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Datasheet for the decision of 12 January 2024

Case Number: T 0196/22 - 3.2.04

Application Number: 07766475.3

Publication Number: 2048933

IPC: A01D69/02

Language of the proceedings: EN

Title of invention:
LAWN-CARE APPARATUS

Patent Proprietor:
Robert Bosch GmbH

Opponents:
Andreas Stihl AG & Co. KG
ikra GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 12(4), 13(2)

Keyword:
Inventive step - (no)
Amendment to case - suitability of amendment to address issues (no)
Amendment after expiry of period in R. 100(2) EPC communication - exceptional circumstances (no)

Decisions cited:
T 1054/05

Catchword:
The Board is within its discretion in refusing a party time to formulate questions to the Enlarged Board whose only purpose it could be to reopen a debate on issues that had already been closed, and based on which the Board had reached its conclusions, Reasons 5

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Case Number: T 0196/22 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 12 January 2024

Appellant: (Opponent 1)	Andreas Stihl AG & Co. KG Badstrasse 115 71336 Waiblingen (DE)
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Respondent: (Patent Proprietor)	Robert Bosch GmbH Postfach 30 02 20 70442 Stuttgart (DE)
Representative:	Daub, Thomas Patent- und Rechtsanwaltskanzlei Daub Bahnhofstrasse 5 88662 Überlingen (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 30 November 2021 concerning maintenance of the European Patent No. 2048933 in amended form.**

Composition of the Board:

Chairman	A. de Vries
Members:	J. Wright
	C. Heath

Summary of Facts and Submissions

I. The appeals were filed by the appellant (opponent 1) and appellant (opponent 2) against the interlocutory decision of the opposition division finding that, on the basis of the auxiliary request 6, the patent in suit met the requirements of the EPC.

II. The opposition division decided that the subject-matter of the claims as amended during the opposition proceedings involved an inventive step.

III. The Board issued a communication setting out its provisional opinion on the relevant matters in preparation for oral proceedings, which were duly held on 12 January 2024.

IV. The appellants (opponents 1 and 2) request that the decision under appeal be set aside and that the patent be revoked in its entirety.

The respondent (patent proprietor) requests that the appeals be dismissed (patent maintained according to auxiliary request 6), or in the alternative that the patent be maintained in amended form according to one of auxiliary requests 11A, 12, 12A, 14A or 16, all filed with the reply to the appeals on 9 August 2022, except auxiliary request 12A, which was filed with letter of 24 November 2023, and auxiliary request 16, which was filed at the oral proceedings before the Board on 12 January 2024.

V. The independent claim 1 of the auxiliary requests relevant for this decision reads as follows:

Auxiliary request 6 (with feature references added by the Board in square brackets):

[A] "A lawn-care apparatus comprising
[B] a rotatable cutting element (20) driven by an electronically commutated motor (15),
[C] wherein the electronically commutated motor (15) is powered by a battery unit (13),
[D] wherein the apparatus further comprises a battery compartment having an openable battery cover (14),
[E] wherein the battery unit (13) comprises engagement means comprising a plurality of grooves or ribs for slidable engagement with a complementary engagement means provided in or on the battery compartment,
[F] wherein the battery unit (13) comprises a lithium-ion battery
[G] wherein the apparatus further comprises a control system, wherein the control system comprises a speed control system, which includes a feedback system to drive the electronically commutated motor at a substantially constant speed
[H-1]] and wherein the control system comprises a battery unit-condition monitoring system comprising a voltage-monitoring system and/or a temperature-monitoring system,
[H-2] wherein monitoring circuitry of the battery-unit condition monitoring system is incorporated together with the control system electronics".

Auxiliary request 11a:

Claim 1 is as in the main requests with the following amendments as highlighted by the respondent proprietor:

"A lawn-care apparatus being implemented as a rotary mower, comprising a rotatable cutting element (20) ~~driven~~ rotated by an electronically commutated motor (15) about a vertical axis by a direct drive assembly in which the cutting element (20) is mounted on a motor drive shaft,
wherein the electronically commutated motor (15) is powered by a battery unit (13), which is demountable for charging,
wherein the apparatus further comprises a battery compartment having an openable battery cover (14),
wherein the battery unit (13) comprises engagement means comprising a plurality of grooves or ribs for slidable engagement with a complementary engagement means provided in or on the battery compartment,
wherein the battery unit (13) comprises a lithium-ion battery
wherein the apparatus further comprises a control system,
wherein the control system comprises a speed control system, which includes a feedback system to drive the electronically commutated motor at a substantially constant speed
and wherein the control system comprises a battery-unit-condition monitoring system comprising a ~~voltage monitoring system and/or~~ temperature-monitoring system,
wherein monitoring circuitry of the battery-unit-condition monitoring system is incorporated together with the control system electronics,
and wherein the control system removes power to the motor (15) in response to the signal from the temperature-monitoring system exceeding a predetermined level".

Auxiliary request 12 reads as for auxiliary request 11a, except for the following wording added to the end of the claim:

", and wherein the apparatus has electronic switching means for modulating the direction and magnitude of current flow in the stator coils of the electronically commutated motor according to electronic phase information on the angular position of the armature, provided by a series of detectors, which are comprised in the motor (15)".

Auxiliary request 12a reads as for auxiliary request 12, except that the following wording is added to the end of the claim:

", and wherein the lawn-care apparatus further comprises a regenerative braking system associated with the driven element".

