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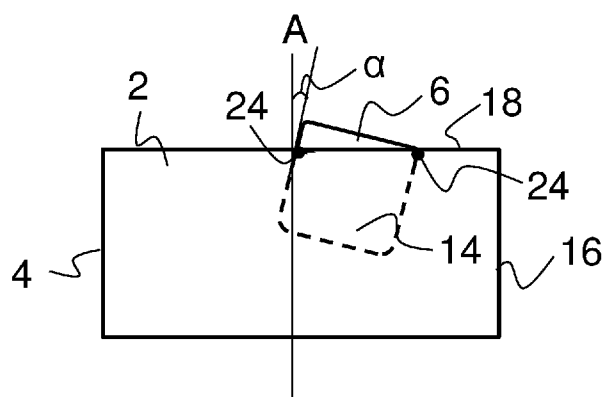


Fig. 2

(57) **Abstract:** The present invention relates to a housing (2) for power tools such as chainsaws, blowers, trimmers or hedge trimmers. The housing (2) has a front end (4), at which a tool (20) of the power tool is attached. The housing furthermore comprises a rear end (16) and a top side (18). A battery compartment (14) is provided at the top side (18) of the housing (2) and extends inside the housing (2) and has a shape adapted to receive a battery (6). The shape is essentially cuboidal and has a rectangular cross section looking at the top side (18) of the housing (2). The short sides (22) of the rectangular cross section are substantially parallel with the rear end (16) and the front end (4) of the housing (2).



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BATTERY COMPARTMENT FOR POWER TOOLS

Technical field

[0001] The present invention relates generally to housings that are used for power tools, such as chainsaws, trimmers, hedge trimmers and the like. Especially, the present invention relates to a battery compartment provided in the housing for power tools.

Background art

[0001] During the last decades, battery-driven power tools such as chainsaws, trimmers, hedge trimmers, etc. have become more and more popular due to the development of more efficient batteries. However, the more powerful batteries are bulkier, which may cause problems when designing the housing of the power tools, and especially the battery compartment provided in the housing.

[0002] The bulkiness of the battery may lead to a bulkiness of the housing, which in turn may lead to power tools that are more difficult to maneuver. Maneuverability in turn is a safety aspect, since many power tools may cause severe injuries if handled in a wrong way.

[0003] US patent no. 8,286,359 discloses a battery-operated chainsaw, wherein the battery is located at one side of a frame of the chainsaw. The purpose of the placement of the battery is to provide a center of gravity for the chainsaw that is located at least partially beneath or in front of a front handle. The front handle is formed by the frame that also forms a rear handle. In US patent no. 8,286,359, the chainsaw is of the type where the battery is attached direct towards a frame and not into a battery compartment. Such battery compartments in prior art may be placed at different positions of the housing.

[0004] Thus, there is a need for a battery compartment that does not build bulkiness to the housing of power tools in order to increase the maneuverability and thereby the safety of the power tool.

Summary of invention

[0005] An object of the present invention is to accomplish a housing for power tools with a battery compartment that does not contribute to the bulkiness of the housing and that makes the power tool easier to maneuver. A further object with the present invention is to provide a battery compartment into which it is easy to insert and release a battery.

[0006] According to one aspect of the present invention this is accomplished by a housing for a power tool, having a front end, at which front end a tool of the power tool is attached, a rear end and a top side. A battery compartment is provided at the top side of the housing, the battery compartment extending inside the housing and having a shape adapted to receive a battery. The shape is essentially cuboidal and has a rectangular cross section when looking at the top side of the housing and the short sides of the rectangular cross section are substantially parallel with the rear end and the front end of the housing.

[0007] In one embodiment, the battery compartment is skewed backwards towards the rear end with an angle of between 5 to 30 degrees in relation to an axis that is perpendicular to the top side of the housing, preferably the angle is between 7 and 15 degrees.

[0008] In another embodiment, the housing further comprises a release button arranged to eject the battery from the battery compartment during removal of the battery.

