with a respective locking plate (7) and defining, with the locking plate (7) itself, a stop ratchet (12) able of preventing the backward motion of the strip (2) within the strip locking passage (4) in said second direction (K2).

2. A cable tie (1) according to claim 1, wherein said locking insert (5) is interposed between a lower discoid portion (3a) and an upper discoid portion (3b) of said strip locking head (3).
3. A cable tie according to claim 2, wherein said upper discoid portion (3b) has two seats (10) arranged on opposite bands by a middle line (M) of the strip locking head (3) over the two respective saw tooth ends (8a) of the protrusions (8) and are each dimensioned so as to contain a locking plate (7) therein.
4. A cable tie according to any of the foregoing claims, wherein the locking plates (7) are inclined with respect to the annular plate (6) by an angle ( $\alpha$ ) comprised between 85 and 120°.
5. A cable tie according to any of the foregoing claims, wherein the locking plates (7) at least partially protrude within the strip locking passage (4) so that the distance (d) between the free ends is smaller or equal to the thickness (s) of said strip (2).
6. A cable tie according to any of the foregoing claims, wherein the free end (7a) of each locking plate (7) is shaped so as to have squared edges.

7. A cable tie according to any of the foregoing claims, wherein the width of each protrusion (8) is smaller or equal to the width of the respective locking plate (7).

8. A cable tie according to any of the foregoing claims, wherein said strip locking passage (4) comprises a first inlet portion (4a), within which the free end (2b) of the strip (2) is adapted to be engaged, and an outlet portion (4b), from which the free end (2b) of the strip (2) is adapted to protrude; said metallic insert (5) being incorporated in the strip locking head (3) so as to be arranged between said inlet portion (4a) and said outlet portion (4b) and has the locking plates (7) converging towards said outlet portion (4b).

9. A cable tie according to any of the preceding claims, wherein each protrusion (8) has a transversal rectangular section having a width smaller than the width of a corresponding seat (10).

10. A method to produce a cable tie (1), comprising:

- a strip (2) made of plastic material;
- a strip locking head (3) stably connected to an end of the strip (2) and comprising a strip locking passage (4) and strip locking means, which are arranged adjacent to said strip locking passage (4) so as to allow the coupling of a free end (2b) of the strip (2) into the strip locking passage (4) in a first direction (K1), and prevent the extraction of the strip (2) from the strip locking passage (4) in a second direction (K2) opposite to the first direction (K1); said strip locking means being provided with a locking insert (5) made of metallic material comprising:
  - an annular plate (6), which is stably incorporated in the strip locking head (3) in a position coaxial to the strip locking passage (4);
  - a pair of locking plates (7), which sticks out from the annular plate (6) towards one another, so as to at least partially protrude within said strip locking passage (4);

and wherein

said method comprises the steps of:

- arranging a forming mould (15) comprising two metallic casings (16,17) able to be abuttingly carried one against the other, and structured so as to form, in the middle of the contact surface between the casings (16,17), at least one closed impression (18) shaped so as to negatively trace the shape of a cable tie (1);
- positioning at least one locking insert (5) within the forming mould (15) between the two casings (16,17) at a portion of the impression intended

to form the strip locking head (3);  
 - inserting plastic material within said closed impression (18) of the forming mould (15) so that the strip (2) and the strip locking head (3) obtained at the end of the injection are molded in one piece and that the locking insert (5) remains incorporated in the strip locking head (3), said method being **characterised in that** said strip locking head (3) of said produced cable tie is shaped so as to have a pair of protrusions (8), which are arranged within the strip locking passage (4) underneath the corresponding locking plates (7) and each has a saw toothed end (8a) arranged in contact with a respective locking plate (7) and defining, with the locking plate (7) itself, a stop ratchet (12) able of preventing the backward motion of the strip (2) within the strip locking passage (4) in said second direction (K2).

## Patentansprüche

### 1. Kabelbinder (1), aufweisend:

- einen Streifen (2);
- einen Streifensperrkopf (3), der fest mit einem Ende des Streifens (2) verbunden ist und einen Streifensperrdurchgang (4) und Streifensperrmittel aufweist, die zum Ermöglichen des Einkuppelns eines freien Endes (2b) des Streifens (2) in den Streifensperrdurchgang (4) in einer ersten Richtung (K1) und zum Verhindern des Herausziehens des Streifens (2) aus dem Streifensperrdurchgang (4) in einer zweiten Richtung (K2), die entgegengesetzt zur ersten Richtung (K1) verläuft, dem Streifensperrdurchgang (4) benachbart angeordnet sind; wobei der Streifensperrkopf (3) und der Streifen (2) aus Kunststoffmaterial hergestellt sind und mittels einer Spritzgussprozedur einstückig geformt sind, wobei

die Streifensperrmittel einen metallischen Sperrein-  
satz (5) aufweisen, der während der Spritzgusspro-  
zedur in den Streifensperrkopf (3) eingegliedert wird  
und Folgendes aufweist:

- eine ringförmige Platte (6), die in einer mit dem Streifensperrdurchgang (4) coaxialen Position fest in den Streifensperrkopf (3) eingegliedert ist;
- ein Paar Sperrplatten (7), die derart von der ringförmigen Platte (6) aus zueinander hin vorstehen, dass sie mindestens zum Teil innerhalb des Streifensperrdurchgangs (4) vorstehen;

