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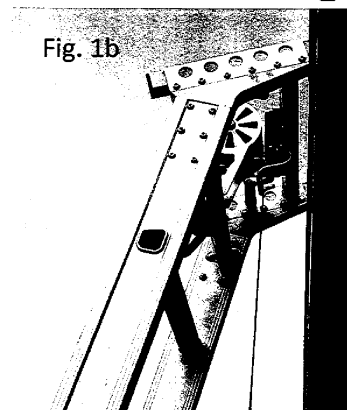
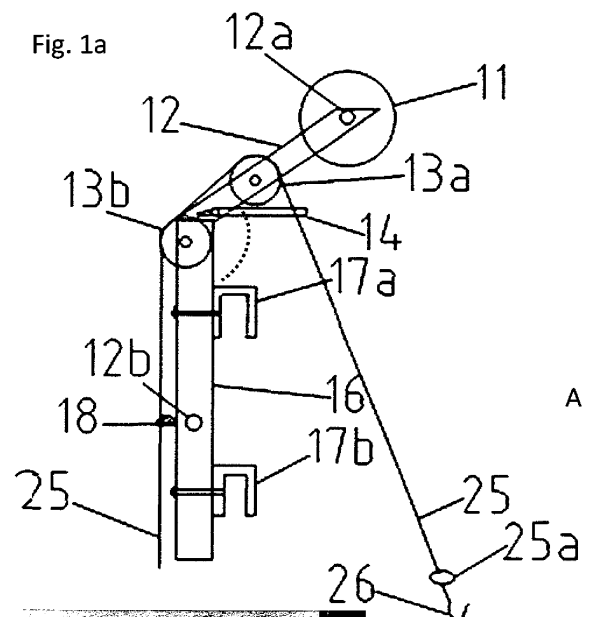
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(54) **DEMOUNTABLE ASSEMBLY FOR LIFTING WINDOWS**

(57) The present invention is in the field of a demountable assembly for lifting windows, and a kit of parts comprising said assembly. The present assembly is especially suited for renovation. Typically height distances of 1-10 m may be covered. The weight of the windows is limited mostly by a ladder, being used to put the assembly on, to about 150-200 kg.



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Description

FIELD OF THE INVENTION

[0001] The present invention is in the field of a demountable assembly for lifting windows, and a kit of parts comprising said assembly. The present assembly is especially suited for renovation. Typically height distances of 1-10 m may be covered. The weight of the windows is limited mostly by a ladder, being used to put the assembly on, to about 150-200 kg.

BACKGROUND OF THE INVENTION

[0002] Nowadays renovation of buildings and homes is an important part of work for contractors and builders. In view of improved isolation techniques windows are replaced, with double or even triple glazing. Builders have to move such windows from the ground floor to a certain level, typically overcoming a height difference of at least a few meters. For lifting the windows they typically use a glass suction, and for larger windows typically also a leveler, which leveler is placed in between the glass suction. In view of the weight of such windows, typically weighing about 100 kg/m², constructions such as scaffolds are built, in order to facilitate the movement of the windows. Building scaffolds is rather time consuming, especially in view of smaller projects, such as houses, where only a limited number of windows is typically to be replaced. In addition, labor regulations limit a weight workers may lift to 25 kg. For larger windows this implies that 2-4 or even more workers have to lift a window together, which is doable, and then transport the window over a scaffold from level to level, which is practically undoable. Also for smaller windows it remains difficult to go from level of the scaffold to another, in view of limit space available for passage.

[0003] In an alternative a so-called "gevelrider" is available. This device is a bar-type construction, which is place against a wall. It is typically made out of lightweight material, such as aluminum. It comprises a pulley, a cable, and a typically manual driven winch. Although the device provides good support safety is still a concern, especially in securing windows during and after lifting. In addition the device in scrolled together status is still relatively long and can not always be transported, especially in smaller vans or SUVs. Also the device consumes extra space in a vehicle, which space would rather be used for windows and so on.

[0004] A lifting apparatus attached to a ladder is recited in GB 2 310 243 A. It is aimed at lifting security covers for windows.

[0005] The present invention relates to a device for lifting windows, which overcomes one or more of the above disadvantages, without jeopardizing functionality and advantages.

SUMMARY OF THE INVENTION

[0006] The present invention relates in a first aspect to an assembly according to claim 1. Albeit the present system being especially suited for lifting windows, the assembly may be used for other applications as well.

