

(12) STANDARD PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 2013265155 B2**

(54) Title
Damping unit for a lift

(51) International Patent Classification(s)
B66B 5/18 (2006.01) **B66B 17/34** (2006.01)

(21) Application No: **2013265155** (22) Date of Filing: **2013.05.24**

(87) WIPO No: **WO13/175001**

(30) Priority Data

(31) Number	(32) Date	(33) Country
12169299.0	2012.05.24	EP

(43) Publication Date: **2013.11.28**

(44) Accepted Journal Date: **2016.07.28**

(71) Applicant(s)
Inventio AG

(72) Inventor(s)
Kocher, Hans;Etzweiler, Lorenz

(74) Agent / Attorney
Watermark Patent and Trade Marks Attorneys, 302 Burwood Road, Hawthorn, VIC, 3122

(56) Related Art
WO 2011/021064

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum

Internationales Büro

(43) Internationales Veröffentlichungsdatum
28. November 2013 (28.11.2013)



(10) Internationale Veröffentlichungsnummer
WO 2013/175001 A1

- (51) Internationale Patentklassifikation:
B66B 5/18 (2006.01) *B66B 17/34* (2006.01)
- (21) Internationales Aktenzeichen: PCT/EP2013/060791
- (22) Internationales Anmeldedatum:
24. Mai 2013 (24.05.2013)
- (25) Einreichungssprache: Deutsch
- (26) Veröffentlichungssprache: Deutsch
- (30) Angaben zur Priorität:
12169299.0 24. Mai 2012 (24.05.2012) EP
- (71) Anmelder: INVENTIO AG [CH/CH]; Seestrasse 55, CH-6052 Hergiswil (CH).
- (72) Erfinder: KOCHER, Hans; Sonnmatt 12, CH-6044 Udligenswil (CH). ETZWEILER, Lorenz; Schützenmatte 7, CH-6214 Schenkon (CH).
- (81) Bestimmungsstaaten (soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM,

GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Bestimmungsstaaten (soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, RU, TJ, TM), europäisches (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

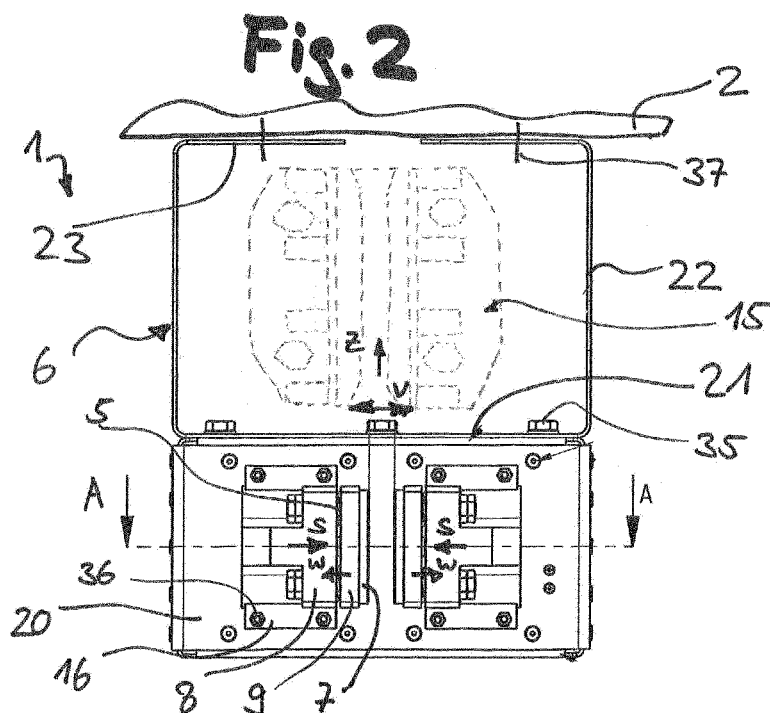
Erklärungen gemäß Regel 4.17:

— hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)

[Fortsetzung auf der nächsten Seite]

(54) Title: DAMPING UNIT FOR A LIFT

(54) Bezeichnung : DÄMPFUNGSEINHEIT FÜR EINEN AUFZUG



(57) Abstract: A damping unit (1) for a lift, for reducing vertical oscillation of a car (2) during a standstill period, has brake-shoe holders (8, 8') provided with brake shoes (7, 7'). The brake-shoe holders (8, 8') are connected to an electric motor (4) via a toothed-gearing mechanism. The damping unit (1) also comprises a spring device (6), which is configured as a metallic bending spring and is arranged between the car and a carrier structure (20) for the brake-shoe holders (8, 8').