Auxiliary request 14a reads as for auxiliary request 12 except that after the wording "wherein monitoring circuitry of the battery-unit-condition monitoring system is incorporated together with the control system electronics,", the following wording is inserted:

"wherein the battery unit (13) further comprises at least one detent for engagement with a retractable catch of the battery unit latching means (31), with the at least one detent being located on the underside of the battery unit (13),"

and at the end of the claim, the following wording is added:

"wherein the apparatus comprises battery cover (14) latching means (31) and battery unit (13) latching means (31) which are operatively connected, wherein the apparatus comprises a spring-loading means for rapid and positive electrical disconnection of the battery unit (13) from the lawn care apparatus and which automatically disconnects the battery unit (13) from the lawn care apparatus by a small distance when the battery cover (14) is opened and the battery unit (13) latching means (31) is disengaged, and wherein the battery unit (13) is connected to the lawn-care apparatus by manually sliding the battery unit (13) into a position such that an at least one detent on its underside latchingly engages with the retractable catch of the battery unit latching means (31)"

Auxiliary request 16:

Claim 1 is as in auxiliary request 14a with amendments as highlighted by the respondent proprietor:

"A lawn-care apparatus being implemented as a rotary mower, comprising a rotatable cutting element (20) rotated by an electronically commutated motor (15) about a vertical axis by a direct drive assembly in which the cutting element (20) is mounted on a motor drive shaft, wherein the electronically commutated motor (15) is powered by a battery unit (13), which is demountable for charging,
wherein the apparatus further comprises a battery compartment having an openable battery cover (14), wherein the battery unit (13) comprises engagement means comprising a plurality of grooves or ribs for slidable engagement with a complementary engagement means provided in or on the battery compartment,

wherein the battery unit (13) comprises a lithium-ion battery wherein the apparatus further comprises a control system,
wherein the control system comprises a speed control system, which includes a feedback system to drive the electronically commutated motor at a substantially constant speed and wherein the control system comprises a battery-unit-condition monitoring system comprising a temperature-monitoring system, wherein monitoring circuitry of the battery-unit-condition monitoring system is incorporated together with the control system electronics,
wherein the battery unit (13) further comprises at least one detent for engagement with a retractable catch of the battery unit latching means (31), with the at least one detent being located on the underside of the battery unit (13),
wherein the control system removes power to the motor (15) in response to the signal from the temperature-monitoring system exceeding a predetermined level,
wherein the apparatus has electronic switching means for modulating the direction and magnitude of current flow in the stator coils of the electronically commutated motor according to electronic phase information on the angular position of the armature, provided by a series of detectors, which are comprised in the motor (15), and
wherein the apparatus comprises battery cover (14) latching means (31) and battery unit (13) latching means (31) which are operatively connected,
wherein the battery unit (13) latching means (31) is pivotally mounted on the apparatus, wherein the battery unit (13) latching means (31) further comprises a retractable catch engageable with the battery unit (13) through rotation about the pivotal mount, wherein the battery unit (13) further comprises at least one detent

on the underside of the battery unit (13) for engagement with the retractable catch of the battery unit (13) latching means (31), wherein the battery unit (13) latching means (31) is either operatively biased with the battery cover (14) latching means (31) or wherein the battery cover (14) latching means (31) and the battery unit (13) latching means (31) function independently,
wherein the apparatus comprises a spring-loading means for rapid and positive electrical disconnection of the battery unit (13) from the lawn care apparatus, wherein the spring-loading means is compressed during operative connection of the battery unit as a result of the engagement of the retractable catch of the battery unit latching means with the at least one detent formed in the underside of battery unit (13), and which automatically disconnects the battery unit (13) from the lawn care apparatus by a small distance when the battery cover (14) is opened and the battery unit (13) latching means (31) is disengaged, and wherein the battery unit (13) is connected to the lawn-care apparatus by manually sliding the battery unit (13) into a position such that an at least one detent on its underside latchingly engages with the retractable catch of the battery unit latching means (31) so that a latching engagement of the at least one detent with the catch positions the battery unit such that an electrical connection is established".

VI. The appellant-opponents' arguments can be summarised as follows:

The subject matter of claim 1 of auxiliary request 6 (as upheld) lacks inventive step starting from D2 combined with the skilled person's general knowledge and various documents. The differing features with

respect to D2 are not synergistically linked so must be treated separately for the assessment of inventive step. Starting from D2, all of them are obvious with respect to various pieces of prior art.

None of auxiliary requests 11a, 12, 12a, 14a are *prima facie* allowable, therefore they should not be admitted into the proceedings.

Auxiliary request 16 should not be admitted into the proceedings because there are no exceptional circumstances justifying its admittance.

VII. The respondent-proprietor's arguments can be summarised as follows:

The subject matter of claim 1 of auxiliary request 6 involves an inventive step starting from D2. The many differing features work synergistically together so should be considered together when assessing inventive step. In particular the idea of using an Electronically Commutated Direct Current (ECDC) motor and a Lithium Ion (Li Ion) battery are synergistically linked, along with the idea of incorporating battery monitoring circuitry with apparatus control system electronics. These features work together to improve the quality of the lawn-care apparatus. Even when considered alone, at least the ideas of using an ECDC motor and incorporating battery monitoring circuitry with apparatus control system electronics in a lawn-care apparatus would not have been obvious to the skilled person at the relevant date.

The auxiliary requests 11a, 12, 12a, 14a are *prima facie* allowable so should be admitted into the proceedings.

The fact that at the oral proceedings before the Board none of auxiliary requests 11a to 14a were admitted into the proceedings constitutes an exceptional circumstance that justifies the admittance of auxiliary request 16.

The request to file a request for referral to the enlarged Board of appeal should be admitted into the proceedings.

Reasons for the Decision

1. Background

The invention relates to an electrically powered lawn-care apparatus, such as a lawnmower (see published patent specification, paragraphs [0001] and [0002]). According to the patent, see paragraph [0003], there is a need for a small lawn-care apparatus that combines the efficiency of a brushless [electronically commutated] motor with mobility and easy maintenance. Amongst other things (see all versions of claim 1) the apparatus has a battery compartment in which a battery is slidably engaged.

