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(54) **HEIGHT POSITIONING DEVICE FOR A PRESENTATION DEVICE**

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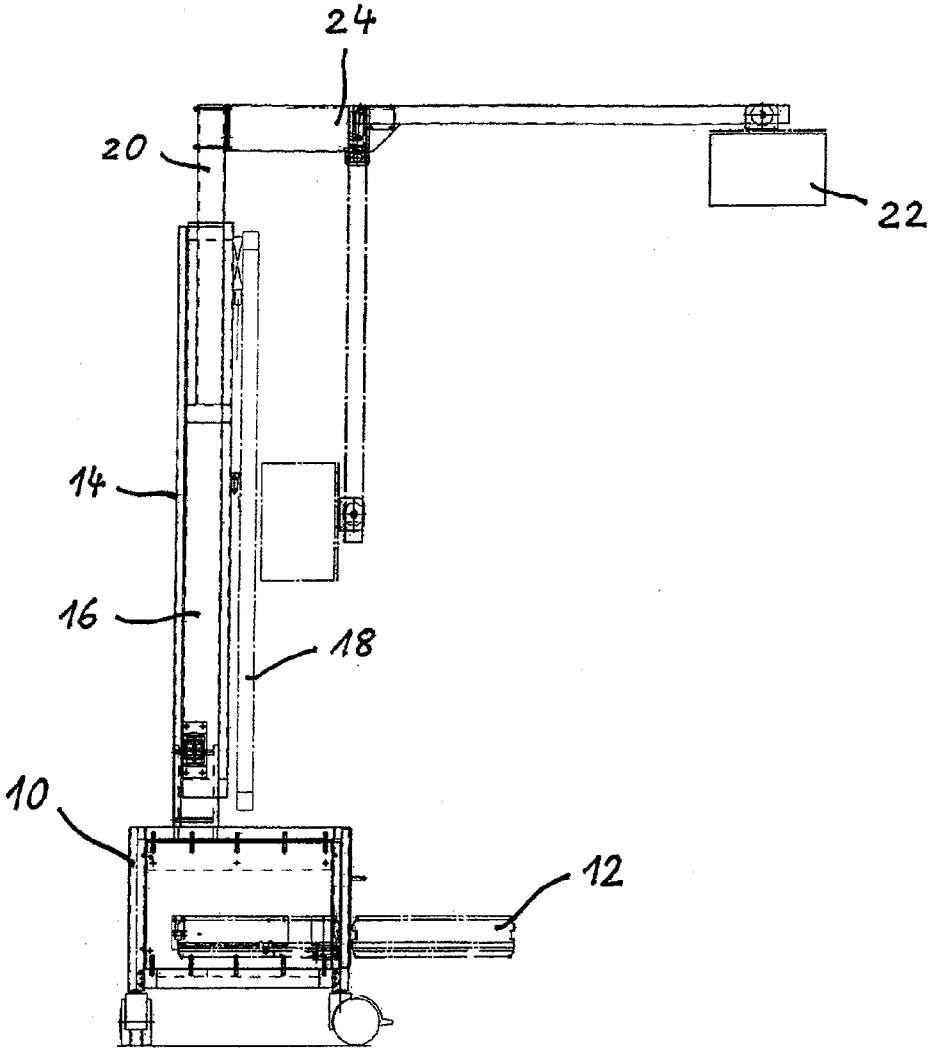
(57) **ABSTRACT**

A height positioning device for a presentation device contains a carrier to which a presentation element can be fastened, and a mount to which the carrier is attached and movable between first and second height positions. Also provided are a flexible traction mechanism having one end fastened to the carrier and a second end fastened to the mount or a stationary element, and a deflection element around which the traction mechanism is guided in the manner of a pulley. To hold the carrier at any desired position, the height positioning device contains a gas compression spring having a first end fastened to the deflection element and a second end supported on the mount, an element of fixed height, on the carrier or an element which can be moved with the carrier, such that the spring compensates for a weight of the carrier and the presentation element.