[0009] Furthermore, a gasket may be provided between the battery compartment and the battery, such that the battery compartment is sealed.

[0010] Providing the battery compartment such that the short sides of the rectangular cross section of the battery compartment are substantially parallel with the rear end and the front end of the housing makes it possible to reduce the width of the housing and thereby design a slimmer power tool. The advantage with a slimmer power tool is that it is possible to have the power tool closer to the body

during operation thereof. This makes the power tool easier to manoeuvre and thus increases the safety of the power tool.

[0011] Another advantage according to embodiments of the present invention is that the battery compartment is skewed backwards towards the rear end with an angle in relation to an axis that is perpendicular to the top side of the housing. This makes it easy for an operator of the power tool to insert and release the battery from the battery compartment.

Brief description of drawings

[0012] The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

[0013] Fig. 1 is a schematic view from above of a housing for power tools.

[0014] Fig. 2 is a schematic side view of the housing for power tools.

[0015] Fig. 3 is a perspective view of a chainsaw having a housing according to one embodiment of the present invention.

[0016] Fig. 4 is a perspective view of a trimmer having a housing according to one embodiment of the present invention.

Description of embodiments

[0017] In the following, a detailed description of a housing for power tools according to embodiments of the present invention will be presented.

[0018] With reference to Fig. 1 and Fig. 2 a housing 2 for power tools is shown. Fig. 1 shows the housing 2 from a view above and Fig. 2 shows the housing 2 in a side view. The housing 2 comprises a front end 4, at which a tool 20 of the power tool is attached. The tool 20 is schematically indicated with dotted lines and will be very different depending on the type of power tool that is used. In context of this application a power tool is a tool that is used primarily in the garden or sometimes also in the forest and is driven or powered by a battery. Examples of such power tools may be, chainsaws, blowers, trimmers, hedge trimmers etc.

[0019] Now returning to Fig. 1 and Fig. 2 where the housing 2 further comprises a rear end 16 and a top side 18. A battery compartment 14 is provided at the top side 18 of the housing 2 and extends inside the housing. The extension of the battery compartment 14 is indicated by dotted lines in Fig 2. The shape of the battery compartment 14 is adapted to receive a battery 6. In general, the shape of the battery compartment 14 is essentially cuboidal with an essentially rectangular cross section looking at the top side 18 of the housing 2. One very important feature of the present invention is that the short sides 22 of the rectangular cross section are substantially parallel with the rear end 16 and the front end 4 of the housing 2. This makes it possible to design a slimmer housing 2, i.e. a housing 2 having a small width W. Having a housing with a small width W is advantageous since it allows the power tool to come closer to the body of a user during operation of the power tool. This makes the power tool easier to manoeuvre and thus safer.

[0020] In Fig. 1 the battery 6 is provided with power indicator lamps 8 that indicate the remaining power in the battery 6, when a power check button 10 is pushed. Furthermore, the housing may also be provided with a release button 12, which when pushed ejects the battery 6 out of the battery compartment 14, such that a user may extract the battery 6 from the battery compartment 14 and replace the battery 6.

[0021] As is evident from Fig. 2, the battery compartment 14 is skewed backwards towards the rear end 16 with an angle α of between 5 to 30 degrees in relation to an axis A that is perpendicular to the top side 18 of the housing 2. The skewing is advantageous since the angle makes it easier for an operator to insert and extract the battery 6 from the battery compartment 14. In a preferred embodiment, the skewing angle α may be in the range of 7 and 15 degrees.

[0022] In another embodiment, the housing 2 may also be provided with a gasket 24 that is provided between the battery compartment 14 and the battery 6 when the battery 6 is inserted in the battery compartment 14, such that the battery compartment 14 is sealed.

[0023] Fig. 3 and Fig. 4 show two implementations of the present invention, wherein the housing 2 is used for two different power tools, i.e. a chainsaw in Fig. 3 and trimmer in Fig. 4. As can be seen the battery 6 is skewed making it easy for a user to access and exchange the battery 6.