**dadurch gekennzeichnet, dass**

der Streifensperrkopf (3) derart geformt ist, dass er ein Paar Vorsprünge (8) aufweist, die innerhalb des Streifensperrdurchgangs (4) unterhalb der entsprechenden Sperrplatten (7) angeordnet sind und jeder ein Ende (8a) mit Sägezähnen aufweist, das in Kontakt mit einer entsprechenden Sperrplatte (7) angeordnet ist und mit der Sperrplatte (7) selbst eine Anschlagrastung (12) definiert, die dazu imstande ist, die Rückwärtsbewegung des Streifens (2) innerhalb des Streifensperrdurchgangs (4) in der zweiten Richtung (K2) zu verhindern.

2. Kabelbinder (1) nach Anspruch 1, wobei der Sperreinsatz (5) zwischen einem unteren scheibenförmigen Abschnitt (3a) und einem oberen scheibenförmigen Abschnitt (3b) des Streifensperrkopfs (3) eingesetzt ist.

3. Kabelbinder nach Anspruch 2, wobei der obere scheibenförmige Abschnitt (3b) zwei Sitze (10) aufweist, die auf gegenüberliegenden Bändern um eine Mittellinie (M) des Streifensperrkopfs (3) über den zwei jeweiligen Sägezahnenden (8a) der Vorsprünge (8) angeordnet sind und jeder derart bemessen sind, dass sie eine Sperrplatte (7) darin aufnehmen.

4. Kabelbinder nach einem der vorhergehenden Ansprüche, wobei die Sperrplatten (7) bezüglich der ringförmigen Platte (6) um einen Winkel ( $\alpha$ ) geneigt sind, der zwischen 85 und 120° enthalten ist.

5. Kabelbinder nach einem der vorhergehenden Ansprüche, wobei die Sperrplatten (7) derart zumindest teilweise innerhalb des Streifensperrdurchgangs (4) vorstehen, dass der Abstand (d) zwischen den freien Enden kleiner oder gleich der Stärke (s) des Streifens (2) ist.

6. Kabelbinder nach einem der vorhergehenden Ansprüche, wobei das freie Ende (7a) jeder Sperrplatte (7) derart geformt ist, dass es eckige Kanten aufweist.

7. Kabelbinder nach einem der vorhergehenden Ansprüche, wobei die Breite jeden Vorsprungs (8) kleiner oder gleich der Breite der jeweiligen Sperrplatte (7) ist.

8. Kabelbinder nach einem der vorhergehenden Ansprüche, wobei der Streifensperrdurchgang (4) einen ersten Einlassabschnitt (4a), in dem das freie Ende (2b) des Streifens (2) zur Ineingriffnahme geeignet ist, und einen Auslassabschnitt (4b) aufweist, aus dem das freie Ende (2b) des Streifens (2) zum Vorstehen geeignet ist; wobei der metallische Einsatz (5) derart im Streifensperrkopf (3) eingegliedert ist, dass er zwischen dem Einlassabschnitt (4a) und dem Auslassabschnitt (4b) angeordnet ist und die

Sperrplatten (7) zum Auslassabschnitt (4b) hin konvergierend aufweist.

9. Kabelbinder nach einem der vorhergehenden Ansprüche, wobei jeder Vorsprung (8) einen quer verlaufenden, rechteckigen Teilabschnitt mit einer Breite, die kleiner als die Breite des entsprechenden Sitzes (10) ist, aufweist. 5
10. Verfahren zum Herstellen eines Kabelbinders (1), aufweisend: 10

- einen Streifen (2), der aus einem Kunststoffmaterial hergestellt ist; 15
- einen Streifensperrkopf (3), der fest mit einem Ende des Streifens (2) verbunden ist und einen Streifensperrdurchgang (4) und Streifensperrmittel aufweist, die zum Ermöglichen des Einkuppelns eines freien Endes (2b) des Streifens (2) in den Streifensperrdurchgang (4) in einer ersten Richtung (K1) und zum Verhindern des Herausziehens des Streifens (2) aus dem Streifensperrdurchgang (4) in einer zweiten Richtung (K2), die entgegengesetzt zur ersten Richtung (K1) verläuft, dem Streifensperrdurchgang (4) benachbart angeordnet sind; wobei die Streifensperrmittel mit einem Sperreinsatz (5) versehen sind, der aus Metallmaterial hergestellt ist, aufweisend: 20
- eine ringförmige Platte (6), die in einer mit dem Streifensperrdurchgang (4) coaxialen Position fest in den Streifensperrkopf (3) eingegliedert ist; 25
- ein Paar Sperrplatten (7), die derart von der ringförmigen Platte (6) aus zueinander hin vorstehen, dass sie mindestens zum Teil innerhalb des Streifensperrdurchgangs (4) vorstehen; 30

