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- (71) Applicant (for all designated States except US):
HUSQVARNA AB [SE/SE]; Drottninggatan 2, S-561 82 Huskvarna (SE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **BERGQUIST, Oskar** [SE/SE]; Skolgatan 30A, S-561 35 Huskvarna (SE). **ARVIDSSON, Mikael** [SE/SE]; Fridländersväg 7, S-561 39 Huskvarna (SE). **LANDBERG, Gustav** [SE/SE]; Dokt- or Abelins Gata 6, S-118 53 Stockholm (SE).
- (74) Agent: **SJÖSTRÖM, Hanna**; Husqvarna AB, EM-LPH, Intellectual Property Dept., Drottninggatan 2, S-561 82 Huskvarna (SE).
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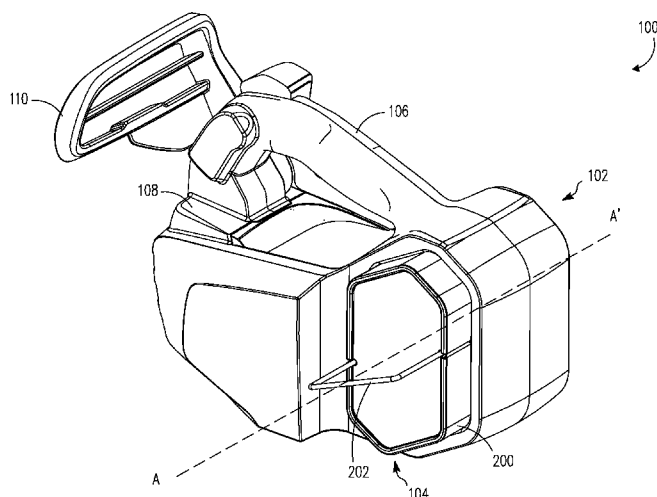


FIG. 2

(57) **Abstract:** The present invention provides a battery powered tool 100 that includes a tool body 102 and a battery pack 104. The tool body 102 is provided with an aperture adapted to receive the battery pack 104. The battery pack 104 includes a housing 200 and a handle 202 adapted to be movable relative to the housing 200 between a recessed position, wherein the handle 202 is pushed into the housing 200, and a protruding position, wherein the handle 202 is pulled out such that it protrudes outside the housing 200. Further the battery pack 104 also includes a resilient member 300 provided in the housing 200. The resilient member 300 is adapted to lock the battery pack 104 to the tool body 102 when the handle 202 is in the recessed position.



HANDHELD POWER TOOL AND BATTERY PACK THEREFOR

TECHNICAL FIELD

5 The present invention relates to handheld power tools. More particularly, the present invention relates to a battery powered handheld power tool and a battery pack therefor.

BACKGROUND

10 Handheld power tools, such as bandsaws, chainsaws, drills, trimmers, grinding machines, power wrenches and the like, are used in a variety of household and industrial applications such as, but not limited to, drilling, cutting, shaping, driving, sanding, grinding, polishing, painting, and heating. Conventionally, the handheld power tools are powered by an AC power source. Alternatively, the handheld power tools may also be powered by a rechargeable power source, such as
15 one or more batteries. Such a rechargeable power source is generally contained within the handheld power tools and thus such power tools are free from cumbersome extension cords. Conventionally, power tools include a cavity adapted to receive the rechargeable power source.

20 U.S. Pat. No. 7,670,714 issued on Mar 2, 2010 and assigned to Robert Bosch GmbH., titled "Battery pack" describes a battery pack for an electrical device. The battery pack comprises a base body, a locking element for locking the base body to the electrical device, and an actuating element for actuating the locking element. The locking element has a retaining region, which is provided for retaining the actuating element at least in the unlocked state of the base body. However, this U.S. patent fails
25 to address the problem of vibrations of the battery pack, during operation of the handheld power tool. Further, this U.S. patent does not intend to preclude the battery pack from falling out when the battery pack is unlocked.

30 U.S. Pat No. 5,937,623 issued on Aug 17, 1999 and assigned to Wolf-Gerate GmbH Vertriebsgesellschaft, titled "Accumulator-powered lawn-mower" describes a lawn mower chassis for holding an electric motor of an electric lawn mower. The accumulator-powered lawn mower includes a battery holder and a battery for providing power to the electric motor. The battery holder includes an interlock recess.

The battery includes a handle and an interlocking member. The battery can be accommodated in a battery housing which can be inserted into the battery holder. The interlocking member engages with the interlock recess to secure the battery to the battery holder when the handle is to a first position i.e. when the handle is folded up.

- 5 However, automatic unlocking of the battery from the battery holder occurs when the handle is swung up. Such unlocking of the battery may result in accidental falling of the battery from the battery holder.

In light of the foregoing, there is a need for safely locking the battery with the power tool during an operation of the power tool, while precluding the battery from
10 accidentally falling during the removal of the battery from the power tool.

SUMMARY

In view of the above, it is an objective of the present invention to solve or at least reduce the problems discussed above. In particular, the objective is to provide an
15 improved battery powered handheld power tool and a battery pack therefor.

Claim 1 provides a novel battery powered tool having a tool body and a battery pack. The tool body is provided with an aperture, which is adapted to receive the battery pack. Further, the battery pack includes a housing and a handle. The handle is adapted to be movable relative to the housing between a recessed position in
20 which the handle is pushed into the housing, and a protruding position in which the handle is pulled out such that it protrudes outside the housing. The battery pack further includes a resilient member provided in the housing. The resilient member is adapted to lock the battery pack to the tool body when the handle is in the recessed position. The advantage of the novel battery powered tool may be that during the
25 operation of the battery powered tool, it may be ensured that the battery remains locked with the tool body. Moreover, the present assembly of the battery pack with the tool body, may allow flexibility to use larger batteries in the battery powered tool. Also, this assembly may require fewer parts and offers a robust design. The handle may be provided to remove the battery from the tool body. As long as the handle is in
30 the recessed position, the battery pack may be locked. In order to unlock the battery pack, the handle may be removed from the recessed position. The recessed position may be a position when the handle is fully pushed into the housing. By the handle being pushed into the housing in the recessed position it may be meant a position of

the handle wherein it is fully pushed into the housing, or is pushed into the housing such that most of the handle is in the housing. A part of the handle may protrude outside the housing when the handle is in the recessed position.