(57) Zusammenfassung: Eine Dämpfungseinheit (1) für einen Aufzug zur Reduktion von Vertikalschwingungen einer Kabine (2) während eines Stillstands weist mit Bremsbacken (7, 7') versehene Bremsbacken-Halter (8, 8') auf. Die Bremsbacken-Halter (8, 8') sind über ein Zahnradgetriebe mit einem Elektromotor (4) verbunden. Die Dämpfungseinheit (1) umfasst weiter eine als metallische Biegefeder ausgestaltete Federeinrichtung (6), die zwischen Kabine und einer

Trägerstruktur (20) für die Bremsbacken-Halter (8, 8') angeordnet ist.



WO 2013/175001 A1

Veröffentlicht:

- *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

Damping unit for a lift

1. Field of the Invention

The invention relates to a damping unit for a lift.

2. Background of the Invention

Lift installations include lift cars which are movable by a drive unit in a lift shaft using support means, for example in the form of support cables or support belts. Guide rails which are fixed in the lift shaft provide a linear guide for the lift car. Persons or goods entering or leaving the lift car during a standstill of the lift car, cause unwanted vertical oscillations of the lift car due to the elasticity of the support means. Such vertical oscillations occur especially in lifts which use support belts as support means, which are enjoying increasing popularity in recent times. Since belts have less favourable vibration characteristics compared to steel cables, vertical vibrations adversely affect increasingly the feeling of comfort of the passengers and operational safety.

EP 1067084 B1 discloses a device for preventing vertical oscillations of a lift car in stationary phases. The device has a brake calliper which can be pressed via a toggle mechanism against the guide rail. Brake shoes are arranged at the front ends of the levers of the calliper. This device causes a more or less rigid sticking of the lift car on the guide rails by virtue of frictional engagement. In practice, however, such retention devices have been shown to be demanding in terms of operating and control systems. In particular, it is difficult and costly to operate the lift in a way permitting jolt-free resumption of movement of the lift car after it has been stopped.

A sufficiently pleasant feeling of comfort for passengers during lift car standstill can be achieved without arresting devices, by attenuating or reducing the vertical oscillations of the lift car, which also requires significantly smaller forces. A damping unit for the reduction of vertical oscillations of a lift car in stationary phases is illustrated for example in EP 1424302 A1. The damping unit has a lever arm extending approximately over half the depth of the lift car, with brake shoes articulated at the terminal free end of the lever. The damping unit is mechanically coupled to a door opening unit of the lift car. Such damping unit, which can be activated via the door drive, requires a complicated lever and gear mechanism, which is why this solution is expensive and prone to failure. Such unit can also not be retrofitted into

existing lifts of older design. Another disadvantage is then that the damping behaviour of the car does not meet the higher demands in terms of ride comfort and safety.

WO 2011/021064 A1 discloses an arrangement for reducing vertical oscillations of a lift car during a standstill, in which brake shoe holders that are hinged centrally to lever arms, are movable by means of an electromotive cylinder against the guide rail. The lever arms are heretofore connected in articulated manner to one side of a base plate mounted on a lift car frame part. Both lever arms are configured in two parts, with the respective lever arm parts being movable relative to one another via a spring-supported damping unit, each of which comprises a helical compression spring. Unwanted vertical oscillations during standstill of the lift car are difficult to suppress with this arrangement, and can only be removed using a complex control system. In addition to its complicated make-up, the arrangement is also expensive and heavy. A further disadvantage is that the arrangement requires a lot of space.

It is evident that avoiding or at least ameliorating the disadvantages addressed above, and in particular providing a damping unit which enables reduction of vertical oscillations of a lift car in a stationary state in optimal and simple fashion, would enrich the state of lift technology. A new damping unit that is suitable for installation in existing lift systems would be beneficial. Such retrofit of a lift installation should be achieved in simple fashion and at comparatively low cost.

3. Summary of the Invention

The present invention provides a damping unit which is preferably equipped with two brake shoes, includes brake shoe holders which are operatively connected with an actuator in order to move the brake shoes. In a rest position during travel of the lift car, the brake shoes run along the (lift car) guide rail without being in contact with it. After activation of the actuator, which is geared to the brake shoe holders, the brake shoes carried at the brake shoe holders are pressed in an active position against the guide rail throughout standstill of the lift car. The damping unit further includes a housing or other support structure (eg in the form of a simple carrier plate) for the brake shoe holders. A number of advantages are achieved by the presence of the spring device at the damping unit, which is fixed to a support structure which in turn is attachable or attached to the lift car and which serves to resiliently mount the support structure. The spring device enables absorption and reduction of unwanted lateral deflections of the lift car perpendicular to its travel direction in a simple manner.

Furthermore, manufacturing and assembly tolerances between the guide rail and brake shoes have no negative effect.

In accordance with the invention, the spring device is devised as a bending spring made of metal. The bending spring can be designed such that it may be deflected in two dimensions only. Bending springs have furthermore the advantage that they can be connected in simple fashion both to the support structure and to the lift car. Bending springs can also be manufactured easily and economically. Finally, bending springs can be optimally adjusted to the desired degrees of freedom of movement.