und wobei

das Verfahren folgende Schritte aufweist: 35

- Anordnen einer Spritzform (15), die zwei Metallgehäuse (16, 17) aufweist, welche dazu imstande sind, anstoßend aneinander getragen zu werden, und derart strukturiert sind, dass sie in der Mitte der Kontaktfläche zwischen den Gehäusen (16, 17) mindestens einen geschlossenen Eindruck (18) ausbilden, der zum negativen Nachzeichnen der Form eines Kabelbinders (1) geformt ist; 40
- Anordnen von mindestens einem Sperreinsatz (5) innerhalb der Spritzform (15) zwischen den zwei Gehäusen (16, 17) an einem Abschnitt des Eindrucks, der zum Ausbilden des Streifensperrkopfs (3) ausgelegt ist; 45
- Einführen von Kunststoffmaterial innerhalb des geschlossenen Eindrucks (18) der Spritzform (15), sodass der Streifen (2) und der Streifen-

sperrkopf (3), die am Ende der Spritzung erzielt sind, einstückig geformt werden und der Sperreinsatz (5) im Streifensperrkopf (3) eingegliedert verbleibt, wobei das Verfahren **dadurch gekennzeichnet ist, dass** der Streifensperrkopf (3) des erzeugten Kabelbinders derart geformt ist, dass er ein Paar Vorsprünge (8) aufweist, die innerhalb des Streifensperrdurchgangs (4) unterhalb der entsprechenden Sperrplatten (7) angeordnet sind und jeder ein Ende (8a) mit Sägezähnen aufweist, das in Kontakt mit einer jeweiligen Sperrplatte (7) angeordnet ist und mit der Sperrplatte (7) selbst eine Anschlagrastung (12) definiert, die dazu imstande ist, die Rückwärtsbewegung des Streifens (2) innerhalb des Streifensperrdurchgangs (4) in der zweiten Richtung (K2) zu verhindern.

## Revendications

1. Collier de serrage (1), comprenant :

- une bande (2) ;
- une tête de blocage de bande (3) reliée de manière stable à une extrémité de la bande (2) et comprenant un passage de blocage de bande (4) et des moyens de blocage de bande, qui sont disposés de manière adjacente audit passage de blocage de bande (4) de manière à permettre l'accouplement d'une extrémité libre (2b) de la bande (2) dans le passage de blocage de bande (4) dans un premier sens (K1), et à empêcher l'extraction de la bande (2) du passage de blocage de bande (4) dans un deuxième sens (K2) opposé au premier sens (K1) ; ladite tête de blocage de bande (3) et ladite bande (2) étant constituées de matière plastique et étant moulées d'une seule pièce au moyen d'une procédure de moulage par injection, 50

lesdits moyens de blocage de bande comprenant un insert de blocage métallique (5) qui est incorporé dans ladite tête de blocage de bande (3) pendant ladite procédure de moulage par injection et comprend :

- une plaque annulaire (6) qui est incorporée de manière stable dans la tête de blocage de bande (3) dans une position coaxiale au passage de blocage de bande (4) ;
- une paire de plaques de blocage (7) qui dépassent de la plaque annulaire (6) en direction l'une de l'autre, de manière à faire saillie au moins partiellement à l'intérieur dudit passage de blocage de bande (4) ;