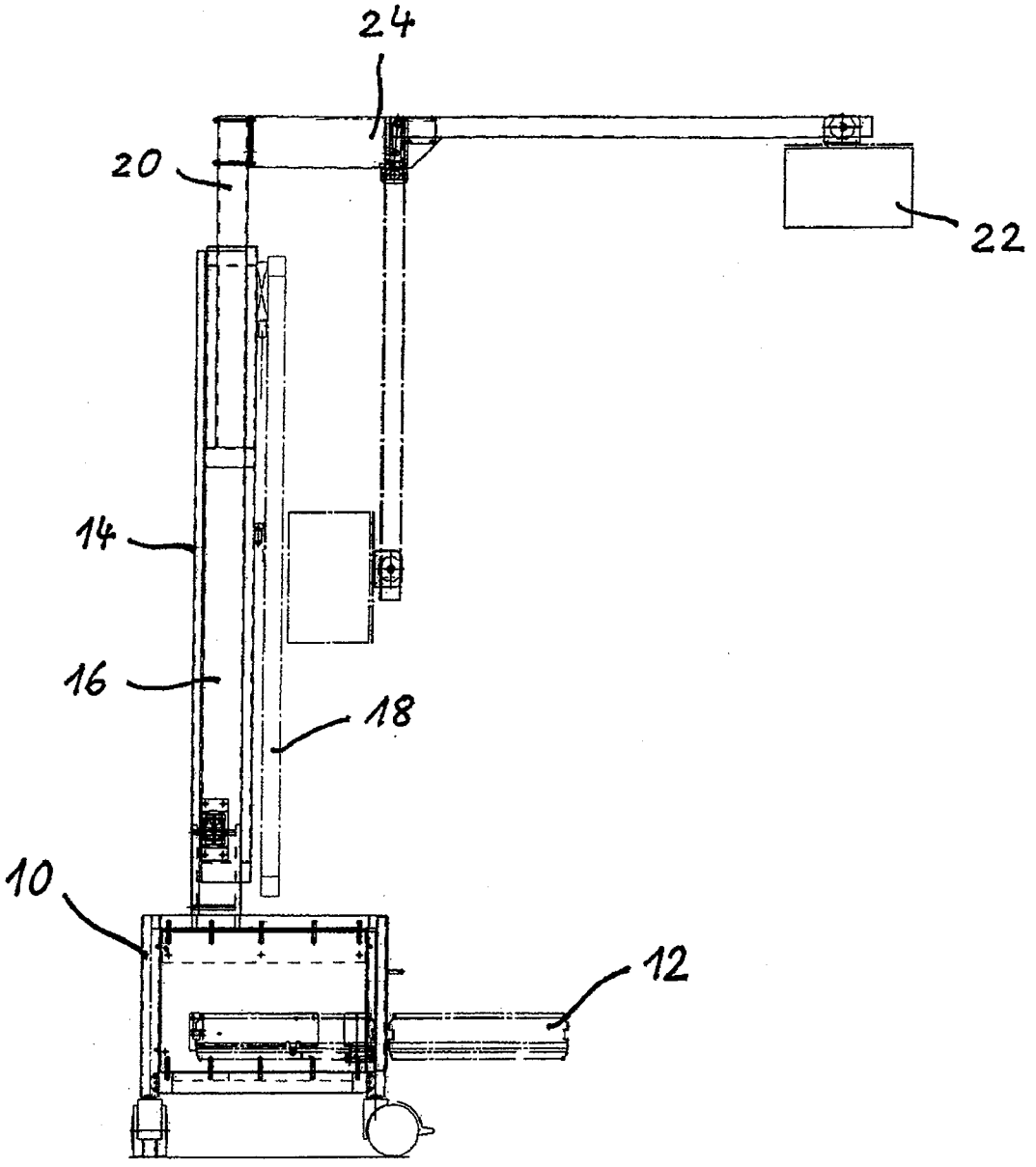


FIG. 1

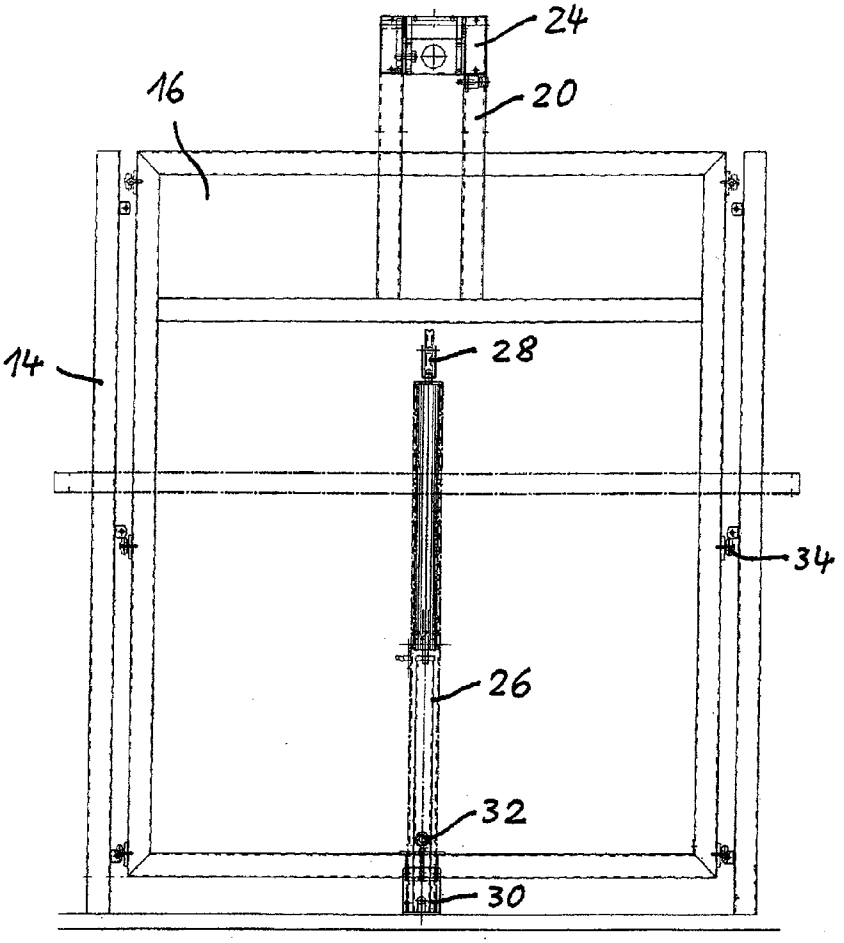


