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(54) MECHANICAL INTERLOCK MECHANISM FOR ELECTRICAL DEVICES

MECHANISCHER VERRIEGELUNGSMECHANISMUS FÜR ELEKTRISCHE VORRICHTUNGEN

MÉCANISME DE VERROUILLAGE MÉCANIQUE POUR DISPOSITIFS ÉLECTRIQUES

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EP 3 326 189 B1

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims the priority of CN patent application 201510424930. 4.

TECHNICAL FIELD

[0002] The present invention relates to a mechanical interlock mechanism, in particular a mechanical interlock mechanism for electrical devices.

BACKGROUND ART

[0003] As is known, the function of an isolating switch is to disconnect a circuit having no load current, so that there is a clear disconnection point between equipment being overhauled and a power supply, to ensure the safety of maintenance personnel. A fast ground switch is a special-purpose ground switch which has a certain short circuit current closing capacity; the function thereof is to put the equipment being overhauled into a grounded state, i.e. the equipment being overhauled is switched to a maintenance state.

[0004] In view of electrical safety considerations, an isolating switch can only be operated once a circuit breaker has opened, and a fast ground switch can only perform a closing operation once the isolating switch is in an open state. Moreover, since the fast ground switch is connected to the isolating switch on one side, if the isolating switch is closed when the fast ground switch is still closed, i.e. the elements (circuit, power supply etc.) on the other side of the isolating switch are connected to ground, a major short circuit accident will occur, so the isolating switch can only be closed once the fast ground switch has been opened.

[0005] However, since the fast ground switch needs to perform fast closing and opening during operation, whereas the closing and opening operations of the isolating switch are slow, those skilled in the art have developed a novel mechanical interlock mechanism for electrical devices in order to ensure electrical safety and also to ensure coordination and continuity during interlocking operations, such that only one of the fast ground switch and the isolating switch is in a closed state while the other is in an open state.

[0006] Document D1 (FR 1 587 240 A) discloses a mechanical interlock mechanism for electrical devices, comprising a first rotary element 5 with a first track, a second rotary element 8 with a second track, a first linkage element 4, wherein one end being capable of moving along the first track, and a second linkage element 11, wherein one end being capable of moving along the second track.

CONTENT OF THE INVENTION

[0007] The object of the present invention is to provide a mechanical interlock mechanism for electrical devices, which is capable of controlling two electrical devices connected thereto to realize connection or disconnection asynchronously, ensuring the reliability of the interlock operation thereof while reducing the action delay.

[0008] The object is met by the independent claim. Further preferred embodiments are part of the dependent claims.

DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0009] The present invention is explained in detail below in conjunction with the accompanying drawings and particular embodiments, wherein:

Fig. 1 is a schematic diagram of the internal structure of the mechanical interlock mechanism according to an embodiment of the present invention;

Fig. 2 is a structural schematic diagram of the first rotary element and second rotary element in Fig. 1;

Fig. 3 is a left schematic view of Fig. 1, wherein an electrical device connected thereto is also shown;

Fig. 4 is a right schematic view of Fig. 1;

Fig. 5 is a schematic diagram of the external structure of the mechanical interlock mechanism according to another embodiment of the present invention, wherein the driving force apparatus is also shown.

Key to labels

[0010] first rotary element 11
second rotary element 12
first linkage element 21
second linkage element 22
first housing 31
second housing 32
third housing 33
fourth housing 34
shaft 30
first track 111
first section 111a
second section 111b
third section 111c
second track 121
first section 121a
second section 121b
third section 121c
third track 311
fourth track 321
driving force apparatus 40
casing 50
fastener 51
fast ground switch 60

connecting rod 61
crank 71

PARTICULAR EMBODIMENTS

[0011] To furnish a clearer understanding of the technical features, object and effects of the present invention, particular embodiments of the present invention are now explained with reference to the accompanying drawings, in which identical labels indicate identical parts. In the drawings representing various embodiments, numbers with the same last two digits represent components with the same structure, or with similar structures but the same function.

[0012] To make the drawings appear uncluttered, only those parts relevant to the present invention are shown schematically in the drawings; they do not represent the actual structure thereof as a product. Furthermore, to make the drawings appear uncluttered for ease of understanding, in the case of components having the same structure or function in certain drawings, only one of these is drawn schematically, or only one is marked.

[0013] Figs. 1 and 2 shows a mechanical interlock mechanism according to an embodiment of the present invention, for controlling two different electrical devices in a cooperative manner. Specifically, the mechanical interlock mechanism comprises: a first rotary element 11 and a second rotary element 12. The first rotary element 11 and second rotary element 12 can rotate synchronously about the same shaft 30. It is worth pointing out that a first track 111 is also provided on the first rotary element 11, while a second track 121 is also provided on the second rotary element 12.

[0014] Moreover, the mechanical interlock mechanism also comprises a first linkage element 21 and a second linkage element 22, the first linkage element 21 and the second linkage element 22 each having two ends. One of the ends of the first linkage element 21 can move along the first track 111 on the first rotary element 11; one of the ends of the second linkage element 22 can move along the second track 121 on the second rotary element 12.

[0015] It is worth pointing out that during synchronous rotation of the first rotary element 11 and second rotary element 12, the first linkage element 21 passes a first section 111a of the first track 111, the second linkage element 22 passes a first section 121a of the second track 121, and the first linkage element 21 and the second linkage element 22 are in different states. Specifically, when the first linkage element 21 is in a moving state, the second linkage element 22 is in a stationary state; when the first linkage element 21 is in a stationary state, the second linkage element 22 is in a moving state.

[0016] The first linkage element 21 and second linkage element 22 of the mechanical interlock mechanism are connected to two different electrical devices, for instance a fast ground switch and an isolating switch, respectively in a cooperative manner, so as to be capable of realizing an arrangement whereby when one of the electrical devices is in a connected state, the other electrical device is in a disconnected state, and when one of the electrical devices is in a disconnected state, the other electrical device is in a connected state. Since only one of the electrical devices can be connected each time, while the other is in a disconnected state, it is possible to realize interlock effectively, and realize anticipated disconnection and connection of a circuit through predetermined operations of the first linkage element 21 and second linkage element 22, to ensure electrical safety.

