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(54) **Method for manufacturing brushes and device applied thereby**

(57) Method for manufacturing brushes which consists in providing fiber bundles (4) in a support (2); in moving the fiber bundles (4) according to a desired profile until they protrude through openings (21) in a holder (10) with one far end; in anchoring the fiber bundles (4) in the holder (10), characterized in that the method comprises

the following operational steps: moving the fiber bundles (4) in the support (2) according to an intermediary profile; shortening the fiber bundles (4) to a desired length; and moving the fiber bundles (4) further until they have been provided through the openings (21) in the holder (10) according to the desired profile.

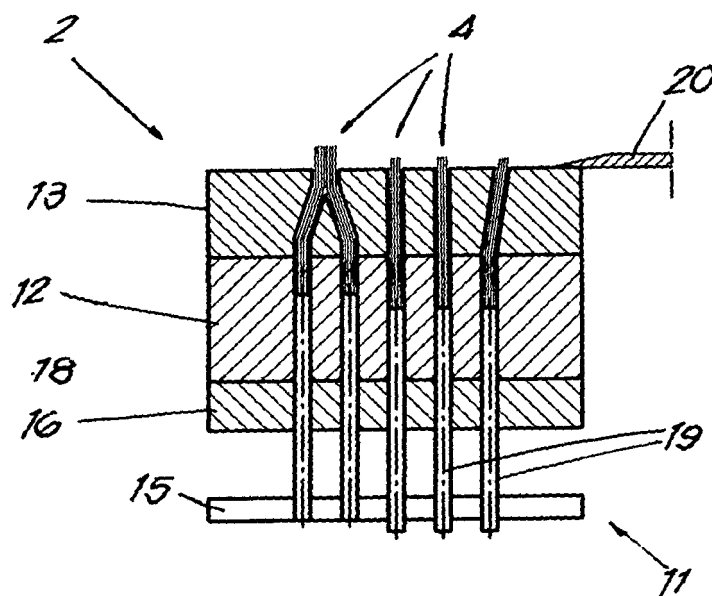


Fig. 3

Description

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

[0002] When manufacturing brushes, it is known to provide fiber bundles in holes or openings in brush bodies or in a part of brush bodies, after which the fibers are joined together at the far ends provided in the openings.

[0003] The fibers are provided in the openings by means of a support with passages that are mutually arranged according to a certain pattern, whereby fiber bundles can be provided in these passages that are to be placed in a brush body.

[0004] According to a known method for manufacturing brushes, fiber bundles are laterally separated from at least one amount of loose fibers, after which the fiber bundles are provided step by step in the above-mentioned support in a mechanical manner.

[0005] Next, the fiber bundles are moved in the support by means of pens, until they protrude through the openings in the brush body with one far end, after which the fibers are heated at said far ends until they melt together and are thus anchored in the brush body.

[0006] According to an alternative method, which is described in EP 0.972.465, use is made of a holder in which are provided openings or holes. In this case, the fiber bundles are pushed out of the support by means of pens until they are positioned through the openings in the holder with one of their far ends, after which these far ends of the fiber bundles are melted together and after which the holder is fixed in or to a brush body.

[0007] Although the above-described methods make it possible to manufacture brushes in an efficient manner, problems arise when manufacturing brushes in which the different fiber bundles vary in thickness, in material choice or the like.

[0008] Indeed, when melting together the far ends of the fiber bundles that are provided through the openings in a brush body or a holder, a melting layer is created which, after it has solidified, anchors the fiber bundles.

[0009] In the case whereby the number of fibers that are provided through the different openings in the brush body or in the holder varies, or in the case whereby some of the fiber bundles protrude further through the openings with their aforesaid far ends than others, it may be harder to melt the fiber bundles, such that smaller fiber bundles, whose far ends do not protrude far through the openings in the brush body or in the holder, will not melt sufficiently, as a result of which these fiber bundles are not sufficiently anchored.

[0010] In order to solve this problem, it is known to prolong the contact between a hot stamp and the far ends of the fiber bundles or to develop a stamp whose shape corresponds exactly to the profile of the far ends of the fibers protruding through the openings in the holder of the brush body.

[0011] Prolonging the contact time between the stamp and the fiber bundles is particularly disadvantageous to

the production capacity, whereas developing stamps with an exact profile is expensive and disadvantageous to the flexibility of the method, since a separate stamp must be made for each type of brush in this case.

[0012] The present invention aims to remedy the above-mentioned and other disadvantages.