2. Auxiliary request 6 (as maintained), claim 1, inventive step starting from D2

2.1 The opposition division considered inventive step starting from D2 in combination with the skilled person's general knowledge and various documents and found that the subject matter of claim 1 involved an inventive step, in particular because the last claim feature was considered not to be obvious (battery

condition monitoring circuitry incorporated with control system electronics - second part of feature H).

2.2 D2 discloses a lawn mower, thus a lawn-care apparatus that comprises a rotatable cutting element (see title, abstract and claim 1). It uses an electric motor (see column 2, line 15), however D2 does not explicitly disclose the type used. D2's mower battery is removable (see figure 1), it fits into a battery compartment or shaft ("Schacht") 28 (see column 2, lines 23 to 53 with figures 1 to 5).

In order to ensure that the battery is always correctly inserted into the shaft (see column 2, lines 47 to 53), that is the battery compartment, guide means in the form of vertical ribs and grooves are provided. The skilled person reads the prior art, just as they do claims, with a mind willing to understand. In the Board's view, when they read that the battery is guided into a shaft by ribs or grooves they will understand that such a guiding effect can only be achieved if corresponding parts are provided on both the shaft and the battery, not just on one of those. Therefore, contrary to how the respondent-proprietor has argued, whether ribs or grooves, the battery has one or the other and the battery compartment (shaft) has their complementary elements. In the Board's view it is also implicit that D2's lawnmower has some kind of control system, whatever form this might take, since a user must, for example, at least be able to turn the electric lawnmower on and off.

2.3 Therefore, the subject matter of claim 1 differs from D2 in the features B, D, F, G and H:

- The electric motor is of the electronically commutated DC type (feature B).
- The battery compartment has an openable battery cover (feature D).
- The battery unit comprises a lithium-ion (LiIon) battery (feature F)
- The control system comprises a speed control system, including a feedback system to drive the electronically commutated motor at a constant speed (Feature G)
- The control system comprises a battery unit condition monitoring system comprising a voltage-monitoring system and/or a temperature-monitoring system (Feature H, first part),
- The battery-unit monitoring circuitry is incorporated together with the control system electronics (Feature H, second part).

2.4 The respondent-proprietor has contended (see its letter of 9 August 2022, page 11, section III.1) that the differing claim features (B,D,F,G and H) are clearly *interrelated* and must therefore form a combination invention in which the differing features must be considered together when assessing inventive step. The Board disagrees.

2.4.1 A mere interrelation between features, such as their forming part of the same apparatus, is insufficient for their being considered together when assessing inventive step, however unusual it may be for there to be so many differing features. Rather, in accordance with established jurisprudence (see Case Law of the Boards of Appeal, 10th edition, 2022 (CLBA) I.D.9.3.1 and for example **T1054/05**, reasons 4.5), the existence of a combination invention requires that features or groups of features must show a combinative effect

beyond the sum of their individual effects, in other words they must interact *synergistically*. This is the case if their functions are not only interrelated but also lead to *an additional effect* that goes beyond the sum of each of the effects taken in isolation. In the absence of such a combination invention, the features are a mere aggregation and must be considered separately for assessing inventive step as they solve so called partial problems (see CLBA I.D.9.3.2).

Moreover, the boards take the approach that the technical problem addressed by the invention should normally start from the problem described in the patent. Alleged advantages to which the patent proprietor merely refers, without offering sufficient evidence to support the comparison with the closest prior art, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step (see CLBA I.D. 4.2.2 and 4.3.1).

2.4.2 According to the published patent specification, the technical effects/problems solved of the various differing features are as follows:

- an electronically commutated direct current ECDC) provides for an efficient motor and is low in weight due to its not being commutated using brushes and having smaller armature windings (see published patent paragraphs [0003], [0041] and [0043]).

- The patent is silent as to any effect of a battery cover, it is merely said to be preferable (see paragraph [0005]), at most it seems implicit that a

cover will protect the battery from ingress of unwanted substances such as dirt.

- A Li Ion battery has a high energy density, and is thus low in weight for the amount of energy it can store, as well as enabling rapid charging without memory effects or self discharge (see paragraphs [0044] and [0045]).

- The patent attributes no particular advantage to the feature of a speed control system with feedback to drive the motor at a constant speed. At most it is merely described as advantageous (see paragraphs [0007] and [0042]).

- Likewise, the patent explains no particular advantage to monitoring the battery voltage/ temperature *as such*. The effect of this feature would therefore appear to be no more than providing monitoring information. At most, only when used in conjunction with a switch means for interrupting the charging or discharging process, which has not been claimed, would there appear to be an effect of enhancing charging/discharging safety (see paragraphs [0046] and [0047]).

- Finally, the idea of incorporating battery monitoring circuitry with control system electronics, whatever part of the monitoring circuitry might be incorporated with the control system (see paragraph [0047]), seems to be presented in the patent as saving costs, presumably by avoiding some hardware duplication, be this of a circuit board, housing or whatever else.

2.4.3 On the face of it, all these effects and advantages appear to be independent of each other, and thus do not prove that the differing features interact *synergistically.* Whilst the patent (see paragraphs [0043] and [0044]) states that both an ECDC motor and a Li Ion battery are light weight in their respective classes and thus contribute to the lawn-care apparatus having a lower weight, their respective contributions to this are independent of each other. Put differently, an ECDC will not have a lower weight if it is powered by an Li Ion battery as opposed to any other battery. By the same token, the energy density of a Li Ion battery is not enhanced when it is connected to an ECDC motor. Thus the Board sees no synergy in this respect.