[0017] Preferably, the first track 111 or the second track 121 consists of multiple sections of arc. Referring to Fig. 2, the first track 111 and second track 121 are both of irregular arcuate shape; the first linkage element 21 and second linkage element 22 perform non-continuous movement in the first track 111 and second track 121 respectively, so as to control electrical devices connected thereto to realize connection or disconnection asynchronously.

[0018] According to a preferred embodiment of the present invention, the first track 111 also comprises a second section 111b connected at one end of the first section 111a of the first track 111. The first section 111a and second section 111b of the first track 111 are separated from the shaft 30 by different distances. Specifically, the distance between the first section 111a of the first track 111 and the shaft 30 is variable, the distance between the second section 111b of the first track 111 and the shaft 30 is constant, and the distance between the second section 111b of the first track 111 and the shaft 30 is greater than the distance between the first section 111a of the first track 111 and the shaft.

[0019] According to a specific embodiment, the first section 111a of the first track 111 is of an irregular arcuate shape, and is separated from the shaft 30 by a gradually increasing distance. The second section 111b of the first track 111 is of a regular arcuate shape, and is separated from the shaft 30 by a constant distance. The first linkage element 21 is in a moving state in the first section 111a, and in a stationary state in the second section 111b.

[0020] The second track 121 also comprises a second section 121b connected at one end of the first section 121a of the second track 121. The first section 121a and second section 121b of the second track 121 are separated from the shaft 30 by different distances. Specifically, the distance between the first section 121a of the second track 121 and the shaft 30 is constant, the distance between the second section 121b of the second track 121 and the shaft 30 is variable, and the distance between the second section 121b of the second track 121 and the shaft 30 is greater than the distance between the first section 121a of the second track 121 and the shaft 30.

[0021] According to a particular embodiment, the first section 121a of the second track 121 is of a regular arcuate shape, and is separated from the shaft 30 by a constant distance. The second section 121b is of an irregular arcuate shape, and is separated from the shaft

30 by a gradually increasing distance. The second linkage element 22 is in a stationary state in the first section 121a, and in a moving state in the second section 121b.

[0022] It is worth pointing out that in order to ensure continuity of movement between the first linkage element 21 and second linkage element 22, and reduce action delay, the central angle corresponding to the first section 111a of the first track 111 is the same as the central angle corresponding to the first section 121a of the second track 121. The central angle corresponding to the second section 111b of the first track 111 is the same as the central angle corresponding to the second section 121b of the second track 121.

[0023] As the first rotary element 11 rotates, the first linkage element 21 will switch from a moving state to a stationary state at a particular moment; at this time, the first linkage element 21 will not stop moving immediately, but continue to move forward a certain distance due to its own inertia. In order to prevent the first rotary element 11 from experiencing certain shock and bumping, it is preferred that a safe movement buffer distance must also be reserved for the first linkage element 21 on the first track 111 of the first rotary element 11.

[0024] Specifically, according to a preferred embodiment of the mechanical interlock mechanism of the present invention, the first track 111 also comprises a third section 111c, located at the other end of the first section 111a of the first track 111. The distance between the third section 111c of the first track 111 and the shaft 30 is constant, and less than the distance between the second section 111b of the first track 111 and the shaft 30.

[0025] By the same principle, as the second rotary element 12 rotates, the second linkage element 22 will switch from a moving state to a stationary state at a particular moment; at this time, the second linkage element 22 will not stop moving immediately either, but continue to move forward a certain distance due to its own inertia. In order to prevent the second rotary element 12 from experiencing certain shock and bumping, it is preferred that a safe movement buffer distance must also be reserved for the second linkage element 22 on the second track 121 of the second rotary element 12.

[0026] Specifically, according to a preferred embodiment of the mechanical interlock mechanism of the present invention, the second track 121 also comprises a third section 121c, located at another end of the second section 121b of the second track 121. The distance between the third section 121c of the second track 121 and the shaft 30 is constant, and greater than the distance between the second section 121b of the second track 121 and the shaft 30.

[0027] To realize the function of guiding the movement of the first linkage element 21, and thereby better control an electrical device connected thereto so as to realize anticipated on/off switching, the mechanical interlock mechanism of the present invention also comprises a first limiting element, capable of defining the movement direction of the first linkage element 21. According to a specific embodiment of the present invention, the mechanical interlock mechanism also comprises a first housing 31, the first limiting element is a third track 311 disposed on the first housing 31, the first housing 31 is located on one side of the first rotary element 11, and another end of the first linkage element 21 can move along the third track 311. Optionally, the third track 311 is of a linear shape extending in a radial direction of the first housing 31.

[0028] It is worth pointing out that in order to achieve better limiting and guiding results while ensuring the mechanical strength of the mechanism, the mechanical interlock mechanism preferably also comprises a third housing 33; the third housing 33 is located on another side of the first rotary element 11, and an identical third track 311 is also disposed thereon, as with the first housing 31. The third track 311 on the third housing 33 and the third track 311 on the first housing 31 are parallel to each other, and the first housing 31 and third housing 33 are both in a stationary state. In this embodiment, two ends of the first linkage element 21 are limited in the third track 311 located on the first housing 31 and in the third track 311 located on the third housing 33 respectively; a middle part of the first linkage element 21 is located in the first track 111 on the first rotary element 11. Through the joint action of the first track 111 and the third tracks 311, the first linkage element 21 is enabled to move according to a predetermined path. It should be understood that in an optional embodiment, the limiting element here may also be a locating sleeve, which can cooperate with and limit the movement direction of the first linkage element 21.

[0029] To realize the function of guiding the movement of the second linkage element 22, and thereby better control another electrical device connected thereto so as to realize anticipated on/off switching, the mechanical interlock mechanism of the present invention also comprises a second limiting element, capable of defining the movement direction of the second linkage element 22. According to a specific embodiment, the mechanical interlock mechanism also comprises a second housing 32, the second limiting element is a fourth track 321 disposed on the second housing 32, the second housing 32 is located on one side of the second rotary element 12, and another end of the second linkage element 22 can move along the fourth track 321. Optionally, the fourth track 321 is of an arcuate shape extending in a radial direction of the second housing 32.

