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(54) Switching device for electrically driveable garden tools

Schaltvorrichtung für elektrisch betriebene Gartengeräte

Dispositif de commutation pour outils de jardinage entraînés électriquement

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Description

Prior Art

[0001] Switching devices for electrically driveable garden tools, which comprise an operating unit to control an electric motor of an electrically driveable garden tool, are well-known. Such an operating unit comprises at least one speed operating element, one switch operating element and one lock operating element.

[0002] US 2009/0229131 A1 and EP 2 500 144 A1 disclose switching devices for garden tools. Another switching device for a tool is disclosed in WO 03/061913 A1.

Summary of the Invention

[0003] The invention relates to a switching device for electrically driveable garden tools, according to claim 1. The term "operating unit" shall define a unit comprising at least one element, in particular an operating element, which can be directly actuated by an operator and which is provided to change and/or to influence a process and/or a state by an actuation and/or by an input of at least one parameter. An "operating element" shall define an element provided to receive an input from an operator in an operation process, wherein the element is directly contacted by an operator and a force exerted on the operating element can be sensed and/or mechanically transferred to actuate a device, a unit and/or an element. The speed operating element is provided to be actuated directly by an operator, in particular by fingers of an operator's hand, so as to control a rotation speed of the electric motor. To this purpose, the operating unit comprises at least one potentiometer, which is actuated by a movement of the speed operating element. Preferably, the speed operating element is moveably supported, in particular pivotally moveably supported. However, it is also possible that the speed operating element is translationally moveably supported. An electrical signal to control the electric motor depends at least on an actuation state of the speed operating element and of at least one electrical switch operable by the switch operating element.

[0004] Preferably, the switch operating element mechanically blocks a movement of the speed operating element in at least an unactuated state of the switch operating element. The switch operating element is provided to be actuated by a thumb of an operator's hand. Furthermore, the lock operating element is provided to be actuated by a palm of an operator's hand. The switching device for electrically driveable garden tools according to the invention has the advantage that a high ease of use can be achieved. The switch operating element can advantageously be locked in an actuated state to achieve a high ease of use. Therefore, a comfortable two-action switching can advantageously be achieved.

[0005] Moreover, the operating unit comprises at least one blocking element which is located at the lock operating element for holding the switch operating element in at least one position and which is moveable depending on a movement of the lock operating element. The blocking element is provided to hold the switch operating element in at least one position via a positive and/or a non-positive connection. However, it is also possible that the blocking element is provided to hold the switch operating element in at least one position, without a direct contact between the blocking element and the switch operating element, e.g. via a magnetic force etc. Furthermore, the switch operating element is moveably supported to be moved into the holding position by overriding a holding portion of the blocking element in an actuated state of the lock operating element. Preferably, the switch operating element is embodied as a lock-off override operating element. Therefore, the switch operating element can be moved into a locked state even if the lock operating element is actuated. Advantageously the operating unit comprises at least one spring element provided to exert a spring load on said blocking element, against which spring load the blocking element is moveably supported. Therefore, a comfortable operation of the switching device can be achieved. The switch operating element can advantageously be moved into a holding position by an operator even when the lock operating element is in an actuated state.

[0006] In a preferred embodiment of the switching device according to the present invention, the operating unit comprises at least one electrical switch operable by the switch operating element. In an alternative embodiment of the switching device according to the invention, the electrical switch is operable by the lock operating element only. Preferably, the electrical switch can be actuated via a movement of the switch operating element. It is also possible that the electrical switch can be actuated by an operator via an electric signal which depends on a sensed contact of the switch operating element. The electrical switch is preferably provided to open and/or close an electric circuit via a mechanical movement of at least one contact element. The electrical switch is embodied as a micro switch. Furthermore, the switching device according to the invention further comprises at least one PCBA (printed circuit board assembly), wherein said electrical switch is at least provided to close an electric circuit for energizing said PCBA. The PCBA can be arranged in the handle or in a motor housing of the electrically driveable garden tool which comprises the switching device according to the invention. The electric motor can only be started or controlled when the PCBA is energized. Therefore, a safe operation of an electrically driveable garden tool which comprises the switching device according to the invention can advantageously be achieved. Moreover, a safe electric power supply and/or a safe current interruption can advantageously be achieved. In addition, an advantageously simple and compact structure of the operating unit according to the invention

can be achieved.

[0007] In an alternative embodiment of the switching device according to the invention, the operating unit comprises at least one further electrical switch operable by the lock operating element. Preferably, the electrical switch can be actuated via a movement of the switch operating element. It is also possible that the electrical switch is actuated by an operator via an electric signal which depends on a sensed contact of the lock operating element. The electrical switch is preferably provided to open and/or close an electric circuit via a mechanical movement of at least one contact element. The electrical switch is embodied as a micro switch. Therefore, a high safety standard can advantageously be achieved. An operator advantageously has to actuate the switch operating element and the lock operating element to close an electric circuit for energizing the PCBA.

[0008] In addition, the switching device according to the invention further comprises at least one handle at which the operating unit is located, wherein the electrical switch and/or the further electrical switch are/is arranged in the handle. Preferably, the handle is part of a bike handle unit of the switching device according to the invention. The bike handle unit comprises a further handle which can be gripped by an operator. The handle and the further handle are connected with each other via a handlebar of the bike handle unit. The handlebar is u-shaped. The handle is arranged at one end of the handlebar, which is located at a far side of the handlebar with respect to the end at which the further handle is arranged. The handle has a shell structure. Therefore, the handle comprises at least two shells which can be connected to each other to form the handle. The switching device according to the invention has the advantage that the electrical switch and/or the further electrical switch can advantageously be protected against environmental conditions.

