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(71) Applicant: **FIRMA G.B. BOUCHERIE, naamloze vennootschap**
8870 Izegem (BE)

(72) Inventor: **Boucherie, Bart Gerard**
8870 Izgem (BE)

(74) Representative: **Donné, Eddy**
Bureau M.F.J. Bockstael nv
Arenbergstraat 13
2000 Antwerpen (BE)

(54) Device for manufacturing brushes and method applied thereby

(57) Device for manufacturing brushes, more particularly for inserting fibers in a brush body, which device mainly consists of a filling tool and at least one supply duct, characterized in that between the supply duct (3) and the filling tool (7) is provided at least one rounding means (16).

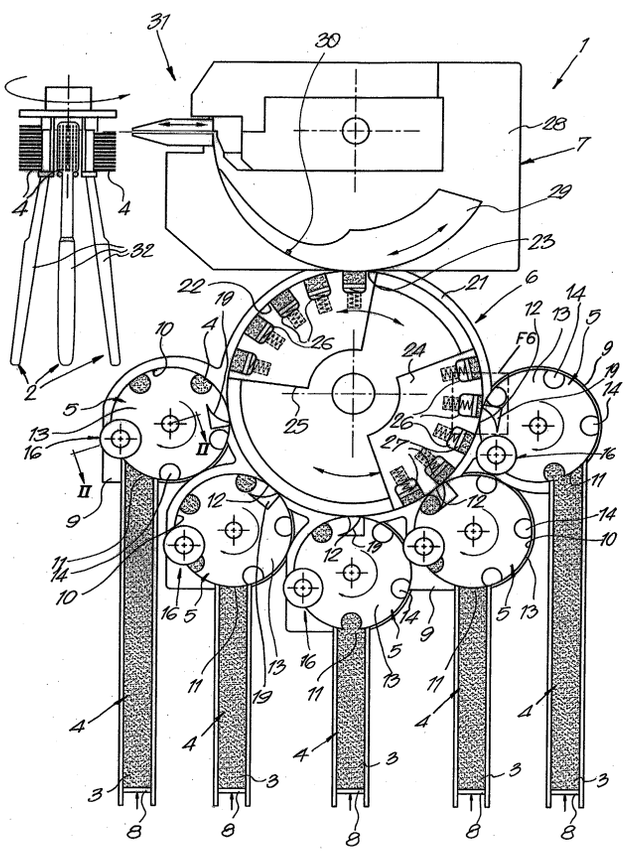

Fig. 1

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Description

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

[0002] More particularly, this invention concerns a device for manufacturing brushes whereby bundles of fibers which are rounded at their far ends are provided in a brush body.

[0003] From Belgian patent No. 1,013,374 in the name of FIRMA G.B. BOUCHERIE N.V., a device for manufacturing brushes is known, whereby fibers are supplied from different fiber loading spaces to a filling tool which inserts the fibers in a brush body on the one hand, and whereby the fibers in the fiber loading spaces are filled up from fiber supply ducts.

[0004] This device makes it possible to manufacture brushes whereby the fibers are rounded after the fibers have been provided in the brush body.

[0005] This is disadvantageous, however, in that when the different fibers in the brush body differ in length, or when fiber bundles are not cut off straight, it turns out to be extremely difficult to round the far ends of the shorter fibers in the brush body without damaging the longer fibers, such that one is limited in forming the fiber profile of the finished brushes.

[0006] In order to remedy this disadvantage, a device for rounding the far ends of the fibers before they are provided in the above-mentioned fiber supply ducts is known.

[0007] The disadvantage of the use of both separate devices is that the fibers are first cut at the desired length, must then be provided in the known device for rounding the fibers and must finally be transferred from this rounding device to the above-mentioned fiber supply ducts.

[0008] The transport of the fibers between the device for rounding the fibers and the above-mentioned fiber supply ducts is done in a predominantly manual manner up to now, which is laborious and time-consuming, with as an additional disadvantage that a worker must stay on the spot all the time to continually fill up the device for manufacturing brushes from the above-mentioned device for rounding the far ends of fibers, as a result of which the labor costs form a relatively important part of the total production costs.

[0009] The present invention aims to provide a solution to the above-mentioned and other disadvantages.

[0010] To this end, the invention concerns a device for manufacturing brushes, more particularly for inserting fibers in a brush body, which device mainly consists of a filling tool and at least one supply duct, whereby between the supply duct and the filling tool is provided at least one rounding means.

[0011] An advantage of the device according to the invention is that the brushes can be manufactured practically entirely automatically in one and the same device, as a result of which the production cost can be restricted.

[0012] This invention also aims a method for manufacturing a device as described above, whereby fibers are provided in at least one supply duct, which are presented to a filling tool which inserts the fibers in a brush body, and whereby the fibers are presented from each supply duct to a rounding means before being presented to the filling tool.