[0030] It is worth pointing out that in order to achieve better limiting and guiding results while ensuring the mechanical strength of the mechanism, the mechanical interlock mechanism preferably also comprises a fourth housing 34; the fourth housing 34 is located on another side of the second rotary element, and an identical fourth track 321 is also disposed thereon, as with the second housing 32. The fourth track 321 on the second housing 32 and the fourth track 321 on the fourth housing 34 are parallel to each other, and the second housing 32 and

fourth housing 34 are both in a stationary state. In this embodiment, two ends of the second linkage element 22 are limited in the fourth track 321 located on the second housing 32 and in the fourth track 321 located on the fourth housing 34 respectively; a middle part of the second linkage element 22 is located in the second track 121 located on the second rotary element 12. Through the joint action of the second track 121 and the fourth tracks 321, the second linkage element 22 is enabled to move according to a predetermined path.

[0031] Optionally, as Fig. 1 shows, the first housing 31 and second housing 32 are disposed on an outer side of the first rotary element 11 and the second rotary element 12 respectively. The third housing 33 and fourth housing 34 are disposed on an inner side of the first rotary element 11 and the second rotary element 12 respectively. To serve the function of protecting the internal structure, the mechanical interlock mechanism for electrical devices of the present invention also comprises: a casing 50. The first housing 31, second housing 32, third housing 33 and fourth housing 34 are connected in a fixed manner to the casing 50 by multiple fasteners 51 therebetween.

[0032] Preferably, the shaft 30 is a drive shaft for supplying a driving force; the first rotary element 11 and second rotary element 12 are fitted round the drive shaft coaxially. In order to supply a stable driving force to the mechanical interlock mechanism, referring to Fig. 1, the mechanical interlock mechanism of the present invention also comprises: a driving force apparatus 40, with an output end of the driving force apparatus being connected to the drive shaft. Optionally, the driving force apparatus 40 is an electric motor. It should be appreciated that a person skilled in the art could also use a hydraulic or pneumatic driving apparatus according to actual circumstances; no restrictions are imposed here.

[0033] According to an optional embodiment of the present invention, the first housing 31, second housing 32, third housing 33 and fourth housing 34 as well as the first rotary element 11 and second rotary element 12 can have the disk-shaped structures shown in the figures. The first linkage element 21 and second linkage element 22 may each have a connecting shaft structure. It should be appreciated that the shapes and structures of these components are not unique; a person skilled in the art could make any alterations or changes according to actual requirements, as long as the abovementioned effects of the present invention can be achieved.

[0034] According to a particular embodiment of the present invention, as Fig. 3 shows, one of the electrical devices, for instance a fast ground switch 60, is connected to the first linkage element 21 via a connecting rod 61. As the first linkage element 21 moves or is stationary, it drives the connecting rod 61 synchronously, so as to control the connection or disconnection of the fast ground switch 60. The other electrical device, for instance an isolating switch (not shown in the drawing) is connected to the second linkage element 22 via a crank 71. As the second linkage element 22 moves or is stationary, it drives the crank 71 synchronously, so as to control the connection or disconnection of the isolating switch.

[0035] In summary, during synchronous rotation of the first rotary element 11 and second rotary element 12, when the first linkage element 21 is in a moving state, the second linkage element 22 is in a stationary state; when the first linkage element 21 is in a stationary state, the second linkage element 22 is in a moving state. Due to mutual constraint of movement between the first linkage element 11 and the second linkage element 12, the isolating switch is in a connected state when the fast ground switch is in a disconnected state; the fast ground switch is in a connected state when the isolating switch is in a disconnected state. Thus it is possible to reliably and efficiently realize asynchronous on/off switching operations between two electrical devices in a coordinated manner, to prevent the occurrence of erroneous operations.

[0036] The mechanical interlock mechanism for electrical devices according to the present invention can ensure that only one of two electrical devices is in a connected state, while the other electrical device is in a disconnected state. In contrast to the prior art, the present invention can control the switching of two electrical devices connected thereto between different states by means of just one mechanical interlock mechanism. This not only lowers the cost thereof, but can also increase the reliability of the interlock operation, and can reduce the action delay; at the same time, accidents caused by operational mistakes can be avoided effectively, ensuring the safety of operation of electrical devices.

Claims

1. A mechanical interlock mechanism for electrical devices, comprising:

   a first rotary element (11), with a first track (111) disposed thereon;
   a second rotary element (12), with a second track (121) disposed thereon;
   a first linkage element (21), one end thereof being capable of moving along the first track (111); and
   a second linkage element (22), one end thereof being capable of moving along the second track (121);
   characterized in that the first rotary element (11) and the second rotary element (12) are adapted to rotate synchronously about the same shaft (30); such that during synchronous rotation of the first rotary element (11) and the second rotary element (12), the first linkage element (21) passes a first section (111a) of the first track (111), the second linkage element (22) passes a first section (121a) of the second track (121), and the first linkage element (21) and the second

linkage element (22) are in different states, wherein one of the first linkage element (21) and the second linkage element (22) is in a moving state, the other is in a stationary state.

2. The mechanical interlock mechanism for electrical devices as claimed in claim 1, wherein the first track (111) or the second track (121) consists of multiple sections of arc.

3. The mechanical interlock mechanism for electrical devices as claimed in claim 1, wherein the first track (111) also comprises a second section (111b) connected at one end of the first section (111a) of the first track (111), the first section (111a) and second section (111b) of the first track (111) being separated from the shaft (30) by different distances; the second track (121) also comprises a second section (121b) connected at one end of the first section (121a) of the second track (121), the first section (121a) and second section (121b) of the second track (121) being separated from the shaft (30) by different distances.

4. The mechanical interlock mechanism for electrical devices as claimed in claim 3, wherein the distance between the first section (111a) of the first track (111) and the shaft (30) is variable, the distance between the second section (111b) of the first track (111) and the shaft (30) is constant, and the distance between the second section (111b) of the first track (111) and the shaft (30) is greater than the distance between the first section (111a) of the first track (111) and the shaft (30); the distance between the first section (121a) of the second track (121) and the shaft (30) is constant, the distance between the second section (121b) of the second track (121) and the shaft (30) is variable, and the distance between the second section (121b) of the second track (121) and the shaft (30) is greater than the distance between the first section (121a) of the second track (121) and the shaft (30).