caractérisé en ce que

- ladite tête de blocage de bande (3) est formée de manière à présenter une paire de saillies (8) qui sont disposées à l'intérieur du passage de blocage de bande (4) en dessous des plaques de blocage correspondantes (7) et présentant chacune une extrémité en dents de scie (8a) disposée de manière à être en contact avec une plaque de blocage respective (7) et définissant, avec la plaque de blocage (7) elle-même, un cliquet d'arrêt (12) susceptible d'empêcher le mouvement vers l'arrière de la bande (2) à l'intérieur du passage de blocage de bande (4) dans ledit deuxième sens (K2).
2. Collier de serrage (1) selon la revendication 1, dans lequel ledit insert de blocage (5) est interposé entre une partie discoïde inférieure (3a) et une partie discoïde supérieure (3b) de ladite tête de blocage de bande (3).
3. Collier de serrage selon la revendication 2, dans lequel ladite partie discoïde supérieure (3b) présente deux logements (10) disposés sur des bandes opposées près d'une ligne médiane (M) de la tête de blocage de bande (3) au-dessus des deux extrémités en dents de scie respectives (8a) des saillies (8) et dimensionnés chacun de manière à contenir une plaque de blocage (7) dans celui-ci.
4. Collier de serrage selon l'une quelconque des revendications précédentes dans lequel les plaques de blocage (7) sont inclinées par rapport à la plaque annulaire (6) d'un angle ( $\alpha$ ) compris entre 85 et 120°.
5. Collier de serrage selon l'une quelconque des revendications précédentes, dans lequel les plaques de blocage (7) font saillie au moins partiellement à l'intérieur du passage de blocage de bande (4) de telle sorte que la distance (d) entre les extrémités libres soit inférieure ou égale à l'épaisseur (s) de ladite bande (2).
6. Collier de serrage selon l'une quelconque des revendications précédentes, dans lequel l'extrémité libre (7a) de chaque plaque de blocage (7) est formée de manière à présenter des bords carrés.
7. Collier de serrage selon l'une quelconque des revendications précédentes, dans lequel la largeur de chaque saillie (8) est inférieure ou égale à la largeur de la plaque de blocage respective (7).
8. Collier de serrage selon l'une quelconque des revendications précédentes, dans lequel ledit passage de blocage de bande (4) comprend une première partie d'entrée (4a), à l'intérieur de laquelle l'extrémité libre (2b) de la bande (2) est adaptée pour être engagée, et une partie de sortie (4b), à partir de laquelle l'extrémité libre (2b) de la bande (2) est adaptée pour faire saillie ; ledit insert métallique (5) étant incorporé dans la tête de blocage de bande (3) de manière à présenter entre ladite partie d'entrée (4a) et ladite partie de sortie (4b) et présentant les plaques de blocage (7) convergeant en direction de ladite partie de sortie (4b).
9. Collier de serrage selon l'une quelconque des revendications précédentes, dans lequel chaque saillie (8) présente une section transversale rectangulaire présentant une largeur inférieure à la largeur d'un logement correspondant (10).
10. Procédé de fabrication d'un collier de serrage (1), comprenant :
- une bande (2) constituée de matière plastique ;
  - une tête de blocage de bande (3) reliée de manière stable à une extrémité de la bande (2) et comprenant un passage de blocage de bande (4) et des moyens de blocage de bande, qui sont disposés de manière adjacente audit passage de blocage de bande (4) de manière à permettre l'accouplement d'une extrémité libre (2b) de la bande (2) dans le passage de blocage de bande (4) dans un premier sens (K1), et à empêcher l'extraction de la bande (2) du passage de blocage de bande (4) dans un deuxième sens (K2) opposé au premier sens (K1) ; lesdits moyens de blocage de bande étant pourvu d'un insert de blocage (5) constitué d'une matière métallique comprenant :
    - une plaque annulaire (6) qui est incorporée de manière stable dans la tête de blocage de bande (3) dans une position coaxiale au passage de blocage de bande (4) ;
    - une paire de plaques de blocage (7) qui dépassent de la plaque annulaire (6) en direction l'une de l'autre, de manière à faire saillie au moins partiellement à l'intérieur dudit passage de blocage de bande (4) ;
- et ledit procédé comprenant les étapes de :
- disposition d'un moule de formage (15) comprenant deux chemises métalliques (16, 17) susceptibles d'être supportées en butée l'une contre l'autre, et structurées de manière à former, au milieu de la surface de contact entre les chemises (16, 17), au moins une empreinte fermée (18) formée de manière à suivre en négatif la forme d'un collier de serrage (1) ;
  - positionnement d'au moins un insert de blocage (5) à l'intérieur du moule de formage (15) entre les deux chemises (16, 17) au niveau d'une partie de l'empreinte destinée à former la tête de blocage de bande (3) ;
  - insertion d'une matière plastique à l'intérieur

de ladite empreinte fermée (18) du moule de  
formage (15) de telle sorte que la bande (2) et  
la tête de blocage de bande (3) obtenues à la  
fin de l'injection soient moulées d'une seule piè- 5  
ce et que l'insert de blocage (5) demeure incor-  
poré dans la tête de blocage de bande (3), ledit  
procédé étant **caractérisé en ce que** ladite tête  
de blocage de bande (3) dudit collier de serrage  
fabriqué est formée de manière à présenter une 10  
paire de saillies (8) qui sont disposées à l'inté-  
rieur du passage de blocage de bande (4) en  
dessous des plaques de blocage correspon-  
dantes (7) et présentant chacune une extrémité en  
dents de scie (8a) disposée de manière à être 15  
en contact avec une plaque de blocage respec-  
tive (7) et définissant, avec la plaque de blocage  
(7) elle-même, un cliquet d'arrêt (12) susceptible  
d'empêcher le mouvement vers l'arrière de la  
bande (2) à l'intérieur du passage de blocage 20  
de bande (4) dans ledit deuxième sens (K2).

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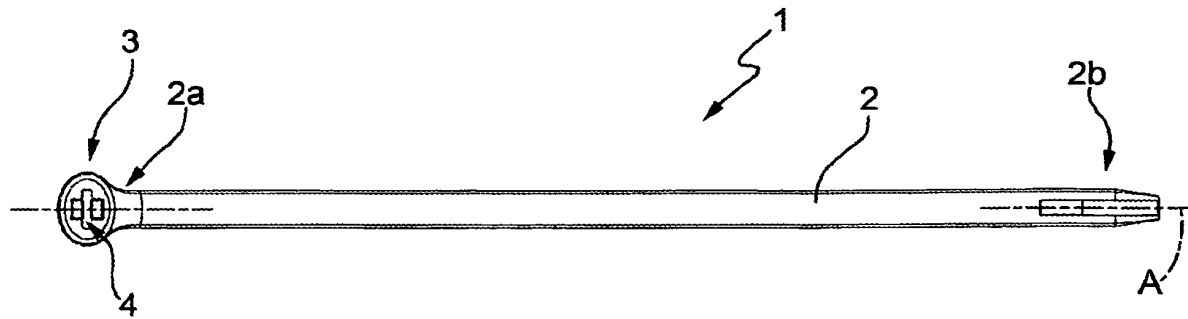