[0009] In a preferred embodiment of the switching device according to the present invention, the switching device comprises the handle at which the switch operating element is translationally moveably supported. It is also possible that the switch operating element is pivotally moveably supported at the handle. Hereby, a compact and simple structure of the operating unit according to the invention can be achieved.

[0010] Moreover, the switching device according to the invention comprises at least one sealing unit at least for waterproof-sealing the electrical switch. It is possible that the sealing unit is provided to only waterproof-seal the electrical switch or to waterproof-seal the entire handle at which the operating unit is arranged. Therefore, the switching device according to the invention can advantageously be used in wet conditions. A high ease of use can advantageously be achieved.

[0011] In a preferred embodiment of the switching device according to the present invention, the switching device comprises the handle, wherein the speed operating element, the switch operating element and the lock operating element each are arranged at a different side of the handle. Therefore, an ergonomic usage can advantageously be achieved. The speed operating element can comfortably be actuated by at least one finger of an operator's hand. The switch operating element can comfortably be actuated by a thumb of the operator's hand. Furthermore, the lock operating element can comfortable be actuated by a palm of the operator's hand.

[0012] Moreover, an electrically driveable garden tool, in particular an electrically driveable brushcutter, is proposed, which comprises at least one switching device according to the invention. The electrically driveable garden tool can be energized by a portable accumulator or by a cable which can be connected with an electrical socket e.g. of a local power network. Preferably, the garden tool is embodied as a brushcutter. It is also possible that the switching device is used in another garden tool, like a hedge trimmer, a leaf blower, a chain saw etc. The electrically driveable garden tool according to the invention has the advantage that a comfortable and safe usage can be realized. Therefore, an electrically driveable garden tool with a high ease of use can advantageously be achieved.

[0013] In addition, a method to control an electric motor of an electrically driveable garden tool with a switching device according to the invention is proposed. A comfortable switching method with a high security level can advantageously be achieved.

[0014] Furthermore, the switch operating element has to be pushed into an actuated position of the switch operating element to actuate the electrical switch to close an electric circuit for energizing a PCBA of the switching device, wherein a movement of the speed operating element starts the electric motor. A simple two-action switching method can be realized.

[0015] Moreover, the switch operating element is held in an actuated state when the lock operating element is actuated. Therefore, a comfortable handling of the switching device can advantageously be achivied.

[0016] The switching device according to the invention, the electrically driveable garden tool according to the invention and/or the method to control an electric motor of an electrically driveable garden tool with a switching device according to the invention is/are not to be limited to the utilization and the embodiment described above. In particular, the switching device according to the invention, the electrically driveable garden tool according to the invention and/or the method to control an electric motor of an electrically driveable garden tool with a switching device according to the invention can have a differing number of elements, components and units for a satisfiying function as specified herein.

Brief Description of the Drawings

[0017] Further objects, features and advantages of the present invention will become apparent from reading the following detailed description, taking in conjunction the accompanying drawing wherein a particular embodiment of the invention is disclosed as an illustrative example.

Fig. 1 shows an electrically driveable garden tool according to the invention, comprising a switching device according to the invention in a schematic representation,

Fig. 2 shows a detail view of the switching device according to the invention in a schematic representation,

Fig. 3 shows another detail view of the switching device according to the invention in a schematic representation and

Fig. 4 shows a detail view of an alternative embodiment of a switching device according to the invention in a schematic representation.

Detailed Description of the Illustrative Embodiment

[0018] Figure 1 shows an electrically driveable garden tool 12 which comprises at least one switching device 10. The electrically driveable garden tool 12 is embodied as an electrically driveable brushcutter. Therefore, the electrically driveable garden tool 12 comprises a motor housing 32 to support an electric motor 16 of the electrically driveable garden tool 12. Moreover, the electrically driveable garden tool 12 comprises a tool holder 34 to which a cutting tool 36 can be mounted. The cutting tool 36 can be embodied as a trimmer line cutting tool, as a blade-like cutting tool, as a saw-like cutting tool etc. The tool holder 34 is rotatably driveable by the electric motor 16. Hence, the electrically driveable garden tool 12 comprises a gear 38 which the electric motor 16 and the tool holder 34 are connected to. It is also possible that the tool holder 34 is directly driven by the electric motor 16. Then, the electric motor 16 is located in a motor housing to which the tool holder 34 is directly attached. The gear 38 is supported in a gear casing 54 of the electrically driveable garden tool 12. The tool holder 34 is mounted to the gear casing 54. The gear casing 54 and the motor housing 32 are connected with each other via a shaft 40 of the electrically driveable garden tool 12. The shaft 40 is embodied as a guidance rod for the electrically driveable garden tool 12. In case the electric motor 16 directly drives the tool holder 34, the motor housing 32 (in the alternative embodiment the gear casing 54 in figure 1 is the motor housing 32) is arranged on one end of the shaft 40 and a housing for electrical components (in the alternative embodiment the motor housing 32 in figure 1 is the housing for electrical components) is arranged at another end of the shaft 40. The electrically driveable garden tool 12 further comprises an energy supply connection unit 42 to which an energy supply unit 44 can be connected. The energy supply unit 44 is embodied as an accumulator unit. The energy supply connection unit 42 is arranged at the motor housing 32. In case the electric motor 16 directly drives the tool holder 34, the energy supply connection unit 42 is arranged at the housing for electrical components which is connected to the motor housing 32/gear casing 54 via the shaft 40. Therefore, a general construction of the electrically driveable garden tool 12 is well known to a person skilled in the art.

