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(54) **DEVICE FOR CREATING SPACES IN AN ELEVATOR PIT AND OVERHEAD FOR THE EXECUTION OF MAINTENANCE WORK IN CONDITIONS OF SAFETY**

VORRICHTUNG ZUR ERZEUGUNG VON RÄUMEN IN EINEM AUFZUGSSCHACHT SOWIE ÜBER DER KABINE ZUR AUSFÜHRUNG VON WARTUNGSARBEITEN UNTER SICHEREN BEDINGUNGEN

DISPOSITIF POUR MÉNAGER DES ESPACES DÉGAGÉS DANS UNE FOSSE D'ASCENSEUR ET EN TÊTE DE CAGE POUR L'EXÉCUTION DE TRAVAUX DE MAINTENANCE DANS DES CONDITIONS DE SÉCURITÉ

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(56) References cited:
EP-A1- 0 725 033 WO-A2-97/23399
US-A1- 2004 251 086 US-A1- 2006 042 883

EP 2 488 435 B1

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Description

Field of application of the invention

[0001] The present invention relates to safety in the field of elevators and, in particular, to a device for creating temporary spaces, in the pit and overhead of the hoistway, where maintenance work can be carried out in conditions of safety.

Review of the known art

[0002] A good example of the known art is given in EP 0 725 033 A.

[0003] In the field of hoisting means, especially of elevators, the question of safety for passengers and for technical staff engaged on maintenance is of primary importance and many are the regulations in force for this purpose. These rules establish the main technical features of the elevator system and the values associated to the chief variables. Technical staff encounter the greatest risks when they have to work in the hoistway of the elevator. It is well known that the highest and lowest levels reached by the cabin do not coincide with the roof or with the bottom of the hoistway, but allow for permanent safety spaces, both between the roof of the cabin and the upper wall of the hoistway called the "overhead" and similarly below, called the "pit", where work can be carried out after the cabin has been moved to some stopping point between floor levels.

[0004] Continuous technical progress in the field has led to a considerable reduction in the vertical bulk of elevator systems in buildings, such as to include the motor, winch and operating apparatus in a compact form now contained in the hoistway to avoid the need for a separate "engine room". This reduction is particularly useful in cases where a new elevator has to be installed in an existing building, so that the above regulations are not fully applicable.

[0005] On a point of information, norm EN 81-21 specifically concerns installation of new elevators in existing buildings.

[0006] Problems of safety are clearly increased by derogation of the law for elevator systems where spaces in the pit and/or overhead cannot be created in a permanent manner. The invention now to be described particularly relates to safety in the pit and/or overhead, to which the present art mentioned corresponds.

[0007] Present regulations categorically exclude the possibility of a maintenance worker taking with him the means for creating temporary safety spaces. These must be provided in the hoistway and must be operated from outside either automatically or manually.

[0008] **Figure 1** illustrates a known device for positioning the safety strut inside the pit of an elevator hoistway. Figure 1 shows a pillar 1 resting on the bottom of a pit 2, sideways in relation to the ledge 3 of the car sling 4 of an elevator cabin (not shown). Lower down on the pillar

1 is a shock-absorber 5 constrained to the elevator guide rail (on the part not visible in the figure) that extends down to ground level. The upper part of the pillar 1 supports an electromechanical device comprising a bracket-shaped balancing bar 6 with a shorter arm 6a hinged to a horizontal pin 7, and a longer arm 6b that forms the actual strut itself. The pin 7 is in proximity to a plate 8 that limits rotation towards the pit of arm 6a to a very small angle. The device includes an electromechanical actuator 9 connected to the longer arm 6b to control its inclination. Starting from the idle (or inactive) position of arm 6b when vertically aligned (dashed line), the working (or active) position of said arm 6b is reached by inclining it towards the inside of the pit 2. In that position the cabin-car sling unit rests against the free end of arm 6b, whose working position is such as to interfere with cabin travel. This device is defective because, for sustaining the weight of the cabin, there is only a limited leaning surface due to laterality of the strut, but chiefly because the greater part of the load is borne by the hinge 6a, 7. In the event of a particularly strong impact, the hinge 6a, 7 might break causing detachment of the balancing bar 6 which would fall into the pit and become ineffective, or the hinge connection might bend and be unable to sustain the weight above it. In either case the maintenance technician would inevitably suffer serious injury.

Summary of the invention

[0009] Purpose of the present invention is to overcome the above drawbacks.

[0010] To do this, subject of the invention is a device for creating temporary spaces in an elevator hoistway to ensure that maintenance work can be done in conditions of safety, comprising means for positioning a strut, in the pit and/or in the overhead of said hoistway, joinable to the vertical guide rail of the cabin or to a wall of the hoistway, said means being operable and controllable from outside the elevator hoistway, and wherein according to the invention, said means for positioning the strut include:

- a pin connected to a longitudinal wall of said guide rail by connecting means interposed between the pin and said longitudinal wall, in such a way as to keep the pin vertical;
- at least one arm to pivot round said pin, there being at the free end of said arm a seat through which a hole is bored for vertical insertion of the strut;
- elastic means acting between the upper end of the strut and said seat at the free end of the pivotal arm, said elastic means opposing the weight of the strut only, keeping it raised above the bottom of the pit or separated from the upper wall of the overhead when not loaded, the length of the strut being such that, when loaded, it rests on the bottom of the pit or against the upper wall of the overhead, so creating a space where work can be done in safety, as described in claim 1.

[0011] Further characteristics of the present invention considered innovative are described in the dependent claims.

[0012] In one form of realizing the invention, valid for elevators fitted with counterweights, the safety space in the overhead is created by placing said device in the pit and fixing it to a vertical guide rail of the counterweight so as to intercept the counterweight when the cabin reaches the limit of said safety space in the overhead.

[0013] In one form of realizing the invention, a second pivoting arm, of a shape preferably the same as that of the first arm, is rigidly joined to the first arm in its vertical position at a previously set distance, the second arm comprising at its free end a second seat bored through for vertical insertion of the strut, to improve its stability when loaded.

[0014] In one form of realizing the invention, the pivoting arm forms part of a substantially C-shaped bracket which, when the strut is inactive, includes a section of the vertical guide rail for sliding the cabin. This conformation of the arm simplifies application of electromagnetic means to lock the strut in its inactive position.

[0015] In the form for realizing the invention with two brackets, these are rigidly joined at their two ends, one below the other, each rigidly connected to a respective end of a tubular element.

