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EP 0 740 916 A1

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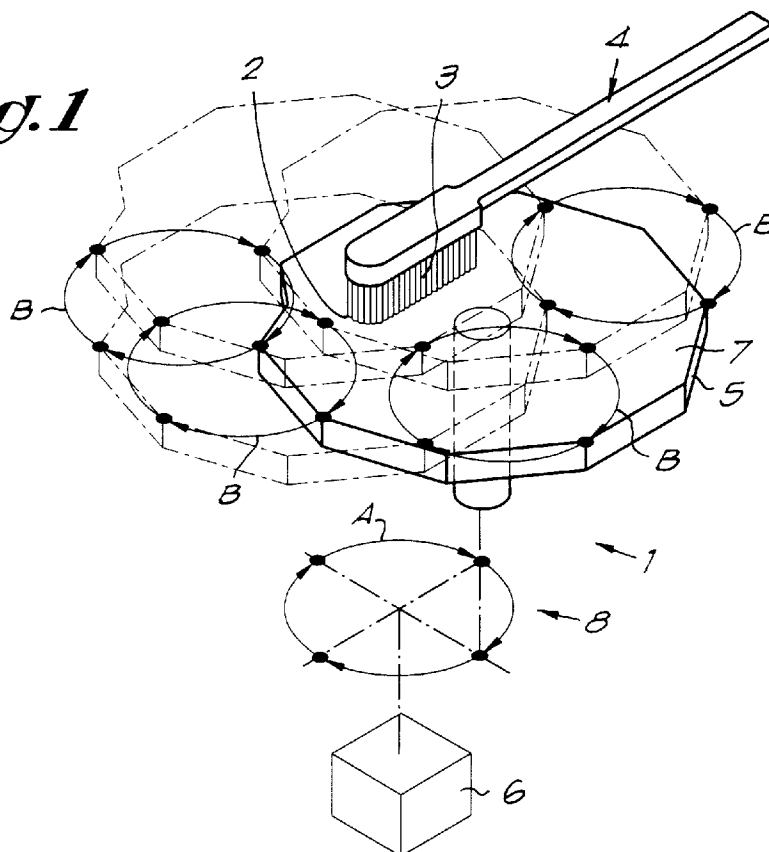
EUROPEAN PATENT APPLICATION

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Bureau M.F.J. Bockstael nv
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2000 Antwerpen (BE)(54) **Device for rounding off brush fibres**

(57) Device for rounding off brush fibres of the type which consists of a rounding off element (5) which is meant to be put against the ends (2) of the brush fibres (3) and at least one drive element (6-26) to move the rounding off element (5) in relation to the brush fibres (3), characterized in that between the drive element

(6-26) and the rounding off element (5) is provided a planetary transmission (8) which, on the one hand, moves the rounding off element (5) around in a circle (A) and, on the other hand, keeps the rounding off element (5) still or almost still as far as the angular displacement is concerned.

Fig. 1**EP 0 740 916 A1**

Description

The present invention concerns a method and device for rounding off brush fibres.

It is known that during the manufacturing of brushes, after the brush fibres have been inserted in the brush bodies, the free ends of the brush fibres are warped even or are milled off to smooth away the unevennesses which arise during the insertion. It is also known that certain types of brush fibres obtain sharp edges at their ends by doing this, which should be avoided in certain applications. In order to remove these sharp edges, the ends of the brush fibres are rounded off by putting them against a polishing element or such, for example as described in European patent application No. 0.019.944 of the present applicant.

Also, the invention aims a device with which the known rounding off process can be optimized.

To this end, the invention concerns a device for rounding off brush fibres of the type which consists of a rounding off element which is meant to be put against the ends of the brush fibres and at least one drive element to move the rounding off element in relation to the brush fibres, characterized in that between the drive element and the rounding off element is provided a planetary transmission which, on the one hand, moves the rounding off element around in a circle and, on the other hand, keeps the rounding off element still or almost still as far as the angular displacement is concerned.