FIG. 2

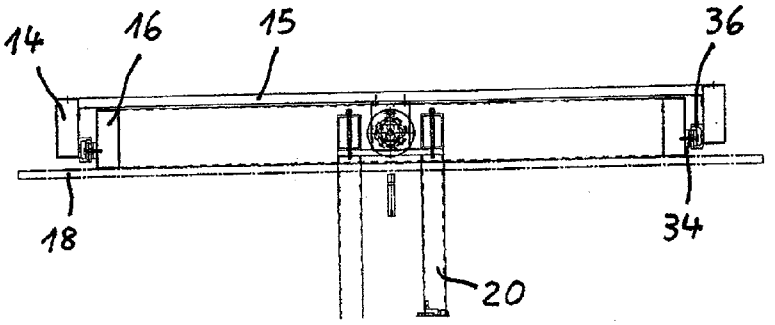
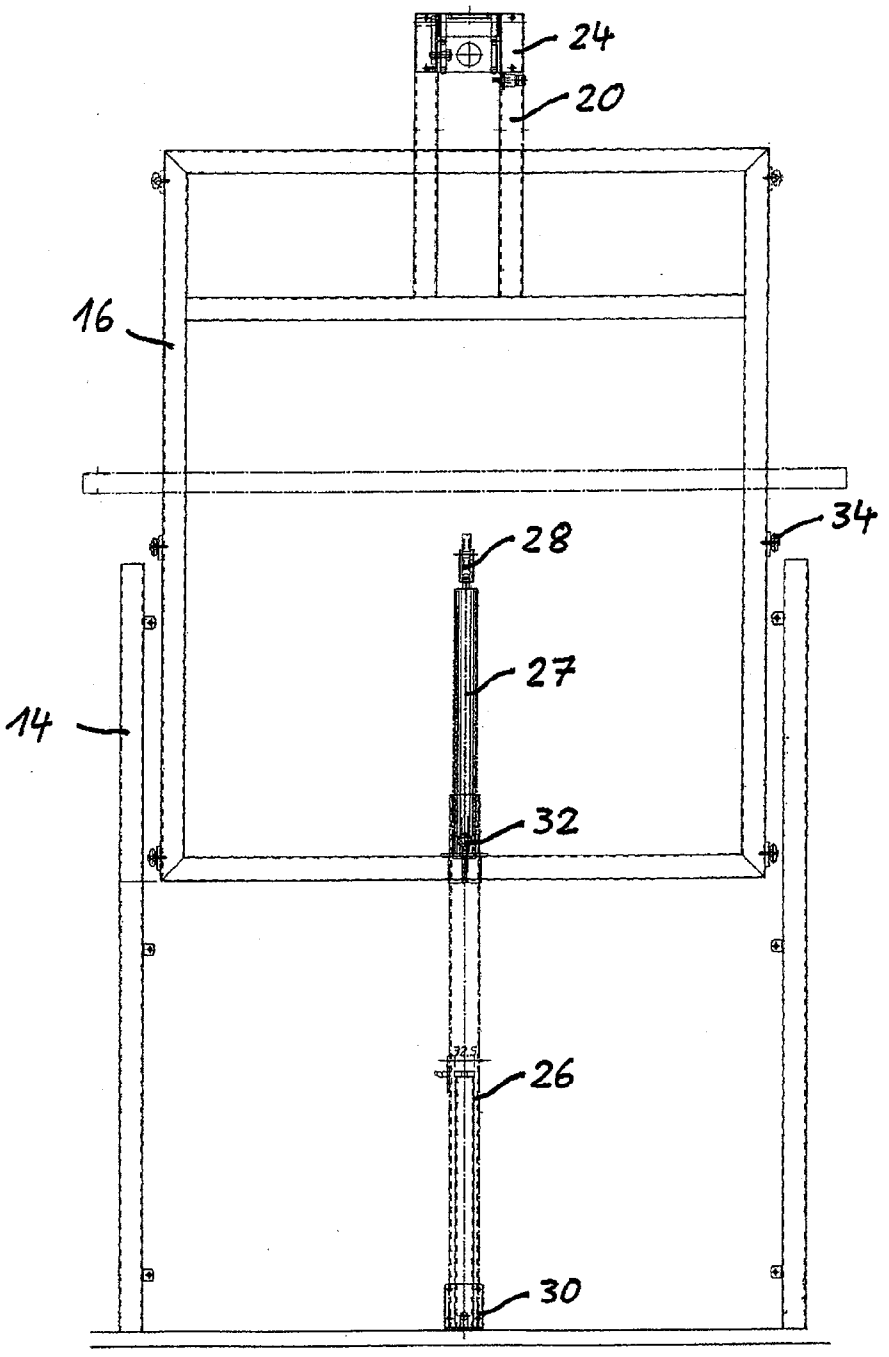


