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(54) **A hand-operated releasing and displacing apparatus for a staircase lift or similar transport apparatus.**

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**CH-A- 308 642
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Description

This invention relates to a hand-operated releasing and displacing apparatus for a staircase lift or similar transport apparatus, comprising a carrier portion movable along a rail by means of a wheel driven by an electric motor and a reduction gearbox, and in which, a brake is actuated automatically in the event of motor standstill or power failure, said hand-operated releasing and displacing apparatus comprising a drive means in the form of a spindle rotatably mounted and slidable longitudinally against spring bias to a hand-operation position, and being adapted on the one hand to be coupled to the wheel drive mechanism and on the other hand to an actuation member, which drive member, upon longitudinal sliding movement to the operable hand-operation position, operates a current break contact and a mechanical brake releasing device.

Such a hand-operated releasing and displacing apparatus is disclosed in GB-A-2 083 292. In the event of a power failure during the use of the staircase lift, this will come to a standstill mostly between two stops; a situation which is unpleasant for the user, as such a staircase lift is practically always rather an open construction which when standing still in between two stepping places will be suspended somewhere in a stairwell.

In such a situation the user can displace himself to a stopping-place by means of the hand-operated releasing and displacing apparatus. To that end, the user of the apparatus known from GB-A-2 083 292 should depress the drive member via the actuation member against spring bias into the hand-operation position, after which the staircase lift can be displaced by turning the actuation member. Practice has shown that the user, mostly an aged or partly disabled person, may have substantial problems in simultaneously keeping the actuation member in its depressed position and turning it.

It is an object of the present invention to eliminate these problems by providing a hand-operated releasing and displacing apparatus of the above described type requiring no combined operating steps.

This object is achieved in accordance with the present invention in that, when the drive spindle and the wheel drive mechanism are coupled, means are provided on the brake releasing device and the combination of the spindle and the actuation member which interact to cause said spindle to be automatically retained in its coupled position and the mechanical brake releasing device to be automatically retained in its releasing position. These features allow to realize the desired effect by retaining both the brake releasing device and the drive spindle in the hand-operation position, so that only a turning of the operating member is necessary to displace the staircase lift. The retention of the brake in the releasing position is then enabled by the self-braking means between drive spindle and wheel drive mechanism. Thus, as a result of the novel, inventive combination of self-braking transmission, permanent release of the brake and the retention of the drive spindle in the hand-operation position, the manual displacement of

the staircase lift in an emergency is appreciably simplified relatively to the state of the art.

When the mechanical brake releasing device is provided with an L-shaped lever drivable by a radial projection on the drive spindle, as disclosed in GB-A-2 083 292, both the retention of said spindle in the hand-operation position and of the brake releasing device in the releasing position can be realized in a simple, advantageous manner when in accordance with a preferred embodiment of the present invention, one end of the L-shaped lever is pivotally secured and is coupled to the brake and the other end is arranged in such a manner that it is displaceable by said radial projection for the release of the brake by pivoting movement of the lever during longitudinal sliding movement of the drive spindle, said radial projection being in the form of a conical face terminating in a receding slot capable of receiving the other end of said L-shaped lever to maintain the brake release. Due to these features, the brake releasing apparatus is used for locking said drive spindle in the hand-operation position, while the retention of said spindle in that position at the same time maintains the brake release. Moreover, this combined operating position can be realized by merely displacing said spindle longitudinally by means of said actuation member. It is thus possible to realize the hand-operation position by depressing the actuation member, while subsequently said actuation member need only be turned to displace the staircase lift.

From considerations of space and construction, the motor spindle of the staircase lift will mostly extend vertically. A convenient hand-operation of the staircase lift preferably has an actuation member having a horizontal spindle. In connection with this, according to a preferred embodiment of the present invention, the drive spindle carries a gear wheel which, upon longitudinal sliding movement of said drive spindle into the hand-operation position, proceeds to coact with a gear wheel coupled to the wheel drive, the shafts of the two gears being perpendicular to one another, said gear transmission thereby providing for an effective construction insensitive to play and wear.

The hand-operation is only destined for emergencies. It is therefore preferable that this is normally not or hardly visible and for the rest is not disturbing and does not induce testing if there is no emergency. To that end, according to a further preferred embodiment of the present invention, the actuation member is mounted on the drive spindle in disengageable fashion, in which case the only visible feature of the hand-operation facility needs to be an encasing with an insertion opening for the actuation member.