[0019] The switching device 10 for the electrically driveable garden tool 12 comprises at least one operating unit 14 to control at least the electric motor 16 of the electrically driveable garden tool 12, wherein said operating unit 14 comprises at least one speed operating element 18, at least one switch operating element 20 for mechanically blocking said speed operating element 18 in at least one actuation state and at least one lock operating element 22 for holding said switch operating element 20 in at least one position. Moreover, said switching device 10 comprises a bike handle unit 46. The bike handle unit 46 is mounted to the shaft 40. Furthermore, the bike handle unit 46 comprises a handle 26 at which said operating unit 14 is located. The handle 26 can be gripped by an operator's hand for guiding the electrically driveable garden tool 12 during work with the electrically driveable garden tool 12. Moreover, the bike handle unit 46 comprises a further handle 48, which can be gripped by an operator. The handle 26 and the further handle 48 are connected with each other via a handlebar 50 of the bike handle unit 46. The handlebar 50 is u-shaped. Herein, the handle 26 is arranged at one end of the handlebar 50 which is located at a far side of the handlebar 50 with respect to the end at which the further handle 48 is arranged.

[0020] The speed operating element 18, the switch operating element 20 and the lock operating element 22 are each arranged at a different side of the handle 26 (figure 2). The speed operating element 18 is provided to be actuated by at least one finger of the operator's hand when the operator grips the handle 26, wherein the at least one finger is different from a thumb of the operator's hand. In addition, the speed operating element 18 is pivotally moveably supported at the handle 26. The switch operating element 20 is provided to be actuated by a thumb of the operator's hand when the operator grips the handle 26. Moreover, the switch operating element 20 is translationally moveably supported at the handle 26. The lock operating element 22 is provided to be actuated by a palm of the operator's hand when the operator

grasps the handle 26. Furthermore, the lock operating element 22 is pivotally moveably supported at the handle 26.

[0021] In an unactuated state of the switch operating element 20, the switch operating element 20 is provided to mechanically block the speed operating element 18 against an opportunity of movement of the speed operating element 18. To this purpose, the switch operating element 20 comprises a blocking portion 56 (figures 2 and 3). Therefore, the blocking portion 56 can be moved together with the switch operating element 20. The speed operating element 18 also comprises a blocking portion 58 provided to interact with the blocking portion 56 of the switch operating element 20. In an unactuated state of the switch operating element 20 the blocking portion 58 of the speed operating element 18 is provided to abut on the blocking portion 56 of the switch operating element 20 or is arranged at a maximum distance less than 5 mm from the blocking portion 56 of the switch operating element 20. If the speed operating element 18 is actuated in an unactuated state of the switch operating element 20, the blocking portion 58 of the speed operating element 18 strikes against the blocking portion 56 of the switch operating element 20.

[0022] Figure 3 shows a detail view of the operating unit 14. In an actuated state of the lock operating element 22 the lock operating element 22 is provided to hold the switch operating element 20 in an actuated position of the switch operating element 20 after the switch operating element 20 has been actuated. For holding the switch operating element 20 in an actuated position, the operating unit 14 comprises at least one blocking element 64, which is located at the lock operating element 22 and which is moveable depending on a movement of the lock operating element 22. The blocking element 64 is pivotally moveably supported at the lock operating element 22. Furthermore, the operating unit 14 comprises at least one spring element 60 provided to exert a spring load on the blocking element 64, against which spring load the blocking element 64 is moveably supported. The spring element 60 is embodied as a leg spring. One leg of the spring element 60 is braced at an inner surface of the handle 26 and another leg of the spring element 60 is braced at the blocking element 64. Therefore, the spring element 60 is further provided to exert a spring load on the lock operating element 22 via the blocking element 64. The blocking element 60 can be moved, relative to the lock operating element 22, against the spring load of the spring element 60. The switch operating element 20 is moveably supported so as to be moved into a holding position by overriding a holding portion 62 of the blocking element 60 in an actuated state of the lock operating element 22. In an unactuated state of the lock operating element 22, of the blocking element 64 and of the switch operating element 20, the switch operating element 20 is located in a cavity 66 of the blocking element 64. When the switch operating element 20 is now moved into an actuated position, the blocking element 64 is moved, relative to the lock operating element 22, against the spring load of the spring element 60. The blocking element 64 is rotated, in particular rotated by few degrees, relative to the lock operating element 22. The switch operating element 20 is still located in the cavity 66 but only abuts on an edge of the cavity 66. This prevents a movement of the blocking element 64 induced by the spring load of the spring element 60 into an unactuated position of the blocking element 64. The switch operating element 20 now operates, in an actuated position, an electrical switch 24 of the operating unit 14, but is not held in position by the blocking element 64. When a force operating on the switch operating element 20 is discontinued, the switch operating element 20 is moved into an unactuated position via a spring load of a further spring element 68 of the operating unit 14. As a result, the blocking element 64 is rotated, in particular rotated by few degrees, relative to the lock operating element 22, by the spring load of the spring element 60, so that the switch operating element 20 is once again located in the cavity 66.