According to claim 2, the resilient member may be adapted to lock the battery
5 pack to the tool body in any position of the handle between the recessed position and the protruding position separated from the protruding position. This may avoid accidental falling of the battery pack during the removal of the battery pack from the tool body. In order to release the battery pack, the handle may need to be moved all the way to the protruding position from the recessed position. The protruding position
10 may be a position wherein the handle protrudes from the housing and the resilient member releases the locking of the battery pack. From that position, further pulling of the handle may cause a removal of the battery from the aperture in the tool instead of movement of the handle relative to the housing.

According to claim 3, the resilient member may be adapted to unlock the
15 battery pack from the tool body when the handle is in the protruding position. This may avoid accidental falling of the battery pack, when the handle is in the protruding position. The resilient member may unlock the battery pack in the protruding position of the handle, however it is required to further pull the handle to remove the battery pack from the aperture provided in the tool body.

According to claim 4, when the handle is in any position between the recessed
20 position and the protruding position, separated from the protruding position the resilient member may be stressed against the handle. The resilient member may urge towards a resting position, which may provide a release of the battery. However, in any position of the handle between the recessed position and the protruding position, separated from the protruding position, the handle may hold the resilient member
25 away from the resting position. This may ensure a safe movement of the battery pack from the recessed position to the protruding position of the handle. Further, when the handle is in the protruding position, the resilient member may reach the resting position, which ensures an easy removal of the battery pack on further movement of
30 the handle.

According to claim 5, the handle may include a recess. The resilient member may be adapted to integrate with the recess for holding the handle in the recessed position. Such integration of the resilient member with the handle may ensure that the

handle remains in the recessed position while keeping the resilient member away from its resting position.

According to claim 6, the resilient member may be provided as a resilient branch. The resilient branch may include a knee adapted to integrate with the recess
5 in the handle for holding the handle in the recessed position. The knee may be formed to effectively integrate with the recess. Further, the recess and the knee may be formed to provide a joint that need a pre-determined force to separate the knee from the recess. This may preclude the movement of the handle from the recessed position in the absence of pre-determined force being applied by the user.

10 According to claim 7, the tool body may comprise an opening within the aperture adapted to receive the battery pack. The opening may be adapted to integrate with an end portion of the resilient member such that the battery pack may be locked to the tool body when said end portion integrates with said opening. This may ensure a safe locking of the battery pack with the tool body, during an operation of the
15 battery powered tool.

According to claim 8, the end portion of the resilient member may be adapted to integrate with the opening within the aperture in the tool body, when the handle is in any position between the recessed position and the protruding position, separated from the protruding position. The resilient member may be pushed into the opening
20 when the handle is not in the protruding position, and thus locks the battery pack with the tool body. Further, on integrating with the opening, the resilient member may get stressed urging towards the handle and the resting position. This may ensure a safe movement of the battery pack from the recessed position to the protruding position. Further, when the handle is in the protruding position, the resilient member may reach
25 the resting position and unlock the battery pack such that further pulling of the handle may remove the battery pack from the tool body.

According to claim 9, the resilient member may be adapted to hold the handle in the protruding position when the handle has been moved to the protruding position. In the protruding position of the handle, the resilient member may be in the resting
30 position. Further, the resting position may provide an interaction between the resilient member and the handle such that the handle may not, by itself, leave the protruding position. This may ensure that the battery pack may not fall accidentally, when the handle is in the protruding position.

According to claim 10 an end portion of the resilient member may be adapted to abut an end portion of the handle in order to hold the handle in the protruding position. This may eliminate the possibility of movement of the handle from the protruding position to the recessed position. Moreover, this may also ensure that the battery pack may not fall accidentally, when the handle is in the protruding position.

According to claim 11, the battery powered tool may be a handheld garden tool.

Claim 12 provides a novel battery pack for a battery powered tool. The battery pack may include a housing and a handle. The handle may be adapted to be movable relative to the housing between a recessed position in which the handle is pushed into the housing, and a protruding position in which the handle is pulled out such that it protrudes outside the housing. The battery pack may further include a resilient member provided in the housing. The resilient member may be adapted to lock the battery pack to the tool body when the handle is in the recessed position. The advantage of the novel battery powered tool may be that during the operation of the battery powered tool, it is ensured that the battery remains locked with the tool body. Moreover, the present assembly of the battery pack with the tool body may allow flexibility to use larger batteries in the battery powered tool. Also, this assembly may require fewer parts and offers a robust design.

According to claim 13, the resilient member may be adapted to lock the battery pack to the tool body in any position of the handle between the recessed position and the protruding position separated from the protruding position. This may avoid accidental falling of the battery pack during the removal of the battery pack from the tool body. In order to release the battery pack, the handle may need to be moved all the way to the protruding position from the recessed position.

According to claim 14, the resilient member may be adapted to unlock the battery pack from the tool body when the handle is in the protruding position. This may avoid accidental falling of the battery pack, when the handle is in the protruding position. The resilient member may unlock the battery pack in the protruding position of the handle, however it is required to further pull the handle to remove the battery pack from the aperture provided in the tool body.

According to claim 15, when the handle may be in any position between the recessed position and the protruding position, separated from the protruding position

the resilient member may be stressed against the handle. The resilient member may urge towards a resting position, which may provide a release of the battery. However, in any position of the handle between the recessed position and the protruding position, separated from the protruding position, the handle may hold the resilient member away from the resting position. This may ensure a safe movement of the battery pack from the recessed position to the protruding position of the handle. Further, when the handle is in the protruding position, the resilient member may reach the resting position, which ensures an easy removal of the battery pack on further movement of the handle.

10 According to claim 16, the handle may include a recess. The resilient member may be adapted to integrate with the recess for holding the handle in the recessed position. Such integration of the resilient member with the handle may ensure that the handle remains in the recessed position while keeping the resilient member away from its resting position.

