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(54) **VACUUM CLEANER AND VACUUM CLEANER NOZZLE**

(57) The present disclosure relates to a vacuum cleaner nozzle 1, comprising a connector tube 3, an outer cover 5 forming a suction space 7 with a suction area 9 of a surface to be cleaned under the nozzle, and an inner channel 11, connecting the suction space 7 with the connector tube 3. A removable plate 19 is provided and means for optionally attaching the removable plate to a bottom side of the nozzle whereby the size of the suction area 9 is changed.

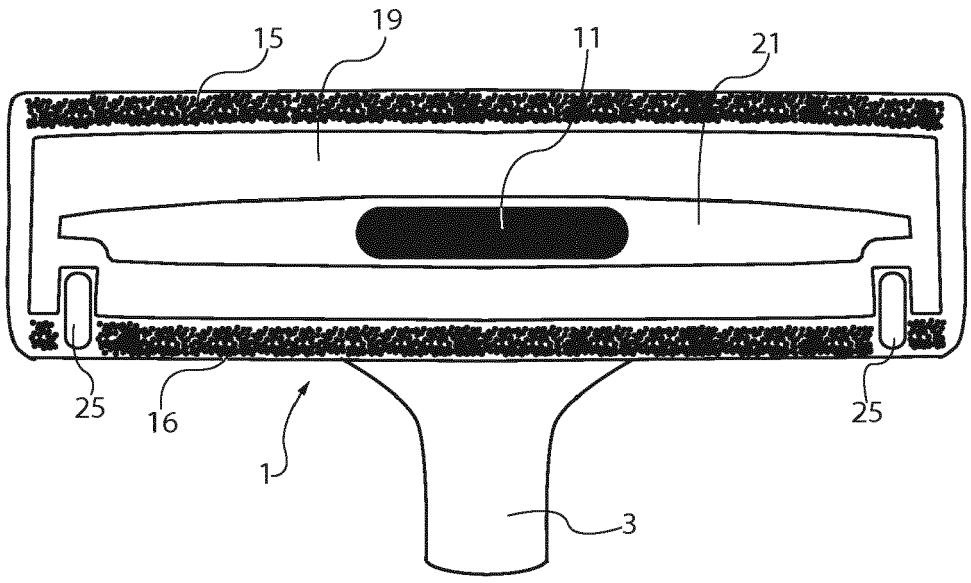

Fig 3

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Description

Field of the invention

[0001] The present disclosure relates to a vacuum cleaner nozzle, comprising a connector tube, a floor interface forming a suction area corresponding to a surface to be cleaned under the nozzle, and an inner channel, connecting the suction area with the connector tube.

[0002] The present disclosure also relates to a vacuum cleaner comprising such a nozzle.

Technical background

[0003] Such a vacuum cleaner nozzle is shown for instance in DE-8116024-U. One general problem associated with nozzles of this type is how to increase their versatility in cleaning under varying conditions.

Summary of the invention

[0004] One object of the present disclosure is therefore to provide a vacuum cleaner nozzle that is more versatile.

[0005] This object is achieved by means of a vacuum cleaner nozzle as defined in claim 1. More particularly, in a vacuum cleaner nozzle of the initially mentioned kind, there is provided a removable plate and means for optionally attaching the removable plate to a bottom side of the nozzle whereby the size of the suction area is changed. This provides the optional provision of a very concentrated cleaning action, for instance for deep cleaning of a rug or carpet, thereby making the vacuum cleaning nozzle more versatile. The removable plate may comprise an opening, preferably in the middle thereof, the plate surrounding an inlet to the inner channel when the plate is attached to the nozzle. Preferably, the width of this opening may be at least half the width of the nozzle. Thereby, a suitable cleaning width is provided.

[0006] The nozzle may comprise at least one wheel on said bottom side, the plate comprising a cut-out accommodating said at least one wheel.

[0007] The plate may be made in a plastic material, for instance by injection molding.

[0008] The nozzle may comprise a front and a rear brush, and the removable plate may be configured to be attached between the front and the rear brushes, which may be retractable.

[0009] The bottom surface of the removable plate may be inclined, such that the plate is thickest at its opening. This may enhance a deep cleaning effect in a rug as the edges at the opening apply some pressure on the rug during cleaning.