[0013] In order to better explain the characteristics of the invention, the following preferred embodiment of a device for manufacturing brushes and of a method applied thereby is described as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 schematically represents a top view of a device according to the invention;
figure 2 represents a section to a larger scale according to line II-II in figure 1;
figures 3 and 4 represent the same part of the device as in figure 2, but according to two other positions;
figures 5 and 6 represent a part which is indicated in figure 1 by F5, F6 respectively, to a larger scale;
figures 7 and 8 represent the same part as in figure 6, but for successive operational steps.

[0014] As represented in figure 1, the device 1 for manufacturing brushes 2 according to the invention mainly consists of supply ducts 3 for fibers 4, which are each provided with a bundle remover 5, which different bundle removers 5 are in this case placed around a distributing device 6, which distributing device 6 is mounted onto a filling tool 7 in the known manner.

[0015] The supply ducts 3, five in total in this case, are preferably rectilinear and are provided with pressson means 8 on a first far end.

[0016] The bundle removers 5, on the far end of each supply duct 3, each consist of a housing 9, in the shape of a rigid body with a cylindrical opening 10, whereby in the casing of the housing 9 are each time provided two openings 11-12, the first opening 11 of which is provided opposite to the second far end of the above-mentioned supply ducts 3.

[0017] In the above-mentioned openings 10 of the different bundle removers 5 is each time provided a rotatable cylindrical body 13 whose diameter is practically equal to the inner diameter of the openings 10.

[0018] In these cylindrical bodies 13 are provided grooves 14 in the outer edge, five in this case, extending axially over the entire length of the bodies 13, whereby this length is in this case smaller than the length of the fibers 4 to be treated.

[0019] Each of the cylindrical bodies 13 is provided with an independent drive which is not represented in the figures.

[0020] As is represented in figures 2 to 4, the bundle removers 5 comprise a plate 15 situated opposite to one side of the cylindrical body 13 and which extends at least opposite to the entire outer edge of the cylindrical body

13 with a width which is equal to or larger than the depth of the grooves 14.

[0021] Each of these plates 15 are preferably provided with means, not represented in the figures, which make it possible to axially move the plate 15 concerned in relation to the cylindrical body 13 concerned.

[0022] To each cylindrical body 13 is presented a rounding means 16, on a side opposite to the side of the above-mentioned plate 15, whereby each of these rounding means 16 is in this case formed of a grinding wheel 17 which is driven by a shaft 18 and which can be axially moved in relation to the cylindrical body 13 concerned.

[0023] As represented in figures 1 and 6 to 8, the bundle removers 5 each comprise a guide 19 which is presented to the same side of the cylindrical body 13 as the grinding wheel 17, but on a different place, namely at the height of the second opening 12 in the above-mentioned housing 9.

[0024] These guides 19 are provided with an edge 20 which is oriented slantingly in relation to the radial direction of the above-mentioned cylindrical body 13.

[0025] The distributing device 6, which is known from Belgian patent No 1,013,374, consists of a housing 21 with a cylindrical opening 22 which coincides, there where the bundle removers 5 abut the distributing device 6, with the housing 9 of said bundle removers 5.

[0026] This housing 21 is provided with openings which coincide with the above-mentioned opening 12 of the different housings 9 of the above-mentioned bundle removers 5. The housing 21 is provided with an extra opening 23 on the spot where the distributing device 6 is erected against the filling tool 7.

[0027] According to the most preferred embodiment, two cartridges 24-25 are provided in a coaxially rotatable manner in the opening 22, which is provided in the housing 21 of the distributing device 6.

[0028] These cartridges 24-25 are made in the shape of identical segments of a circle which are each provided with a drive, which is not represented in the figures.

[0029] In the outer edge of the cartridges 24-25 are provided each time five recesses 26 in this case, in which are provided press-on means 27 in the shape of pistons excited with springs.

[0030] The filling tool 7, which is also known from BE 1,013,374, mainly consists of a base 28 which is connected to the housing 21 of the distributing device 6 at the height of the above-mentioned opening 23.

[0031] In the above-mentioned base 28 is provided, as is known, a bundle remover 29 which can be moved to and fro and which is provided with a recess 30.

[0032] Further, the filling tool 7 comprises means 31 for inserting fibers 4 in a brush body 32 which is presented to the filling tool 7.

[0033] The method for manufacturing brushes 2 which is applied when using this device is simple and as follows.

[0034] As is known, fibers 4 which may differ as far as color, size, type and/or the like is concerned, are provided in the different supply ducts 3 of the device 1.

[0035] These fibers 4 are pushed to the different bundle removers 5 at the far ends of the supply ducts 3 by the press-on means 8.

