(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 901 632 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
10.11.2010 Bulletin 2010/45

(21) Application number: **07701587.3**

(22) Date of filing: **18.01.2007**

(51) Int Cl.:
A46D 3/04 *(2006.01)*

(86) International application number:
PCT/BE2007/000012

(87) International publication number:
WO 2007/087694 (09.08.2007 Gazette 2007/32)

(54) METHOD FOR MANUFACTURING BRUSHES

VERFAHREN ZUR HERSTELLUNG VON BÜRSTEN

PROCÉDÉ DE FABRICATION DE BROSSES

(84) Designated Contracting States:
BE CH DE IT LI

(30) Priority: **02.02.2006 BE 200600068**
23.02.2006 BE 200600118

(43) Date of publication of application:
26.03.2008 Bulletin 2008/13

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EP 1 901 632 B1

Description

[0001] The present invention concerns a method for manufacturing brushes.

[0002] Many methods for manufacturing brushes are already known, among others the methods described in documents EP 0,972,464 and EP 0,972,465 which are particularly important in this context.

[0003] In this known method, use is made of a device which consists of at least one support with openings which are mutually arranged according to a certain pattern, whereby fibre bundles can be provided in this support which have to be placed in a brush body.

[0004] Further, this method consists of the combination of at least four steps, namely laterally separating fibre bundles from a number of loose fibres by means of a fibre bundle remover which is provided with a recess in which fibres can be gathered when the recess passes a , fibre magazine; gradually providing the above-mentioned fibre bundles in the above-mentioned support in a mechanical manner; transferring, by means of the support, the fibre bundles provided therein to a holder by means of a mutual positioning between each respective fibre bundle and the opening in which it has to be provided, and by subsequently pushing the separate fibre bundles in the longitudinal direction in the above-mentioned openings; and fixing the fibre bundles in the brush body, or at least in a part of the brush body, by means of this holder.

[0005] This known method is very suitable for applying fibre bundles in a brush body, and it enables us to manufacture brushes in a simple manner in many varieties as far as thickness of the fibre bundles, colour of the fibres, etc. are concerned.

[0006] A disadvantage of this method, however, is that it is not suitable for manufacturing brushes with fibres having a pointed head.

[0007] For, such fibres with a pointed head cannot be pushed out of a support via the head side without being damaged, as this head is not strong enough and has too little bearing capacity.

[0008] Document EP 1,425,989 in the name of Kwon describes how, with a similar known method, tooth brushes with fibres having a pointed head can be manufactured.

[0009] With this method, however, the pointed heads of the fibres are constantly being pushed on, which inevitably leads to the fibres being damaged.

[0010] Moreover, the method is only applied to fibres having a total length of 8 to 13 mm, whereby the pointed heads may be 4 to 8 mm long.

[0011] However, in order to be able to separate fibre bundles from the fibre magazine, for example by means of the above-mentioned fibre bundle remover with the recess, it is necessary to get hold of the fibres on the cylindrical part.

[0012] Indeed, if the fibres were picked up at the pointed heads, the fibres would tend to move away from each other and thus they would not form a nice cylindrical bundle, which is necessary to be able to put the fibre bundle in holes in a support.

[0013] In other words, an additional disadvantage of the method described in EP 1,425,989 is that only a very small length remains to get hold of the fibres so as to form fibre bundles.

[0014] The present invention aims to remedy the above-mentioned and other disadvantages.

[0015] To this end, the invention concerns a method for manufacturing brushes according to the steps as claimed in claim 1.

[0016] An advantage of this method according to the invention is that, when fibre bundles are applied in the support, as well as when transferring the fibre bundles from the support to a holder, one always pushes in the same direction, namely on one far end of the fibres, which makes the method suitable for manufacturing brushes with sharp brush hairs.

[0017] In order to better explain the characteristics of the invention, the following preferred embodiments are given as an example only with reference to the accompanying drawings, in which:

figure 1 schematically represents different steps of the method according to the invention;

figure 2 represents means for composing a fibre bundle from an amount of loose fibres;

figure 3 schematically represents how the fibre bundles can be placed in a support;

figures 4 to 6 schematically represent how the fibre bundles can be provided from a support into a holder;

figure 7 illustrates the embedding of the fibre bundles in a brush body by means of injection-moulding; and

figures 8 to 15 represent successive steps of an alternative method according to the invention.

[0018] Figure 1 schematically represents the method according to the invention for manufacturing brushes, whereby the method comprises the following steps:

- A) providing an amount of loose fibres 1 which are provided with a base end 2 and a sharp tip 3 and which are all oriented in the same direction;
- B) composing this loose amount of fibres into fibre bundles 4;
- C) pushing the fibre bundles 4 one by one, by means of a push movement on the base end 2 of the fibres 1 according to the longitudinal direction, in openings 5 of a support 6;
- D) providing a holder 7 on the support 6 which is provided with openings 8 corresponding to the fibre pattern which is to be realised in the brush;

- E) pushing the fibre bundles 4 from the support 6 into the openings 8 of the holder 7 by exerting a combined pushing force on the base ends 2 of the fibres 1 by means of a device 9 which is suitable to that end, whereby it is made sure that the fibre bundles 4, after having been applied in the holder 7, partly protrude from the holder 7 with their base ends 2;
- F) connecting the fibre bundles 4 to a brush body 10 and;
- G) removing the holder 7 again.

[0019] As is described in EP 0,972,464 and as is represented in figure 2, in order to compose the fibre bundles 4 from an amount of loose fibres 1, use can be made of a fibre magazine 11 and a fibre bundle remover 12 working in conjunction with it which is moved along the fibres 1 provided in the fibre magazine 11 by means of rotation, whereby this fibre bundle remover 12 is provided with a recess 13 in which fibres 1 can be collected so as to form a fibre bundle 4 as said recess 13 passes along the fibre magazine 11.

[0020] At the recess 13, the fibre bundle remover 12 is preferably some 0.5 to 2 mm thick, and the fibres 1 are 20 to 22 mm long, such that the cylindrical part of the fibres 1 is sufficiently long to hold the fibres 1.