FIG. 1

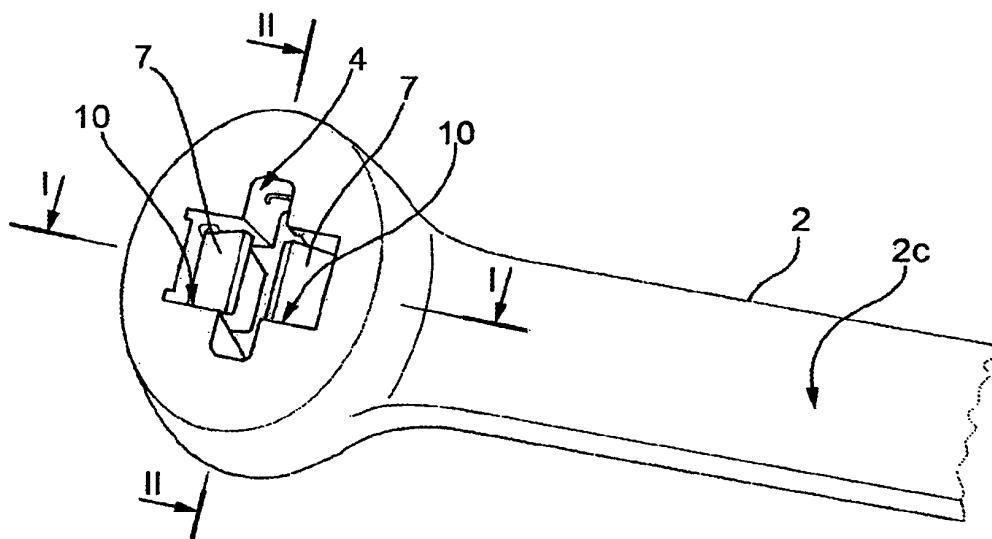


FIG. 2

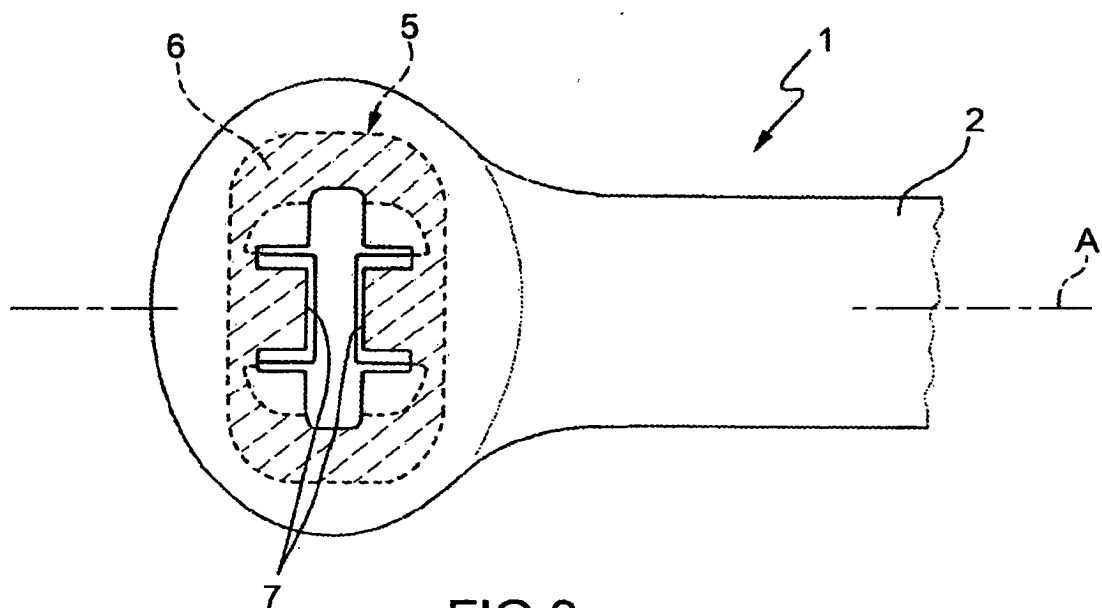