FIG. 4

FIG. 3



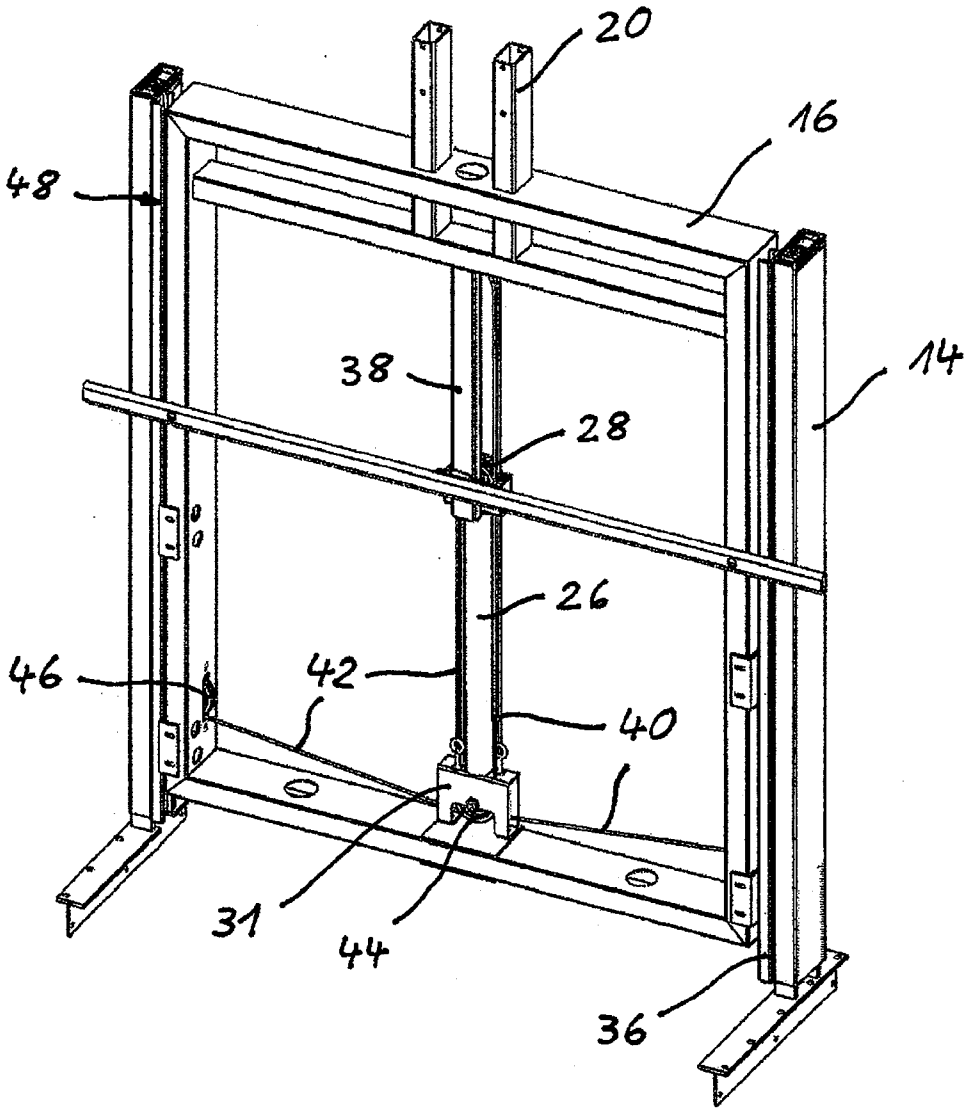


FIG. 5

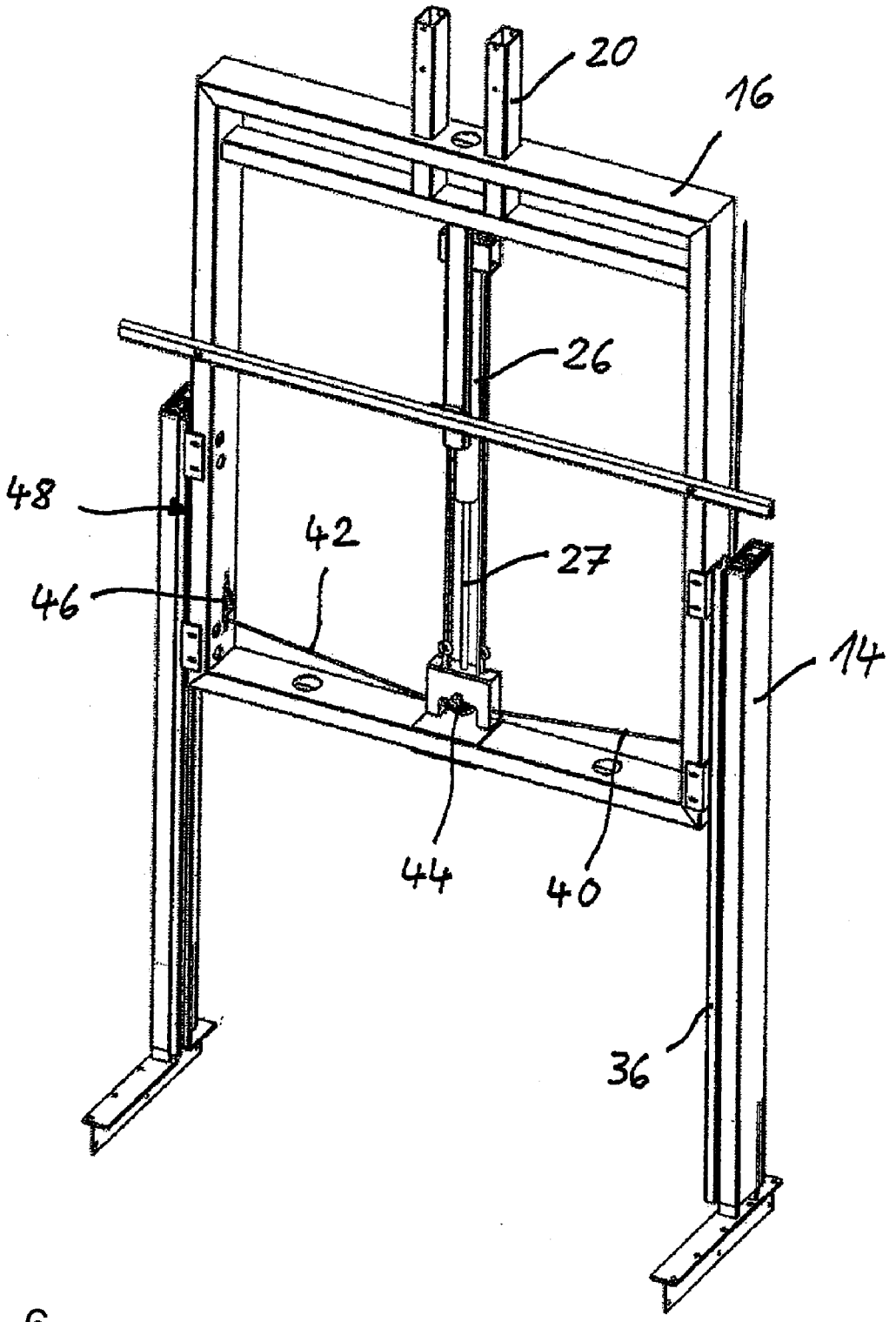


FIG. 6

HEIGHT POSITIONING DEVICE FOR A PRESENTATION DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority, under 35 U.S.C. §119, of German application DE 10 2008 033 059.0, filed Jul. 14, 2008; the prior application is herewith incorporated by reference in its entirely.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a height positioning device for a presentation device.

[0004] 2. Description of the Prior Art

[0005] There are both stationary presentation systems, which are for example attached to a building wall, and mobile presentation systems, which are for example provided with a movable undercarriage. In both cases, it is advantageous if the height of the presentation systems can be adjusted, so as to be able in each case optimally to adapt the systems to the current conditions. The corresponding height positioning devices should in this case be as simple as possible to operate.

[0006] As more and more presentation systems are being developed which are intended to offer the user flexible options for use, there is an increasing demand for a weight-optimized solution for height positioning devices of this type for presentation systems. Lower weight of the height positioning device is advantageous both in the case of a mobile presentation system and in the case of stationary mounting of a presentation system. Further advantages are obtained with regard to the transportation and logistics of the height positioning devices or the overall presentation systems.

[0007] Various presentation systems with different height positioning or adjustment devices are known in the art.

[0008] Thus, for example, published, non-prosecuted German patent application DE 102 48 987 A1 discloses a mobile presentation unit which has an integrated electronic presentation device and can be used variably for presentations in a limited circle of participants. This known presentation unit has in particular a movable undercarriage with a plurality of support profiles and a supporting construction for fastening the presentation device, for example a whiteboard or an integrated unit consisting of a projection board and projector.

[0009] German utility model DE 20 2007 010 920 U1 discloses a presentation system with a projection surface and a projector fastened to the projection surface via a supporting arm which can pivot about a vertical axis, in which the projection surface is fastened to a plurality of pylons via a height-adjustable carrier and coupled to counterweights. This conventional presentation system can be arranged on a wall, on wall rails or on a movable carriage, as desired.

[0010] Furthermore, German utility model application DE 20 2008 002 222.3 describes a mobile presentation device in which the supporting construction has at least one substantially vertical pylon with a counterweight, on which a carrier is arranged so as to be able to move between a first and a second height positioning, and the projection surface and the supporting arm of the projector are each fastened to the carrier. In addition, the supporting arm is preferably configured so as to allow the projector to be folded from its operating position above the projection surface downward before the projection surface.

[0011] A further height-adjustable pylon board is known for example from German utility model DE 20 2006 007 109 U1, wherein the board surface in this system can additionally be inclined relative to the substantially vertical pylons.

[0012] As the counterweights provided in or on the pylons have substantially to correspond to the overall weight of the carrier and the presentation elements attached thereto and the mounts thereof, the height positioning device is in the latter cases relatively heavy; this is a drawback for mobile presentation systems and stationary mounting to wall rails and the like.

[0013] Also known, in addition to this board system and these presentation systems in which the height positioning takes place by counterweights, are systems of the type in which the height positioning is implemented with the aid of a spring mechanism such as, for example, a gas compression spring.

[0014] Thus, published, non-prosecuted German patent application DE 42 35 764 A1 discloses a height positioning device with a vertically displaceable carrier plate, wherein the carrier plate can in one embodiment be held in a desired height position with the aid of a gas compression spring in the manner of a car jack. This system is no longer suitable in modern presentation devices owing to its relatively high weight, as the gas compression spring would have to provide excessively high spring forces and very stringent requirements would have to be placed on the guidance of the carrier plate.

[0015] Finally, published, non-prosecuted German patent application DE-OS 19 18 262 discloses a continuously height-adjustable board which can be held in a desired height position on a structural element wall by a centrally arranged gas compression spring and a symmetrically constructed pulley cable arrangement. The height positioning is an integral part of a blackboard or the like and thus cannot be used flexibly for the different modern presentation elements.