[0036] In order to fill one of the grooves 14 of one of the bundle removers 5 with fibers 4, the cylindrical body 13 of the bundle remover 5 concerned is rotated until a groove 14 is situated opposite to the above-mentioned first opening 11 in the corresponding housing 9, whereby the press-on means 8 push the fibers 4 through said opening 11 in the groove 14.

[0037] Once the groove 14 is filled, it can be presented to the rounding means 16 concerned by rotating the cylindrical body 13.

[0038] The far ends of the fibers 4 are rounded by rotating the grinding wheel 17, and by bringing the fibers 4 into contact with the grinding wheel 17 by axially moving the plate 15 and/or the grinding wheel 17 in relation to the cylindrical body 13.

[0039] In order to round the fibers 4, the far ends of the fibers 4 are preferably, at first, moved only a little bit out of the cylindrical body 13, such that the far ends of these fibers 4 cannot be pushed far away from each other by the rotating grinding wheel 17.

[0040] Secondly, the fibers 4 can be pushed further out of the body 13, by axially moving the plate 15 towards the cylindrical body 13, and by moving the grinding wheel 17 away from the cylindrical body 13 practically proportionally, such that the distance between the plate 15 and the grinding wheel 17 remains practically the same, namely a little bit shorter than the length of the fibers 4.

[0041] When the far ends of the fibers 4 are rounded in a shape such as represented, for example, in figure 5, the grinding wheel 17 and the plate 15 are moved away from each other and the cylindrical body 13 rotates further in the direction of the guide 19 and the second opening 12 in the housing 9 of the bundle remover 5 concerned.

[0042] The fibers 4 are removed out of the bundle remover 5 by rotating the groove 14 concerned with rounded fibers along the above-mentioned guide 19, whereby the fibers 4, which now protrude partly out of the cylindrical body 13, are pushed against the slanting wall 20 of the guide, as represented in figures 6 to 8.

[0043] The fibers 4 which are removed out of the grooves 14 of the bundle removers 5 are put in one of the recesses 26 of the cartridges 24-25, by presenting these recesses 26 in relation to the second opening 12 in the housing 9-21 of the bundle remover 5 concerned, from where the rounded fibers 4 are removed out of one of the grooves 14 at that time.

[0044] In this manner, the different recesses 26 in one of the cartridges 24-25 are filled with rounded fibers 4, while the other cartridge 24-25 works in conjunction with the bundle remover 29 of the filling tool 7 in the known manner at that time.

[0045] This co-operation comprises the presentation of fibers 4 to the recess 30 in the bundle remover 29; presenting the bundle of fibers 4, in the above-mentioned recess 30, to the filling tool 7 which, in the known manner, inserts the bundle of fibers 4 in the brush body 32 which is also presented in front of the filling tool 7.

[0046] It should be noted that it is always possible to make the above-mentioned supply ducts 3 work in conjunction with a single common bundle remover 5, while it is also always possible to provide a single supply duct 3 and to make this supply duct 3 co-operate with several bundle removers 5.

[0047] Naturally, it is also possible, in the described embodiment, to provide a rounding means 16 in the plate 15, for example exactly opposite to the present rounding means 16, such that both far ends of the fibers 4 are rounded.

[0048] Such an embodiment is especially useful when the fibers 4 are inserted as folded in two, whereby the far ends of the fibers 4 both extend outward.

The present invention is by no means limited to the embodiment given as example and represented in the accompanying drawings; on the contrary, such a device and method can be made according to different variants while still remaining within the scope of the invention.

Claims

1. Device for manufacturing brushes, more particularly for inserting fibers in a brush body, which device mainly consists of a filling tool and at least one supply duct, **characterized in that** between the supply duct (3) and the filling tool (7) is provided at least one rounding means (16).

2. Device according to claim 1, **characterized in that** it is provided with several supply ducts (3) which are each provided with a rounding means (16).

3. Device according to any one of claims 1 and 2, **characterized in that** the rounding means (16) are each situated opposite to a bundle remover (5) which consists of a housing (9) with an opening (10) in which has been provided a body (13) which moves in a fitting manner, which comprises grooves (14) in its outer edge for picking up fibers (4).

4. Device according to claim 3, **characterized in that** the above-mentioned housing (9) comprises an opening (11) which is provided opposite to a far end of one of the supply ducts (3).

5. Device according to any one of claims 3 and 4, **characterized in that** between the different bundle removers (5) and the above-mentioned filling tool (7) is provided a distributing device (6) with at least one cartridge (24-25) provided with at least one recess (26).

6. Device according to claim 5, **characterized in that** the above-mentioned distributing device (6) comprises a housing (21) which forms a whole with the housing (9) of the above-mentioned bundle removers (5), whereby in this housing (9-21), opposite to each of the bundle removers (5), is provided an opening (12).