[0016] Before proceeding with the description, it must be stated that the expression an inactive or idle position signifies a position of the strut that allows the cabin (or the counterweight) to slide alongside said strut without interference. The expression active or operative position signifies a position of the strut that would prevent the cabin (or counterweight) from descending below the level established by the strut's own length, as this would cause the cabin-car sling unit to rest on the head of the strut.

[0017] When the strut assumes an active position a distinction must be made between the condition of the strut 'without load', namely when the car sling does not make contact with the head of the strut, and the condition of the strut when 'loaded' with the weight of the cabin (or counterweight).

[0018] Therefore, according to one aspect of the invention, when the strut reaches the active or the inactive position, a respective electrical contact will either close or open.

[0019] According to one aspect of the invention, the strut is fitted at one of its ends with a shock-absorbing element to decelerate the cabin, or the counterweight, at the moment of impact.

[0020] According to one aspect of the invention, said means for positioning the strut include elastic means, such as a helical spring (that acts as a retaining pin) to oppose externally controlled rotation of said pivoting arm towards the inactive position of the strut.

[0021] According to one aspect of the invention, the means for positioning the strut include means for locking it in the inactive position. Advantageously said means can include an electromagnet.

[0022] According to one aspect of the invention, movement of the strut from the inactive to the active position is done manually by means of cords, as well as moving it from the active to the inactive position.

[0023] According to one aspect of the invention, the strut is moved from its inactive to its active position is done by means of an electromechanical actuator which also serves to move it from the active to the inactive position.

[0024] According to one aspect of the invention, the strut is move manually from its inactive to its active position by means of cords, while an electromechanical actuator moves it from its active to its inactive position.

[0025] According to one aspect of the invention, the strut is moved from its inactive to its active position by an electromechanical actuator, and manually from its active to its inactive position by means of cords.

[0026] According to one aspect of the invention, strut movement in one direction or the other may also be obtained by the force of gravity, for example by a weight transmitted by a cord.

Advantages of the invention

[0027] Compared with the known art previously discussed, the invention offers considerable advantages.

[0028] As the safety strut, in its active position, rests vertically on the ground and the cabin car sling (or the counterweight) rests on the strut, the entire weight from above is discharged directly onto the ground without affecting any mechanical parts belonging to the kinematic means for positioning said strut.

[0029] This greatly simplifies decisions on the size of the cross section of the strut, according to the type of system where it will be installed.

[0030] The head of the strut can be larger than is strictly necessary; all that is needed is to lengthen the arms not hinged to the brackets in order to move the strut farther away from the guide rail of the cabin. This is possible because the brackets rotate on a horizontal plane that does not affect the length of the strut, but could not be done with the device as conceived by the known art, where moving the strut to a more central position would also have meant exceeding the minimum height of the pit.

Short description of the figures

[0031] Further purposes and advantages of the present invention will be clear from the following detailed description of an example of its realization and by the attached drawings provided solely for explanatory reasons in no way limitative, wherein:

- **Figure 1** is a side view of a device from the known art, for creating temporary spaces in the pit for carrying out maintenance work in the hoistway of the elevator in conditions of safety;
- **Figure 2** is front and side view in perspective of a

device, according to the present invention for creating temporary spaces where maintenance work can be executed in safety in the pit or in the overhead of the elevator hoistway, placed in the pit showing a strut in its active position but not loaded with the weight of the cabin;

- **Figure 2A** is an exploded view of a detail in Figure 2;
- **Figure 3** is a view in perspective that differs from that in Figure 2 in that the strut is loaded with the cabin;
- **Figure 4** is a view in perspective of the device in Figure 2 showing the strut in its inactive position;
- **Figure 5** is a view in perspective that shows the rear side of the device in **Figure 4**;
- **Figures 5A** and **5B** show enlarged details from Figure 5.

Detailed description of some preferred forms of realizing the invention

[0032] In the following description elements that appear in different figures may be marked with the same symbols. In describing a figure reference may be made to parts not expressly shown in that figure but in preceding ones. Scale and proportions of the various elements shown do not necessarily correspond to reality.

[0033] **Figure 2** shows a device 10 fixed to the wall of one guide rail 11 of the two that extend throughout the entire hoistway of an elevator to maintain vertical alignment of the cabin in its upward and downward movement. The end of the guide rail 11 is firmly fixed to the bottom 12 of the hoistway in the part known as the pit. Along the guide rail 11 the lower part of a car sling 13 can be seen that supports the frame of an elevator cabin (not shown), A flat ledge 14 is fixed a short distance above the end of the car sling 13. The device 10 comprises two special three-armed brackets, 15 and 16 aligned one below the other and more clearly seen in Figure 2A. **Figure 2A** shows the substantially C-shaped bracket 15 with a first curving arm 15a, joined at 90° to a second arm 15b from which a third arm. 15c branches off at 90° opposite to arm 15a. Bracket 16 possesses a similar set of arms 16a, 16b and 16c. The curved arms 15a and 16a of the two brackets 15 and 16 are joined at their ends by a tubular element 17 into which is inserted a pin 18 supported at the two ends by two short bored shelves 19, 20 connected to the wall of the vertical guide rail 11. Pin 18 stands vertically and acts as a hinge for rotation of the two brackets joined together. The arms 15b and 16b of the two brackets are joined by a vertical handle 21 placed at the angle with the third arms 15c and 16c. Arm 15c of the bracket 15 supports a small plate 22 in which is a square central hole 23 through which passes the safety strut 26, whose cross section is also square (figure 2). Similarly, arm 16c of the bracket 16 supports a plate 24 in which there is a square central hole 25 for passage of the strut safety 26. The centres of the two holes 23 and 25 are vertically aligned and keep the strut 26 stable in its vertical

position. The strut can obviously be of a shape different from the parallelepiped form seen in the figure; for example it could be cylindrical in which case the holes 23 and 25 would be circular. The bored plates 22 and 24 are made from a single sheet of metal 22a with a double 90° bend at the two ends.