[0007] The assembly for lifting windows comprises an upper element A and a lower element B. The lower element may be made of steel and may be formed out of plate steel. Two substantially circular tubes may be attached, such as by welding. Elements A and B are preferably protected from environmental influences and damage, such as by powder coating. The upper element is to be placed on top of a ladder, whereas the lower element is attached to lower located crosspieces, typically one or two crosspieces. The upper element comprises two or more wheels 11 attached to at least one first bar 12a such that the wheels can rotate around a virtual longitudinal axis of the first bar. Therewith a ladder comprising the upper part can be moved up against a wall with ease and also extended with ease. Attached to the bar at least two first arms 12 are provided; these give stability and comprise further elements. The at least two first arms comprise a first pulley 13a (such as a small wheel with a grooved rim or the like) arranged at a distance of the first bar in order to guide a cable and to provide sufficient space to a hook, and a motor protection 14, the motor protection being in wireless or electrical contact with an electro-motor 21. The motor may receive 230 V/110 V power or the like from the power net, or from a battery, such as an 18 V battery. The motor protection may have a level, which is at one end oriented downwards in a free status and upwards in a lock status. The level may be switch from a free to a lock status by contact with a hook or a further element. When in a lock status the electromotor is switched off. Attached to the first arms at least two second arms 16 are provided, wherein the at least two second arms comprise an optional second pulley 13b arranged at an intersection of the first arms and second arms. The first and second pulley guide a cable over the assembly. The second arms further comprise a second bar 12b connecting the at least two arms and a closable guiding element 18 attached to the second bar, the closable guiding element being provided to secure the cable into a fixed position such that at a lower height the cable can be moved sideways away from the assembly and therewith not limiting movement of a builder, and at least two securing elements 17a,b for securing the upper element to a ladder located at a lower side of the upper element, wherein optionally a distance of the at least two securing elements can be varied, e.g. in view of a varying distance between crosspieces of the ladder. In order to provide sufficient distance from a wall the at least two first arms and the at least two second arms are located under an angle of 100-170°, preferably an angle of 110-160°, more preferably 120-150°. A length of the first two arms is typically 20-70 cm, such as 30-40 cm, whereas a length of the second arms is typically 20-70

cm, such as 30-50 cm. In use the upper element can be attached to an upper side of a ladder. The lower element B comprises at an upper end a hook 22 for attaching the lower element to a crosspiece of a ladder, at least one movable grip 23 for attaching to a lower crosspiece of the ladder and securing the lower element to the ladder, the lower crosspiece being located lower than the crosspiece to which the hook is attached, an electromotor 21, a cable 25, wherein the electromotor is adapted to wind and unwind the cable, and a hook 26 attached to the cable. The hook can be attached and secured to a glass suction and/or to a leveler. The electromotor, cable and hook can be considered as a lifting tackle. The electromotor may be at a front side or a back side of the ladder, preferably at a back side.

[0008] Thereby the present invention provides a solution to one or more of the above mentioned problems.

[0009] Advantages of the present invention are detailed throughout the description.

DETAILED DESCRIPTION OF THE INVENTION

[0010] The present invention relates in a first aspect to an assembly according to claim 1.

[0011] In an exemplary embodiment of the present assembly the first pulley (13a) and the motor protection (14) may be releasably attached. Therewith transport is easier.

[0012] In an exemplary embodiment of the present assembly the at least two securing elements (17a,b) may each individually be integrated in the respective arm of the at least two second arms (16). Such provides a firm attachment to a ladder.

[0013] In an exemplary embodiment of the present assembly arms (12) may be extendable, preferably over a horizontal h distance of 10-50 cm, and wherein in not extended position the wheels (11) may remain within a ladder width w. As such the present element can remain on the ladder.

[0014] In an exemplary embodiment the present assembly may comprise two wheels. The two wheels support movement against a wall.

[0015] In an exemplary embodiment of the present assembly at least one of the first pulley 13a may be arranged at a distance of 5-20 cm from the first bar, the motor protection may be in electrical contact with the electromotor through a cable, the at least two securing elements 17a,b may be removably attached and fixed to the upper element, the lower element may comprise two movable grips, and the at least one grip may be an upside down clamp.

[0016] In an exemplary embodiment of the present assembly the motor protection may prevent upwards movement, but may still allow downwards movement, for instance if the cable for the motor is not attached to the motor. It is preferred to operate the higher control at 24 V or 12 V.

