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Remscheid (DE)(51) **Int. Cl.**  
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**B23Q 17/00** (2006.01)(72) Inventors: **Egbert Frenken**, Heinsberg (DE);  
**Roman Bobowicz**, Remscheid (DE)(52) **U.S. Cl.**  
CPC ..... **B25F 5/00** (2013.01); **B23Q 17/007**  
(2013.01)(21) Appl. No.: **14/403,373**(57) **ABSTRACT**(22) PCT Filed: **May 14, 2013**(86) PCT No.: **PCT/EP2013/059912**

§ 371 (c)(1),

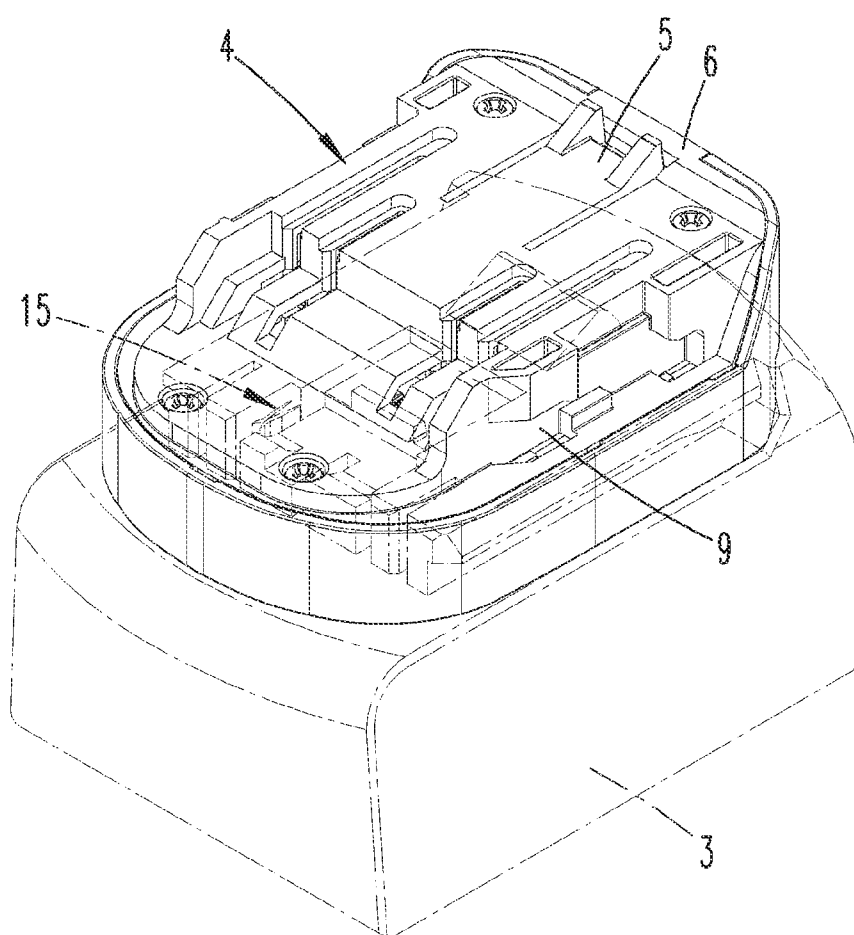
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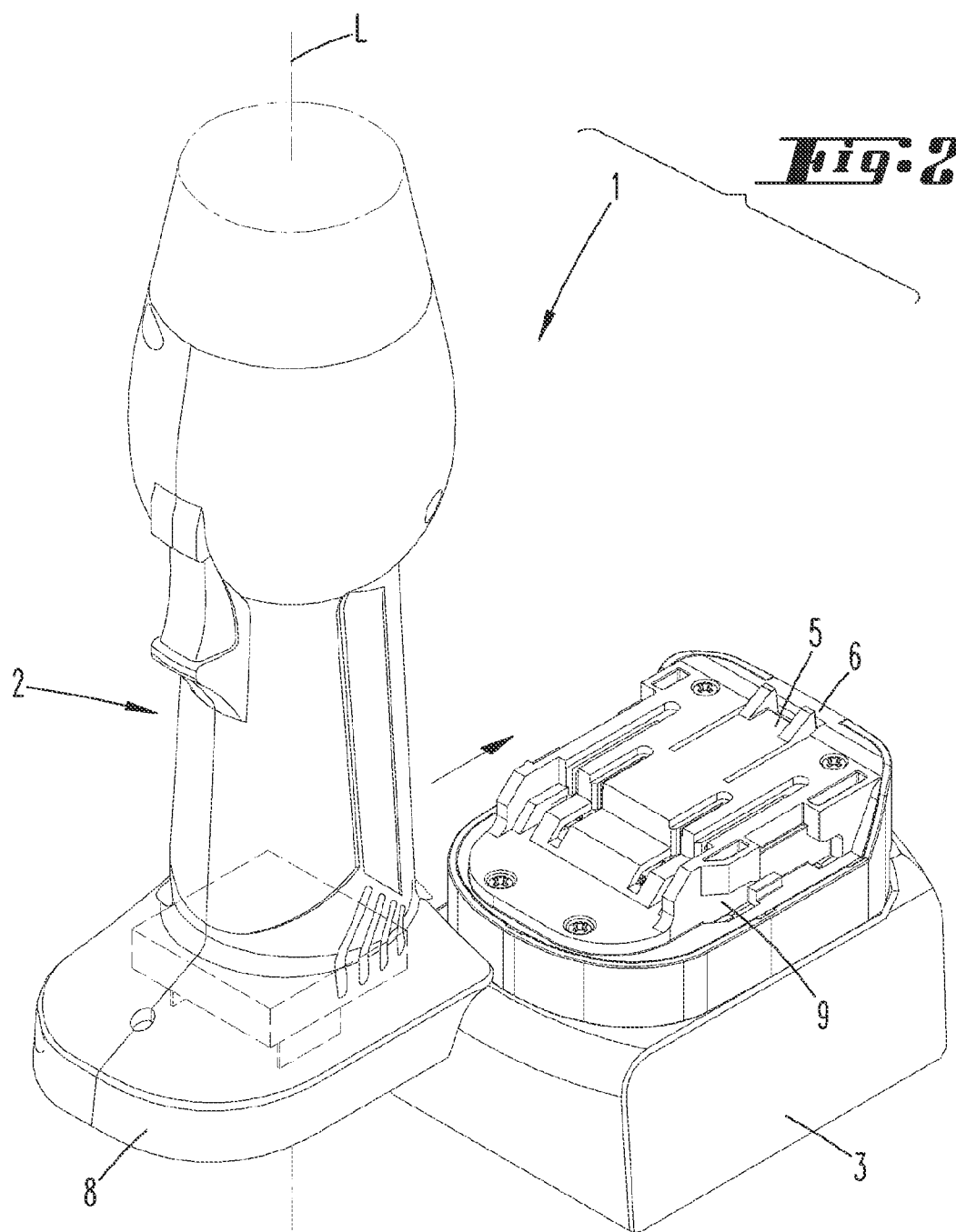
The invention relates to a hydraulically or electric motor operated tool (1), for example a crimping device, with a device shaft (2) that exhibits at least a first and second electrical contact, and with an accumulator (3) that can be latched with the device shaft (2), wherein an adapter (4) that can be secured by a latching connection to the device shaft (2) and accumulator (3) is provided on the device shaft (2) between the device shaft (2) and accumulator (3). In order to indicate a favorable connection between an adapter and a device shaft of such a device, it is proposed that the latched connection with the device shaft (2) can only be released by acting on a detaching part situated inside the adapter (4).

