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(54) **MOTORISED COMPACT STORE**

MOTORISIERTES KOMPAKTLAGER

ELEMENT DE STOCKAGE COMPACT MOTORISE

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a compact store. The invention relates especially to a motorised compact store.

PRIOR ART

[0002] In order to utilise storage spaces effectively, displaceable shelf systems, so-called compact shelves or compact stores, are usually used, for example in offices, libraries, record offices and store rooms. An example of a truck comprising a shelf in just such a displaceable shelving system is shown in Fig. 1. In order to make it easier for a user to move the trucks in a compact store, the shelving system can also be motorised.

[0003] Drawbacks of currently found systems of motorised compact stores are, inter alia, that they are electrically powered with 220 V via cables for supplying power to the motor, in which the cables lie externally to the trucks in a variety of ways.

BRIEF SUMMARY OF THE INVENTION

[0004] An object of the present invention is to provide a motorised compact store which does not have cables externally to the trucks of the compact store.

[0005] The present invention is based on the insight that the aforementioned object can be achieved by means of a compact store which, in each truck, comprises a motor and an electric accumulator for driving the motor.

[0006] The specific characteristics of a motorised compact store according to the present invention can be ascertained from patent claim 1.

[0007] An advantage with a motorised compact store configured according to the present invention is that the trucks in the compact store do not need connecting cables to supply power to the motors.

[0008] Further characteristics and advantages of the present invention will be ascertained from the following description and subsequent patent claims.

[0009] The invention will be described in greater detail below with reference to the detailed description of embodiments and the accompanying figures, which merely illustrate and thus do not limit the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Figure 1 shows a truck in a compact store according to the prior art, and

Figure 2 shows an exploded diagram of a motorised truck in a compact store according to the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0011] In the following description, specific details, such as particular techniques and applications, are given for explanatory and non-limiting purposes in order to achieve a thorough understanding of the present invention. It will be clear to a person skilled in the art, however, that the present invention can be realised in other embodiments which differ from these specific details. In other examples, a detailed description of well-known methods and devices is omitted so as not to obscure the description of the present invention with unnecessary details.

[0012] A first embodiment of the present invention will now be described with reference to Fig. 2.

[0013] A compact store comprises a plurality of trucks 1 which, track-bound, are movable on a pair of rails 2. Each truck 1 comprises wheels for movement of the truck 1 on the rails 2, shelves or the like for stock-keeping, a motor 4, coupled to a drive shaft 8, for moving the truck 1 and a battery 5 for driving the motor 4. Since the current for driving the motor 4 comes from inside the truck 1, i.e. from the battery 5, no cabling is required outside the truck 1.

[0014] Activation of the motor 4 and hence movement of the truck 1 can be provided in a number of different ways.

[0015] Each truck 1 can have a handle with circuit breaker 3 for movement of the truck 1 to the left and right.

The truck can transport itself under its own power, together with other trucks which need to be moved. Alternatively, the truck can send control signals to other trucks so that the truck located adjacent to an empty space to be filled moves first and, after this, one truck at a time is moved until the desired corridor is freed. Preferably, the signal traffic is sent by wireless transmission between the trucks, so that there is no need for wiring between the trucks, or else the signal traffic is sent via the rails and the wheels. The wireless connection can be realised, for example, via IR or radio.

[0016] A central panel can be present, which indicates the corridor which is required to be entered, i.e. the shelves between which access is sought. In this case, too, a truck can receive an activation signal and hence required trucks can be moved under its own power, or alternatively one truck is moved at a time, refilling the respective empty space. Preferably, this signalling is also realised in a wireless manner. The central panel can be provided, for example, as a remote control.

[0017] A central controlling of the compact store can advantageously be combined with software, which, for example, in the event of a search hit in a register, automatically opens the right corridor for accessing the sought material according to any of the above-described methods for clearing corridors between shelves.

[0018] A system in which the motor in a truck is used to move a plurality of trucks at once has a greater inertia than a system in which each truck moves under its own

power. The less inertia which is present in the system, the quicker the trucks can be stopped, which means that it is advantageous to use a system in which each truck moves under its own power.

[0019] A central panel can, of course, be combined with an activation member on each truck. The activation member on each truck can alternatively also comprise a panel for opening all the corridors, one corridor at a time.