15 According to claim 17, the resilient member may be provided as a resilient branch. The resilient branch may include a knee adapted to integrate with the recess in the handle for holding the handle in the recessed position. The knee may be formed to effectively integrate with the recess. Further, the recess and the knee may be formed to provide a joint that need a pre-determined force to separate the knee from the recess. This may preclude the movement of the handle from the recessed position in the absence of pre-determined force being applied by the user.

20 According to claim 18, the resilient member may be adapted to hold the handle in the protruding position when the handle has been moved to the protruding position. In the protruding position of the handle, the resilient member may be in the resting position. Further, the resting position may provide an interaction between the resilient member and the handle such that the handle may not, by itself, leave the protruding position. This may ensure that the battery pack may not fall accidentally, when the handle is in the protruding position.

25 According to claim 19 an end portion of the resilient member may be adapted to abut an end portion of the handle in order to hold the handle in the protruding position. This may eliminate the possibility of movement of the handle from the protruding position to the recessed position. Moreover, this may also ensure that the battery pack may not fall accidentally, when the handle is in the protruding position.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will in the following be described in more detail with reference to the enclosed drawings, wherein:

FIG. 1 illustrates a perspective view of a handheld power tool, according to an embodiment of the present invention;

FIG. 2 illustrates a perspective view of the handheld power tool, according to an embodiment of the present invention;

FIG. 3 illustrates a perspective view of a battery pack, according to an embodiment of the present invention;

FIG. 4 illustrates a sectional view of the battery pack, according to an embodiment of the present invention;

FIG. 5 illustrates a sectional view of the battery pack and a portion of a tool body, according to an embodiment of the present invention; and

FIG. 6 illustrates a side view of the battery pack, according to an embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which example embodiments of the invention incorporating one or more aspects of the present invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. For example, one or more aspects of the present invention can be utilized in other embodiments and even other types of devices. In the drawings, like numbers refer to like elements.

FIG. 1 and FIG. 2 illustrate perspective views of an exemplary handheld power tool **100**, according to an embodiment of the present invention. In the embodiments of FIG. 1 and FIG. 2 the exemplary handheld power tool **100** is a handheld chainsaw. The handheld chainsaw (hereinafter referred to as the “battery powered tool **100**”) may be employed in various activities, such as but not limited to felling, limbing, bucking, pruning and related applications. However, the present invention may also be used in any other battery powered tools, such as, but not

limited to, line trimmers, hedge trimmers, drills, reciprocating saws, rotary saws, power screw drivers, or other cutting or pruning tools without departing from the essence of the present invention. In addition, any suitable size, shape or type of elements or materials could be used.

5 As illustrated in FIG. 1 and FIG. 2, the battery powered tool **100** includes a tool body **102** and a battery pack **104**. Further, the tool body **102** includes an aperture, which is adapted to receive the battery pack **104**. In the embodiment of FIG. 1 and FIG. 2, the tool body **102** includes a handle member **106** on a top surface **108** of the tool body **102**. However, it is apparent to a person of ordinary skill in the art that the
10 handle member **106** may be placed on any other part of the tool body **102** without departing from the scope of the present invention. The handle member **106** facilitates the handling and transportation of the battery powered tool **100**. The handle member **106** may also include one or more vibration absorbing means (not shown), such as springs, rubber members, or the like. Further, the tool body **102** includes a chain
15 brake lever **110** extending from the top surface **108** thereof.

Additionally, the tool body **102** may include a motor (not shown), such as but not limited to, an AC motor, a DC motor or the like, contained within the tool body **102**. The battery powered tool **100** also includes one or more implements, such as cutting blades (not shown) associated with the tool body **102**. The one or more
20 implements are coupled to the motor through suitable transmission means (not shown), for example, but not limited to, one or more gears, belt drives, friction drives or any combination thereof. The suitable transmission is utilised to selectively drive the one or more cutting implements at one or more speeds.

As illustrated in FIG 3, the battery pack **104** includes a housing **200** and a
25 handle **202**, which is adapted to be movable relative to the housing **200**. The handle **202** is adapted to move between a recessed position (as illustrated in FIG. 1), where the handle **202** is pushed into the housing **200** and a protruding position (as illustrated in FIG. 2), where the handle **202** is pulled out such that the handle **202** protrudes outside the housing **200**. The movement of the handle **202** is illustrated in FIG. 2
30 along an imaginary section line AA'. The housing **200** also includes a resilient member **300**, which is adapted to lock the battery pack **104**, relative to the tool body **102**, in any position of the handle **202** between the recessed position and the protruding position, separated from the protruding position.

FIG. 3 illustrates a perspective view of the battery pack **104**, according to an embodiment of the present invention. As illustrated in FIG. 3, the housing **200** includes the resilient member **300**. The resilient member **300** may be composed of an elastic material such as, but not limited to, a metallic strip, rubber, spring and the like.

5 However, it is apparent to a person of ordinary skill in the art that the resilient member **300** may alternatively be composed of any other elastic material without departing from the scope of the present invention. The housing **200** includes a vertically upstanding slot carrying the resilient member **300**. However, it is apparent to a person of ordinary skill in the art that the resilient member **300** may be placed at

10 any other suitable location within the housing **200** without departing from the scope of the present invention. The resilient member **300** is adapted to lock and unlock the battery pack **104** to the tool body **102**, when the handle **202** is in the recessed position (as illustrated in FIG. 1).

Further, the handle **202** includes a holding member **302** and a pair of

15 retractable members **304a** and **304b**, having their top end portions connected to the holding member **302**. The recessed position of the handle **202** corresponds to a position when the pair of retractable members **304a** and **304b** of the handle **202** are pushed into the housing **200**, such that a substantial portion of the pair of retractable members **304a** and **304b** is received in the housing **200**. The resilient member **300** is

20 adapted to lock the battery pack **104** to the tool body **102** when the handle **202** is in the recessed position. Accordingly, as long as the handle **202** is in the recessed position, the battery pack **104** remains locked in the tool body **102**. Further, in order to unlock the battery, the handle **202** is pulled out such that the pair of retractable members **304a** and **304b** protrudes outside the housing **200**. Thus, in order to unlock

25 the battery pack **104** from the tool body **102**, the handle **202** is pulled out to the protruding position thereof. Subsequent pulling of the handle **202** causes removal of the battery pack **104** from the tool body **102**.