(30) **Foreign Application Priority Data**

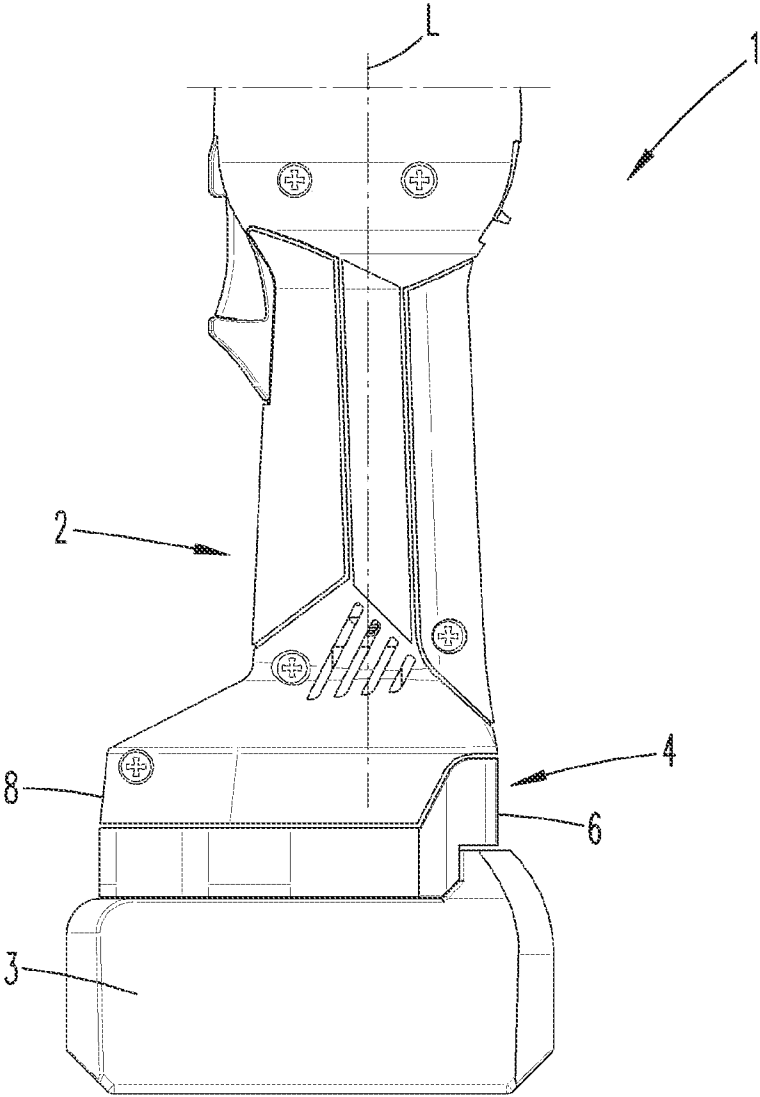
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***Fig. 1***