[0023] In an actuated state of the lock operating element 22 and in an unactuated state of the switch operating element 20, the blocking element 64 is rotated, in particular rotated by few degrees, relative to the lock operating element 22 and relative to the switch operating element 20. An opening of the cavity 66 is tilted by few degrees. When the switch operating element 20 is moved from an unactuated position into an actuated position, the blocking element 64 is further rotated, in particular rotated by few degrees, relative to the lock operating element 22 against a spring load of the spring element 60, so that the switch operating element 20 can completely be moved out of the cavity 66. After the switch operating element 20 is moved out of the cavity 66 the blocking element 64 is rotated in a direction towards the lock operating element 22 by a spring load of the spring element 60. The holding portion 62 of the switch operating element 20 can now hold the switch operating element 20 in a holding position.

[0024] The electrical switch 24 of the operating unit 14 is operable by the switch operating element 20. The electrical switch 24 can be actuated by a movement of the switch operating element 20 from an unactuated position of the switch operating element 20 to an actuated position of the switch operating element 20. The electrical switch 24 is embodied as a micro switch. Herein, the electrical switch 24 is embodied as a dual micro switch. Furthermore, the electrical switch 24 is arranged in the handle 26. The switching device 10 further comprises at least one sealing unit 28 at least for waterproof-sealing the electrical switch 24. It is also possible that the sealing unit is provided to waterproof-seal the whole handle 26 at which the operating unit 14 is arranged. The switching device 10 further comprises at least one PCBA 52, wherein the electrical switch 24 is at least provided to close an electric circuit for energizing the PCBA 52. The PCBA 52 is located in the motor housing 32. Therefore, the electrical switch 24 and the PCBA 52 are connected with each other via an electrical supply line (not shown) of the switching device 10.

[0025] A method to control and/or start the electric motor 16 of the electrically driveable garden tool 12 with the switching device 10 can comprise the following steps:

The switch operating element 20 is pushed into an actuated position of the switch operating element 20 by an operator, whereby the electrical switch 24 is actuated. The electrical switch 24 closes an electric circuit for energizing the PCBA 52. The PCBA 52 is turned on. It is also possible that the PCBA 52 is only turned on when the speed operating element 18, the switch operating element 20 and the lock operating element 22 are actuated. In the process of actuation of the switch operating element 20, the lock operating element 22 also is moved into an actuated position of the lock operating element 22. The lock operating element 22 now holds the switch operating element 20 in the actuated position of the switch operating element 20 via the blocking element 64. The lock operating element 22 can be depressed without the switch operating element 20 being moved but does not trigger or maintain a signal from the electrical switch 24. A signal from the electrical switch 24 only occurs when the switch operating element 20 is operated. Now that the electrical switch 24 is engaged and the PCBA 52 is in operation, a movement of the speed operating element 18 starts the electric motor 16. In case the operator's hand is removed from the handle 24, the lock operating element 22 releases the switch operating element 20 and the electrical switch 24 switches off the PCBA 52 and the electrically driveable garden tool 12.

[0026] The following table shows all possible operating element activation sequences. Section one is the activation of individual operating elements. Section two is the activation of one operating element followed by another. A→B means operating element A is actuated first followed by operating element B, wherein A stands for the speed operating element 18, B stands for the switch operating element 20 and C stands for the lock operating element 22. Section III is the activation of all three operating elements in the described sequence. A→B→C means that operating element A is actuated followed by B and then C.

	Pushed operating element			Electrical signal	Motor status
	A	B	C		
A	1	0	0	0	0
B	0	1	0	1	0
C	0	0	1	0	0
A→B	1	0	0	0	0
B→A	1	1	0	1	1
A→C	1	0	1	0	0
C→A	1	0	0	0	0
B→C	0	1	1	1	0
C→B	0	1	1	1	0
A→B→C	1	0	0	0	0
A→C→B	1	0	1	0	0
B→A→C	1	1	1	1	1
B→C→A	1	1	1	1	1
C→A→B	1	1	0	0	0
C→B→A	1	1	1	1	1

[0027] The following table shows what happens when one or two operating elements are released after the electric motor 16 has been started.

Push sequence to start motor			Release	Pushed operating element			Elelctric signal	Motor status
				A	B	C		
		B→A	A	0	1	0	1	0
		B→A	B	1	0	0	1	1
C→B→A	B→C→A	B→A→C	A	0	1	1	1	0
C→B→A	B→C→A	B→A→C	B	1	0	1	1	1
C→B→A	B→C→A	B→A→C	C	1	0	0	1	1
C→B→A	B→C→A	B→A→C	AB	0	0	1	0	0
C→B→A	B→C→A	B→A→C	AC	0	1	0	1	0
C→B→A	B→C→A	B→A→C	BC	1	0	0	0	0

[0028] Figure 4 shows an alternative embodiment of the switching device 10, wherein the operating unit 14 comprises at least one further electrical switch 30 operable by the lock operating element 22. Therefore, the operating unit 14 comprises, in the alternative embodiment of the switching device 10, two electrical switches 24, 30. The electrical switches 24, 30 are each embodied as a micro switch. Furthermore, the electrical switches 24, 30 are both arranged in the handle 26. The electrical switches 24, 30 are provided to close an electric circuit for energizing the PCBA 52. Without operating both electrical switches 24, 30, the electric motor 16 does not start. It is also possible that the operating unit 14 alternatively comprises the further electrical switch 30 operable by the lock operating element 22 only. Then, the further electrical switch 30 is embodied as a dual micro switch.

