

(19)



(11)

**EP 3 181 029 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**21.06.2017 Bulletin 2017/25**

(51) Int Cl.:  
**A47L 9/02 (2006.01) A47L 9/06 (2006.01)**

(21) Application number: **16204473.9**

(22) Date of filing: **15.12.2016**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**MA MD**

(72) Inventors:  
• **ZHOU, Hui**  
**215000 Suzhou City**  
**Jiangsu Province (CN)**  
• **YAO, Bin**  
**215151 Suzhou (CN)**  
• **JIANG, Peng**  
**226100 Bao chang Town**  
**Hai men**  
**Jiangsu Province (CN)**

(30) Priority: **18.12.2015 CN 201510961243**

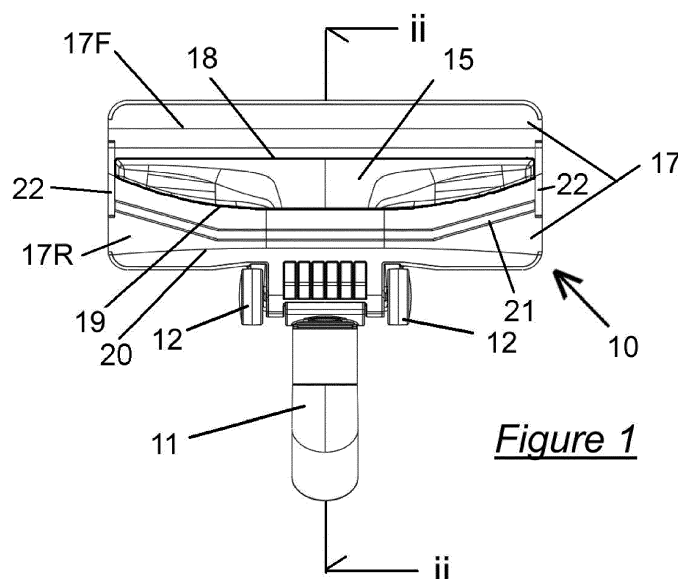
(71) Applicant: **CONTA S.R.O**  
**441 00 Podborany (CZ)**

(74) Representative: **chapman + co**  
**Cardiff Business Technology Centre**  
**Senghennydd Road**  
**Cardiff, South Wales CF24 4AY (GB)**

**(54) VACUUM CLEANER NOZZLE**

(57) A vacuum cleaner head has a floor-engaging soleplate which comprises a bottom surface 17 which defines a transversely extending suction mouth 15. The bottom surface 17 has substantially flat front and rear surface portions 17F, 17R which respectively extend from front and rear edges of the suction mouth 15. A rib 21 extends across the rear portion 17R behind the suction mouth 15. When the head is moved forwardly over a carpet to be cleaned, the rib 21 penetrates, agitates and

flicks engrained dust in the carpet pile towards the surface of the carpet. When the head is moved rearwardly, the displaced dust on the surface of the carpet is drawn into the suction mouth 15 under the action of airflow and reduced agitation. The repeated backwards and forwards movement of the head brings more deeply embedded dust to the surface of the carpet on successive strokes.

**Figure 1****EP 3 181 029 A1**

## Description

**[0001]** This invention relates to a vacuum cleaner head which is particularly suited to cleaning carpets.

**[0002]** In so-called canister vacuum cleaners, a vacuum cleaner head is pivoted at the end of a tubular wand which is connected to the body of the cleaner by an elongate flexible duct. The body of the cleaner comprises a motor and fan unit that is arranged to draw air through the head into the body where any entrained dirt and dust in the air is separated and collected. Sometimes the head may be detachable, so that the user can fit other kinds of cleaning tools to the wand.

**[0003]** Conventional passive vacuum cleaner heads comprise a floor-engaging sole plate provided with a transversely extending elongate suction mouth. Conventionally, the suction mouth in the sole plate has sharp front and rear edges, and the areas of the sole plate to the front and rear of the suction mouth edges are upwardly and outwardly inclined. This arrangement is effective for cleaning carpet but unsuitable for use on hard floors. For hard floor use, the head is conventionally provided with brush strips at the front and rear of the head, these being retractable for carpet cleaning and extendable for hard-floor use. The mechanism for displacing the brushes between carpet and hard floor modes typically comprises a pedal on the top of the body of the head and an associated brush actuating cam mechanism. Such conventional heads are needlessly complex for users who do not have a need for hard floor cleaning, and are clearly more expensive to manufacture than heads which are intended for carpet use only. Hence, heads for carpet use only are, in some circumstances, a viable alternative to more complex constructions.