[0013] To this end, the invention concerns a method for manufacturing brushes which consists in providing fiber bundles in a support; in moving the fiber bundles according to a desired fiber bundle profile until they protrude with one far end through openings in a brush body or a holder; and in anchoring the fiber bundles in the brush body or the holder, whereby the method comprises the following additional operating steps: moving the fiber bundles in the support according to an intermediary profile; shortening at least one of the fiber bundles to a desired length; and moving the fiber bundles further until they have been provided through the openings in the brush body or in the holder according to the desired profile and up to a desired distance.

[0014] The present invention is advantageous in that the fiber bundles are cut at length as a function of their desired profile, according to which they have to be anchored in the holder or in the brush body, and as a function of their composition, such that, when melting the far ends of the fiber bundles, there is always an appropriate amount of fiber material in order to obtain a good melting of the far ends, such that the anchoring of the fibers in the brush body or in the holder is always of good quality.

[0015] The present invention also concerns a device for manufacturing brushes with a method according to the invention, which device comprises at least a support in which are provided openings for fiber bundles, as well as transmission means comprising pens which make it possible to move fiber bundles through the openings in the support, whereby this device further comprises means which make it possible to shorten fiber bundles and whereby the above-mentioned pens can be mutually moved according to an axial translation.

[0016] According to an equivalent variant, the device comprises at least a support in which are provided openings for fiber bundles, as well as transmission means comprising pens which make it possible to move fiber bundles through the openings in the support, whereby the device further comprises means which make it possible to shorten fiber bundles, whereby the device comprises two different sets of pens, and whereby the pens are positioned according to a different profile with their free far ends.

[0017] In order to better explain the characteristics of the present invention, the following preferred method according to the invention for manufacturing brushes is given as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 schematically represents a method for manufacturing brushes;

figures 2 to 6 represent different operational steps, applied in a method according to the invention, in greater detail.

[0018] Figure 1 schematically represents a method for manufacturing brushes whereby, for the supply of fibers, use is made of a device 1 with at least one support 2 which is provided with openings 3 which are mutually arranged according to a specific pattern, whereby fiber bundles 4 can be collected in this support 2 that need to be provided in a brush body 5.

[0019] This method further mainly consists of the combination of at least four operational steps, a first step 6 in which the fiber bundles 4 are separated from at least one amount of loose fibers 7; a second step 8 which consists in filling the support 2 with fiber bundles 4; a third step 9 which consists in transmitting the fiber bundles 4 provided in said support to a holder 10 by means of the support 2; and a fourth step respectively, in which the fiber bundles 4 are fixed in the brush body 5 or a part thereof by means of the holder 10.

[0020] Separating the fiber bundles 4 from an amount of loose fibers 7 and filling the support 2 with fiber bundles 4 is generally known in the field of the invention and is not treated in any further detail here.

[0021] Figures 2 to 6 represent a part of the device 1 in greater detail which makes it possible to transfer the fiber bundles 4 to the holder 10.

[0022] In this case, this part of the device 1 contains the above-mentioned support 2 and the transmission means 11.

[0023] The support 2 is preferably composed of an actual support 12 and a guiding plate 13 for fibers.

[0024] The guiding plate 13 for fibers is provided with openings 14 which are arranged according to a pattern on one side which corresponds to the pattern of the openings 3 in the actual support 12, whereas the same openings are arranged according to a pattern on the other side of the guiding plate 13 which corresponds to the pattern in which the fiber bundles 4 must be fixed in the brush body 5.

[0025] The transmission means 11 in this case consist of a base 15 and a guiding plate 16 in which are provided different passages 17, 18 which are arranged according to a pattern that corresponds to the openings 3 in the actual support 2.

[0026] In each of the passages 17 in the base is provided a pen 19 which can be axially moved in the passage 18 concerned of the guiding plate 16.

[0027] According to the invention, at least one of the above-mentioned pens 19 can be moved in the base according to an axial translation, or at least one of the pens 19 has a variable length, and the device comprises means which are not represented in the figures which make it possible to accurately check the position of the pens 19.

[0028] As is represented in figure 3, the aforesaid part of the device preferably contains a knife 20 which, when

operational, can move over the side wall of the guiding plate 13 for fibers that is directed away from the actual support, as well as means which make it possible to make the material out of which the fibers are made melt.

[0029] In this case, these heating means consist of a stamp 22 in a heat-conducting material which is electrically heated.

[0030] According to the invention, when transferring the fiber bundles from the support 2 to the holder 10 or the brush body 5, the following operational steps are taken.