In a particularly advantageous form, the spring device is formed by a box-like profile (or section), approximately C-shaped in cross-section. The desired two-dimensional resilient mounting of the support structure can be achieved with such C-section in an advantageous manner. The C-shaped profile can be arranged or positioned in the damping unit in such manner that it extends with its longitudinal extension parallel to the braking surfaces of the brake shoes. A further advantage of such spring mechanism (device) is that the cavity defined within the C-section may be used in whole or in part to receive a guide shoe, making compact lift cabins with relatively low heights possible.

The spring device may comprise a mounting portion which abuts or rests on the support structure for fixing the support structure, and two mutually opposite side walls adjoining the mounting portion, which preferably extend approximately at right angles to the mounting portion. Further, terminal (or end) portions are present at the other ends of the side walls, extending parallel to the mounting portion, by way of which the damping unit can be attached at the lift car (cabin). The end portions may have attachment means for attaching the spring unit to the cabin, for example in the form of holes for receiving screws.

It may furthermore be advantageous if each brake shoe is respectively resiliently supported via at least one spring element on the respective brake shoe holder. The additional cushioning of the brake pads results in a further optimized behaviour of the lift car during stand still phases. Metallic spring elements are in particular useful as spring elements. In a preferred embodiment, the spring element can be a helical compression spring. The damping unit may comprise one, two or even a plurality of helical compression springs per brake pad.

It may be further advantageous for the brake shoes to be received on the brake shoe holders in limited displaceable manner. To limit the displacement path, the brake shoe holders may be provided with corresponding stops.

The brake shoes can be secured to support elements or rest thereon. The support members may be made of a metallic material, for example of steel. For elastic support of the brake shoes, the spring elements may abut on one side at the support members. Thus, the spring elements can abut at one side on the brake shoe holders and at the other side on the support elements.

For optimal adjustment of the damping force it is advantageous for the actuator to comprise a preferably electrically driven motor. This motor can for example be designed as a step-motor by way of which one can adjust with high precision the required pressing force to reduce the vertical oscillations of the cabin.

It is particularly advantageous for the damping unit to have a single motor for moving both brake shoes, and by way of which the brake shoe holders are preferably simultaneously moved but in opposite directions.

The damping unit may include a support structure formed for example by a housing at which the brake shoe holders are received, preferably in a sliding mounting. In the latter case, the sliding direction would run transversely to the direction of travel or running of the lift car.

The damping unit may include an eccentric via which the brake shoes are movable to and fro. Thanks to the eccentric, the rest and active positions of the brake shoe holders can be set in particularly simple and efficient manner. In particular, the mechanics of the eccentric enable a precise yet simple application of force on the braking surface with high power transmission to reduce the vertical oscillations of the lift car during standstill phases, enabling use of small actuators (eg an electric motor).

An advantageous gear transmission link between the brake shoe holders and the actuator is provided where the actuator is connected via a toothed gearing with the brake shoe holders.

The toothed gearing can for example be designed as a spur gear, with a central drive gearwheel which is secured against rotation on and in extension of an output shaft of the motor. The toothed gearing may further have two eccentric gearwheels, whereby each brake shoe is assigned a respective eccentric gearwheel. The rest and active positions for the brake shoes can then be specified as a function of the rotational position of the eccentric gearwheels which are driven in common via the central drive gearwheel.

The eccentric gearwheels can have eccentrically arranged bearing journals (ie, each eccentric gearwheel has one bearing journal or pin), which engage in each case in bearing mounts of the brake shoe holders for moving the brake shoes. The bearing journals define the rest position or the active position depending on their rotational position.

The invention may further provide a lift with a lift cabin and at least one damping unit of the type previously described. The spring unit (device) is disposed between the support structure (of the damping unit) and the cabin and forms, as it were, a resilient interface between the oscillation attenuator and the cabin.

Further individual features and advantages of the invention will become apparent from the following description of an embodiment and the drawing figures to which the description references.

4. Brief Description of the Drawings

Figure 1 is a simplified representation of a lift installation in a side view,

Figure 2 is an illustration of a damping device for a lift in accordance with the invention,

Figure 3 shows a cross section through the damping unit (section line AA in Figure 2),

Figure 4 shows a gear train for the damping unit according to Figure 2,

Figure 5 shows a perspective exploded view of the damping unit,

Figure 6 is an enlarged view of an assembly group with a brake shoe holder and brake shoes for the damping unit according to Figure 2, and

Figure 7 shows a perspective exploded view of the assembly group of figure 6

5. Description of Preferred Embodiments

Figure 1 shows a lift installation with a vertically to and fro movable cabin (lift car) 2 for the transport of persons or goods. Belt or cable support means 34 are examples of support elements that serve for moving the car 2. The lift installation has two guiding rails 3 for guidance of the car 2 in vertical, lift-travel path direction z. Each guide rail 3 in this case has three lift car guide surfaces extending in the direction of travel of the cabin 2. Guide shoes,

which as exemplarily shown in figure 1 are in the form of roller guide shoes, are provided at the cabin 2. With the damping unit, denoted by reference number 1, one can reduce unwanted vertical oscillations of the cabin during a standstill phase. Such vertical oscillations arise when people enter or leave the car 2. Changes in load cause the car 2 to oscillate. This phenomenon is particularly pronounced in lift installations which use belt support means and have substantial lift shaft heights. The letter z indicates the direction in which the guide rail extends, as well as the direction of travel of the car 2.

