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(54) **HOISTING DEVICE AND HOISTING ELEMENT**

HEBEVORRICHTUNG UND HEBEELEMENT

DISPOSITIF DE LEVAGE ET ELEMENT DE LEVAGE

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Description

[0001] The present invention relates to a hoisting device as defined in the preamble of claim 1.

[0002] Practically all theatres and other stages are equipped with such a hoisting device which usually comprises a large number of hoisting elements, simply referred to as battens, for the purpose of receiving scenery backdrops and other stage fixtures and optionally changing them during a performance. In addition to sets and other pieces of scenery, such stage fixtures also include in this context for instance spotlights, loudspeakers and other items of a more technical nature for the purpose of giving a performance added value.

[0003] The European patent application EP 671.195 gives an example of such a hoisting device which is applied for lowering and raising a piece of scenery or similar load. The lifting means comprise a number of lines which are operated simultaneously using a motor provided for the purpose and which thus form a group of lines. The term 'lines' should be interpreted broadly here and, in addition to ropes and cables, can for instance also comprise chains as in this known device, depending on the intended hoisting load. The group of lines is fastened on the free end at regular distances to a hoisting element in the form of an elongate rod or a closed assembly to which the piece of scenery or the like can in turn be connected.

[0004] Further FR-A-2 687 328 discloses an example of a hoisting device.

[0005] In theatres the vertical cables from which the stage fixture to be lifted is suspended are normally guided to a side of the stage on a so-called fly loft. Here the cables are brought together per group of lines and fastened to a vertically moving mechanism which is usually hand-operated. A number of such constructions in a row are normally referred to as a hoist wall. In an effort to create increasingly larger scale and spectacular productions, the number of fixtures and pieces of scenery that has to be changed during a performance is also increasing. The changes not infrequently have to take place here while the performance is progressing, so that a lot of time not usually will be available for this purpose. Increasing use is therefore being made of motorized operation of the hoist wall, whereby pieces of scenery can be raised and lowered in a short time. The speed at which this has to take place, and in particular the accelerations and decelerations thereby exerted in the lifting device, results in exceptionally great loads, particularly on the hoisting element which carries the stage fixture but which is not usually designed to withstand such forces.

[0006] The present invention has for its object, among others, to provide a hoisting device of the type stated in the preamble with a hoisting element which, while retaining its functionality, is able to withstand such an increased dynamic load resulting from a motorized driving.

[0007] In order to achieve the desired objective a hoisting device of the type stated in the preamble has the feature according to the invention that the hoisting element comprises a profile assembly of at least two elongate profiles which are substantially parallel to each other and which are mutually connected by at least one rigid intermediate body, wherein a first of the two profiles is coupled to the group of lines and a second of the two profiles is adapted to receive the at least one stage fixture thereon, and that the profiles are adapted on their outer end for coupling to a corresponding profile of a further profile assembly. By thus making use of an assembly of at least two profiles which are mutually coupled, the requirements the hoisting element must meet can be extended over the individual profiles. The first profile is herein adapted to the desired dynamic load which the hoisting element has to be able to withstand, while the second profile fulfills the hanging function and is adapted to enable easy coupling of pieces of scenery and other stage fixtures. Because the profiles are adapted on their outer end for coupling to a corresponding profile of a further profile assembly, it is possible to extend the hoisting element to any desired length by making use of one or more standard length dimensions.

[0008] In a preferred embodiment the hoisting device according to the invention is characterized in that the first profile has a substantially rectangular cross-section and the second profile a substantially round cross-section. The second profile with a round cross-section is herein adapted to generally applied fastening hooks and clips with which stage fixtures such as spotlights and loudspeakers are usually equipped and which grip round the hoisting element. The existing functionality of a conventional hoisting element is thus preserved. Conversely, the first profile has a rectangular cross-section in order to provide a greater bending strength and is thereby geared to withstand high dynamic loads during rapid deceleration and acceleration of the whole.

[0009] In a particular embodiment the hoisting device according to the invention has the feature that the at least one intermediate body comprises a number of separate intermediate members. By thus making use of separate rods instead of a continuous connection, an exceptionally light unit is achieved while retaining strength and which also has advantages in respect of weight-saving as well as from an aesthetic viewpoint.