2.4.4 Moreover, although the published patent specification, paragraph [0048] states that: *An additional benefit of* [using an ECDC motor] *in conjunction with a lithium-ion battery is that very high peak powers are obtainable which enables a lawn care apparatus* [...] *to be used in tough cutting conditions*, the Board is not convinced that this proves any synergistic relationship between these features in their claim context. In particular, the claim is not limited to a lawn-care apparatus using a motor operated in any particular power range, let alone at peak power. Moreover, the passage does not explain, nor is it evident to the Board, why a battery that used a different technology and specified to be able to supply sufficient current would not be able to supply power to an ECDC motor running at its peak power. Vis-a-vis such a different battery a Li-Ion battery might be lighter, but as stated, any weight gain is independent of the weight gain possible through the use of an ECDC motor.

2.4.5 For these reasons, the Board concludes that the above differing features are not synergistically related to each other and must therefore be treated independently when examining inventive step. In reaching this conclusion, the Board has not been convinced by the respondent-proprietor's arguments to the contrary.

2.4.6 In particular, with regard to the combination of an ECDC motor and an Li Ion battery, the proprietor-respondent has argued that figure 9 of the patent would demonstrate a synergetic interrelationship.

Nothing in the figure itself relates to any particular battery technology used. Nor is it implicit that it gives information related to Li Ion batteries because the patent is only concerned with such batteries as the respondent-proprietor has argued, rather the patent presents Li Ion batteries as being optional (see for example published patent specification, paragraph [0005]). Moreover, figure 9 only compares parameters of ECDC and conventional [brushed] motors, in particular their current, motor speed and efficiency. This is confirmed by the description, paragraph [0043], which explains that the graphs illustrate the efficiency improvements over a wider speed range offered by an ECDC motor compared to a conventional [brushed] DC motor. The skilled person reads this information, keeping mind what they have already learnt from the preceding paragraph [0041]: Namely that ECDC motors are more efficient because they do not suffer from the mechanical drag caused by the brushes of conventional motors, not because they are powered by a particular battery. By the same token, this paragraph also explains the increased efficiency to be available over a wider speed range *due to pulse wave modulation switching parameters of the control electronics*, rather

than because of the type of battery technology being used.

Without doubt, when operating an ECDC motor at the right hand (high power) side of the figure 9 graph, whatever its technology, the battery would need to be suitably specified to supply the high currents demanded by the motor. It may well be that a suitable Li Ion battery would be much lighter than a similarly specified lead-acid battery, and so make for a manoeuvrable lawn-care apparatus (cf. published patent specification, paragraph [0044]). In other words using a lead-acid battery of comparably capacity and current rating might make for an impracticably heavy mower as the respondent-proprietor has argued. However, at most this boils down to no more than a confirmation that Li Ion batteries have a higher energy density, which, as has already been explained, is not enhanced when they are used to power a ECDC motor. Similarly, whether or not conventional [brushed] motors might be susceptible to brush fires at peak powers might, at most, demonstrate an advantage to using a brushless ECDC motor, independent of the battery technology used but does not support the respondent-proprietor's assertion that there might be synergy derivable from using such a motor with a Li Ion battery.

2.4.7 The respondent has also argued that the longer lifetimes of Li Ion batteries and ECDC motors contribute synergistically to a longer apparatus lifetime. The patent says nothing about the relative lifetimes of these components. Nor has the respondent provided any evidence to this effect, let alone explained how the longer life of the one component might synergically improve the lifetime of the other. Therefore, the argument is moot.

2.4.8 The respondent has furthermore argued that the combination of an ECDC motor and Li Ion battery improves regenerative braking (cf. published patent specification, claim 9 and figures 10 and 11) or simply [electrical] braking. The Board notes that claim 1 is not limited to an apparatus with regenerative braking or any other kind of electrical braking (the patent appears not to disclose the latter). That said, regenerative braking will always be achievable with a rechargeable battery irrespective of its technology, (cf. published patent specification, paragraph [0040] - *In preferred embodiments* [with regenerative braking], *the power supply is a battery*). Therefore, the argument is moot.

2.4.9 The respondent-proprietor has also argued there to be a synergistic relationship between the features B, F and H. In particular, so the argument goes, an ECDC motor requires commutation control electronics and a Li Ion battery a temperature/voltage monitoring system (where other DC motors need no such control electronics and other batteries need no such monitoring electronics), so the claimed motor and battery offers the synergistic advantage that these circuits can be incorporated together as defined in the last part of feature H. The Board disagrees.

That both the claimed motor and battery technologies require, according to the argument, additional control/ monitoring circuitry compared to other components fulfilling the same function is, if anything, disadvantageous in terms of adding cost and weight. Therefore, at most, incorporating any of this circuitry together might mitigate respective disadvantages associated with an ECDC motor and a Li Ion battery

which was only available when these are used together, rather than represent a synergistic advantage attributable to this combination that saves cost and weight, as the respondent-proprietor has argued.

Moreover, the respondent's argument is premised on the idea that the *control system* mentioned in the claim incorporates motor commutation electronics. However, this is not defined in the claim. Feature G defines that the apparatus *control system* comprises feedback speed control for the motor, which is not dependent on using any particular type of motor. Nor is it implicit that the claimed *apparatus control system* comprises the motor commutator logic: Claim 1 as granted defines an ECDC motor (which indeed requires commutator logic somewhere), without defining the apparatus to have a control system, which is only introduced as an option in dependent claim 4. Therefore, the arguments of the respondent-proprietor in these respects are moot.

2.4.10 At the oral proceedings before the Board, the respondent seemed to argue that synergy between features B, D, F, G and H lay therein that these constituted a chain of linked improvements with one contingent on the other. Thus, when starting from the problem of weight, a first step for the patented invention was to use an ECDC motor. Though this motor is light-weight, it would require a more powerful battery. Merely inserting a bigger battery of the same type would however negate any weight saved by the lighter motor. That could be countered by a Li Ion battery with higher energy density. A Li-Ion battery however suffers from overheating, which could then be avoided by monitoring its temperature. All these changes would form a chain of linked improvements, a sequence of steps, that achieve the over-arching

objective of a light-weight, efficient lawn mower and should therefore be considered together.