5. The mechanical interlock mechanism for electrical devices as claimed in claim 3 or 4, wherein the central angle corresponding to the first section (111a) of the first track (111) is the same as the central angle corresponding to the first section (121a) of the second track (121), and the central angle corresponding to the second section (111b) of the first track (111) is the same as the central angle corresponding to the second section (121b) of the second track (121).

6. The mechanical interlock mechanism for electrical devices as claimed in claim 5, wherein the first track (111) also comprises a third section (111c), connected at the other end of the first section (111a) of the first track (111); the distance between the third section (111c) of the first track (111) and the shaft (30) is constant, and less than the distance between the second section (111b) of the first track (111) and the shaft (30).

7. The mechanical interlock mechanism for electrical devices as claimed in claim 5, wherein the second track (121) also comprises a third section (121c), connected at another end of the second section (121b) of the second track (121); the distance between the third section (121c) of the second track (121) and the shaft (30) is constant, and greater than the distance between the second section (121b) of the second track (121) and the shaft (30) .

8. The mechanical interlock mechanism for electrical devices as claimed in claim 1, also comprising a first limiting element, capable of defining the movement direction of the first linkage element (21).

9. The mechanical interlock mechanism for electrical devices as claimed in claim 8, also comprising a first housing (31), the first limiting element is a third track (311) disposed on the first housing (31), the first housing (31) is located on one side of the first rotary element (11), and another end of the first linkage element (21) can move along the third track (311), wherein the third track (311) is preferably of a linear shape extending in a radial direction of the first housing (31).

10. The mechanical interlock mechanism for electrical devices as claimed in claim 9, also comprising a third housing (33) located on another side of the first rotary element (11) and similarly being provided with a third track (311); the third track (311) on the third housing (33) and the third track (311) on the first housing (31) are parallel to each other.

11. The mechanical interlock mechanism for electrical devices as claimed in claim 1, also comprising a second limiting element, capable of defining the movement direction of the second linkage element (22).

12. The mechanical interlock mechanism for electrical devices as claimed in claim 11, also comprising a second housing (32), the second limiting element is a fourth track (321) disposed on the second housing (32), the second housing (32) is located on one side of the second rotary element (12), and another end of the second linkage element (22) can move along the fourth track (321), wherein the fourth track (321) is preferably of an arcuate shape extending in a radial direction of the second housing (32) .

13. The mechanical interlock mechanism for electrical devices as claimed in claim 12, also comprising a fourth housing (34) located on another side of the

second rotary element (11) and similarly being provided with a fourth track (321); the fourth track (321) on the second housing (32) and the fourth track (321) on the fourth housing (31) are parallel to each other.

14. The mechanical interlock mechanism for electrical devices as claimed in claim 1, wherein the shaft (30) is a drive shaft capable of supplying a driving force; the first rotary element (11) and second rotary element (12) are fitted round the drive shaft coaxially also preferably comprising a driving force apparatus (40), with an output end of the driving force apparatus being connected to the drive shaft.

Patentansprüche

1. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen, umfassend:

ein erstes Drehelement (11), auf dem eine erste Schiene (111) angeordnet ist,
ein zweites Drehelement (12), auf dem eine zweite Schiene (121) angeordnet ist,
ein erstes Verbindungselement (21), dessen eines Ende sich entlang der ersten Schiene (111) bewegen kann, und ein zweites Verbindungselement (22), dessen eines Ende sich entlang der zweiten Schiene (121) bewegen kann,
dadurch gekennzeichnet, dass das erste Drehelement (11) und das zweite Drehelement (12) dafür ausgelegt sind, sich synchron um die gleiche Welle (30) zu drehen, derart, dass während der synchronen Drehung des ersten Drehelements (11) und des zweiten Drehelements (12) das erste Verbindungselement (21) ein erstes Teilstück (lila) der ersten Schiene (111) passiert, das zweite Verbindungselement (22) ein erstes Teilstück (121a) der zweiten Schiene (121) passiert und sich das erste Verbindungselement (21) und das zweite Verbindungselement (22) in verschiedenen Zuständen befinden, wobei sich eines des ersten Verbindungselements (21) und des zweiten Verbindungselements (22) in einem sich bewegenden Zustand befindet und sich das andere in einem stationären Zustand befindet.

2. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 1, wobei die erste Schiene (111) oder die zweite Schiene (121) aus mehreren Bogenteilstücken besteht.

3. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 1, wobei die erste Schiene (111) zudem ein zweites Teilstück (111b) umfasst, das sich an ein Ende des ersten Teilstücks (lila) der ersten Schiene (111) anschließt, wobei das erste Teilstück (111a) und das zweite Teilstück (111b) der ersten Schiene (111) durch verschiedene Abstände von der Welle (30) getrennt sind, und wobei die zweite Schiene (121) zudem ein zweites Teilstück (121b) umfasst, das sich an ein Ende des ersten Teilstücks (121a) der zweiten Schiene (121) anschließt, wobei das erste Teilstück (121a) und das zweite Teilstück (121b) der zweiten Schiene (121) durch verschiedene Abstände von der Welle (30) getrennt sind.

4. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 3, wobei der Abstand zwischen dem ersten Teilstück (111a) der ersten Schiene (111) und der Welle (30) veränderlich ist, der Abstand zwischen dem zweiten Teilstück (111b) der ersten Schiene (111) und der Welle (30) konstant ist und der Abstand zwischen dem zweiten Teilstück (111b) der ersten Schiene (111) und der Welle (30) größer ist als der Abstand zwischen dem ersten Teilstück (111a) der ersten Schiene (111) und der Welle (30), und wobei der Abstand zwischen dem ersten Teilstück (121a) der zweiten Schiene (121) und der Welle (30) konstant ist, der Abstand zwischen dem zweiten Teilstück (121b) der zweiten Schiene (121) und der Welle (30) veränderlich ist und der Abstand zwischen dem zweiten Teilstück (121b) der zweiten Schiene (121) und der Welle (30) größer ist als der Abstand zwischen dem ersten Teilstück (121a) der zweiten Schiene (121) und der Welle (30).

5. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 3 oder 4, wobei der dem ersten Teilstück (111a) der ersten Schiene (111) entsprechende Zentriwinkel dem dem ersten Teilstück (121a) der zweiten Schiene (121) entsprechenden Zentriwinkel gleicht und der dem zweiten Teilstück (111b) der ersten Schiene (111) entsprechende Zentriwinkel dem dem zweiten Teilstück (121b) der zweiten Schiene (121) entsprechenden Zentriwinkel gleicht.

6. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 5, wobei die erste Schiene (111) zudem ein drittes Teilstück (111c) umfasst, das sich an das andere Ende des ersten Teilstücks (111a) der ersten Schiene (111) anschließt, und wobei der Abstand zwischen dem dritten Teilstück (111c) der ersten Schiene (111) und der Welle (30) konstant und kleiner als der Abstand zwischen dem zweiten Teilstück (111b) der ersten Schiene (111) und der Welle (30) ist.

7. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 5, wobei die zweite Schiene (121) zudem ein drittes Teilstück (121c) umfasst, das sich an ein weiteres Ende des

zweiten Teilstücks (121b) der zweiten Schiene (121) anschließt, und wobei der Abstand zwischen dem dritten Teilstück (121c) der zweiten Schiene (121) und der Welle (30) konstant und größer als der Abstand zwischen dem zweiten Teilstück (121b) der zweiten Schiene (121) und der Welle (30) ist.

8. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 1, der zudem ein erstes Begrenzungselement umfasst, das die Bewegungsrichtung des ersten Verbindungselements (21) definieren kann.

9. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 8, der zudem ein erstes Gehäuse (31) umfasst, wobei es sich bei dem ersten Begrenzungselement um eine dritte Schiene (311) handelt, die auf dem ersten Gehäuse (31) angeordnet ist, sich das erste Gehäuse (31) auf einer Seite des ersten Drehelements (11) befindet und sich ein weiteres Ende des ersten Verbindungselements (21) entlang der dritten Schiene (311) bewegen kann, wobei die dritte Schiene (311) bevorzugt eine lineare Form aufweist, die sich in einer Radialrichtung des ersten Gehäuses (31) erstreckt.

10. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 9, der zudem drittes Gehäuse (33) umfasst, das sich auf einer weiteren Seite des ersten Drehelements (11) befindet und ebenfalls mit einer dritten Schiene (311) versehen ist, wobei die dritte Schiene (311) auf dem dritten Gehäuse (33) und die dritte Schiene (311) auf dem ersten Gehäuse (31) parallel zueinander verlaufen.

11. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 1, der zudem ein zweites Begrenzungselement umfasst, das die Bewegungsrichtung des zweiten Verbindungselements (22) definieren kann.

12. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 11, der zudem ein zweites Gehäuse (32) umfasst, wobei es sich bei dem zweiten Begrenzungselement um eine vierte Schiene (321) handelt, die auf dem zweiten Gehäuse (32) angeordnet ist, sich das zweite Gehäuse (32) auf einer Seite des zweiten Drehelements (12) befindet und sich ein weiteres Ende des zweiten Verbindungselements (22) entlang der vierten Schiene (321) bewegen kann, wobei die vierte Schiene (321) bevorzugt eine Bogenform aufweist, die sich in einer Radialrichtung des zweiten Gehäuses (32) erstreckt.

13. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 12, der zudem ein viertes Gehäuse (34) umfasst, das sich auf einer weiteren Seite des zweiten Drehelements (11) befindet und ebenfalls mit einer vierten Schiene (321) versehen ist, wobei die vierte Schiene (321) auf dem zweiten Gehäuse (32) und die vierte Schiene (321) auf dem vierten Gehäuse (31) parallel zueinander verlaufen.

14. Mechanischer Verriegelungsmechanismus für elektrische Einrichtungen nach Anspruch 1, wobei es sich bei der Welle (30) um eine Antriebswelle handelt, die in der Lage ist, eine Antriebskraft zu liefern, und wobei das erste Drehelement (11) und das zweite Drehelement (12) koaxial um die Antriebswelle herum angebracht sind, zudem bevorzugt umfassend eine Antriebskraftvorrichtung (40), wobei eine Abtriebsseite der Antriebskraftvorrichtung mit der Antriebswelle verbunden ist.

Revendications

1. Mécanisme de verrouillage mécanique pour dispositifs électriques, comprenant :

un premier élément rotatif (11), sur lequel est disposée une première voie (111) ;
un deuxième élément rotatif (12), sur lequel est disposée une deuxième voie (121) ;
un premier élément de liaison (21), dont une extrémité est apte à se déplacer le long de la première voie (111) ; et
un deuxième élément de liaison (22), dont une extrémité est apte à se déplacer le long de la deuxième voie (121) ;
caractérisé en ce que le premier élément rotatif (11) et le deuxième élément rotatif (12) sont conçus pour tourner de manière synchrone autour du même arbre (30) ; de telle sorte que pendant la rotation synchrone du premier élément rotatif (11) et du deuxième élément rotatif (12), le premier élément de liaison (21) parcourt une première section (111a) de la première voie (111), le deuxième élément de liaison (22) parcourt une première section (121a) de la deuxième voie (121), et le premier élément de liaison (21) et le deuxième élément de liaison (22) sont dans des états différents, l'un parmi le premier élément de liaison (21) et le deuxième élément de liaison (22) étant dans un état mobile, l'autre étant dans un état fixe.

2. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 1, dans lequel la première voie (111) ou la deuxième voie (121) consiste en de multiples sections d'arc.

3. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la reven-

dication 1, dans lequel la première voie (111) comprend également une deuxième section (111b) reliée à une extrémité de la première section (111a) de la première voie (111), la première section (111a) et la deuxième section (111b) de la première voie (111) étant séparées de l'arbre (30) par différentes distances ; la deuxième voie (121) comprend également une deuxième section (121b) reliée à une extrémité de la première section (121a) de la deuxième voie (121), la première section (121a) et la deuxième section (121b) de la deuxième voie (121) étant séparées de l'arbre (30) par différentes distances.

4. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 3, dans lequel la distance entre la première section (111a) de la première voie (111) et l'arbre (30) est variable, the distance entre la deuxième section (111b) de la première voie (111) et l'arbre (30) est constante, et la distance entre la deuxième section (111b) de la première voie (111) et l'arbre (30) est supérieure à la distance entre la première section (111a) de la première voie (111) et l'arbre (30) ; la distance entre la première section (121a) de la deuxième voie (121) et l'arbre (30) est constante, la distance entre la deuxième section (121b) de la deuxième voie (121) et l'arbre (30) est variable, et la distance entre la deuxième section (121b) de la deuxième voie (121) et l'arbre (30) est supérieure à la distance entre la première section (121a) de la deuxième voie (121) et l'arbre (30).

5. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 3 ou 4, dans lequel l'angle au centre correspondant à la première section (111a) de la première voie (111) est le même que l'angle au centre correspondant à la première section (121a) de la deuxième voie (121), et l'angle au centre correspondant à la deuxième section (111b) de la première voie (111) est le même que l'angle au centre correspondant à la deuxième section (121b) de la deuxième voie (121).

6. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 5, dans lequel la première voie (111) comprend également une troisième section (111c), reliée à l'autre extrémité de la première section (111a) de la première voie (111) ; la distance entre la troisième section (111c) de la première voie (111) et l'arbre (30) est constante, et inférieure à la distance entre la deuxième section (111b) de la première voie (111) et l'arbre (30).

7. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 5, dans lequel la deuxième voie (121) comprend également une troisième section (121c), reliée à une autre extrémité de la deuxième section (121b) de la deuxième voie (121) ; la distance entre la troisième section (121c) de la deuxième voie (121) et l'arbre (30) est constante, et supérieure à la distance entre la deuxième section (121b) de la deuxième voie (121) et l'arbre (30).

8. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 1, comprenant également un premier élément de limitation apte à définir la direction de déplacement du premier élément de liaison (21).

9. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 8, comprenant également un premier boîtier (31), le premier élément de limitation est une troisième voie (311) disposée sur le premier boîtier (31), le premier boîtier (31) est situé sur un côté du premier élément rotatif (11), et une autre extrémité du premier élément de liaison (21) peut se déplacer le long de la troisième voie (311), dans lequel la troisième voie (311) présente de préférence une forme linéaire s'étendant dans une direction radiale du premier boîtier (31).

10. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 9, comprenant également un troisième boîtier (33) situé sur un autre côté du premier élément rotatif (11) et doté de manière similaire d'une troisième voie (311) ; la troisième voie (311) sur le troisième boîtier (33) et la troisième voie (311) sur le premier boîtier (31) sont parallèles l'une à l'autre.

11. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 1, comprenant également un deuxième élément de limitation apte à définir la direction de déplacement du deuxième élément de liaison (22).

12. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 11, comprenant également un deuxième boîtier (32), le deuxième élément de limitation est une quatrième voie (321) disposée sur le deuxième boîtier (32), le deuxième boîtier (32) est situé sur un côté du deuxième élément rotatif (12), et une autre extrémité du deuxième élément de liaison (22) peut se déplacer le long de la quatrième voie (321), dans lequel la quatrième voie (321) présente de préférence une forme arquée s'étendant dans une direction radiale du deuxième boîtier (32).

13. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la reven-

dication 12, comprenant également un quatrième boîtier (34) situé sur un autre côté du deuxième élément rotatif (11) et doté de manière similaire d'une quatrième voie (321) ; la quatrième voie (321) sur le deuxième boîtier (32) et la quatrième voie (321) sur le quatrième boîtier (31) sont parallèles l'une à l'autre.

14. Mécanisme de verrouillage mécanique pour dispositifs électriques tel que revendiqué dans la revendication 1, dans lequel l'arbre (30) est un arbre d'entraînement apte à fournir une force d'entraînement ; le premier élément rotatif (11) et le deuxième élément rotatif (12) sont montés autour de l'arbre d'entraînement de manière coaxiale, comprenant également de préférence un appareil de force d'entraînement (40), une extrémité de sortie de l'appareil de force d'entraînement étant reliée à l'arbre d'entraînement.