[0010] In a further preferred embodiment the hoisting device according to the invention is characterized in that the first profile comprises on a side remote from the second profile a guide slot for receiving displaceably therein at least one fastening member for a hoisting line of the group of lines. By thus making use of a guide slot for receiving therein the fastening member of a line, the hoisting element can be manufactured and applied in a standard embodiment without having to take into account the specific positions and numbers of the lines in an actual theatre arrangement. The fastening members of the lines are placed easily in the slot and then guided to the desired position.

[0011] Backdrops are not infrequently tied releasably or otherwise tied fixedly to the hoisting element, which

requires much manual work. So as to avoid this a further preferred embodiment of the hoisting device according to the invention has the feature that the second profile comprises on a side remote from the first profile a guide slot for receiving displaceably therein at least one fastening member of a backdrop.

[0012] Conventional curtain runners or other guides are for instance used here as fastening members on the backdrop so that as a result this backdrop can travel or slide as a curtain in the slot of the second profile.

[0013] For an easy mounting a further embodiment of the hoisting device according to the invention is characterized in that both profiles of the assembly are provided on sides directed toward each other with a recess in which an outer end of an intermediate body is received and fixed. Separate intermediate members can thus be placed in the profiles at the desired positions and fixed there. For fixing purposes use can for instance be made of a bayonet fitting or threaded connection so that welding work can be dispensed with and the whole unit can optionally be disassembled again. A further preferred embodiment of the hoisting device according to the invention herein has the feature that the recess in at least one of the two profiles comprises a longitudinal slot. A close-fitting nut can for instance be placed in such a slot so as to be connected at the intended location to an outer thread provided for this purpose on the outer end of the intermediate body. The intermediate body can thus be screwed fixedly into the profile at the desired location. The inner walls of the slot avoid co-rotation of the nut. By applying oppositely rotating threaded connections in the two profiles a simultaneous connection can thus be made to the two profiles.

[0014] The invention also relates to a hoisting element for use in the hoisting device according to the invention and will now be further elucidated with reference to an embodiment and an associated drawing, in which:

figure 1 shows a perspective view of a part of an embodiment of a hoisting device with a hoisting element according to the invention.

[0015] The figure is otherwise schematic and not drawn to scale. For the sake of clarity some dimensions in particular are exaggerated to a greater or lesser extent. Corresponding parts are designated as far as possible in the figure with the same reference numeral.

[0016] Figure 1 shows a part of an embodiment of a hoisting device according to the invention. The hoisting device here comprises lifting means (not shown) which are normally motorized and with which a group of one or more lines 5 can be drawn in or, conversely, payed out. Fastened to one end of lines 5 is a hoisting element 10 to which can be fixed a piece of scenery or one or more other stage fixtures. These stage fixtures can thus be raised or lowered with the hoisting element and optionally interchanged during a performance. A professional theatre usually has many such hoisting elements arranged successively in order to meet the ever increasing need to be able to change many pieces of scenery during a performance and moreover enable the deployment of a large number of spotlights, loudspeakers and other items of a more technical nature.

[0017] According to the invention the hoisting element 10 comprises a profile assembly of at least two elongate and substantially parallel profiles 11, 12 mutually connected by at least one rigid intermediate body 13. A first of the two profiles 11 herein has a substantially rectangular cross-section and is hereby designed to be able to withstand a dynamic load exerted thereon during rapid lowering and raising of the hoisting element. Conversely, a second of the two profiles 12 has a substantially round cross-section so as to fit standard couplings for spotlights and loudspeakers which usually grip round the hoisting element with a round hook or clip.

[0018] The first profile 11 is provided on its side remote from the second profile 12 with a guide slot 14 for receiving displaceably therein a number of fastening members 15. These fastening members 15 are pushed in guide slot 14 to the desired position and there coupled to a line 15 of the group of lines. If desired, the fastening members are fixed in this position.

[0019] The second profile 12 is also equipped with a guide slot 16 on its side remote from the first profile 11. Fastening members, such as for instance curtain runners, provided for this purpose on a backdrop can be received displaceably in this slot 16, so that a piece of scenery provided therewith can slide like a curtain in the hoisting element.