In order to reduce these vertical oscillations (or vibrations), the lift system is provided with damping units located at both sides of the car 2. The two damping units 1 are driven via control means (non-shown). The controller sends a command to the damping units as soon as the car stops, for example, or when the lift car door opens. The activation of the damping units is generally maintained for such time until the doors are closed again, and thus up to a stage where further significant load changes at the lift car are no longer possible. During activation, the controller may further send control commands for the damping units.

In the embodiment according to Figure 1, the damping units 1 are mounted, for example, at the top of car 2, whereby they are placed separately from the upper guide shoes 14. Depending on lift car configuration and cabin space, the guide shoes and damping units can be combined with each other or arranged in other ways. Thus, the at least one damping unit could also be mounted at the bottom of the cabin 2. As can be seen exemplarily from figure 2, the damping unit can be mounted on a console (or bracket) which encases the guide shoe 15 in whole or in part. In Figure 2, the console, which is referenced at 6 and described in more detail below, is configured as a spring device. The guide shoe 15, which in the embodiment illustrated is a sliding guide and shown in dashed lines, is enclosed by console 6 which is about C-shaped in cross-section, as can be seen.

In Figure 2, a damping unit 1 is shown in a lateral front view. The damping unit 1 includes two opposed brake shoes 7, whereby one of the plane-parallel guide surfaces (not shown here) of the guide rail face each brake shoe 7. Each brake shoe 7 is supported by a brake shoe holder, identified by reference number 8. The brake shoe holders 8 are guided laterally at binding elements 16 and can be moved towards and away from the guide rail. Arrows indicate the respective directions of movement. The individual guide members 16 are attached by screw connections 36 to a housing 20.

The brake shoes 7 are resiliently supported together with supporting elements 9 at the respective brake shoe holders 8. The brake shoes 7 give way when in contact with the respective guide surfaces of the guide rail, and retract towards and relative to the brake shoe holder 8 in direction b. However, such additional resilient support arrangement is not necessarily mandatory. Tests have shown that damping units which although equipped with spring facilities designed as bending springs, but in which the brake pads are more or less rigidly connected to the brake shoe holders, ie which have no additional mechanical spring-mount for the brake shoes at the holders, also achieve satisfactory results as regards ride comfort and operational safety.

A box-like profile member, C-shaped in cross-section, is disposed in the region of an upper side of the housing 20. This C-profile member forms a spring device 6 by way of which the housing 20 with the brake pads 7 and brake shoe holders 8 arranged thereon is resiliently mounted at the lift cabin 2. The spring device 6 is formed from a metal sheet by press-folding or bending, and comprises a fastening portion 21, side walls 22 which adjoin the ends of the fastening portion at right angles, and end portions 23 which respectively extend at right angles from the ends of the side walls 23. The C-profile member of the spring device 6 is preferably manufactured from a blank of sheet-steel. Spring steel is in particular a preferred material for making the C-profile member. The spring device 6 is thus designed as a metallic bending spring. The spring travel of the elastic support (mount) created by the spring device 6 is indicated by double arrow v. The special design of the spring device 6 provides a parallelogram configuration which allows an approximately linear parallel displacement of the housing 20 with respect to the underside of the lift cabin 2 in the v direction, ie in horizontally transverse direction with respect to the travel direction z.

The end portions 23 of the spring device 6 abut flat in surface engagement on to a part of the lift car 2, and are fixedly connected thereto by a screw connection 37. The lift car part may for example be provided by the cabin floor, a supporting frame of the car or by another element forming part of the lift car.

The sectional view according to Figure 3 shows further details of the damping unit 1. It will be noted that the guide rail 3 is shown in this figure. In the rest position shown in Figure 3, the brake shoes 7 can travel along the guide rail 3 without contacting the rail during travel of the lift car. During a standstill of the lift car, the brake shoe holders 8 and the brake pads 7 arranged thereon are slid into engagement against the guide rail 3. The brake shoes 7 which are pressed against the respectively facing one of the guide surfaces of the guide rail 3 bring

about a reduction of the vertical vibrations (oscillations) of the cabin caused by load changes. Activation of unit 1 may, for example, be effected in response to opening of the lift car door, or alternatively earlier (eg when the lift car is at a still stand). An electric motor 4 is used primarily for moving the brake shoe holders 8. In principle, however, other actuators such as linear actuators could be envisaged. The electric motor 4 is arranged to drive movement of the brake shoe holders 8. This transmission link comprises a toothed-gearing 10 and an eccentric for converting the rotational movement into the linear movement in the s direction.