[0024] Although, the present invention has been described above with reference to specific embodiments, it is not intended to be limited to the specific form set forth herein. Rather, the invention is limited only by the accompanying claims.

[0025] In the claims, the term “comprises/comprising” does not exclude the presence of other elements or steps. Furthermore, although individually listed, a plurality of means or elements may be implemented by e.g. a single unit or processor. Additionally, although individual features may be included in different claims, these may possibly advantageously be combined, and the inclusion in different claims does not imply that a combination of features is not feasible and/or advantageous. In addition, singular references do not exclude a plurality. The terms “a”, “an”, “first”, “second” etc do not preclude a plurality. Reference signs in the claims are provided merely as a clarifying example and shall not be construed as limiting the scope of the claims in any way.

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CLAIMS

1. A housing (2) for a power tool, the housing (2) having front end (4), at which front end (4) a tool (20) of the power tool is attached, a rear end (16) and a top side (18), wherein a battery compartment (14) is provided at the top side (18) of the housing (2), the battery compartment (14) extending inside the housing (2) and having a shape adapted to receive a battery (6), said shape being essentially cuboidal and having a rectangular cross section looking at the top side (18) of the housing (2) and wherein the short sides (22) of the rectangular cross section are substantially parallel with the rear end (16) and the front end (4) of the housing (2).
2. The housing (2) according to claim 1, wherein the battery compartment (14) is skewed backwards towards the rear end (16) with an angle (α) of between 5 to 30 degrees in relation to an axis (A) that is perpendicular to the top side (18) of the housing (2).
3. The housing (2) according to claim 2, wherein the angle (α) is between 7 and 15 degrees.
4. The housing (2) according to any of the previous claims, wherein the housing (2) further comprises a release button (12) arranged to eject the battery (6) from the battery compartment (14) during removal of the battery (6).
5. The housing (2) according to any of the previous claims, wherein a gasket (24) is provided between the battery compartment (14) and the battery (6), such that the battery compartment (14) is sealed.
6. The housing (2) according to any of the previous claims, wherein the housing (2) is adapted to be part of a chainsaw, a blower, a trimmer or a hedge trimmer.