One embodiment of the hand-operated releasing and displacing apparatus according to the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a top view of a drive mechanism for a staircase lift or similar transport apparatus;

Fig. 2 is a side view according to arrow A shown in Fig. 1; and

Fig. 3 shows on an enlarged scale and partly in cross section a releasing and displacing apparatus.

The drive mechanism shown in Figs. 1 and 2 is provided with an electric motor 1 driving via a reduction gearbox 2 a spindle 3 whereon is mounted a wheel construction 4. Wheel construction 4 runs along a rail, not shown, whereby a slip-free displacement is obtained by coaction of a gear 5 with a rack mounted on the rail. The drive mechanism is secured through a base plate 6 on a frame, not shown, which may further include a carrier construction, such as a platform or a seat. There is only shown one driven wheel construction. It stands to reason that for the purpose of a stable guidance, further driven, or non-driven wheel constructions are provided which can be supported on one or more rails.

At the side of electric motor 1 remote from the reduction gearbox 2 there is provided a brake 7, which becomes operative in the event of motor standstill or power failure. In addition to electrical energization, brake 7 can be released mechanically by means of a lever 8. The operation of said lever will be further discussed hereinafter with reference to Fig. 3, and so will the operation of the releasing and displacing apparatus 9 mounted contiguous with brake 7 and operable by means of a turning wheel 10.

The apparatus 9 shown in Fig. 3 comprises a housing 11 accommodating a spindle 12 for turning and sliding movement. Mounted on spindle 12 is a conical gear wheel 13 adapted to coact with a conical gear wheel 14 mounted on spindle 15 of electric motor 1. Gear wheel 13 is urged out of engagement with gear wheel 14 by means of a spring 16, which position is indicated by a dashed line. Spring 16 ensures at the same time that a portion 17 of a current break contact mounted on the left end of spindle 12 is kept out of coaction with the other portion 18 of said contact. Adjacent the other end, spindle 12 is provided with a cross pin 19 adapted to coact with a transverse slot 20 in a bush 21 slidable on spindle 12. Bush 21 is provided with a conical face 22 which, when bush 21 is pushed on spindle 12, comes into contact with the free end 8' of the upright leg of the L-shaped lever 8, the end of the other leg being pivotally mounted in brake 7. Conical face 22 terminates in a peripheral groove 23 adapted to receive the end of the upright leg 8' of lever 8.

The operation of apparatus 9 is as follows. When the lift has come to a standstill between two stopping-places as a result of power failure or other disturbance it can be displaced manually by placing bush 21 on turning wheel 10 on spindle 12 until cross pin 19 abuts with the end of transverse slot 20. Further displacement results in sliding movement of spindle 12 in its bearing in housing 11. This has a triple effect. First, gear wheel 13 is brought into engagement with gear wheel 14. Second, the break contact is closed by contact of portions 17 and 18, so that any current supply to the entire driving mechanism is prevented. Third, due to the sliding movement of the free end of the upright leg, lever 8 is tilted, so that brake 7 is released. The lift will then not be displaced automatically, as a result of a self-braking effect in the reduction gearbox 2.

Upon closure of the break contact and proper enmeshing of the gear wheels 13, 14, the free end of the upright leg 8' of lever 8 extends into peripheral

groove 23. The depth of said groove is such that in that position brake 7 remains released, while at the same time the recoil force of spring 16 is such that bush 22 is retained in its active hand-operation position by the upright leg.

For displacing the lift, only the turning wheel 10 need be rotated, which, via bush 21, spindle 12, gear wheel 13, gear wheel 14, motor shaft 15, reduction gearbox 2 and spindle 3, results in a rotation of wheel construction 4 and thus in a displacement of the lift.

It stands to reason that many modifications and variants are possible without departing from the scope of the present invention. For instance, spindle 12, bush 21 and turning wheel 10 may be integral or be mutually slidable otherwise. It is also possible to arrange spindle 12 parallel to and adjacent shaft 15, in which case straight gear wheels can be used and lever 8 is operated by moving spindle 12 vertically downwards, just as the current break contact. In that case, also bush 21 could be mounted in housing 11, within which spindle 12 telescopes and is securable in its active position by means of bayonet-like transverse slot 20. Besides, it may be preferable in practice to place the apparatus 9 in an entirely enveloping encasing containing only an opening for inserting bush 21. Another possibility is to fixedly connect the portion of bush 21 with the conical face 22 and the adjoining peripheral groove 23 to spindle 12, when an entirely enveloping encasing, if any, need only contain an opening for the passage of the spindle of turning wheel 10.