The toothed gearing 10 comprises a central drive gearwheel 11, connected to the drive shaft of the electric motor 4, which drives the gearwheels 12 and 12'. As shown in Figure 3 and in Figure 4, the toothed gearing 10 is configured as a spur gear. It is understood, however, that other gear transmission types could be used. The bearing journals 13 and 13' are located eccentric to the rotation axes R of gearwheels 12, 12', this being the reason why in the following the two gearwheels 12, 12' are referred to as "eccentric gearwheels". The respective eccentric gearwheels 12, 12' are fixed against rotation on axle parts 18, the bearing journals 13 being integrally formed at the end faces of these parts.

Details about the location and operation of the toothed gearing 10 of the damping unit are shown in figure 4. The respective eccentric gearwheels 12, 12' are connected in form-fitting way by means of a shaft-hub connection to axle part 18 which is rotatable about the axis of rotation R. In the rest position shown in figure 4, the drivers (eg feather keys) are oriented towards each other. The bearing journals 13 and 13' are mounted eccentrically in rotatable manner in respective bearing openings of the brake shoe holders and act together with the respective bearing openings in such manner that upon rotation of the bearing journals (pins) 13, 13', the brake shoe holders and thus also the brake shoes are movable to and fro in a horizontal direction. From figure 4 is for example clearly discernible that the geometric axis of the bearing pin 13 does not coincide with the axis of rotation R of the eccentric gearwheel 12 and is thus so arranged eccentrically. To achieve the activated position of the damping unit, the motor is activated. The bearing journals 13, 13' connected via the gear train with the motor are thus rotated respectively 180° about axis R, whereby the brake shoes are displaced towards the respective guide surfaces of the guide rail and pressed against these.

The individual components of the damping unit can be discerned from figure 5. One brake shoe 7 and one brake shoe holder 8 form part of an assembly which can be moved to and fro on one side along rail-like guide members 16 transversely to the travel direction (of the lift car) or length of the profile that provide the guide rail.

One of the assemblies is illustrated in exploded view at the lower right corner in figure 5, with reference numbers 7' and 8' respectively designating the brake shoe and the brake shoe holder. From figure 5 it will then be noted that the carrier structure is of three-part layout, consisting of a lower housing part 26, an upper housing part 25 and a housing part 27, u-shaped in cross-section and in top plan view. The guide members 16 are secured by screws 36.1 and nuts 36.2 on the housing part 27. The toothed gearing 10 can be pre-mounted on a rear side wall 27 formed from sheet metal, the rear wall being integrated into the remainder of the housing during final assembly.

The spring device 6 which is devised as a C-shaped bending spring comprises end portions 23 which are oriented towards each other and which have holes for screw 30 for screw connections for securing the spring device 6 on to the not-illustrated lift car (cabin). Using screws 33, the spring device 6 is fastened in the region of the top side 25 to the housing of the damping unit and thus secured against movement.

Figures 6 and 7 show an assembly (or brake-shoe-unit) with brake shoe holder 8 and brake shoe 7. The brake shoe 7 can be made of a metallic material. The brake shoe 7 can also be made of a plastic material or a material mixture. Advantageous braking surfaces for the targeted reduction of the vertical oscillations of the lift cabin can be implemented, for example, by using brake shoes of the type which at least in the automotive industry are known by the names of "Semi-Metallic", "organic" or "low-Metallic" brake pads.

The brake shoe 7 is located on a relatively rigid support member 9 made of steel. The brake shoe 7 supported on the support member 9 is resiliently supported by two helical compression springs 5 on the brake shoe holder 8. Arrow w indicates the direction of movement in which the brake shoe 7 is moved against brake pad holder 8 during engagement of the assembly against the guide rail upon actuation of the damping unit brake shoes 7. The brake shoe 7 together with the associated supporting element is supported for limited movement at the brake shoe holder 8 by means of screws 31 and nuts 32. Depending on operational requirements, the inner (or front) nuts 32 can be tightened to an extent which enables biasing (pre-tensioning) of the brake shoe 7. The outer (or rear) nuts serve as counter-nuts.

In order to ensure best possible linear displacement of the brake shoe 7 during loading against the guide rail, a cylindrical guide pin 28 is arranged at the brake shoe holder 8 and a hereto complementary guiding receptacle 29 is arranged at the support element 9.