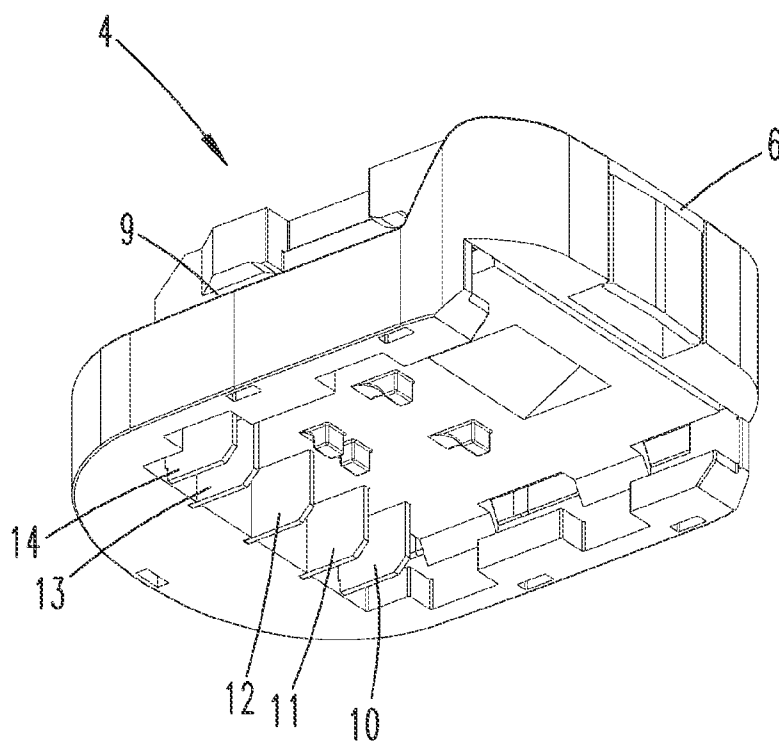




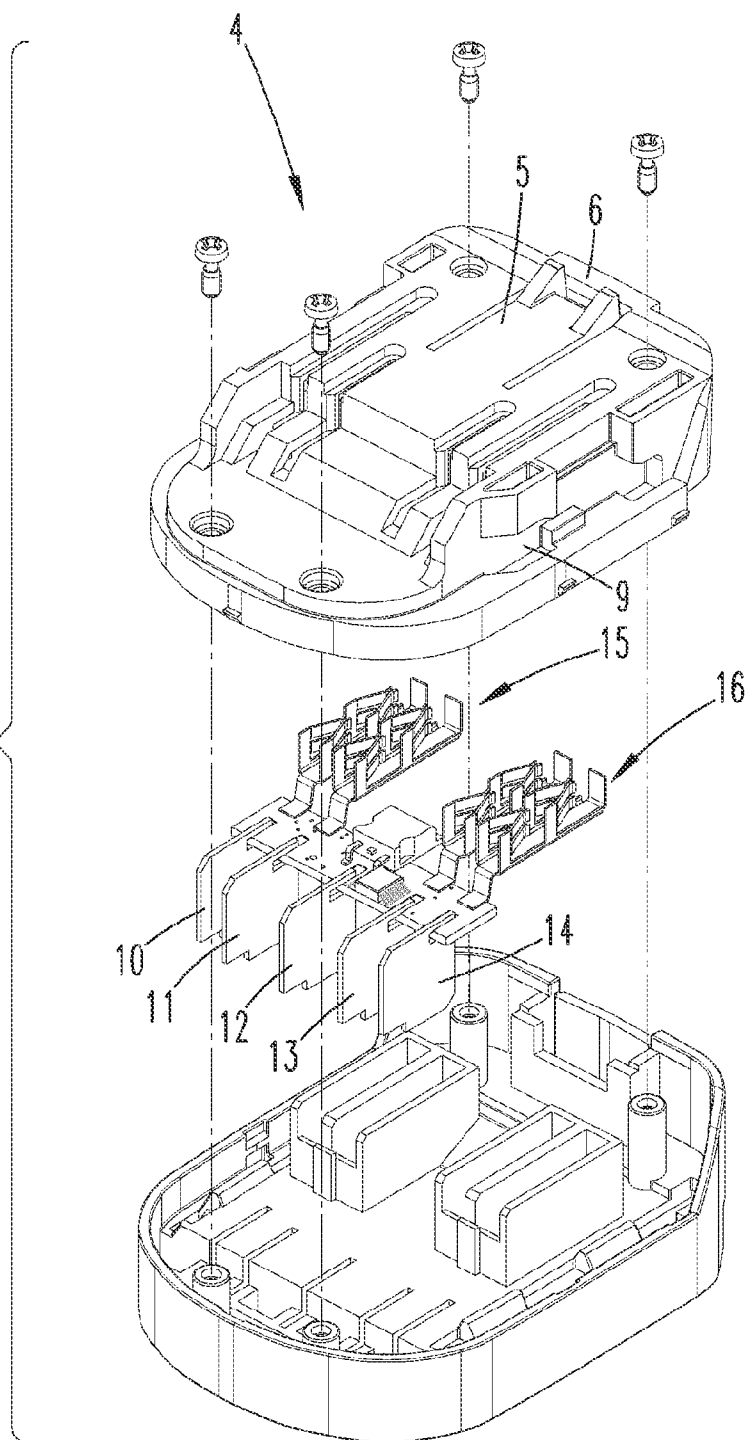
***Fig. 3***

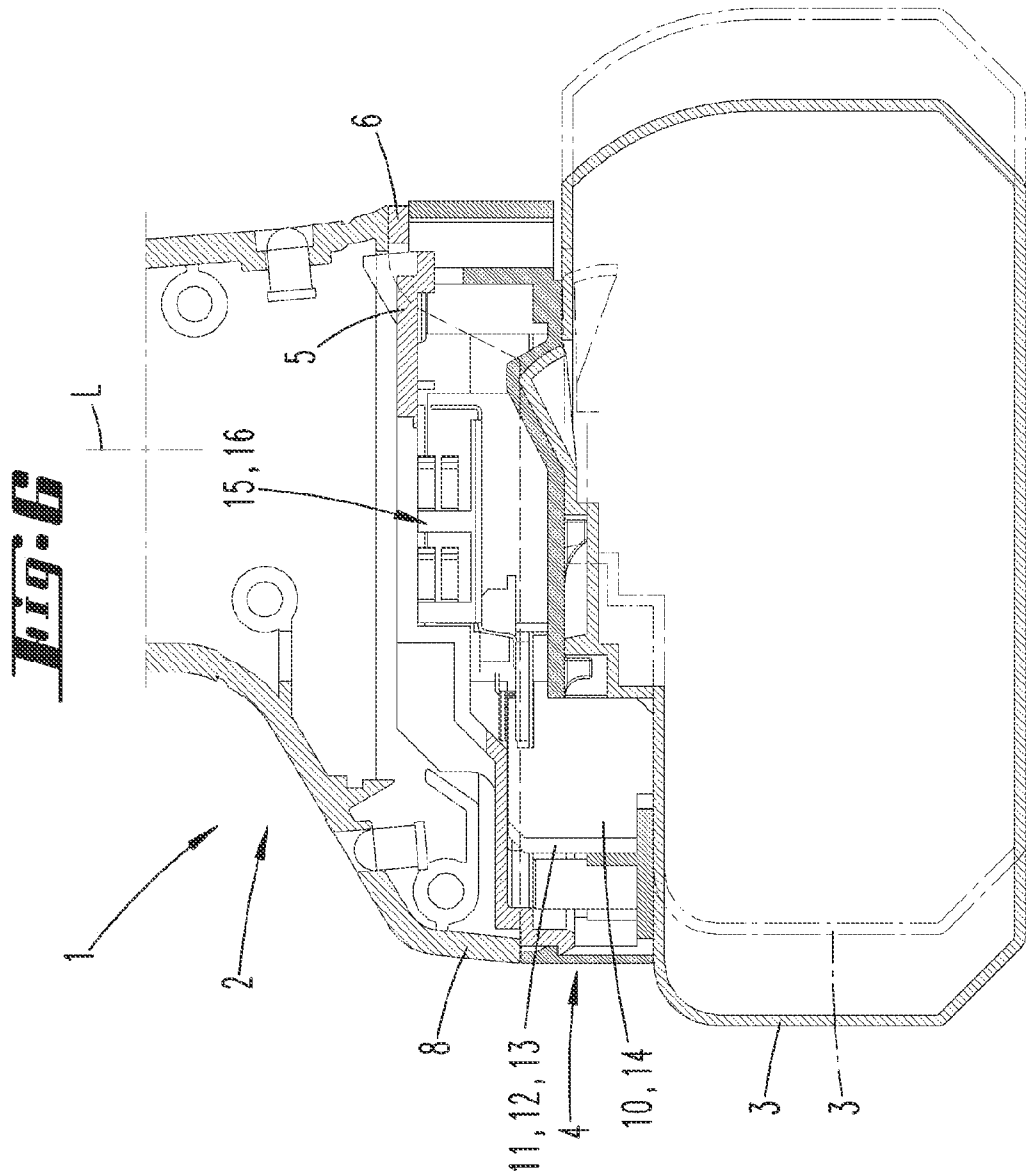


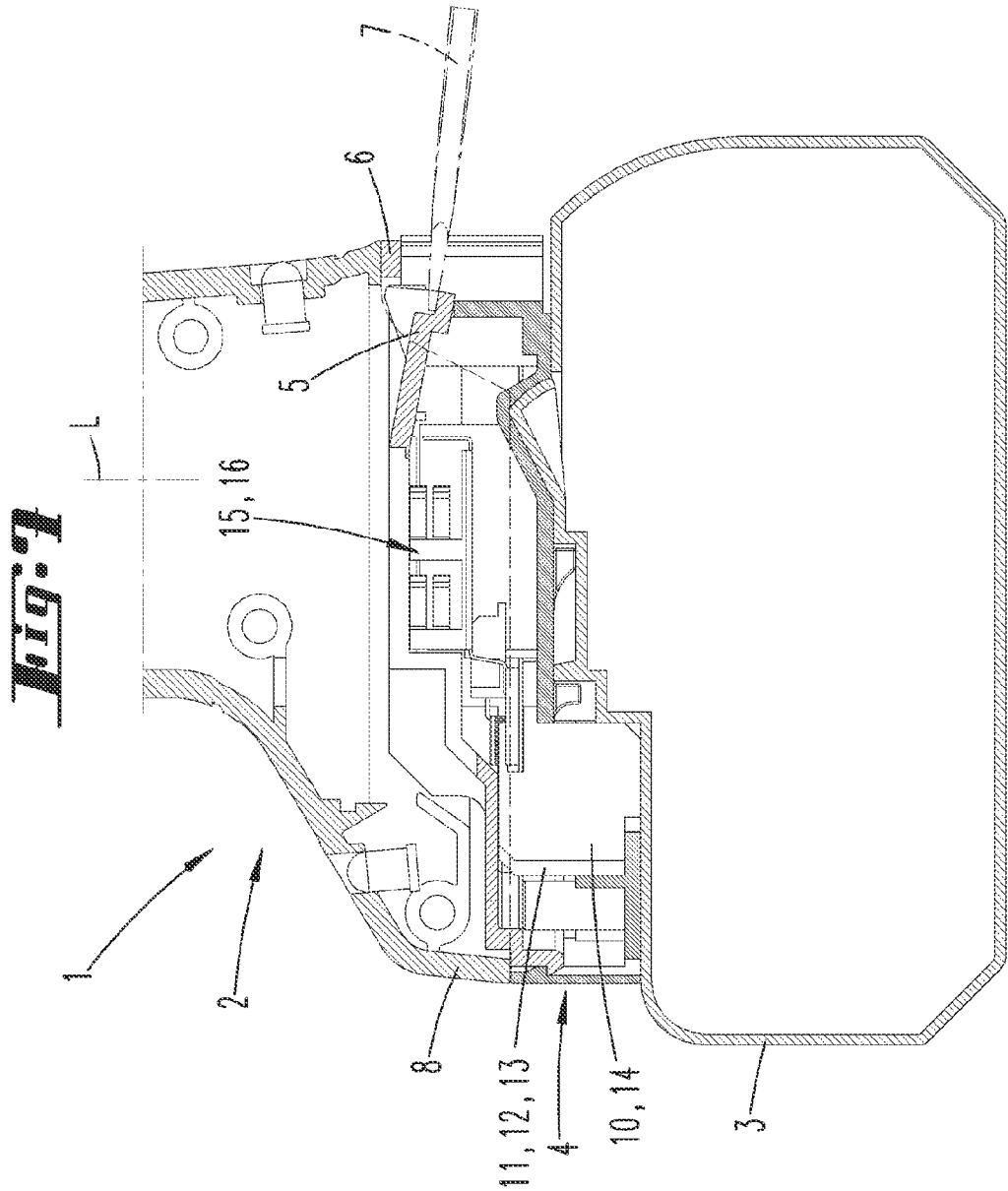
***Fig. 4***



**Fig. 5**

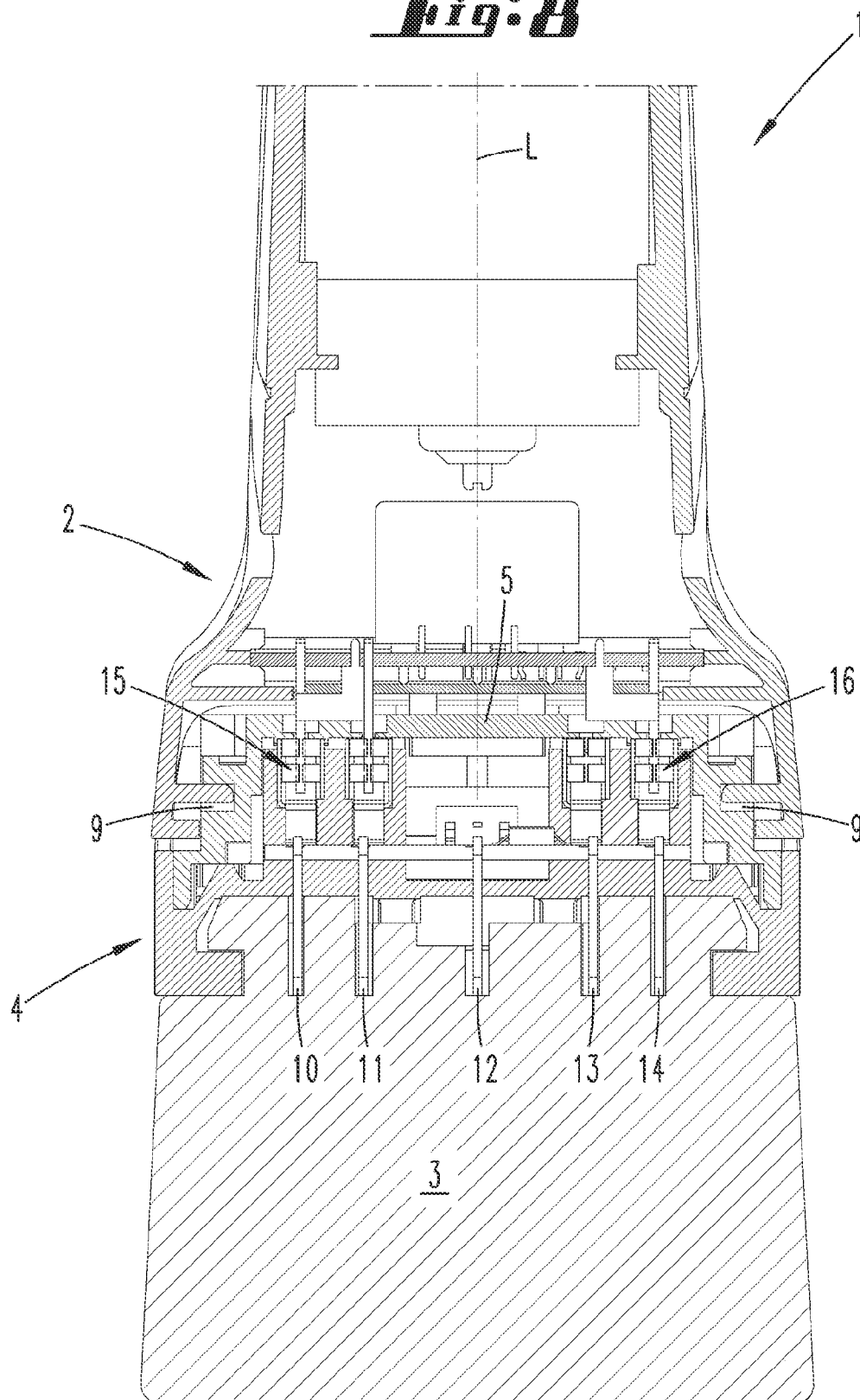