[0021] In this manner is avoided that the fibres 1 must be picked up by the fibre bundle remover 12 over a part of the pointed head 3, as a result of which they would be inclined to move away from each other and would not form a nice cylindrical fibre bundle 4.

[0022] The fibres 1 can for example be made of polyester or polyamide.

[0023] Figure 3 schematically represents how the separated fibre bundles 4 are provided in the openings 5 of the support 6 by appropriately positioning these fibre bundles 4 opposite the openings 5 concerned and by subsequently pushing these fibre bundles 4 axially in the openings 5 concerned, for example by means of a punch 14.

[0024] According to the invention, it is hereby of major importance that the above-mentioned punch 14 exerts its pressure force on the fibre bundles 4 at the base end 2 of the fibres 1.

[0025] The openings 5 in the support 6 continue from one side of the support 6 to the other side.

[0026] This makes it possible to push the fibre bundles 4 out of the support 6 into a holder 7 in a subsequent step E of the method according to the invention, in the same direction as before, i.e. by again exerting a pressure force on the base end 2 of the fibres 1.

[0027] Figures 4 to 6 schematically represent an embodiment whereby a support 6 filled with fibre bundles 4 is provided up to a holder 7 by means of transfer means which are not represented in the figures, and whereby on the other side of the support 2 is provided a device 9 designed to transfer the fibre bundles 4 from the support 6 into the holder 7.

[0028] To this end, said device 9 consists of push-out pins 15, fixed on a common support 16 according to a pattern which corresponds to the pattern of the openings 5 in the support 6.

[0029] Although it is not strictly necessary according to the invention, a fibre guide 17 is provided in the given example of figures 4 to 6 between the support 6 and the holder 7 which makes it possible, for example, to join certain fibre bundles 4 or to move them in a diagonal direction.

[0030] In another embodiment, such a fibre guide 17 could also be used to guide the fibre bundles 4 in such a manner that they end up in the brush body 10 at a certain angle.

[0031] In this manner, one and the same support 6 can be used for manufacturing brushes with all sorts of different fibre patterns.

[0032] One only has to move the push-out pins 15 in the openings 5 of the support 6 now to transfer the fibre bundles 4 into the holder 7, such that the base ends 2 of these fibre bundles 4 extend over a suitable length from the above-mentioned openings 8 of the holder 7, as is represented in figure 6.

[0033] A subsequent step F of the method then consists of connecting the fibre bundles 4 to a brush body 10.

[0034] This may be done, as is represented in figure 7, by designing the holder 7 as part of a mould 18, whereby a complementary part 19 of the mould 18 can be put against the holder 7 and one or other substance 21, for example a plastic, can be injected in the mould 18 via a passage 20 so as to form a brush body 10, so that, after the substance 21 has cured, the fibre bundles 4 will be embedded in the brush body 10 with their base ends 2.

[0035] By removing the holder 7 and the complementary part 19 from the mould 18, the desired brush is then finally obtained.

[0036] Alternatively, it is also possible to mutually connect the fibre bundles 4 protruding from the holder with their base ends 2 in the course of a thermal treatment, by fusing them together for example, or by welding them in a base 30, as will be further discussed.

[0037] It is also possible to form such a base during a first injection moulding operation, whereby the fibre bundles 4 are embedded in the base, such that they are being held by the base.

[0038] Afterwards, the fibre bundles 4 can be removed from the holder 7 to be possibly worked into a brush body 10 at a later stage, for example also by means of injection-moulding or simply by means of gluing or the like. Figures 8 to 15 represent the successive steps of an alternative method according to the invention for manufacturing a brush.

[0039] The first steps of this alternative method, represented in figure 8, are analogous to the above-described method, whereby fibre bundles 4 are separated from an amount of loose fibres 1 and are provided in the openings 5 of a support 6 by exerting a pushing force, for example by means of a punch 14, on the base ends 2 of the fibres 1.

[0040] In order to obtain a certain profiling of the brush hairs, as is represented in figure 9, after the fibre bundles 4 have been provided one by one in the support 6, a second support 22 is provided against this first support 6, in which openings 23 are provided corresponding to the first support 6.

[0041] As is represented in figure 10, use is then made of a device 24, consisting of a series of push-out pins 25 provided on a support 26 whereby the tips 27 of the push-out pins 25 are aligned in relation to each other according to the above-mentioned profiling.

[0042] With this device 24, the fibre bundles 4 can be simultaneously pushed out of the first support 6 into the second support 22, whereby the fibre bundles 4 still protrude out of the second support 22 over a certain length 28 with their base ends 22, as a function of the profiling of the push-out pins 25, as is represented in figure 11.

[0043] A subsequent step then consists, as is represented in figures 11 and 12, of cutting off the parts 28 of the fibre bundles 4 protruding from the second support 22 by means of a knife 29.

[0044] Finally, the method as described above is further applied as of step E whereby the fibre bundles 4 are pushed out of a support, in this case the second support 22, into a holder 7, as is represented in figures 13 to 15.

[0045] In the given figures 13 to 15, use is hereby made again of a fibre guide 17, whereby between this fibre guide 17 and the holder 7 is also positioned a base 30, however, with openings 31 corresponding to the openings 8 in the holder 7.

[0046] The fibre bundles 4 can then be fixed to the above-mentioned base 30, for example in the course of a thermal treatment, after which the base 30 and fibre bundles 4 can be worked in a brush body 10 as a whole.

[0047] Alternatively, it is also possible to keep the fibre bundles 4 together by forming a base in a mould by means of injection-moulding, whereby the fibre bundles are embedded in this base during the injection-moulding.

[0048] At a later stage, this base with the fibre bundles can then be worked in a brush body 10, for example also by means of injection-moulding, gluing or the like.

[0049] The present invention is by no means limited to the methods described as an example; on the contrary, such a method can be made according to different variants while still remaining within the scope of the invention.

