



- (51) **International Patent Classification:**
A47L 5/24 (2006.01) A47L 9/00 (2006.01)
- (21) **International Application Number:**
PCT/SE20 13/000063
- (22) **International Filing Date:**
7 May 2013 (07.05.2013)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
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- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

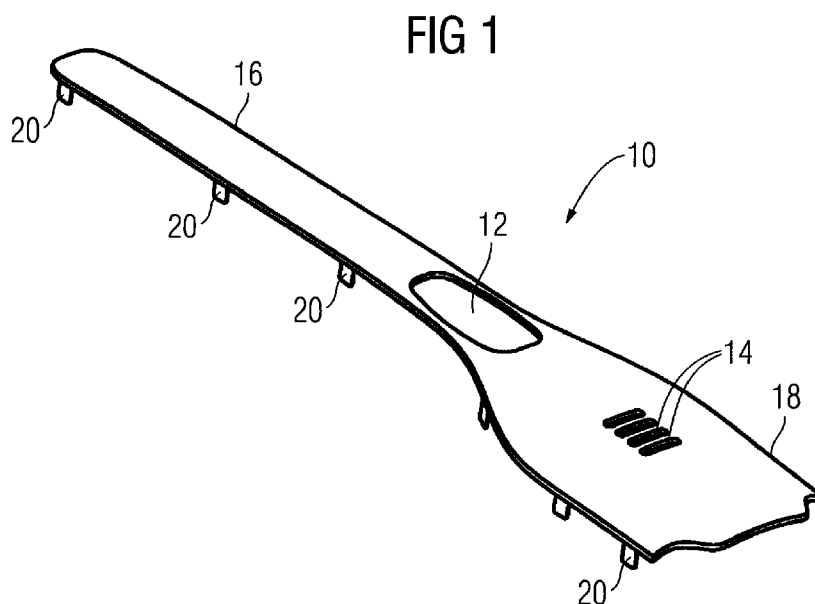
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) **Title:** VACUUM CLEANER



(57) **Abstract:** The present invention relates to a vacuum cleaner (20) comprising a casing. The casing includes one or more casing parts made of plastics. The casing includes at least one metal sheet (10, 30). The at least one metal sheet (10, 30) is arranged at an outer side of the casing. The at least one metal sheet (10, 30) forms a central portion of one side of the casing.



Vacuum cleaner

The present invention relates to a vacuum cleaner. In particular, present invention relates to a handheld vacuum cleaner.

A vacuum cleaner comprises usually a casing made of one or more plastic parts. Such a vacuum cleaner can be easily produced by low costs. However, plastic parts have a tendency to be deformed over age, if they are subjected to heat. In particular, the motor and electronics of the vacuum cleaner generate a substantial amount of heat. Plastic parts beside heat generating components may be deformed. The design of the vacuum cleaner may be damaged, if outer plastic parts are deformed.

It is an object of the present invention to provide a vacuum cleaner, which prevents deformation plastic parts by heat.

The object of the present invention is achieved by the vacuum cleaner according to claim 1.

The vacuum cleaner according to the present invention comprises a casing, wherein:

- the casing includes one or more casing parts made of plastics,
- the casing includes at least one metal sheet,
- the at least one metal sheet is arranged at an outer side of the casing, and
- the at least one metal sheet forms a central portion of one side of the casing.

The core of the present invention is the metal sheet as part of the casing of the vacuum cleaner, The at least one metal sheet improves the physical properties of the casing. The metal sheet cannot be deformed by heat as the other plastic parts of the casing. The metal sheet increases the stiffness of the casing.

Preferably, the at least one metal sheet is arranged besides one or more heat generating components of the vacuum cleaner.

In particular, the at least one metal sheet is arranged beside a
5 motor of the vacuum cleaner.

Further, the at least one metal sheet may be arranged at an outer side of a dust container of the vacuum cleaner.

10 Moreover, the at least one metal sheet may include a cut-out provided for a switch of the vacuum cleaner.

Preferably, the at least one metal sheet includes a number of slots intended for light emitting diodes (LEDs) and/or light
15 guides. Said LEDs and/or light guides may indicate a state of the vacuum cleaner. For example, the LEDs and/or light guides indicate a charging status.

For fastening the metal sheet, the at least one metal sheet may
20 include a plurality of lug elements for fastening at neighboured parts of the casing of the vacuum cleaner.