In an embodiment of the present invention, the resilient member **300** is adapted to lock the battery pack **104** to the tool body **102** in any position of the handle

30 **202** between the recessed position and the protruding position, separated from the protruding position.

In the embodiment of FIG. 3, at least one of the retractable members **304a** and **304b** of the handle **202** includes a recess **306**. Further, the resilient member **300** is

adapted to integrate with the recess **306** provided in the retractable member **304a** for holding the handle **202** in the recessed position.

FIG. 4 illustrates a sectional view of the battery pack **104**, taken along the sectional line AA' of FIG. 2, according to an embodiment of the present invention.

5 As illustrated in FIG. 4, the resilient member **300** is provided as a resilient branch and the resilient branch includes a knee **400** and an end portion **402**. The knee **400** of the resilient member **300** is positioned towards the handle **202**. The knee **400** of the resilient member **300** is adapted to integrate with the recess **306** provided in the retractable member **304a** of the handle **202** to lock the battery pack **104** with the tool
10 body **102**, when the handle **202** is in the recessed position.

Further, as the resilient member **300** is composed of elastic material, the resilient member **300** urges toward a resting position, which provides a means to release the battery pack **104**. However, when the handle **202** is in any position between the recessed position and the protruding position, but separated from the
15 protruding position, the handle **202** displaces the resilient member **300** from the resting position to a stressed position (illustrated in FIG. 5). In the stressed position, the resilient member **300** applies a constant stress on the handle **202**. Specifically, the knee **400** of the resilient member **300** is adapted to be in contact with one of the retractable members **304a** and **304b** of the handle **202** for applying constant stress to
20 the handle **202**. The stress applied by the resilient member **300** against the handle **202** also eliminates the possibility of rattling of the battery pack **104** during the operation of the battery powered tool **100**.

FIG. 5 illustrates a sectional view of the battery pack **104** and a portion of the tool body **102** taken along the imaginary sectional line AA' of FIG. 2. As illustrated
25 in FIG. 5, the tool body **102** includes an opening **500** positioned on an inner surface of the aperture of the tool body **102**. When the resilient member **300** is displaced from the resting position thereof, i.e. when the handle **202** is in any position between the recessed position and the protruding position, the end portion **402** of the resilient member **300** is adapted to integrate with the opening **500** positioned on the inner
30 surface of the aperture of the tool body **102**. The integration of the end portion **402** of the resilient member **300** and the opening **500** locks the battery pack **104** to the tool body **102** in any position of the handle **202** between the recessed position and the protruding position, but separated from the protruding position. Further, as soon as

the handle **202** moves up to the protruding position, the resilient member **300** gets displaced to the resting position thereof, and accordingly the end portion **402** of the resilient member **300** is adapted to disengage from the opening **500**. Such disengagement of the end portion **402** from the opening **500** unlocks the battery pack
5 **104** from the tool body **102** and subsequently, further pulling of the handle **202** removes the battery pack **104** from the tool body **102**.

FIG. 6 illustrates a side view of the battery pack **104**, according to an embodiment of the present invention. When the handle **202** is moved up to the protruding position, the end portion **402** of the resilient member **300** gets disengaged
10 from the opening **500**. As illustrated in FIG. 6, in order to preclude free movement of the handle **202**, the end portion of the resilient member **300** is adapted to abut an end portion **600** of the handle **202** and thus, holds the handle **202** in the protruding position. Specifically, when the handle **202** is pulled up to the protruding position, the end portion **600** of the retractable member **304a** of the handle **202** gets engaged with
15 the end portion of the resilient member **300**. This abutting of the resilient member **300** with the end portion **600** of the handle **202** restricts the movement of the handle **202** towards the recessed portion without application of an external force. Further, it also ensures that the battery pack **104** does not fall accidentally when the handle **202** reaches the protruding position. Since the resilient member **300** abuts an end portion
20 of the handle **202**, an external force is required to pull the handle further away from the protruding position in order to remove the battery pack **104** from the tool body **102**.

In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are
25 employed, they are used in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being set forth in the following claims.

CLAIMS

1. A battery powered tool **(100)** comprising a tool body **(102)** and a battery pack **(104)**, wherein the tool body **(102)** is provided with an aperture adapted to receive
5 said battery pack **(104)**,
characterized in that the battery pack **(104)** comprises
a housing **(200)**,
a handle **(202)** adapted to be movable relative to the housing **(200)** between a
recessed position, wherein the handle **(202)** is pushed into the housing **(200)**, and a
10 protruding position, wherein the handle **(202)** is pulled out such that it protrudes
outside the housing **(200)**, and
a resilient member **(300)** provided in the housing **(200)**,
wherein the resilient member **(300)** is adapted to lock the battery pack **(104)** to
the tool body **(102)** when the handle **(202)** is in the recessed position.
15
2. Battery powered tool **(100)** according to claim 1, wherein the resilient member **(300)** is adapted to lock the battery pack **(104)** to the tool body **(102)** in any position
of the handle **(202)** between the recessed position and the protruding position,
separated from the protruding position.
20
3. Battery powered tool **(100)** according to claim 1 or 2, wherein the resilient
member **(300)** is adapted to unlock the battery pack **(104)** from the tool body **(102)**
when the handle **(202)** is in the protruding position.
- 25 4. Battery powered tool **(100)** according to any of the claims 1-3, wherein the
resilient member **(300)** is stressed against the handle **(202)**, when the handle **(202)** is
in any position between the recessed position and the protruding position, separated
from the protruding position.
- 30 5. Battery powered tool **(100)** according to any of the claims 1-4, wherein the
handle **(202)** is provided with a recess **(306)**, and wherein the resilient member **(300)**
is adapted to integrate with the recess **(306)** for holding the handle **(202)** in the
recessed position.