[0031] First, as is represented in figure 2, the guiding plate 13 for fibers is placed against the actual support 12 filled with fiber bundles 4, while the pens 19 are being positioned according to a desired intermediary profile.

[0032] By the term profile is meant here the mutual position of the fiber bundles in an axial direction, whereby the desired profile is the position of the fiber bundles 4 after they have been fixed in the holder of the brush body 5.

[0033] The intermediary profile and the desired profile are preferably different.

[0034] This intermediary profile depends on the desired profile in which the fiber bundles 4 must be provided in the brush body 5, and it is designed to obtain a relatively uniform distribution of fiber material on the side of the holder 10 or the brush body 5 where the far ends of the fiber bundles are melted so as to anchor the fiber bundles 4 in the holder 10 or the brush body 5.

[0035] From what precedes follows that, when two fiber bundles with a different number of fibers and the same length must be provided in the brush body, the intermediary profile is such that the fiber bundle with the largest number of fibers will be pushed further out of the support 2 in case the pens 19 have an intermediary profile.

[0036] Secondly, the far ends of the fiber bundles 4 protruding from the guiding plate 13 of the support 2 are cut by means of the knife 20.

[0037] After the far ends of one or several of the fiber bundles 4 have been cut, as represented in figure 4, the holder 10 is positioned against the guiding plate 13 for fibers, whereby the openings 14 in the guiding plate 13 are situated opposite openings 21 in the holder 10.

[0038] Next, one or several of the pens 19 are axially moved in relation to each other in the base 15, until these pens 19 are situated in the desired profile in which the fiber bundles 4 must be provided in the brush body 5, after which the basis 15 of the transmission means 11 is moved over a certain distance towards the support 2, such that the fiber bundles 4 are pushed over a desired distance through the openings 21 in the holder 10.

[0039] As is represented in figure 5, the far ends of the fiber bundles 4, which protrude through the openings 21 in the holder 10, are heated by means of the stamp 22 or the like, such that the above-mentioned far ends melt together and thus, after having solidified again, form an anchoring for the fiber bundles 4.

[0040] In a final operating step, the holder 10 can be

fixed in the known manner in the brush body or in a part thereof.

[0041] It is clear that the far ends of the fibers must not necessarily be cut off on one side of the guiding plate 13 for fibers, but that they can just as well be cut off on the surface of the actual support 12 against which the guiding plate 13 for fibers is provided, or that the shortening can take place when the fiber bundles 4 have been provided in the holder 10 according to the intermediary profile.

[0042] It should be noted that the fibers must not necessarily be anchored in a holder 10 either, but that they can be anchored just as well directly in the brush body 5.

[0043] Finally, it should be noted that, in order to move the fiber bundles 4 according to the intermediary profile and the desired profile, it is not strictly necessary to use transmission means with pens 19 that move according to an axial translation, but that it is also possible to use two sets of pens 19, namely one in which the free far ends of the pens 19 are mutually positioned in correspondence with the intermediary profile and one in which the free far ends of the pens 19 are positioned in correspondence with the desired profile.

[0044] The present invention is by no means limited to the method described above and represented in the accompanying drawings; on the contrary, such a method according to the invention for manufacturing brushes can be made according to different variants while still remaining within the scope of the invention.

Claims

1. Method for manufacturing brushes which consists in providing fiber bundles (4) in a support (2); in moving the fiber bundles (4) according to a desired profile of the fiber bundles (4) until they protrude through openings (21) in a brush body (5) or a holder (10) with one far end; in anchoring the fiber bundles (4) in the brush body (5) or the holder (10), **characterized in that** the method comprises the following operational steps: moving the fiber bundles (4) in the support (2) according to an intermediary profile; shortening at least one of the fiber bundles (4) to a desired length; and moving the fiber bundles (4) further until they have been provided through the openings (21) in the brush body (5) or in the holder (10) according to the desired profile and up to a desired distance.
2. Method according to claim 1, **characterized in that** the fiber bundles (4) are shortened, after they have been arranged according to the above-mentioned intermediary profile, by moving them with their far ends - with which they must be provided in the brush body (5) - up to a desired distance out of the support (2) and by cutting off the protruding part of the above-mentioned far end of the fiber bundles (4).

