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(54) **ARRANGEMENT IN A VACUUM CLEANER FOR REDUCING NOISE EMITTED FROM SAID VACUUM CLEANER, A FILTER GRILLE COMPRISED IN SUCH ARRANGEMENT, AND A VACUUM CLEANER COMPRISING SUCH ARRANGEMENT**

(57) The present invention relates to an arrangement (1) in a vacuum cleaner (2) for reducing noise emitted from a motor chamber (3) in said vacuum cleaner (2). The arrangement comprises a dust bag chamber (4), adapted to enclose a dust bag, and a motor chamber (3), adapted to comprise at least a motorized fan. The arrangement further comprises an intake air passage opening (5) arranged between said dust bag (4) chamber and said motor chamber (3), through which intake air is adapted to travel from said dust bag chamber (4) into said

motor chamber (3). The dust bag chamber (4) and said motor chamber (3) are integrated in said vacuum cleaner (2). A baffle body (6), adapted to redirect said emitted noise, is arranged in said dust bag chamber (4) such that said baffle body (6) at least partly covers said intake air passage opening (5). The present invention further relates to a filter grille (13) for vacuum cleaner (2) comprised in such an arrangement (1), and a vacuum cleaner (2) comprising such an arrangement (1).

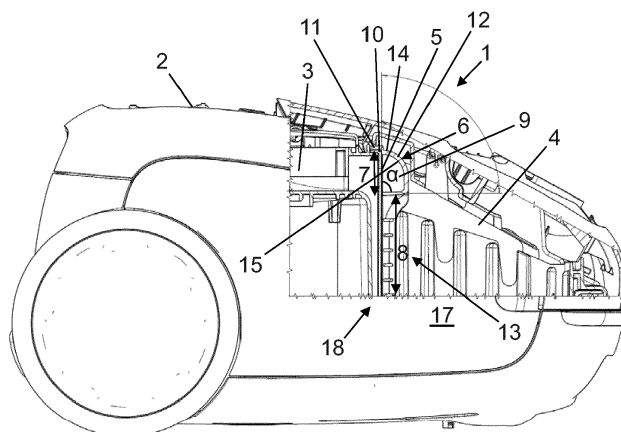


Figure 1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an arrangement in a vacuum cleaner for reducing noise emitted from said vacuum cleaner, a filter grille comprised in such an arrangement, and a vacuum cleaner comprising such an arrangement according to the preambles of the independent claims.

BACKGROUND OF THE INVENTION

[0002] Elevated noise levels in general may be disturbing, cause annoyance and may sometimes create stress. For example, in an indoor environment, sound levels even as low as 40 dB(A), about as loud as a refrigerator, may be disturbing.

[0003] An example of a home appliance which affects the sound levels in indoor environment, and which may generate noise levels which may be disturbing, is a vacuum cleaner. In vacuum cleaners a source of noise is the fan and the motor. Commonly, the bag chamber comprising the dust bag and the fan and motor chamber, comprising a motorized fan, are connected via an intake air passage, such that intake air from the dust bag chamber may pass into the motor and fan chamber. In connection with the intake air passage a filter may be arranged, which is adapted to filter the intake air, and also functions as a disaster filter protecting the motor if the dust bag would break.

[0004] Furthermore, the motor chamber comprises an exhaust air outlet through which the exhaust air may travel out from the motor chamber to the ambient air outside the vacuum cleaner. A disadvantage with the intake air passage opening is that noise emitted from the motor and fan chamber may travel out through the intake and the filter, which may cause increased noise levels.

[0005] An example of a bagged vacuum cleaner is disclosed in EP 2374394 A1, which shows a vacuum cleaner which has a holding grid, holding a motor protection filter, arranged between a dust chamber and motor chamber in a swivelable manner. A locking unit locks the holding grid in a swiveling position. The locking unit is arranged in an area in a hinged side of the holding grid. A resting nose and a recess serve as the locking unit for locking the holding grid, where the recess corresponds to the resting nose. The recess has a projection that is contactable by the resting nose. The projection protrudes over a surface, in which the recess is formed.

[0006] Today, vacuum cleaners are often designed to be optimized from different points of view, e.g. noise. However, since noise levels often are a concern in indoor environment, e.g. in households, the inventors of the present invention have identified a need for a vacuum cleaner which is further improved with respect to noise levels.