For example, the at least one metal sheet is adapted to the contour of the casing of the vacuum cleaner.

25

In particular, the vacuum cleaner is a handheld vacuum cleaner.

According to a preferred embodiment of the present invention the casing of the vacuum cleaner includes a narrow handle part and
30 wide motor part connected in series, wherein the metal sheet extends over one side of the handle part and motor part.

According to another embodiment of the present invention the casing of the vacuum cleaner includes a narrow handle part, a
35 wide motor part and a wide dust container, wherein the metal sheet extends over one side of the handle part, motor part and dust container.

Moreover, the vacuum cleaner comprises at least one floor nozzle.

5 In particular, the at least one metal sheet is arranged on a top side of the casing of the vacuum cleaner.

In a similar way, the at least one metal sheet forms a top side of the casing of the vacuum cleaner.

10

Novel and inventive features believed to be the characteristic of the present invention are set forth in the appended claims.

The invention will be described in further detail with reference
15 to the drawings, in which

FIG 1 illustrates a perspective view of a metal sheet for a casing of a vacuum cleaner according to a preferred embodiment of the present invention,

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FIG 2 illustrates a side view of the metal sheet for the casing of the vacuum cleaner according to the preferred embodiment of the present invention,

25 FIG 3 illustrates a top view of the metal sheet for the casing of the vacuum cleaner according to the preferred embodiment of the present invention,

FIG 4 illustrates a perspective view of the casing of the vacuum cleaner according to the preferred embodiment of
30 the present invention,

FIG 5 illustrates a further perspective view of the casing of the vacuum cleaner according to the preferred embodiment of
35 the present invention, and

FIG 6 illustrates a perspective view of the casing of the vacuum cleaner according to another embodiment of the present invention.

5 FIG 1 illustrates a perspective view of a metal sheet 10 for a casing of a vacuum cleaner according to a preferred embodiment of the present invention. The metal sheet 10 forms a part of the casing of the vacuum cleaner. The metal sheet 10 is slightly curved, wherein an outer side is convex and an inner side is
10 concave.

The metal sheet 10 comprises a cut-out 12 and a set of slots 14. The cut-out 12 is provided for a switch of the vacuum cleaner. The slots 14 are optional. In this embodiment the slots 14 are
15 intended for light emitting diodes (LEDs) or light guides. Said LEDs or light guides are provided for indicating a state of the vacuum cleaner. For example, the LEDs or light guides indicate a charging status. In this example, the metal sheet 10 comprises four parallel slots 14.

20 The metal sheet 10 includes a narrow portion 16 and a wide portion 18. The slots 14 are arranged in the wide portion 18 of the metal sheet 10. The cut-out 12 is arranged in a transitional portion of the portion 16 and the wide portion 18 of the metal
25 sheet 10.

Further, the metal sheet 10 comprises a plurality of lug elements 20. The lug elements 20 are arranged at the border of the concave inner side. The lug elements 20 extend substantially
30 perpendicular to the plane of the metal sheet 10. The lug elements 20 are provided for connecting the metal sheet 10 to the casing.

FIG 2 illustrates a side view of the metal sheet 10 for the casing of the vacuum cleaner according to the preferred embodiment of the present invention. In particular, FIG 2 clarifies the arrangement of the lug elements 20 at the metal sheet 10.
35

FIG 3 illustrates a top view of the metal sheet 10 for the casing of the vacuum cleaner according to the preferred embodiment of the present invention. In particular, FIG 3 clarifies the positions of the cut-out 12 and slots 14 and the relationship between the narrow portion 16 and the wide portion of the metal sheet 10.

FIG 4 illustrates a perspective view of the casing of the vacuum cleaner 22 according to a preferred embodiment of the present invention. The vacuum cleaner 22 is a handheld vacuum cleaner.

The vacuum cleaner 22 includes a handle part 24, a motor part 26 and a dust container 28. The handle part 24, the motor part 26 and the dust container 28 are arranged in series, wherein the motor part 26 is between the handle part 24 and the dust container 28.

The metal sheet 10 covers one side of the handle part 24 and the motor part 26. An on-off switch 32 is arranged within the cut-out 12 of the metal sheet 10. A further metal sheet 30 covers one side of the dust container 28. The other parts of the casing of the vacuum cleaner 22 are made of plastics.