[0020] The compact store is powered by low voltage, for example 12 V or 24 V, which is fed via the rails to the trucks. A transformer 7 is used to convert ordinary mains voltage into the low voltage which is applied to the rails. The current is received in the trucks, for example via the wheels or via a purpose-built collector shoe system for charging the batteries in the trucks. Drive power to the trucks is thereby obtained without the need for external cables, since the low voltage is divided between the two rails.

[0021] Preferably, the battery in each truck is only charged when the truck is stationary. Uneven voltage levels and any sparking which might arise if the charging is carried out whilst the truck is in motion are thereby avoided. If the charge current varies, the drive current from the battery to the motor is also in danger of varying, which is not desirable. Each battery preferably has a control system which controls the charging. In addition, a central control system can be present, which, for example, only applies voltage to the rails when some battery is in need of charging.

[0022] Charging faults in a battery are indicated, for example, with a light-emitting diode on the respective truck, alternatively with a light-emitting diode on a central panel indicating the truck whose battery has a charging fault.

[0023] In order to achieve the above-described movement of the trucks automatically, break strips, for example, are provided on the trucks. A sensor is thereby provided, for example break contacts against the next truck 6, which indicates whether there is free space beside a truck, i.e. whether the shelves are accessible or not.

[0024] A second embodiment of the present invention will next be described, this too with reference to Fig. 2. This embodiment is identical with the first embodiment described above, apart from the following differences.

[0025] A compact store according to this second embodiment additionally comprises sensors for preventing jamming between shelves. Such a sensor interrupts the current to the motor in the truck in which the sensor is situated. In addition, an emergency stop signal can be sent to other trucks, so that the current to their respective motors is interrupted.

[0026] The above-described break strips can be used as sensors for jamming protection. Alternatively, the sensors for jamming protection can be provided in addition to the break strips, for example in the form of an optic detector or a mechanical contact breaker.

[0027] In case of automatic movement of the trucks, either one truck can move at a time, or else each truck

which is to be moved can move as fast as the break strips and the jamming sensors allow. If a plurality of trucks are allowed to move simultaneously, an emergency stop, i.e. interruption of the motor current as the result of an emergency stop signal from a jamming sensor, should stop all moving trucks for safety reasons.

[0028] Preferably, a movement of a truck is activated with the aid of pulse control, i.e. a corridor is opened regardless of whether the circuit breaker is released or not, but is stopped if a jamming sensor emits an emergency stop signal.

[0029] It is clear that the present invention can be varied in a number of ways. Such variations should not be regarded as deviation from the scope of the present invention. All such variations which are obvious to a person skilled in the art are meant to be included within the scope of the present invention as claimed.

Claims

1. A motorised compact store comprising a plurality of trucks (1), rails (2) for track-bound movement of the said plurality of trucks and members (3) for activating the said movement, in which each truck comprises a motor (4) for executing the said movement and an electric accumulator (5) for driving the said motor, **characterised in that** the said rails are connected to a power supply unit of the low voltage type, each truck comprising current-receiving contact members for receiving charge current from the said rails for charging the respective accumulator.
2. The motorised compact store as claimed in claim 1, in which the wheels of the truck are used as the said current-receiving contact members.
3. The motorised compact store as claimed in claim 1, in which the said current-receiving contact members are designed as a collector shoe system.
4. The motorised compact store as claimed in any of the above claims, in which control signals for activating the said movement are transmitted in a wireless manner between the said plurality of trucks.
5. The motorised compact store as claimed in any of the above claims, in which each truck comprises sensor members (6) and control members for providing automatic mutual controlling and movement of the said plurality of trucks.
6. The motorised compact store as claimed in any of the above claims, in which each accumulator is designed to be charged when the respective truck is stationary.
7. The motorised compact store as claimed in any of

the above claims, in which each truck comprises safety cutouts for stopping movement by interrupting the motor current.

8. The motorised compact store as claimed in claim 7, in which the said safety cut-out comprises break strips for detecting obstacles in the direction of movement.
9. The motorised compact store as claimed in claim 7 or 8, in which interruption of the motor current in a truck gives a signal which interrupts the motor current in all trucks.