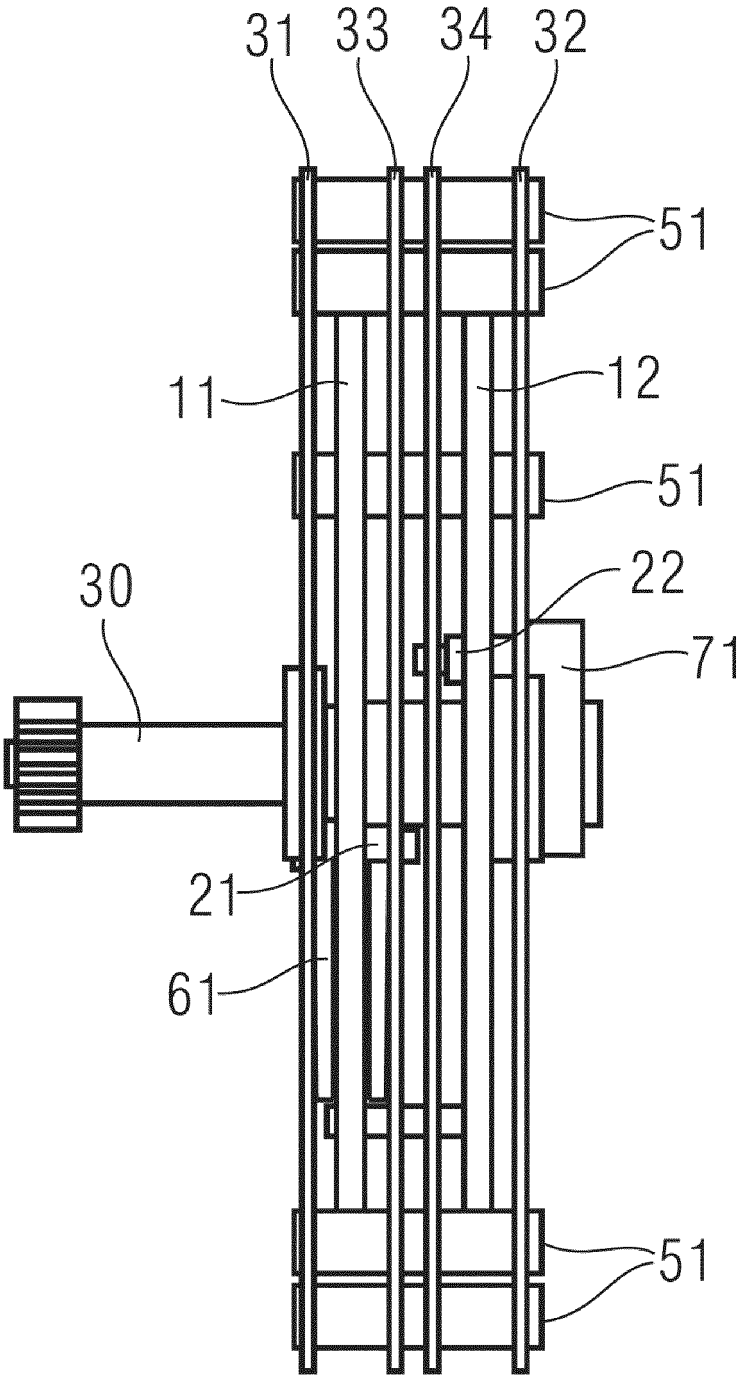

Fig. 1

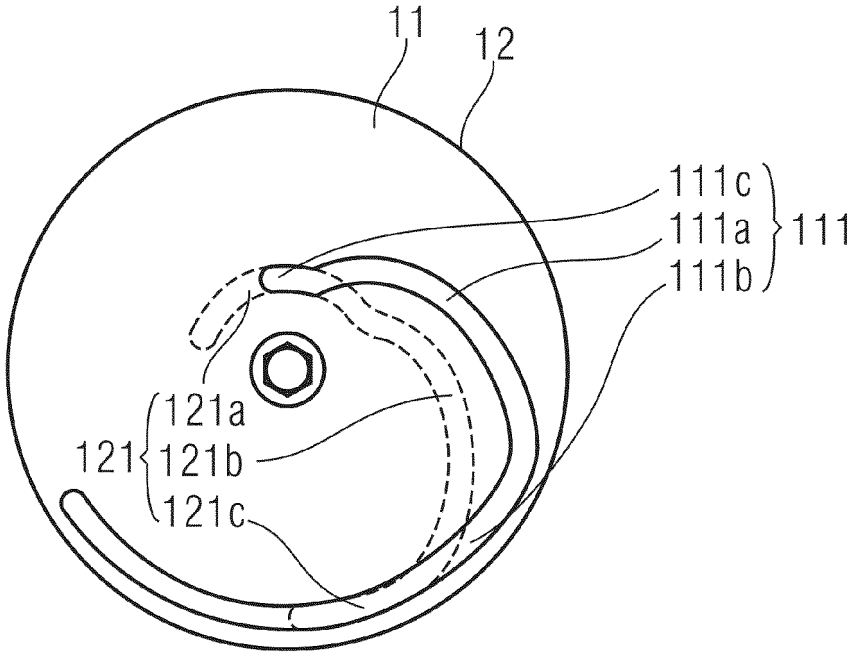

Fig. 2

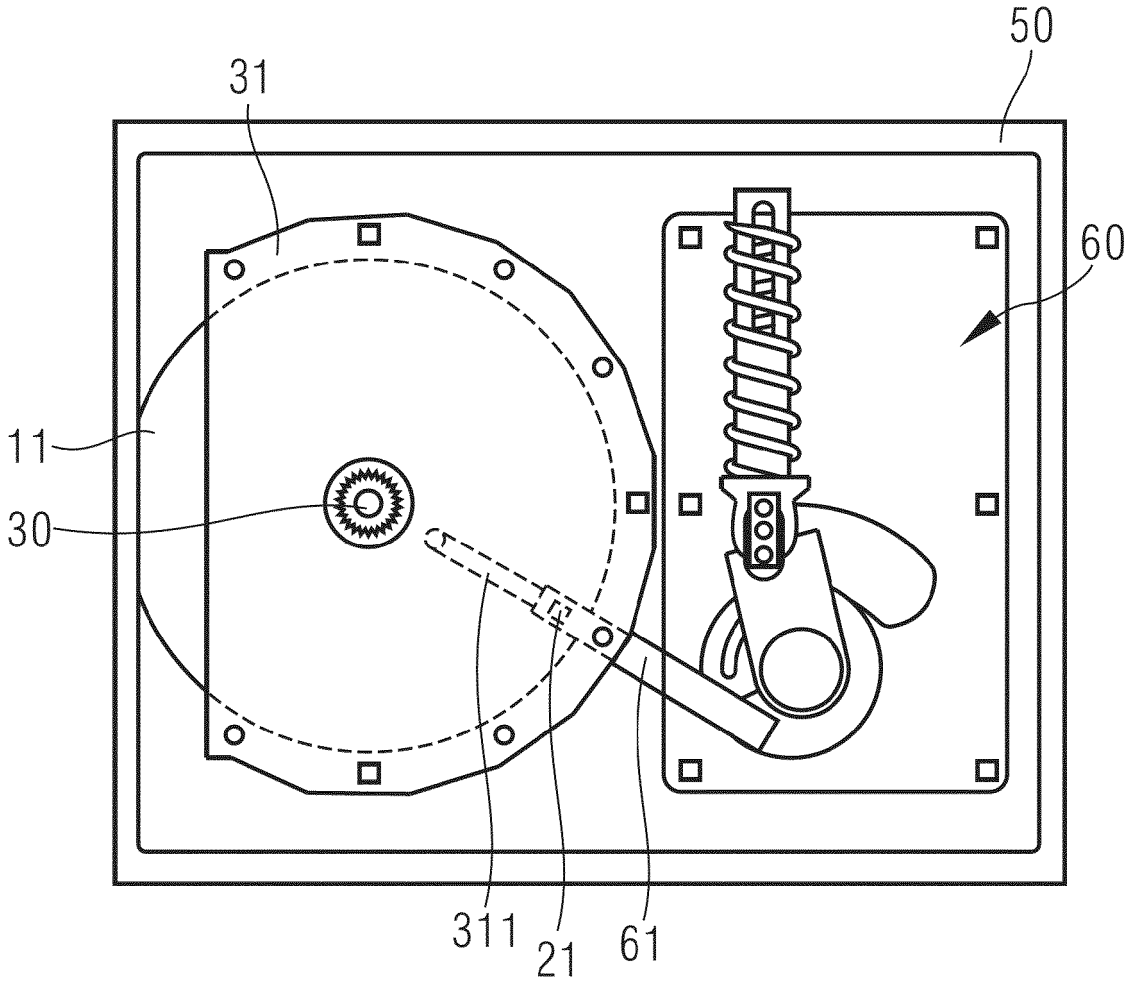

Fig. 3

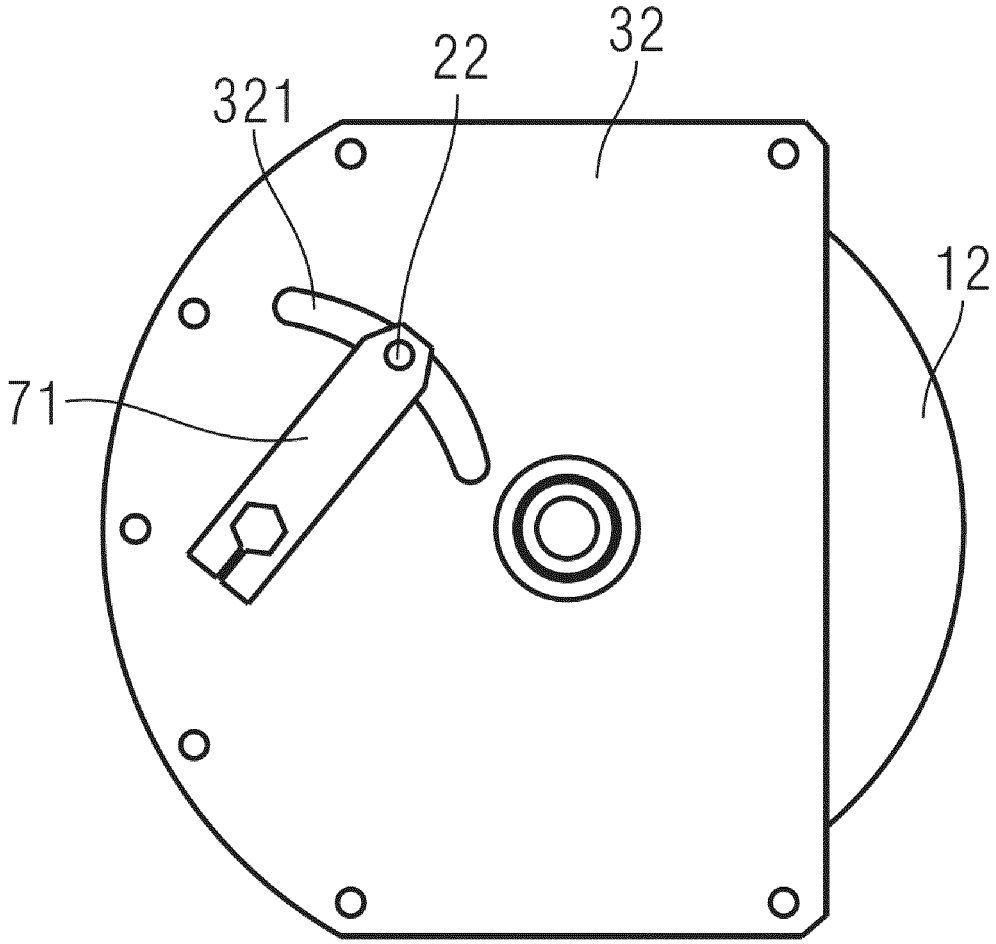