[0007] Thus, an object of the present invention is to

provide an arrangement for reducing the noise emitted from a vacuum cleaner, which arrangement is inexpensive, easy and straight forward to manufacture.

[0008] A further object of the present invention is to provide a vacuum cleaner which provides an overall reduced noise level.

SUMMARY OF THE INVENTION

[0009] The above-mentioned objects are achieved by the present invention according to the independent claims.

[0010] Preferred embodiments are set forth in the dependent claims.

[0011] The arrangement in a vacuum cleaner for reducing noise emitted from a motor chamber in said vacuum cleaner, in accordance with the present invention, comprises a dust bag chamber, adapted to enclose a dust bag, and a motor chamber, adapted to comprise at least a motorized fan. The arrangement further comprises an intake air passage opening arranged between said dust bag chamber and said motor chamber, through which intake air is adapted to travel from said dust bag chamber into said motor chamber. The dust bag chamber and said motor chamber being integrated in said vacuum cleaner. A baffle body, adapted to redirect said emitted noise, is arranged in said dust bag chamber such that said baffle body at least partly covers said intake air passage opening.

[0012] In another aspect, the present invention relates to a filter grille for a vacuum cleaner comprised in an arrangement for reducing noise emitted from a motor chamber in said vacuum cleaner.

[0013] In a further aspect, the present invention relates to a vacuum cleaner comprising an arrangement for reducing noise emitted from a motor chamber in said vacuum cleaner.

SHORT DESCRIPTION OF THE APPENDED DRAWINGS

[0014]

Figure 1 shows a bagged vacuum cleaner comprising an arrangement for reducing noise emitted from a motor chamber in said vacuum cleaner, according to one embodiment of the present invention.

Figure 2 shows a filter grille comprised in an arrangement for reducing noise emitted from a motor chamber in said vacuum cleaner, said filter grille comprising a baffle body, according to one embodiment of the present invention.

Figure 3 shows a side view of the filter grille shown in Figure 2, according to one embodiment of the present invention.

Figure 4 shows a dust bag chamber and a filter grille covering an intake air passage in a partition wall arranged between the dust bag chamber and the motor chamber, according to one embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0015] Throughout the application, the word upper refers to the part located furthest away from a supporting surface, e.g. a floor, when the vacuum cleaner is placed horizontally on the floor (as shown in Figure 1). The word lower refers to the part located closest to the supporting surface.

[0016] Figure 1 shows a partially cutaway view, of the arrangement 1 in a vacuum cleaner 2 for reducing noise emitted from a motor chamber 3 in the vacuum cleaner 2, according to one embodiment of the present invention. The arrangement 1 comprises a dust bag chamber 4, adapted to enclose a dust bag, and a motor chamber 3, adapted to comprise at least a motorized fan (not shown). An intake air passage opening 5 is arranged between the dust bag chamber 4 and the motor chamber 3, through which intake air is adapted to travel from the dust bag chamber 4 into the motor chamber 3. The dust bag chamber 4 and the motor chamber 3 are integrated in the vacuum cleaner 2. A baffle body 6, adapted to redirect the emitted noise, is arranged in the dust bag chamber 4 such that the baffle body 6 at least partly covers the intake air passage opening 5. The baffle body 6 is arranged such that it is adapted to redirect the emitted noise travelling through the air passage opening 5, and as a consequence, the baffle body 6 reduces the propagation of sound waves in the vacuum cleaner 2.

[0017] In one embodiment, as shown in Figure 1, the baffle body 6 is adapted to cover at least an upper portion 7 of the air passage opening 5. The baffle body 6 is adapted to redirect the noise partly in a direction towards a lower portion 8 of the air passage opening 5 and partly in a direction back into the motor chamber 3. Advantageously, redirecting the emitted noise prevents or at least reduces the propagation of sound waves in the vacuum cleaner 2, wherein the emitted noise from the vacuum cleaner is reduced. Approximately, the baffle body reduces the noise level emitted from the vacuum cleaner about 0,3-0,5 dB(A).