CLAIMS:

1. Damping unit for a lift installation for the reduction of vertical oscillation of a lift car during standstill thereof, including:
 - mutually opposite brake shoe holders which carry brake shoes and which are movable by an actuator between a rest position and an active position, wherein the brake shoes, in the rest position, are movable during lift car travel along a guide rail without contacting the guide rail, and, in the active position, are pressed during lift car standstill against the guide rail;
 - a gear mechanism connecting the brake shoe holders to the actuator;
 - a housing or other support structure at which the brake shoe holders are positioned; and
 - a spring device for resilient mounting of the housing or the support structure, the spring device fastened to the housing or the supporting structure and mountable to the lift car, the spring device being devised as a bending spring made from metal.
2. Damping unit according to claim 1, wherein the bending spring comprises a profile member, basically C-shaped in cross section.
3. Damping unit according to claim 1 or 2, wherein the bending spring comprises an attachment portion which abuts on or at the housing or support structure for attaching to the housing or support structure, and two, mutually opposite side walls which adjoin the fastening portion and extend preferably approximately at right angles therefrom.
4. Damping unit according to claim 3, wherein end portions adjoin the side walls and extend parallel to the attachment portion, the end portions enabling the damping unit to be fastened to the lift car.
5. Damping unit according to any one of claims 1 to 4, wherein the brake shoes are respectively resiliently supported via at least one spring element on the respective brake shoe holder.
6. Damping unit according to claim 5, wherein the brake shoes are arranged at the brake shoe holders in limited displaceable manner.

7. Damping unit according to claim 5 or 6, wherein the brake shoes are secured to supporting elements, onto which abut on one side the spring elements for the resilient mounting of the brake shoes.
8. Damping unit according to any one of claims 1 to 7, further including a common motor by way of which both brake shoe holders are movable.
9. Damping unit according to any one of claims 1 to 8, wherein the brake shoe holders are movable via an eccentric for setting the rest position and the active position.
10. Lift installation with a lift car and at least one damping unit according to any one of claims 1 to 9 arranged at the lift car.