7. Device according to claim 6, **characterized in that** opposite to each of the above-mentioned openings (12) in the housing (9-21) is provided a guide (19), whereby this guide (19) has an edge (20) which is oriented slantingly in relation to the direction of movement of the moving body (13) of the bundle remover (5) concerned.

8. Method for manufacturing brushes, which can be applied according to any one of the preceding claims, whereby fibers are applied in at least one supply duct and are presented to a filling tool which inserts the fibers in a brush body, **characterized in that** the fibers (4) are presented from each supply duct (3) to a rounding means (16), before presenting them to the filling tool (7).

9. Method according to claim 8, **characterized in that** the fibers (4) of each supply duct (3) are loaded in grooves (14) of a moving body (13), by moving the body (13), such that the groove (14) concerned is presented to the supply duct (3) concerned which is provided with press-on means (8) which push the fibers (4) in the groove (14).

10. Method according to claim 9, **characterized in that** the fibers (4) which are loaded in the above-mentioned groove (14) are presented to the rounding means (16) by moving the cylindrical body (13).

11. Method according to any one of claims 9 and 10, **characterized in that** the fibers (4) are loaded out of each of the above-mentioned grooves (14) in recesses (26), which are provided in cartridges (24-25) of a distributing device (6).

12. Method according to claim 11, **characterized in that** the fibers (4) are removed out the above-mentioned groove (14) by means of a guide (19) which is provided with a slanting edge (20) in order to move the fibers (4) out of the groove (14) concerned in one of the recesses (26) in the above-mentioned cartridges (24-25) of the distributing device (6).

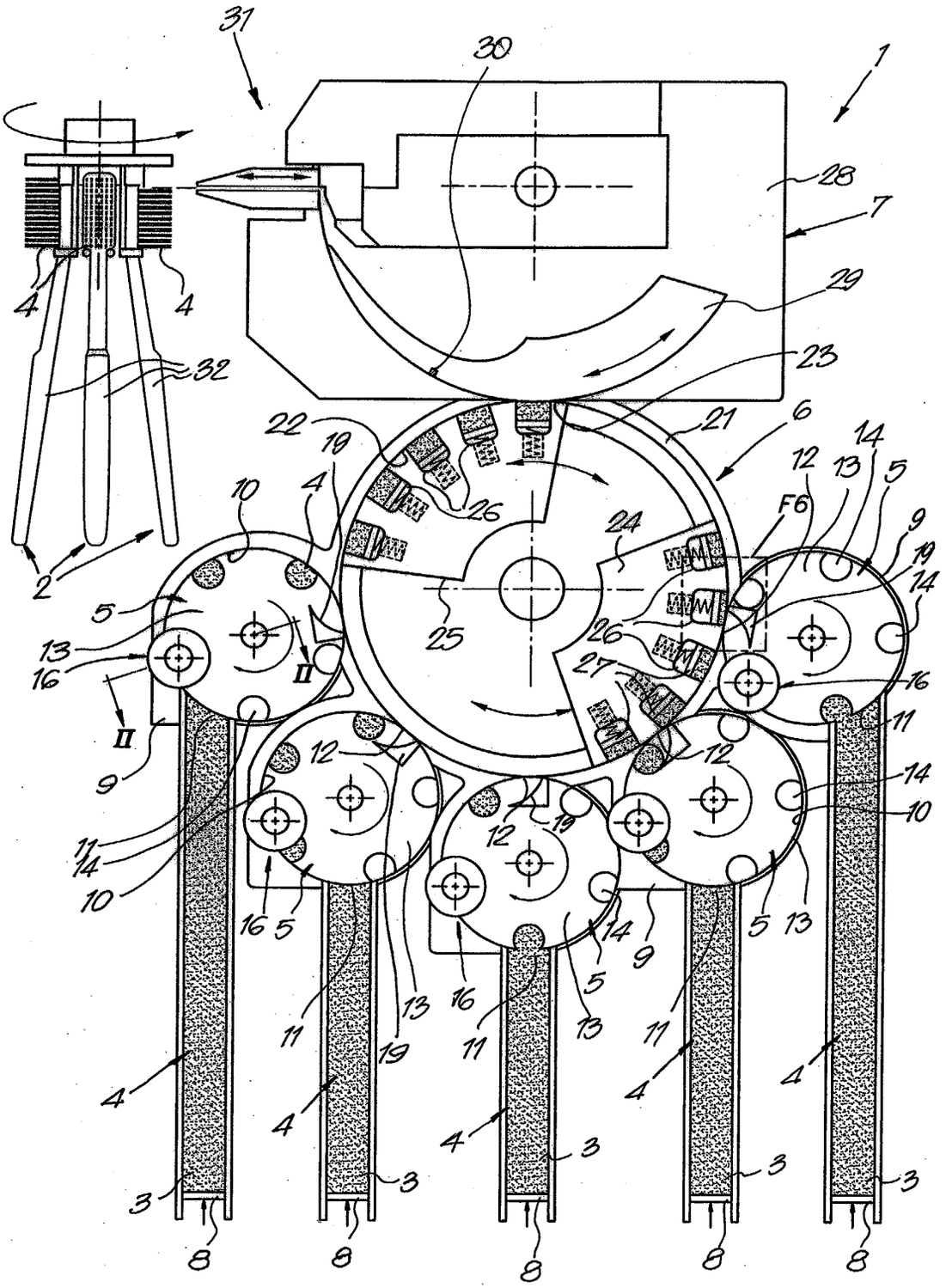
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Fig. 1