**[0004]** The object of the present invention is to provide a vacuum cleaner head for use on carpet only in which the dust pick up performance is improved compared with that achieved using conventional all-purpose vacuum cleaners in their carpet cleaning setting.

**[0005]** In accordance with the present invention, there is provided a vacuum cleaner head having an underside which comprises a bottom surface which defines a transversely extending suction mouth, the bottom surface having substantially flat front and rear surface portions which respectively extend from front and rear edges of the suction mouth respectively, wherein a rib extends across the rear portion behind the suction mouth.

**[0006]** In use, the head is moved backwards and forwards over the carpet to be cleaned. On the forward stroke, the rib augments dust removal as it penetrates, agitates and flicks engrained dust in the carpet pile towards the surface of the carpet and away from the influence of the suction. On the rearward stroke, the displaced dust on the surface of the carpet is drawn into the suction mouth under the action of airflow and reduced agitation. The repeated backwards and forwards movement of the head brings more deeply embedded dust to the surface of the carpet on successive strokes.

**[0007]** The front and rear surface portions of the bottom surface may be inclined upwardly and away from the front and rear edges of the suction mouth respectively in respective opposite directions. The angle of inclination at an inner region of the front and rear surface portions may be less than at an outer region thereof. The angle of inclination may be stepped between the inner region of the front and rear surface portions and the outer region thereof, that is to say that the change in angle may be abrupt rather than smooth. The more steeply inclined outer regions of the bottom surface of the head help to make it easier to move the head backwards and forwards over the carpet, whilst the less steeply inclined inner regions help with creating a better seal with the carpet around the suction mouth.

**[0008]** The rear edge of the suction mouth may be curved forwardly at its outer ends. The longitudinal profile of the rib may substantially follow the longitudinal profile of the rear edge of the suction mouth. The complementary shape of the rib with the rear edge of the suction mouth improves dust removal.

**[0009]** A region of the rear surface portion of the bottom surface may be disposed between the rib and the rear edge of the suction mouth.

**[0010]** The rib may extend across the inner region of the rear portion.

**[0011]** A pair of ribbed formations may extend on the bottom surface adjacent respective opposite ends of the suction mouth. The ribs and ribbed formations each contribute to maintaining a good vacuum seal around the suction mouth, so that substantially all of the air being drawn into the suction mouth is drawn through the carpet pile.

**[0012]** The ribbed formations may extend from respective opposite ends of the rib.

**[0013]** The bottom surface of the head and the rib may be a unitary moulding of plastics material.

**[0014]** The bottom surface of the head, the rib and the ribbed formations may be a unitary moulding of plastics material.

**[0015]** An embodiment of the present invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a bottom view of a vacuum cleaner head in accordance with the present invention;

Figure 2 is a sectional view along the line ii-ii of Figure 1;

Figure 3 is an enlarged view of the area A of Figure 2; and

Figure 4 is a perspective front view of the vacuum cleaner head of Figure 1 from the left side and above.

**[0016]** Referring to the drawings, there is shown a cleaning head in accordance with the present invention

for fitting to a canister vacuum cleaner, the head comprising a body 10 and a rearwardly-extending tubular suction outlet 11 at the rear of the body 10 for releasably coupling to the distal end of a tubular wand of the cleaner. In use, a motor and fan unit in a body portion of the cleaner (not shown) draws air through the head via the wand.

**[0017]** The head is supported at its rear by a pair of wheels 12. The body 10 of the head comprises a one-piece shell 13 of moulded plastics material which is T-shaped in plan and defines a passageway 14 that leads from the tubular suction outlet 11 to an elongate suction mouth 15 provided on the underside of the body 10. The one-piece moulded body 10 comprises an integral floor-engaging soleplate on its underside. An aesthetic hollow plastics covering 16 is fitted on top of the shell 13 to also add some stiffness and strength to the body.