Claims

1. Method for manufacturing a brush, which consists in (A) providing an amount of loose fibres (1) provided with a base end (2) and a sharp tip (3) and which are all oriented in the same direction; (B) composing fibre bundles (4) from this loose amount of fibres (1); (C) pushing the fibre bundles (4) one by one in openings (5) of a support (6) by means of a push movement on the base end (2) of the fibres (1) according to the longitudinal direction; (D) providing a holder (7) on the support (6) which is provided with openings (5) corresponding to the fibre pattern which must be realised in the brush; (E) pushing the fibre bundles (4) from the support (6) into the openings (5) of the holder (7) by exerting a pushing force on the same above-mentioned base end (2) of the fibres (1) in the same direction as the above-mentioned push movement, whereby it is made sure that the fibre bundles (4) partly protrude from the holder (7) with the base ends (2) of the fibres (1); (F) connecting the base ends (2) of the individual fibres (1) within a fibre bundle (4) to each other and connecting the base ends (2) of the fibres of the fibre bundles (4) to each other or to a brush body (10) and (G) removing the holder (7) again.

2. Method according to claim 1, **characterised in that** the fibres have a pointed tip (3) on one far end, whereby the above-mentioned pushing forces are exerted on the other far end (2), in particular on the base end (2) of the fibres (1).

3. Method according to claim 2, **characterised in that** the brush body is formed by means of injection-moulding in a mould (18), whereby the above-mentioned holder (7) serves as one half of the mould (18) and the base ends (2) of the fibres are embedded in the brush body (10).

4. Method according to any one of the preceding claims, **characterised in that** the loose fibres (1) initially are 20 to 22 mm long.

5. Method according to any one of the preceding claims, **characterised in that** the loose fibres (1) are made of polyester.

6. Method according to any one of claims 1 to 5, **characterised in that** the loose fibres (1) are made of polyamide.

7. Method according to any one of the preceding claims, **characterised in that** the fibre ends of the individual fibres (1) within a fibre bundle (4) are connected to each other and/or the fibre bundles (4) are mutually connected in the course of a thermal treatment.

8. Method according to any one of the preceding claims, **characterised in that** in order to obtain a certain profiling of the brush hairs (1), apart from providing the fibre bundles (4) in the support (6), additional steps are carried out which consist in providing a second support (22) up against said first support (6), in which openings (23) have been provided corresponding to the first support (6); in simultaneously pushing the fibre bundles (4) out of the first support (6) into the second support (22), making use of a

series of push-out pins (25) whose tips (27) are aligned in relation to each other according to the above-mentioned profiling, whereby the fibre bundles (4) protrude with their base ends (2) out of the second support (22) over a certain length as a function of the profiling of the push-out pins (25); in cutting off the parts of the fibre bundles protruding from the second support and in further applying the method of claim 1 as of step (E) whereby the fibre bundles (4) are pushed out of a support (6), in this case the second support (22), into the holder.

9. Method according to any one of the preceding claims, **characterised in that** in order to provide the fibre bundles (4) from a support (6) into a holder (7), a fibre guide (17) is additionally placed between the support (6) and the holder (7) so as to guide the fibre bundles (4) from the support (6) to certain openings (8) or positions in the holder (7) or to place the fibres (1) at a certain angle in relation to the brush body (10).

10. Method according to any one of the preceding claims, **characterised in that**, before the fibre bundles (4) are placed on the above-mentioned holder, a base (30) is positioned on the holder with openings (31) that correspond to the openings (8) in the holder.

11. Method according to claim 9, **characterised in that** the fibre bundles (4) are fixed to the above-mentioned base (30), after which the base (30) and fibre bundles (31) are worked as a whole into a brush body (10).

12. Method according to any one of the preceding claims, **characterised in that** the fibre bundles are composed by laterally separating fibre bundles (4) from the fibre magazine (11) by means of at least one fibre bundle remover (12) which is provided with a recess (13) in which fibres (1) can be collected as the recess (13) passes the fibre magazine (11).

13. Method according to any one of the preceding claims, **characterised in that** the recess (13) in the fibre bundle remover (12) is about 1 to 2 mm wide.

Patentansprüche

1. Verfahren zur Herstellung einer Bürste, das darin besteht, (A) eine Quantität loser Fasern (1) vorzusehen, die mit einem Basisende (2) und einer spitz zulaufenden Spitze (3) versehen sind und die alle in der gleichen Richtung orientiert sind; (B) aus dieser losen Quantität von Fasern (1) Faserbündel (4) zusammenzustellen; (C) die Faserbündel (4), mittels einer Drückbewegung auf das Basisende (2) der Fasern (1) gemäß der Längsrichtung, eines nach dem anderen in Öffnungen (5) eines Trägers (6) zu drükken; (D) eine Halterung (7) an dem Träger (6) anzubringen, die mit Öffnungen (5) versehen ist, die dem Fasermuster entsprechen, das in der Bürste verwirklicht werden muss; (E) die Faserbündel (4) aus dem Träger (6) in die Öffnungen (5) der Halterung (7) zu schieben, indem eine Andrückkraft auf dasselbe vorgenannte Basisende (2) der Fasern (1) in der gleichen Richtung wie die vorgenannte Drückbewegung ausgeübt wird, wobei dafür gesorgt wird, dass die Faserbündel (4) mit den Basisenden (2) der Fasern (1) teilweise aus der Halterung (7) ragen; (F) die Basisenden (2) der einzelnen Fasern (1) innerhalb eines Faserbündels (4) miteinander zu verbinden und die Basisenden (2) der Fasern der Faserbündel (4) miteinander oder mit einem Bürstenkörper (10) zu verbinden, und (G) die Halterung (7) wieder zu entfernen.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** die Fasern an einem Ende eine spitz zulaufende Spitze (3) aufweisen, wobei die vorgenannten Andrückkräfte auf das andere Ende (2) ausgeübt werden, insbesondere auf das Basisende (2) der Fasern (1).

3. Verfahren nach Anspruch 2, **dadurch gekennzeichnet, dass** der Bürstenkörper mittels Spritzgießen in einem Formwerkzeug (18) geformt wird, wobei die vorgenannte Halterung (7) als eine Hälfte des Formwerkzeugs (18) dient und die Basisenden (2) der Fasern in dem Bürstenkörper (10) eingebettet werden.

4. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass** die losen Fasern (1) anfänglich 20 bis 22 mm lang sind.

5. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass** die losen Fasern (1) aus Polyester hergestellt sind.