[0034] Returning to Figure 2 it will be seen that at the top of the safety strut 26 there is a plate 27 matched by a collar 28 fixed to the strut 26 at some distance 26a from the upper plate 27. The collar 28 is made from a plate similar to plate 27, with a central hole in it through which the strut 26 passes and is fixed. A helical spring 29 includes the upper end of the strut 26 comprised between the collar 28 and upper plate 22. An electromagnet 30 is connected to the wall of the vertical slide rail 11, matched (as shown in Figure 5) by a magnet 31 connected to an extension 32 of the handle 21. On the plate 22 is a contact 33 to control the active position of the strut 26. There is also a similar contact to control the inactive position of the strut but this is not shown in the Figure. From the functional aspect, the positioning device 10 in Figure 2 corresponds in this conformation to the active position of the strut 26 but is not loaded by the weight of the cabin. Here the strut 26 is aligned with the ledge 14, and detached from it; The weak spring 29 is not compressed and when fully extended keeps the strut 26 detached from the ground 12. As will be explained below, the device 10 includes a spring that automatically ensures that the active position is reached when the lock for the inactive position is removed from the outside of the hoistway. This lock is worked by the electromagnet 30 on the ferromagnetic disk (or magnet) 31. When the electromagnet 30 is de-energised, the actuator of rotation overcomes the force exerted by residual magnetism and causes the two brackets, 15 and 16, to rotate at 90° towards the inside of the pit. Contact 33 is closed to inform the control centre that the strut 26 has reached its active position. When device 10 is in the conformation shown, the maintenance worker can enter the pit.

[0035] The active conformation of the device 10 in **Figure 3** differs from the preceding one only because the strut 26 is now loaded with the weight of the car sling 13 and of the cabin, indicated by the arrow 34. As shown, the weak spring 29 is compressed, the strut 26 rests on the bottom of the pit 12, its length being suitable for keeping the cabin at a distance of safety.

[0036] **Figure 4** shows the device 10 in the inactive conformation of the strut 26. It will be seen that the actuator, that controls rotation of the brackets 15 and 16, has completed a rotation of 90° towards the outside of the pit, moving the strut 26 away from vertical of interception by the ledge 14 and causing the opposing magnetic disc 31 to match with the electromagnet 30. This latter is therefore energised locking the strut 26 in the inactive position. The magnetic locking device is better seen in **Figure 5B**. The electric contact that controls the inactive position (not shown) is closed confirming that this position has been reached; the electric contact 33

(not shown) controlling the active position is, however, open. The helical spring 29 is decompressed and the strut 26, raised above the ground 12, is out of line with the ledge 14 of the car sling 13.

[0037] Figure 5 shows the rear side of the device 10 in Figure 4 in the inactive conformation. It will be seen from the figure that brackets 15, 16 are hinged on the pin 18 by means of tubular element 17. A further look at Figure 5A, shows the hinged end of the curved arm 16a of the lower bracket 16 is connected to the shaft of a rotation actuator 40, typically a small DC geared-down electric motor connected to the wall of the guide rail 11 and parallel to it. The above end also comprises an eyehole 41 for fixing a cord in case manual operation is required. A spring 42, acting as a retaining pin, is wound round the tubular element 17, with the two ends of the spring placed respectively against the wall of the guide rail 11 and the end of the arm 16a, for automatic return of brackets 15 and 16 to the active position of strut 26 should the electromagnet 30 be no longer energised. In the conformation seen in the figure, the spring 42 is kept compressed by the electromagnetic device 30 and 31 for locking the strut 26 in the inactive position, more clearly seen in Figure 5B where the contact for electric feed 43 is visible.

[0038] In the case of elevators with a counterweight, the same device as in the preceding figures can clearly be placed in the pit in order to intercept movement of the counterweight, also stopping the cabin and creating a safety space in the overhead.

[0039] It is also clear that, apart from some small changes, the same device can be positioned in the overhead, stopping the cabin in its upward movement and creating there a place for working in safety.

Claims

1. Safety device (10) for creating temporary spaces in an elevator hoistway to ensure that maintenance work can be done in conditions of safety, comprising means for positioning a strut (26), in the pit and/or in the overhead of said hoistway, joinable to the vertical guide-rail (11) of the cabin, or to a wall of the hoistway, said means being operable and controllable from outside the elevator hoistway, **characterized in that** said means for positioning the strut include:
 - a pin (18) connected to a longitudinal wall of said guide rail (11) by connecting means (19, 20) interposed between the pin (18) and said longitudinal wall in such a way as to keep the pin (18) vertical;
 - at least one arm (15) to pivot round said pin, there being at the free end of said arm a seat (22) through which a hole (23) is bored for vertical insertion of the strut (26);
 - elastic means (29) acting between the upper

end (27) of the strut and said seat (22) at the free end of the pivotal arm (15), said elastic means opposing the weight of the strut (26) only, keeping it raised above the bottom (12) of the pit, or separated from the upper wall of the overhead when not loaded, the length of the strut (26) being such that, when loaded, it rests on the bottom of the pit or against the upper wall of the overhead, so creating a space where work can be done in safety.

2. Device as in claim 1, **characterized in that** said pivotal arm (15) is part of an approximately C-shaped bracket that, when the strut (26) is in the inactive position, includes a section of the vertical guide-rail (11) of the cabin.
3. Device as in claim 2, **characterized in that** said means for positioning the strut include a second pivotal arm (16) preferably shaped exactly like the first arm (15), the brackets formed by the two pivotal arms (15, 16) opposed, one to another, each rigidly connected to a respective end or a tubular element (17), the second pivotal arm (16) comprising at its free end a second bored seat (24) for vertical insertion of the strut (26), all of which improves the stability of the vertical position of the strut when loaded.
4. Device as in claim 1, **characterized in that** the positioning means of the strut include elastic means placed between said pin (18) and said guide-rail (11) to oppose rotation of the pivotal arm (15) towards the inactive position of the strut (26).
5. Device as in claim 1, **characterized in that** said means for positioning the strut (26) include means (30, 31) for locking it in the inactive position.
6. Device as in claim 5, **characterized in that** said means (30, 31) for locking the strut (26) in the inactive position include an electromagnet.
7. Device as in claim 1, **characterized in that** said means for positioning the strut (26) include cords workable by hand from a distance to move it from the inactive to the active position, and vice versa.
8. Device as in claim 1, **characterized in that** said means for positioning the strut (26) include an electro-mechanical actuator (40) to move it from the inactive to the active position, and vice versa.
9. Device as in claim 1, **characterized in that** said means for positioning the strut (26) include cords workable by hand to move said strut (26) from the inactive to the active position, and an electro-mechanical actuator (40) for moving it from the active to the inactive position.