Claims

1. A switching device for electrically driveable garden tools, comprising:

   at least one operating unit (14) to control at least one electric motor (16) of an electrically driveable garden tool; wherein said operating unit (14) comprises at least one speed operating element (18), at least one switch operating element (20) for mechanically blocking said speed operating element (18) in at least one actuation state, at least one lock operating element (22) for holding said switch operating element (20) in at least one position **characterised in that** the switching device further comprises at least one potentiometer, which is actuated by a movement of said speed operating element (20).

2. The switching device as defined in Claim 1, wherein said operating unit (14) comprises at least one blocking element (64) which is located at said lock operating element (22) for holding said switch operating element (20) in at least one position and which is moveable depending on a movement of said lock operating element (22).

3. The switching device as defined in Claim 2, wherein said operating unit (14) comprises at least one spring element (60) provided to exert a spring load on said blocking element (64), against which spring load said blocking element (64) is moveably supported.

4. The switching device as defined in any one of the preceding Claims, wherein said operating unit (14) comprises at least one electrical switch (24) operable by said switch operating element (20).

5. The switching device as defined in Claim 4, wherein said operating unit (14) comprises at least one further electrical switch (30) operable by said lock operating element (22).

6. The switching device as defined in Claim 4 or 5, further comprising at least one handle (26) at which said operating unit (14) is located, wherein said electrical switch (24) and/or said further electrical switch (30) are/is arranged in said handle (26).

7. The switching device as defined in any one of the preceding Claims, further comprising at least one handle (26) at which said switch operating element (20) is translationally moveably supported.

8. The switching device as defined in any one of the preceding Claims, further comprising at least one handle (26), wherein said speed operating element (18), said switch operating element (20) and said lock operating element (22) each are arranged at a different side of said handle (26).

9. An electrically driveable garden tool, in particular an electrically driveable brushcutter, comprising:

at least one switching device as defined in any one of the preceding Claims.

10. A method to control an electric motor (16) of an electrically driveable garden tool with a switching device as defined in any one of Claims 1 to 8, wherein the switch operating element (20) has to be pushed into an actuated position of the switch operating element (20) to actuate the electrical switch (24) to close an electric circuit for energizing a PCBA (52) of the switching device.

11. The method as defined in claim 10, wherein a movement of the speed operating element (18) starts the electric motor (16).

12. The method as defined in claim 10 or 11, wherein the switch operating element (20) is held in an actuated state when the lock operating element (22) is actuated.

Patentansprüche

1. Schaltvorrichtung für elektrisch betriebene Gartengeräte, die Folgendes umfasst:

wenigstens eine Bedieneinheit (14) zum Regeln von wenigstens einem Elektromotor (16) eines elektrisch betriebenen Gartengeräts;
wobei die Bedieneinheit (14) wenigstens ein Drehzahlregelungselement (18), wenigstens ein Schalterregelungselement (20) zum mechanischen Blockieren des Drehzahlregelungselements (18) in wenigstens einem Betriebszustand, wenigstens ein Verriegelungsregelungselement (22) zum Halten des Schalterregelungselements (20) in wenigstens einer Stellung umfasst;
dadurch gekennzeichnet, dass die Schaltvorrichtung weiterhin wenigstens einen Potentiometer umfasst, der durch eine Bewegung des Drehzahlregelungselements (20) betätigt wird.

2. Schaltvorrichtung nach Anspruch 1, wobei die Bedieneinheit (14) wenigstens eine Arretierung (64) umfasst, die am Verriegelungsregelungselement (22) positioniert ist, um das Schalterregelungselement (20) in wenigstens einer Stellung zu halten und die abhängig von einer Bewegung des Verriegelungsregelungselements (22) beweglich ist.

3. Schaltvorrichtung nach Anspruch 2, wobei die Bedieneinheit (14) wenigstens ein Federelement (60) umfasst, das bereitgestellt wird, um eine Federlast, gegen welche die Arretierung (64) beweglich gelagert ist, auf die Arretierung (64) auszuüben.

4. Schaltvorrichtung nach einem beliebigen der vorstehenden Ansprüche, wobei die Bedieneinheit (14) wenigstens einen elektrischen Schalter (24) umfasst, der durch das Schalterregelungselement (20) bedienbar ist.

5. Schaltvorrichtung nach Anspruch. 4, wobei die Bedieneinheit (14) wenigstens einen weiteren elektrischen Schalter (30) umfasst, der durch das Verriegelungsregelungselement (22) bedienbar ist.

6. Schaltvorrichtung nach Anspruch 4 oder 5, die weiterhin wenigstens einen Handgriff (26) umfasst, an dem die Bedieneinheit (14) positioniert ist, wobei der elektrische Schalter (24) und/oder der weitere elektrische Schalter (30) im Handgriff (26) angeordnet ist/sind.

7. Schaltvorrichtung nach einem beliebigen der vorstehenden Ansprüche, die weiterhin wenigstens einen Handgriff (26) umfasst, an welchem das Schalterregelungselement (20) translatorisch beweglich gelagert ist.

8. Schaltvorrichtung nach einem beliebigen der vorstehenden Ansprüche, die weiterhin wenigstens einen Handgriff

(26) umfasst, wobei das Drehzahlregelungselement (18), das Schalterregelungselement (20) und das Verriegelungsregelungselement (22) jeweils auf einer unterschiedlichen Seite des Handgriffs (26) angeordnet sind.

9. Elektrisch betriebenes Gartengerät, insbesondere eine elektrisch betriebene Heckenschere, das Folgendes umfasst:

wenigstens eine Schaltvorrichtung nach einem beliebigen der vorstehenden Ansprüche.