FIG 5 illustrates a further perspective view of the casing of the vacuum cleaner 22 according to the preferred embodiment of the present invention. The metal sheet 10 covers one side of the handle part 24 and the motor part 26, while the further metal sheet 30 covers one side of the dust container 28.

The metal sheet 10 and the further metal sheet 30 are arranged on the top side of the casing of the vacuum cleaner 22.

Alternatively, the metal sheet 10 and the further metal sheet 30 may be formed as a single-piece part. Depending on the structure and emptying mechanism of the dust container 28, the metal sheet

10 and the further metal sheet 30 may be formed as two separate metal sheets or as one single metal sheet.

The metal sheet 10 and the further metal sheet 30 are arranged
5 at such places of the casing of the vacuum cleaner, in which the temperature is relative high. The metal sheets 10 and 30 are more resistant to deformation than plastic parts. Further, the metal sheets 10 and 30 provide a reinforcement and support for the casing of the vacuum cleaner 22.

10

FIG 6 illustrates a perspective view of the casing of the vacuum cleaner 22 according to another embodiment of the present invention. The vacuum cleaner 22 of FIG 6 is similar to the vacuum cleaner 22 shown in FIG 4 and 5. Additionally, the vacuum
15 cleaner 22 of FIG 6 comprises a floor nozzle 34, so that the vacuum cleaner 22 can be used as a floor vacuum cleaner.

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Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not
20 limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be
25 included within the scope of the invention as defined by the appended claims .

List of reference numerals

	10	metal sheet
	12	cut-out
5	14	slot
	16	narrow portion
	18	wide portion
	20	lug element
	22	vacuum cleaner
10	24	handle part
	26	motor part
	28	dust container
	30	further metal sheet
	32	on-off switch
15	34	floor nozzle

Claims

1. A vacuum cleaner (20) comprising a casing, wherein:
- the casing includes one or more casing parts made of plastics,
 - the casing includes at least one metal sheet (10, 30),
 - the at least one metal sheet (10, 30) is arranged at an outer side of the casing, and
 - the at least one metal sheet (10, 30) forms a central portion of one side of the casing.
2. The vacuum cleaner according to claim 1, characterized in that the at least one metal sheet (10, 30) is arranged besides one or more heat generating components of the vacuum cleaner (22) .
3. The vacuum cleaner according to claim 1 or 2, characterized in that the at least one metal sheet (10, 30) is arranged beside a motor of the vacuum cleaner (22) .
4. The vacuum cleaner according to any one of the preceding claims, characterized in that the at least one metal sheet (30) is arranged at an outer side of a dust container (28) of the vacuum cleaner (22) .
5. The vacuum cleaner according to any one of the preceding claims, characterized in that the at least one metal sheet (10, 30) includes a cut-out (12) provided for a switch (32) of the vacuum cleaner (22).
6. The vacuum cleaner according to any one of the preceding claims, characterized in that

the at least one metal sheet (10, 30) includes a number of slots (14) intended for light emitting diodes and/or light guides .

- 5 7. The vacuum cleaner according to any one of the preceding claims ,
characterized in that
the at least one metal sheet (10, 30) includes a plurality
of lug elements (20) for fastening at neighboured parts of
10 the casing of the vacuum cleaner (22) .
8. The vacuum cleaner according to any one of the preceding claims,
characterized in that
15 the at least one metal sheet (10, 30) is adapted to the contour of the casing of the vacuum cleaner (22) .
9. The vacuum cleaner according to any one of the preceding claims ,
20 characterized in that
the vacuum cleaner (22) is a handheld vacuum cleaner.
10. The vacuum cleaner according to claim 9 ,
characterized in that
25 the casing of the vacuum cleaner (22) includes a narrow handle part (24) and wide motor part (26) connected in series, wherein the metal sheet (10) extends over one side of the handle part (24) and motor part (26) .
- 30 11. The vacuum cleaner according to claim 9 ,
characterized in that
the casing of the vacuum cleaner (22) includes a narrow handle part (24), a wide motor part (26) and a wide dust container (28), wherein the metal sheet (10, 30) extends over
35 one side of the handle part (24), motor part (26) and dust container (28) .

12. The vacuum cleaner according to any one of the preceding
claims,
characterized in that
the vacuum cleaner (22) comprises at least one floor nozzle
5 (34) .

13. The vacuum cleaner according to any one of the preceding
claims,
characterized in that
10 the at least one metal sheet (10, 30) is arranged on a top
side of the casing of the vacuum cleaner (22) .