10. Device as in claim 1, **characterized in that** said means for positioning the strut (26) include an electro-mechanical actuator (40) to move strut (26) from the inactive position to the active position, and cords workable by hand to move it from the active to the inactive position. 5
11. Device as in claim 1, **characterized in that** said means for positioning the strut (26) include electric contacts (33) closed and opened mechanically to signal when strut (26) has reached its active or inactive position. 10
12. Device as in claim 1, **characterized in that** it is so placed in the pit to intercept the counterweight, thus creating the space for working safely in the overhead above the cabin. 15
13. Device as in claim 1, **characterized in that** the strut (26) is fitted at one end with a shock-absorbing element to decelerate the cabin at the moment of impact. 20

Patentansprüche 25

1. Schutzvorrichtung (10) um temporäre Räume in einer Bahn des Schachts eines Aufzuges zu schaffen, um sicherzustellen, dass Wartungsarbeiten unter Sicherheitsbedingungen durchgeführt werden können, die Mittel zum Positionieren einer Strebe (26) im Schacht und in dem oberen Teil der besagten Bahn des Schachts aufweist, mit der Möglichkeit, mit der vertikalen Führungsschiene (11) der Kabine oder an einer Wand der Bahn des Schachts in Verbindung zu kommen, wobei die besagten Mittel von außen mit Bezug auf die Bahn des Schachts des Aufzuges betätigbar und steuerbar sind, **dadurch gekennzeichnet, dass** die besagten zum Positionieren der Strebe verwendeten Mittel umfassen: 30
- einen mit einer länglichen Wand der besagten Führungsschiene (11) durch Verbindungsmittel (19, 20) verbundener Stift (18), die zwischen dem Stift (18) und der besagten länglichen Wand so zwischengeschaltet sind, dass sie den Stift (18) in einer senkrechten Lage halten; 45
 - mindestens einen um dem besagten Stift drehenden Arm (15), wobei bei dem freien Ende des besagten Arms eine Aufnahme (22) vorhanden ist, durch die eine Bohrung (23) für die vertikale Einführung der Strebe (26) eingearbeitet wird; 50
 - elastische zwischen dem oberen Ende (27) der Strebe und der besagten Aufnahme (22) bei dem freien Ende des drehenden Arms wirkende Mittel, wobei die besagten elastische Mittel nur das Gewicht der Strebe (26) derart tragen, dass 55

sie erhöht über dem Boden (12) des Schachts von denen gehalten oder von der oberen Wand der oberen Schiene getrennt wird, wenn er nicht geladen wird, wobei die Länge der Strebe (26) so bemessen ist dass sie wenn geladen auf dem Boden des Schachts oder der oberen Wand der oberen Schiene derart aufliegt, dass sie einen Raum schafft, wo die Arbeit mit Sicherheit getan werden kann.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der besagte drehbare Arm (15) ein Teil eines im Wesentlichen C-förmigen Bügels ist, der wenn die Strebe (26) sich in einer inaktiven Lage befindet, ein Teil der senkrechten Führungsschiene (11) der Kabine umfasst. 10
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** die besagten zum Positionieren der Strebe verwendeten Mittel einen zweiten drehenden Arm umfassen (16), dessen Gestalt vorzugsweise gleich deren des ersten Arms (15) ist, wobei die von den zwei drehenden Armen (15, 16) gebildeten Bügel entgegengesetzt zueinander sind, wobei jeder mit einem entsprechenden Ende oder einem rohrförmigen Glied (17) fest verbunden ist, der zweite drehende Arm (16) bei seinem freien Ende eine zweite durchbohrte Aufnahme (24) für die vertikale Einführung der Strebe (26) umfasst, wobei alle die Stabilität der vertikalen Lage der Strebe verbessern, wenn diese geladen wird. 20
4. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Positionierungsmittel der Strebe elastische Mittel umfassen, die zwischen dem besagten Stift (18) und der besagten Führungsschiene (11) derart angeordnet sind, dass sie eine Drehung des drehenden Arms (15) gegen die inaktive Lage der Strebe (26) unterbinden. 35
5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die besagten Positionierungsmittel der Strebe (26) Mittel (30, 31) umfassen, um es in der inaktiven Lage zu blockieren. 40
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die besagten Mittel (30, 31) zum Blockieren der Strebe (26) in ihrer Inaktivstellung einen Elektromagneten umfassen. 45
7. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die besagten Mittel zum Positionieren der Strebe (26) von Hand betätigbare Schnüre umfassen, die derart entfernt sind, dass sie die Strebe von der inaktiven zur aktiven Lage bewegen, und umgekehrt. 50
8. Vorrichtung nach Anspruch 1, **dadurch gekenn-** 55

zeichnet, dass die besagten Mittel zum Positionieren der Strebe (26) einen elektromechanischen Aktuator (40) umfassen, um ihn von einer inaktiven zu einer aktiven Lage zu bewegen, und umgekehrt.

9. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die besagten Mittel zum Positionieren der Strebe (26) von Hand betätigbare Schnüre umfassen, um die besagte Strebe (26) von der inaktiven zu der aktiven Lage zu bewegen, und einen elektro-mechanischen Aktuator (40), um sie von der aktiven zu der inaktiven Lage zu bewegen.
10. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die besagten Mittel zum Positionieren der Strebe (26) einen elektro-mechanischen Aktuator (40) umfassen, um die Strebe (26) von der inaktiven zu der aktiven Lage zu bewegen, und von Hand betätigbare Schnüre umfassen, um sie von der aktiven zu der inaktiven Lage zu bewegen.
11. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die besagten Mittel zum Positionieren der Strebe (26) elektrische Kontakte (33) umfassen, die mechanisch geschlossen und geöffnet werden um zu signalisieren wenn die Strebe (26) seine aktive oder inaktive Lage erreicht hat.
12. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie derart im Schacht angeordnet ist, dass sie das Gegengewicht derart abfängt, dass sie einen Raum schafft, um mit Sicherheit im Raum über der Kabine zu arbeiten.
13. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Strebe (26) auf einem Ende einen Dämpfungsglied aufweist, um die Kabine im Moment eines Aufpralls zu verzögern.