[0010] Typically, the suction area is reduced by attaching the removeable plate to provide a stronger cleaning effect on a smaller area, although other options are possible.

[0011] The front and rear bottom faces of the removeable plate may form a single, flat plane from a front edge to a rear edge of the removeable plate.

[0012] Alternatively, front and/or rear bottom faces of the removeable plate may be inclined to rise from the floor on which the nozzle is intended to rest, having their lowest points at the opening providing the above-mentioned deep cleaning effect.

[0013] In another alternative, the front and/or rear walls of the opening in the removeable plate may be inclined such that their mutual distance tapers in a direction towards the bottom faces of the removeable plate. This reduces the suction area.

[0014] In yet another alternative, the front and/or rear walls of the opening in the removeable plate may be inclined such that their mutual distance tapers in a direction away from bottom faces of the removeable plate. This may even increase the suction area compared to when no removable plate is attached, instead giving an optional more gentle cleaning effect.

[0015] The present disclosure also considers a vacuum cleaner comprising a nozzle as described above.

Brief description of the drawings

[0016]

Fig 1A shows a perspective view of an example of a vacuum cleaner nozzle, and fig 1B shows a schematic cross section through a nozzle being used to clean a floor.

Fig 2 shows schematically a removable plate for use under a vacuum cleaner nozzle.

Fig 3 shows the removable plate attached to a nozzle.

Fig 4 illustrates schematically a cross section through a nozzle as in fig 1B with an attached deep-cleaning plate.

Fig 5A and 5B illustrate examples of attachment arrangements for a removable plate.

Fig 6 shows a perspective view of an example of a part of a nozzle.

Fig 7A shows a cross section through the floor interface of the nozzle of fig 6.

Fig 7B shows a corresponding cross section through a removeable plate.

Fig 7C shows a corresponding cross section where the plate of fig 7B is assembled with the nozzle portion of fig 7A.

Figs 8A-8D illustrate different removeable plate configurations.

Detailed description

[0017] The present disclosure relates generally to vacuum cleaner nozzles. Fig 1A shows one example of such a nozzle 1. The nozzle comprises a connector tube 3 that can be removably connected to a vacuum cleaner (not shown) although in the context of the present disclosure, the connector tube 3 may just as well be permanently connected to a vacuum cleaner.

[0018] The nozzle 1 further comprises an outer cover 5. Fig 1B illustrates, in schematic cross section, a nozzle 1 that is used to clean a surface, such as a floor 13. Inside the outer cover 5, there is formed a floor interface 6 that in some cases glide on the floor 13, especially on a soft floor such as a carpet. In other cases, typically on hard floors, brushes 15 (cf. fig 1A) may be extended from the nozzle, and the hard floor interface 6 may hover a small distance above the floor 13.

[0019] As illustrated in fig 1B, the floor interface 6 may form, together with the floor 13 a suction space 7, where a reduced pressure is created in order to remove dust by means of an air stream leaking into the suction space 7. Thereby, a suction area 9 of the surface, under the suction space 7, is cleaned. Dust laden air is led from the suction space to the connector tube via an inner channel 11 of the nozzle 1.

[0020] Returning to fig 1A, the nozzle 1 may as mentioned comprise retractable brushes 15 (illustrated extended at a part of the nozzle periphery only) that may be retracted when cleaning soft surfaces such as carpets, and may be extended when cleaning hard surfaces, such as parquet or other wooden floors, in order to avoid scratching the surface to be cleaned. The retracting and extending of the brushes may be carried out by means of lever buttons 17 or other control means on the nozzle 1. The nozzle 1 may further comprise wheels that allow rolling the nozzle on a surface to be cleaned (not shown in fig 1A).

[0021] The use of retractable brushes thus makes it possible to optimize the nozzles function depending on the surface to be cleaned. The present disclosure relates to additional or alternative means for adapting the nozzle depending on use.

[0022] This is done by attaching a removeable plate on the bottom side of the nozzle. An example of such a removable plate 19 is shown in a front view in fig 2. The plate 19 may be made in a plastic material such as polypropylene, PP, or polyamide, PA, for instance, although other plastic materials or non-plastic materials, such as aluminum could be considered. If made in a plastic material, injection molding is a conceivable production method. The plate 19 may have a uniform thickness and may comprise an opening 21 in the middle thereof.