SUMMARY OF THE INVENTION

[0016] It is accordingly an object of the invention to provide a height positioning device for a presentation device that overcomes the above-mentioned disadvantages of the prior art devices of this general type, which allows simple adjustment by the user of the height of presentation elements, has low inherent weight and can be used variably for a broad range of presentation systems.

[0017] The height positioning device for the presentation device of the invention has a carrier to which at least one presentation element can be fastened, and a mount to which the carrier is attached so as to be able to move between a first and a second height position. Also provided are at least one flexible traction mechanism, one end of which is fastened to the carrier or an element which can be moved with the carrier and the other end of which is fastened to the mount or an element of fixed height, and at least one deflection element around which the at least one traction mechanism is guided in the manner of a pulley. In order to hold the carrier, with the presentation elements fastened thereto, at any desired position between the first and the second height position, also provided is a pneumatic piston mechanism, to one end of which the at least one deflection element is fastened and the other end of which is supported on the mount or an element of fixed height or on the carrier or an element which can be moved with the carrier, in such a way that the piston mecha-

nism substantially compensates for a total weight of the carrier and the at least one presentation element which can be fastened thereto.

[0018] The main part of the height positioning device according to the invention is the height-adjustable carrier to which the respective positioning element(s) can be attached. The carrier provides a separation of the height positioning device and presentation element(s), thus allowing a height positioning device to be used in a variable manner for different presentation devices; this increases the flexibility of the height positioning device and reduces the production costs.

[0019] The pneumatic piston mechanism for compensating for the weight of the carrier and presentation element(s) has, compared to a counterweight in conventional devices, a relatively low inherent weight; this entails advantages in the mobility or the mounting of the presentation device as a whole and also in logistics and transportation. As the at least one traction mechanism is coupled to the piston mechanism via the at least one deflection element in the manner of a pulley, the piston mechanism has to provide, compared for example to the principle of a car jack, a greater force but a much smaller stroke; this simplifies mounting of the piston mechanism.

[0020] Preferably, precisely one piston mechanism is provided, which is preferably arranged substantially centrally in the width direction of the carrier and preferably extends substantially vertically. In principle, the use of a plurality of piston mechanisms is also possible in the height positioning device according to the invention; in this case, however, the at least two piston mechanisms must be configured in synchronization with each other and be actuated in order to move the carrier for the presentation elements in the desired manner and hold it at a height position.

[0021] In a first embodiment, (precisely) one traction mechanism is provided, which is guided between two fastening points via the at least one deflection roller of the pulley, the two fastening points being arranged substantially centrally in the width direction of the carrier.

[0022] In a second embodiment, two traction mechanisms and two parallel deflection rollers of the pulley are provided, the two traction mechanisms each being guided between two fastening points via one of the two parallel deflection rollers of the pulley, the one fastening points of the two traction mechanisms being provided on different sides of the carrier. In this embodiment, the two sides of the carrier for the presentation elements are acted on by the piston mechanism in synchronization with each other, i.e. moved and held in synchronization. Preferably, one fastening point is arranged in each case laterally of the carrier in the width direction of the carrier and the other fastening point is arranged in each case substantially centrally in the width direction of the carrier.

[0023] In one configuration of the invention, the pneumatic piston mechanism is a gas compression spring, preferably a damped gas compression spring.

[0024] In a further configuration of the invention, the at least one traction mechanism is guided in the manner of a single pulley. A single pulley achieves an optimum compromise with regard to the working stroke, the force and the costs of the pneumatic piston mechanism. Without a pulley, i.e. at a transmission ratio of 1:1, an excessively large working stroke of the piston mechanism would be required; in a double pulley, a very large force of the piston mechanism would be required.

[0025] In one configuration of the invention, the mount has a first guide element and the carrier has a second guide element which is complementary to the first guide element, so that the carrier is guided between the first and the second height position along the mount.

[0026] The mount of the height positioning device according to the invention can be mounted on a movable undercarriage or fastened to a stationary element, as desired.

[0027] In a further configuration of the invention, at least one further board element can additionally be fastened to the carrier and/or the mount of the height positioning device. The at least one further board element is preferably configured or mounted so as to be able to pivot/fold.

[0028] In particular in the case of stationary mounting of the height positioning device according to the invention, for example to a wall rail or the like, it is advantageous if at least one holding arm or the like is additionally provided on the mount and/or the carrier of the height positioning device for fastening or depositing at least one peripheral apparatus (for example a computer) of the presentation elements of the presentation device.

[0029] The at least one presentation element, which can be fastened to the carrier of the height positioning device, can for example be selected from a screen, a (preferably interactive) whiteboard, a (preferably interactive) projection board, an integrated unit consisting of a projection board and projector directed toward the projection board, a projection board and a projector which is fastened to a projector arm and directed toward the projection board, a projector and the like.

[0030] According to a further aspect, the height positioning device for a presentation device of the invention has a carrier to which at least one presentation element can be fastened, and a mount to which the carrier is attached so as to be able to move between a first and a second height position. Also provided is at least one flexible traction mechanism, one end of which is fastened to the carrier or an element which can be moved with the carrier and the other end of which is fastened to the mount or an element of fixed height, and at least one deflection element around which the at least one traction mechanism is guided in the manner of a single pulley. In order to hold the carrier, with the presentation elements fastened thereto, at any desired position between the first and the second height position, there is further provided a gas compression spring, to one end of which the at least one deflection element is fastened and the other end of which is supported on the mount or an element of fixed height or on the carrier or an element which can be moved with the carrier, in such a way that the gas compression spring substantially compensates for a total weight of the carrier and the at least one presentation element which can be fastened thereto.

[0031] Other features which are considered as characteristic for the invention are set forth in the appended claims.

[0032] Although the invention is illustrated and described herein as embodied a height positioning device for a presentation device, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

[0033] The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the follow-

ing description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0034] FIG. **1** is a diagrammatic, side view of a presentation device with a projection board and a projector, in which a height positioning device according to the invention can be used;

[0035] FIG. **2** is a diagrammatic, front view of the height positioning device according to a first exemplary embodiment of the invention, with the carrier in its lowest height position;

[0036] FIG. **3** is a diagrammatic, front view of the height positioning device from FIG. **2**, with the carrier in its highest height position;

[0037] FIG. **4** is a diagrammatic, plan view of the height positioning device from FIGS. **2** and **3**;

[0038] FIG. **5** is a diagrammatic, perspective view of the height positioning device according to a second exemplary embodiment of the invention, with the carrier in its lowest height position; and

[0039] FIG. **6** is a diagrammatic, perspective view of the height positioning device from FIG. **5**, with the carrier in its highest height position.