FIG.3

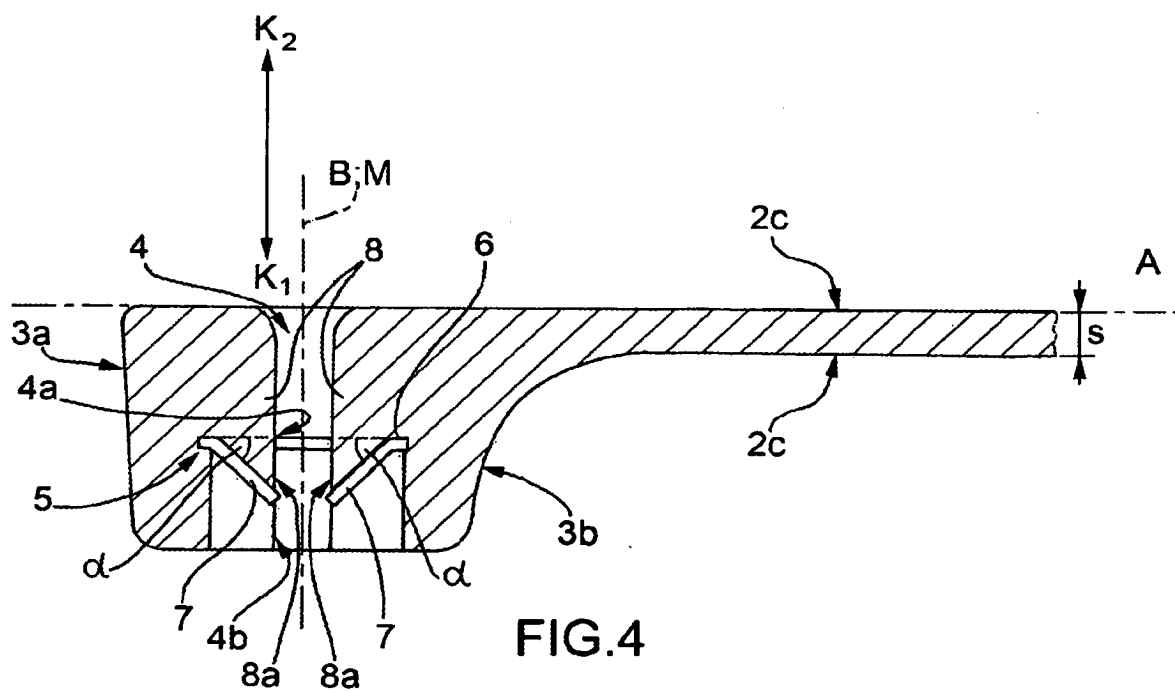
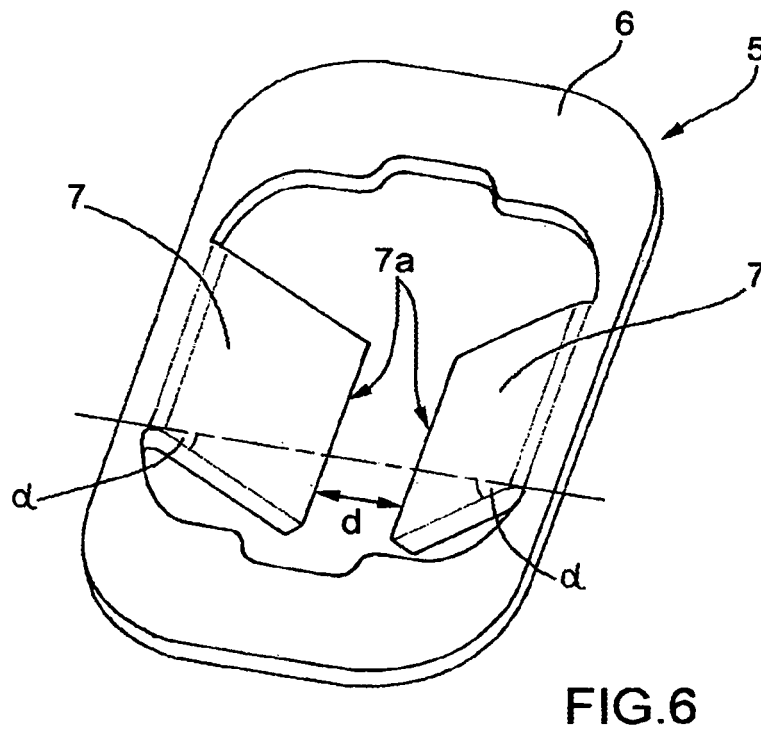