Revendications

1. Dispositif de sécurité (10) pour la création d'espaces temporaires dans une cage d'ascenseur pour faire en sorte qu'un travail de manutention soit fait dans des conditions de sécurité, comprenant des moyens pour positionner un étai (26) dans la fosse et/ou au dessus de ladite cage d'ascenseur, s'assemblant sur le rail de guidage vertical (11) de la cabine, ou à une paroi de la cage d'ascenseur, lesdits moyens pouvant être actionnés et commandés de l'extérieur de la cage d'ascenseur, **caractérisé en ce que** lesdits moyens pour positionner l'étai comprennent :
- un pivot (18) connecté à une paroi longitudinale dudit rail de guidage (11) par des moyens de moyens de connexion (19, 20) interposés entre le pivot (18) et ladite paroi longitudinale, de telle

manière à maintenir le pivot (18) vertical ;

- au moins un bras (15) pour pivoter autour ledit pivot, à l'extrémité libre dudit bras étant formé un siège (22) à travers duquel un trou (23) est percé pour une insertion verticale de l'étai (26) ;

- des moyens élastiques (29) agissant entre l'extrémité supérieure (27) de l'étai et ledit siège (22) à l'extrémité libre du bras pivotant (15), lesdits moyens élastiques s'opposant seulement au poids de l'étai (26), en manière de le maintenir soulevé au dessus du fond (12) de la fosse, ou séparé de la paroi supérieure de la cage d'ascenseur quand il n'est pas chargé, la longueur de l'étai (26) étant telle que, une fois chargé, il s'appuie sur le fond de la fosse ou contre la paroi supérieure de la cage d'ascenseur, pour créer une espace où le travail peut être fait en sécurité.

2. Dispositif selon la revendication 1, **caractérisé en ce que** ledit bras pivotant est une partie d'un support approximativement en forme de C qui, quand l'étai (26) se trouve dans une position inactive, comprend une section du rail de guidage (11) vertical de la cabine.
3. Dispositif selon la revendication 2, **caractérisé en ce que** lesdits moyens pour le positionnement de l'étai comprennent un deuxième bras pivotant (16) de préférence en forme exactement comme le premier bras (15), les supports étant formés par les deux bras pivotants (15, 16) opposés, l'un à l'autre, chacun rigidement connecté à une respective extrémité ou à un élément tubulaire (17), le deuxième bras pivotant (16) comprenant à son extrémité libre une deuxième siège percée (24) pour une insertion verticale de l'étai (26), tout ce qui améliore la stabilité de la position verticale du support quand il est chargé.
4. Dispositif selon la revendication 1, **caractérisé en ce que** les moyen de positionnement de l'étai comprennent des moyens élastiques placés entre ledit pivot (18) et ledit rail de guidage (11) pour empêcher une rotation du bras pivotant (15) vers la position inactive de l'étai.
5. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens de positionnement de l'étai (26) comprennent des moyens (30, 31) pour le bloquer dans la position inactive.
6. Dispositif selon la revendication 5, **caractérisé en ce que** lesdits moyens (30, 31) pour bloquer l'étai (26) dans la position inactive comprennent un électro-aimant.
7. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens pour le positionnement de

l'étai (26) comprennent des cordons réalisables à la main à partir d'une distance pour le déplacer de la position inactive à la position active, et vice-versa.

8. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens pour le positionnement de l'étai (26) comprennent un actionneur électromécanique (40) pou le déplacer da la position inactive à la position active, et vice-versa. 5
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9. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens pour le positionnement de l'étai (26) comprennent des cordons réalisables à la main pou déplacer ledit étai (26) de la position inactive à la position active, et un actionneur électromécanique (40) pour le déplacer de la position active à la position inactive. 15
10. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens pour le positionnement de l'étai (26) comprennent un actionneur électromécanique (40) pour déplacer l'étai (26) de la position inactive à la position active, et des cordons réalisables à la main pour le déplacer de la position active à la position inactive. 20
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11. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens pour le positionnement de l'étai (26) comprennent des contacts électriques (33) fermés et ouverts mécaniquement pour signaler quand l'étai (26) a atteint sa position active ou inactive. 30
12. Dispositif selon la revendication 1, **caractérisé en ce qu'il** est placé dans le puis pour intercepter le contrepoids, créant ainsi l'espace pour travailler en toute sécurité dans la tête au dessus de la cabine. 35
13. Dispositif selon la revendication 1, **caractérisé en ce que** l'étai (26) est monté à une extrémité avec un élément d'amortissement pour décélérer la cabine au moment d'un impact. 40

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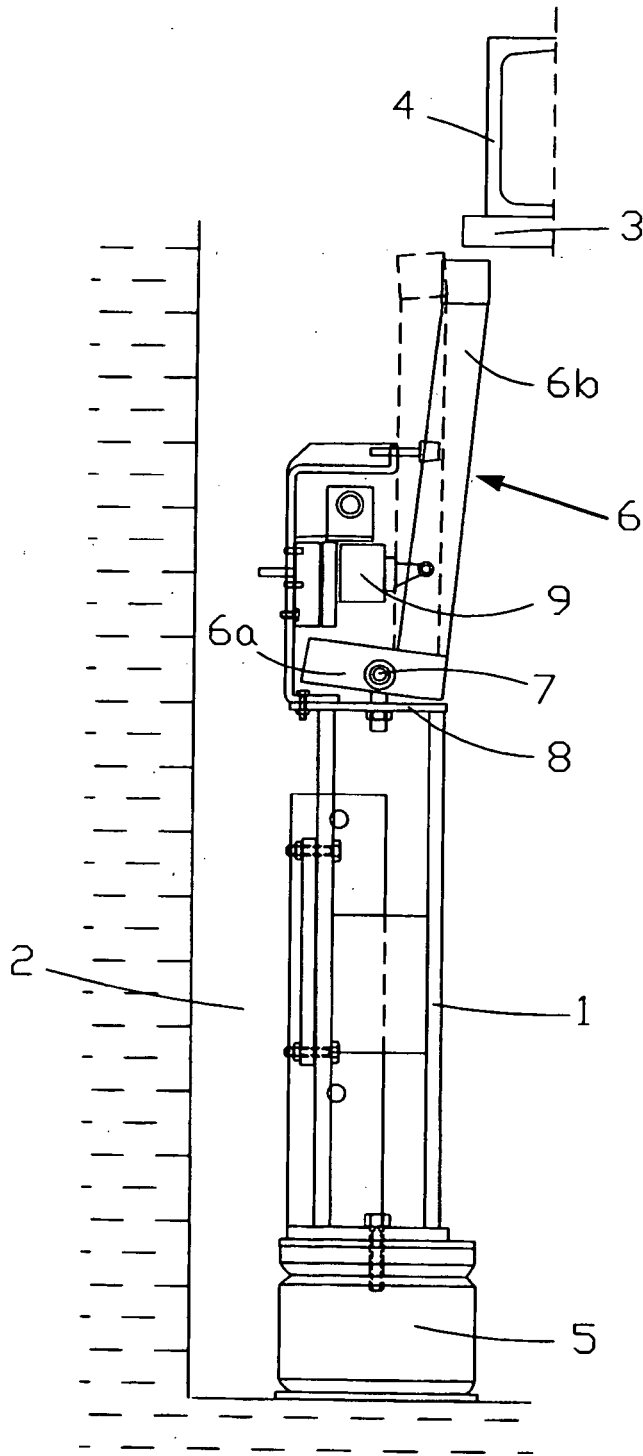