[0023] Fig 3 shows the removable plate 19 attached to the bottom side of a nozzle. When attached, the opening 21 of the plate 19 surrounds the inlet to the nozzle's inner channel 11. The plate may be located between front and rear brush lines 15, 16 of the nozzle. As shown in fig 2, the plate may be provided with cut-outs 23 to accommodate wheels 25 of the nozzle 1. It is not necessary that the plate 19 surrounds the inlet to the channel 11, the plate could be for instance U-shaped.

[0024] The effect of the attached plate 19 is to reduce the suction area of the nozzle 1.

[0025] This is illustrated in fig 4 showing a schematic cross section corresponding to the one in fig 1B with an attached removeable plate 19 for deep-cleaning purposes. There is therefore obtained a reduced suction space 7' that cleans a reduced suction area 9' of the floor, formed by the opening 21 (cf. fig 2) in the removeable plate 19. This is typically used to deep-clean a thick rug where normal cleaning is not enough, and a more concentrated suction power is needed. The removable plate 19 is however not used during normal cleaning as the high suction force may cause the nozzle 1 to become less flexible to move around.

[0026] As shown in fig 3, the opening 21 of the removeable plate 19 may be wider than half the width of the nozzle width as a whole such that efficient cleaning of a surface may still be carried out. By width is here meant the greatest width of the nozzle's bottom area, or the extension in a direction perpendicular to a direction in which the nozzle is adapted to be pushed or pulled, determined e.g. by the orientation of wheels, if any, and by the orientation of the connector tube in relation to the suction area.

[0027] The plate 19 should preferably be easily removed from and attached to the nozzle by a user. Fig 5A and 5B schematically illustrate examples of attachment arrangements for a removable plate 9. Fig 5A shows an example where a snap lock fitting is used, projections 27 on the plate 19 snapping into recesses 29 in the floor interface 6, or vice versa.

[0028] Fig 5B shows an alternative embodiment where no snap lock is used. Instead a permanent magnet 31 is located on the top of each projection 27 of the plate 19, and another magnet 31 is located in the bottom of a recess 29 in the floor interface 6. Thereby the plate 19 can be kept in place by inserting the projections 27 in the recesses 29. The location of the recess and projection may be swapped also in this embodiment, and either of the magnets 31 can be replaced by a ferromagnetic material, for instance.

[0029] As the plate is mainly subjected to forces directed in its plane only little retaining force is needed in the direction of the normal of the plane. The magnetic lock or snap fit need not carry much more than the plate's 19 own weight.

[0030] Other attachment means such as VELCRO are also conceivable in this context.

[0031] Fig 6 shows a perspective view of an example of a part of a nozzle 1 (e.g. the outer cover is not shown) as seen from the floor where there is formed a suction space 7 between a front 15 and a rear 16 brush.

[0032] Fig 7A shows a cross section through the nozzle of fig 6 with brushes removed, and fig 7B shows a cor-

responding cross section through a removeable plate 19 that is configured to be attached to the nozzle 1 and has an upper surface that correspond to the lower surface of the nozzle where the plate is to be attached. In this case, the bottom surface of the removable plate 19 is inclined such that it is thickest at the opening 21. This may provide some pressure e.g. on a carpet under the nozzle, improving the cleaning function.

[0033] Fig 7C shows a corresponding cross section where the plate of fig 7B is assembled with the nozzle of fig 7A, now with brushes 15, 16.

[0034] It should be understood that the removeable plate 19 can be devised in different ways to obtain different cleaning effects. Figs 8A-8D illustrate different plate configurations. In general, the removeable plate 19 has a front 33 and a rear edge 35, as defined by the normal use of the nozzle. The removeable plate 19 further has a front 37 and a rear 39 bottom face, located in front of and behind the orifice or opening 21 of the plate. The opening further has front 41 and rear 43 walls rising from the plate bottom faces 37, 39, cf. also fig 7B.

[0035] Fig 8A illustrates a removeable plate 19 in a basic configuration where the front and rear bottom faces 37, 39 form a single, flat plane from the front 33 to the rear 35 edge. The front and rear walls 41, 43 rise vertically from this plane, and form right angle corners with the front and rear bottom face 37, 39, respectively.

