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(54) **SPRING-LOADED TENSIONING DEVICE FOR AN OVERSPEED GOVERNOR ROPE**

(57) A tensioning device (1) for an overspeed governor rope of an elevator with a spring tension mechanism for tensioning a deflection pulley (8) for the overspeed governor rope, wherein the spring tension mechanism is composed of at least two guide columns (2) onto each of which a respective spring element (14) is threaded and which are secured by a main frame (3a, 3a, 3b, 3b) in such a way that their first guide column section (2a) lies entirely within the region encompassed by the main frame (3a, 3b) and their second guide column section (2b) is situated above the main frame (3a, 3b) outside the region encompassed by it, and of a carriage (4a, 4b, 5, 6) with a deflection pulley (8) mounted on it in rotatable fashion, which carriage is supported in sliding fashion on the guide columns (2) by means of two yokes (5, 6); the lower yoke (5) of the slider travels on the first guide column section (2a) and constitutes an abutment for the spring elements (14), which are supported at their other end against the upper horizontal section (3a) of the main frame (3a, 3b); and the upper yoke (6) of the carriage (4a, 4b, 5, 6) travels on the second guide column section (2b) and preferably comes to a stop against an adjustable spring travel limiter (15).

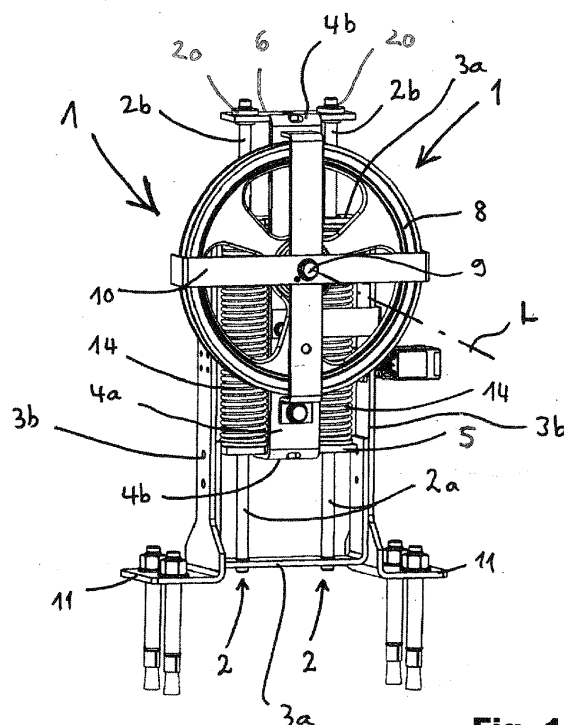


Fig. 1

Description

[0001] The invention relates to a spring-loaded tensioning device for the overspeed governor rope of an elevator according to the preamble to claim 1.

Technical Background

[0002] Elevators, at least up to now, are still generally provided with a conventional overspeed governor rope.

[0003] This is an endless steel cable that travels around at least one upper and one lower deflection pulley. The overspeed governor rope is typically fastened to a lever mounted on the elevator car for triggering the arresting and braking device of the car. In this way, the overspeed governor rope is carried along with and thus driven by the car.

[0004] The upper deflection pulley is typically coupled to its own overspeed governor. If this deflection pulley turns too fast, then this is an indication that the car has exceeded the maximum permissible speed and must be slowed down or even arrested. Then the overspeed governor slows down the deflection pulley with which it is associated. The overspeed governor rope decelerates, falls behind the elevator and in this way, triggers the still usually mechanical arresting and braking device.

[0005] In order to function properly, the overspeed governor rope must be correctly tensioned because otherwise, slippage can occur between the deflection pulley associated with the overspeed governor and the overspeed governor rope. Then the overspeed governor rope cannot be properly slowed down by the deflection pulley associated with the overspeed governor and therefore cannot fulfill its function.

[0006] Because of the sometimes very long overspeed governor rope (when the building has a corresponding number of floors) and the different temperatures that can occur in the elevator shaft, an overspeed governor rope must be tensioned so that the tensioning device producing the tension is able to readjust the tension at any time in order to prevent slippage or is able to flex in order to prevent an overloading of the overspeed governor rope.

Prior Art

[0007] For this reason, up to this point, tensioning devices primarily in the form of weights have been used, which load the lower deflection pulley of the overspeed governor rope and thus tension the overspeed governor rope with a constant weight and thus a constant tension, regardless of how much the overspeed governor rope has momentarily elongated or contracted.

[0008] Such weight-loaded tensioning devices, however, tend to occasionally oscillate, which is undesirable. In addition, they are expensive, if only due to the fact that a corresponding mass is required for the tensioning, but this mass cannot simply hang freely and instead also requires guidance.

[0009] Because of this, there has been an increasing tendency to transition to the use of spring-loaded tensioning devices. The known tensioning devices, which operate with a spring tension, do not offer a sufficiently precise guidance and/or cannot be finely adjusted with regard to their pretensioning.

Object of the Invention

[0010] In light of the foregoing, the object of the invention is to disclose a tensioning device, which enables a precise and permanent guidance of the deflection pulley and which is nevertheless compactly embodied so that the base area of the car can be embodied to be as large as possible for a given shaft cross-section.

[0011] The object is attained with the features of claim 1.

[0012] Wherever the terms "above" and "below" are used in the following, they relate to when the tensioning device is properly installed in an elevator system.

[0013] Consequently, a tensioning device for an overspeed governor rope of an elevator is proposed, which has a spring tension mechanism for tensioning a deflection pulley, which holds the overspeed governor rope, in a way that pretensions the rope. In this case, the spring tension mechanism has at least two guide columns. The two guide columns are situated next to each other on the same side of the deflection pulley. At least one spring element is threaded onto each guide column. The guide columns are secured by a main frame in such a way that their first guide column section lies completely inside the region enclosed by the main frame, which is completely closed or at least essentially closed on four sides. By contrast, its second guide column section lies above the main frame and outside of the region enclosed by it. The tensioning device also includes a carriage. The carriage supports a deflection pulley that is mounted in it in rotary fashion. The carriage is supported in sliding fashion on the guide columns by means of two yokes or yoke plates. In this case, the lower yoke of the carriage, which travels on the first guide column section, constitutes an abutment for the spring elements, which are supported at their other ends against the upper horizontal section of the main frame. The tension of the spring elements thus acts on the lower yoke of the carriage and pulls it downward. The upper yoke of the carriage travels on the second guide column section and preferably comes to a stop against an adjustable spring travel limiter.

[0014] This produces a redundant tensioning device, which does not completely fail even if one spring element fails, e.g. when helical compression springs are used and a coil fracture occurs in one helical compression spring.

[0015] In addition, the special embodiment of the guide columns makes it possible to guide the carriage in a very robust fashion. This is because the upper and lower yoke sections that guide the carriage on the guide columns are spaced a large distance apart from each other. They therefore support the carriage and the deflection pulley

mounted thereon particularly well in relation to forces acting on them in the vertical direction. As a result, the deflection pulley, despite its overhung support, does not have a tendency to tilt due to unwanted pivoting about a horizontal axis. Even a pivoting of the deflection pulley about a vertical axis is effectively arrested by the two parallel guide columns situated next to each other on one side of the deflection pulley. Because of all these measures, the tensioning device according to the invention is extremely narrow and its maximum width corresponds essentially to the diameter or width of a spring element plus the width of the deflection pulley and/or the covering shroud that secures it in place. In other words: the width of the tensioning device is generally no greater than the distance between the end of a guide rail that protrudes the farthest into the shaft in the horizontal direction and the shaft wall that holds this guide rail. As a result, the tensioning device according to the invention can also be used with no trouble if a (usually machine roomless) elevator is to be constructed, which makes optimal use of the available shaft cross-section.

[0016] In a preferred modification of the invention, the main frame is entirely closed on four sides. Not least, this achieves a main frame that promotes universal use and that is intrinsically stable even if its base is not bolted to the bottom of the shaft, but is instead affixed to at least one of the guide rails with the aid of a retaining bracket.

[0017] Preferably, the guide carriage is composed of a C-shaped bracket with a preferably straight middle part and two short legs protruding from it preferably at right angles. In this case, each of the short legs transitions into a yoke. Such a guide carriage can be produced in a simple and yet very stable fashion out of one or more bent flat bars that are screwed or welded to one another. In order to provide a bearing for the overhung support of the deflection pulleys, it is sufficient to weld or screw a bearing pin to the middle part of the C-shaped bracket on which the deflection pulley is mounted in rotary fashion.