That there might exist such a sequence of steps does not demonstrate to the Board that their total effect is more than the sum of their individual effects, and the Board is thus unable to see therein any synergy. This is all the more so as the Board is unconvinced that each of the features is conditioned by or contingent on other features. Therefore, the set of features can be considered an aggregation and obviousness of each individual step can be considered in isolation. Only if at least one of those steps can be seen to be non-obvious can inventive step be concluded. The number of steps or the number of documents cited plays no role.

2.4.11 For all these reasons, the Board sees no synergetic relationship between the various differing claim features B,D,F,G,H, so these must be considered separately when examining inventive step.

2.5 Turning now to the question of inventive step of these features, in the Board's view, all of them are obvious in the light of the cited prior art, and therefore the claim as a whole lacks inventive step.

2.5.1 Claim feature B (ECDC motor)

Starting from D2, which does not spell out the type of electric motor used, the Board agrees with the respondent-proprietor that the objective technical problem can be formulated as specifying a suitable electric motor for implementing the lawn-care apparatus of D2.

The skilled person, tasked with specifying D2's motor, will immediately see (D2, column 2, lines 15 to 17) that the motor is to be powered by the battery via connecting cables. Given that batteries provide DC power, it is at least immediately obvious to use some kind of DC motor in D2's apparatus. As to the type of DC motor to use, the skilled person would be aware of the ECDC motors from their general knowledge, as evidenced by the text book D26, published at least 6 years prior to the filing date of the patent and which is concerned with various aspects of small DC motors (see title, bibliography and contents pages).

In particular, D26, second chapter (see pages 10 and 18) lists various applications of DC motors in general. These include garden apparatus (page 18). In this regard, every kind of garden apparatus must operate in the particular outdoor environment of gardens which, as the respondent has pointed out, may be cold and damp. Thus, the skilled person would understand the statement on page 18 as being applicable to lawn-care apparatus amongst other gardening implements. It is with this in mind that the skilled person would read about the various possible arrangements of DC motors in a later chapter (*Bauarten und Formen des Gleichstrom-Kleinmotors* - Types and forms of the small DC motor). In other words, the skilled person reads the whole pallet of applications established in the second chapter, including garden apparatus as applying to the DC motors explained in the book, including the ECDC motors introduced on page 35. Thus, when they read on page 35 that DC motors can be brushless electrically commutated motors (ECDC motors), they would understand that this form would be suitable for use in a garden environment, contrary to how the respondent has suggested.

The Board is also not convinced that the skilled person would understand ECDC motors to be only applicable to small fans, as the respondent proprietor has also suggested. Following on from the general discussion of ECDC motors on page 35, page 36 of D26 discusses "Sonderbauformen" - special designs. There, it is explained that ECDC motors are usually arranged in a very similar way to conventional [DC] motors, with the stator (windings) built around the (permanent magnet) rotor but that exceptionally for small fans, the opposite is true. Thus the example of a small fan is merely an example of a special design rather than being the only application for ECDC motors as the proprietor-respondent has argued.

From the above, starting from D2, the skilled person would use an ECDC motor in D2's lawn-care apparatus by applying their general knowledge, as exemplified by D26. Thus, they would arrive at claim feature B (ECDC motor) as a matter of obviousness.

2.5.2 In its communication in preparation for the oral proceedings, the Board gave its preliminary opinion on inventive step to the various differing features, including features D, F, G and H first part, all of which it found to be obvious when starting from D2 in combination with various pieces of prior art (see sections 5.2 to 5.5). In particular, the Board wrote the following:

5.2 Regarding feature D (openable battery cover), this protects the battery. The objective technical problem can be considered as how to improve D2's mower to better protect it [from the elements]. Providing a cover for the battery is an obvious solution that the

skilled person knows from their common general knowledge.

5.3 As to feature F (lithium Ion battery), the Board agrees with the opposition division (see impugned decision, reasons 3.1 and published patent specification, paragraph [0044]) that such batteries have a higher energy density and thus are lighter weight for the power stored compared to nickel cadmium (NiCd) batteries . The objective technical problem can be formulated as how to modify D2 to save weight. In solving this problem it would be obvious for the skilled person to replace D2's NiCd battery with a lithium ion battery as a matter of obviousness.

5.4 *With respect to feature G (speed control with feedback), the published patent specification does not appear to mention any particular advantage to this arrangement. At most paragraph [0007] says it is advantageous. The opposition division (see impugned decision, section 7.3), considered that the effect would be uniformity of cut, which appears plausible. Faced with the problem of modifying D2 to make cutting more uniform. This problem is solved by D18, which also relates to a lawnmower (see page 2, lines 44 to 49). The solution is to provide a constant speed circuit for the motor with feedback (see page 2, lines 90 to 100 and figure 5).*

5.5 Regarding the first part of feature H (monitoring battery temperature and/or voltage), these features appear to have the effect of improving surveillance of the operating parameters. With respect to D2, the objective technical problem can therefore be seen as how to improve surveillance of operating parameters. The Board agrees with the opposition division (see

impugned decision section 8.2) that monitoring of battery temperature and voltage are known to the skilled person from their general knowledge, and in solving the objective technical problem it would be obvious to arrive at the first part of feature H. The Board considers that the combination of D2 with D15 would lead to the same result: D15 relates to batteries for electrical tools - including gardening machines - and discloses monitoring battery temperature and voltage, including for Lithium Ion batteries using a microprocessor (cf. paragraphs [0127] and [0128], [0136] and [0137]). [...].