By making use of a planetary transmission which has the above-mentioned specifications, one obtains that each point of the rounding off element follows an almost identical and, according to the most preferred embodiment entirely identical path, so that the ends of all brush fibres are subjected to exactly the same polishing movement, and one also obtains that this can be realized with a very compact construction.

According to the preferred embodiment of this device, the planetary transmission has an element functioning as a planet carrier which is driven by means of the drive element, whereas the rounding off element is provided as a planet to the above-mentioned element.

In order to better explain the characteristics of the invention, the following preferred embodiments are described as an example only without being limitative in any way, with reference to the accompanying drawings, in which:

figure 1 schematically represents the method according to the invention;

figure 2 shows a section of a device according to the invention;

figure 3 shows a section according to line III-III in figure 2;

figure 4 shows a similar section as that in figure 3, but for a variant of the embodiment;

figure 5 shows yet another embodiment according to the invention;

figure 6 shows a section according to line VI-VI in figure 5.

As is schematically represented in figure 1, the invention concerns a device 1 for rounding off the ends 2 of the brush fibres 3 of a brush 4. As is represented, the invention concerns a device of the type which consists of a rounding off element 5 which is designed to be put against the ends 2 of the brush fibres 3 and at least one drive element 6, such as an electric motor, to move the rounding off element 5 in relation to the brush fibres 3.

Such a rounding off element 5 usually consists of a disc with a grinding face 7. The grinding face 7 can be of different nature. Thus, it can be formed for example in that the top side of the rounding off element 5 is covered with a layer of abrasive material, such as diamond grit and such. According to a variant, the grinding face 7 can also be formed in that the top side of the rounding off element 5 is profiled, for example notched or toothed, whereby this notched or toothed surface is also hardened, or also in that the top side is sandblasted.

The invention is special in that between the drive element 6 and the rounding off element 5 is provided a planetary transmission 8 which, on the one hand, moves the rounding off element 5 around in a preferably circular path A and, on the other hand, keeps the rounding off element 5 practically still and preferably entirely still as far as the angular displacement is concerned.

The thus obtained movement is illustrated in figure 1 by representing the rounding off element 5 in different positions, whereby this rounding off element 5, in order to make it possible to recognize the different positions, is represented in the shape of a polygon, whereby an incision is provided in one side. It is clear, however, that such a rounding off element 5 may actually consist of a disc of any shape whatsoever.

As mentioned in the introduction, thanks to the device 1 of the invention is obtained that every point of the rounding off element 5 follows an identical path B, whose shape moreover coincides with the shape of the circle A, all this with a constructional arrangement which requires relatively little space.

In order to obtain the above-mentioned movements B, the planetary transmission 8, which is represented only very schematically in figure 1, can be composed in different manners in practice. This is illustrated by means of the practical embodiments described hereafter.

Figure 2 shows an arrangement in which the rounding off element 5 extends in the horizontal plane. The brush 4 is hereby held above the rounding off element 5 in a brush holder 9 which is provided to this end with the necessary clamps 10.

The planetary transmission 8 is provided with an element 11 functioning as a planet carrier which is driven by means of the drive element 6, whereas the rounding off element 5 is provided as a planet to the element 11.

According to the realisation of figure 2, the element

11 consists of a cylindrical head which can rotate around a vertical rotary shaft 12. In particular, the element 11 is provided in a hollow shaft 14 borne in a frame 13, which is driven in a rotating manner by the drive element 6 via a belt coupling 15.

The rounding off element 5 is mounted fixed at the end of a shaft 16 which is borne eccentrically in the element 11.

The embodiment of figure 2 makes use of a planetary transmission 8 with a fixed sun wheel 17. This sun wheel 17 is mounted to this end on a pivot 18 extending through the hollow shaft 14 which is locked against any rotation at its bottommost end, for example by means of a locking pin 19 which clutches in the frame 13.