[0036] Fig 8B illustrates an alternative version of the removeable plate 19 where, as compared to fig 8A, the front and rear bottom faces 37, 39 are inclined to rise from the floor on which the nozzle is intended to rest, having their lowest points at the opening 21. Differently worded, the bottom surface of the removable plate is inclined such that it is thickest at the opening. In any case, this forms acute angle corners between the front and rear walls 41, 43 of the opening 21 and the front and rear bottom face 37, 39, respectively. These acute corners may interfere with e.g. the structure of a thick carpet to a greater extent providing an improved deep-cleaning effect. This is similar the removeable plate 19 illustrated in fig 7B, although the corner angles are somewhat greater in that version.

[0037] Fig 8C shows another variation of the removeable plate 19 where, compared to fig 7B, the front and rear walls 41, 43 of the opening 21 are inclined such that their mutual distance tapers in the direction towards the bottom faces 37, 39. This means that the suction area 9 is reduced further, thereby providing an even greater cleaning effect.

[0038] Fig 8D shows yet another variation of the removeable plate 19 where, compared to fig 7B, the front and rear walls 41, 43 of the opening 21 are instead inclined such that their mutual distance tapers in the direction away from the bottom faces 37, 39. This makes it possible to allow a removeable plate 19 to even increase the suction area 9, for instance to clean a sensitive material rug, or the like. Needless to say, a plurality of different removeable plates may be provided. The features illustrated in figs 8A-8D may be combined in different ways.

[0039] The present disclosure is not restricted to the above-described embodiment and may be varied and altered in different ways within the scope of the appended claims.

Claims

1. A vacuum cleaner nozzle (1), comprising a connector tube (3), a floor interface (6) forming a suction area (9) corresponding to a surface to be cleaned under the nozzle, and an inner channel (11), connecting the suction area (9) with the connector tube (3), **characterized by** a removable plate (19) and means for optionally attaching the removable plate to a bottom side of the nozzle whereby the size of the suction area (9) is changed.

2. A vacuum cleaner nozzle according to claim 1, wherein the removable plate (19) comprises an opening (21), preferably in the middle thereof, the plate surrounding an inlet to the inner channel (11) when the plate is attached to the nozzle.

3. A vacuum cleaner nozzle according to claim 1, wherein the width of the opening (21) is at least half the width of the nozzle (1).

4. A vacuum cleaner nozzle according to any of the preceding claims, wherein the nozzle comprises at least one wheel (25) on said bottom side, the plate (19) comprising a cut-out (23) accommodating said at least one wheel (25).

5. A vacuum cleaner nozzle according to claim, wherein the plate (19) is made in a plastic material.

6. A vacuum cleaner nozzle according to any of the preceding claims, wherein the nozzle comprises a front (15) and a rear (16) brush, the removable plate (19) being configured to be attached between the front and the rear brush (15, 16).

7. A vacuum cleaner nozzle according to claim 6, wherein the front and the rear brush (15, 16) are retractable.

8. A vacuum cleaner nozzle according to claim 2, wherein the bottom surface of the removable plate (19) is inclined such that it is thickest at the opening (21).

9. A vacuum cleaner nozzle according to any of the preceding claims, wherein the suction area (9) is reduced by attaching the removeable plate (19).

10. A vacuum cleaner nozzle according to claim 2, wherein front and rear bottom faces (37, 39) of the removeable plate (19) form a single, flat plane from a front (33) to a rear (35) edge of the removeable plate (19).

11. A vacuum cleaner nozzle according to claim 2, wherein front and/or rear bottom faces (37, 39) of the removeable plate (19) are inclined to rise from the floor on which the nozzle is intended to rest, having their lowest points at the opening 21.

12. A vacuum cleaner nozzle according to claim 2, wherein front and/or rear walls (41, 43) of the opening (21) in the removeable plate (19) are inclined such that their mutual distance tapers in a direction towards bottom faces (37, 39) of the removeable plate (19).

13. A vacuum cleaner nozzle according to claim 2, wherein front and/or rear walls (41, 43) of the opening (21) in the removeable plate (19) are inclined such that their mutual distance tapers in a direction away from bottom faces (37, 39) of the removeable plate (19).