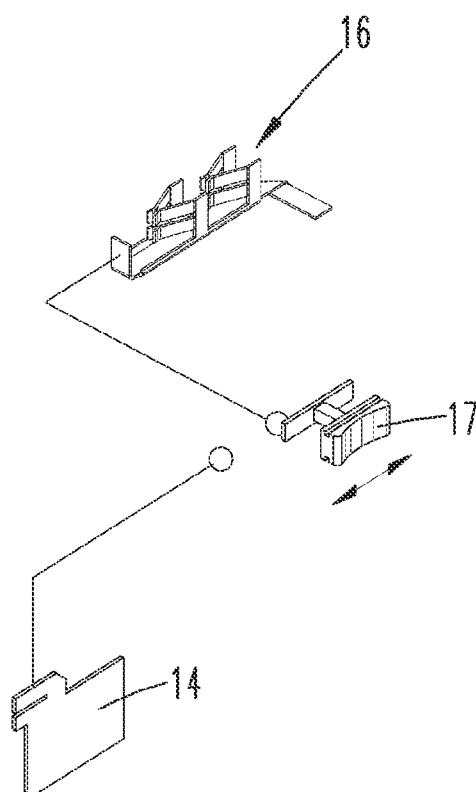




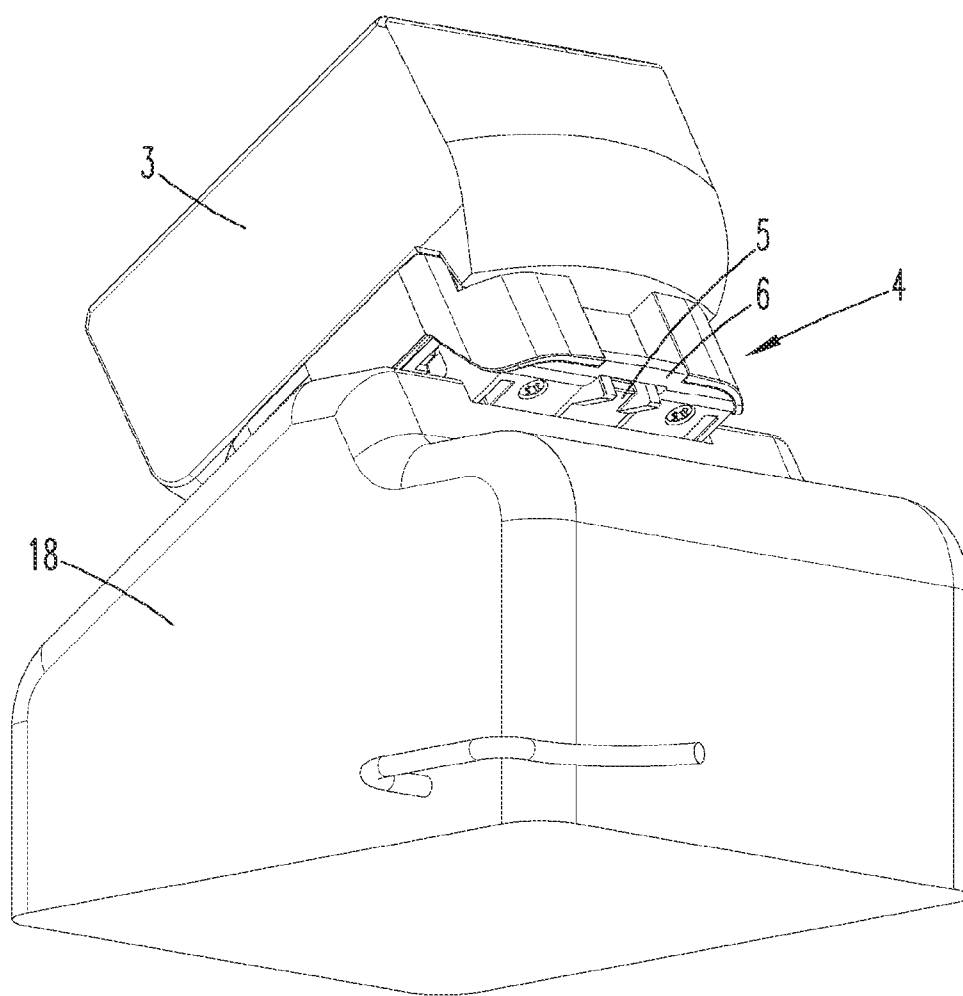
***Fig. B***



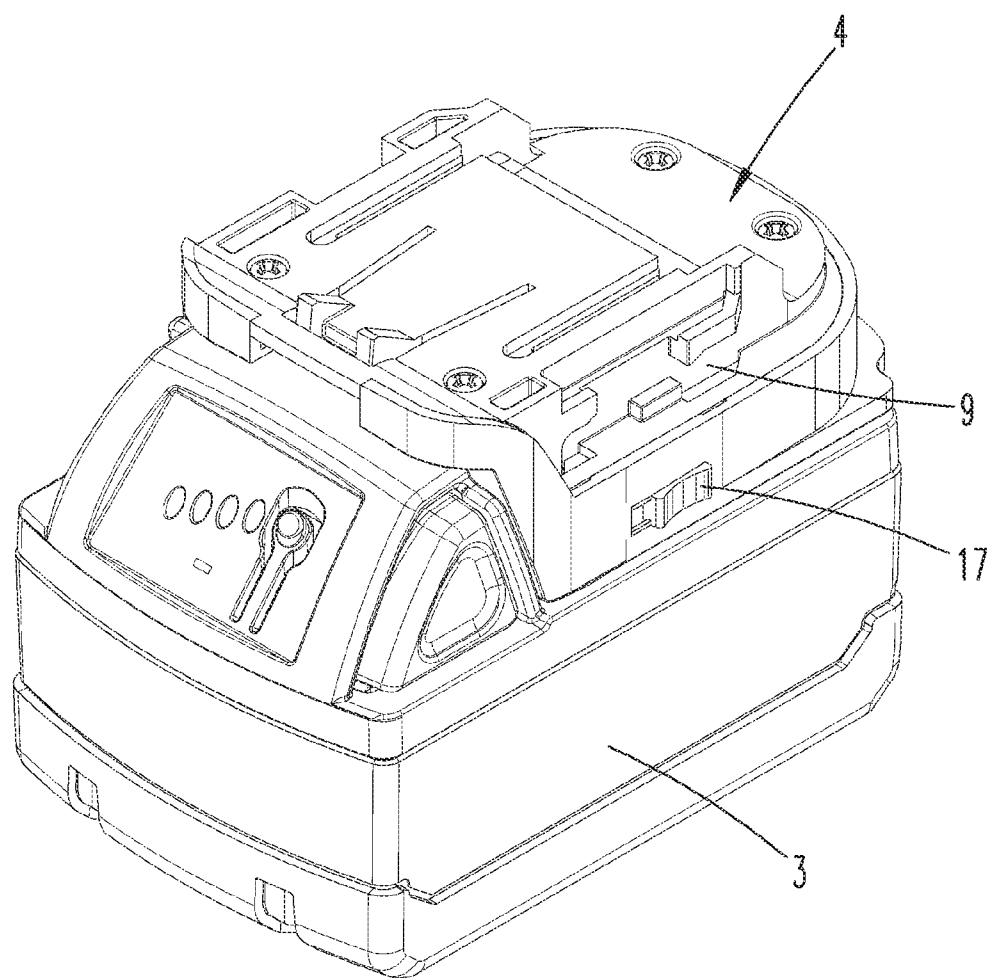
***Fig. 9***



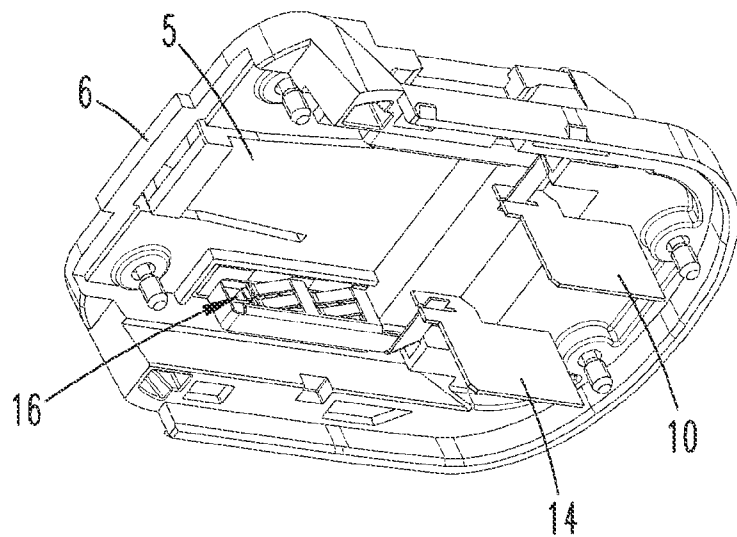
***Fig. 10***



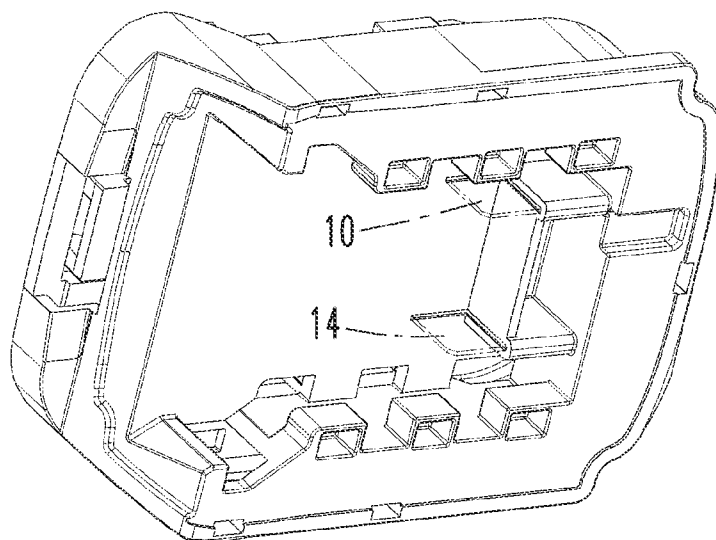