Neither in written proceedings nor at the oral proceedings did the respondent-proprietor comment on this part of the opinion. Therefore, the Board confirms its preliminary opinion that, starting from D2, the skilled person would also arrive at each of features D, F, G and H first part, considered individually as a matter of obviousness.

2.5.3 Turning now to the second part of feature H (incorporating voltage and/or battery monitoring circuitry with control system electronics), the opposition division (see impugned decision, pages 32 and 33) saw this feature as defining a hardware merging of battery condition monitoring circuitry and control system electronics. The Board finds this a reasonable interpretation and notes that it requires no more than for *some part* of the battery monitoring circuitry to be combined with the apparatus's control system electronics.

It is common ground that the technical effect of this feature is one of saving costs. Starting from D2, the objective technical problem associated with this

feature can be expressed as how to implement the control system of D2's lawn-care apparatus economically.

As already established, the skilled person would modify D2 to introduce the features of a Li Ion battery with battery condition monitoring circuitry *per se* as a matter of obviousness, from D15. In the Board's view, faced with the objective technical problem (economic implementation), the skilled person would likewise incorporate battery monitoring circuitry into D2's control arrangement as a matter of obviousness from the teaching of D15.

Whilst it is true that many of D15's examples illustrate a drill with a small removable battery pack (see for example paragraph [0126] with figure 5), as already explained, D15 also pertains to other devices including *high performance* devices such as garden devices including those used in farming. Thus, D15's teaching is applicable to the outdoor garden environment and, moreover, is not limited to only very small devices, which might be associated with a domestic environment, as the respondent-proprietor has argued. Faced with the objective technical problem, the skilled person would therefore study D15 to find out how to economically implement an apparatus control system where a removable battery has a battery monitoring system.

As explained in paragraphs [0131] and [0136] to [0139] with figures 21A to 21C, a circuit 130 in the battery unit can monitor battery voltage and temperature with a thermistor amongst other things. The circuit 130 can include battery monitoring logic circuitry such as a microprocessor and a state of charge display - which

relates to battery voltage condition, for example by means of LEDs on the battery housing.

As explained in paragraph [0140] with figure 21C, in an alternative arrangement, this *state of charge* part of the battery monitoring circuitry can be on the apparatus itself and controlled by a circuit 420 in the apparatus. Thus, according to this alternative arrangement, some circuitry of the battery-unit condition monitoring unit is incorporated together with the circuit 420 provided in the apparatus, as claimed. How the circuit of this arrangement looks is shown in the next figure - figure 22, cited by the appellant-opponent 1 and from which it is immediately apparent that the apparatus 55 has the control circuit 420 connected to the battery unit, whereas the battery unit 50 has no such control electronics.

The skilled person would immediately see that incorporating a part of the battery monitoring circuitry into the apparatus, such as state of charge processing, provides the economic benefit of rendering the battery simpler and thus cheaper. Therefore, it offers a solution to the objective technical problem (economic implementation) posed. The Board holds that, starting from D2 and considering D15's teaching, the skilled person would thus incorporate battery monitoring circuitry into the D2's control system as a matter of obviousness.

2.6 From the above, the Board concludes that the subject matter of claim 1 of auxiliary request 6 lacks inventive step, Article 56 EPC.

3. Admissibility of auxiliary requests 11a, 12, 12a and 14a

3.1 In accordance with Article 12(2) RPBA 2020, in view of the primary object of the appeal proceedings to review the decision under appeal in a judicial manner, a party's appeal case shall be directed to the requests, facts, objections, arguments and evidence on which the decision under appeal was based.

In the present case, at the oral proceedings before the opposition division, the proprietor filed new auxiliary requests V, VI (present auxiliary request 6) and VII (see minutes 11.5 to 11.9) because its higher ranking requests were found not to be allowable. The opposition division found that auxiliary request VI met the requirements of the EPC and therefore did not consider auxiliary request VII. In appeal, the respondent-proprietor has abandoned auxiliary request VII and filed new requests 11a, 12, 12a and 14a, which therefore constitute an amendment to its case. In accordance with Article 12(4) RPBA 2020, such amendments may be admitted only at the Board's discretion. In exercising its discretion, the Board considers, amongst other things, the suitability of the amendment to address the issues which lead to the decision under appeal.

3.2 In the Board's view, none of these requests offer a clear prospect of success, i.e. are not *prima facie* allowable. Therefore, they are not suitable to address the issues which lead to the impugned decision.

3.3 Auxiliary request 11A

In essence, compared to auxiliary request 6, this request makes mandatory a temperature monitoring system as part of the battery-unit-condition monitoring system

and adds the feature that the [apparatus] control system removes power to the motor (15) in response to the signal from the temperature-monitoring system exceeding a predetermined level.

D15, see paragraphs [0232] to [0235] with figure 22 discloses (see in particular paragraph [0235], first two sentences) that battery temperature monitoring is carried out by the control system 420 located in the apparatus 55 (rather than a control system on the battery as is the case in other embodiments of D15), by reading the battery temperature measured by a thermistor 150 located in the battery unit 50. When a threshold temperature is exceeded the control system 420 locks the apparatus 55, which can but entail cutting its power so that it cannot operate. Therefore, D15 also discloses the main features added to auxiliary request 11a so that the request is not *prima facie* allowable.

3.4 Auxiliary request 12

Auxiliary request 12 adds to auxiliary request 11a the feature which can be summarised as: electronic switching means for modulating the direction and magnitude of current flow in the stator coils of the ECDC motor based on armature phase information provided by detectors comprised in the motor.