[0018] According to one embodiment, as illustrated in Figure 1, the air passage opening 5 has an area, and the baffle body 6 covers approximately 5 - 50% of the area. The area is approximately 1300-4500 mm². Furthermore, the intake air passage opening 5 may have any shape, such as an elongated square-shape, or a circular shape, or any other suitable shape.

[0019] In one embodiment, as shown in Figure 1, the baffle body 6 is hollow and forms a passageway 9, through which passageway 9 the intake air is adapted to travel. The passageway 9 ensures that the intake air may

freely travel from the dust bag chamber 4 into the motor chamber. Furthermore, the sound waves are reflected inside the passageway, wherein the emitted noise is re-directed, and advantageously reduces the noise level.

Naturally, the intake air also travels through the intake air passage opening 5 through other portions of the opening 5 not being covered by the baffle body 6.

[0020] According to one embodiment, as also shown in Figure 1, the baffle body 6 is arranged such that it extends from an upper edge 10 of the air passage opening 5 and downwards in a direction towards an opposite lower portion 8 of the air passage opening 5. The baffle body 6 is preferably made from any hard plastic, or any other similar material, suitable for redirecting emitted sound.

[0021] In one embodiment, shown in Figure 1, the baffle body 6 comprises an attachment portion 11 attached at least along the upper edge 10. The baffle body 6 may be detachable, or may be integrated with any other suitable feature, such as the partition wall 18 between the dust bag chamber 4 and the motor chamber 3. The baffle body 6 is preferably tightly attached to said partition wall 18 or filter grille 13, such that emitted noise at least partially, is restricted from entering the dust bag chamber (4). Advantageously, a detachable baffle body 6 provides more flexibility for the user and facilitates cleaning of the inside of the vacuum cleaner 2.

[0022] In one embodiment, as shown in Figure 1, the baffle body 6 is provided with a bend 12 and wherein a bending angle α of the bend 12 is approximately 10 - 90°. The bent baffle body 6 reflects the sound waves in a desired direction, and thus redirects the emitted noise, wherein the noise level is reduced.

[0023] According to one embodiment, as shown in Figure 1, the bending angle α is approximately 90°. This is advantageous in that parts of the emitted noise, i.e. parts of the sound waves, is reflected back into the motor chamber and parts of the noise is reflected such that it is directed in a direction towards a lower part 17 of the dust bag chamber 4.

[0024] According to one embodiment (see Figure 3), the baffle body 6 has an inner side 15, directed towards the passageway 9, and wherein the inner side 15 is provided with a sound absorbing material (not shown). The material may be any sound absorbing plastic material, e.g. T-Plasztik Item number 30301 with 100% PES fibers. The thickness of the material is preferably 4 - 6 mm. The sound absorbing material is advantageous in that it reduces propagation of sound waves and thus further reduces the noise levels from the vacuum cleaner 2.

[0025] In another aspect, as shown in Figure 2, the present invention relates to a filter grille 13 for a vacuum cleaner 2 comprised in an arrangement 1 as described above. In the embodiment shown in Figure 2, the filter grille 13 is adapted to be arranged in the dust bag chamber 4 such that it essentially covers the intake air passage opening 5 arranged between the dust bag chamber 4 and the motor chamber 3. The baffle body 6 is attached

to the filter grille 13 along at least one filter grille edge 14 of the filter grille 13, such that the baffle body 6, which is adapted to redirect the emitted noise, at least partly covers the intake air passage opening 5. The baffle body 6 being attached to a filter grille 13 is advantageous in that a conventional filter grille 13, arranged in a conventional filter grille holder, may easily be changed into a filter grille 13 provided with a baffle body 6, according to the present invention. Thus, the baffle body 6 being attached to a filter grille 13 facilitates mounting of the baffle body 6 in the vacuum cleaner 2.

[0026] In the embodiment shown in Figure 2, the baffle body 6 is integrated with the filter grille 13. The filter grille 13 has a filter grille area, and the baffle body 6 covers approximately 5-50% of the filter grille area.

[0027] Figure 3, shows a side view of the filter grille 13 comprising a baffle body 6 shown in Figure 2. As also mentioned above, the baffle body 6 has an inner side 15, directed towards the passageway 9, and the inner side 15 may be provided with a sound absorbing material, adapted to absorb the emitted noise. Thus, the inner side 15 of the baffle body 6 and the front side 19 of the filter grille 13 are arranged at a distance D from each other. The distance D is preferably between 10-30 mm, and more preferably 15 mm. The baffle body 6 redirects the emitted noise partly in a direction towards an opposite filter grille edge 16, and partly back into the motor chamber 3.