3. Method according to claim 1, **characterized in that** the intermediary profile and the desired profile are different.
4. Method according to claim 1, **characterized in that** the fiber bundles are shortened before they are provided with their far ends in the brush body (5) or holder (10).
5. Method according to claim 1, **characterized in that** the fiber bundles (4) in the brush body (5) or in the holder (10) are anchored by making the far ends of the fibers of the fiber bundles (4) that are provided in the brush body (5) or the holder (10) melt together.
6. Device for manufacturing brushes with a method according to any one of the preceding claims, whereby this device comprises at least a support (2) in which are provided openings (3) for fiber bundles (4), as well as transmission means (11) that comprise pens (19) which make it possible to move fiber bundles (4) through the openings (3) in the support (2), **characterized in that** the device further comprises means which make it possible to shorten fiber bundles (4) and **in that** the above-mentioned pens (19) can mutually move according to an axial translation.
7. Device for manufacturing brushes with a method according to any one of claims 1 to 5, whereby this device comprises at least a support (2) in which are provided openings (3) for fiber bundles (4), as well as transmission means (11) which comprise pens (19) that make it possible to move fiber bundles (4) through the openings (3) in the support (2), **characterized in that** the device further comprises means (20) which make it possible to shorten fiber bundles (4) and **in that** the device comprises two different sets of pens (19), whereby the pens (19) are positioned according to a different profile with their free far ends.