**[0018]** The suction mouth 15 extends transversely across almost the entire width of the bottom wall 17 of the soleplate of the body 10 and is bounded at its front and rear by front and rear bottom wall portions 17F, 17R, which extend upwardly and outwardly from the front and rear edges 18, 19 of the suction mouth 15 respectively. The angle between the front edge 18 of the suction mouth 15 and the front portion 17F is initially 3 degrees increasing to 10 degrees towards the front edge of the bottom wall 17. The angle between the rear edge 19 of the suction mouth 15 and the rear portion 17R is initially 2 degrees increasing at step 20 to 10 degrees towards the rear edge of the bottom wall 17.

**[0019]** The front edge 18 of the suction mouth 15 is straight and extends parallel to the front edge of the bottom wall 17. The rear edge 19 of the suction mouth 15 is curved forwardly towards its outer ends on opposite sides of a straight central portion. This shape helps to maintain a uniform air velocity across the full width of the suction mouth 15.

**[0020]** In accordance with the present invention, a rib 21 extends transversely of the body 10 across the rear portion 17R of the bottom wall 17 at the inner region where it lies at 2 degrees. The rib 21 comprises a front face 21 F which extends downwardly and rearwardly from the rear portion 17R of the bottom wall 17 to the front edge of bottom face 21 C, which lies substantially parallel to the rear portion 17R of the bottom wall 17. The rib 21 also comprises a rear face 21 R which extends downwardly and forwardly from the rear portion 17R of the bottom wall 17 to the rear edge of bottom face 21C. The rib 21 has a height of 2.5mm and is 7mm and 5mm wide at its top and bottom respectively. The profile of the rib 21 is a compromise between dust removal, tractive effort, longevity and carpet wear.

**[0021]** The longitudinal profile of the rib 21 substantially follows the longitudinal profile of the rear edge 19 of the suction mouth 15 and is separated therefrom by approximately 13mm. Respective opposite ends of the rib 21 meet a pair of side ribs 22, which extend forwardly along the side edge of the body 10 to a point in front of the suction mouth 15.

**[0022]** In use, once the cleaner has been energised, the broad front and rear surfaces 17F, 17R of the bottom wall 17 of the body 10 create a good seal between the head and the carpet. A good seal with the carpet means that the carpet piles are better pulled into the suction mouth 15 and this improves dust removal. The head is then moved backwards and forwards over the carpet to be cleaned. The more steeply inclined outer regions of the bottom wall 17 of the body 10 help to make it easier to move the head backwards and forwards over the carpet, whilst the less steeply inclined inner regions help with creating a better seal with the carpet around the suction mouth 15.

**[0023]** On the forward stroke, the rib 21 augments dust removal as it penetrates, agitates and flicks engrained dust towards the surface of the carpet away from the influence of the suction. On the rearward stroke, the head is lifted slightly from the carpet by the angle of the wand and the displaced dust on the surface of the carpet is drawn into the suction mouth 15 under the action of air-flow and reduced agitation. The repeated backwards and forwards movement of the head bring more deeply embedded dust to the surface of the carpet on successive strokes. The complementary shape of the rib 21 with the rear edge 19 of the suction mouth 15 improves dust removal. The rear rib penetrates the carpet on the forward stroke to compress and flick the carpet as it passes. The ribs 21 and 22 each contribute to maintaining a vacuum around the suction mouth 15.

**[0024]** The present invention is simple and inexpensive in construction, yet provides a vacuum cleaner head for use on carpet only in which the dust pick up performance is improved compared with that achieved using conventional all-purpose vacuum cleaners in their carpet cleaning setting.

## Claims

1. A vacuum cleaner head having an underside which comprises a bottom surface which defines a transversely extending suction mouth, the bottom surface having substantially flat front and rear surface portions which respectively extend from front and rear edges of the suction mouth respectively, wherein a rib extends across the rear portion behind the suction mouth.
2. A vacuum cleaner head as claimed in claim 1, in which the front and rear surface portions are inclined upwardly and away from the front and rear edges of the suction mouth respectively in respective opposite directions.
3. A vacuum cleaner head as claimed in claim 2, in which the angle of inclination at an inner region of the front and rear surface portions is less than at an outer region thereof.