6. Verfahren nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die losen Fasern (1) aus Polyamid hergestellt sind.

7. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass** die Faserenden der einzelnen Fasern (1) innerhalb eines Faserbündels (4) miteinander verbunden werden und/oder die Faserbündel (4) im Verlauf einer thermischen Behandlung miteinander verbunden werden.

8. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass**, um eine gewisse Profilierung der Bürstenborsten (1) zu erhalten, außer dem Anbringen der Faserbündel (4) in dem Träger (6) zusätzliche Schritte ausgeführt wer-

den, die darin bestehen, einen zweiten Träger (22) bis gegen diesen ersten Träger (6) anzubringen, worin Öffnungen (23) entsprechend dem ersten Träger (6) angebracht worden sind; darin, die Faserbündel (4) gleichzeitig aus dem ersten Träger (6) in den zweiten Träger (22) zu drücken, unter Verwendung einer Serie von Ausdrückstiften (25), deren Enden (27) in Bezug zueinander gemäß der vorgenannten Profilierung ausgerichtet sind, wobei die Faserbündel (4) mit ihren Basisenden (2) über eine gewisse Länge aus dem zweiten Träger (22) ragen, in Funktion der Profilierung der Ausdrückstifte (25); darin, die aus dem zweiten Träger ragenden Teile der Faserbündel abzuschneiden und weiter das Verfahren von Anspruch 1 ab Schritt (E) anzuwenden, wobei die Faserbündel (4) aus einem Träger (6), in diesem Fall dem zweiten Träger (22), in die Halterung gedrückt werden.

9. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass**, um die Faserbündel (4) aus einem Träger (6) in einer Halterung (7) anzubringen, zusätzlich eine Faserführung (17) zwischen dem Träger (6) und der Halterung (7) plaziert wird, um die Faserbündel (4) von dem Träger (6) zu bestimmten Öffnungen (8) oder Positionen in der Halterung (7) zu führen oder um die Fasern (1) in Bezug auf den Bürstenkörper (10) unter einen bestimmten Winkel zu setzen.

10. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass**, bevor die Faserbündel (4) auf die vorgenannte Halterung plaziert werden, ein Basisteil (30) auf der Halterung positioniert wird, mit Öffnungen (31), die den Öffnungen (8) in der Halterung entsprechen.

11. Verfahren nach Anspruch 9, **dadurch gekennzeichnet, dass** die Faserbündel (4) auf dem vorgenannten Basisteil (30) befestigt werden, wonach das Basisteil (30) und die Faserbündel (31) als Ganzes in einen Bürstenkörper (10) eingearbeitet werden.

12. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass** die Faserbündel zusammengestellt werden durch das seitliche Abscheiden von Faserbündeln (4) aus dem Fasermagazin (11) mittels mindestens eines Faserbündelabnehmers (12), der mit einer Aussparung (13) versehen ist, worin Fasern (1) gesammelt werden können, wenn die Aussparung (13) das Fasermagazin (11) passiert.

13. Verfahren nach einem der vorgenannten Ansprüche, **dadurch gekennzeichnet, dass** die Aussparung (13) in dem Faserbündelabnehmer (12) etwa 1 bis 2 mm breit ist.

Revendications

1. Procédé pour la fabrication d'une brosse, qui consiste à (A) procurer une quantité de fibres lâches (1) munies d'une extrémité de base (2) et d'une extrémité pointue (3) et qui sont toutes orientées dans la même direction ; (B) composer des faisceaux de fibres (4) à partir de cette quantité lâche de fibres (1) ; pousser les faisceaux de fibres (4) un par un dans des ouvertures (5) d'un support (6) au moyen d'un mouvement de poussée s'exerçant sur l'extrémité de base (2) des fibres (1) dans la direction longitudinale ; (D) procurer un dispositif de serrage (7) sur le support (6), qui est muni d'ouvertures (5) de manière correspondante au motif de fibres qui doit être réalisé dans la brosse ; (E) pousser les faisceaux de fibres (4) à partir du support (6) jusque dans les ouvertures (5) du dispositif de serrage (7) en exerçant une force de poussée sur la même extrémité de base (2) des fibres (1) que celle mentionnée ci-dessus dans la même direction que celle du mouvement de poussée mentionné ci-dessus, en s'assurant du fait que les faisceaux de fibres (4) font saillie en partie par rapport au dispositif de serrage (7) avec les extrémités de base (2) des fibres (1) ; (F) relier les extrémités de base (2) des fibres individuelles (1) au sein d'un faisceau de fibres (4) les unes aux autres et relier les extrémités de base (2) des fibres des faisceaux de fibres (4) les unes aux autres ou bien à un corps de brosse (10) ; et (G) retirer le dispositif de serrage (7).

2. Procédé selon la revendication 1, **caractérisé en ce que** les fibres possèdent une extrémité pointue (3) à une extrémité éloignée, les forces de poussée mentionnées ci-dessus s'exerçant sur l'autre extrémité éloignée (2), en particulier sur l'extrémité de base (2) des fibres (1).

3. Procédé selon la revendication 2, **caractérisé en ce qu'**on obtient le corps de brosse au moyen d'un moulage par injection dans un moule (18), le dispositif de serrage (7) mentionné ci-dessus faisant office d'une moitié du moule (18) et les extrémités de base (2) des fibres étant encastrées dans le corps de brosse (10).

4. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les fibres lâches (1) possèdent, au départ, une longueur de 20 à 22 mm.

5. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les fibres lâches (1) sont réalisées en polyester.

6. Procédé selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** les fibres lâches (1)

sont réalisées en polyamide.

7. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les extrémités des fibres individuelles (1) au sein d'un faisceau de fibres (4) sont reliées les unes aux autres et/ou les faisceaux de fibres (4) sont reliés les uns aux autres au cours d'un traitement thermique.

8. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que**, afin d'obtenir un certain profil des poils de brosserie (1), en dehors du fait de procurer les faisceaux de fibres (4) dans le support (6), des étapes supplémentaires sont mises en oeuvre, qui consistent à procurer un deuxième support (22) contre ledit premier support (6) dans lequel on a prévu des ouvertures (23) de manière correspondante au premier support (6) ; à pousser simultanément les faisceaux de fibres (4) hors du premier support (6) jusque dans le deuxième support (22) en faisant usage d'une série de broches de déplacement par poussée (25) dont les extrémités (27) sont mises en alignement les unes avec les autres conformément au profil mentionné ci-dessus, si bien que les faisceaux de fibres (4) font saillie avec leurs extrémités de base (2) hors du deuxième support (22) sur une certaine longueur en fonction du profil des broches de déplacement par poussée (25) ; à découper les parties des faisceaux de fibres faisant saillie par rapport au deuxième support et à mettre en oeuvre en outre le procédé selon la revendication 1 en ce qui concerne l'étape (E) par laquelle les faisceaux de fibres (4) sont poussés hors d'un support (6), dans le cas présent le deuxième support (22), jusque dans le dispositif de serrage.

9. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que**, afin de procurer les faisceaux de fibres (4) à partir d'un support (6) jusque dans un dispositif de serrage (7), on place en outre un guide de fibres (17) entre le support (6) et le dispositif de serrage (7) de façon à guider les faisceaux de fibres (4) à partir du support (6) jusque dans certaines ouvertures (8) ou certaines positions dans le dispositif de serrage (7) ou bien de façon à placer les fibres (1) en formant un certain angle par rapport au corps de brosse (10).

10. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que**, avant de placer les faisceaux de fibres (4) sur le dispositif de serrage susmentionné, on positionne une base (30) sur le dispositif de serrage comportant des ouvertures (31) qui correspondent aux ouvertures (8) pratiquées dans le dispositif de serrage.

11. Procédé selon la revendication 9, **caractérisé en ce que** les faisceaux de fibres (4) sont fixés à la base susmentionnée (30) ; après quoi, la base (30) et les faisceaux de fibres (31) sont usinés pour obtenir une seule pièce sous la forme d'un corps de brosse (10).

12. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les faisceaux de fibres sont composés en séparant latéralement des faisceaux de fibres (4) par rapport à un magasin de fibres (11) au moyen d'au moins un dispositif de retrait de faisceaux de fibres (12) qui est muni d'un évidement (13) dans lequel des fibres (1) peuvent être récoltées lorsque l'évidement (13) passe devant le magasin de fibres (11).

13. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'évidement (13) dans le dispositif de retrait des faisceaux de fibres (12) possède une largeur d'environ 1 à 2 mm.