INVENTIO AG

WATERMARK PATENT AND TRADE MARKS ATTORNEYS

P39793AU00

Fig. 1

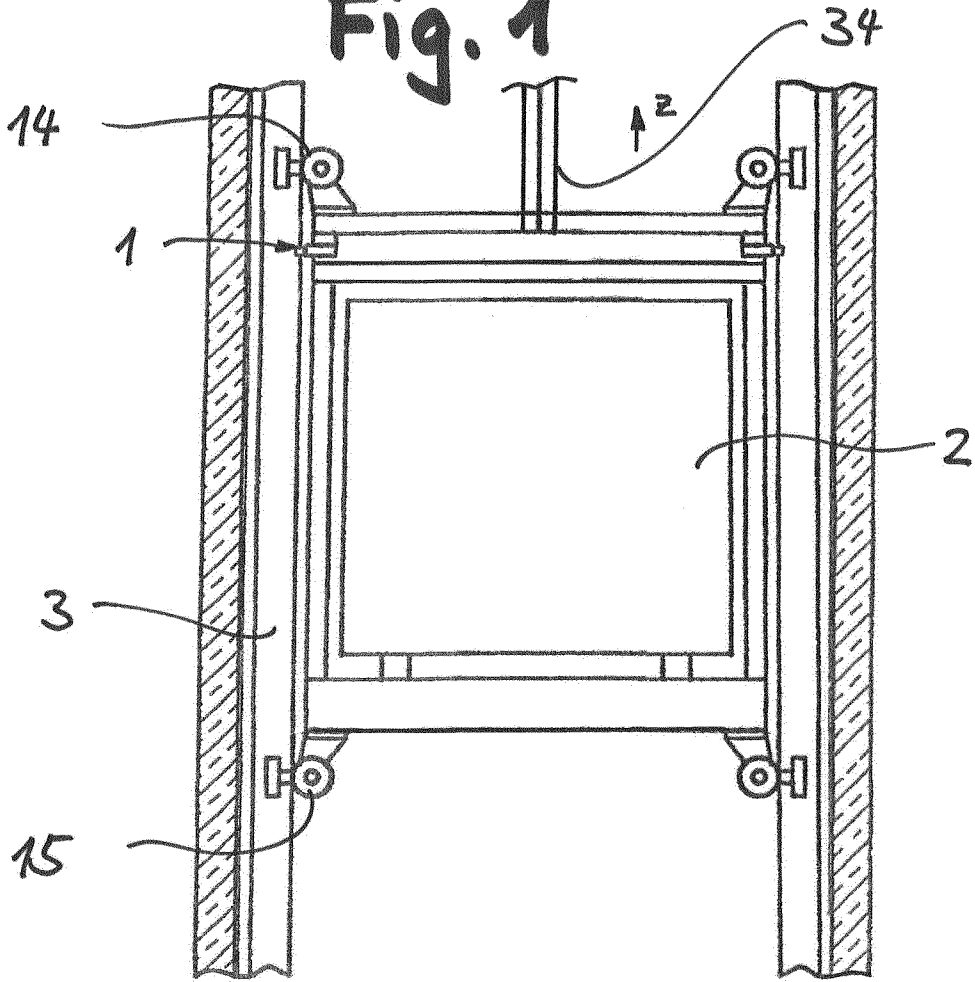


Fig. 2