In order to obtain that the rounding off element 5 makes a movement as represented in figure 1, the shaft 16 is coupled to the sun wheel 17 by means of a transmission 20, which causes a rotation in the shaft 16 which is opposite to the circular movement A and which has a total transmission ratio of 1/1.

According to figure 2, the transmission 20 consists of a gear wheel transmission. The sun wheel 17 hereby consists of a gear wheel which is coupled via an intermediate gear 21, which can rotate thanks to a shaft 22 provided in the element 11, to a gear wheel 23 which is mounted fixed on the shaft 16.

It is clear that also several intermediate gears can be provided, whereby the number of such intermediate gears, or at least the number of rotary shafts used hereby, must be odd.

The working of the device 1 of figures 2 and 3 is mainly as follows. By switching on the drive element 6, the shaft 14 and the element 11 start to rotate. Consequently, the intermediate gear 21 and the gear wheel 23 are moved as planets around the sun wheel 17. As a result, the rounding off element 5 does not only make a circular movement, but it constantly remains orientated in the same sense.

The transmission 20 does not necessarily need to be a gear wheel transmission and may for example also consist of a belt transmission as represented in figure 4.

Figures 5 and 6 show a variant whereby the planetary transmission 8 has a driven sun wheel 17 with which the rounding off element 5 is coupled by means of a transmission 24 whereby, on the one hand, the ratio between the number of revolutions of the element 11 and of the sun wheel 17, and on the other hand the transmission ratio of the transmission 24 is selected such that the rounding off element 5 always stays orientated in the same direction during its movement A. In the embodiment of figures 5 and 6, this is obtained in particular by means of a transmission 24 which provides for a rotation between the sun wheel 17 and the rounding off element 5 with a certain transmission ratio, as well as by driving the sun wheel 17 and the element 11 at the appropriate speed.

By way of example is represented a 1/1 transmission, whereas the sun wheel 17 is driven double as fast

as the element 11.

The transmission 24 may consist of a single gear wheel transmission as represented in figure 6.

The sun wheel 17 is driven via the in this case rotatable erected pivot 18, which is coupled to a drive element 26 at its lower end. This drive element 26 simultaneously provides for the drive of the element 11 by means of a transmission 27.

If the transmissions 25 and 27 consist of belt couplings, as represented in figure 5, the speed of the sun wheel 17 can be set in relation to the speed of the element 11 by appropriately selecting the diameters of the pulleys 28-29 and 30-31 used hereby.

The working of the embodiment of figure 5 can be easily derived from the figure. It is clear that the rounding off element 5 hereby also makes a movement as represented in figure 1.

A same movement can be communicated to rounding off elements 5 of larger sizes by fixing these elements 5 on two or more outgoing shafts 16 of two or more devices as in figure 2 or figure 5, whereby these devices are preferably driven commonly and synchronously.

It is clear that the brush holder 9, the frame 13 and the drive element 6-26 are mounted on frames 32-33-34 which can be fixed or moveable. The mobility can hereby serve to provide for a mutual positioning or to create an additional movement between the brush 4 and the rounding off element 5.

The present invention is by no means limited to the embodiments described as an example and represented in the accompanying drawings; on the contrary, such a method and device for rounding off brush fibres can be made in all sorts of variants while still remaining within the scope of the invention.

Claims

1. Device for rounding off brush fibres of the type which consists of a rounding off element (5) which is meant to be put against the ends (2) of the brush fibres (3) and at least one drive element (6-26) to move the rounding off element (5) in relation to the brush fibres (3), characterized in that between the drive element (6-26) and the rounding off element (5) is provided a planetary transmission (8) which, on the one hand, moves the rounding off element (5) around in a circle (A) and, on the other hand, keeps the rounding off element (5) still or almost still as far as the angular displacement is concerned.
2. Device according to claim 1, characterized in that it has a planetary transmission (8) which keeps the rounding off element (5) entirely still in relation to the brush fibres (3) to be treated as far as the angular displacement is concerned.