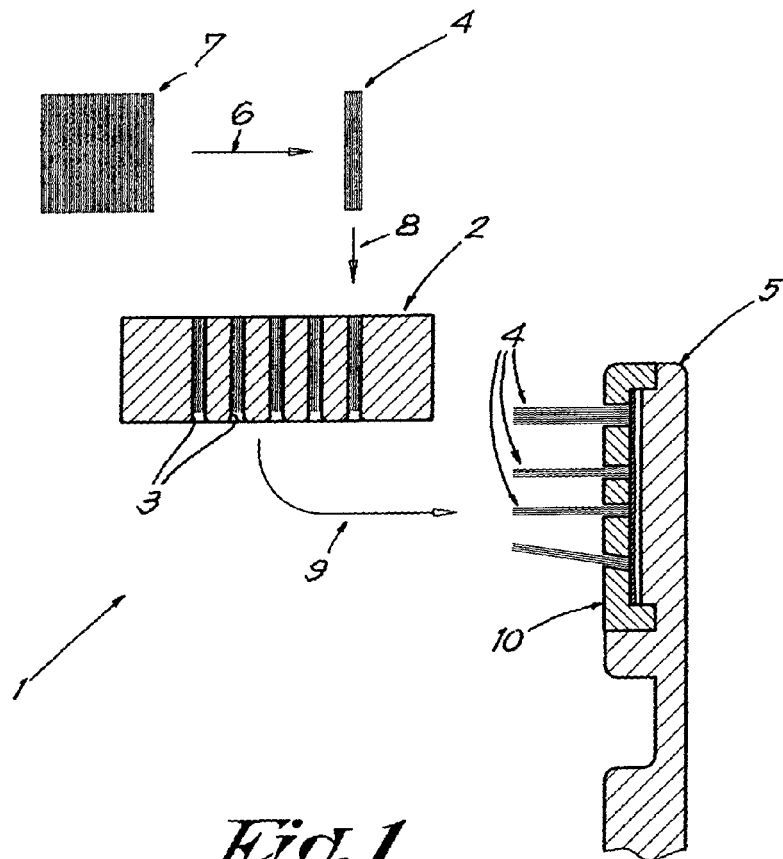


Fig. 1

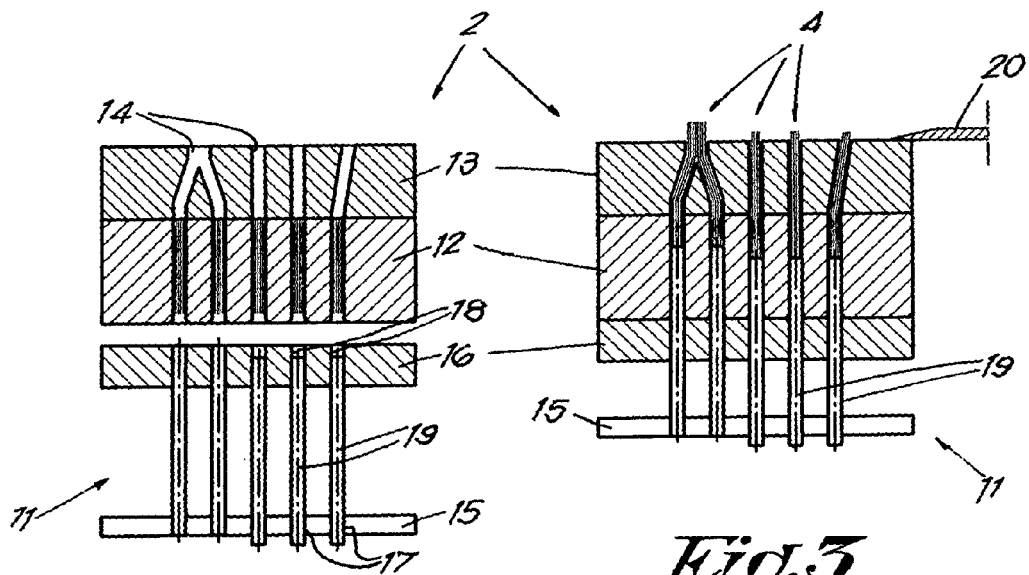


Fig. 2

Fig. 3

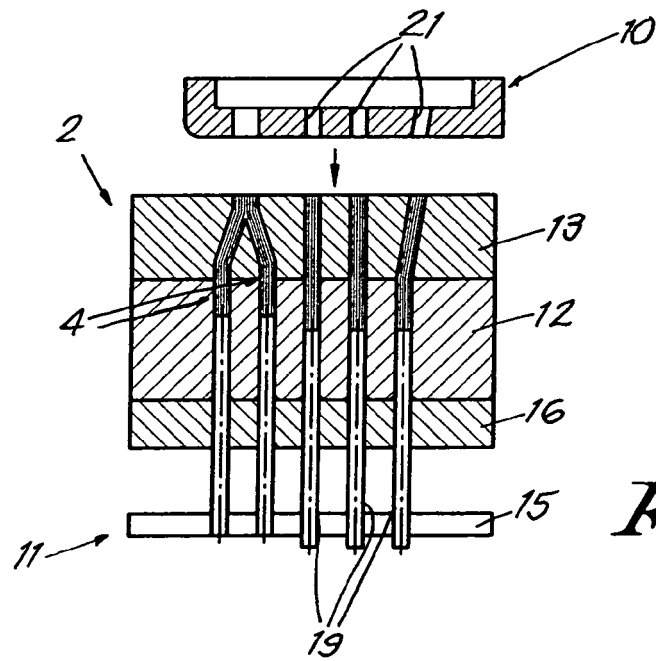


Fig. 4

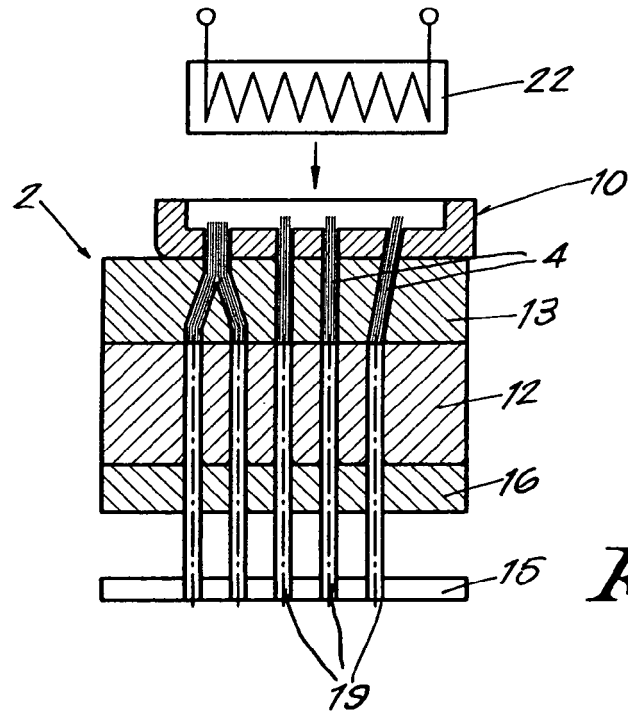


Fig. 5

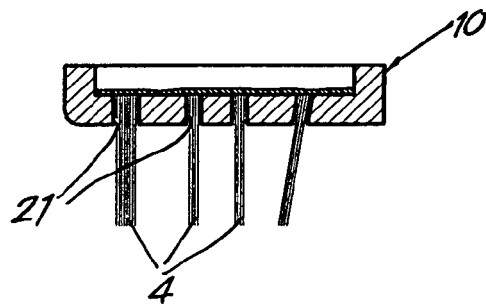


Fig. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 07 07 5506

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		6 November 2007	Vanrunxt, Joseph
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 07 5506

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