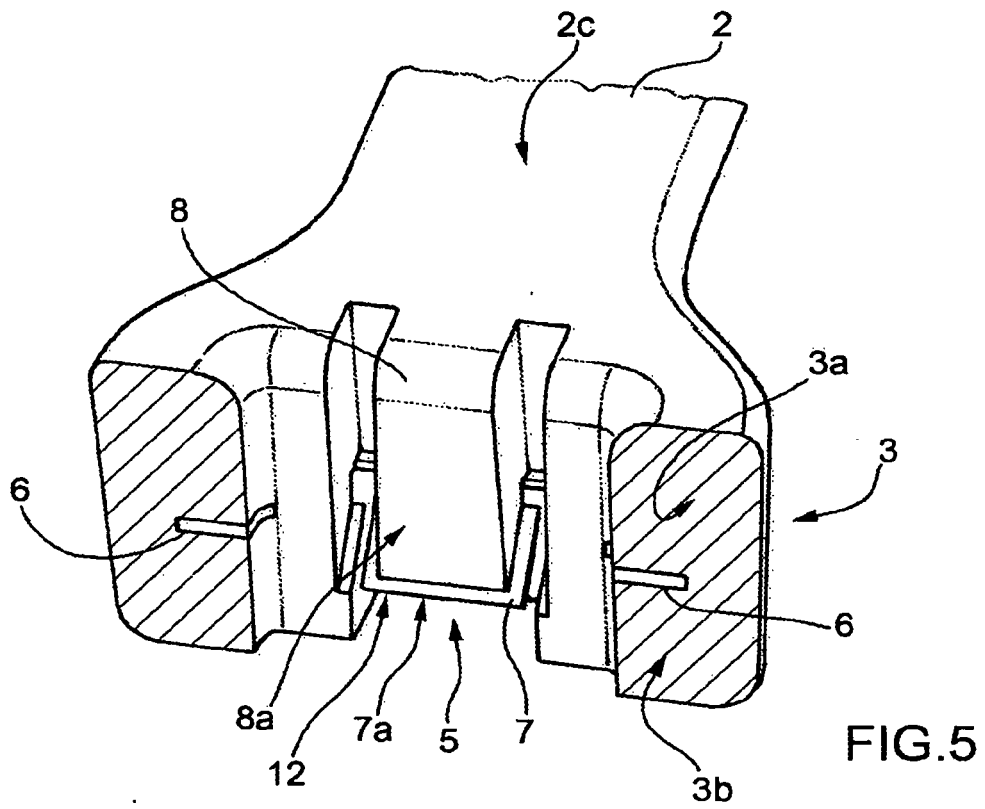
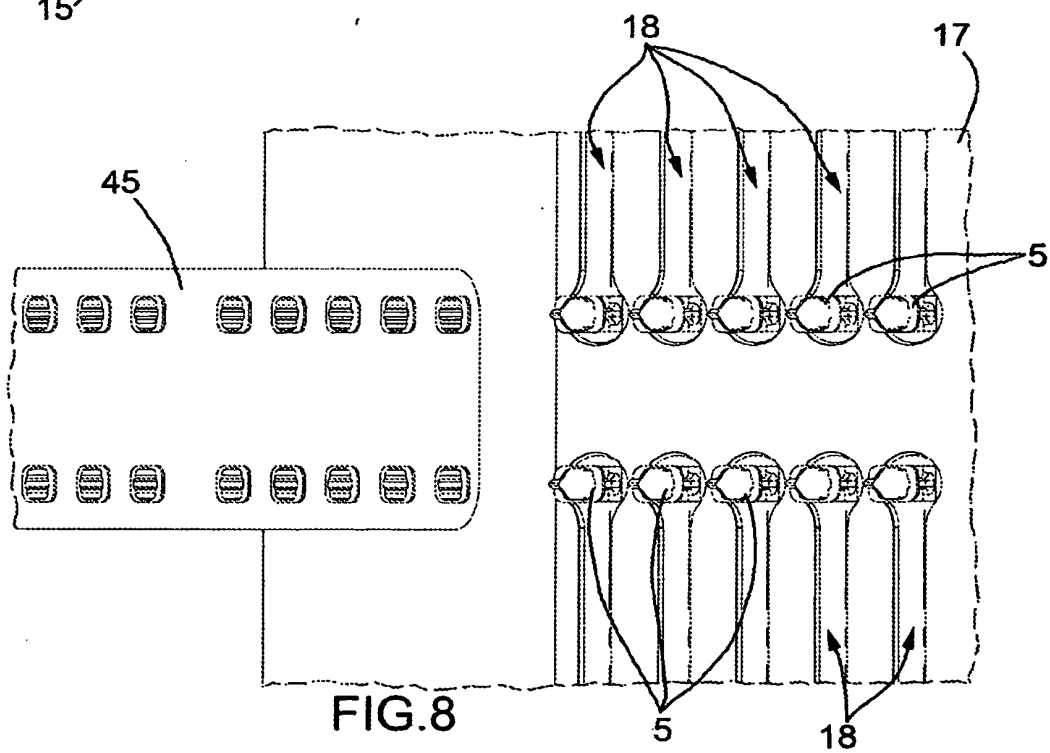
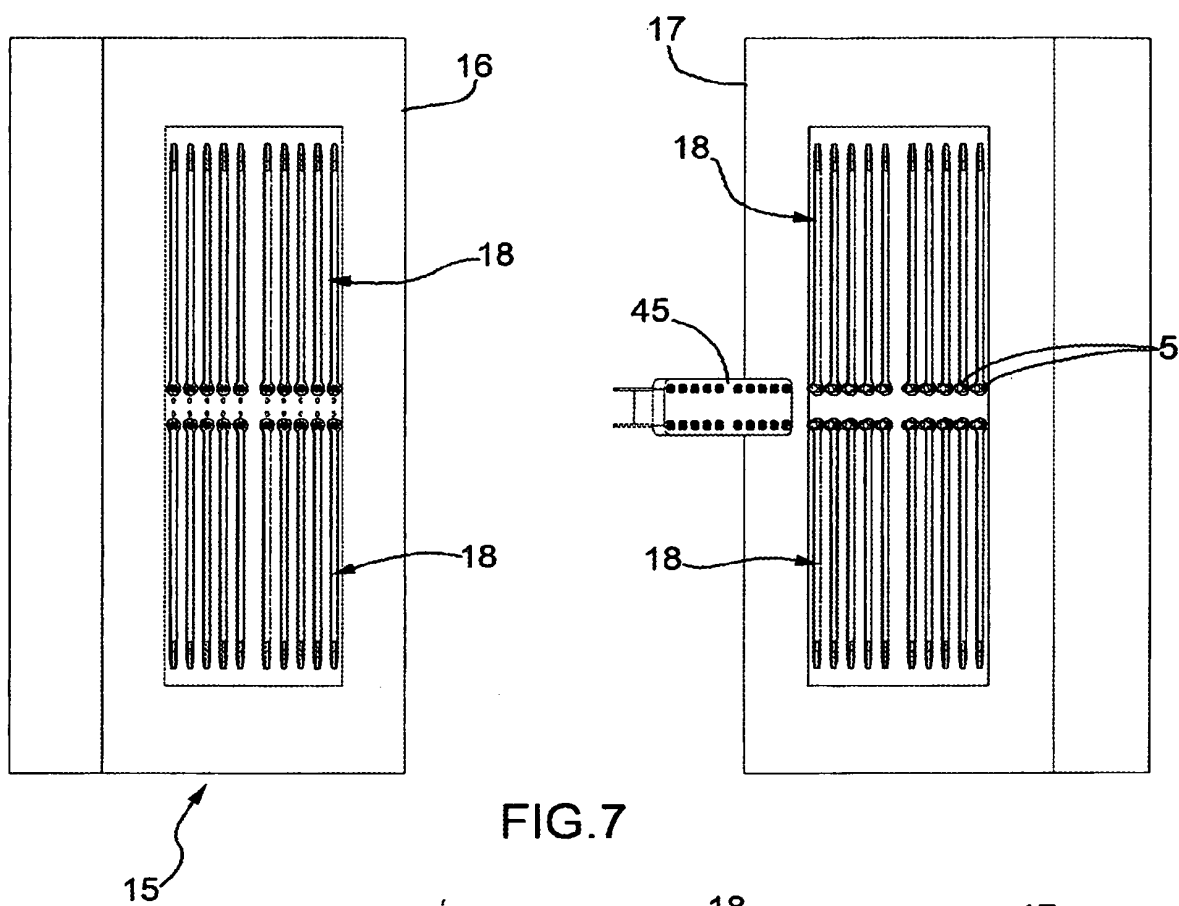