3. Device according to claim 1 or 2, characterized in that the planetary transmission (8) has an element (11) functioning as a planet carrier which is driven by means of the drive element (6-26), whereas the rounding off element (5) is provided as a planet to the above-mentioned element (11). 5
4. Device according to claim 3, characterized in that the planetary transmission (8) has a fixed sun wheel (17) and in that the rounding off element (5) is coupled to it by means of a transmission (20), which causes a rotation in the rounding off element (5) itself which is opposite to the circular movement (A), so that it remains orientated in the same sense, and which has a total transmission ratio of 1/1. 10 15
5. Device according to claim 4, characterized in that the above-mentioned transmission (20) consists of a gear wheel transmission with an odd number of intermediate gears (21). 20
6. Device according to claim 4, characterized in that the above-mentioned transmission (20) consists of a belt transmission. 25
7. Device according to claim 3, characterized in that the planetary transmission (8) has a driven sun wheel (17) and in that the rounding off element (5) is coupled to this sun wheel (17) by means of a transmission (24), whereby this transmission (24) is made such and the number of revolutions of the above-mentioned movement of the rounding off element (4) on the one hand, and of the sun wheel (17) on the other hand are selected such that the rounding off element (5) stands still as far as the angular displacement is concerned. 30 35
8. Device according to claim 7, characterized in that a transmission (24) is used which provides for a rotation between the sun wheel (17) and the rounding off element (4) with a certain transmission ratio and in that the sun wheel (17) and the element (11) functioning as a planet carrier are driven with a certain appropriate speed. 40 45
9. Device according to claim 8, characterized in that the transmission ratio is 1/1 and in that the number of revolutions of the sun wheel (17) is the double of that of the element (11) functioning as a planet carrier. 50
10. Device according to claim 7, 8 or 9, characterized in that it has a common drive element (26) which provides for the drive of both the sun wheel (17) and the rounding off element (5) on condition that the appropriate transmissions (25-27) are provided. 55
11. Device according to any of the preceding claims,

characterized in that the rounding off element (5) is fixed to two or more devices as described in the preceding claims, whereby these devices are preferably driven commonly and synchronously.