Fig. 4

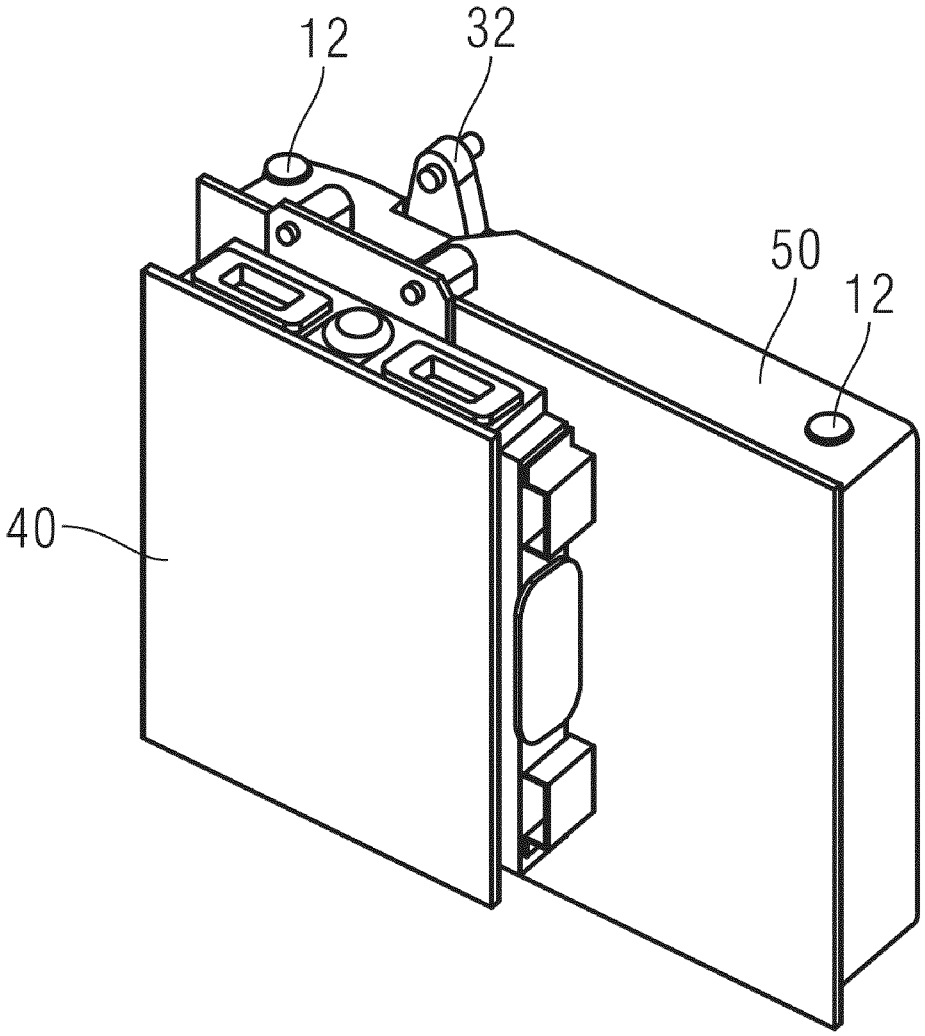

Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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