***Fig. 11***



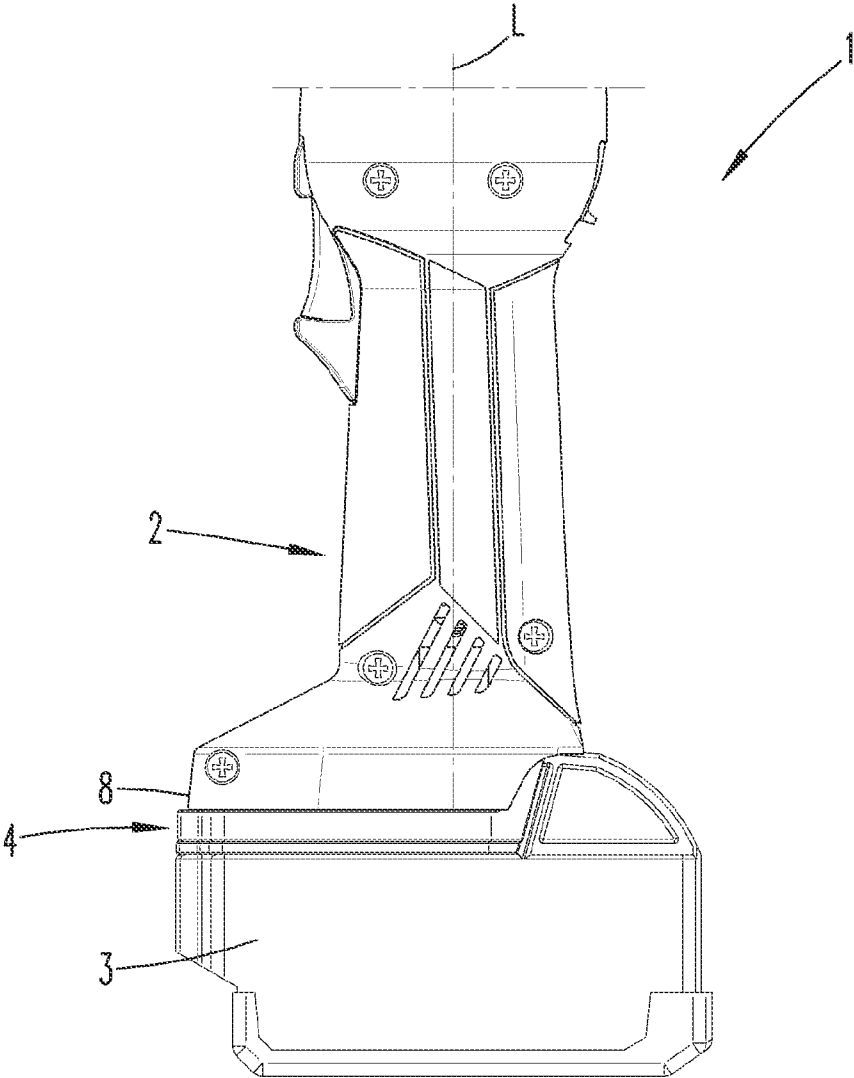
***Fig. 12***



***Fig. 13***



***Fig. 14***



# **TOOL**

**[0001]** The invention relates to a hydraulically or electric motor operated tool, for example a crimping device, with a device shaft that exhibits at least a first and second electrical contact, and with an accumulator that can be latched with the device shaft, wherein an adapter that can be secured by a latching connection to the device shaft and accumulator is provided on the device shaft between the device shaft and accumulator.