10. Verfahren zum Regeln eines Elektromotors (16) eines elektrisch betriebenen Gartengeräts mit einer Schaltvorrichtung nach einem beliebigen der Ansprüche 1 bis 8, wobei das Schalterregelungselement (20) in eine betätigte Stellung des Schalterregelungselements (20) gedrückt werden muss, um den elektrischen Schalter (24) zu betätigen, um einen Stromkreis zu schließen, der eine Leiterplattenanordnung (52) der Schaltvorrichtung unter Spannung setzt.

11. Verfahren nach Anspruch 10, wobei eine Bewegung des Drehzahlregelungselements (18) den elektrischen Motor (16) in Gang setzt.

12. Verfahren nach Anspruch 10 oder 11, wobei das Schalterregelungselement (20) in einem betätigten Zustand gehalten wird, wenn das Verriegelungsregelungselement (22) betätigt wird.

Revendications

1. Dispositif de commutation pour outils de jardin à commande électrique, comprenant :

au moins une unité de commande (14) servant à commander au moins un moteur électrique (16) d'un outil de jardin à commande électrique ;
dans lequel ladite unité de commande (14) comprend au moins un élément de commande de vitesse (18), au moins un élément de commande de commutateur (20) servant à bloquer manuellement ledit élément de commande de vitesse (18) dans au moins un état d'actionnement, au moins un élément de commande de verrou (22) servant à maintenir ledit élément de commande de commutateur (20) dans au moins une position, **caractérisé en ce que** le dispositif de commutation comprend également au moins un potentiomètre, qui est actionné par un mouvement dudit élément de commande de vitesse (20).

2. Dispositif de commutation selon la revendication 1, dans lequel ladite unité de commande (14) comprend au moins un élément de blocage (64) qui est situé au niveau dudit élément de commande de verrou (22) pour maintenir ledit élément de commande de commutateur (20) dans au moins une position et qui peut se déplacer suivant le mouvement dudit élément de commande de verrou (22).

3. Dispositif de commutation selon la revendication 2, dans lequel ladite unité de commande (14) comprend au moins un élément faisant ressort (60) disposé de manière à exercer une charge de ressort sur ledit élément de blocage (64), ledit élément de blocage (64) étant supporté de manière mobile contre cette charge de ressort.

4. Dispositif de commutation selon l'une des revendications précédentes, dans lequel ladite unité de commande (14) comprend au moins un commutateur électrique (24) pouvant être actionné par ledit élément de commande de commutateur (20).

5. Dispositif de commutation selon la revendication 4, dans lequel ladite unité de commande (14) comprend au moins un autre commutateur électrique (30) pouvant être actionné par ledit élément de commande de verrou (22).

6. Dispositif de commutation selon la revendication 4 ou 5, comprenant également au moins une poignée (26) au niveau de laquelle ladite unité de commande (14) est située, ledit commutateur électrique (24) et/ou ledit autre commutateur électrique (30) étant agencés dans ladite poignée (26).

7. Dispositif de commutation selon l'une des revendications précédentes, comprenant également au moins une poignée (26) au niveau de laquelle ledit élément de commande de commutateur (20) est supporté en translation de manière mobile.

8. Dispositif de commutation selon l'une des revendications précédentes, comprenant également au moins une poignée (26), dans lequel dispositif ledit élément de commande de vitesse (18), ledit élément de commande de commutateur

(20) et ledit élément de commande de verrou (22) sont agencés chacun sur un côté différent de ladite poignée (26).

9. Outil de jardin à commande électrique, en particulier une débrousailleuse à commande électrique, comprenant :

au moins un dispositif de commutation selon l'une des revendications précédentes.

10. Procédé de commande d'un moteur électrique (16) d'un outil de jardin à commande électrique doté d'un dispositif de commutation selon l'une des revendications 1 à 8, dans lequel l'élément de commande de commutateur (20) doit être poussé sur une position actionnée de l'élément de commande de commutateur (20) pour actionner le commutateur électrique (24) afin de fermer un circuit électrique permettant d'alimenter une PCBA (52) du dispositif de commutation.

11. Procédé selon la revendication 10, dans lequel un mouvement de l'élément de commande de vitesse (18) permet de démarrer le moteur électrique (16).

12. Procédé selon la revendication 10 ou 11, dans lequel l'élément de commande de commutateur (20) est maintenu dans un état actionné lorsque l'élément de commande de verrou (22) est actionné.