Patentansprüche

1. Motorisiertes Kompaktlager mit mehreren Wagen (1), Schienen (2) für die spurgebundene Bewegung der mehreren Wagen und Elemente (3) zur Aktivierung der Bewegung, wobei jeder Wagen einen Motor (4) zur Ausführung der Bewegung und einen elektrischen Akkumulator (5) zum Antrieb des Motors aufweist, **dadurch gekennzeichnet, dass** die Schienen mit einer Stromversorgungseinheit der Niederspannungsart verbunden sind, wobei jeder Wagen stromaufnehmende Kontaktelemente zur Aufnahme von Ladestrom von den Schienen zum Aufladen des jeweiligen Akkumulators aufweist.
2. Motorisiertes Kompaktlager nach Anspruch 1, wobei die Räder des Wagens als die stromaufnehmenden Kontaktelemente verwendet werden.
3. Motorisiertes Kompaktlager nach Anspruch 1, wobei die stromaufnehmenden Kontaktelemente als ein Stromabnehmerschleifstücksystem ausgelegt sind.
4. Motorisiertes Kompaktlager nach einem der vorhergehenden Ansprüche, wobei Steuersignale zur Aktivierung der Bewegung auf drahtlose Weise zwischen den mehreren Wagen übermittelt werden.
5. Motorisiertes Kompaktlager nach einem der vorhergehenden Ansprüche, wobei jeder Wagen Sensorelemente (6) und Steuerelemente zur Bereitstellung automatischer gegenseitiger Steuerung und Bewegung der mehreren Wagen aufweist.
6. Motorisiertes Kompaktlager nach einem der vorhergehenden Ansprüche, wobei jeder Akkumulator dazu ausgelegt ist, aufgeladen zu werden, wenn der jeweilige Wagen stillsteht.
7. Motorisiertes Kompaktlager nach einem der vorhergehenden Ansprüche, wobei jeder Wagen eine Sicherheitsabschaltung zum Stoppen der Bewegung durch Unterbrechung des Motorstroms aufweist.

8. Motorisiertes Kompaktlager nach Anspruch 7, wobei die Sicherheitsabschaltung Unterbrecherstreifen zum Erfassen von Hindernissen in der Bewegungsrichtung aufweist.
9. Motorisiertes Kompaktlager nach Anspruch 7 oder 8, wobei die Unterbrechung des Motorstroms in einem Wagen ein Signal erzeugt, das den Motorstrom in allen Wagen unterbricht.

Revendications

1. Élément de stockage compact motorisé comportant une pluralité de chariots (1), des rails (2) pour un mouvement guidé par des voies de ladite pluralité de chariots et des éléments (3) servant à activer ledit mouvement, dans lequel chaque chariot comporte un moteur (4) destiné à exécuter ledit mouvement et un accumulateur électrique (5) servant à actionner ledit moteur, **caractérisé en ce que** lesdits rails sont reliés à une unité d'alimentation de type à basse tension, chaque chariot comportant des organes de contact récepteurs de courant destinés à recevoir un courant de charge desdits rails afin de charger l'accumulateur correspondant.
2. Élément de stockage compact motorisé selon la revendication 1, dans lequel les roues du chariot sont utilisées comme lesdits organes de contact récepteurs de courant.
3. Élément de stockage compact motorisé selon la revendication 1, dans lequel lesdits organes de contact récepteurs de courant sont conçus comme un système de sabots collecteurs.
4. Élément de stockage compact motorisé selon l'une quelconque des revendications ci-dessus, dans lequel des signaux de commande destinés à activer ledit mouvement sont transmis sans fil entre ladite pluralité de chariots.
5. Élément de stockage compact motorisé selon l'une quelconque des revendications ci-dessus, dans lequel chaque chariot comporte des organes capteurs (6) et des organes de commande destinés à assurer une commande mutuelle et un mouvement automatiques de ladite pluralité de chariots.
6. Élément de stockage compact motorisé selon l'une quelconque des revendications ci-dessus, dans lequel chaque accumulateur est conçu pour être chargé lorsque le chariot correspondant est immobile.
7. Élément de stockage compact motorisé selon l'une quelconque des revendications ci-dessus, dans lequel chaque chariot comporte des coupures de sé-

curité destinées à arrêter le mouvement en interrompant le courant du moteur.