14. A vacuum cleaner comprising vacuum cleaner nozzle according to any of the preceding claims.

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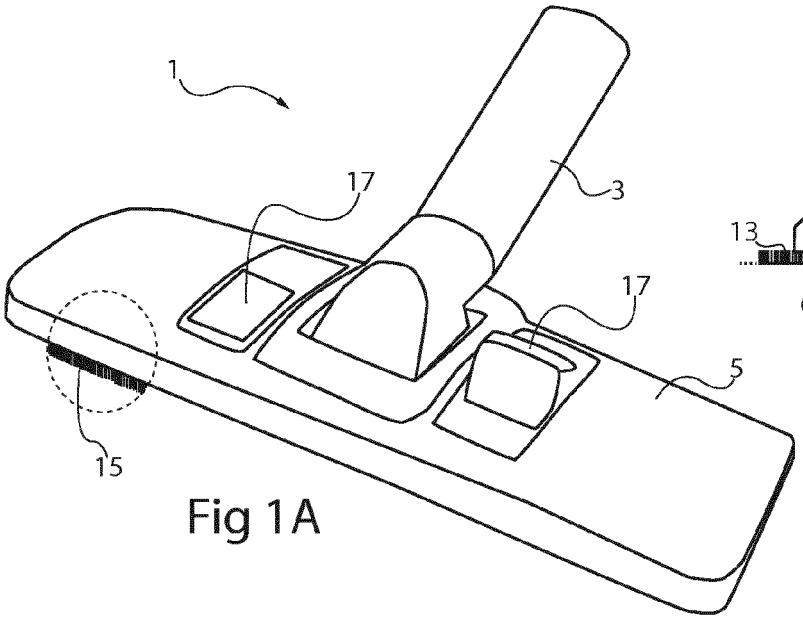