14. The vacuum cleaner according to any one of the preceding
claims,
15 characterized in that
the at least one metal sheet (10, 30) forms a top side of
the casing of the vacuum cleaner (22) .

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FIG 1

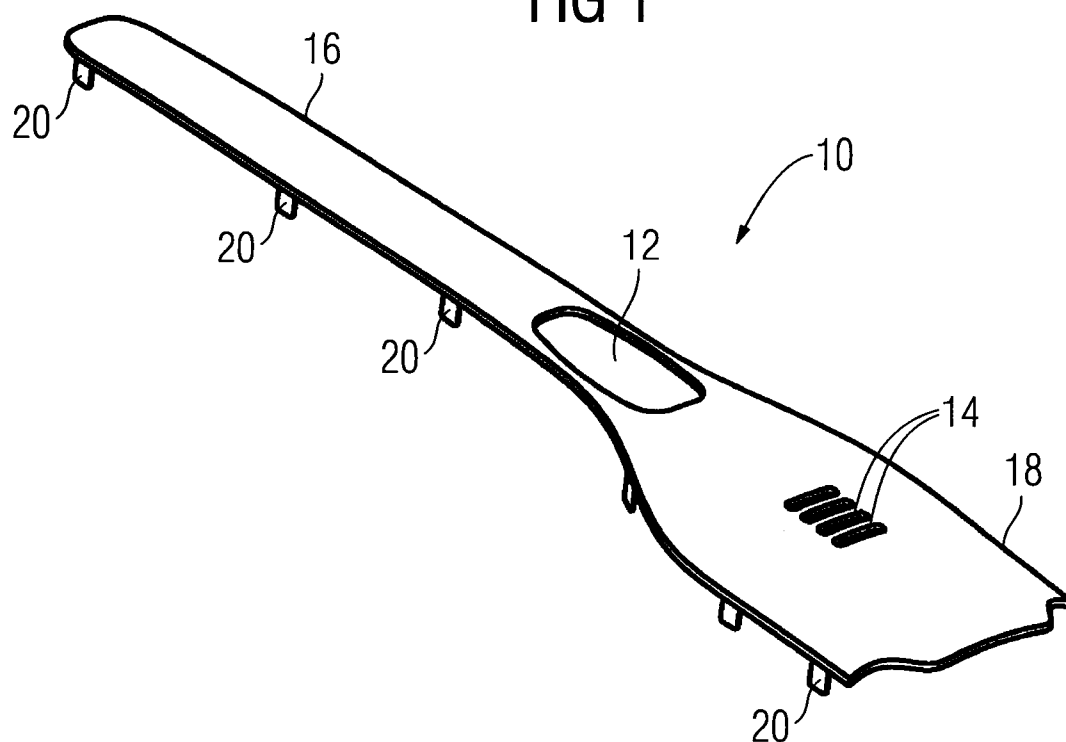


FIG 2

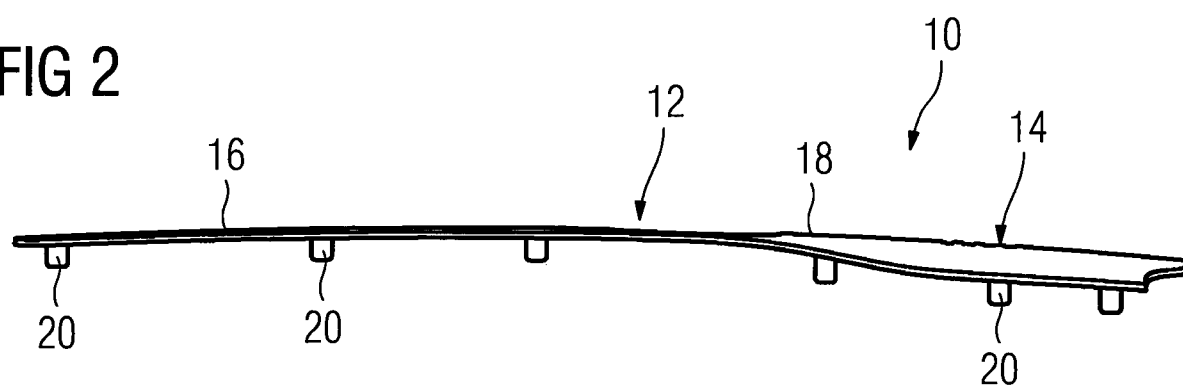


FIG 3

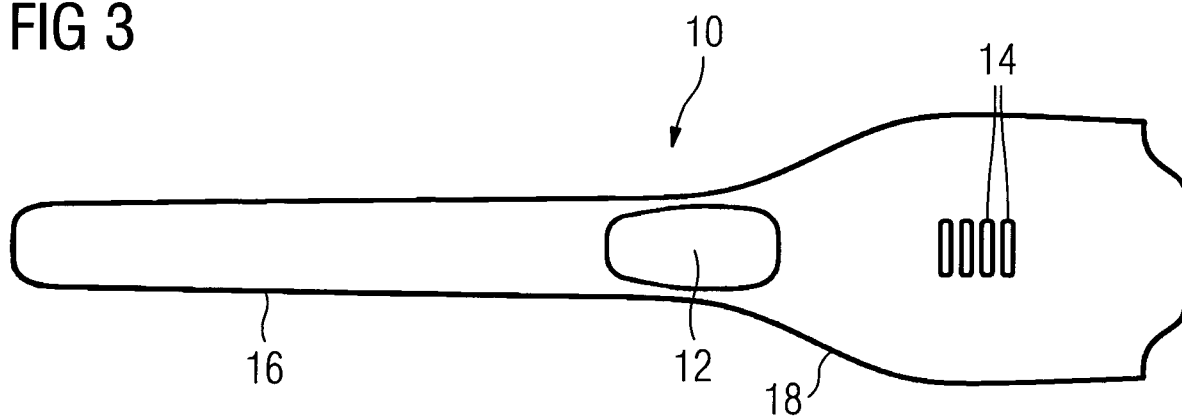


FIG 4

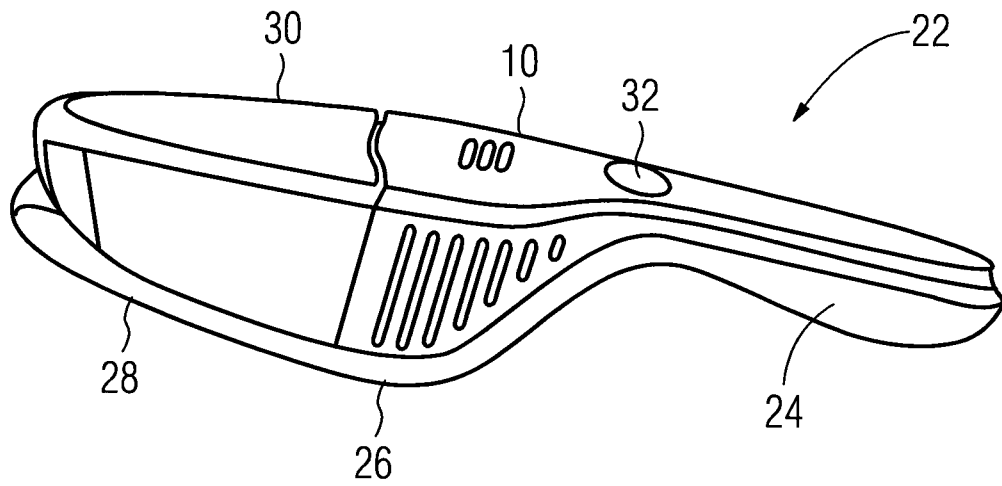


FIG 5

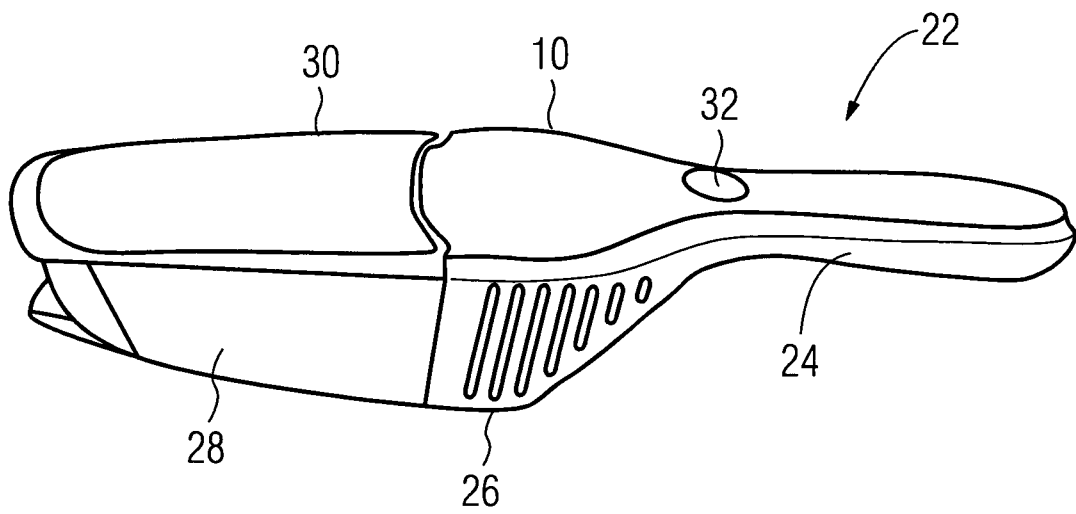
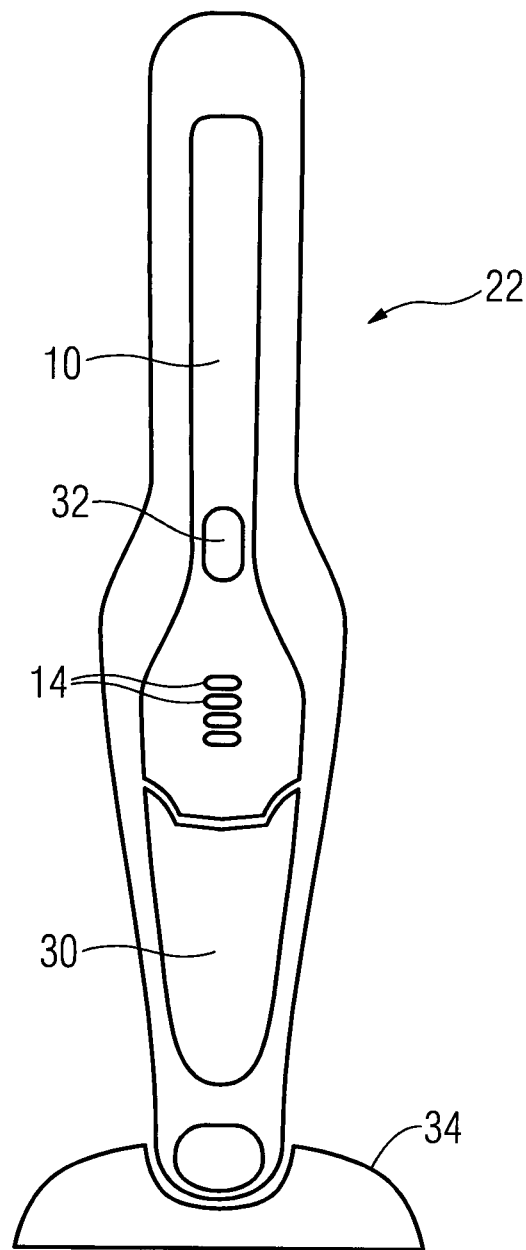


FIG 6



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE201 3/000063

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3333564 A (WATERS ROBERT S), 1 August 1967 (1967-08-01); abstract; column 2, line 20 - line 22; column 3, line 1 - line 7; figure 1 --	1-14
A	WO 2008088278 A2 (AKTIEBOLAGET ELECTROLUX), 24 July 2008 (2008-07-24); abstract; figures --	1-14
A	WO 2010042002 A1 (AKTIEBOLAGET ELECTROLUX), 15 April 2010 (2010-04-15); figure 3 --	1-14
A	US D364013 S1 (KLINGSPOR ET AL), 7 November 1995 (1995-11-07); figures -- -----	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

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Date of the actual completion of the international search

04-02-2014

Date of mailing of the international search report

05-02-2014

Name and mailing address of the ISA/SE

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Continuation of: second sheet**International Patent Classification (IPC)****A47L 5/24** (2006.01)**A47L 9/00** (2006.01)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE201 3/000063

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				US	7882593	B2	08/02/201 1
WO	201 0042002	A 1	15/04/201 0	CN	102245073	A	16/1 1/201 1
				EP	2358251	A 1	24/08/201 1
				SE	532852	C2	20/04/201 0
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US	D36401 3	S 1	07/1 1/1 995	NONE			