In the Board's view, this is a usual way of commutating an electronically commutated motor which the skilled person knows from their general knowledge, as exemplified by D26. In particular, D26, page 35 explains that in an ECDC motor, the commutation function (i.e. the modulation of the direction and magnitude of current flow in the stator coils) of a

conventional [brushed] DC motor is performed by an electronic switching means depending on the angular position of the armature (winding) which it receives from Hall detectors. Contrary to how the respondent-proprietor has argued, the Board considers that since these detectors detect the rotor's *magnetic field* they can but be part of the motor rather than located remotely on the output drive of the motor. Because this feature appears to be obvious, auxiliary request 12 is *prima facie* not allowable.

3.5 Auxiliary request 12a

This request adds to auxiliary request 12 the idea of a regenerative braking system associated with the driven element, that is the cutting element.

In this regard, the respondent-proprietor has argued that the idea works synergistically with the claim features of an ECDC motor and a Li Ion battery and therefore, also a *prima facie* inventive step assessment must take this into account.

The Board notes that the patent itself (see published specification, paragraph [0040] with figures 12A and 12B) does not disclose a particular effect achieved by applying the technique of regenerative braking in the context of an ECDC motor or Li Ion battery. Whilst it is true that the paragraph is to be read in the general framework of an ECDC motor, it does not refer to any advantageous effect achieved as a result of this technique being applied with such a motor. Rather, it only refers to the power electronics, in particular the MOSFET bridge, which have not been claimed. The respondent-proprietor's complementary argument that brushed DC motors suffer from brush fires when used

with regenerative braking has not been supported by any evidence and so will not be taken into consideration.

As to the battery, the relevant paragraph of the patent (see paragraph [0040]) refers to a battery in general rather than a Li Ion battery.

Therefore, the arguments of the respondent proprietor of a particular advantage to applying regenerative braking in conjunction with a ECDC motor and a Li Ion battery are moot.

Turning now to prior art relevant to regenerative braking, the idea of applying this efficiency increasing measure to a battery powered lawnmower, thus a lawn-care apparatus with a cutter, is known for example from D12 (see paragraph [0009]), cited in the opposition proceedings against the same feature in granted claim 14. Therefore, on the face of it, the skilled person would apply this known idea to D2's lawn-care apparatus as a matter of obviousness.

The Board concludes that, auxiliary request 12a is not *prima facie* allowable.

3.6 Auxiliary request 14a

This request adds various features to auxiliary request 12 pertaining to a battery cover latching means with a retractable catch for engaging a detent on the battery unit.

In its communication in preparation for the oral proceedings (see section 12.1, second paragraph), the Board noted the following with regard to auxiliary

requests 13 onwards then on file, of which auxiliary request 14a is one:

Furthermore (auxiliary requests 13 onwards) combine granted claims 10 and 11 which were not linked in the granted claim set, nor claimed with various other granted claims included in these claim sets (cf. granted claims 3 to 9). In this regard, these claim sets appear to add only some but not all features from the original claim set and description (cf. application as published, claims 22 to 28 and 31 to 34 and the description page 3, lines 1 to 23 - rotatable retractable catch), resulting in, on the face of it, an unallowable intermediate generalisation.

In the respondent-proprietor's written reply to this (see letter of 24 November 2023, page 26, point e) and at the oral proceedings before the Board, the respondent-proprietor argued that the application as filed, page 3, offered a word for word basis for the amendment.

On page 3, first sentence it is said that *preferably* the battery unit latching means is pivotably mounted on the apparatus. The next sentence introduces the idea of a retractable catch with the following wording: *Suitably, the battery unit latching means further comprises a retractable catch engageable with the battery unit through rotation about the pivotal mount.*

Thus here, the *retractable catch* is introduced in a very particular form - namely one that engages through rotation, whereby the *rotational* aspect of the retractable catch (which has not been claimed) is not defined as being optional as the respondent-proprietor has argued.

Therefore, the problem that this request appears, *prima facie*, to represent an unallowable intermediate generalisation remains.

3.7 From the above, none of the auxiliary requests 11a, 12, 12a or 14a appear to be *prima facie* allowable and are thus not suitable for addressing the relevant issues. For these reasons the Board decided to exercise its discretion by not admitting them into the proceedings, Article 12(4) RPBA 2020.

4. Auxiliary request 16

4.1 Any amendment to a party's appeal case after this is only admitted at the Board's discretion. Where, as in the present case, amendments are made after the Board has issued its communication, the strict requirements of Article 13(2) RPBA 2020 apply, according to which such amendments shall, in principle not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

4.2 In the present case, auxiliary request 16 was filed at the very last moment, namely during the oral proceedings before the Board, after the discussion on the main request and the auxiliary requests had been concluded. The respondent-proprietor has argued that exceptional circumstances arose because none of its higher ranking auxiliary requests were admitted into the proceedings and were therefore not discussed in detail. In the Board's view, these do not represent exceptional circumstances justifying admittance of the present request at such a late stage of the appeal proceedings.

4.3 The Board noted in its communication, section 12, that the auxiliary request sets 7 to 15 then on file: *represent an amendment to the proprietor's case which may be admitted at the Board's discretion. In exercising its discretion, the Board considers the complexity of the amendment and the suitability of the amendment to address the issues which lead to the decision under appeal.*

4.4 In the light of the communication, it should not have come as a surprise to the respondent-proprietor that the admissibility of the auxiliary requests 11, 12, and 14a, or the later filed auxiliary request 12a would be discussed at the oral proceedings, or that this discussion would consider the suitability of these requests for addressing the various issues on file.

4.5 Moreover, however surprising it may be to the respondent-proprietor that none of these requests were admitted into the proceeding because none was considered suitable for successfully addressing the various issues on hand, this in itself is not an exceptional circumstance: A party should always be prepared for the eventuality that one or more of its auxiliary requests is not admitted, however strong it may consider its case to be.