[0018] Preferably, the upper leg transitions in one piece into the yoke that is associated with it. This simplifies production. The yoke and C-shaped bracket can be stamped out of a single piece and then bent into shape.

[0019] It has turned out to be advantageous if the guide eyes with which the upper yoke travels on the guide columns each have a slot that is open toward the side oriented away from the deflection pulley. This facilitates the assembly. Then the upper yoke does not have to be threaded onto the guide rods from their ends. Instead, the upper yoke can be quite simply slid onto the guide rods from the side - from the side toward which the deflection pulley will never tilt or pivot out of the way during operation due to the rope- and tensioning forces.

[0020] Preferably, the deflection pulley is supported in overhung fashion on the straight middle part of the C-shaped bracket. The overhung support contributes to minimizing the width of the tensioning device in the direction along the operating rotational axis of the deflec-

tion pulley.

[0021] It is particularly suitable if the guide columns are completely affixed only to the lower horizontal section of the main frame, while they merely reach through the upper horizontal section of the main frame, i.e. are slid through them. This makes it significantly easier to replace the spring elements as needed. Each of the guide columns only has to be detached from the lower horizontal part of the main frame and can then be entirely or at least partially extracted toward the top.

[0022] It has turned out to be particularly advantageous if the upper horizontal section of the main frame has a recess or hollow into which the straight middle part of the C-shaped bracket protrudes. It is thus possible for the C-shaped bracket and the main frame to be moved against each other even more tightly, thus making it possible to reduce the width even further.

[0023] Other functions, advantages, and possible embodiments ensue from the following description of two exemplary embodiments based on the figures.

List of Figures

[0024]

Fig. 1 shows an oblique front view of a first exemplary embodiment in the form of a tensioning device according to the invention intended for being mounted to the floor.

Fig. 2 shows an oblique view from below of the tensioning device according to the invention shown in Fig. 1.

Fig. 3 shows tensioning device according to the invention shown in Fig. 1, from its side oriented away from the deflection pulley.

Fig. 4 shows an oblique top view of the tensioning device according to the invention shown in Fig. 1.

Fig. 5 shows a second exemplary embodiment of the tensioning device according to the invention, viewed from the front with the protective cover removed.

Fig. 6 shows a rear view of the tensioning device according to the invention shown in Fig. 5 with the protective cover installed.

Fig. 7 shows a third exemplary embodiment of the tensioning device according to the invention, viewed from its side oriented away from the deflection pulley.

Fig. 8 is a sectional view of Fig. 7, with the intersecting plane extending through the two guide col-

umns 2.

Fig. 9 shows a fourth exemplary embodiment of the tensioning device according to the invention, from its side oriented away from the deflection pulley.

Fig. 10 shows a section through Fig. 9, with the intersecting plane positioned behind the two guide columns 2, which are therefore "cut away" and are no longer visible in Fig. 9.

Fig. 11 shows a fifth exemplary embodiment.

Fig. 12 once again shows the third exemplary embodiment and based on it, shows the limit position switch, which can be correspondingly provided in all of the exemplary embodiments.

Exemplary Embodiments

First Exemplary Embodiment

[0025] The centerpiece of the tensioning device is a main frame, which is composed of two horizontal sections 3a and two vertical sections 3b, see Fig. 2. This frame, which is usually fully closed on four sides, therefore *de facto* constitutes an imaginary block, which is open at its two large surfaces. The frame is ideally composed of flat bars, which are bent by 90° where necessary. It constitutes a ring-like cage for the spring elements 14.

[0026] At least two guide columns 2 are fastened to the lower horizontal section 3a of the main frame, preferably with the aid of a thread or, less preferably, by means of a respective welding seam or spot weld. The two guide columns cross through the interior of the main frame 3a, 3b, reach through two openings in the upper horizontal section 3a of the main frame and protrude out from the top of the main frame, see Figs. 3 and 4. In this way, the guide columns 2 each comprise a first guide column section 2a, which lies in the region enclosed by the main frame, and a second guide column section 2b, which lies above the main frame, outside the region enclosed by it.

[0027] Each of the guide columns 2 has a spring element 14 threaded onto it, which in this case, are each preferably embodied in the form of a helical compression spring.

[0028] A carriage travels on the guide columns 2. It is composed of a C-shaped bracket 4a, 4b and the yokes 5 and 6 that interact with it, see Fig. 1.

[0029] The middle part 4a of the C-shaped bracket is usually straight. The middle part 4a of the C-shaped bracket is adjoined by short legs 4b of the C-shaped bracket that usually protrude from it at right angles. The lower short leg 4b is connected to a lower yoke 5, preferably with the aid of screws or welding, see Fig. 2. The upper short leg 4b, as is visible, transitions in one piece

into the less heavily loaded upper yoke 6 or the upper short leg in this case is itself embodied as a yoke 6, see Fig. 4. This makes it possible to stamp the upper yoke 6 and the C-shaped bracket 4a, 4b out of one piece and to bring it into its required form by bending.

[0030] The carriage supports an axle journal 9 for the deflection pulley, which is only suggested in the figures - see Fig. 2 for the best view. The deflection pulley 8 is supported thereon so that it can rotate about the axis L.

[0031] In addition, the carriage has a rope slip-off guard 10 mounted on it, see Fig. 1. The rope slip-off guard 10 is preferably embodied in the form of a cross. It embraces the deflection pulley at four points along its outer circumference in such a way that the overspeed governor rope, not shown here, cannot accidentally slip out of the rope groove of the deflection pulley 8. The rope slip-off guard 10 is preferably fastened with a central screw, which is screwed into the axle journal 9 of the deflection pulley 8, see Figs. 1 and 2. In addition, the rope slip-off guard 10, as is clear from the drawings, is secured with an additional screw, which is screwed into the straight middle part 4a of the C-shaped bracket.

[0032] The lower yoke 5 travels on the first guide column section 2a. Since the spring elements 14, as is clear from Fig. 2, are supported at one end against the lower yoke 5 and are supported at the other end against the upper horizontal section 3a of the main frame, they tend to push the carriage downward and thus tension the overspeed governor rope via the pulley, which in fact constitutes the lower deflection pulley 8 for the overspeed governor rope.

[0033] The upper yoke 6 travels on the second guide column section 2b. The upper yoke is preferably provided with two guide bushes 20, which are preferably composed of a bearing material and in particular of a bearing material that is not steel such as brass or bearing bronze, possibly even plastic. It is easy to see that the tensioning device, due to its special design, can be very easily prestressed again, for example if the overspeed governor rope has broken and the spring elements have been slackened to a maximum degree - as long as the lower yoke 5 has come to rest against the lower horizontal section 3a of the main frame. A hoisting device such as a chain hoist is simply hooked to the upper yoke 6 or an eye or screw fastened there and then the upper yoke is drawn upward until the new overspeed governor rope can be easily inserted into the deflection pulley, see Figs. 2 and 4. Then the upper yoke 6 is carefully lowered again until the deflection pulley is prevented from executing further downward movement for the time being by the overspeed governor rope that is now taut.

[0034] As is the most clearly visible in Fig. 2, the top side of the upper horizontal section 3a of the main frame can be provided with a spring travel limiter 15. In this case, the latter is embodied in the form of a screw. The screw usually serves as an optional transport retainer element, which keeps the spring elements 14 stressed even when no overspeed governor rope is suspended in

the deflection pulley. The screw is then preferably screwed into a thread in the upper yoke 6 and is supported with its lower end against the horizontal section 3a of the main frame. After the overspeed governor rope has been suspended, the screw 15 is unscrewed and removed, thus tensioning the overspeed governor rope. This spring travel limiter 15 or the screw that incorporates it can also be used for readjusting the tension if the overspeed governor rope has elongated to an impermissible degree. By screwing the screw back in, the springs can be stressed again and the tensioning device (if it is used in a rail-mounted fashion) can be released and reattached to the rails in a lower position or the limiter rope can be shortened (when mounted at the bottom of the shaft).

[0035] It is clear from Fig. 4 that the guide eyes with which the upper yoke 6 travels on the guide columns 2 each have a slot 7 that is open toward the side oriented away from the deflection pulley 8, which simplifies assembly.

[0036] Aside from this, it is worth mentioning that the exemplary embodiment shown is a tensioning device 1 that is provided for fastening to the bottom of the shaft. To this end, at their bottom ends, the vertical sections 3b of the main frame 3a, 3b transition into feet 11 that preferably each have two fastening holes via which they can be pegged to the bottom of the shaft. For mass production, it makes sense to provide the integral embodiment of the feet 11 shown here. Alternatively, the feet 11 can be removed and replaced with a rail-holding bracket, as will be explained in greater detail below in conjunction with the second exemplary embodiment.