Claims

1. A hand-operated releasing and displacing apparatus for a staircase lift or similar transport apparatus, comprising a carrier portion movable along a rail by means of a wheel (4) driven by an electric motor (1) and a reduction gearbox (2), and in which, in the event of motor standstill or power failure, a brake (7) is automatically actuated, said hand-operated releasing and displacing apparatus comprising a drive means in the form of a spindle (12) mounted for rotation and being slidable longitudinally against the action of a spring (16) to a hand-operation position, and being adapted to be coupled on the one hand to the wheel drive mechanism and on the other hand to an actuation member (10), and which drive means further, upon longitudinal sliding movement to the operable hand-operation position, actuates a current break contact (17, 18) and a mechanical brake releasing device (8), characterized in that when the drive spindle (12) and the wheel drive mechanism are coupled, means (8', 22, 23) are provided on the brake releasing device (8) and the combination of the spindle (12) and the actuation member (10) which interact to cause the drive spindle (12) to be retained automatically in its coupled position and the mechanical brake releasing device (8) to be automatically retained in its releasing position.

2. A hand-operated releasing and displacing apparatus as claimed in claim 1, characterized in that the mechanical brake releasing device is provided with an L-shaped lever (8) drivable by a radial projec-

tion on the drive spindle (12) and one end of said L-shaped lever (8) is pivotally secured and is coupled to the brake (7) and the other end (8') is arranged so that it is displaceable by said radial projection for the release of the brake (7) by pivoting movement of the lever (8) during longitudinal sliding movement of the drive spindle (12), said radial projection being in the form of a conical face (22) terminating in a receding slot (23) capable of receiving the other end of the L-shaped lever (8) to maintain the brake release.

3. A hand-operated releasing and displacing apparatus as claimed in claim 1 or 2, characterized in that the drive spindle (12) carries a gear wheel (13) which, on longitudinal sliding movement of the drive spindle (12) to the hand-operation position, will coact with a gear wheel (14) coupled to the wheel drive mechanism.

4. A hand-operated releasing and displacing apparatus as claimed in claim 3, characterized in that the spindles (12, 15) of the two gear wheels (13, 14) are perpendicular to one another.

5. A hand-operated releasing and displacing apparatus as claimed in any of the preceding claims, characterized in that the actuation member (10) is mounted on the drive spindle (12) in disengageable fashion.

Patentansprüche

1. Handbetätigte Löse- und Verschiebevorrichtung für Treppenaufzüge oder ähnliche Fördereinrichtungen, versehen mit einem Trägerteil, der mittels eines durch einen Elektromotor (1) und ein Reduktionsgetriebe (2) angetriebenen Rades (4) über eine Schiene verschiebbar ist, und in der bei Motorstillstand oder Stromausfall eine Bremse (7) automatisch betätigt wird, welche handbetätigte Löse- und Verschiebevorrichtung ein Antriebsmittel in Form einer für Rotationszwecke angeordneten Welle (12) aufweist, die entgegen der Wirkung einer Feder (16) bis zur Handbetätigungsstellung in Längsrichtung verschiebbar ist, und die einerseits mit dem Radantriebsmechanismus und andererseits mit einem Betätigungsorgan (10) kuppelbar ist, und welches Antriebsmittel weiter bei Verschiebung in Längsrichtung bis zur wirksamen Handbetätigungsstellung einen Stromunterbrechungskontakt (17, 18) und eine mechanische Bremslösevorrichtung (8) betätigt, dadurch gekennzeichnet, dass bei Kupplung der Antriebswelle (12) mit dem Radantriebsmechanismus Mittel (8', 22, 23) an der Bremslösevorrichtung (8) und der Kombination der Welle (12) mit dem Betätigungsorgan (10) vorgesehen sind, die zusammenwirken, um die Antriebswelle (12) automatisch in ihrer gekuppelten Stellung und die mechanische Bremslösevorrichtung (8) automatisch in ihrer Lösestellung zu halten.