[0028] In a further aspect, the present invention relates to a vacuum cleaner 2 comprising an arrangement 1 as described above, and as illustrated in Figure 1.

[0029] In one embodiment, the vacuum cleaner 2 comprises a dust bag chamber 4, adapted to enclose a dust bag, and a motor chamber 3 comprising at least a motorized fan (not shown). The vacuum cleaner 2 further comprises an intake air passage opening 5, through which intake air is adapted to travel from the dust bag chamber 4 to the motor chamber 3. The chambers 3, 4 are integrated in the vacuum cleaner 2. The baffle body 6, being adapted to redirect the emitted noise, is arranged in the dust bag chamber 4 such that the baffle body 6 at least partly covers the intake air passage opening 5. The vacuum cleaner 2 being provided with such an arrangement provides an overall reduced noise level emitted from the vacuum cleaner 2, since the arrangement redirects the emitted noise such that less noise reaches the outside of the vacuum cleaner 2.

[0030] In one embodiment, as illustrated in Figure 4, the vacuum cleaner 2 comprises a partition wall 18 arranged between the dust bag chamber 4 and the motor chamber 3, the partition wall 18 comprising the intake air passage opening 5. The dust bag chamber 4 is adapted to comprise a dust bag (not shown).

[0031] In the embodiment shown in Figure 4, the filter grille 13 comprising the baffle body 6 is attached to the partition wall 18, the filter grille 13 is arranged such that the filter grille 13 essentially covers the intake air passage opening 5. The baffle body 6 is integrated with the filter

grille 13.

[0032] In another embodiment, the baffle body 6 is attached to the partition wall 18, i.e. the baffle body 6 is attached directly to the partition wall 18 and a separate filter grille is arranged to essentially cover the intake air passage opening 5. The baffle body 6 is arranged such that it covers approximately 5-50% of the intake air passage opening 5. Consequently, the baffle body 6 then also partly covers the filter grille. In a similar manner, as in the case where the baffle body 6 is integrated with the filter grille 13, the baffle body 6 is hollow and forms a passageway 9, through which passageway 9 the intake air is adapted to travel.

[0033] The present invention is not limited to the above-described preferred embodiments. Various alternatives, modifications and equivalents may be used. Therefore, the above embodiments should not be taken as limiting the scope of the invention, which is defined by the appending claims.

Claims

1. Arrangement (1) in a vacuum cleaner (2) for reducing noise emitted from a motor chamber (3) in said vacuum cleaner (2), said arrangement comprising:
 - a dust bag chamber (4), adapted to enclose a dust bag;
 - a motor chamber (3), adapted to comprise at least a motorized fan;
 - an intake air passage opening (5) arranged between said dust bag (4) chamber and said motor chamber (3), through which intake air is adapted to travel from said dust bag chamber (4) into said motor chamber (3); said dust bag chamber (4) and said motor chamber (3) being integrated in said vacuum cleaner (2),
 - a baffle body (6) arranged in said dust bag chamber (4) such that said baffle body (6) at least partly covers said intake air passage opening (5) wherein the baffle body (6) is detachable.
2. Arrangement according to claim 1, wherein said baffle body (6) is adapted to cover at least an upper portion (7) of said air passage opening (5).
3. Arrangement according to claim 1, wherein said baffle body (6) is adapted to cover the upper portion (7) of said air passage opening (5).
4. Arrangement according to any of claims 1-3, wherein said air passage opening (5) has an area, and wherein said baffle body (6) covers approximately 5-50 % of said area.
5. Arrangement according to any of claims 1-4, wherein said baffle body (6) is hollow and forms a passage-

way (9), through which passageway (9) said intake air is adapted to travel.