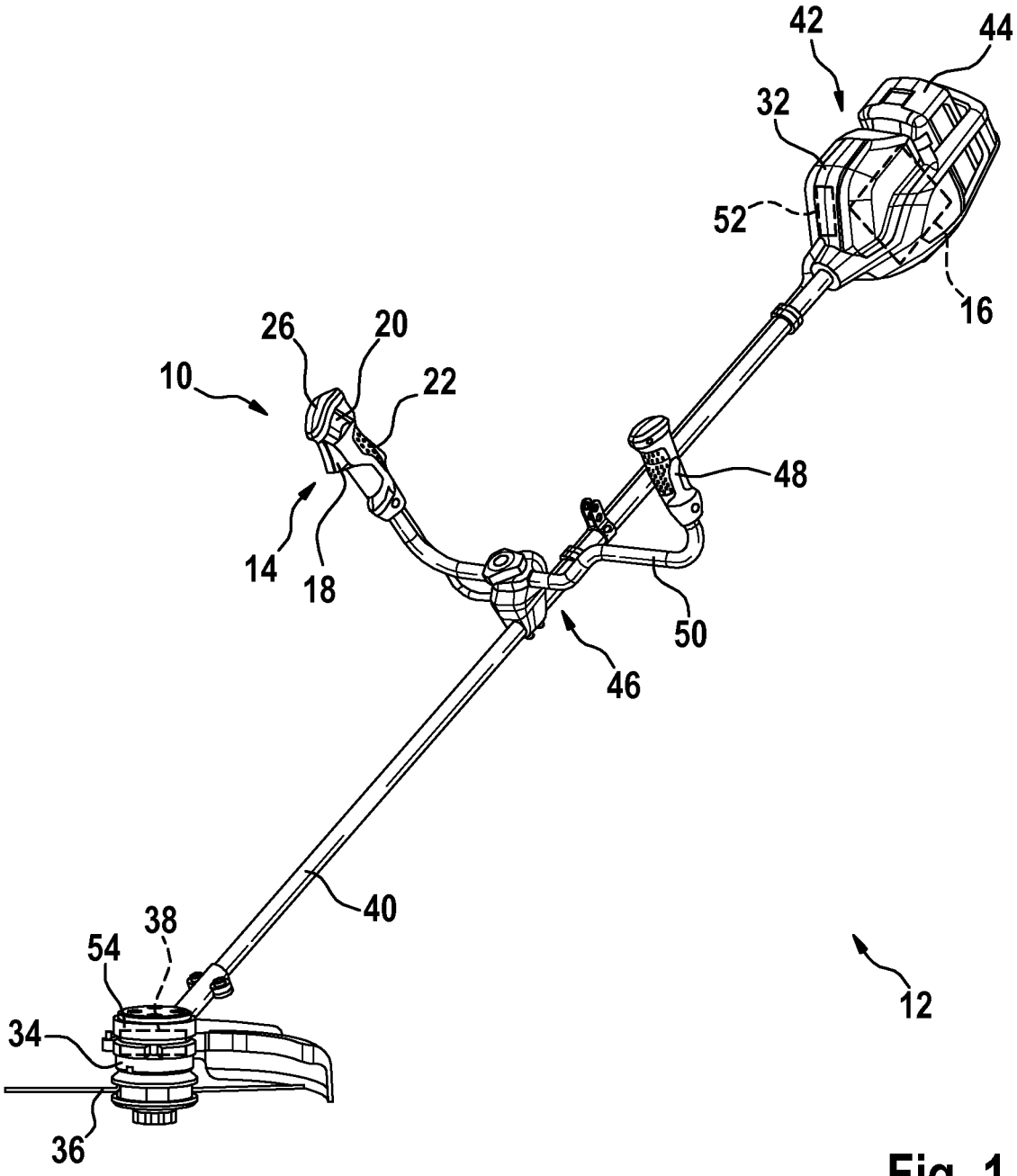


Fig. 1

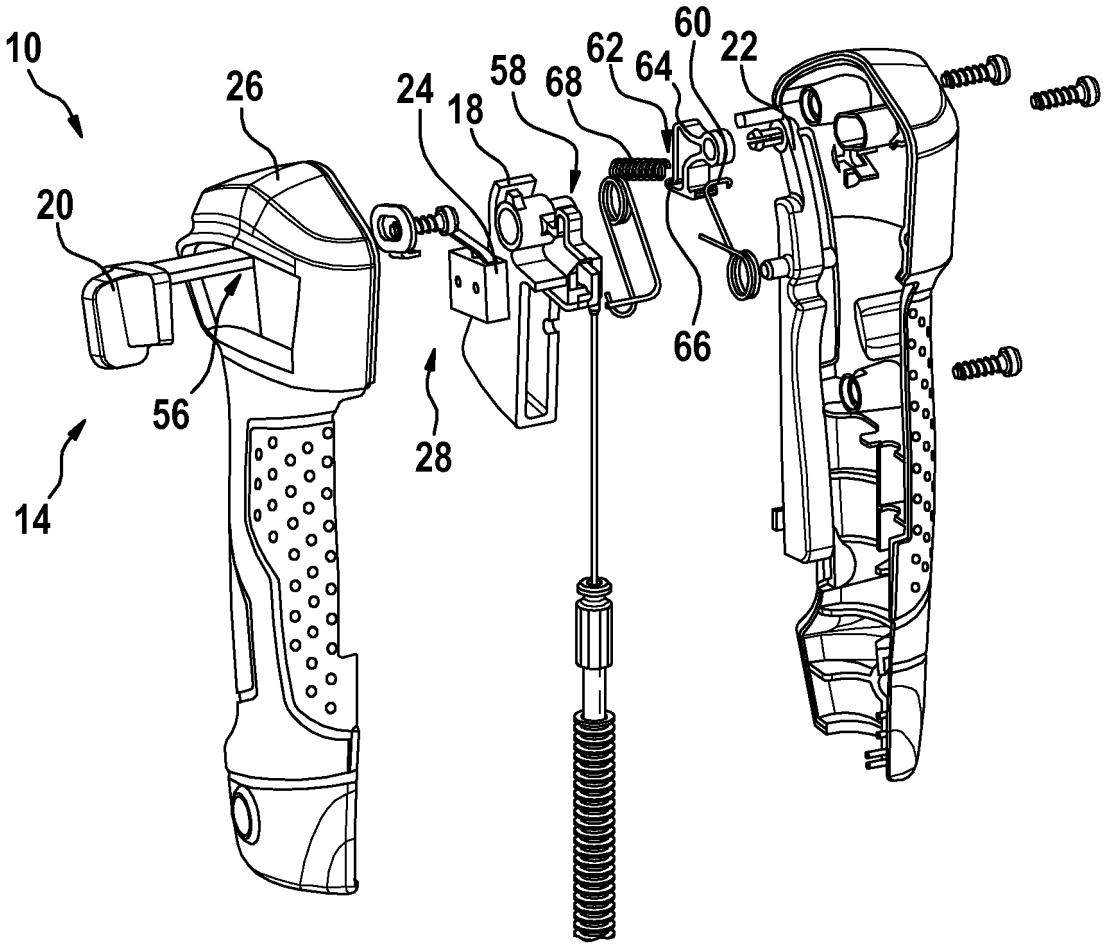


Fig. 2

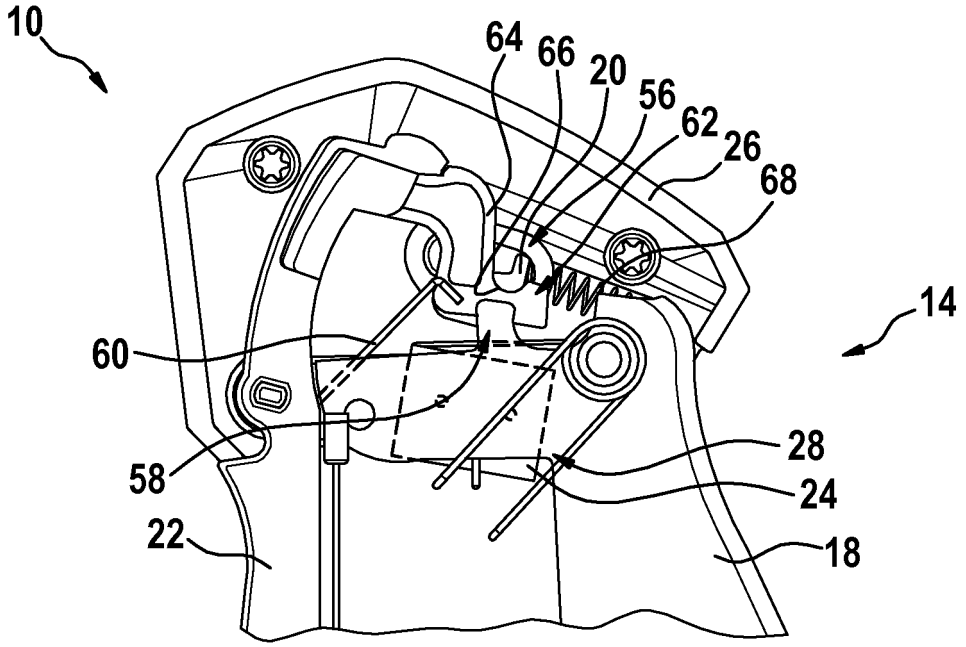


Fig. 3