8. Élément de stockage compact motorisé selon la revendication 7, dans lequel ladite coupure de sécurité comporte des bandes de rupture destinées à détecter des obstacles dans la direction du mouvement. 5
9. Élément de stockage compact motorisé selon la revendication 7 ou 8, dans lequel l'interruption du courant du moteur sur un chariot envoie un signal qui interrompt le courant du moteur sur tous les chariots. 10

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KÄND TEKNIK

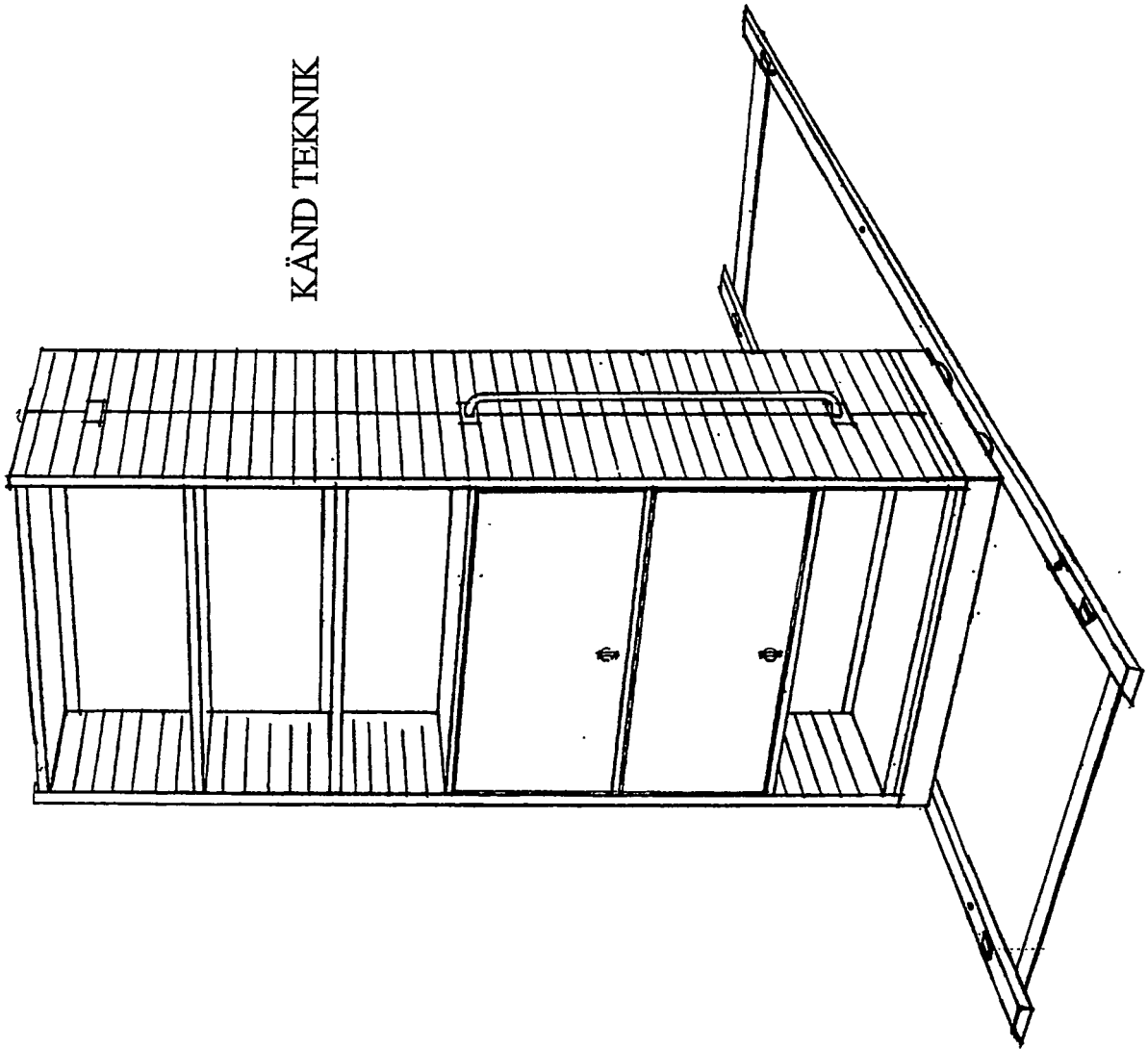


FIG. 1

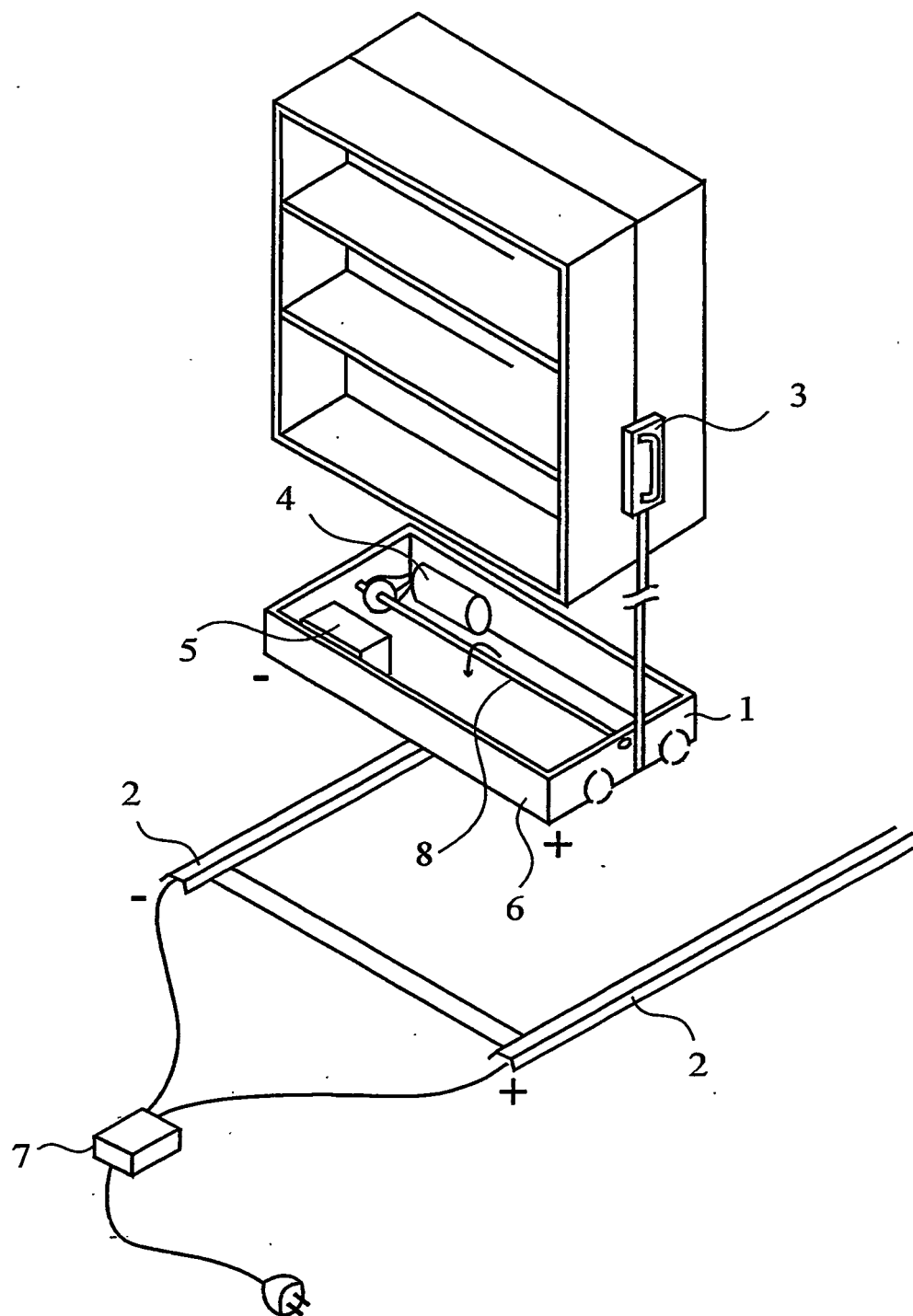


FIG. 2