6. Arrangement according to any of claims 1-5, wherein said baffle body (6) is arranged such that it extends from an upper edge (10) of said air passage opening (5) and downwards in a direction towards an opposite lower portion (8) of said air passage opening (5). 5
7. Arrangement according to any of claims 1-6, wherein the baffle body (6), is adapted to redirect said emitted noise. 10
8. Arrangement according to any of claims 1-7, wherein said baffle body (6) is provided with a bend (12) and wherein a bending angle α of said bend is approximately 90° . 15
9. Arrangement according to any of claims 1-8, wherein said baffle body (6) has an inner side (15), provided with a sound absorbing material. 20
10. Arrangement according to claim 9, wherein the inner side (15), is directed towards said passageway (9). 25
11. Filter grille (13) for a vacuum cleaner (2), comprising a dust bag chamber, a motor chamber, and an intake air passage opening (5), through which intake air is adapted to travel from said dust bag chamber (4) to said motor chamber (3), said filter grille (13) being adapted to be arranged in said dust bag chamber (4) such that it essentially covers said intake air passage opening (5), arranged between said dust bag chamber (4) and said motor chamber (3), wherein a baffle body (6) is attached to said filter grille (13) such that said baffle-body (6), at least partly covers said intake air passage opening (5). 30 35
12. Filter grille according to claim 11, wherein said baffle body (6) is attached along at least one filter grille edge (14) of said filter grille (13). 40
13. Filter grille according to any of claims 11-12, wherein said filter grille (13) has a filter grille area, and wherein said baffle body (6) covers 5-50% of said filter grille area. 45
14. Filter grille according to any of claims 11-13, wherein said filter grille (13) comprises a filter. 50
15. Filter grille according to any of claims 11-14, wherein the inner side (15) and a front side (19) of the filter grille (13) are arranged a distance, preferably between 10-30 mm, from each other. 55
16. Vacuum cleaner (2) comprising an arrangement according to any of the claims 1-10 or a filter grille according to any of the claims 11-15.