4. A vacuum cleaner head as claimed in claim 3, in which the angle of inclination is stepped between the inner region of the front and rear surface portions and the outer region thereof. 5
5. A vacuum cleaner head as claimed in claim 1, in which the rear edge of the suction mouth is curved forwardly at its outer ends.
6. A vacuum cleaner head as claimed in claim 1, in which the longitudinal profile of the rib substantially follows the longitudinal profile of the rear edge of the suction mouth. 10
7. A vacuum cleaner head as claimed in claim 1, in which a region of the rear surface portion is disposed between the rib and the rear edge of the suction mouth. 15
8. A vacuum cleaner head as claimed in claim 7, in which in which the angle of inclination at an inner region of the front and rear surface portions is less than at an outer region thereof, the rib extending across the inner region of the rear portion. 20  
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9. A vacuum cleaner head as claimed in claim 1, in which a pair of ribbed formations extend on the bottom surface adjacent respective opposite ends of the suction mouth. 30
10. A vacuum cleaner head as claimed in claim 9, in which the ribbed formations extend from respective opposite ends of the rib.
11. A vacuum cleaner head as claimed in claim 1, in which the bottom surface of the head and the rib are a unitary moulding of plastics material. 35
12. A vacuum cleaner head as claimed in claim 9, in which the bottom surface of the head, the rib and the ribbed formations are a unitary moulding of plastics material. 40  
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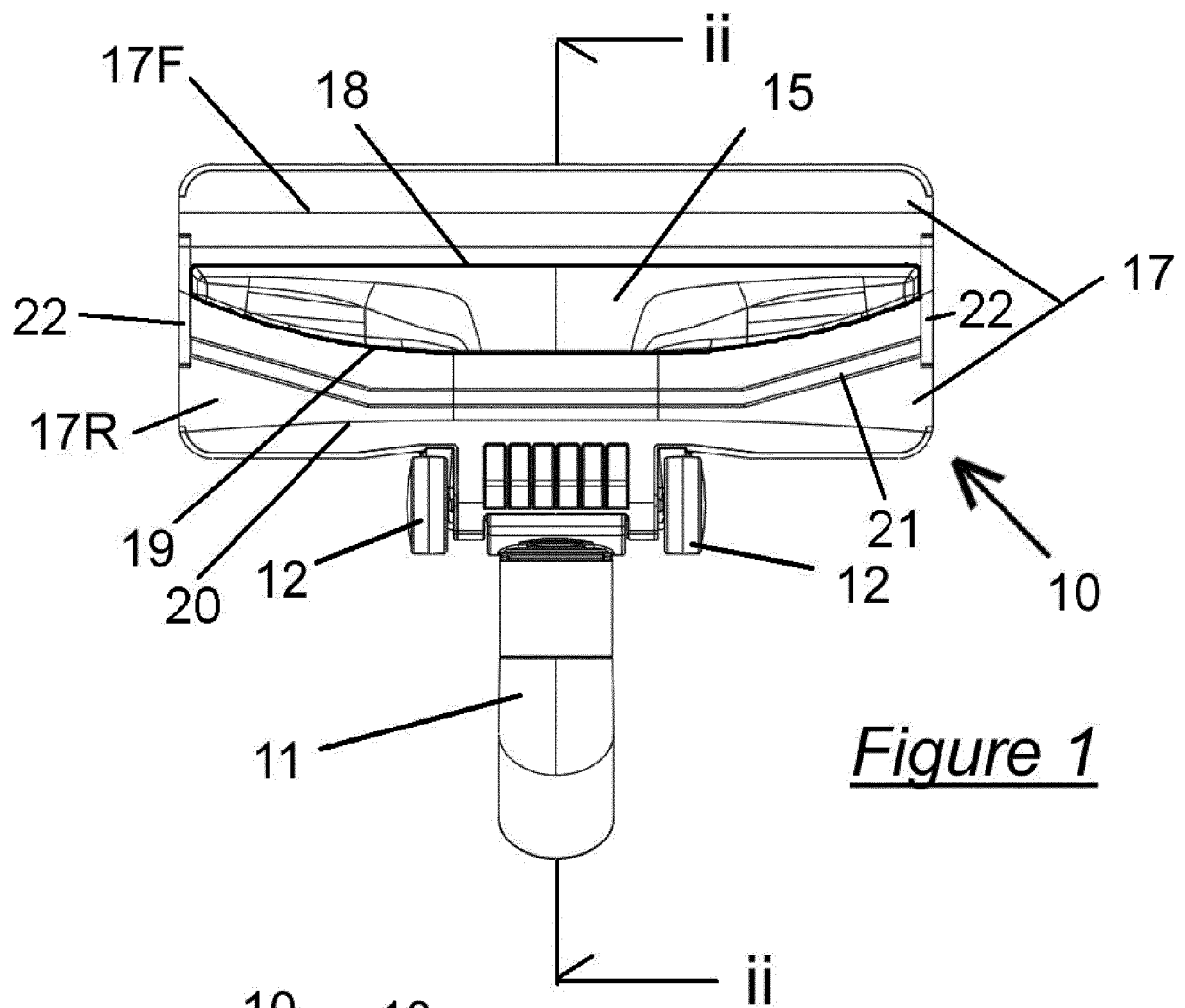