DETAILED DESCRIPTION OF THE INVENTION

[0040] Referring now to the figures of the drawing in detail and first, particularly, to FIG. **1** thereof, there is shown a basic structure of a mobile presentation device in which a height positioning device of the invention can be used.

[0041] The presentation device has a movable undercarriage **10** which has a plurality of foot rollers and is configured for example in the form of an item of furniture such as a shelving unit, sideboard or the like. As a result of the movable undercarriage, the presentation device can be used flexibly at various locations and it is not necessary, for example, to purchase a separate presentation device for each classroom or each conference room.

[0042] The undercarriage **10** has preferably a plurality of receptacles **12** which are for example configured in the form of a compartment or a drawer and can preferably be closed, more preferably also be locked. The receptacles **12** of the undercarriage **10** serve in particular to receive peripheral apparatuses of the presentation elements of the presentation device. The peripheral apparatuses include for example a control apparatus, a computer, a printer and the like. In the case of interactive presentation elements, further examples of peripheral apparatuses include pens, pointing apparatuses and the like for allowing the user(s) to activate a projection surface.

[0043] As indicated in FIG. **1**, one of the receptacles **12** can for example contain a stand/support for a computer, a notebook and the like, which is for example configured so as to be height-adjustable by gas compression springs. This provides the user with for example a notebook support at an optimum working height for operation.

[0044] Also accommodated in the movable undercarriage **10** are the electrical terminals for the presentation elements and the complete cable management. The electrical terminals include in particular terminals for the supply of power and the communication of the presentation elements with one another and with other apparatuses and networks. Different, and in each case a plurality of such, terminals are also preferably provided.

[0045] A height positioning device is disposed on and fastened to the undercarriage **10**. The height positioning device contains in particular a mount or supporting construction **14** and a carrier **16**. The mount **14** has, in the exemplary embodiments illustrated here, two parallel pylons or columns on which the carrier **16** is mounted so as to be able to move between a first and a second height position. The carrier **16** is substantially plate-like or frame-like in its configuration.

[0046] The present example is not limited only to the mount **14**. The mount **14** can for example also have just one pylon or more than two pylons. Other columns, props, supporting elements and the like can also be used instead of pylons.

[0047] One or more presentation elements can be fastened to the carrier **16** of the height positioning device. In the exemplary embodiment of FIG. **1**, a projection board **18**, preferably an interactive projection board, and a projection mount **20**, with the projector **22** mounted thereon, are fastened to the carrier **14**. When the projector **22** is in the operating position (solid lines in FIG. **1**), the projector **22** is located at a predetermined position above the projection board **18**.

[0048] The projector mount **20** is preferably configured so as to allow the projector to be folded downward into a non-use position (broken lines in FIG. **1**) before the projection board **18**. For this purpose, the projector mount **20** has for example a specific joint **24** or the like. In particular in the case of mobile presentation devices, it is important to protect the projector **22** when not in use and to limit the overall dimensions of the device for transportation. Thus, when the projector **22** is folded down and protected in the non-operative position, the presentation device can be moved through doors having standard dimensions and takes up less space when not in use.

[0049] In this exemplary embodiment, the presentation elements are an interactive projection board and a projector directed toward the projection board. Obviously, within the scope of the invention, other presentation elements or other combinations of presentation elements can also be fastened to the carrier **16** of the height positioning device. Examples of other possible presentation elements include a screen, a whiteboard, a projection board, an integrated unit consisting of a projection board and projector directed toward said projection board, a projector and the like.

[0050] Furthermore, the present invention is not limited to the fastening of the projector **22** via a projector arm **20** which can be folded downward. Alternatively, a rigid projector arm or a projector arm which is able to pivot laterally, i.e. about a substantially vertical axis, can also be used. Telescopic technology can also be used for the projector arm.

[0051] The height positioning device of the present invention is described here based on the example of use in a mobile presentation device in which the height positioning device is mounted on or to a mobile undercarriage. The present invention is however not limited merely to this embodiment. The height positioning device of the invention can equally be attached to a stationary element such as for example a building wall, a room partition, a cupboard element or the like. Furthermore, the height positioning device can also be mounted on or suspended from a wall rail which is fastened to one of the aforementioned stationary elements, thus allowing

the height positioning device, and therefore also the presentation device as a whole, to be laterally displaced within the wall rail.

[0052] Whereas in the exemplary embodiment of FIG. **1** of a mobile presentation device with a movable undercarriage, a plurality of receptacles, stands or the like are preferably provided on the undercarriage, this is not possible in an alternative presentation device of the invention, which can be mounted on a wall rail, a stationary element or the like. In this case, it is advantageous if there is attached to the mount **14** of the height positioning device, via which the presentation device can be suspended for example from a wall rail, an additional device, for example in the form of a pivotable and/or height-adjustable arm having a stand or an option for fastening, for example for a notebook, for activating the presentation elements **18**, **22** of the presentation device. The electrical terminals and communication connections are accordingly accommodated in the mount **14**.

[0053] A height positioning device according to a first exemplary embodiment, which is used in the presentation device illustrated in FIG. **1**, will now be described in greater detail with reference to FIGS. **2** to **4**.

[0054] As may be seen in FIGS. **2** to **4**, the mount **14** has a first guide element **36** in the form of a substantially vertically extending guide rail and the carrier **16** is provided with a plurality of running rollers **34** as a second guide element. The first and the second guide elements **34**, **36** are not limited to this combination of guide rail and running rollers; two guide rails, running one inside the other, can for example also be provided. The two guide elements must merely fit each other, i.e. be configured and/or arranged so as to be complementary to each other.

[0055] The height positioning device has furthermore a pneumatic piston mechanism in the form of a gas compression spring **26**, preferably a damped gas compression spring. In the exemplary embodiment of FIGS. **2** and **4**, one gas compression spring **26** is arranged substantially centrally in the width direction of the height positioning device (right-to-left direction in FIGS. **2** to **4**). In this case, a piston rod **27** of the gas compression spring **26** is retracted in the lowest height position of the carrier **16** (FIG. **2**) and extended in its highest height position (FIG. **3**).