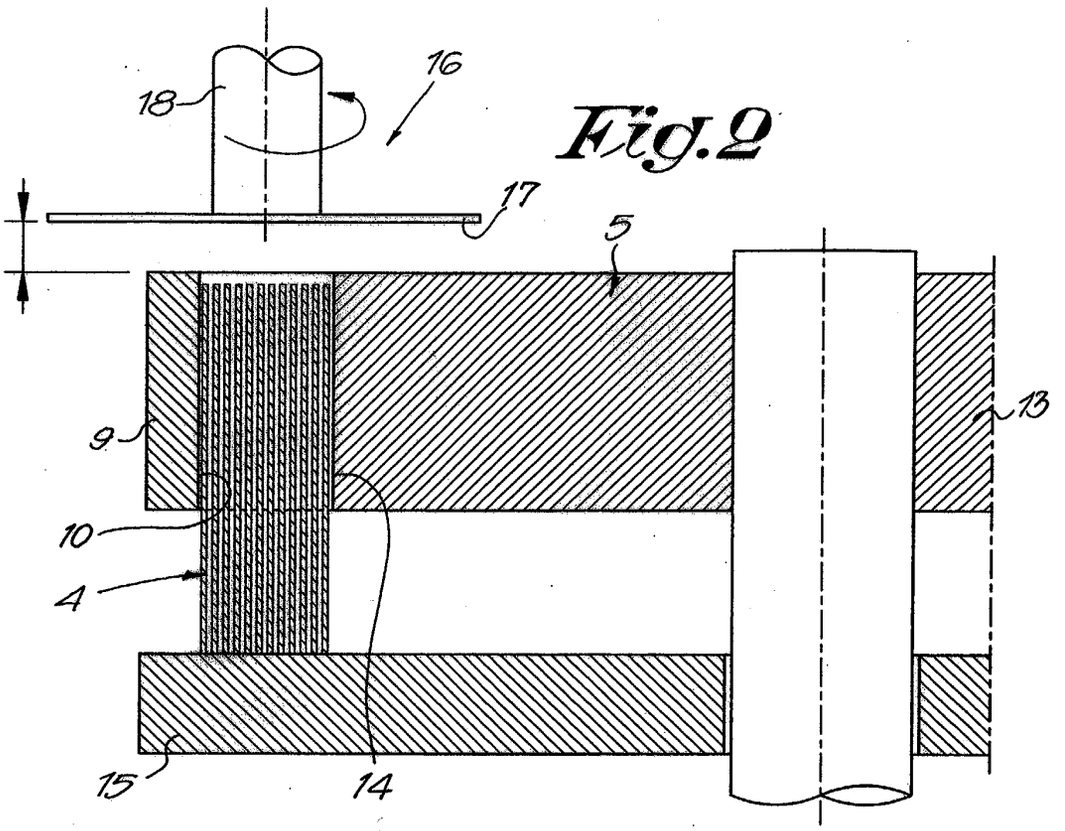

Fig.2

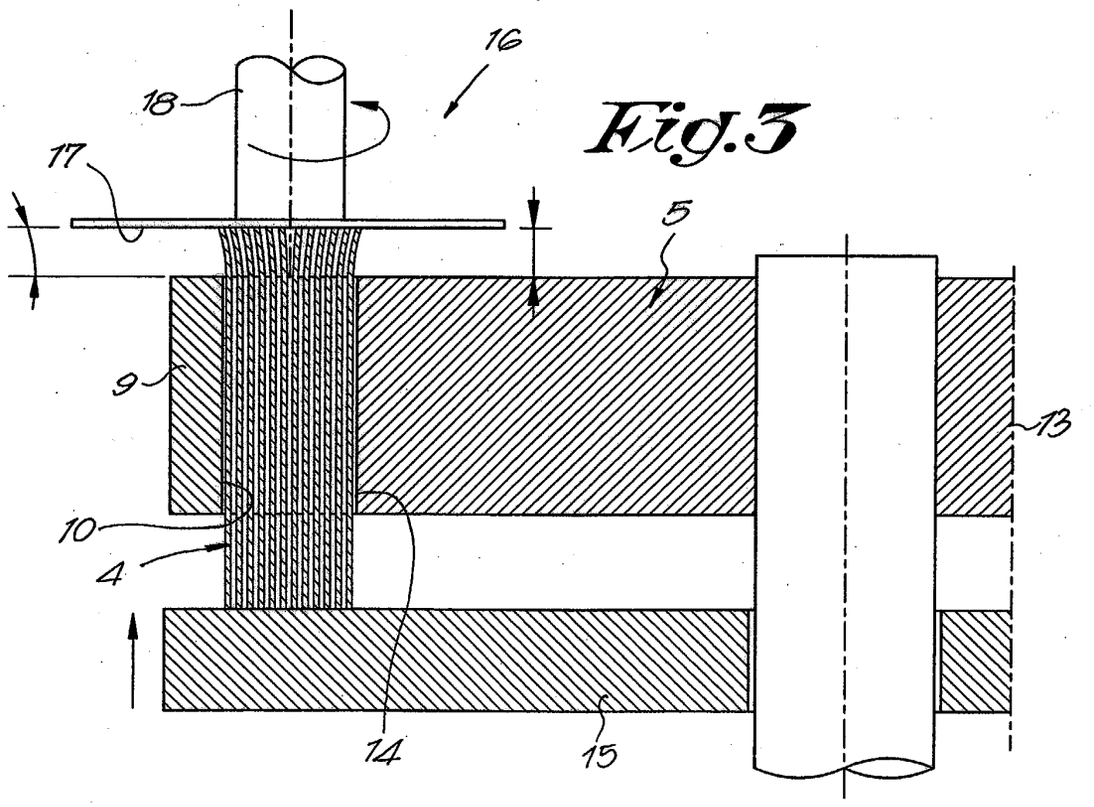

Fig.3