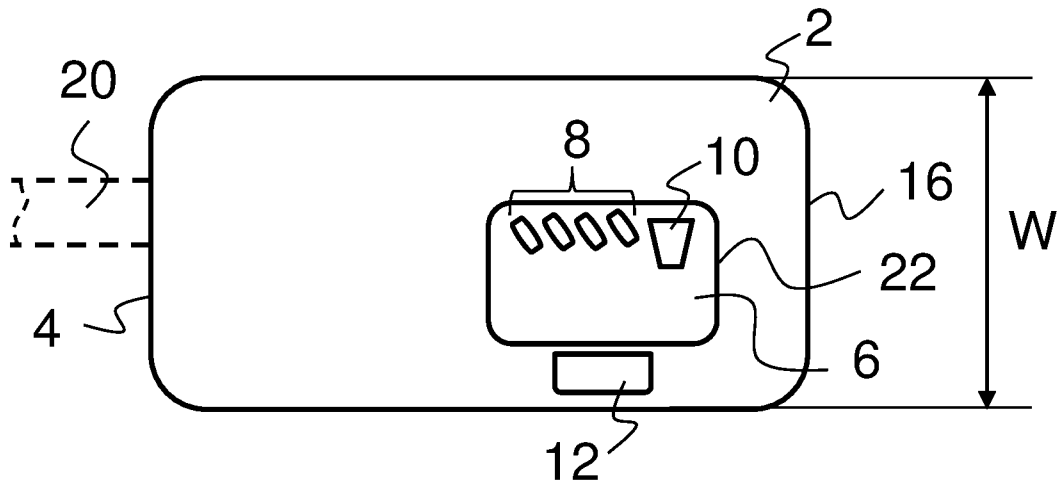


Fig. 1

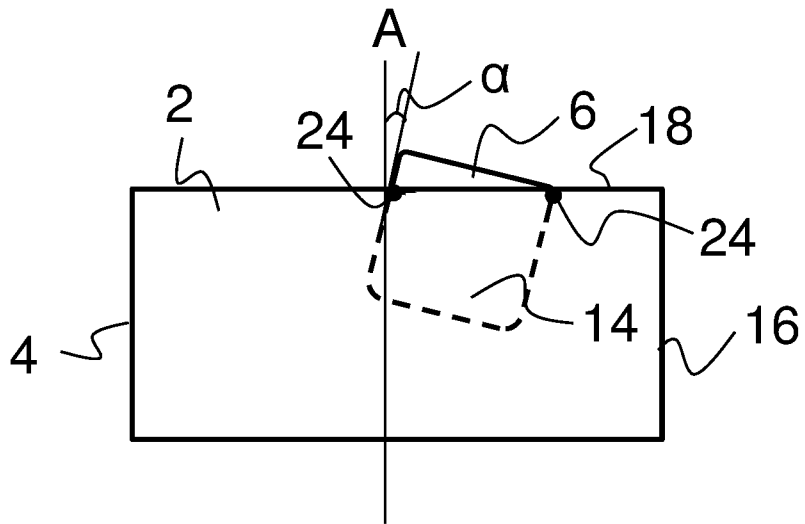


Fig. 2

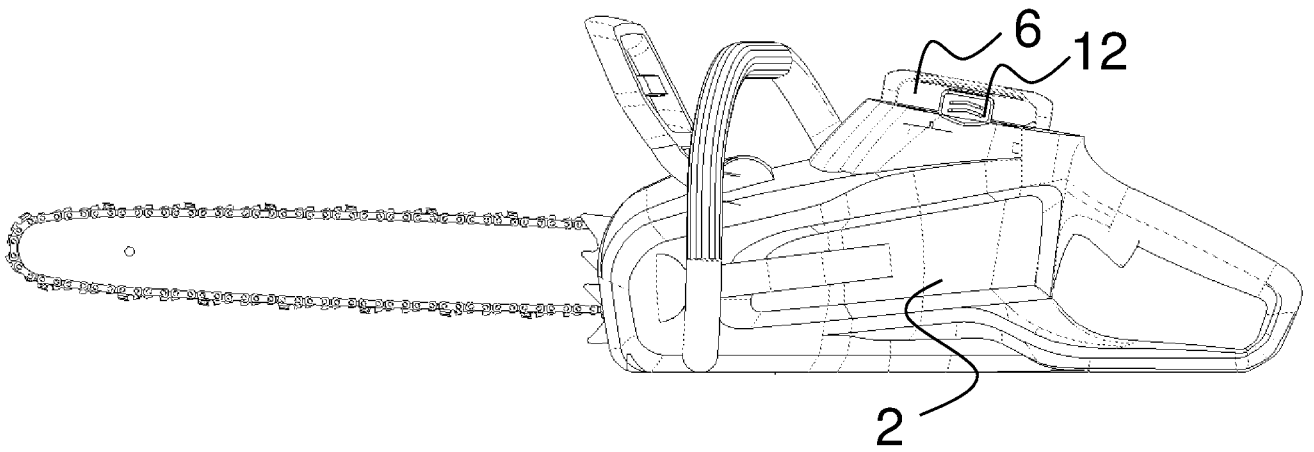


Fig. 3

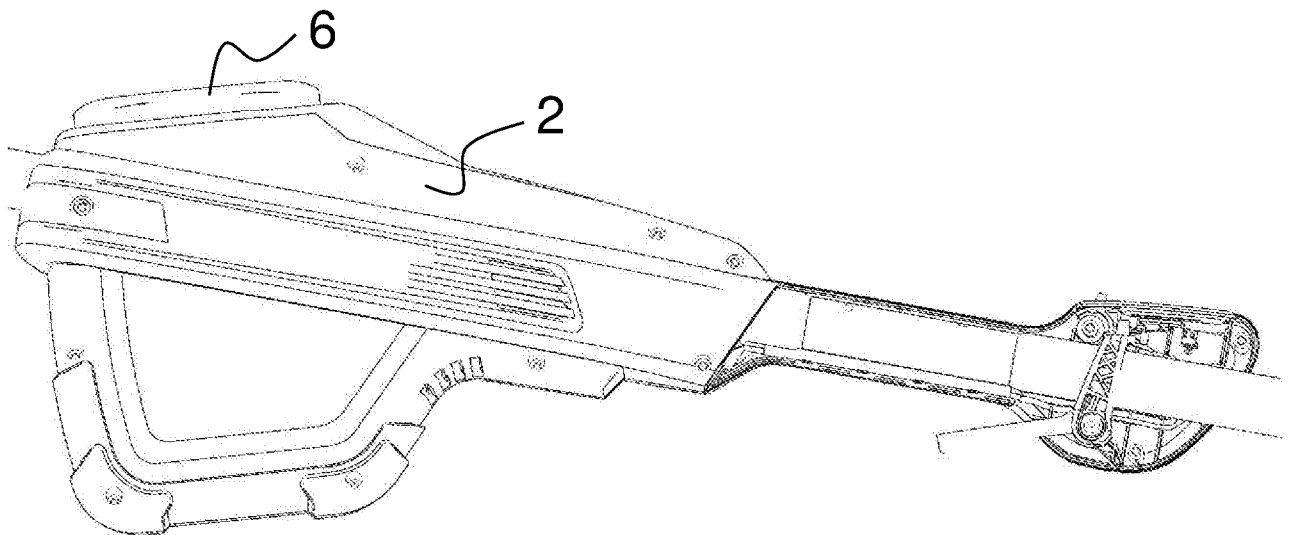


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER		
H01M 10/42(2006.01)i		
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)		
H01M; G06F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
CNABS;SIPOABS,IEEE:壳体, 电池, 电池间, 前, 后, 形状, 平行, 矩形, 空间, 容纳, 横断面, shell, housing, battery, cell?, front, rear, shape, parallel, rectangular, space, carry, corss section		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 1595714 A (SAMSUNG SDI CO LTD) 16 March 2005 (2005-03-16) the description page 2 line 27 to page 3 line 31, the figures 1-3	1-6
A	CN 101378109 A (SAMSUNG SDI CO LTD) 04 March 2009 (2009-03-04) the whole document	1-6
A	CN 1088024 A (MOTOROLA INC) 15 June 1994 (1994-06-15) the whole document	1-6
A	CN 101504973 A (JIADE ENERGY TECHNOLOGY ZHUHAI) 12 August 2009 (2009-08-12) the whole document	1-6
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search		Date of mailing of the international search report
27 June 2018		06 July 2018
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Information on patent family members

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	1595714	A	16 March 2005	JP	4484640	B2	16 June 2010
				US	7642005	B2	05 January 2010
				US	2005053829	A1	10 March 2005
				JP	2005085767	A	31 March 2005
				KR	100497252	B1	23 June 2005
				KR	20050026162	A	15 March 2005
				CN	1324723	C	04 July 2007
<hr/>							
CN	101378109	A	04 March 2009	US	2009061294	A1	05 March 2009
				EP	2031674	B1	31 October 2012
				JP	2009059681	A	19 March 2009
				JP	5319165	B2	16 October 2013
				EP	2031674	A1	04 March 2009
				KR	100876265	B1	26 December 2008
				CN	101378109	B	18 April 2012
<hr/>							
CN	1088024	A	15 June 1994	US	5300372	A	05 April 1994
				EP	0669041	A4	22 May 1996
				JP	H08502619	A	19 March 1996
				JP	3614431	B2	26 January 2005
				WO	9410711	A1	11 May 1994
				EP	0669041	A1	30 August 1995
<hr/>							
CN	101504973	A	12 August 2009	CN	101504973	B	23 April 2014