2. Handbetätigte Löse- und Verschiebevorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die mechanische Bremslösevorrichtung mit einem L-förmigen Hebel (8) versehen ist, der durch einen radialen Vorsprung auf der Antriebswelle (12) antreibbar ist, und ein Ende des genannten L-förmigen Hebels (8) drehbar befestigt und mit der Bremse

(7) gekuppelt ist und das andere Ende (8') so angeordnet ist, dass es durch den genannten radialen Vorsprung zum Lösen der Bremse (7) durch Drehung des Hebels (8) während der Verschiebung der Antriebswelle (12) in Längsrichtung verschiebbar ist, welcher radiale Vorsprung die Form einer konischen Fläche (22) aufweist, die in eine Umfangsnut (23) endet, die das andere Ende des L-förmigen Hebels (8) aufnehmen kann, um die Bremse gelöst zu halten.

3. Handbetätigte Löse- und Verschiebevorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass die Antriebswelle (12) ein Getrieberad (13) trägt, das bei Verschiebung der Antriebswelle (12) in Längsrichtung bis zur Handbetätigungsstellung mit einem mit dem Radantriebsmechanismus gekuppelten Getrieberad (14) zusammenwirkt.

4. Handbetätigte Löse- und Verschiebevorrichtung nach Anspruch 3, dadurch gekennzeichnet, dass die Wellen (12, 15) der zwei Getrieberäder (13, 14) senkrecht aufeinander stehen.

5. Handbetätigte Löse- und Verschiebevorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass das Betätigungsorgan (10) auf der Antriebswelle (12) abschaltbar angeordnet ist.

Revendications

1. Un appareil de déclenchement et de déplacement actionné à main pour un ascenseur d'une cage d'escalier ou appareil de transport similaire, comprenant une portion porteuse pouvant être déplacée le long d'un rail à l'aide d'une roue (4) commandée par un moteur électrique (1) et une boîte d'engrenage réducteur (2), et dans lequel, en cas d'arrêt du moteur ou de panne de courant, un frein (7) est activé automatiquement, ledit appareil de déplacement et de déclenchement actionné à main comprenant un organe de commande dans la forme d'un arbre (12) monté pour rotation et étant coulissant longitudinalement contre l'action d'un ressort (16) vers une position d'actionnement à main, et étant arrangé à être couplé d'une part au mécanisme de commande de roue et d'autre part à un organe d'actionnement (10), et lequel organe de commande, en cas de mouvement coulissant longitudinal vers la position d'actionnement à la main effective, également actionne un contact de rupture de circuit (17, 18) et un dispositif de déclenchement de frein mécanique (8), caractérisé en ce que, lorsque l'arbre de commande (12) et le mécanisme de commande de roue sont couplés, des moyens (8', 22, 23) sont prévus sur le dispositif de déclenchement de frein (8) et la combinaison de l'arbre (12) et l'organe d'actionnement (10) qui agissent l'un sur l'autre pour retenir l'arbre de commande (12) automatiquement dans sa position couplée et pour retenir le dispositif de déclenchement de frein mécanique (8) automatiquement dans sa position de déclenchement.

2. Un appareil de déclenchement et de déplacement actionné à main selon la revendication 1, caractérisé en ce que le dispositif de déclenchement de frein mécanique est muni d'un levier en forme de L (8) pouvant être commandé par une projection radiale

sur l'arbre de commande (12) et qu'une extrémité dudit levier en forme de L (8) est fixée de façon pivotante et est couplée au frein (7) et l'autre extrémité (8') est arrangée à être déplaçable par ladite projection radiale pour le déclenchement du frein (7) par un mouvement pivotant du levier (8) pendant un mouvement coulissant longitudinal de l'arbre de commande (12), ladite projection radiale ayant la forme d'une face conique (22) terminant dans une fente fuyante (23) faite pour recevoir l'autre extrémité du levier en forme de L (8) pour maintenir le déclenchement du frein.

3. Un appareil de déclenchement et de déplacement actionné à main selon la revendication 1 ou 2, caractérisé en ce que l'arbre de commande (12) porte

une roue d'engrenage (13) qui, en cas de mouvement coulissant longitudinal de l'arbre de commande (12) vers la position d'actionnement à main, agira ensemble avec une roue d'engrenage (14) couplée au mécanisme de commande de roue.

4. Un appareil de déclenchement et de déplacement actionné à main selon la revendication 3, caractérisé en ce que les arbres (12, 15) des deux roues d'engrenage (13, 14) sont perpendiculaires l'un à l'autre.

5. Un appareil de déclenchement et de déplacement actionné à main selon l'une quelconque des revendications précédentes, caractérisé en ce que l'organe d'actionnement (10) est monté sur l'arbre de commande (12) d'une façon dégageante.

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