Figure 1

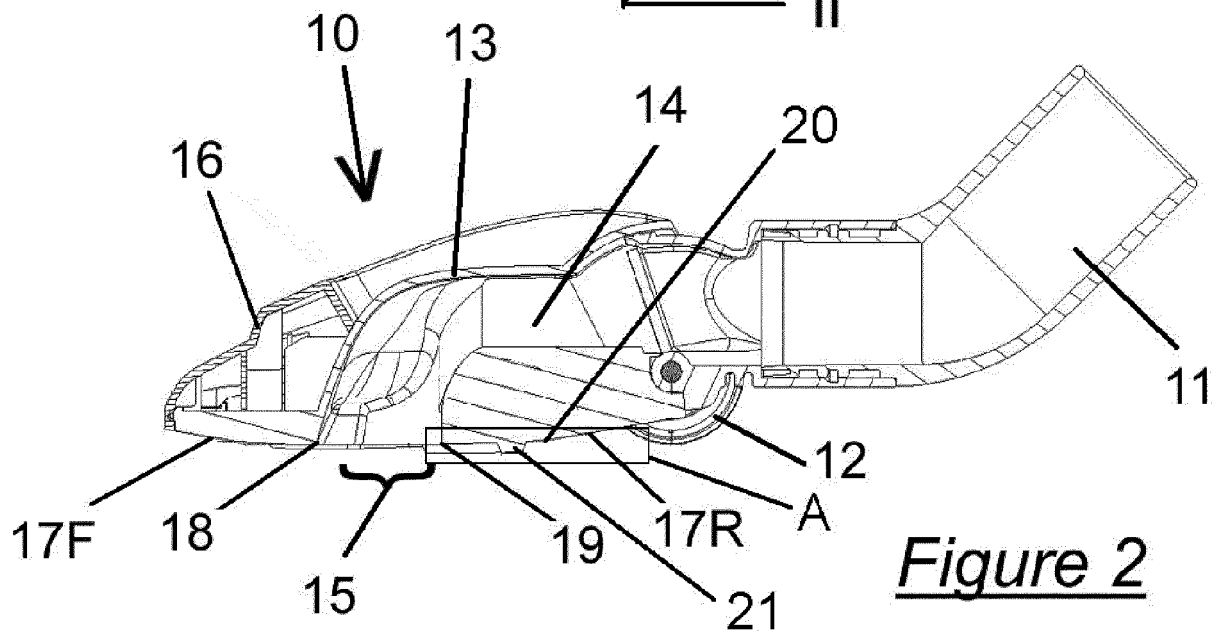


Figure 2

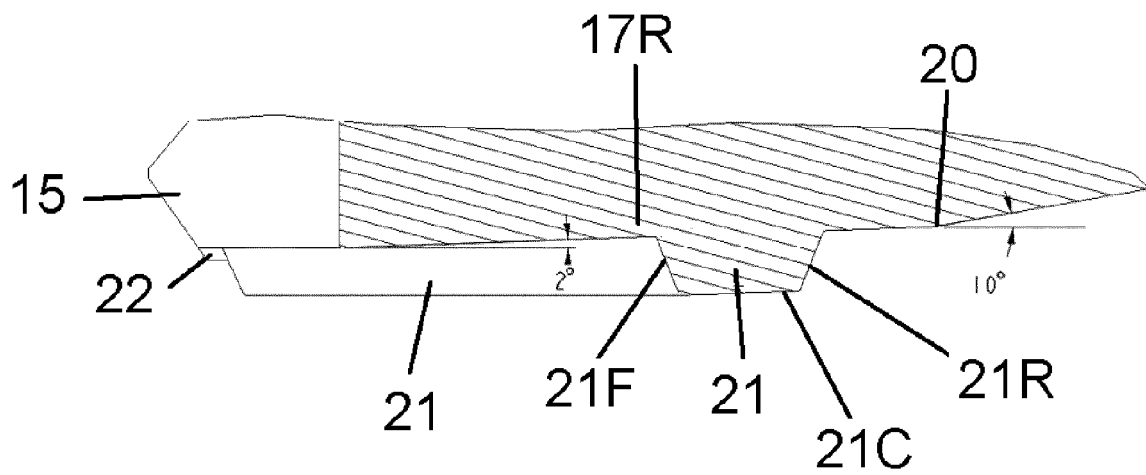


Figure 3

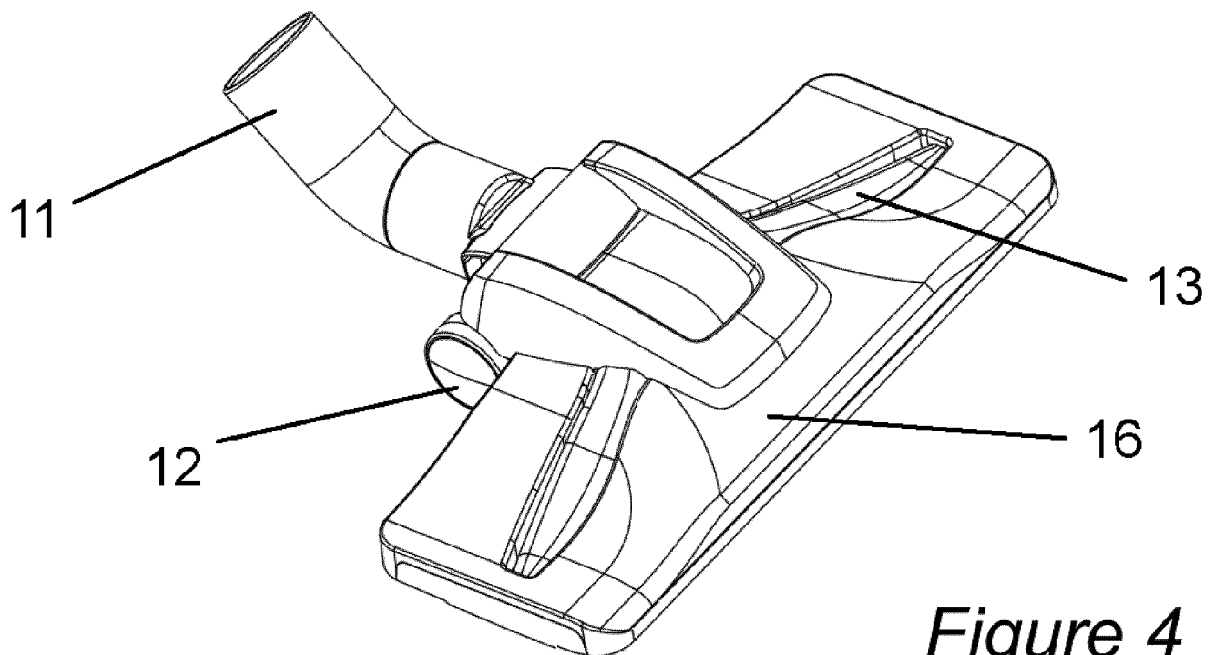


Figure 4



## EUROPEAN SEARCH REPORT

Application Number  
EP 16 20 4473

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The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>25 April 2017</b>	Examiner <b>Redelsperger, C</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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