Second Exemplary Embodiment

[0037] The second exemplary embodiment differs from the first exemplary embodiment only in that it is not provided for mounting to the bottom of the shaft, but rather with the aid of a rail bracket, preferably at the bottom end of the guide rails, i.e. is embodied for wall mounting. Because of this, that which has been stated above for the first exemplary embodiment also applies to this second exemplary embodiment so that reference can be made thereto.

[0038] As is clearly visible in Fig. 6, in this exemplary embodiment, the feet 11 have been eliminated. Instead, the main frame 3a, 3b has a rail-holding bracket 12 fastened, preferably screwed, to it. This bracket preferably has oblong holes or individual holes that are spaced one after the other in close succession and laterally intersect with one another, to permit them to be fastened with the aid of the extremely wide variety of rail-fastening clamps that are used for mounting rails to walls.

[0039] Fig. 6 also clearly indicates another special feature, which can advantageously also be implemented in the first exemplary embodiment:

The upper horizontal section 3a of the main frame

has a recess 16 into which the flat main part 4a of the C-shaped clamp 4a, 4b - at least partially - protrudes. In this way, the C-shaped clamp 4a, 4b and thus the carriage formed by it can be moved even closer to the main frame, which further reduces the width required by the tensioning device.

[0040] Finally, it is also worth noting the protective cover 17 is preferably made of sheet metal, which can be provided in the same form in the first exemplary embodiment as well. The protective cover 17 is open at the bottom and can therefore be slid over the deflection pulley 8 from above. On the back side, it has sheet metal flanges 18 with which it rests against the vertical parts 3b of the main frame and can be screw-mounted thereto.

Third Exemplary Embodiment

[0041] Figs. 7 and 8 show a third exemplary embodiment. The third exemplary embodiment corresponds almost entirely to the first exemplary embodiment, which is why that which has been stated with regard to the first exemplary embodiment also applies to the third exemplary embodiment, provided that nothing to the contrary is indicated by the difference explained below.

[0042] This third exemplary embodiment differs from the first exemplary embodiment in that each of the spring elements 14 that are embodied as helical compression springs here as well, is threaded onto a guide tube 19. Each guide tube 19 is in turn threaded onto a guide column 2. Each guide tube 19 is preferably dimensioned so that it crosses all the way through the region enclosed by the main frame 3a, 3b and preferably rests with the interposition of a respective centering bush 21 against the upper and lower vertical section 3b of the main frame. The outer diameter of the guide tube 19 is preferably undersized by 1 mm to 2 mm compared to the inner diameter of the spring element 14.

[0043] Each centering bush 21 is possibly embodied so that it has a bore with which it is concentrically threaded onto a guide column 2 and a centering shoulder with which it holds the guide tube 19 concentrically relative to the guide column 2. This is particularly visible in Fig. 8.

[0044] It is particularly advantageous that in this exemplary embodiment, the lower yoke 5 is also no longer guided directly by the first guide columns 2, but instead, this task is performed by the guide tubes 19, i.e. those that guide the lower yoke 5.

[0045] It is also worth noting that the lower yoke 6 is preferably screwed to the lower short leg 4b of the C-shaped bracket as shown in Fig. 7, with the head of the screw possibly constituting a stop with which the lower yoke 6 likewise comes to a stop against the lower horizontal section 3a of the main frame.

Fourth Exemplary Embodiment

[0046] Figs. 9 and 10 show a fourth exemplary embod-

iment. The fourth exemplary embodiment largely corresponds to the second exemplary embodiment, which is why that which has been stated with regard to the second exemplary embodiment also applies to the fourth exemplary embodiment, provided that nothing to the contrary is indicated by the difference explained below.

[0047] This fourth exemplary embodiment differs from the second exemplary embodiment once again mainly in that here as well, each of the spring elements 14 is threaded onto a guide tube 19. This guide tube 19 and its attachment to the guide columns 2 corresponds that which has been described above in connection with the third exemplary embodiment. The above statements apply here as well so that these statements can be referred to without going into further detail.

[0048] Another difference from all of the other exemplary embodiments lies in the design of the main frame in this exemplary embodiment.

[0049] Naturally, the main frame can be embodied as described above. Figs. 9 and 10 show a variant that differs from it. The main frame in this case is composed of two C-shaped brackets C whose open C-sides are oriented toward each other. Each of the C-shaped brackets constitutes a horizontal section 3a of the main frame, each of which is adjoined on both sides by a respective vertical section 3b of the main frame.

[0050] The pairs of opposing vertical sections 3b are either absolutely not directly connected to each other in a frictional, nonpositive way by means of another straight vertical section or are not directly connected to each other at least at the side by means of another straight vertical section on which the rail-holding bracket 12 is provided. It is then the rail-holding bracket 12, which on both sides or preferably on only one side, i.e. on the side oriented toward it, provides for the frictional, nonpositive connection of the opposing vertical sections 3b of the two C-shaped brackets oriented toward each other and therefore replaces a part of the main frame, which would be readily apparent to the person skilled in the art from a direct comparison of Figs. 9 and 10.

[0051] In this exemplary embodiment, the region that is enclosed by the main frame according to the invention is the region that is enclosed by the two C-shaped brackets arranged with their open C-shaped sides facing each other and the intersecting imaginary extensions of the vertical sections 3b that are positioned opposite each other in the vertical direction.

Fifth Exemplary Embodiment

[0052] Fig. 11 shows a fifth exemplary embodiment, which functions according to a fundamentally different principle than the preceding exemplary embodiments and for which entirely independent protection is therefore also claimed herein.

[0053] This exemplary embodiment is essentially comprised of a first frame element 30 and a second frame element 31. Each of the two frame elements in this case

is provided with preferably two rotatable rollers 33.

[0054] In a tensioning device 1 that is provided for mounting on the guide rails of the elevator, the first frame element 30 and the second frame element 31 can each be a component - possibly even an integral component - of the rail-holding bracket 12. As is evident, this rail-holding bracket 12 here is composed of a 2-armed plate, which is fastened to the guide rails at the part where the two arms come together.

[0055] If the unit is to be mounted to the bottom of the shaft instead, then the first frame element and the second frame element can instead each be a component or an integral component of a frame structure mounted to the bottom of the shaft, which is not shown here.

[0056] In this exemplary embodiment, the deflection pulley 8 for the overspeed governor rope is supported on an L-shaped bracket 34a, 34b. The long, usually straight leg 34a of the L-shaped bracket is movably supported between the rotatable rollers 33. The support is preferably embodied so that the narrow side surfaces of the straight middle part 34a roll along correspondingly profiled rollers 33 that embrace them in a form-fitting way.

[0057] The upper of the two frame elements 30 is provided with a window 36 through which the long leg 34a of the L-shaped bracket extends.

[0058] At its upper end, the straight leg 34a of the L-shaped bracket transitions into the short leg 34b of the L-shaped bracket, which is usually bent at right angles.

[0059] This short leg 34b is supported against a spring element 14, which in this case is preferably composed of a helical compression spring. This helical compression spring is thus supported with its one end against the short leg 34b and at its other end via a corresponding washer against a tension bolt 37, which in turn reaches through the short leg 34b in an essentially or completely contactless manner and underneath it, is anchored to the upper of the two frame elements 31. This anchoring is preferably achieved in that the tension bolt 37 reaches through the frame element 31 and in the region in which it emerges from the frame element 31 again, is supported against the frame element 31 with the aid of a nut. The tension bolt 37 preferably has a thread at least at its upper end, with the aid of which the prestressing of the spring element 14 or of the helical compression spring can be increased or decreased by changing the position of the above-mentioned washer, which serves as an abutment for the spring element 14.

[0060] Aside from this, it should also be mentioned that the deflection pulley 8 in this case is provided with a rope slip-off guard 10, which is installed in exactly the same way as has been described above for the other exemplary embodiments and thus that which was stated there applies here as well.

[0061] The same is true for the overhung support of the deflection pulley 8, which is likewise embodied in the way that has already been described above for the other exemplary embodiments.

[0062] The decisive advantage of this exemplary em-

bodiment is that it only requires a minimal amount of installation space in the direction parallel to the rotation axis of the deflection pulley 8, at the expense of a greater installation space in the vertical direction. The deflection pulley 8 is nevertheless movable, but guided in a very precise and rigid fashion.