FIG. 1

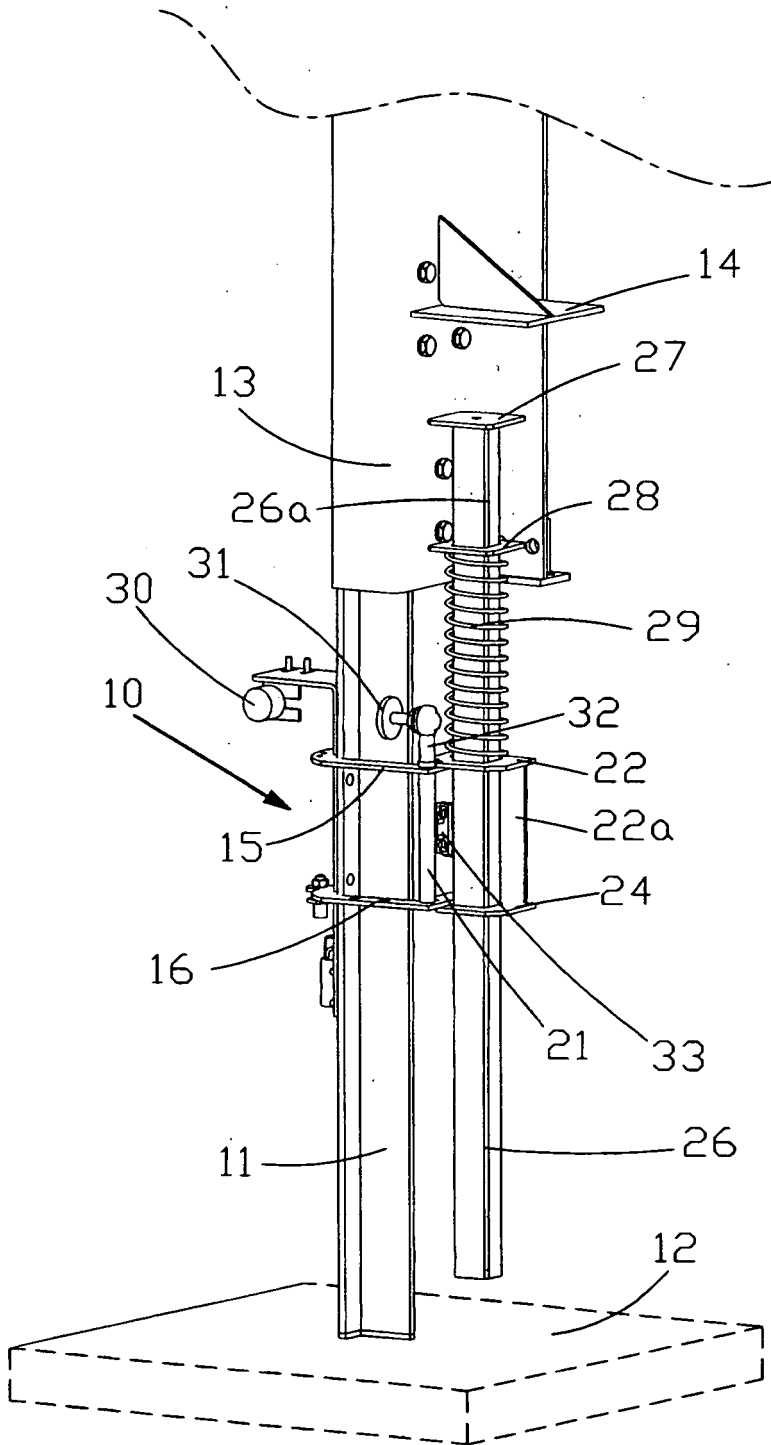


FIG. 2

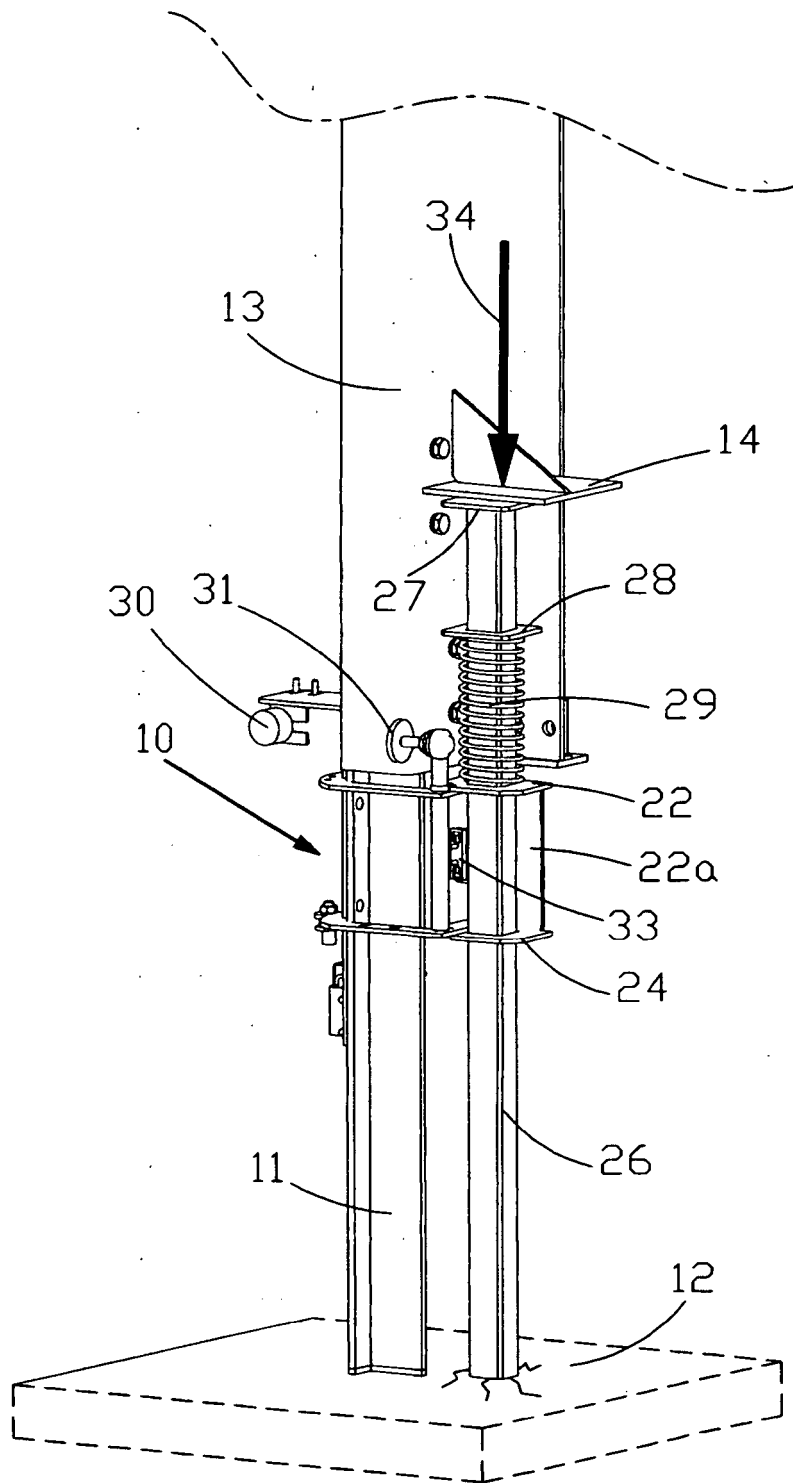


FIG. 3

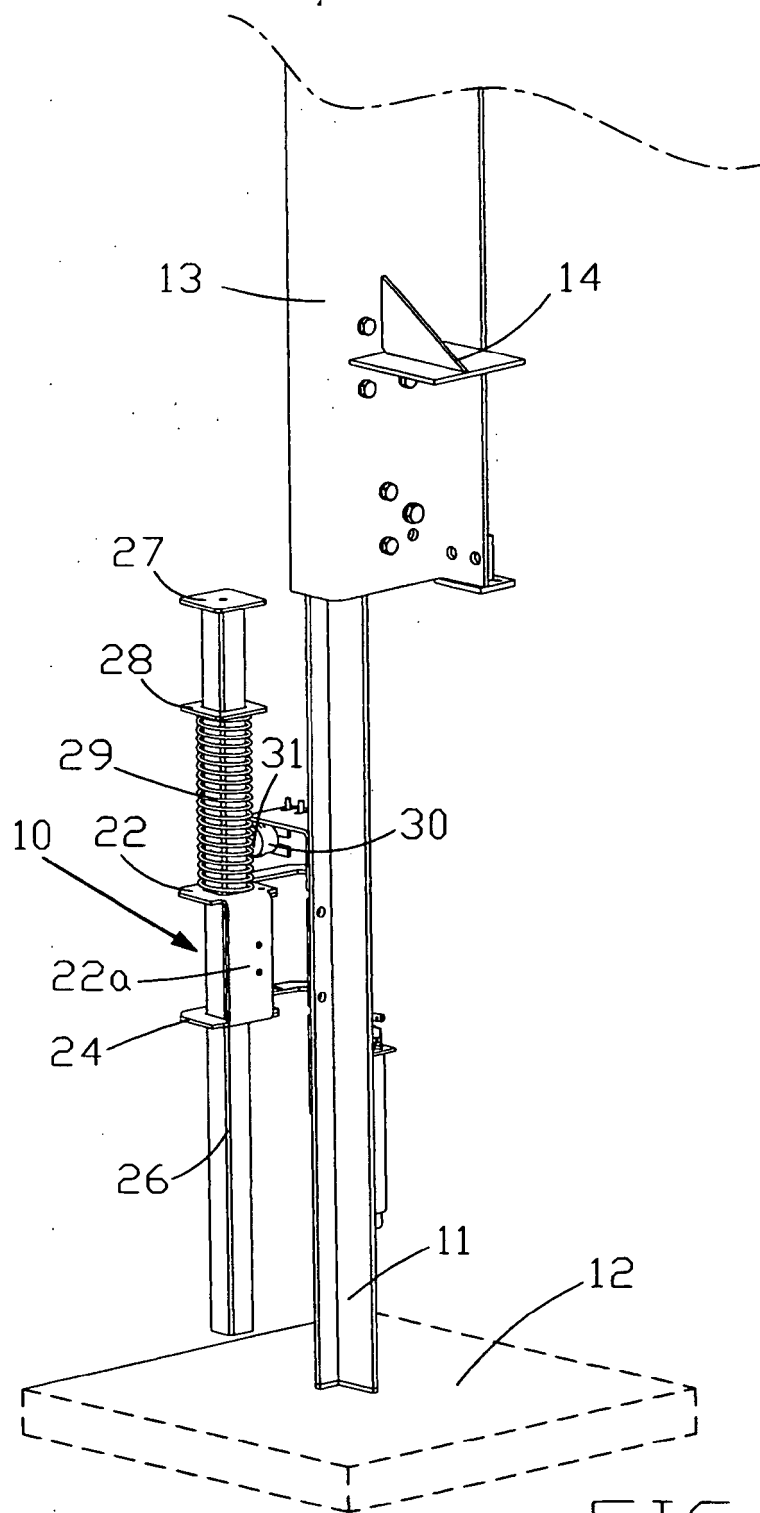