Fig. 1

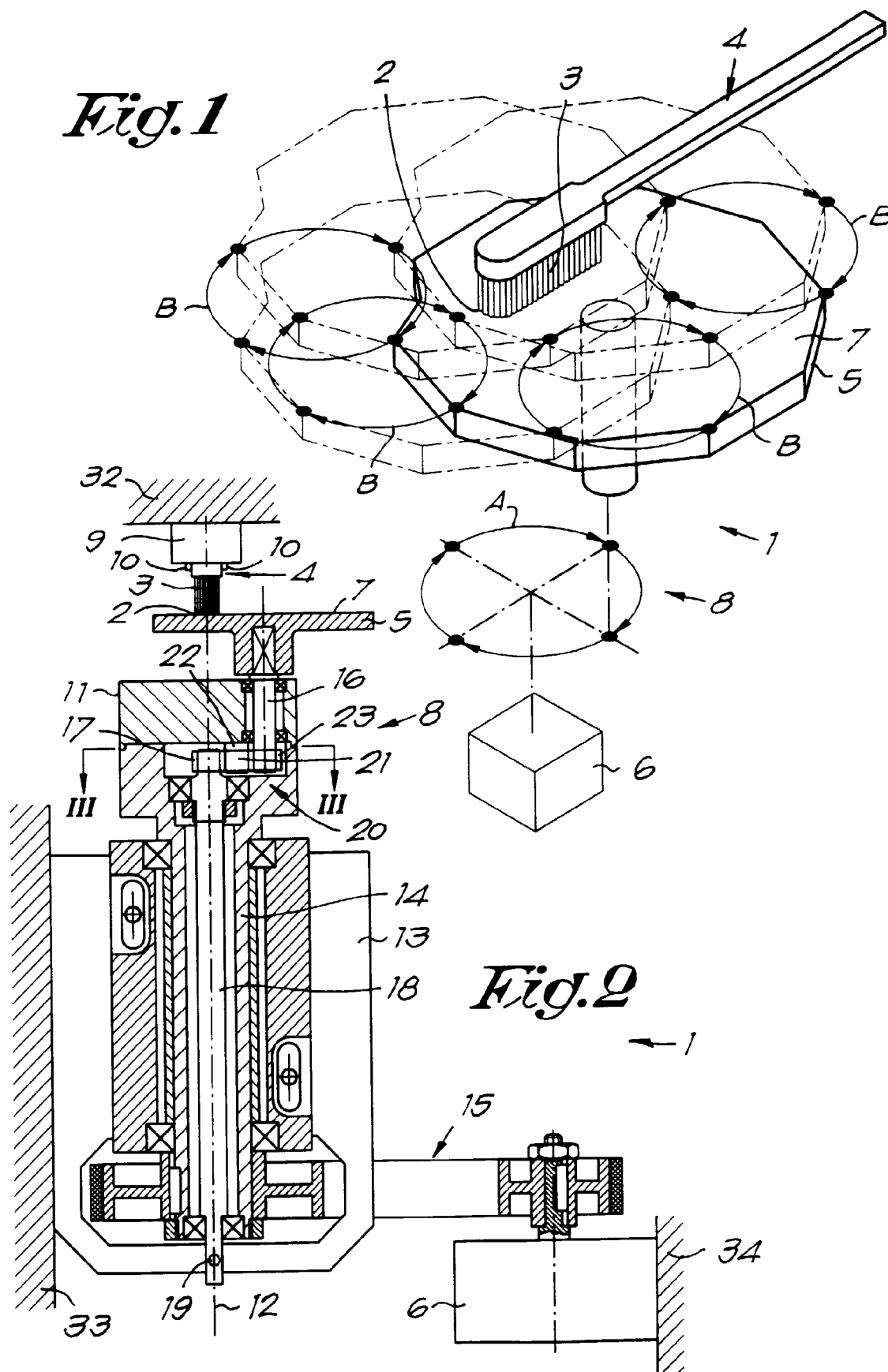


Fig. 2

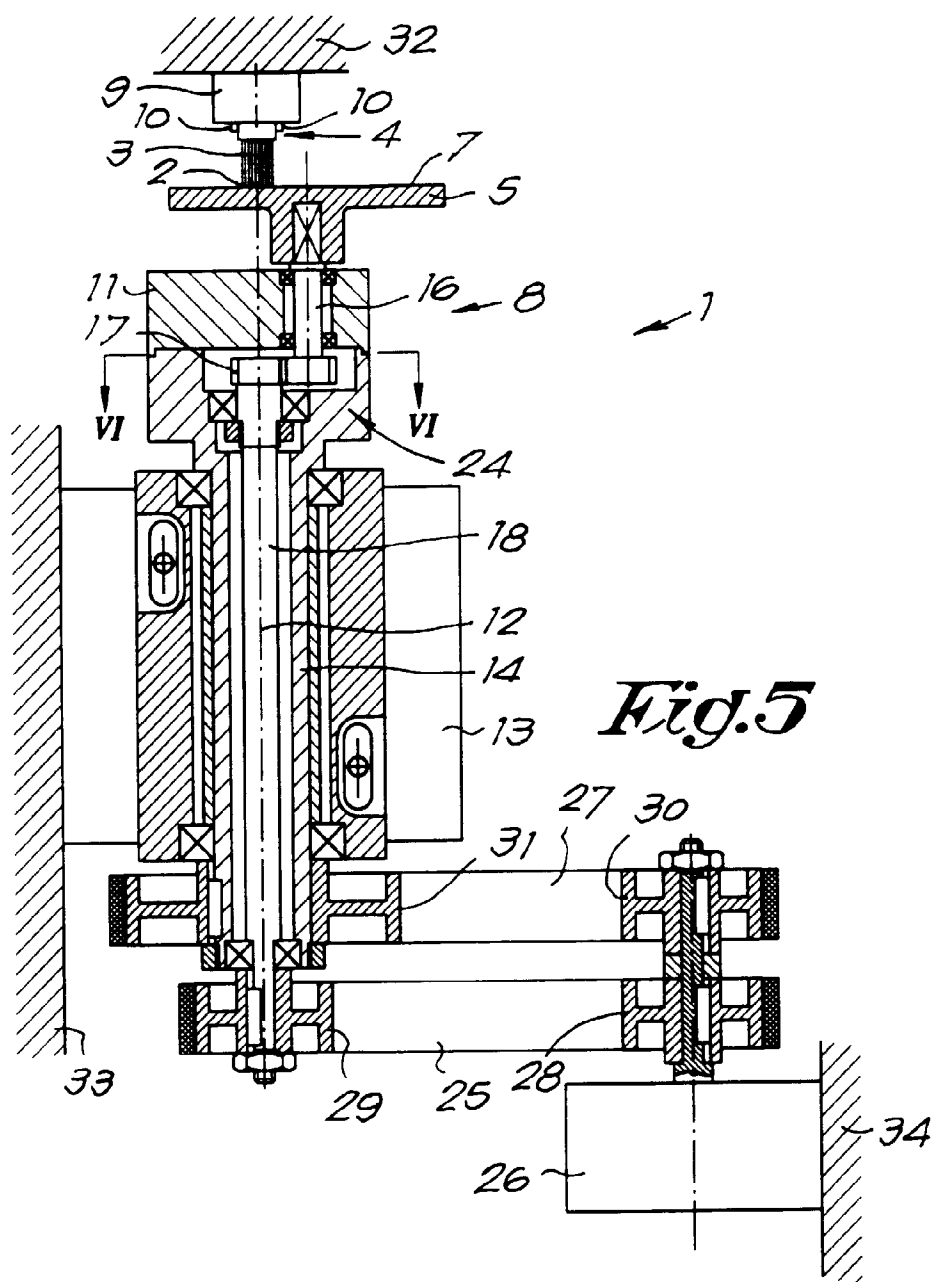


Fig.5

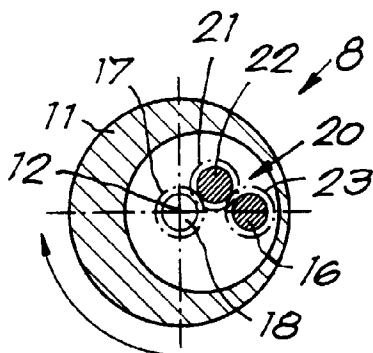


Fig.3

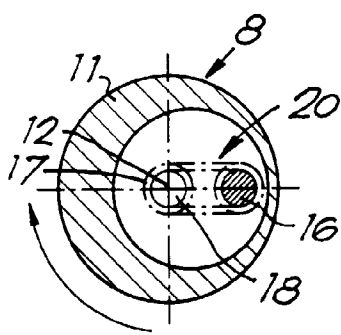


Fig.4

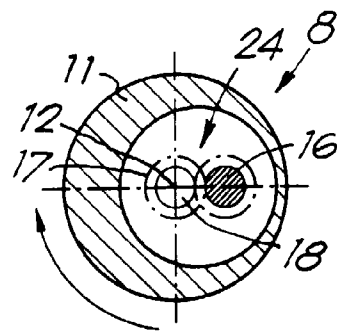


Fig.6



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EUROPEAN SEARCH REPORT

Application Number
EP 96 20 0548

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A,D	EP-A-0 019 944 (G.B.BOUCHERIE) * claims; figures *	1	A46D9/02
A	US-A-3 063 204 (BAUMGARTNER) * claim 1; figures 1-12 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A46D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 July 1996	Examiner Ernst, R
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