Fig 1A

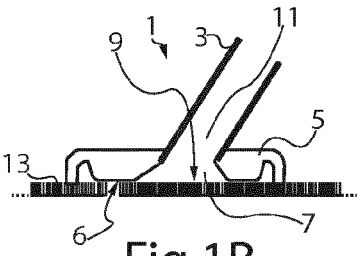

Fig 1B

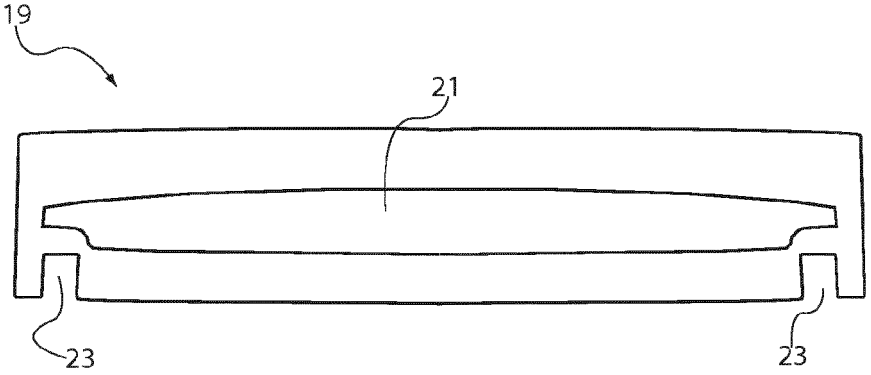

Fig 2

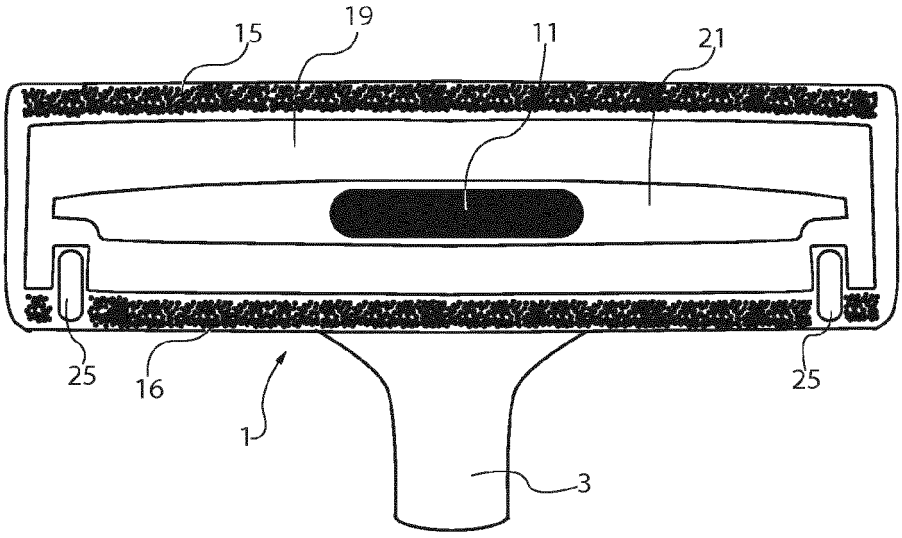

Fig 3

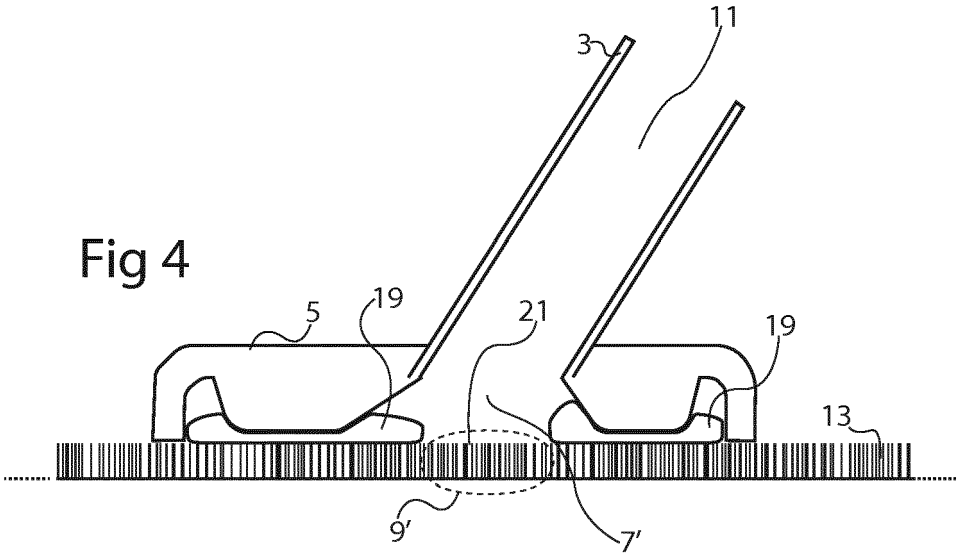

Fig 4

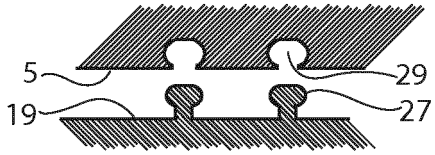

Fig 5A

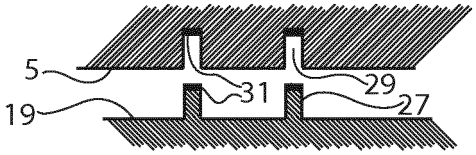

Fig 5B

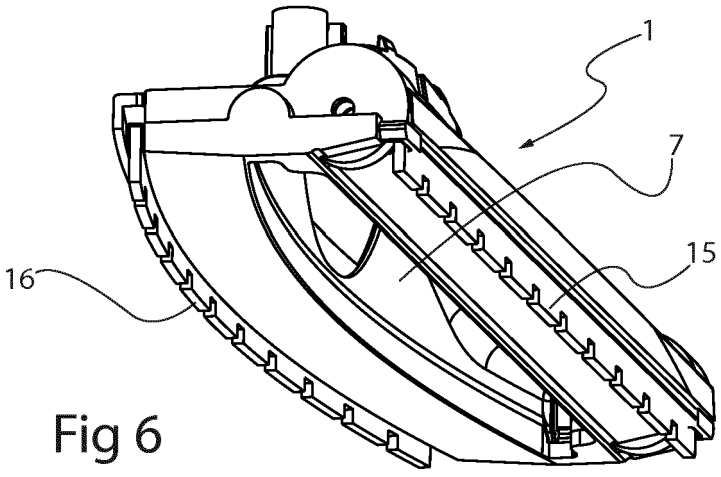

Fig 6

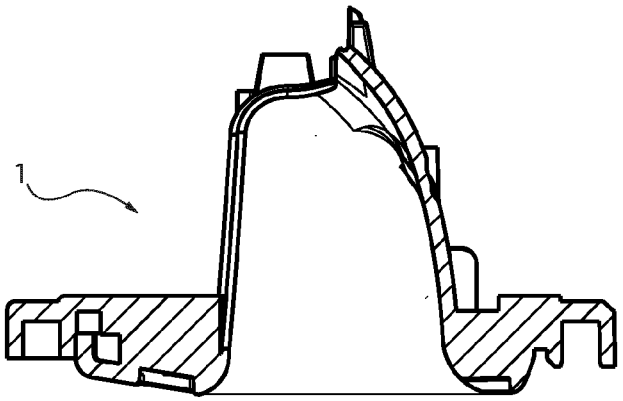

Fig 7A

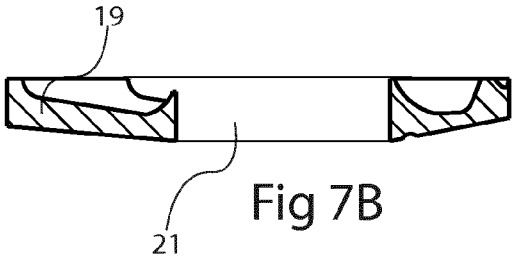

Fig 7B

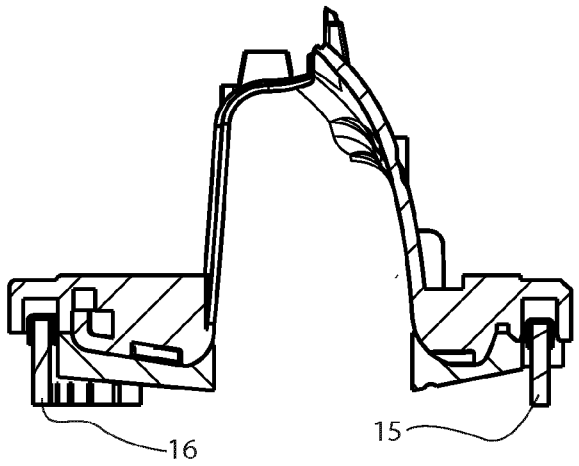