FIG. 4

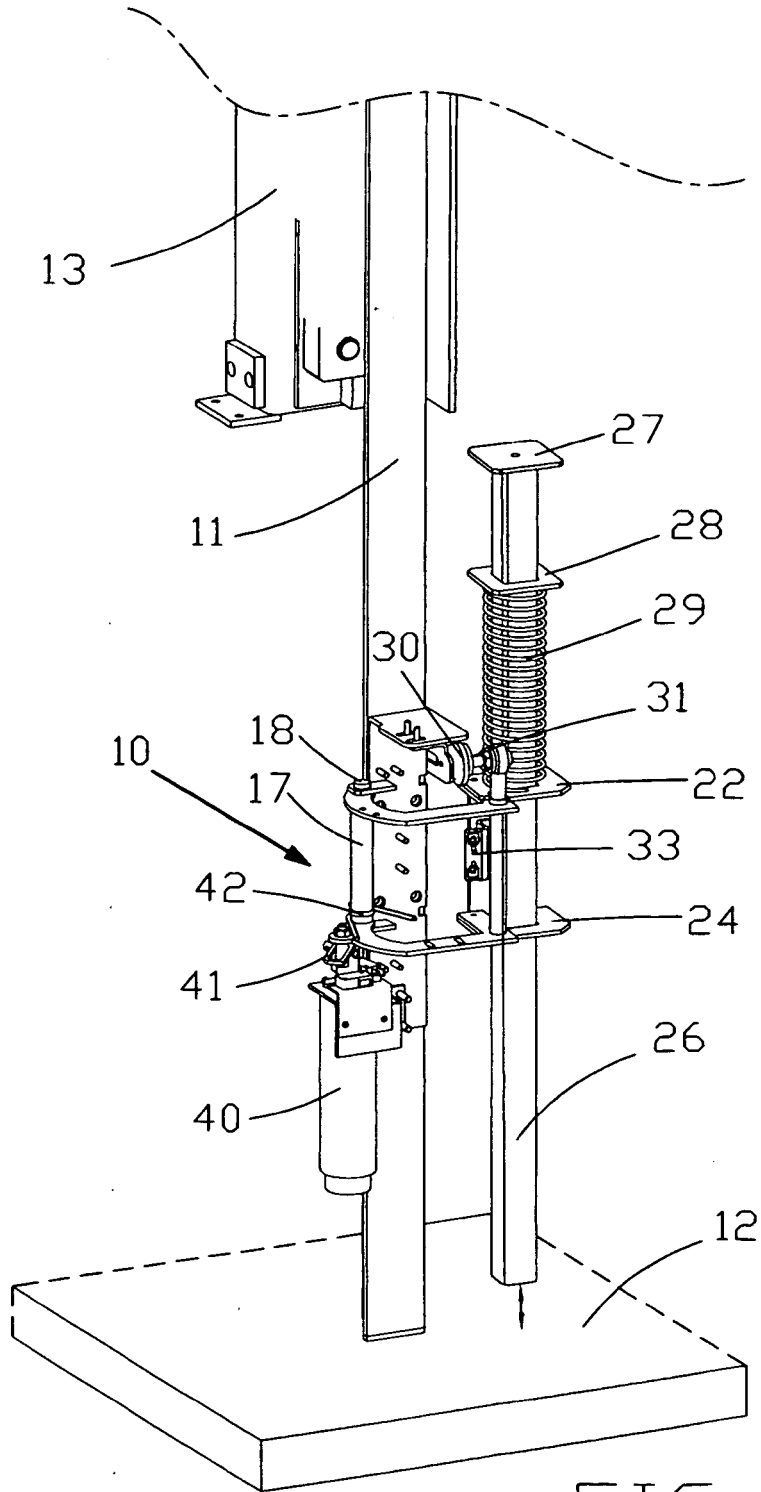


FIG. 5

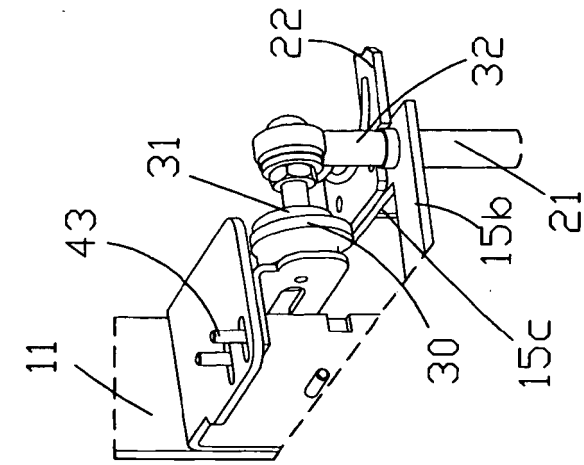


FIG. 5B

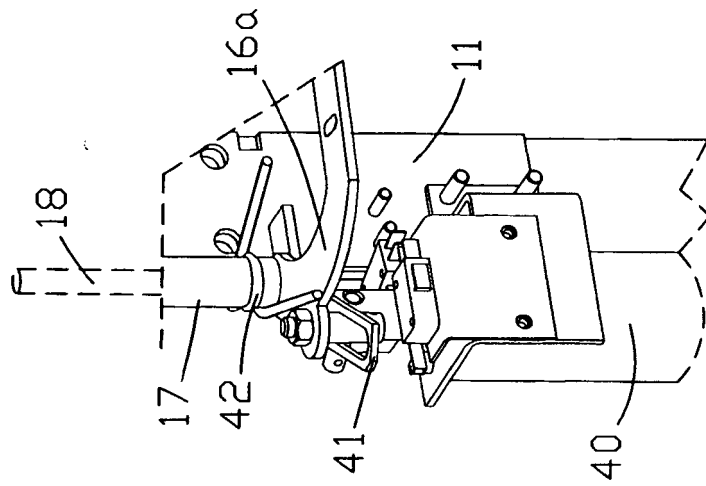