6. Battery powered tool **(100)** according to claim 5, wherein the resilient member **(300)** is provided as a resilient branch, the resilient branch comprising a knee **(400)** adapted to integrate with the recess **(306)** in the handle **(202)** for holding the handle **(202)** in the recessed position.
7. Battery powered tool **(100)** according to any of the claims 1-6, wherein the tool body **(102)** comprises an opening **(500)** within the aperture adapted to receive the battery pack **(104)**, said opening **(500)** being adapted to integrate with an end portion **(600)** of the resilient member **(300)** such that the battery pack **(104)** is locked to the tool body **(102)** when said end portion integrates with said opening **(500)**.
8. Battery powered tool **(100)** according to claim 7, wherein the end portion **(600)** of the resilient member **(300)** is adapted to integrate with the opening **(500)** within the aperture in the tool body **(102)** when the handle **(202)** is in any position between the recessed position and the protruding position, separated from the protruding position.
9. Battery powered tool **(100)** according to any of the claims 1-8, wherein the resilient member **(300)** is adapted to hold the handle **(202)** in the protruding position when the handle **(202)** has been moved to the protruding position.
10. Battery powered tool **(100)** according to claim 9, wherein an end portion **(600)** of the resilient member **(300)** is adapted to abut an end portion **(600)** of the handle **(202)** in order to hold the handle **(202)** in the protruding position.
11. Battery powered tool **(100)** according to any of the claims 1-10, wherein the tool is a handheld garden tool.
12. A battery pack **(104)** for a battery powered tool **(100)**, characterized in that the battery pack **(104)** comprises a housing **(200)**,

a handle **(202)** adapted to be movable relative to the housing **(200)** between a recessed position, wherein the handle **(202)** is pushed into the housing **(200)**, and a protruding position, wherein the handle **(202)** is pulled out such that it protrudes outside the housing **(200)**, and

- 5 a resilient member **(300)** provided in the housing **(200)**,
wherein the resilient member **(300)** is adapted to lock the battery pack **(104)** to the tool body **(102)** of the battery powered tool when the handle **(202)** is in the recessed position.

- 10 13. Battery pack **(104)** according to claim 12, wherein the resilient member **(300)** is adapted to lock the battery pack **(104)** to the tool body **(102)** in any position of the handle **(202)** between the recessed position and the protruding position, separated from the protruding position.

- 15 14. Battery pack **(104)** according to claim 12 or 13, wherein the resilient member **(300)** is adapted to unlock the battery pack **(104)** from the tool body **(102)** when the handle **(202)** is in the protruding position.

- 20 15. Battery pack **(104)** according to any of the claims 12-14, wherein the resilient member **(300)** is stressed against the handle **(202)**, when the handle **(202)** is in any position between the recessed position and the protruding position, separated from the protruding position.

- 25 16. Battery pack **(104)** according to any of the claims 12-15, wherein the handle **(202)** is provided with a recess **(306)**, and wherein the resilient member **(300)** is adapted to integrate with the recess for holding the handle **(202)** in the recessed position.

- 30 17. Battery pack **(104)** according to claim 16, wherein the resilient member **(300)** is provided as a resilient branch, the resilient branch comprising a knee **(400)** adapted to integrate with the recess **(306)** in the handle **(202)** for holding the handle **(202)** in the recessed position.

18. Battery pack **(104)** according to any of the claims 12-17, wherein the resilient member **(300)** is adapted to hold the handle **(202)** in the protruding position when the handle **(202)** has been moved to the protruding position.
- 5 19. Battery pack **(104)** according to claim 18, wherein an end portion **(402)** of the resilient member **(300)** is adapted to abut an end portion **(600)** of the handle **(202)** in order to hold the handle **(202)** in the protruding position.