[0020] In this embodiment the two profiles are provided in the sides directed toward each other with a recess for receiving therein an outer end of an intermediate body 13 which is fixed therein for the purpose of the desired mutual connection of the two profiles 11, 12. In this embodiment the recess is embodied in both profiles 11, 12 as a continuous guide slot 17, 18. Herein slide nuts which are guided to the desired locations, where the intermediate bodies are screwed fixedly therein. The intermediate bodies are provided for this purpose on their outer end with a mating outer thread which takes an oppositely rotating form on either side. The threaded ends eventually clamp against a bottom of slot 17, 18 and are thus fixed in this position.

[0021] In practice a hoisting element can have a length in the order of 15-25 metres, depending on the actual stage width in the theatre or the width of another stage. Such a span is realized according to the invention by mutually coupling to the desired length a number of profile assemblies of one or more standard lengths. To this end the hoisting elements according to the invention are adapted on their outer end to enable such a coupling. In this embodiment the first profile 11 takes a hollow form in order to receive close-fittingly therein a connecting piece (not shown) of complementary form. This connecting piece protrudes as a result into both the hoisting elements for connecting and is secured therein. Instead of

separate connecting pieces, use can also be made of hoisting elements which are widened on one of the two ends so as to receive close-fittingly therein an opposite end of a further hoisting element.

[0022] Although the invention has been further elucidated above with reference to only a single embodiment, it will be apparent that the invention is by no means limited thereto. On the contrary, many other variations and embodiments are possible for a skilled person without him being required to depart from the scope of the invention as defined by the apendent claims.

Claims

1. Hoisting device comprising lifting means for taking in and paying out at least one group of lines (5) with at least one elongate hoisting element (10) on a free outer end of said lines, which hoisting element is adapted to receive at least one stage fixture thereon, the hoisting element comprises a profile assembly of at least two elongate profiles (11, 12) which are substantially parallel to each other and which are mutually connected by at least one rigid intermediate body (13), wherein a first (11) of the two profiles is coupled to the group of lines and a second (12) of the two profiles is adapted to, in use, receive the at least one stage fixture thereon, **characterized in that** the profiles are adapted on their outer end for coupling to a corresponding profile of a further profile assembly.

2. Hoisting device as claimed in claim 1, **characterized in that** the first profile (11) has a substantially rectangular cross-section and the second profile (12) a substantially round cross-section.

3. Hoisting device as claimed in claim 1 or 2, **characterized in that** the at least one intermediate body (13) comprises a number of separate intermediate members.

4. Hoisting device as claimed in one or more of the foregoing claims, **characterized in that** the first profile comprises on a side remote from the second profile a guide slot (14) for receiving, in use, displaceably therein at least one fastening member for a hoisting line of the group of lines.

5. Hoisting device as claimed in one or more of the foregoing claims, **characterized in that** the second profile comprises on a side remote from the first profile a guide slot (16) for receiving displaceably therein at least one fastening member of a backdrop.

6. Hoisting device as claimed in one or more of the foregoing claims, **characterized in that** both profiles of the assembly are provided on sides directed toward each other with a recess (17) in which an outer end of the intermediate body (13) is received and fixed.

7. Hoisting device as claimed in claim 6, **characterized in that** the recess (17) in at least one of the two profiles comprises a longitudinal slot.

8. Hoisting device as claimed in one or more of the foregoing claims, **characterized in that** the hoisting element (10) comprises a number of sets of first and second profiles (11, 12) which are coupled to each other in a lengthwise direction.

9. Hoisting device as claimed in one or more of the foregoing claims, in combination with at least one further hoisting element (10).

Patentansprüche

1. Hebevorrichtung mit Anhebemitteln, um mindestens eine Gruppe von Leinen (5) aufzunehmen und abzulassen, mit mindestens einem länglichen Hebeelement (10) an einem freien äußeren Ende der Leinen, wobei das Hebeelement dazu eingerichtet ist, mindestens eine Bühnenbefestigung daran aufzunehmen, wobei das Hebeelement eine Profilanordnung mit mindestens zwei länglichen Profilen (11, 12) aufweist, die im Wesentlichen parallel zueinander verlaufen und miteinander durch mindestens einen starren Zwischenkörper (13) verbunden sind, wobei ein erstes (11) der zwei Profile an die Gruppe von Leinen gekuppelt ist, und ein zweites (12) der zwei Profile dazu eingerichtet ist, daran mindestens eine Bühnenbefestigung aufzunehmen, **dadurch gekennzeichnet, dass** die Profile an ihren äußeren Enden dazu eingerichtet sind, mit einem entsprechenden Profil einer weiteren Profilanordnung gekuppelt zu werden.

2. Hebevorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das erste Profil (11) einen im Wesentlichen rechtwinkligen Querschnitt aufweist, und dass das zweite Profil (12) einen im Wesentlichen runden Querschnitt aufweist.

3. Hebevorrichtung gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der mindestens eine Zwischenkörper (13) eine Anzahl einzelner Zwischenstücke aufweist.

4. Hebevorrichtung gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Profil an einer von dem zweiten Profil abgelegenen Seite einen Führungsschlitz (14) aufweist, um darin im Einsatz mindestens ein Befestigungsglied für eine Hebeleine aus der

Gruppe von Leinen auf verstellbare Weise aufzunehmen.

5. Hebevorrichtung gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das zweite Profil auf einer von dem ersten Profil abgelegenen Seite einen Führungsschlitz (16) aufweist, um darin auf verstellbare Weise mindestens ein Befestigungsglied einer Kulisse aufzunehmen.

6. Hebevorrichtung gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** beide Profile der Anordnung an einander zugewandten Seiten eine Aussparung (17) aufweisen, in welcher ein äußeres Ende des Zwischenkörpers (13) aufgenommen und fixiert ist.

7. Hebevorrichtung gemäß Anspruch 6, **dadurch gekennzeichnet, dass** die Aussparung (17) in mindestens einem der zwei Profile einen Längsschlitz aufweist.

8. Hebevorrichtung gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Hebeelement (10) eine Anzahl von Sätzen an ersten und zweiten Profilen (11, 12) aufweist, welche in Längsrichtung miteinander gekuppelt sind.

9. Hebevorrichtung gemäß einem oder mehreren der vorhergehenden Ansprüche, in Kombination mit mindestens einem weiteren Hebeelement (10).

Revendications

1. Dispositif de levage comprenant des moyens de levage pour enrouler et dévider au moins un groupe de lignes (5) avec au moins un élément de levage allongé (10) sur une extrémité externe libre desdites lignes, lequel élément de levage est adapté pour recevoir au moins une installation scénique sur celui-ci, l'élément de levage comprend un ensemble de profilés d'au moins deux profilés allongés (11, 12) qui sont sensiblement parallèles entre eux et qui sont mutuellement raccordés par au moins un corps intermédiaire rigide (13), dans lequel un premier (11) des deux profilés est couplé au groupe de lignes et un second (12) des deux profilés est adapté pour recevoir (à l'usage) la au moins une installation scénique sur celui-ci, **caractérisé en ce que** les profilés sont adaptés au niveau de leur extrémité externe pour se coupler à un profilé correspondant d'un autre ensemble de profilés.

2. Dispositif de levage selon la revendication 1, **caractérisé en ce que** le premier profilé (11) a une section transversale sensiblement rectangulaire et le second profilé (12) a une section transversale sensiblement ronde.

3. Dispositif de levage selon la revendication 1 ou 2, **caractérisé en ce que** le au moins un corps intermédiaire (13) comprend un certain nombre d'éléments intermédiaires séparés.

4. Dispositif de levage selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** le premier profilé comprend, sur un côté éloigné du second profilé, une fente de guidage (14), pour recevoir (à l'usage) de manière déplaçable à l'intérieur de celle-ci, au moins un élément de fixation pour une ligne de levage du groupe de lignes.

5. Dispositif de levage selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** le second profilé comprend sur un côté éloigné du premier profilé, une fente de guidage (16) pour recevoir de manière déplaçable à l'intérieur de celle-ci, au moins un élément de fixation d'une toile de fond.

6. Dispositif de levage selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** les deux profilés de l'ensemble sont prévus sur des côtés dirigés l'un vers l'autre, avec un évidement (17) dans lequel une extrémité externe du corps intermédiaire (13) est reçue et fixée.

7. Dispositif de levage selon la revendication 6, **caractérisé en ce que** l'évidement (17) dans au moins l'un des deux profilés comprend une fente longitudinale.