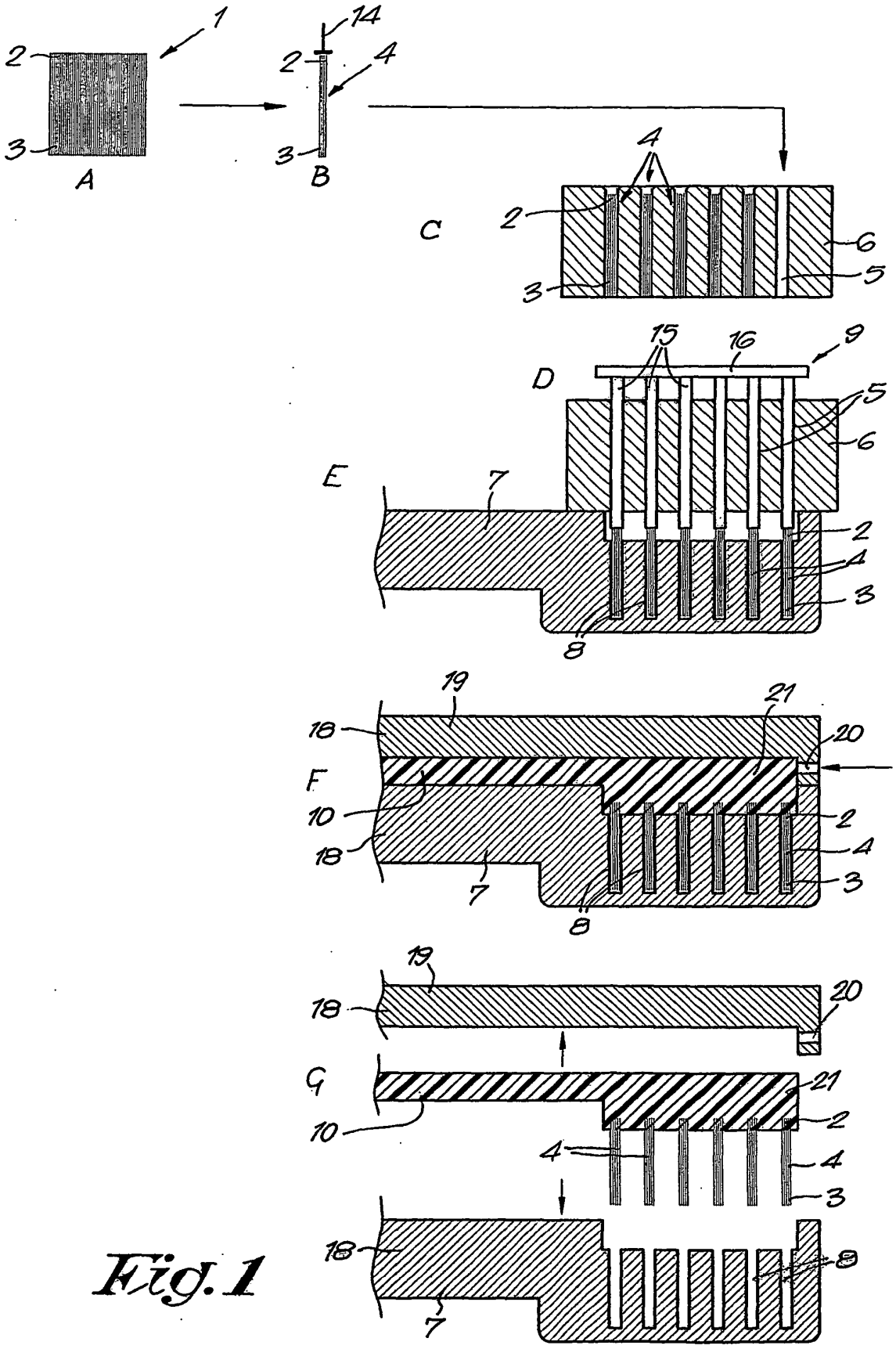


Fig. 1

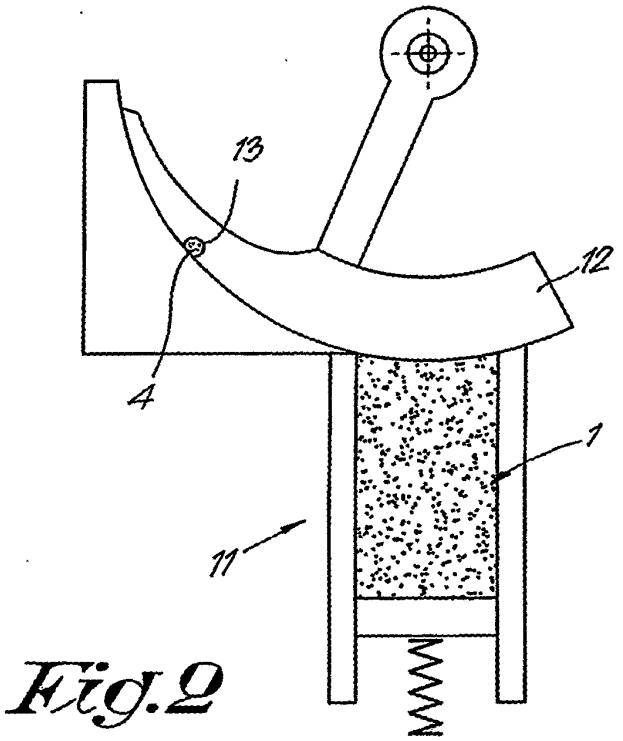


Fig.2

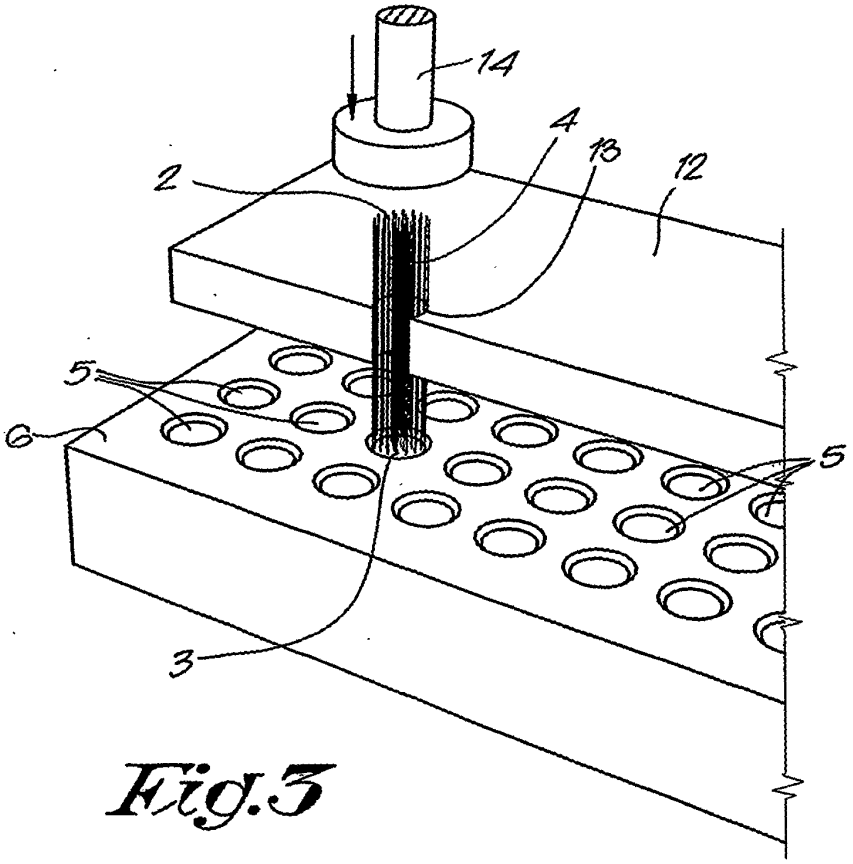


Fig.3

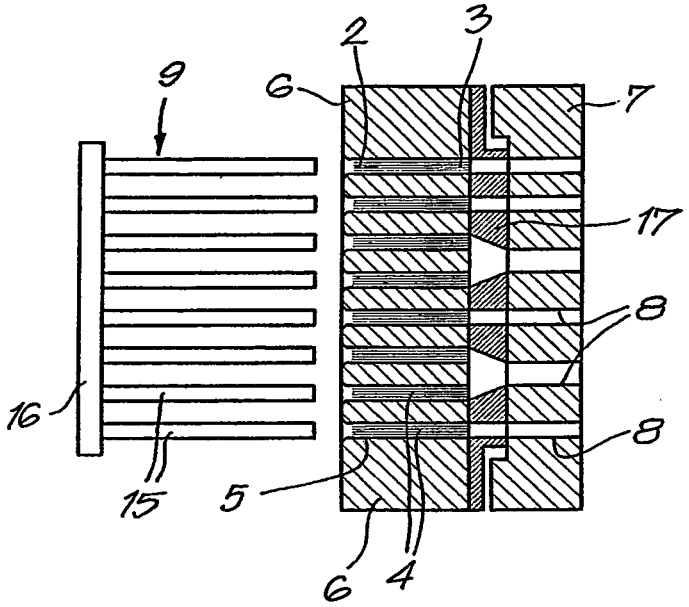


Fig.4

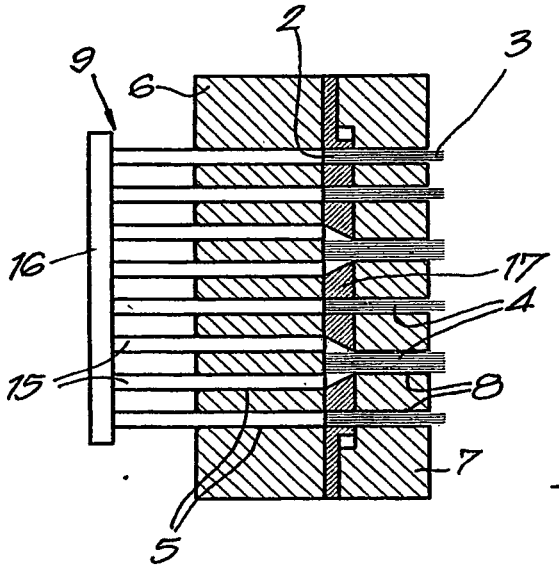


Fig.5

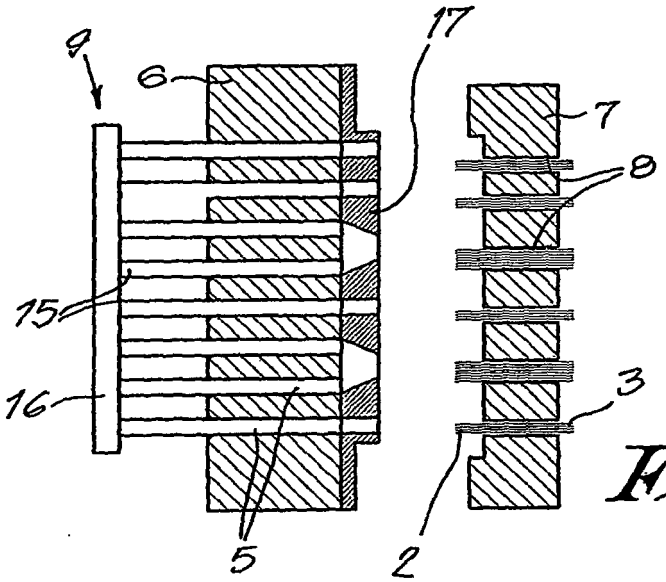