FIG. 5A

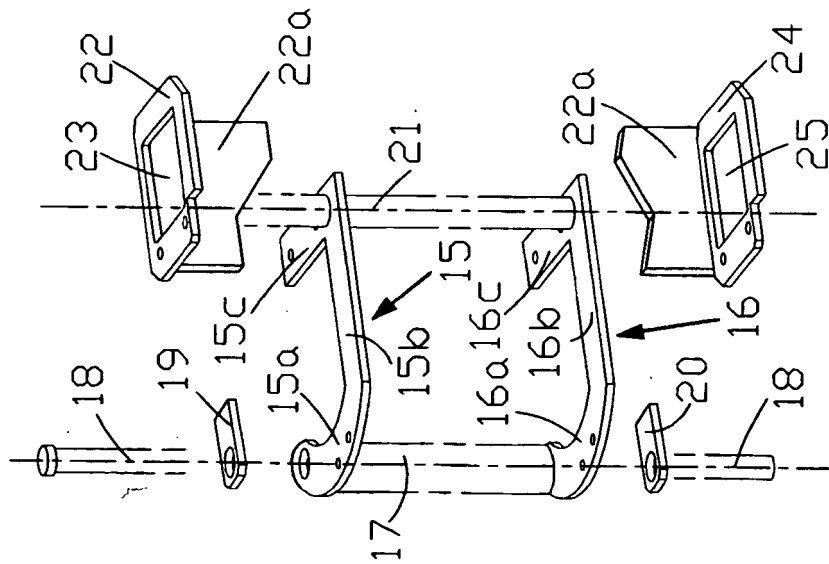


FIG. 2A

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0725033 A [0002]