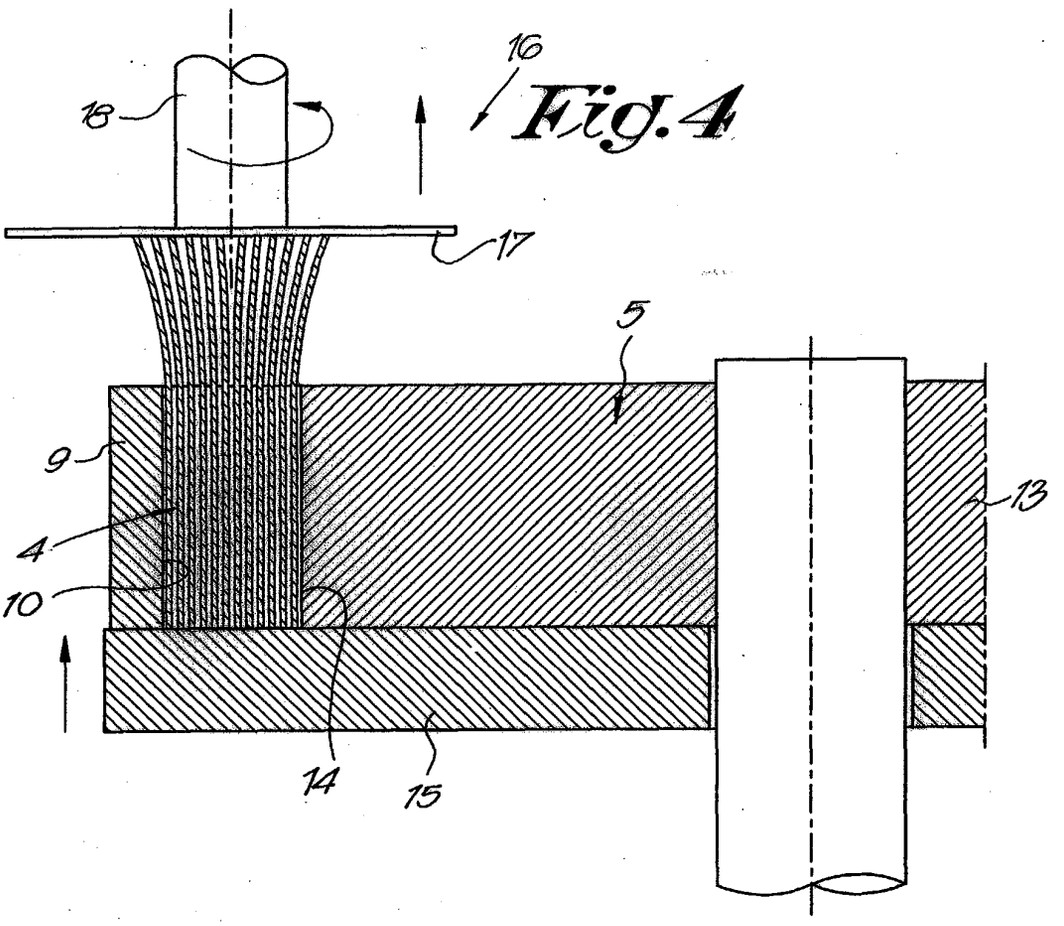

Fig.4

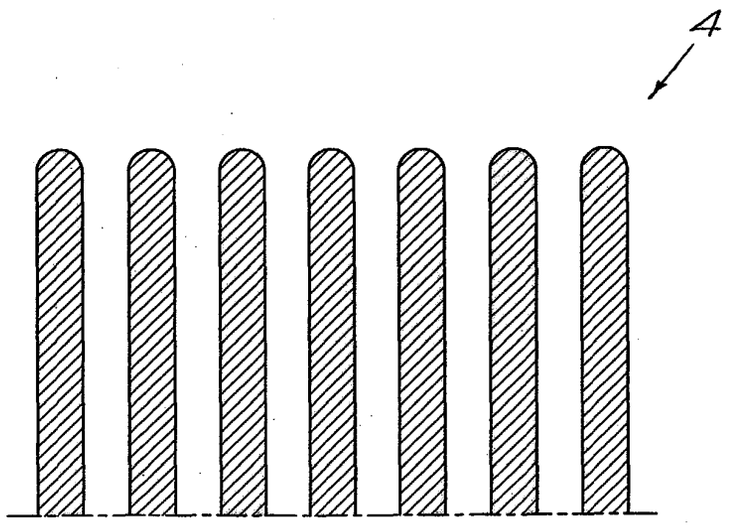

Fig.5