[0056] The lower end of the gas compression spring **26** is supported against an angle bracket **30** which, in the case of the mobile presentation device, can be fastened to the mount **14** or to the undercarriage **10**. In the case of stationary mounting of the presentation device, the angle bracket **30** is fastened for example to the mount **14** or a building wall. The angle bracket **30** is generally fastened to an element of fixed height, i.e. it does not move along with the carrier when the carrier moves in the vertical direction. The angle bracket **30** also forms a fastening point for an end of a traction mechanism.

[0057] A deflection roller **28** is attached to the other end (at the top in FIG. **2** and **3**) of the gas compression spring **26**. The lower end of the carrier **16** is also coupled to the piston rod **27** of the gas compression spring **26**, so that the piston rod **27** is extended when the carrier **16** slides upward and retracted when the carrier **16** slides downward. A second fastening point **32** for the traction mechanism is also provided in the region of this coupling.

[0058] A flexible traction mechanism (not shown in FIG. **2** to **4**), for example a cable-type, belt-type or chain-type traction mechanism, runs between the first fastening point of fixed height on the angle bracket **30** of the gas compression spring **26** and the second fastening point **32**, which move along with the carrier **16**, via the deflection roller **28**. This forms a single pulley in which the stroke of the gas compression spring **26** or the piston rod **27** thereof is transmitted at a transmission ratio of 1:2 to the vertical displacement of the carrier **16**.

[0059] The gas compression spring **26** is configured or adjusted in such a way that its spring force substantially compensates for the total weight force of the carrier **16** and the presentation elements **18**, **22** fastened thereto and also the mounting devices **20**, **24** thereof. The carrier **16** can thus easily be continuously displaced by the user between its two height end positions, and the desired height position is then securely maintained by the gas compression spring **26**.

[0060] Although, owing to the pulley principle, a greater spring force of the gas compression spring **26** is required to compensate for the total weight of the carrier **16** and presentation elements **18** to **24**, a gas compression spring **26** having a smaller stroke is sufficient; overall, this offers a significant advantage in terms of overall space.

[0061] As may be seen in FIG. **4**, a cover **15** is also preferably arranged on the side of the carrier **16** that is remote from the protection board **18**, so that the gas compression spring **26**, the deflection roller **28** and the traction mechanism are not visible and not accessible to the user in order to provide an attractive visual appearance and to minimize the risk of injury to the user.

[0062] A second exemplary embodiment of a height positioning device of the invention will now be described in greater detail with reference to FIGS. **5** and **6**. In this case, like components are denoted by the same reference numerals as in the first exemplary embodiment and will for the most part not be described again in depth hereinafter.

[0063] FIG. **5** shows the carrier **16** of the height positioning device in its lowest height end position and FIG. **6** shows the carrier in its highest height end position. As in the foregoing first exemplary embodiment, one or more presentation elements can again be fastened to the carrier **16**. In addition, the height positioning device can also be mounted to or on a movable undercarriage or to a stationary element (building wall, cupboard, etc.), as desired.

[0064] The second exemplary embodiment of the height positioning device differs from the height positioning device illustrated in FIGS. **2** to **4** in terms of synchronous supporting of the carrier **16** on its two sides. Owing to this synchronous supporting of the two sides of the carrier, less stringent requirements are placed on the first and second guide elements **34**, **36** of the mount **14** and carrier **16**, as the vertical movement of the carrier between its two height end positions is carried out without tilting the carrier **16**.

[0065] The height positioning device has, as illustrated in FIGS. **5** and **6**, for this purpose a pneumatic piston mechanism **26** in the form of a gas compression spring, preferably a damped gas compression spring, which, as in the first exemplary embodiment, is arranged substantially centrally in the width direction of the carrier **16** (right-to-left direction in FIGS. **5** and **6**) and extends substantially vertically. The gas compression spring **26** is positioned in such a way that its piston rod **27** protrudes downward and is retracted in the lowest height position of the carrier **16** (FIG. **5**) and extended in the highest height position of the carrier **16** (FIG. **6**).

[0066] The gas compression spring **26** is supported at its lower end, i.e. by its piston rod **27**, on a support block **31** which is attached to the carrier **16** (or if appropriate to another

element moving with the carrier **16**). The support block **31** serves at the same time as a fastening point for the two traction mechanisms **40**, **42** to be described hereinafter.

[0067] The sleeve of the gas compression spring is guided on a, for example rail-type, guide **38** which is fixed to the carrier **16**. Two deflection rollers **28**, which are preferably arranged parallel to each other on a common axis of rotation, are provided at the upper end of the gas compression spring **26**, i.e. at its end remote from the piston rod **27**.

[0068] Two further (second) deflection rollers **44**, which are also preferably arranged parallel to each other on a common axis of rotation, are integrated into the support block **31** on the carrier **16**. Two third deflection rollers **46** are each provided on one side of the carrier **16**, and two further fastening points **48** for the traction mechanisms **40**, **42** are each arranged on one side on the mount **14** at a level above the third deflection rollers **46** in the highest height position of the carrier **16**.

[0069] A first traction mechanism **40** extends from the first fastening point on the support block **31** upward to one of the two deflection rollers **28**, where it is deflected through 180° and is guided back down to one of the two second deflection rollers **44**, thus forming a single pulley. From the second deflection roller **44**, the first traction mechanism **40** is guided substantially through about **900** to one side (toward the right in FIG. **5** and **6**) of the carrier **16**, where it loops around the third deflection roller **46** substantially through about 90°. From the third deflection roller **46**, the first traction mechanism **40** extends upward to the second fastening point **46** on one side (on the right in FIGS. **5** and **6**) of the mount **14** of the height positioning device.

[0070] Similarly, a second flexible traction mechanism **42** extends from the first fastening point on the support block **31** upward to the other first deflection roller **28** of the single pulley, from there downward to the other second deflection roller **44**, from there onward to the other side (toward the left in FIGS. **5** and **6**) of the other carrier **16** up to the other third deflection roller **46**, and from there finally upward to the second fastening point **48** at the other side (on the left in FIG. **5** and **6**) on the mount **16**.

[0071] If the carrier **16** (with the presentation elements fastened thereto) is moved upward starting from its lowest height position in FIG. **5**, this shortens the distance of the traction mechanism **40**, **42** from the fastening point **48** of fixed height on the mount **16** to the second deflection roller **44** in the support block **31**. In order to compensate for this, the distance between the support block **31** and the first deflection roller **28** of the pulley is lengthened by extending the piston rod **27** of the gas compression spring **26** by half the aforementioned change in distance. The functioning during lowering of the carrier **16** is similar in an inverted manner.