Fig 7C

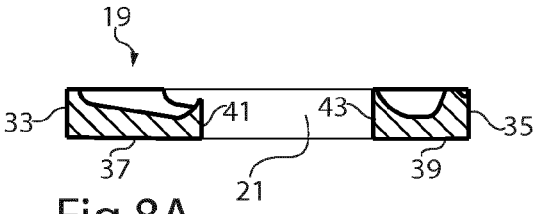

Fig 8A

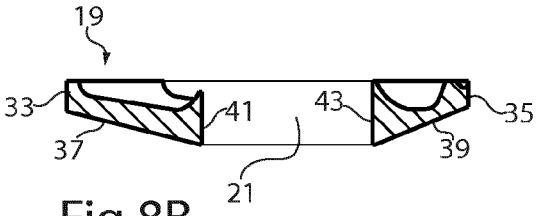

Fig 8B

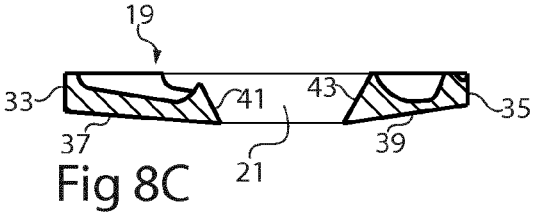

Fig 8C

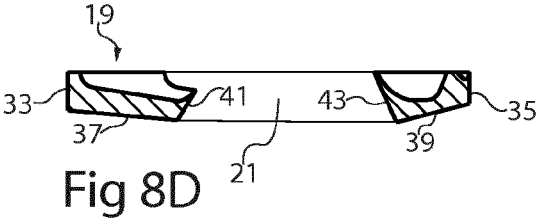

Fig 8D

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EUROPEAN SEARCH REPORT

Application Number
EP 19 18 4912

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 January 2020	Blumenberg, Claus

CATEGORY OF CITED DOCUMENTS

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