8. Dispositif de levage selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** l'élément de levage (10) comprend un certain nombre d'ensembles de premier et second profilés (11, 12) qui sont couplés entre eux dans une direction suivant le sens de la longueur.

9. Dispositif de levage selon une ou plusieurs des revendications précédentes, en combinaison avec au moins un autre élément de levage (10).

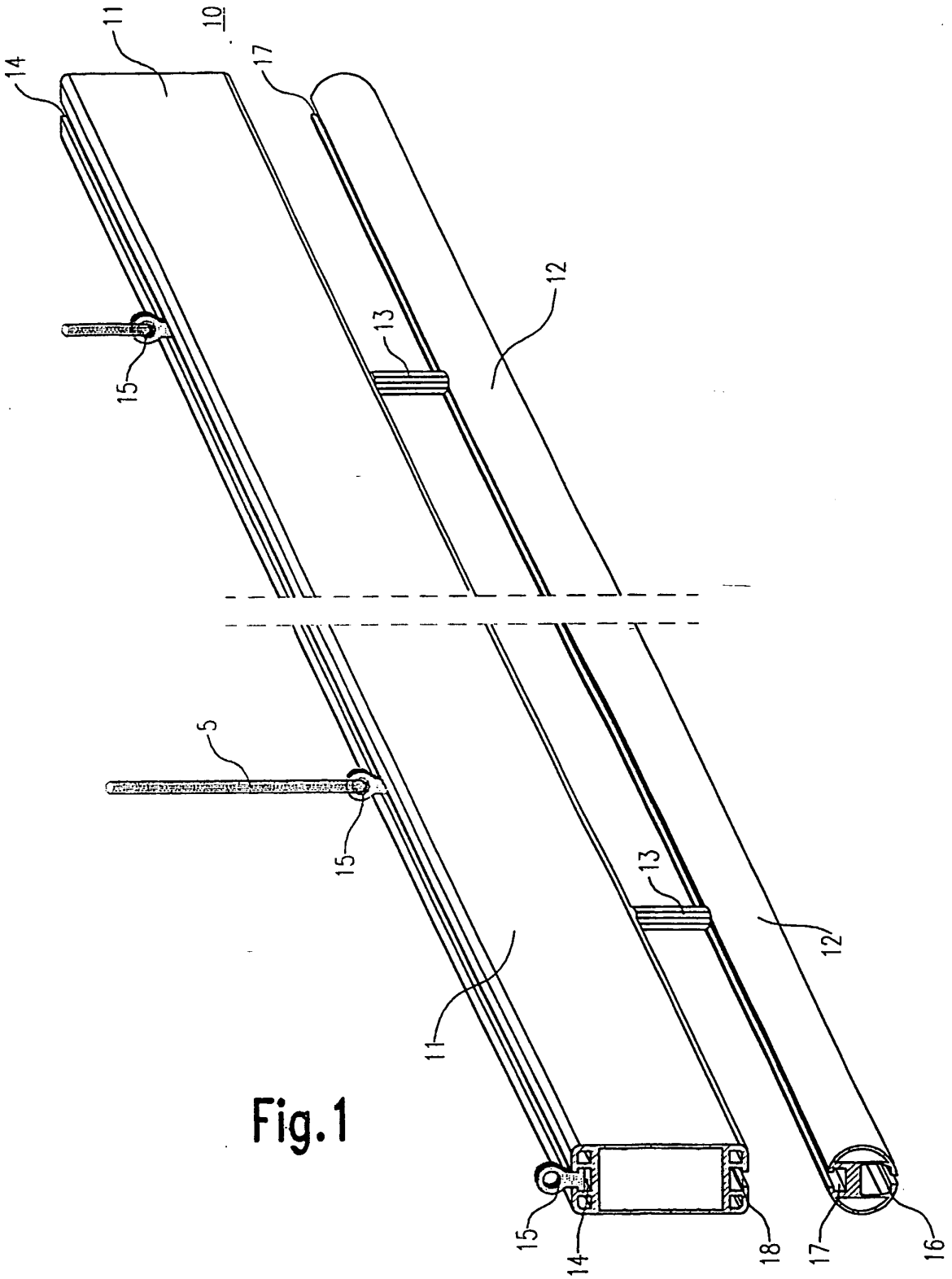

Fig.1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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