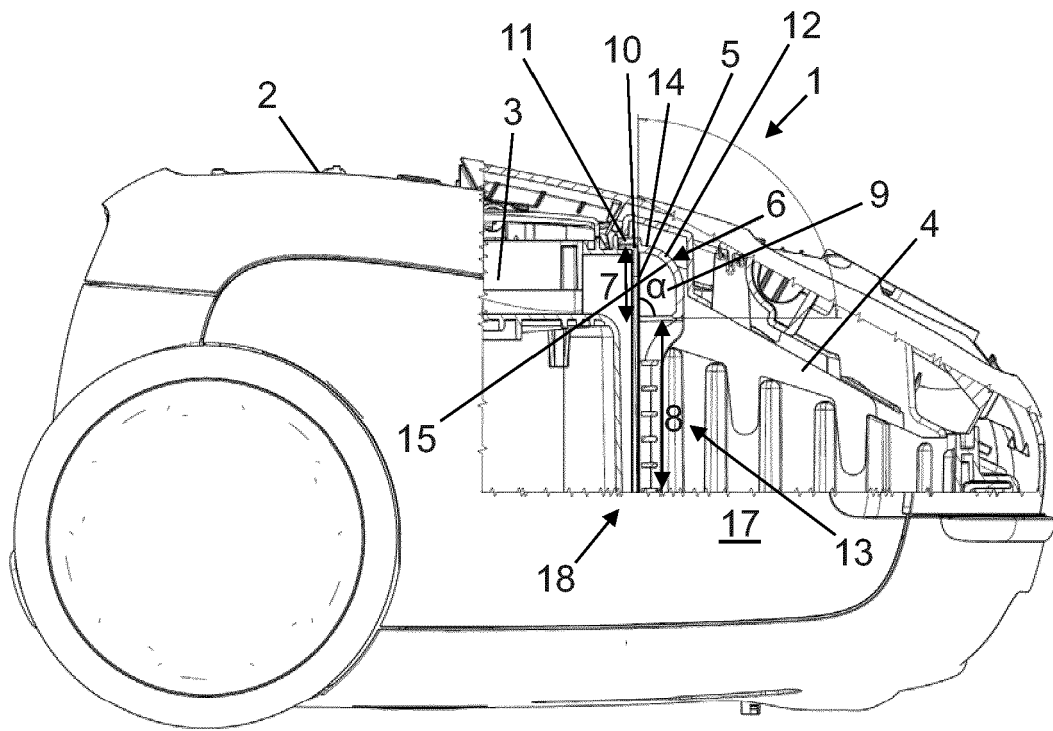


Figure 1

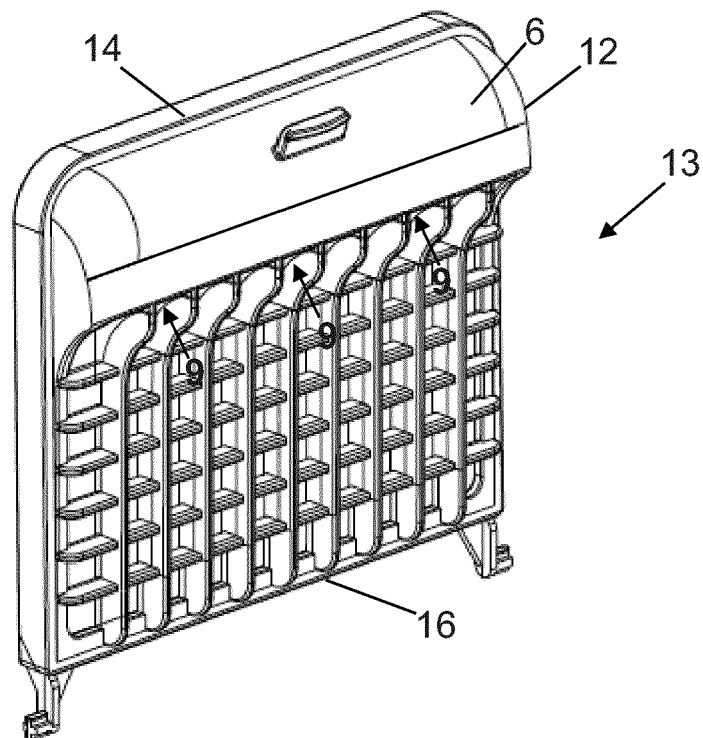


Figure 2

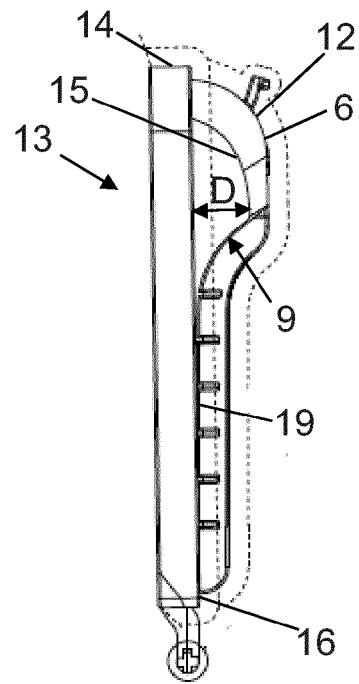


Figure 3

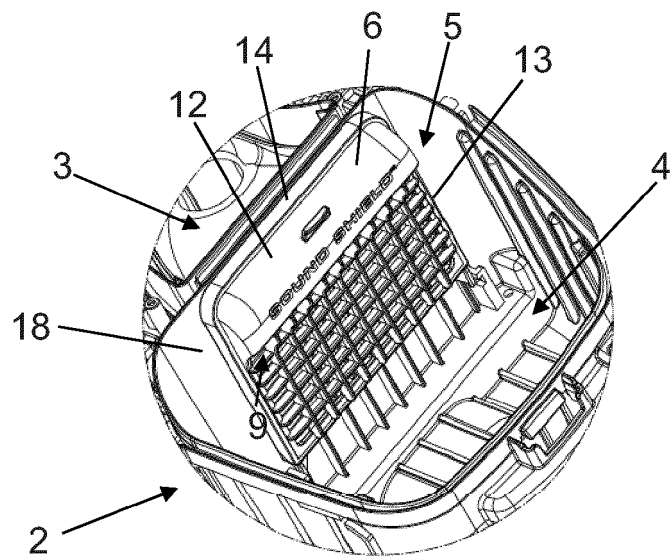


Figure 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 15 6616

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	* paragraph [0014] - paragraph [0017]; figures 1-3 *	1-10,12,13	A47L9/12 A47L5/36
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A	----- CN 101 999 865 A (LG ELECTRONICS TIANJIN) 6 April 2011 (2011-04-06) * the whole document *	1-16	

			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 May 2020	Examiner Blumenberg, Claus
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

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 EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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14-05-2020

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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