General note

[0063] In the example shown in Fig. 12, in a way that once again applies to all of the exemplary embodiments, it should be noted that a limit position switch 40 is installed, which cooperates with a switch ramp 41. Preferably, the limit position switch 40 "travels" along with the C-shaped bracket 4a, 4b or the L-shaped bracket 34a, 34b, while the switch ramp is mounted in stationary fashion to the respective main frame 3a, 3b or to a stationary frame part.

[0064] The limit position switch 40 trips an alarm or switches the system off when the deflection pulley 8 has reached a position that lies outside the position range that the deflection pulley 8 is permitted to assume with a proper tensioning of the overspeed governor rope.

[0065] Finally, it should be noted that protection is also claimed for the following variant of the tensioning device according to the invention, separately from claim 1 or the other dependent claims: a tensioning device for an overspeed governor rope of an elevator with a spring tension mechanism for tensioning a deflection pulley for the overspeed governor rope, which has at least one spring element, characterized in that the spring tension mechanism includes a carriage with a deflection pulley mounted thereon in overhung fashion, which is movably supported on at least one guide column by means of two yokes or two guide arms, with the at least one spring element exerting a tensioning force on the lower yoke or lower guide arm of the slider.

[0066] This tensioning device can have other (even individual) features of the kind stipulated in claims 2 through 10 and in the above description.

Reference Numeral List

[0067]

- | | |
|----|--|
| 1 | tensioning device |
| 2 | guide column |
| 2a | first guide column section |
| 2b | second guide column section |
| 3a | horizontal section of the main frame |
| 3b | vertical section of the main frame |
| 4a | straight middle part of the C-shaped bracket |
| 4b | short leg of the C-shaped bracket |
| 5 | lower yoke |
| 6 | upper yoke |
| 7 | slot in the guide eye of the upper yoke |
| 8 | deflection pulley |
| 9 | axle journal of the deflection pulley |

- | | |
|-------|--|
| 10 | rope slip-off guard |
| 11 | foot |
| 12 | rail-holding bracket |
| 13 | recess in the horizontal section of the main frame |
| 5 14 | spring element |
| 15 | spring travel limiter |
| 16 | recess |
| 17 | covering shroud |
| 18 | fastening flange of the covering shroud |
| 10 19 | guide tube |
| 20 | guide bushes |
| 21 | centering bush |
| 22 | through 29 not assigned |
| 30 | first frame element |
| 15 31 | second frame element |
| 32 | not assigned |
| 33 | rotatable rollers |
| 34a | long leg of the L-shaped bracket |
| 34b | short leg of the L-shaped bracket |
| 20 35 | not assigned |
| 36 | window in the frame element 30 |
| 37 | tension bolt |
| 38 | not assigned |
| 39 | not assigned |
| 25 40 | limit position switch |
| 41 | switch ramp |
| C | C-shaped bracket, which is part of the main frame |
| L | axis |

Claims

1. A tensioning device (1) for an overspeed governor rope of an elevator with a spring tension mechanism for tensioning a deflection pulley (8) for the overspeed governor rope, **characterized in that** the spring tension mechanism is composed of at least two guide columns (2) onto each of which a respective spring element (14) is threaded and which are secured by a main frame (3a, 3a, 3b, 3b) in such a way that their first guide column section (2a) lies entirely within the region encompassed by the main frame (3a, 3b) and their second guide column section (2b) is situated above the main frame (3a, 3b) outside the region encompassed by it, and of a carriage (4a, 4b, 5, 6) with a deflection pulley (8) mounted on it in rotatable fashion, which carriage is supported in sliding fashion on the guide columns (2) by means of two yokes (5, 6); the lower yoke (5) of the slider travels on the first guide column section (2a) and constitutes an abutment for the spring elements (14), which are supported at their other end against the upper horizontal section (3a) of the main frame (3a, 3b); and the upper yoke (6) of the carriage (4a, 4b, 5, 6) travels on the second guide column section (2b) and preferably comes to a stop against an adjustable spring travel limiter (15).

2. The tensioning device (1) according to claim 1, **characterized in that** the main frame (3a, 3b) is closed on four sides.
3. The tensioning device (1) according to claim 1 or 2, **characterized in that** the guide carriage (4a, 4b, 5, 6) is composed of a C-shaped bracket (4a, 4b), with a preferably straight middle part (4a) and two short legs (4b) preferably protruding at right angles therefrom, and each of the short legs (4b) transitions into a yoke (5; 6).
4. The tensioning device (1) according to claim 3, **characterized in that** the upper leg (4b) transitions in one piece into the yoke (6) associated with it and/or the yoke supports guide bushes (20), which are preferably made of plastic or a bearing metal.
5. The tensioning device (1) according to claim 3 or 4, **characterized in that** the guide eyes with which the upper yoke (6) travels on the guide columns (2) each have a slot (7) that is open toward the side oriented away from the deflection pulley (8).
6. The tensioning device (1) according to one of claims 3 through 5, **characterized in that** the deflection pulley (8) is supported in overhung fashion on the preferably straight middle part (4a) of the C-shaped bracket (4a, 4b).
7. The tensioning device (1) according to one of claims 3 through 5, **characterized in that** a rope slip-off guard (10) is fastened to the preferably straight middle part (4a) of the C-shaped bracket (4a, 4b).
8. The tensioning device (1) according to one of the preceding claims, **characterized in that** the guide columns (2) are fully affixed only to the lower horizontal section (3a) of the main frame (3a, 3b) whereas they merely reach through the upper horizontal section (3a) of the main frame (3a, 3b).
9. The tensioning device (1) according to one of the preceding claims, **characterized in that** the upper horizontal section (3a) of the main frame (3a, 3b) has a recess (13) into which the straight middle part (4a) of the C-shaped bracket (4a, 4b) protrudes.
10. The tensioning device (1) according to one of the preceding claims, **characterized in that** at their lower ends, the vertical sections (3b) of the main frame (3a, 3b) transition in a preferably integral fashion into feet (11) for mounting to the bottom of the shaft.
11. The tensioning device according to one of the preceding claims, **characterized in that** each of the spring elements (14) is a helical spring, which is at least partially threaded onto a guide tube (19), which is in turn threaded onto a guide column (2).
12. The tensioning device according to claim 11, **characterized in that** the guide tube (19) can be moved in telescoping fashion.
13. The tensioning device according to claim 11, **characterized in that** the guide tube (19) is longer than the spring element (14) and the preferably one-piece guide tube (19) reaches all the way through the spring element (14).
14. The tensioning device according to claim 13, **characterized in that** the lower yoke (5) is guided in sliding fashion on the two guide tubes (19).
15. The tensioning device (1) for an overspeed governor rope of an elevator with a spring tension mechanism for tensioning a deflection pulley (8) for the overspeed governor rope, which has at least on spring element (14), **characterized in that** the spring tension mechanism includes a carriage (4a, 4b, 5, 6) with a deflection pulley (8) supported in overhung fashion, which is supported by means of at least two yokes (5, 6) or guide arms in sliding fashion on at least one guide column (2) and at least one spring element (14) exerts a tensioning force on the lower yoke (5) or lower guide arm of the slider.
16. The tensioning device according to claim 15, **characterized in that** the tensioning device is modified by means of one or more features according to one of claims 1 through 10.
17. A tensioning device (1) for an overspeed governor rope of an elevator with a spring tension mechanism for tensioning a deflection pulley (8) for the overspeed governor rope, **characterized in that** the deflection pulley (8) is preferably supported in overhung fashion on a carriage, which is held so that it can be slid between a plurality of rotatable rollers (33) and which can be moved in opposition to the force exerted by at least one spring element (14).