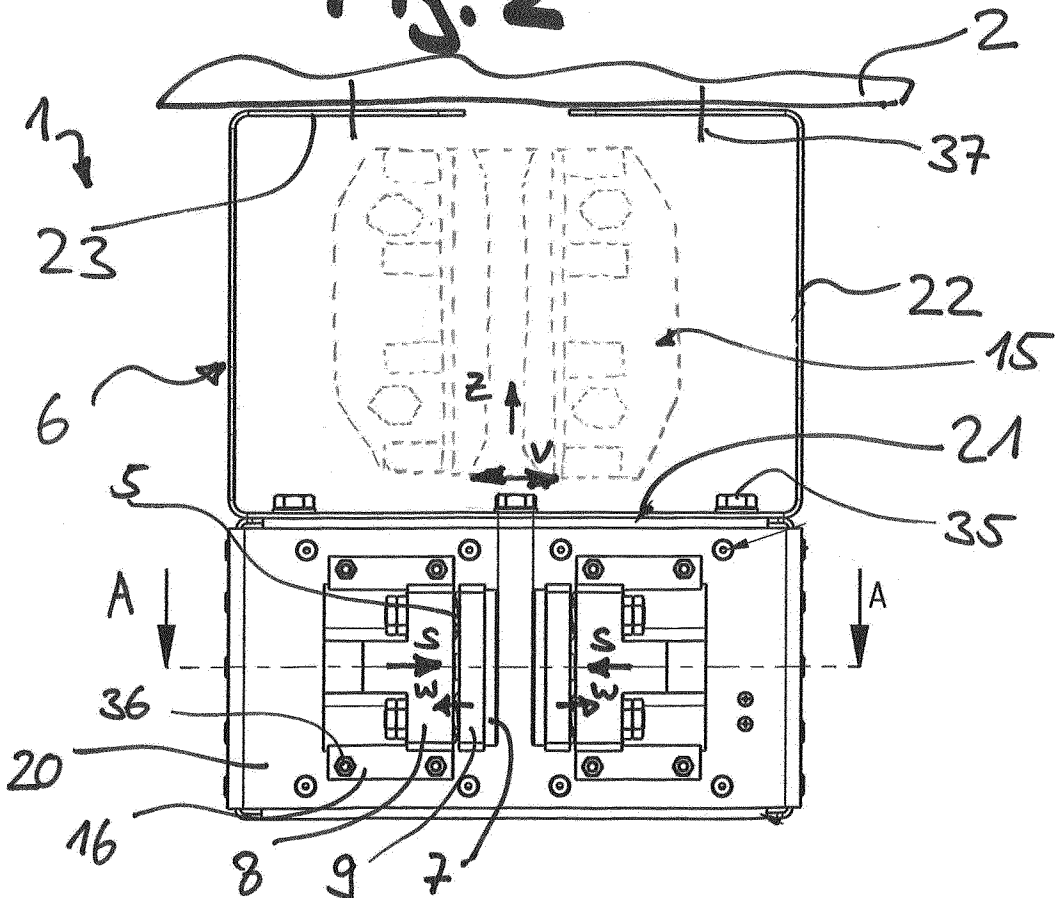


Fig. 5

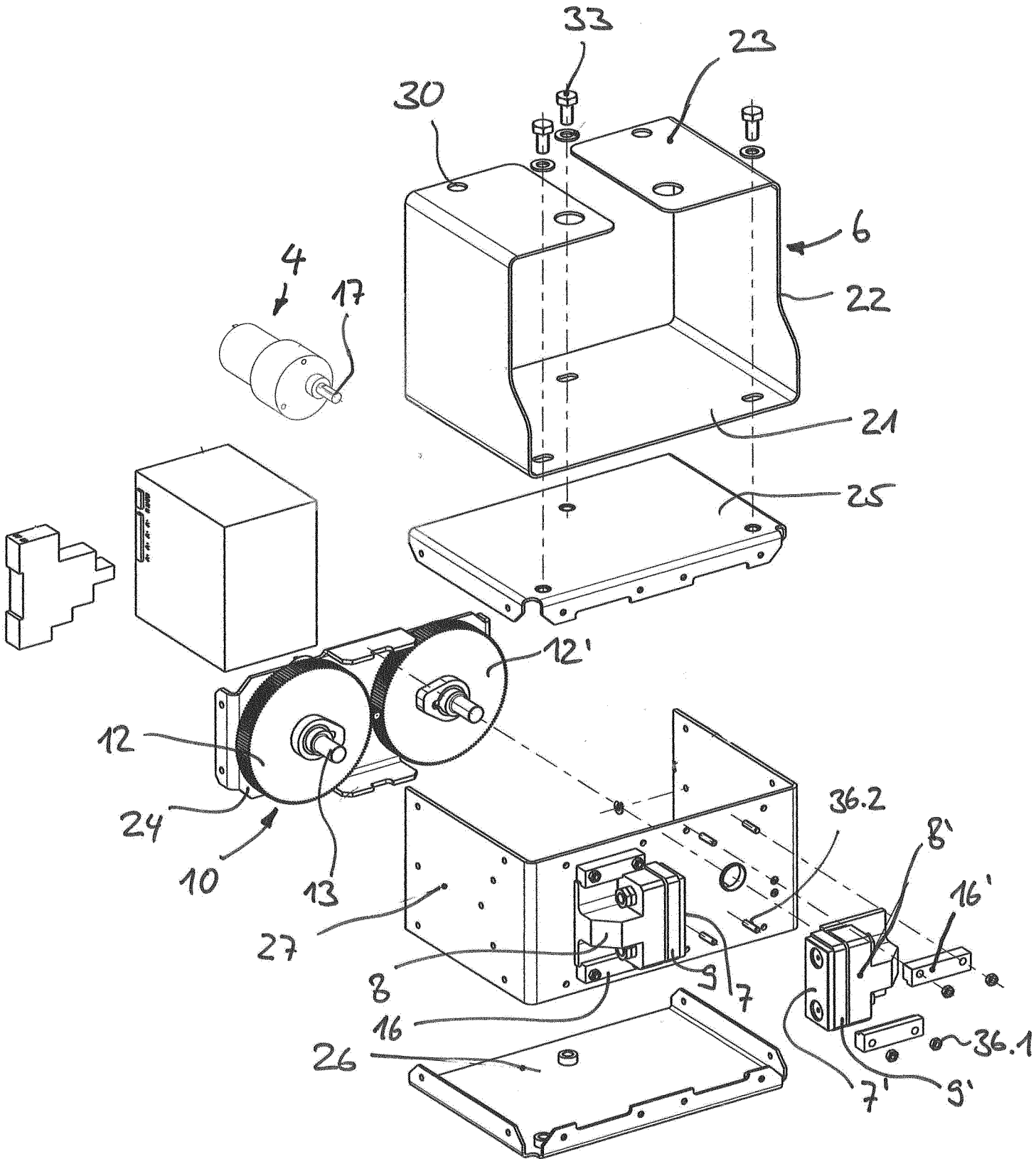


Fig. 6

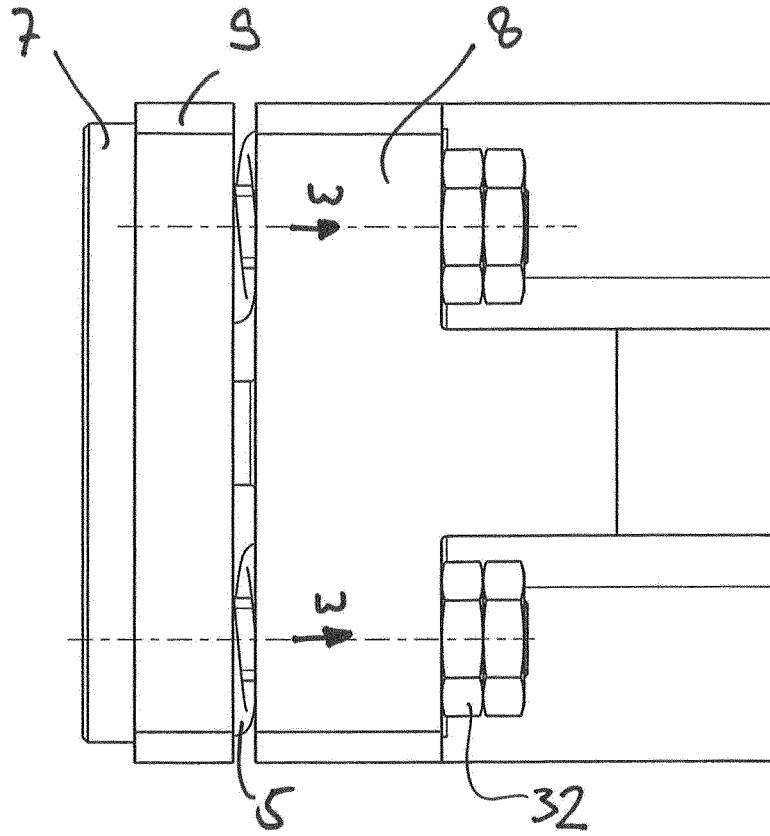


Fig. 7