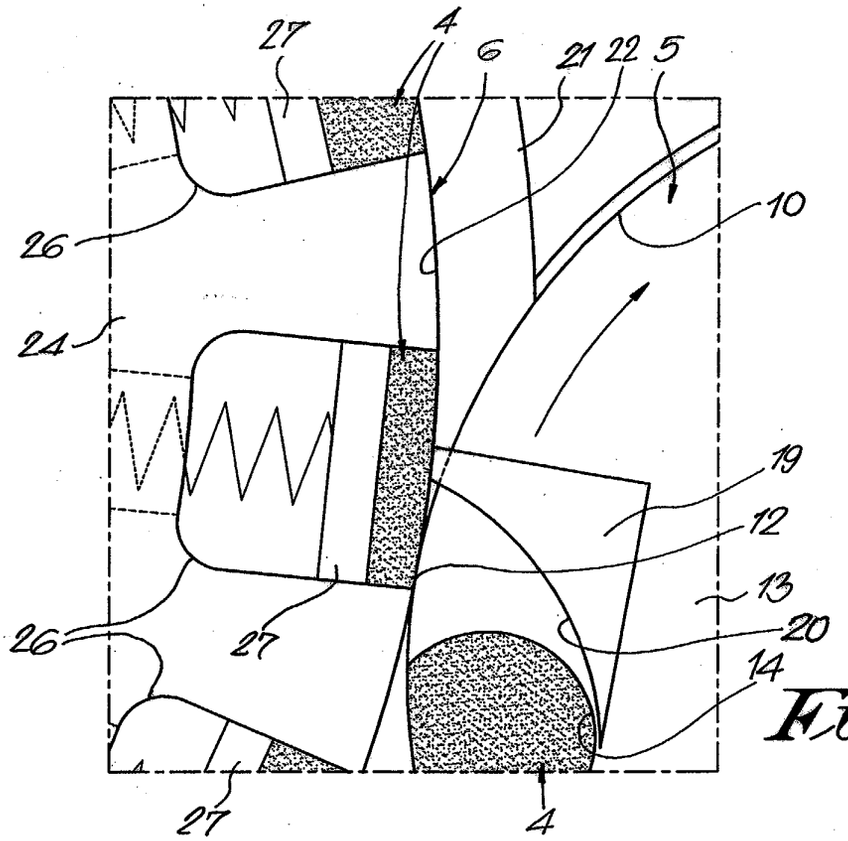
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Fig.6