**FIG.4**





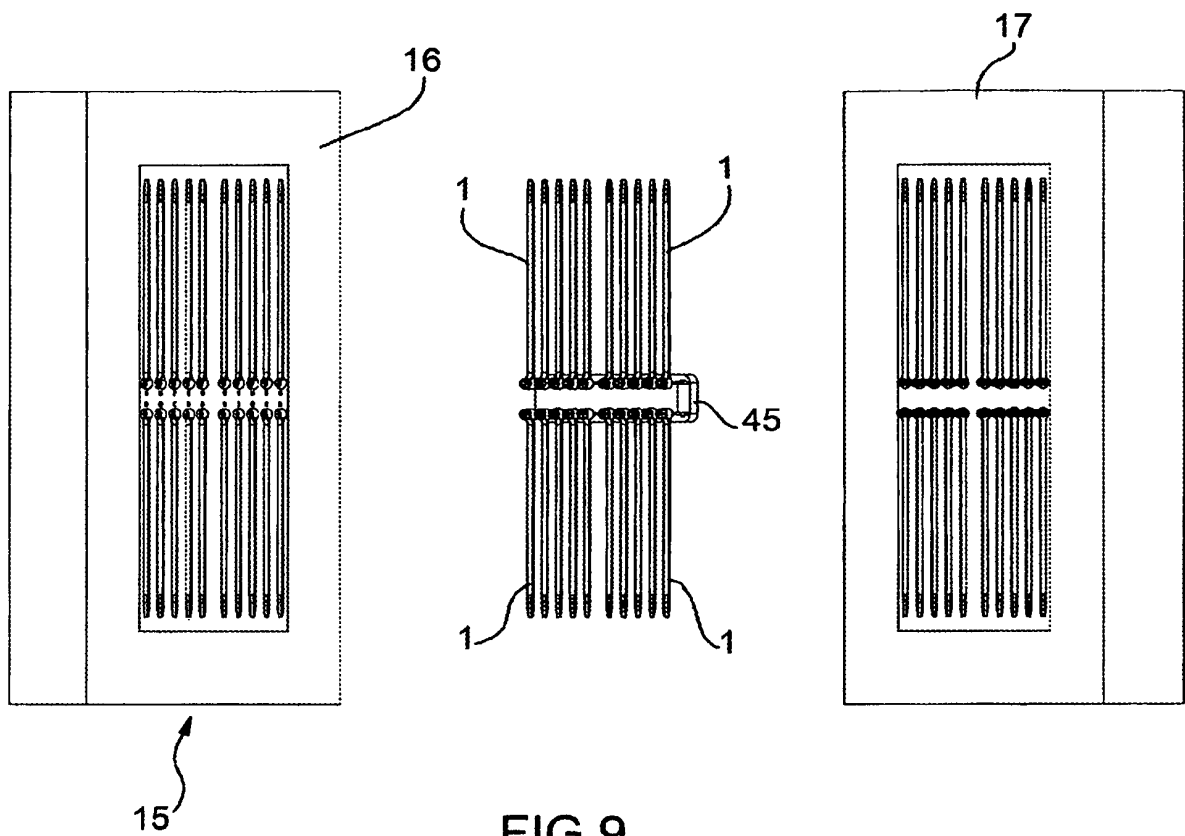


FIG.9

**REFERENCES CITED IN THE DESCRIPTION**

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