Fig.6

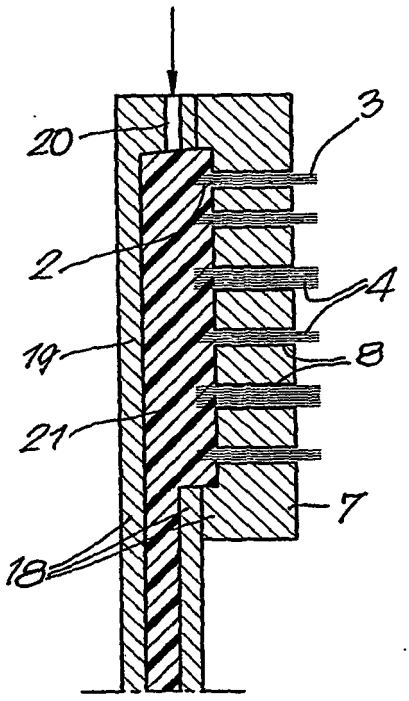


Fig.7

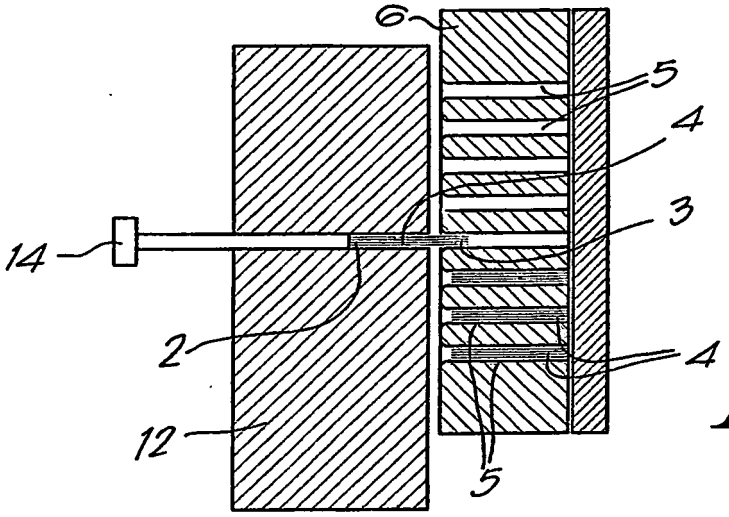


Fig.8

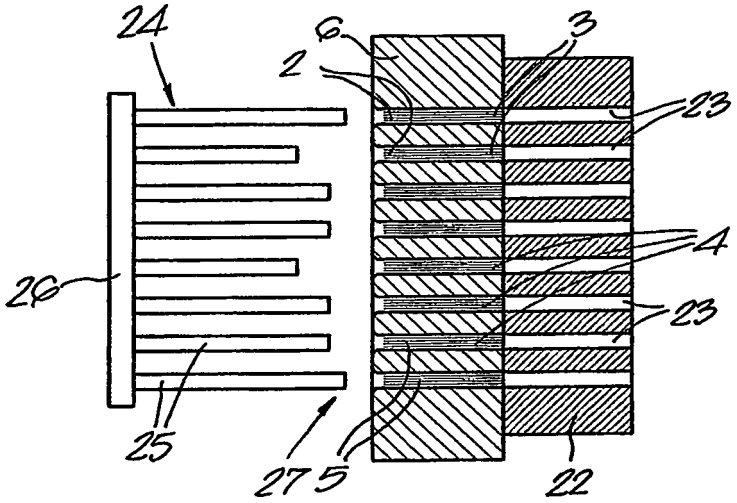


Fig.9

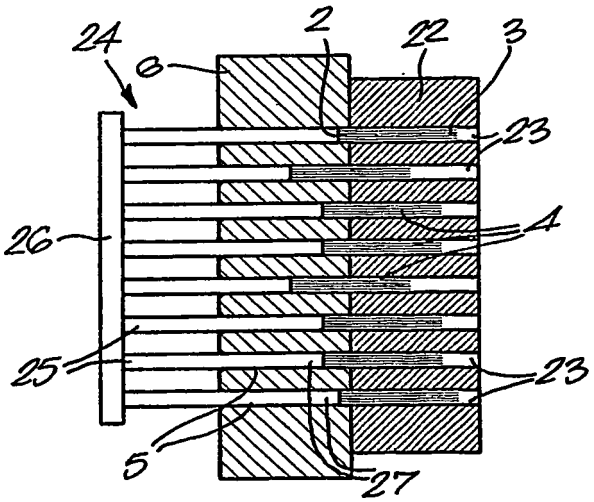


Fig.10

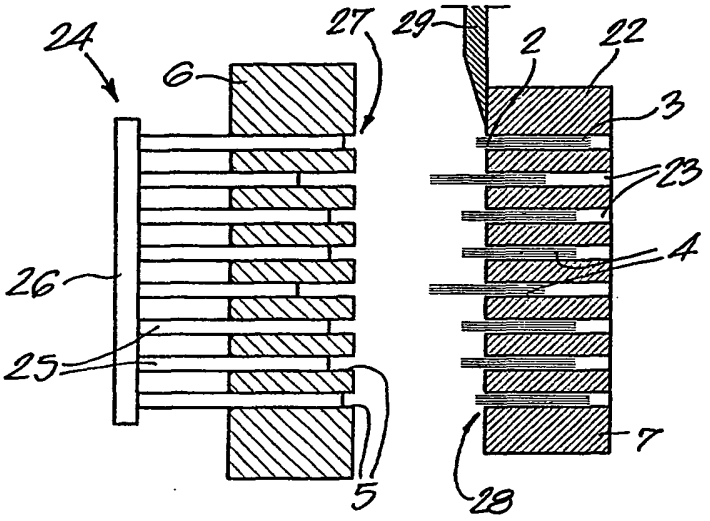


Fig.11