[0072] Each of the two traction mechanisms **40**, **42** supports or holds one of the two sides of the carrier **16**, so that synchronous height positioning takes place, this requiring merely a central gas compression spring **26**. Even if the user engages on one side the carrier **16** or the projection board **18** fastened thereto for adjusting the height, the carrier **16** as a whole having this structure is moved upward uniformly without tilting. In principle, it would also be conceivable to arrange a respective gas compression spring **26** on both sides of the carrier **16**. Nevertheless, the use of two gas compression springs **26** would increase the overall costs of the height positioning device.

[0073] A gas compression spring, which is arranged substantially centrally in the width direction of the device and extends substantially vertically, is provided in each of the above-described exemplary embodiments. The present invention is however not limited to this embodiment. As mentioned hereinbefore, the provision of a plurality of gas compression springs is in principle also conceivable, although this does increase the overall costs of the height positioning device. Furthermore, one gas compression spring does not have to be arranged centrally or the, if appropriate, plurality of gas compression springs do not have to be arranged symmetrically to the center. Likewise, it is not absolutely essential for the gas compression spring(s) to extend vertically; it/they can for example also be mounted at an angle to the vertical. The desired movement of the carrier and, in particular, its synchronous movement of the right and left sides in the vertical direction are caused in all cases by the traction mechanisms (arrangement, length, fastening points) and also the guide elements.

[0074] FIGS. **5** and **6** also show two mounting struts **13** of the mount **14** that can be used to fasten the height positioning device according to the invention on a movable undercarriage **10** (see FIG. **1**) or the like. If, on the other hand, the presentation device is intended to be able to be suspended, for example, from a wall rail or the like, these mounting struts **13** at the lower end of the mount **14** are dispensed with and corresponding fastening devices are provided instead in the upper region of the mount **14**.

[0075] The height positioning device of the invention for a presentation device can therefore be used, with simple and minimal conversion, as a mobile device, for example on a movable undercarriage, or as a stationary device or a device which can be moved to a defined extent, for example on a wall rail, as desired. The basic structure of the height positioning device according to the invention does not have to be modified for this purpose; the height positioning device according to the invention for a presentation device is distinguished by its options for universal use.

[0076] In the above-described exemplary embodiments, a respective (preferably interactive) projection board **18** is fastened to the height-adjustable carrier **16** of the height positioning device according to the invention. Optionally, still further board elements can also be attached to the height positioning device or the presentation device of the invention.

[0077] Further board elements of this type are for example configured as conventional writing boards or magnet boards and can be positioned to the right of, to the left of, below and/or above the projection board **18**. Preferably, the height of these further board elements is adjusted together with the projection board. For this purpose, the further board elements can for example be mounted on the projection board **18** itself or—as a stabler solution—on the height-displaceable carrier **16**. The profiles, illustrated for example in FIG. **4**, of the mount **14** and carrier **16** can easily be adapted so as to allow the mounting of further board elements.

[0078] In addition, the further board elements are preferably configured so as to be able to pivot or fastened to the carrier **16** or projection board **18**. In the case of mounting on the right or left side of the projection board **18**, the further board elements can for example pivot about a vertical axis, thus allowing them to be folded before the projection board **18**.

1. A height positioning device for a presentation device, the height positioning device comprising:

a carrier for fastening to at least one presentation element;

a mount attach to said carrier so as to be able to move said carrier between a first and a second height position;

at least one flexible traction mechanism having a first end fastened to one of said carrier and an element which can be moved with said carrier and a second end fastened to one of said mount and an element of fixed height;

at least one deflection element around which said at least one flexible traction mechanism is guided in a manner of a pulley; and

a pneumatic piston mechanism having a first end fastened to said at least one deflection element and a second end supported on one of said mount, the element of fixed height, on said carrier, and on the element which can be moved with said carrier, such that said pneumatic piston mechanism substantially compensates for a total weight of said carrier and the at least one presentation element which can be fastened thereto to hold said carrier at any desired position between the first and the second height positions.

2. The height positioning device according to claim **1**, wherein precisely one said pneumatic piston mechanism is provided.

3. The height positioning device according to claim **1**, wherein:

said deflection element being said pulley has at least one deflection roller;

said carrier having two fastening points being disposed substantially centrally in a width direction of said carrier; and

precisely one said flexible traction mechanism is provided, and is guided between said two fastening points via said at least one deflection roller of said pulley.

4. The height positioning device according to claim **1**, wherein:

said carrier having fastening points;

said flexible traction mechanism is one of two traction mechanisms; and

said deflection element being said pulley has two parallel deflection rollers, said two traction mechanisms each being guided between said fastening points via one of said two parallel deflection rollers, one of said fastening points for said two traction mechanisms being provided on different sides of said carrier.

5. The height positioning device according to claim **1**, wherein said pneumatic piston mechanism is a gas compression spring.

6. The height positioning device according to claim **1**, wherein said at least one flexible traction mechanism is guided in a manner of a single pulley.

7. The height positioning device according to claim **1**, wherein said mount has a first guide element and said carrier has a second guide element which is complementary to said first guide element, so that said carrier is guided between the first and the second height positions along said mount.

8. The height positioning device according to claim **1**, further comprising a movable undercarriage and said mount is mounted on said movable undercarriage.

9. The height positioning device according to claim **1**, wherein said mount can be mounted on a stationary element.

10. The height positioning device according to claim **1**, wherein at least one further board element is fastened to at least one of said carrier and said mount.

11. The height positioning device according to claim **1**, further comprising at least one means disposed on at least one of said mount and said carrier for fastening or depositing at least one peripheral apparatus of the presentation element of the presentation device.

12. The height positioning device according to claim **1**, wherein the at least one presentation element is selected from the group consisting of a screen, a whiteboard, a projection board, an integrated unit having a projection board and a projector directed toward the projection board, a projection board, a projector fastened to a projector arm and directed toward the projection board, and a projector.

13. The height positioning device according to claim **5**, wherein said gas compression spring is a damped gas compression spring.

14. A height positioning device for a presentation device, the height positioning device comprising:

a mount;

a carrier for fastening at least one presentation element, said carrier attached to said mount so as to be able to move between a first and a second height position;

at least one flexible traction mechanism having a first end fastened to one of said carrier and an element which can be moved with said carrier and a second end fastened to one of said mount and an element of fixed height;

at least one deflection element around which said at least one flexible traction mechanism is guided in a manner of a single pulley; and

a gas compression spring having a first end fastened to said at least one deflection element and a second end supported on one of said mount, the element of fixed height, on said carrier, and on the element which can be moved with said carrier, such that said gas compression spring substantially compensates for a total weight of said carrier and the at least one presentation element which can be fastened thereto to hold said carrier at any desired position between the first and the second height position.

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