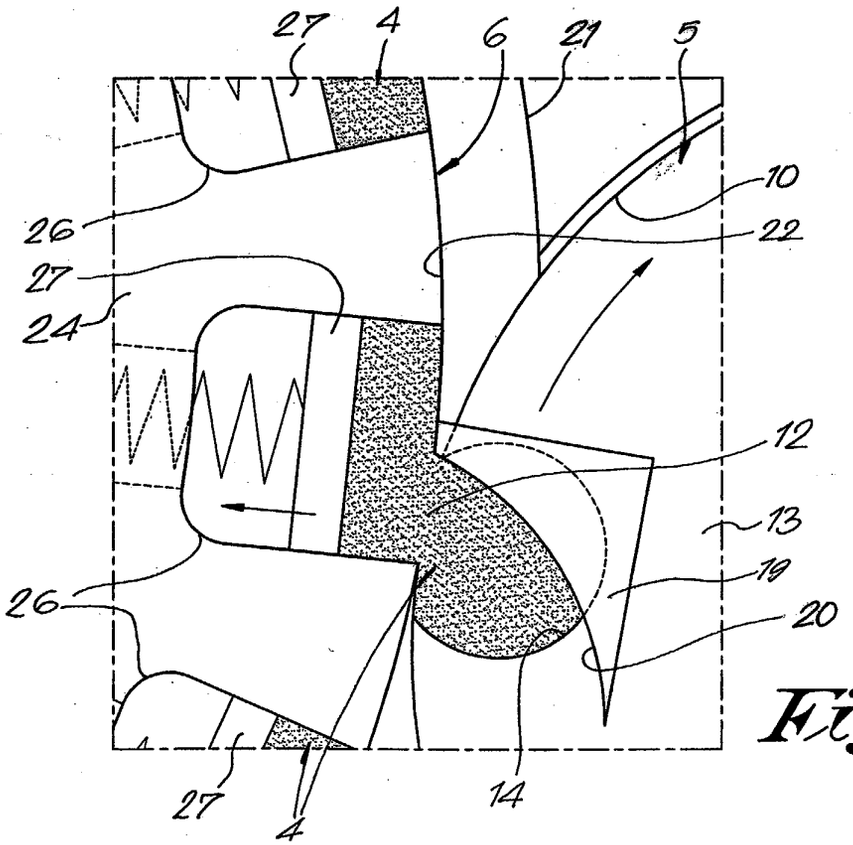
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Fig.7

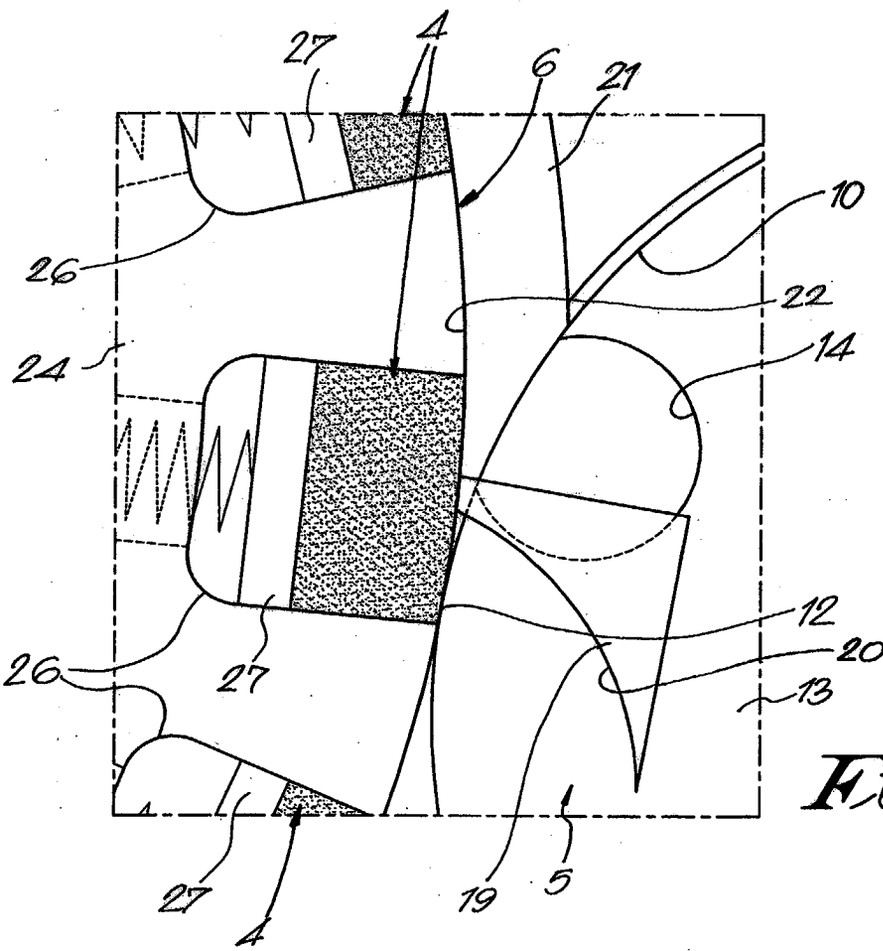

Fig.8