4.6 From the above, the reasons presented by the respondent-proprietor did not convince the Board that there were exceptional circumstances which would justify admittance of the present request. Therefore, it decided not to admit auxiliary request 16 into the proceedings, Article 13(2) RPBA 2020.

5. Request to file a request for referral to the enlarged Board of appeal, Article 112(a)

5.1 Together with the filing of Auxiliary Request 16, the respondent requested to be given time to formulate two questions that should be referred to the Enlarged Board of Appeal, the first question relating the the interpretation of synergy and the second to the standard for not admitting Auxiliary Requests 11a, 12, 12a or 14a into the proceedings. While the respondent acknowledged that the discussion on these points had been closed and the Board had announced its conclusions in regard of synergy and taken the decision not to admit the above auxiliary requests into the proceedings, they argued that the necessity of a referral lay in the Board's conclusions, which of course could only be known once the Board had reached them.

5.2 During the discussions on the above two points, the respondent neither explicitly requested a referral, nor argued that these issues were of fundamental importance or that the Board when coming to a certain conclusion would deviate from previous case law. The only argument in regard of the latter was the representative's remark that the position the Board appeared to take on synergy was nothing he had experienced in his 25 years of practice before the Boards of Appeal. However, the Board is not privy to a representative's experience and therefore cannot draw the conclusion that this amounts to a request for referral because of a perceived conflict with existing case law. A request for referral, be it directly or indirectly, or an argument in regard of fundamental importance or previous inconsistent case law, was thus not made when the relevant points were open for discussion. In fact, the

representative cited not even one single decision. And since the Board's communication expressing its provisional opinion had mentioned both the question of synergy and of problems with late-filed requests, the representative was not confronted with new issues that may have taken him by surprise.

5.3 The question is then whether the Board should give a party time to formulate questions for a potential referral in regard of points that have already been discussed and decided. The Board takes the view that it should not, for the following reason:

Oral proceedings, and court proceedings, for that matter, are not a domination-free discourse in the sense of Habermas where issues are discussed in whatever order until a solution agreeable to everyone has been reached. Rather, proceedings are meant to put the deciding body, in this case the Board, in a position to decide about the issues in dispute. In order to do so, procedure is structured by different stages, and once a certain stage has been concluded, a party may no longer be able or allowed to undertake certain procedural acts: Once the time limit for filing an appeal has passed, an appeal can no longer be filed; once a party has presented its complete case with the grounds of appeal or the reply thereto, any amendments may, but do not have to be allowed, Art. 13(1) Rules of Procedure of the Boards of Appeal. This is good law and has a recognised doctrinal basis in academic writings, e.g. James Goldschmidt, Der Prozeß als Rechtslage, Berlin 1925.

Where in oral proceedings an issue has been discussed, the Board closes the debate on this issue, deliberates thereupon and announces its conclusions. The Board may

of course reopen the discussion on this issue. During the oral hearing on this case, the issue of synergy was addressed. While the Board was under the impression that a discussion on synergy was all the respondent had to say on inventive step, it transpired that the respondent had been under the impression that they should address issues other than synergy at a later stage. Due to this misunderstanding, the Board then reopened the discussion on inventive step which was then continued to hear the respondent's further submissions. Reopening the discussion was thus a necessity for guaranteeing the respondent's right to be heard. A Board can also reopen the discussion of its own motion if during its deliberation further issues of relevance come to light. However, the Board is unlikely to reopen the discussion once the parties have been properly heard and the Board feels in a position to form an opinion. It may do so, but it does not have to.

In the case at issue, the respondent's request for time in order to formulate questions to the Enlarged Board could have had no other purpose but to reopen a debate that already been concluded. Its only aim could have been for the Board to review its conclusions of its own motion, or to request guidance from the Enlarged Board and review its conclusions in light of such guidance. As the Board had already reached its conclusions, a reopening of the discussion was at the discretion of the Board, and the Board decided that no such reopening was opportune or necessary.

5.4 The respondent argued that the point they wanted to make with the referral had only become pertinent once the Board had reached its conclusions.

For one, it is inherent in judicial decisions that their result only becomes known after the court has reached its decision. Reopening the discussion on any issue relevant to the decision is then subject to the procedural avenues that are available. In regard of a decision rendered by the Boards of Appeal, the only judicial remedy is a petition for review, as was pointed out to the respondent during the oral proceedings. After all, there is no mechanism equivalent to Art. 109 EPC that would allow the party to an adverse decision to request an interlocutory review and have the Board review its own decision.

5.5 In addition, if the respondent was correct in its argumentation, parties to an oral hearing would be entitled to request a referral to the Enlarged Board every time the Board reached an adverse conclusion, thereby forcing the Board to reopen the discussion on subject matter that by way of the Board's conclusions has become "water under the bridge". Should a party to proceedings before the Boards of Appeal be convinced that certain questions merit the attention of the Enlarged Board, this argument should be made before or during the discussion on this question, but certainly not afterwards. A party may very well indicate during the discussion that "should the Board intend to decide the question in this way, the following question should be referred to the Enlarged Board of Appeal", or "should the Board not be minded to admit the Auxiliary Requests into the proceedings, it would deviate from established case law and the matter should be referred to the Enlarged Board of Appeal". However, submitting such requests raised only after the debate on the issue has been closed would, if allowed, make oral proceedings a merry-go-round, which, in the Board's view, they should not be.

5.6 The Board for these reasons was within its discretion in refusing to give a party time to formulate questions to the Enlarged Board whose only purpose it could have been to reopen a debate that had already been closed, and based on which the Board had reached its conclusions.

6. As the patent according to auxiliary request 6 (as maintained) fails to meet the requirements of the EPC, and no other request has been admitted, the appealed decision must be set aside and the patent revoked pursuant to Article 101(3)(b) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

G. Magouliotis A. de Vries

Decision electronically authenticated