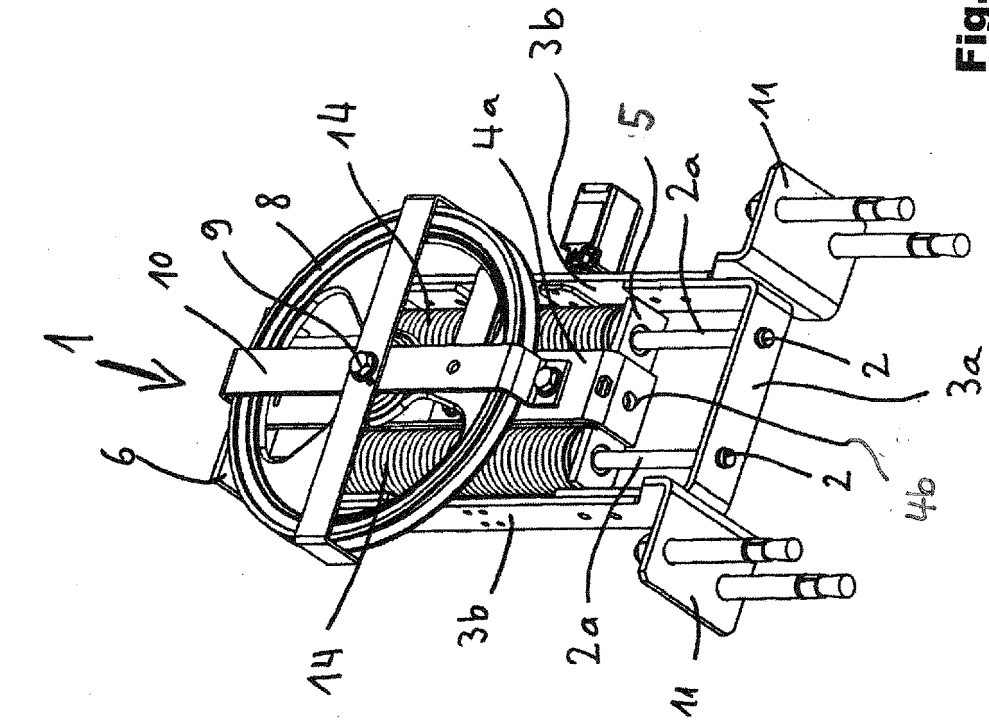


Fig. 1

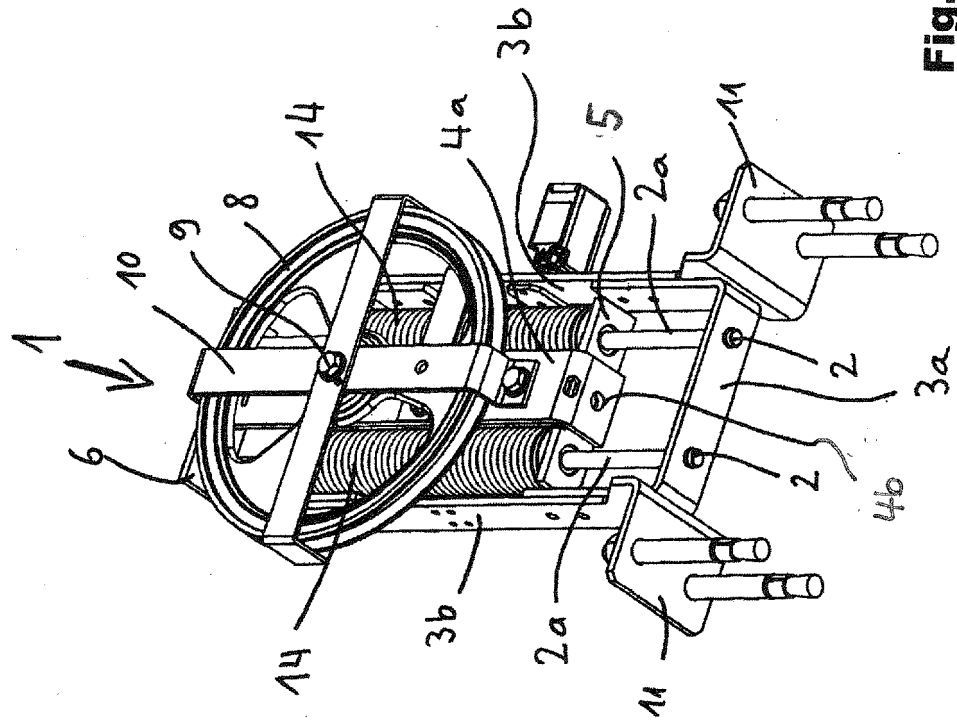


Fig. 2

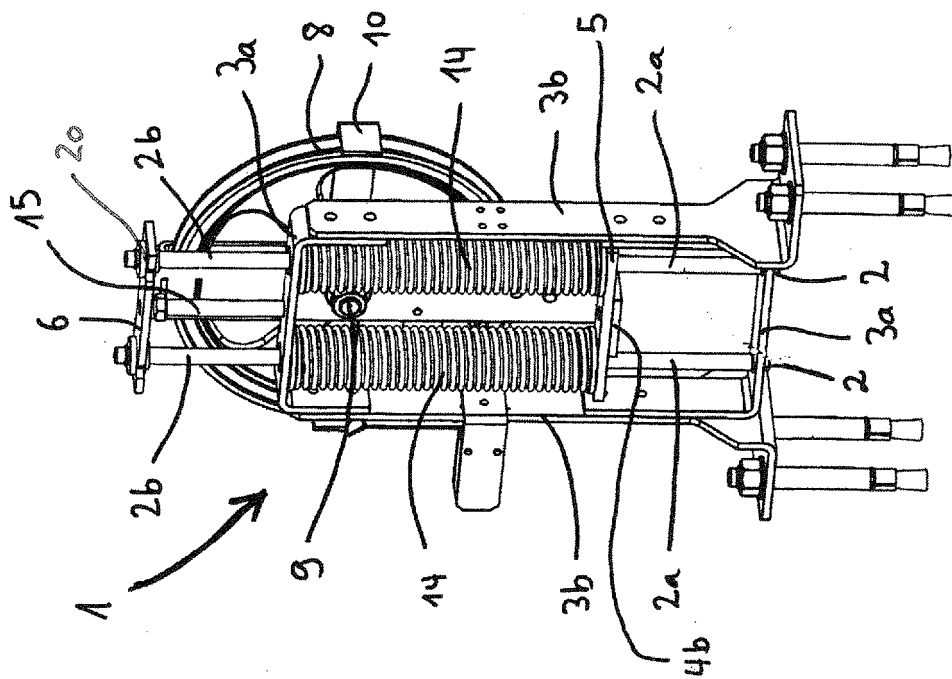


Fig. 3

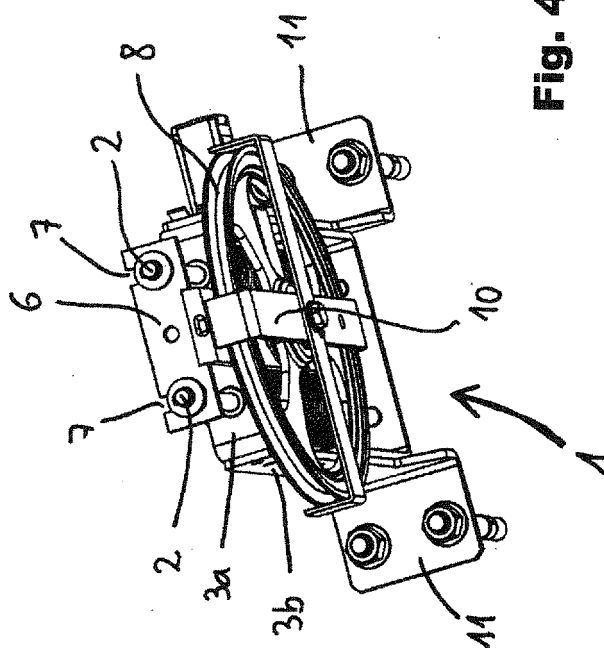


Fig. 4

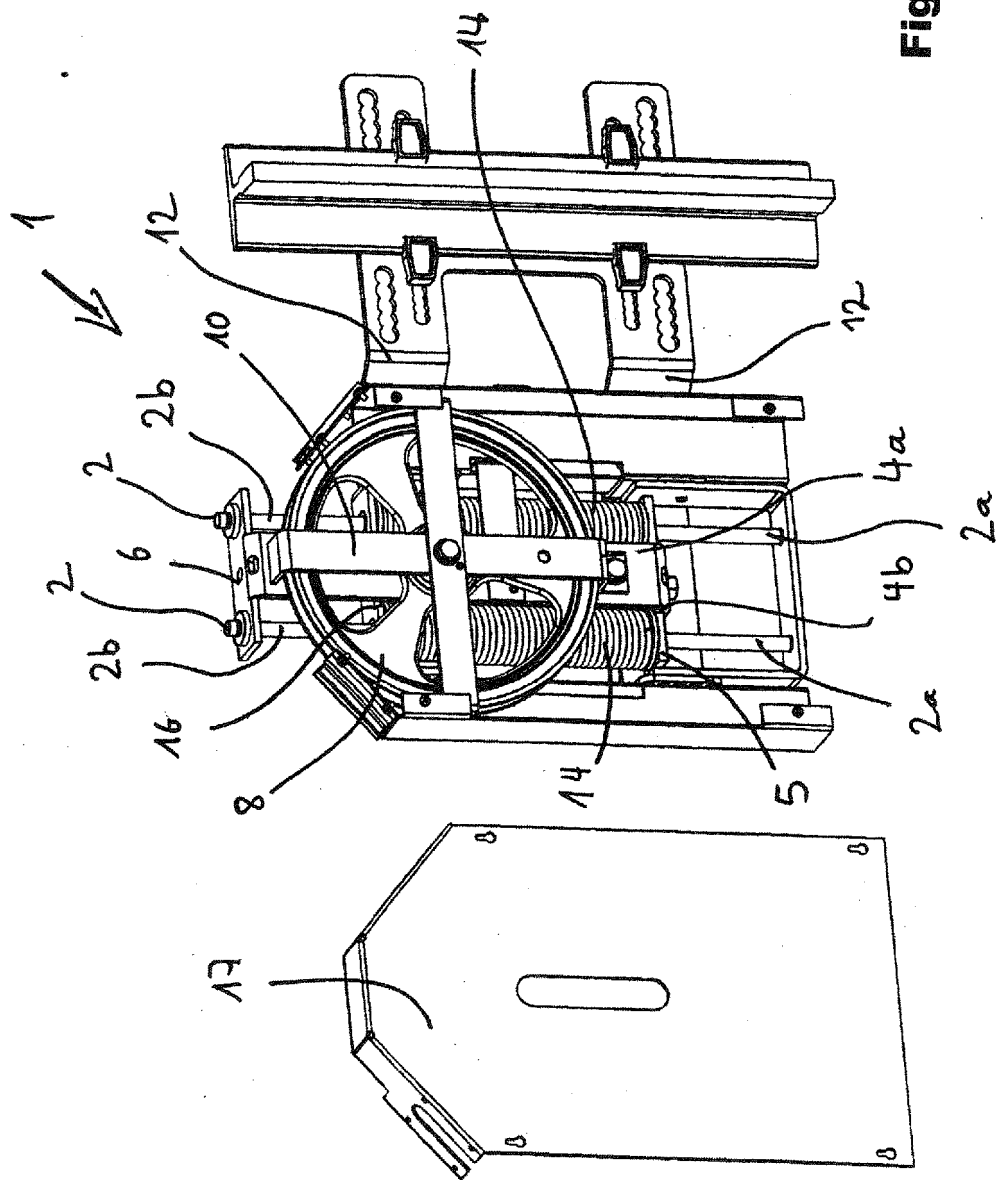


Fig. 5