**[0002]** Such tools, in particular also in the form of hydraulically or electric motor operated tools, are already known from a variety of standpoints. For example, reference is made to WO 99/19947 A or U.S. Pat. No. 6,532,790 B2, WO 03/084719 A2 or U.S. Pat. No. 7,254,982 B2. Reference is further made to a prior art according to DE 10 2006 058 825 A1 or U.S. Pat. No. 6,965,214 B2.

**[0003]** In known adapters, it is often regarded as disadvantageous that the adapters can easily be detached from the device again.

**[0004]** Proceeding from the mentioned prior art, the object of the invention is to indicate a favorable connection between an adapter and a device shaft of such a device.

**[0005]** In a first inventive idea, one possible way of achieving this object involves a tool in which emphasis is placed upon only being able to release the latched connection with the device shaft by acting on a detaching part situated inside the adapter. Inside the adapter here means that it is otherwise recessed in relation to the outer wall, toward the inside. This initially yields at least a hidden position for a trigger part that can be used to release the latched connection with the device shaft.

**[0006]** Another way of achieving the object provides that it not be possible to release the latched connection between the adapter and device without destroying part of the adapter. This makes it extremely easy to equip a device shaft with an adapter, providing the user with a quasi-fixed configuration. Without destroying the adapter, he or she can only operate the device modified in this way with the accumulator that fits on the adapter.

**[0007]** For example, such a solution is advantageous if a device manufacturer wishes to configure the devices with an eye toward several possible accumulators at the request of the customer, but a customer wants to continue working with an accumulator once it has been selected. When changing out or recharging the accumulator, the adapter should not be detached if at all possible, so as to avoid disruptions.

**[0008]** In particular with regard to the first solution mentioned, it can also be preferably provided that the latched connection can only be released by a tool that engages into the interior of the adapter. In a first solution, for example, a detaching part can be actuated by inserting a finger into the hidden position, thereby causing the latched connection to be released, while the second solution can provide that this can only be done with a tool, for example a screwdriver. An opening in the adapter exposing such a detaching part for actuation purposes can be given so small a design as to only allow a screwdriver head that is clearly smaller than the fingertip of a conventional user to fit through, for example.

**[0009]** Another problem associated with such adapters lies in the fact that, aside from the electrical contacts for electrical power transmission, i.e., an electrical plus and electrical minus contact, the accumulators also exhibit contacts with which certain information from the accumulator can be called up and evaluated in the device, e.g., relating to the charging

status and/or temperature of the accumulator. Such information can also be of importance in a charging device, for example, and read out there via the mentioned contacts.

**[0010]** Proceeding from this prior art, the object of the invention is also to configure a tool of the kind indicated so that it allows a favorable evaluation of an accumulator regardless of whether an adapter is used.

**[0011]** This object is achieved in a tool where it is provided that at least the side of the adapter facing the accumulator exhibits contacts for acquiring and, if needed, transmitting values about the temperature and/or charging status, potentially also as relates to individual cells of the accumulator. If these contacts are only formed on the side of the accumulator, the adapter itself can already incorporate an evaluator circuit, which also has display means that can outwardly display an impermissible temperature and/or a specific charging status or a drop below a specific charging status, for example.

**[0012]** Values can be transmitted using conventional electrical conducting paths. However, this can also take place optically, magnetically, by radio and/or mechanically, at least in places.

**[0013]** In addition, the object of the invention is also to favorably design a tool of the kind mentioned exhibiting an adapter for connection to an accumulator in such a way as to prevent potential adverse effects caused by accumulator malfunctions.

**[0014]** This object is achieved in a tool where the emphasis is placed on designing the adapter to interrupt the power supply to the crimping device. This is especially important in cases where, as already basically explained, an impermissibly high temperature relative to the accumulator has been detected and/or a temperature rise has been detected indicating the probability of an impermissibly high temperature having been reached and/or a short circuit has been detected and/or possible other events that indicate that the power supply to the tool should be immediately deactivated.

**[0015]** Above and beyond its function to connect the accumulator with the device via different interfaces, the adapter is hence also designed to assume a safety function.

**[0016]** Another object is to ensure a favorable charging process. To this end, the invention proposes that the adapter along with the coupled accumulator be capable of docking with a charging device in such a way that the accumulator is connected with the charging device by means of the adapter. The adapter is here used to transmit the charging current from the charging device to the accumulator so as to charge the latter.

**[0017]** Additional features of the invention are described or depicted below, to include the description of the figures and the drawing, often as relates to their preferred allocation to the already elucidated concept. However, they can also be important as allocated to just one or more individual features, which are described or graphically depicted herein, or independently or in relation to some other overall concept.

**[0018]** It is further preferred that the power switch be configured in such a way as to automatically shut down as a function of an accumulator condition datum. As already explained, a condition datum can be a temperature detected in the accumulator and/or a charging status of the accumulator or the like.

**[0019]** In conjunction with one or more of the previously described embodiments, or with regard to the kind of adapter alluded to here as such, it can preferably also be provided that the adapter be designed to output a signal, for example a light

and/or audio signal. For example, a signal can also be output with respect to a detected elevated temperature and/or a detected specific charging status and/or a short circuit or a similar event.

[0020] The invention is also described below based upon the attached drawing, wherein the latter only depicts exemplary embodiments. Shown here on:

[0021] FIG. 1 is a top view of an adapter with an accumulator coupled to its lower side;

[0022] FIG. 2 is a possible connection of a device with an adapter and accumulator located thereon;

[0023] FIG. 3 is the assembled device shaft with adapter and accumulator;

[0024] FIG. 4 is a perspective view of an adapter from below;

[0025] FIG. 5 is an exploded view of an adapter;

[0026] FIG. 6 is a cross section through the device base according to FIG. 3 in the area of the adapter;

[0027] FIG. 7 is a clarification of the possible release of the latched connection between the adapter and device shaft;

[0028] FIG. 8 is a cross section according to FIG. 6, but turned by 90° relative to a longitudinal device shaft axis;

[0029] FIG. 9 is a diagrammatic view of an electrical circuit incorporated in the adapter to interrupt the power;

[0030] FIG. 10 is a combination of an adapter and an accumulator placed on a charging device;

[0031] FIG. 11 is a combination of a second type of accumulator with an adjusted adapter;

[0032] FIG. 12/FIG. 13 is a second type of accumulator, shown in an exploded view with regard to its two-part structure; and

[0033] FIG. 14 is a side view of a device shaft coupled with an adapter and accumulator according to FIG. 11.

[0034] Depicted and described initially with reference to FIGS. 1 to 3 is a tool 1 only partially shown here that exhibits a device shaft 2 with which an accumulator 3 can be joined via an adapter 4. The adapter 4 can be adjusted to the configuration of a first accumulator 3. The device shaft 2 can be adjusted to the configuration of a second accumulator 3, which then can be joined directly with the device shaft 2 without the adapter 4.