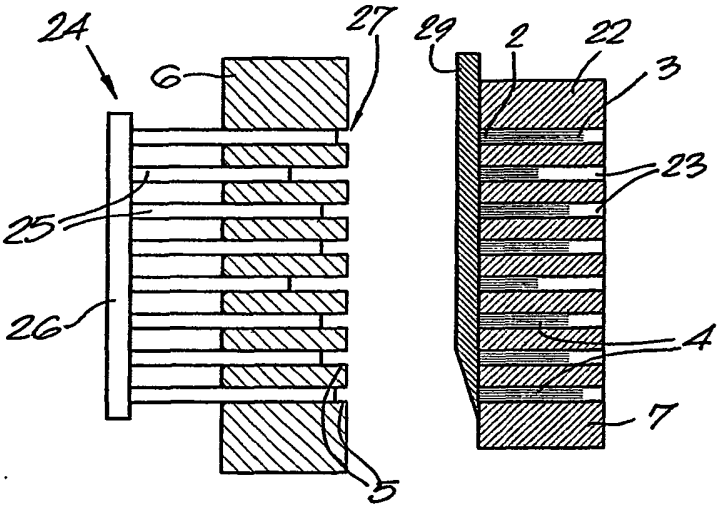


Fig.12

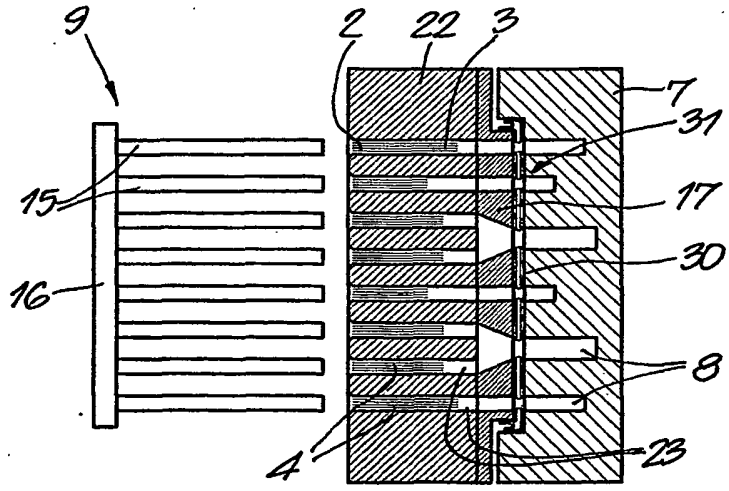


Fig.13

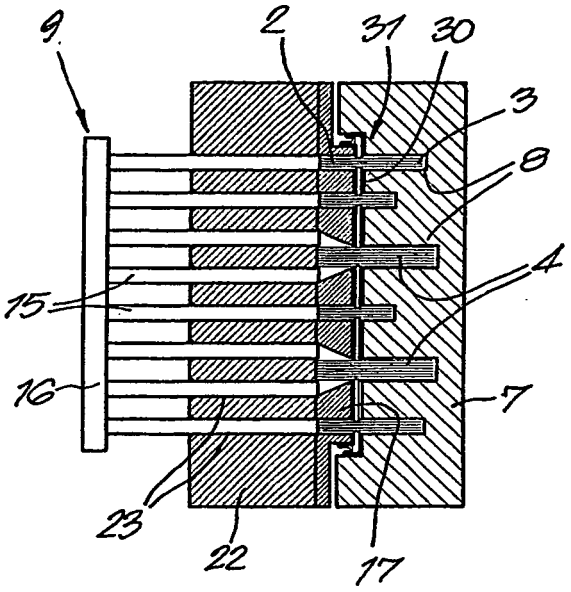


Fig. 14

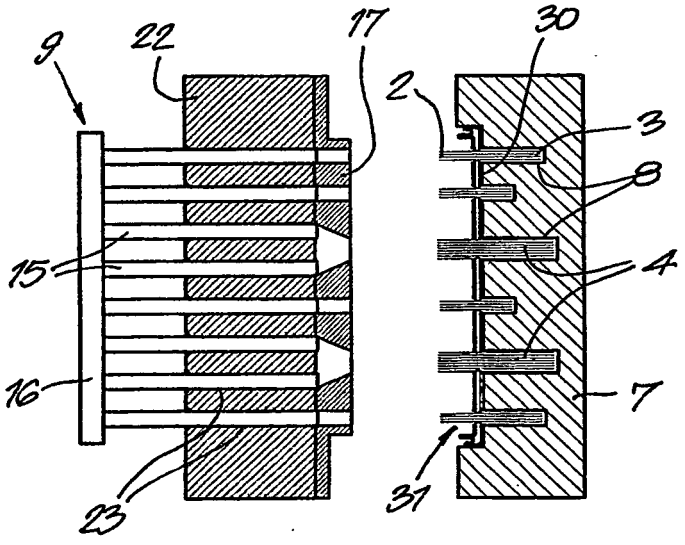


Fig. 15

REFERENCES CITED IN THE DESCRIPTION

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