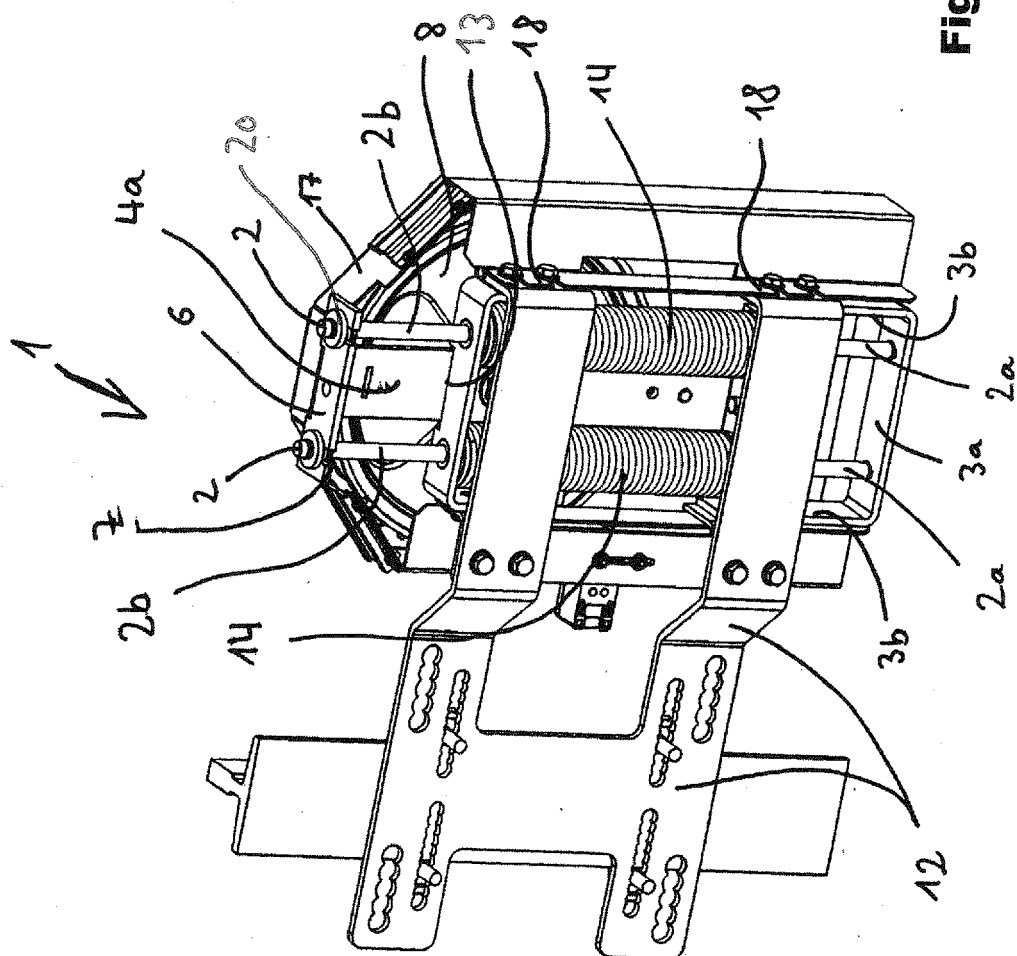


Fig. 6

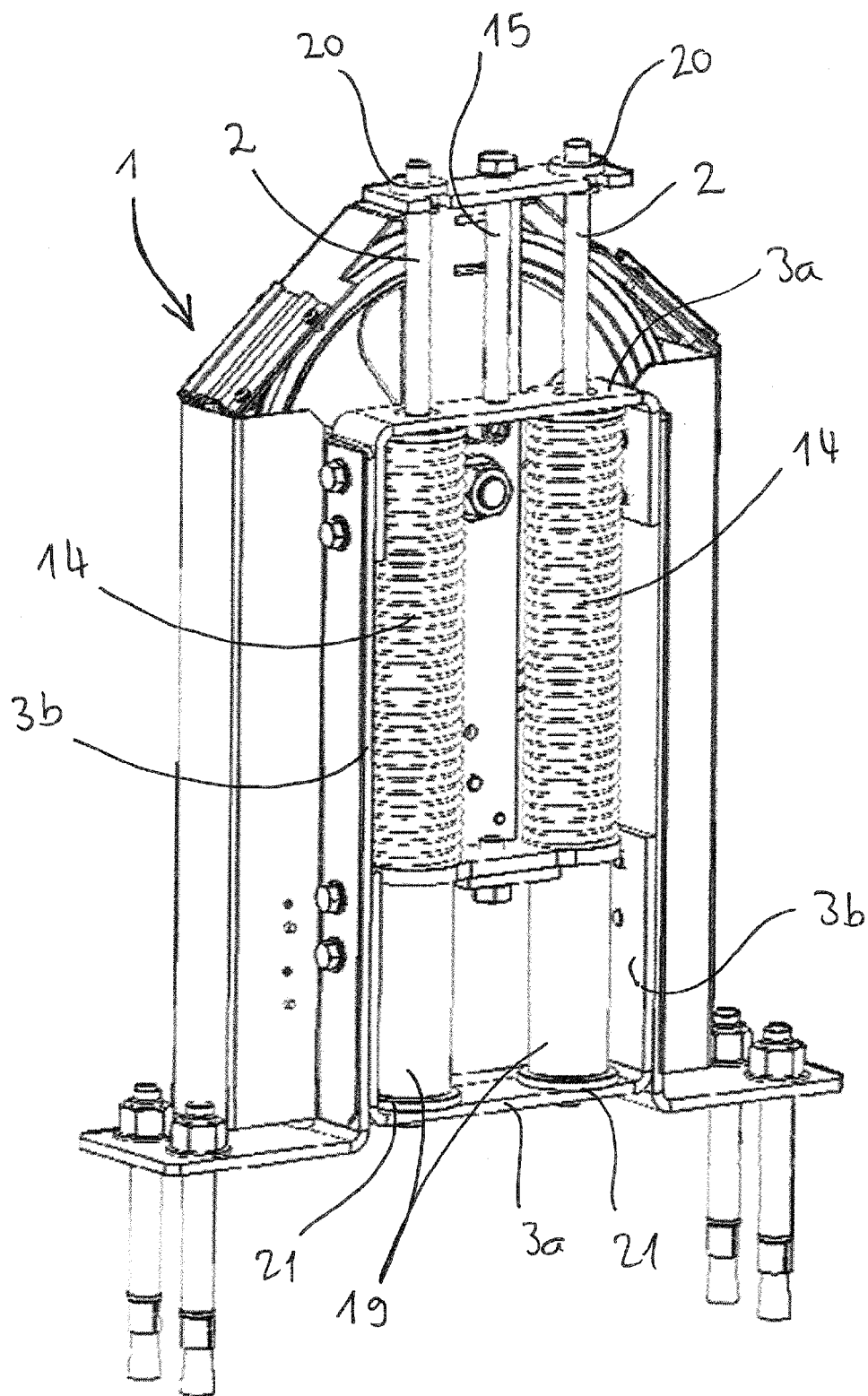


Fig. 7

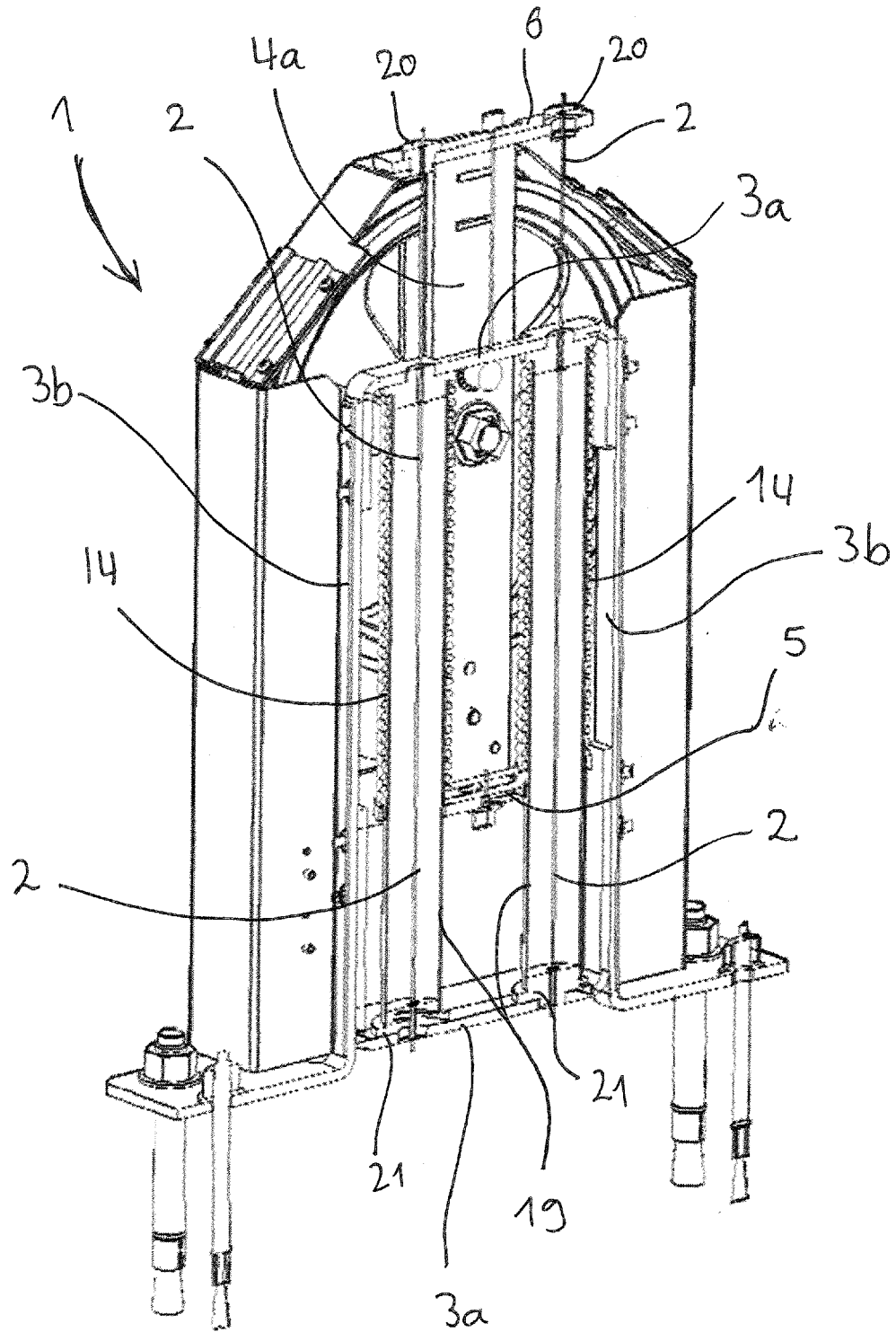


Fig. 8

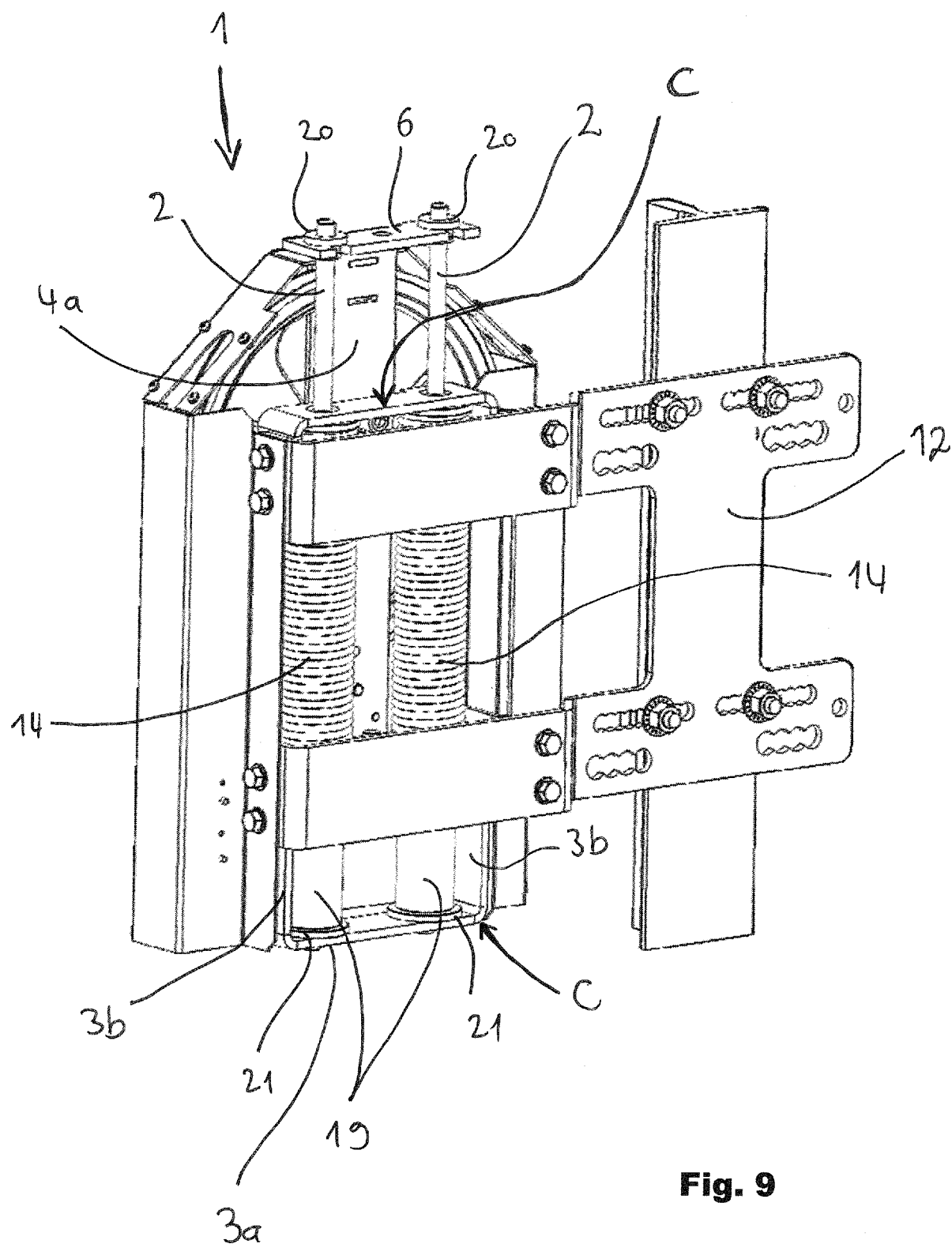


Fig. 9

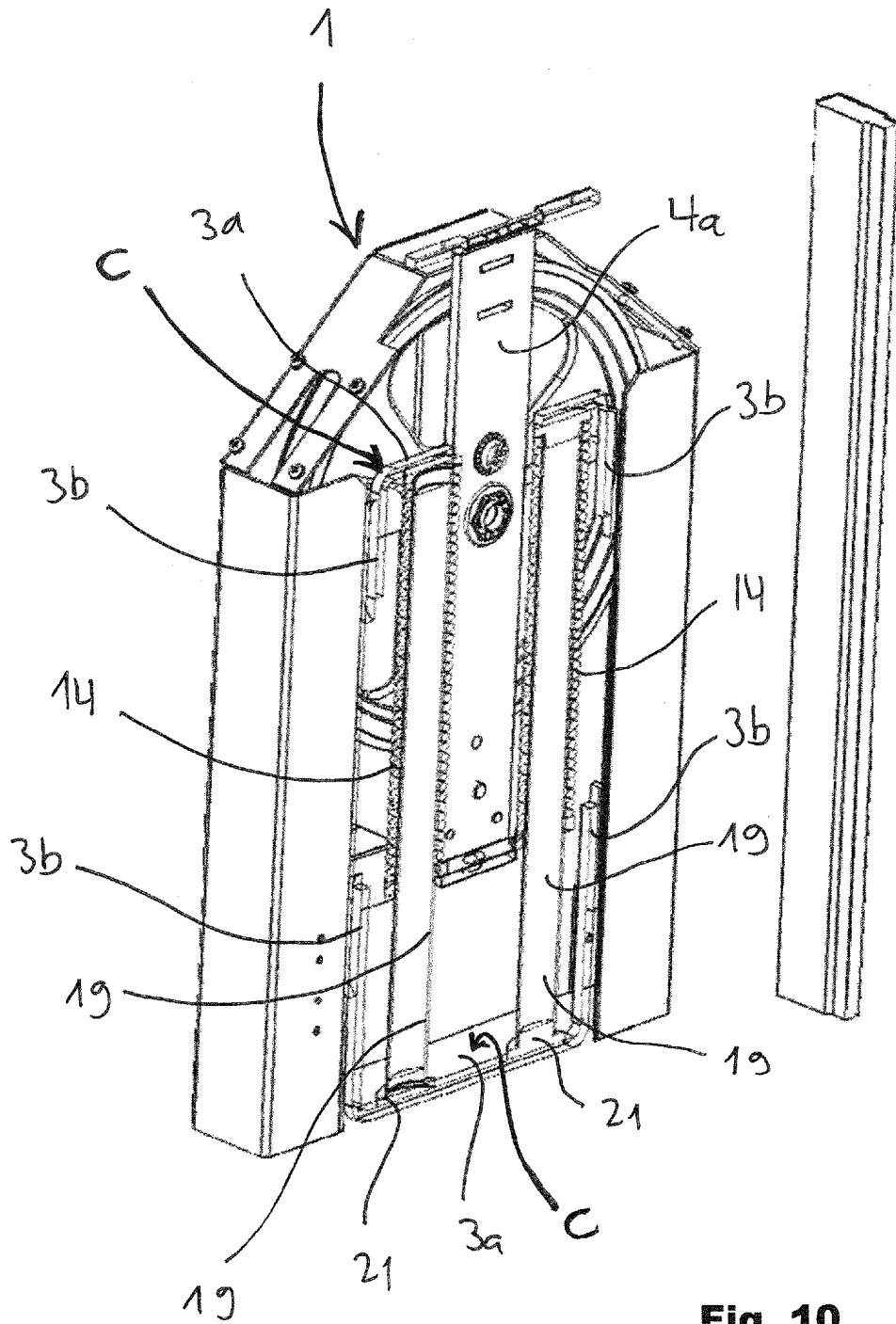