[0035] The adapter 4 can be latched with the device shaft 2, as may be gleaned in further detail from FIGS. 6 and 7. In order to be able to establish a latched connection between the device shaft 2 and adapter, the adapter 4 preferably incorporates a detaching part, which in the exemplary embodiment is a latching part 5 that can here give way downwardly when exposed to a spring force. The latching part 5 is inwardly displaced in relation to an outer wall 6 of the adapter 4. Therefore, engagement into the interior of the adapter 4 is necessary to actuate the latching part 5. In the embodiment on FIG. 6, the outer wall 6 is continuous in design. Once here latched in, the adapter 4 cannot be detached again without destroying the outer wall 6. The outer wall 6 also exhibits a door or latching opening.

[0036] As evident from FIG. 7, if the outer wall 6 is not continuous in design, the latching part 5 can potentially also be actuated with a tool, such as a screwdriver 7 only partially shown here.

[0037] The adapter 4 depicted here is a slide-in adapter. The latter is slide-connected with the device shaft 2 at essentially a right angle to a longitudinal axis L of the device shaft 2. A front cover wall 8 of the device shaft here constitutes a slide stop. In addition, the interior of the device shaft is preferably

provided with projections, which interact with recesses 9 in the adapter, thereby yielding a rail-like convergence. The latching part 5 is thus the only movable part required to anchor the adapter 4 to the device shaft 2. Also possible as an alternative is a configuration as a tower adapter (not shown). The latter is joined with the device in the longitudinal direction of the device shaft 2, usually through insertion into a receiving space formed on the device shaft.

[0038] As may be gleaned in particular from FIG. 5, which presents an exploded view of the adapter, the interior of the adapter 4 incorporates electrical contacts 10 to 14, which in a plugged-in state project downwardly into corresponding contacts of the accumulator. The electrical currents are transmitted to the upper side of the adapter 4, which accommodated corresponding contact elements 15, 16. Not just a plus and minus transmission is here possible, but also a conveyance of values relating to temperature and/or charging status and/or other data queried in the accumulator. Conventional accumulators make such values available at corresponding contacts.

[0039] In addition, it can be provided that it be possible to interrupt a power supply inside the adapter 4, specifically by way of a switch 17, as evident from the electrical circuit shown on FIG. 9. The switch 17 can either be automatically actuated, e.g., in the device, in a microprocessor or the like, by comparing permissible data with a measured temperature or some other measured datum inside the adapter and/or by initially transmitting the values into the device, and interrupting the power or not as a function hereof. The switch can also be manually activatable.

[0040] It can further be provided (not shown in any detail) that the adapter be designed to output a signal, for example a light and/or audio signal.

[0041] The accumulator 3 can also be charged together with a plugged-in adapter 4, as depicted on FIGS. 9 and 10, for example. A charging device 18 is here connected to the accumulator 3 via the adapter 4 for charging purposes. This is possible in particular because the adapter 4 in this embodiment exhibits more electrical transmission contacts than just the two electrical contacts required for supplying electrical power, specifically to also include electrical transmission contacts involving the temperature of the accumulator and/or charging status of a charging cell in the accumulator, etc.

[0042] Data can also be solely or additionally transmitted optically, magnetically, by radio, or mechanically.

[0043] All disclosed features are (in and of themselves) essential to the invention. The disclosure of the application hereby also includes the contents disclosed in the accompanying/ attached priority documents (copy of the earlier application) in its entirety, also for purposes of incorporating features from these documents into claims of the present application. In their optional equivalent wording, the subclaims describe independent inventive further developments of prior art, in particular to submit partial applications based upon these claims.

#### REFERENCE LIST

- [0044] 1 Tool
- [0045] 2 Device shaft
- [0046] 3 Accumulator
- [0047] 4 Adapter
- [0048] 5 Latching part
- [0049] 6 Outer wall
- [0050] 7 Screwdriver
- [0051] 8 Cover wall



[0052] 9 Recess  
 [0053] 10 Electrical contact  
 [0054] 11 Electrical contact  
 [0055] 12 Electrical contact  
 [0056] 13 Electrical contact  
 [0057] 14 Electrical contact  
 [0058] 15 Contact element  
 [0059] 16 Contact element  
 [0060] 17 Switch  
 [0061] 18 Charging device  
 [0062] L Longitudinal axis

1. A hydraulically or electric motor operated tool comprising:

a device shaft having at least first and second electrical contacts;  
 an accumulator capable of being latched with the device shaft;  
 an adapter capable of being secured by a latching connection to the device shaft and to the accumulator, said adapter provided between the device shaft and the accumulator;  
 wherein the latching connection with the device shaft can only be released by acting on a detaching part provided inside the adapter.

2. The tool according to claim 1, wherein latching connection cannot be released without destroying part of the adapter.

3. The tool according to claim 1, wherein the latching connection can only be released by a tool that engages into an interior of the adapter.

4. The tool according to claim 1, wherein at least a side of the adapter facing the accumulator exhibits contacts for acquiring values about the temperature and/or charging status of the accumulator, said contacts capable of transmitting said values.

5. The tool according to claim 1, wherein the adapter is capable of interrupting a power supply to the tool.

6. The tool according to claim 1, wherein in the accumulator has a power switch.

7. The tool according to claim 6, wherein the power switch automatically actuates as a function of a condition datum of the accumulator.

8. The tool according to claim 6, wherein the power switch actuates as a function of a temperature and/or a charging status of the accumulator.

9. The tool according to claim 1, wherein the accumulator can be charged with a plugged-in adapter, wherein the accumulator is connected with a charging device via the adapter.

10. The tool according to claim 1, wherein the adapter is capable of outputting a signal.

11. The tool of claim 10, wherein said signal is a light and/or audio signal.

12. The tool of claim 1, wherein said tool is a crimping tool.

13. A hydraulically or electric motor operated tool comprising:

a device shaft having at least first and second electrical contacts;  
 an accumulator capable of being latched with the device shaft; and  
 an adapter capable of being secured by a latching connection to the device shaft and to the accumulator, said adapter provided between the device shaft and the accumulator, said adapter is capable of interrupting a power supply to the tool.

14. The tool of claim 13, wherein said tool is a crimping tool.

15. A hydraulically or electric motor operated tool comprising:

a device shaft having at least first and second electrical contacts;  
 an accumulator capable of being latched with the device shaft; and  
 an adapter capable of being secured by a latching connection to the device shaft and to the accumulator, said adapter provided between the device shaft and the accumulator, the adapter is capable of outputting a signal.

16. The tool of claim 15, wherein said signal is a light and/or audio signal.

17. The tool of claim 15, wherein said signal relates to values about the temperature and/or charging status of the accumulator.

18. The tool of claim 17, wherein said tool is a crimping tool.

19. The tool of claim 15, wherein said tool is a crimping tool.

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