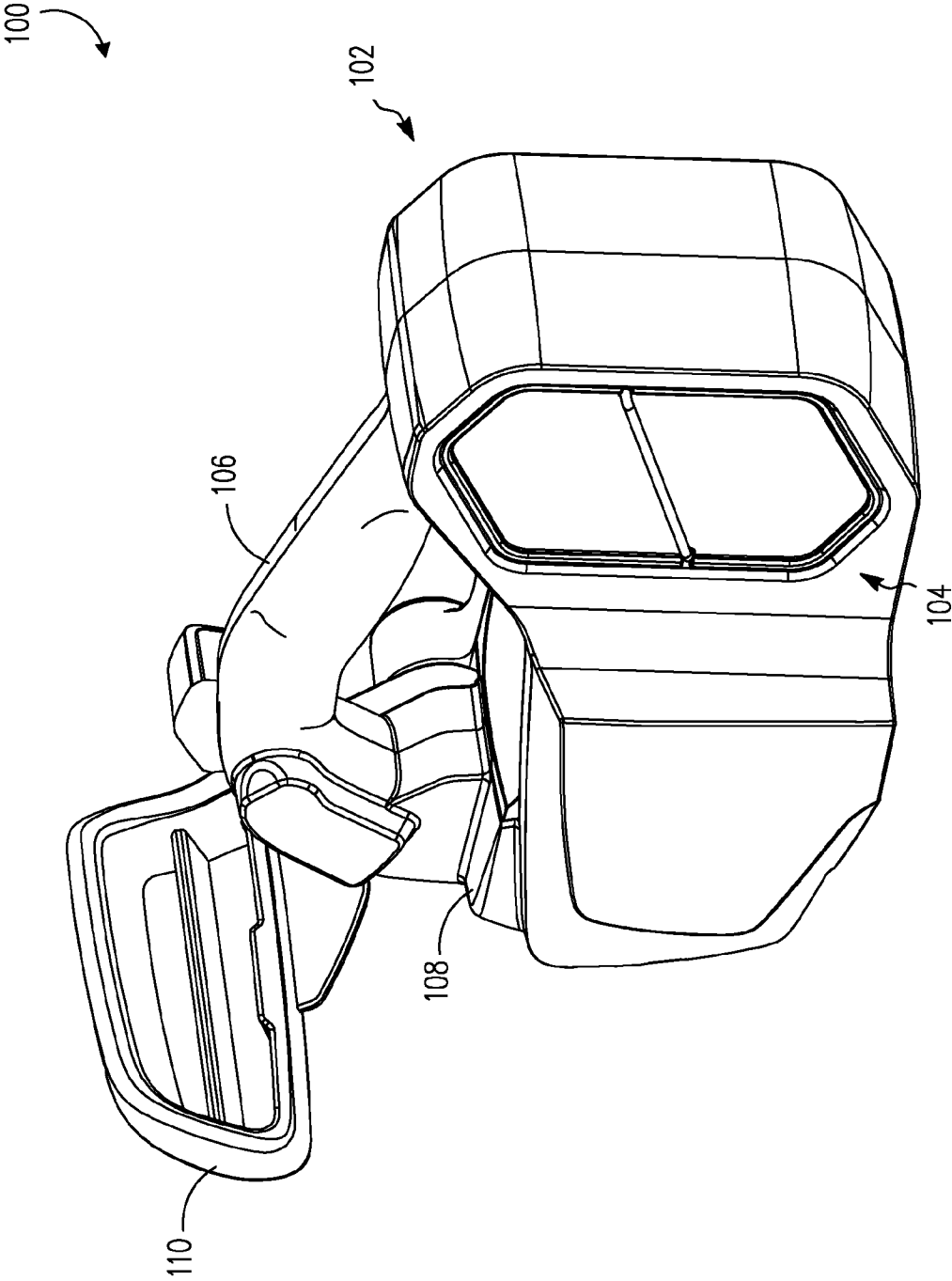


FIG. 1

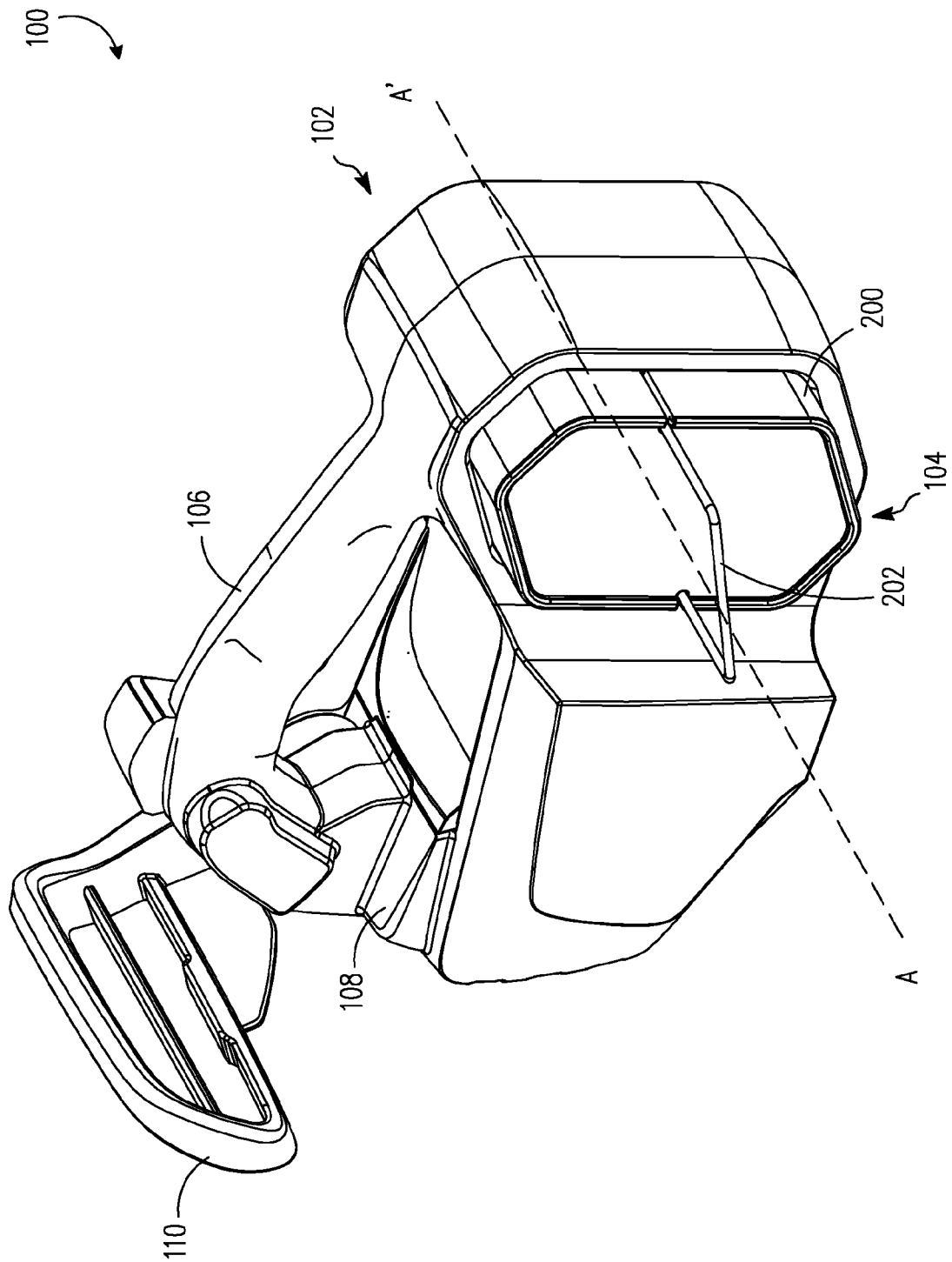


FIG. 2

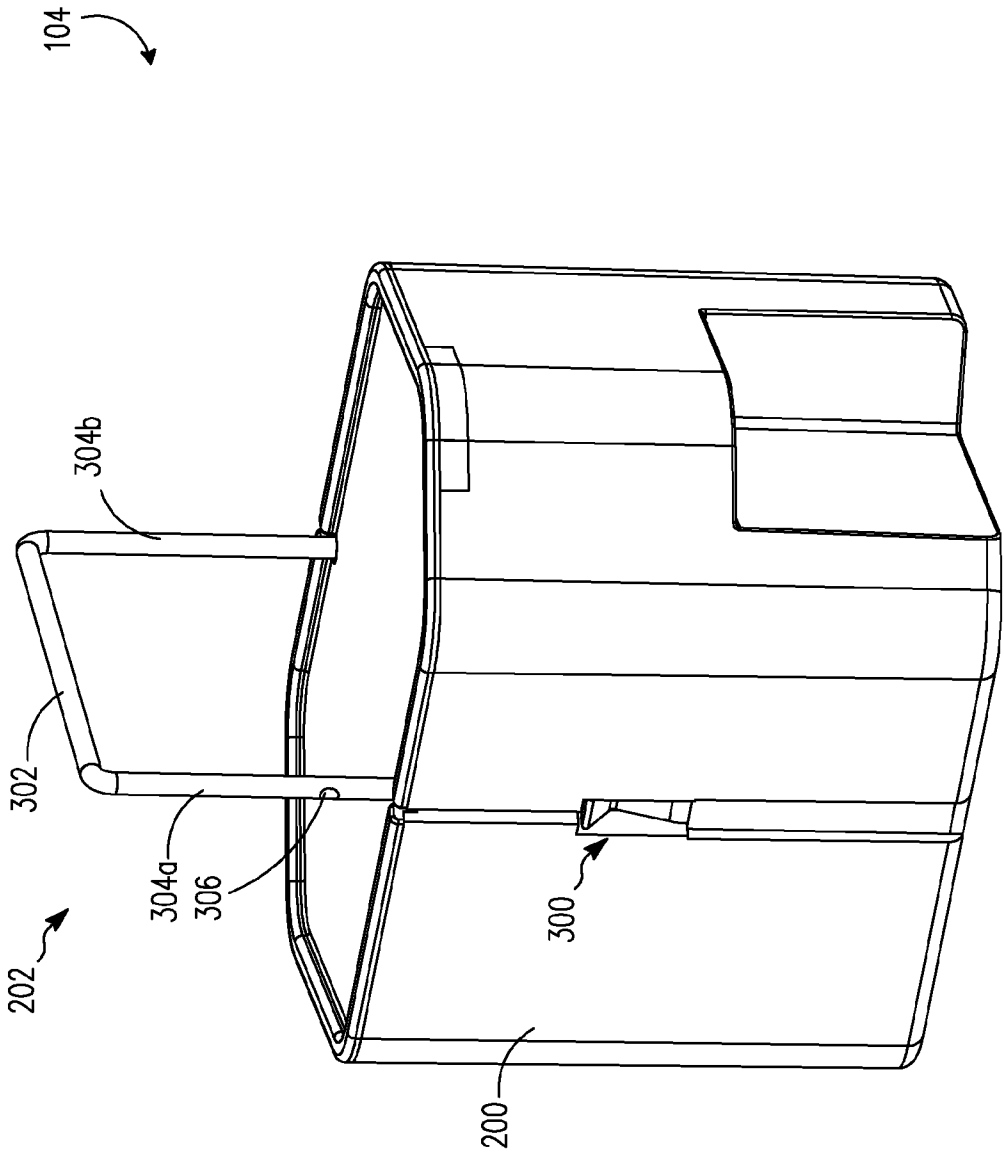


FIG. 3

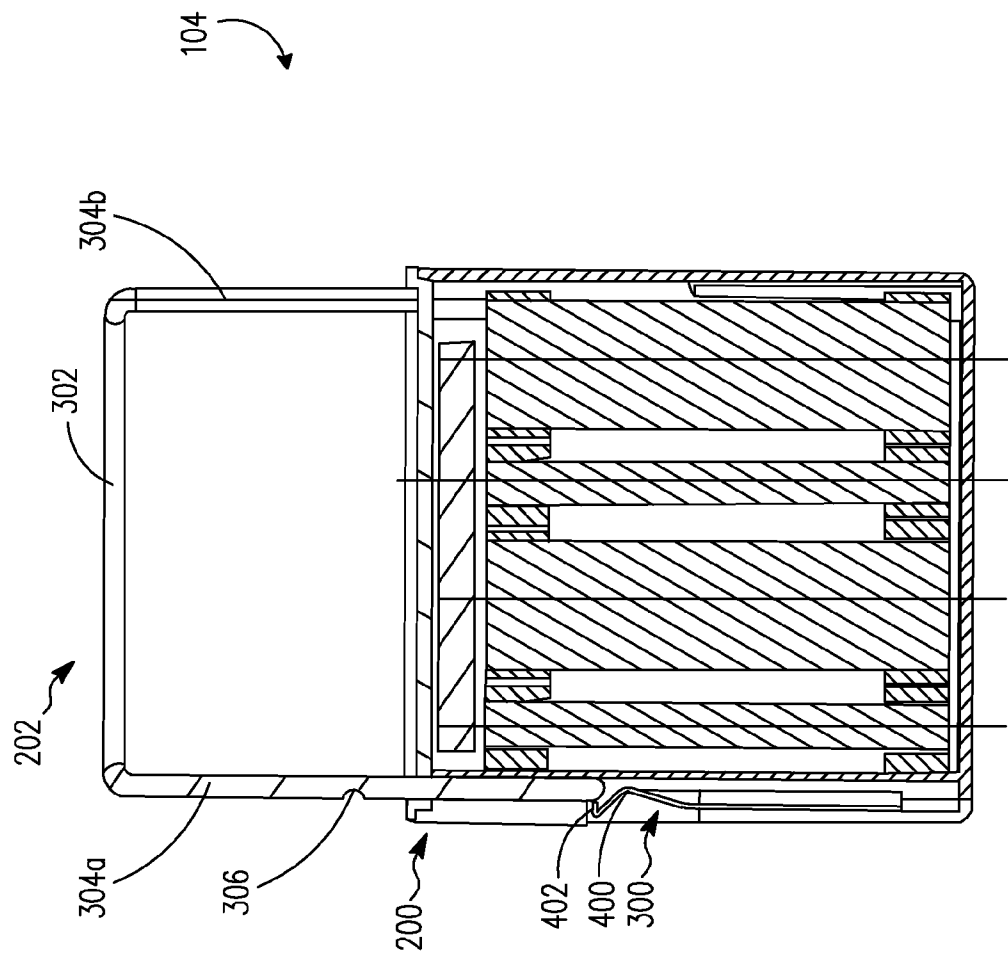


FIG. 4

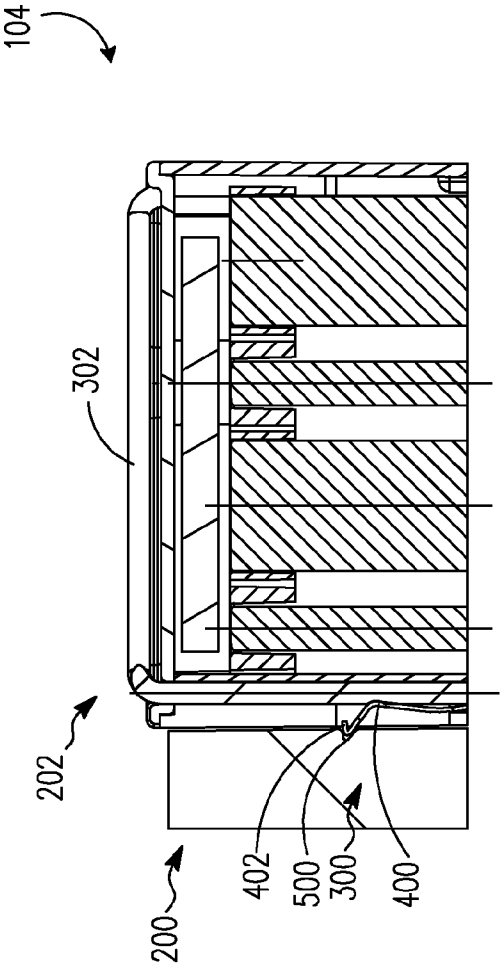


FIG. 5

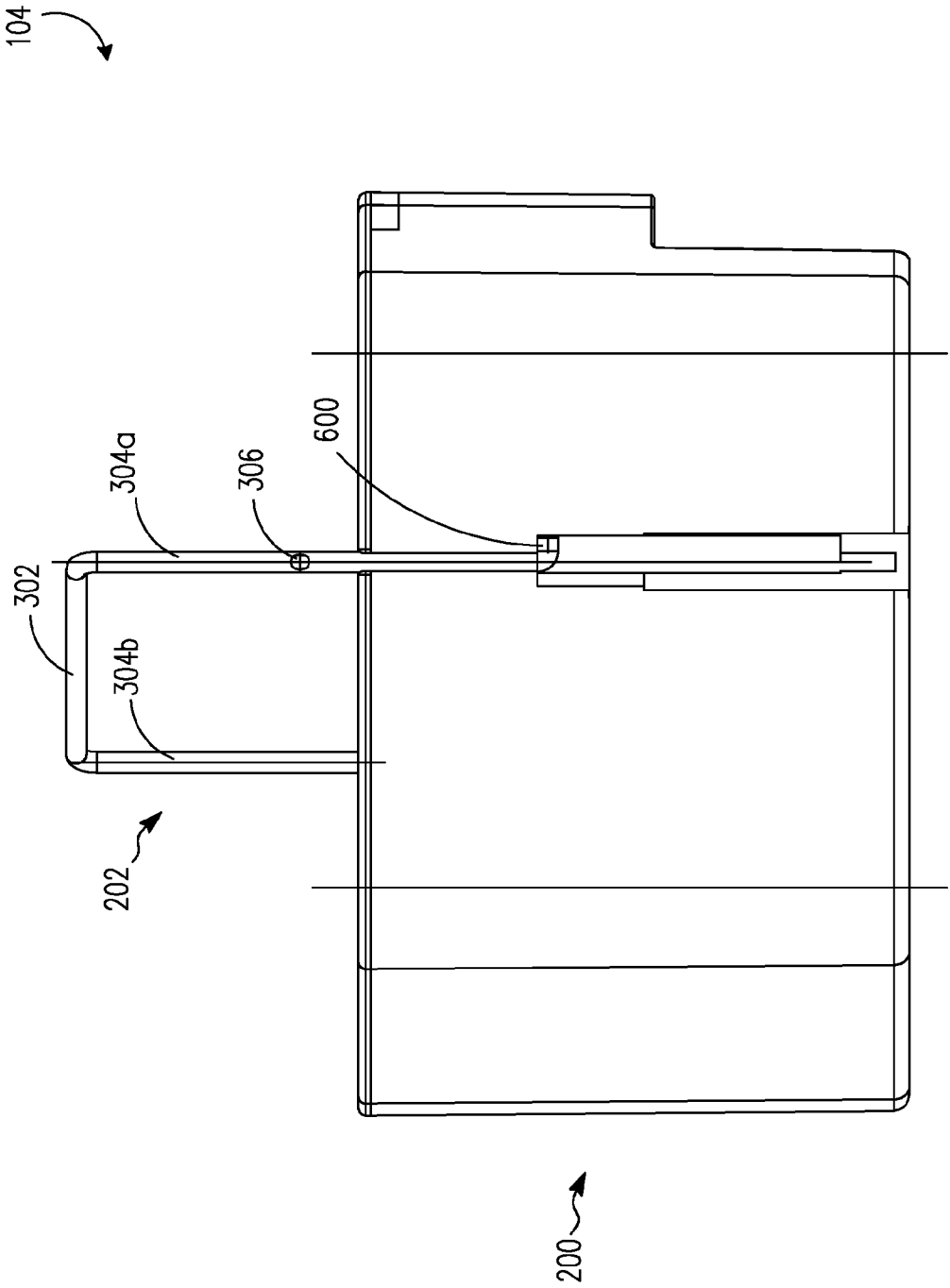


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2011/050243

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: A01G, B23D, B25F, B27B, H01M

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.
A	US 20040258983 A1 (VETTORETTI ALAIN ET AL), 23 December 2004 (2004-12-23); abstract; figure 2 --	1-19
A	US 20070119641 A1 (TIEN CHENG-JY), 31 May 2007 (2007-05-31); abstract; figures 2-4 --	1-19
A	GB 1235597 A (SEMPERIT AG), 16 June 1971 (1971-06-16); whole document --	1-19
A	JP 1226427 A (TOYODA AUTOMATIC LOOM WORKS), 11 September 1989 (1989-09-11); abstract -- -----	1-19



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

02-11-2011

Date of mailing of the international search report

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Name and mailing address of the ISA/SE

Patent- och registreringsverket
Box 5055
S-102 42 STOCKHOLM
Facsimile No. + 46 8 666 02 86

Authorized officer

Anders Toll

Telephone No. + 46 8 782 25 00

Continuation of: second sheet

International Patent Classification (IPC)

B25F 5/02 (2006.01)

H01M 2/10 (2006.01)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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