Fig. 10

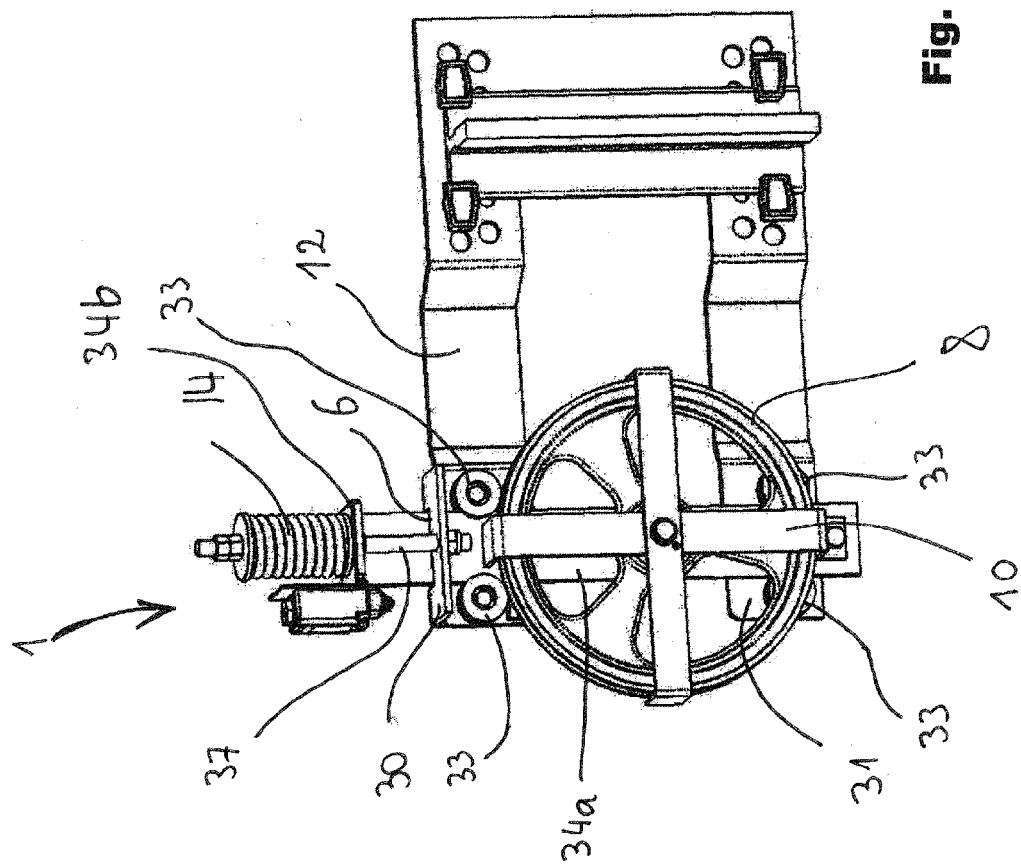


Fig. 11

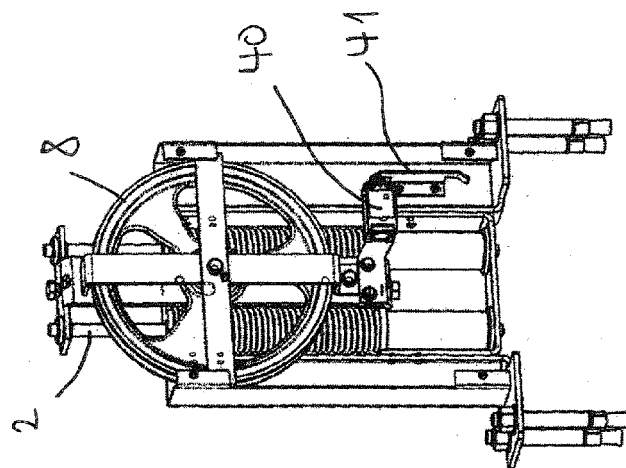


Fig. 12



EUROPEAN SEARCH REPORT

Application Number
EP 16 19 1807

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			B66B
Place of search		Date of completion of the search	Examiner
The Hague		7 February 2017	Janssens, Gerd
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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07-02-2017

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