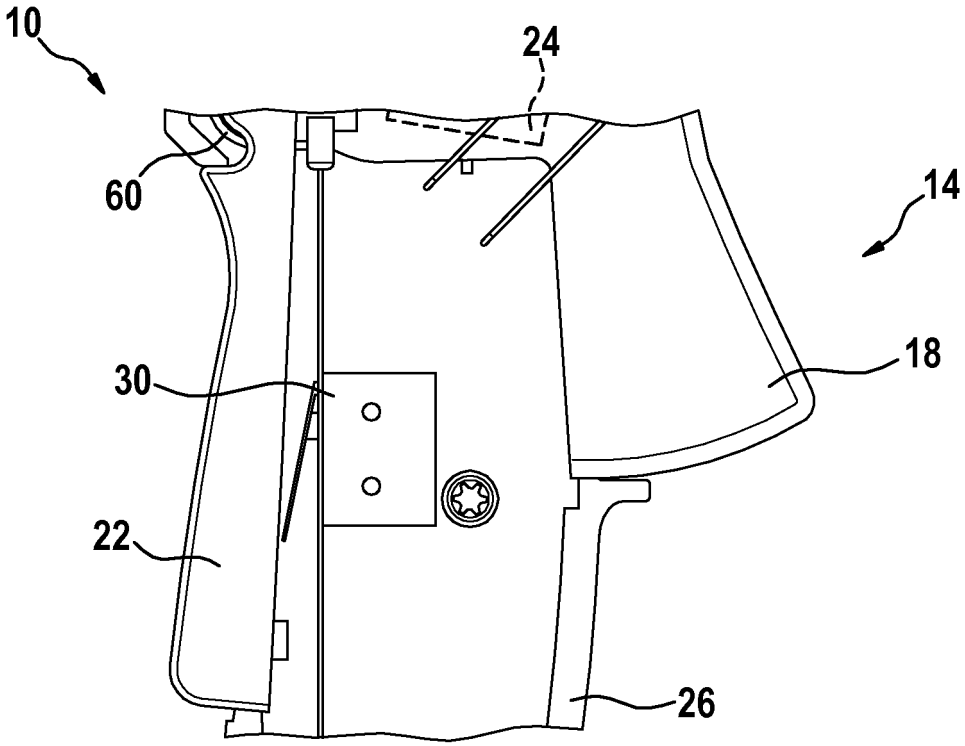


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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