[0017] In an exemplary embodiment of the present as-

sembly the motor protection may comprise a sensor for detecting tilt of the ladder and deactivating the motor. If tilt is too high the motor is blocked or only allowed to move downwards.

[0018] In an exemplary embodiment of the present assembly the distance of the at least two securing elements can be varied to at least two, preferably at least three distances, such as between a distance of 20-35 cm, such as a distance of 25 cm, 27 cm, 28 cm and 30 cm. Therewith the present assembly can be used with most common available ladders.

[0019] In an exemplary embodiment of the present assembly the electromotor may comprise a socket 21a for receiving a plug 14a from the electrical contact of the motor protection, wherein the electromotor comprises a lock 21b for preventing the electromotor from running, which lock can be opened by connecting the plug 14a to the socket 21a. In an alternative two plugs and sockets may be provided, one close to the protection in element A, and one at the electromotor. Therewith a cable between upper element A and electromotor 21 can be fully removed. As such safety measures are incorporated in the present assembly for preventing amongst others accidents from happening.

[0020] In an exemplary embodiment of the present assembly the cable may further comprise a restricting element 25a for securing the cable to the motor protection 14. The restricting element can be a disc with a diameter such that it can be placed against the level of the motor protection and be relatively secured.

[0021] In an exemplary embodiment of the present assembly the electromotor may comprise a remote control for lifting and lowering the cable. As such a builder can move the window up (and down) at a safe distance.

[0022] In an exemplary embodiment of the present assembly the at least one movable grip may be adaptable such that it firmly is attached to a crosspiece of the ladder.

[0023] In an exemplary embodiment of the present assembly the at least one movable grip (23) for attaching to a lower crosspiece of the ladder and securing the lower element to the ladder may comprise at least one and preferably two grip(s), such as a hook, the grip(s) being attached to at least one stretch belt, the stretch belt preferably comprising a tensioner, wherein lower element B comprises at least one element for securing the stretch belt, preferably two securing elements, such as a hole. The grip(s) can be attached and secured to a (or two) side hole(s) of the crosspiece. These side holes are typically present in modern lightweight ladders. Tests on using only a stretch identified that the lower element is then typically secured insufficiently and in addition the force on a crosspiece is too high.

[0024] In a second aspect the present invention relates to a kit of parts comprising an assembly according to the invention, at least one glass suction, a table, at least two trestle, and optionally a roll of marketing ribbon, a leveler, a helmet, and safety glasses. Therewith a builder or constructor only needs a ladder to lift windows, the ladder

typically being available. In an alternative also a ladder is provided. In a further alternative a part of element A, i.e. a non-detachable may remain on the ladder, whereas a detachable part is kept elsewhere.

[0025] The invention is further detailed by the accompanying figures and examples, which are exemplary and explanatory of nature and are not limiting the scope of the invention. To the person skilled in the art it may be clear that many variants, being obvious or not, may be conceivable falling within the scope of protection, defined by the present claims.

SUMMARY OF THE FIGURES

[0026] Figures 1-5 show schematics of the present invention.

DETAILED DESCRIPTION OF THE FIGURES

[0027]

Figure 1a shows a schematic side view of the upper element A and fig. 1b shows a side view of an embodiment.

Figure 2a shows a schematic side view of the lower element B. Fig. 2b shows a side view of an embodiment, and fig. 2c a front view, where element B is partly removed to a side.

Figure 3 shows a front view of upper element A.

Figure 4 shows upper element A on a ladder when extended (right) and not-extended (left). In extended position extra room may be created for lifting, whereas in non-extended position the ladder can be stored.

Figure 5s shows an example of element A. Therein the second pulley 13b and motor protection can be detached. In addition arms 12 may be extended. Figure 5b shows a view of element A from below.

[0028] The figures have been detailed throughout the description.

EXAMPLES/EXPERIMENTS

[0029] The invention although described in detailed explanatory context may be best understood in conjunction with the accompanying examples.

[0030] In an example the present assembly is mounted on a ladder. As the assembly is adjustable it can be mounted on any ladder, such as with a crosspiece distance of 25, 27 and 28 cm. The upper and lower elements can each individually and independently be adapted. The assembly can lift up to 150 kg in this case being equal to a maximum load of a crosspiece. As the present cable is limited in length, a height over which a window can be lifted is limited as well, such as to 9 m. The present assembly is typically provided in a kit of parts, the kit further comprising two trestles, a suction (such as with a maximum 200 kg), and optionally a lift and demarcation lint.

The assembly can be mounted as follows. The ladder is placed in a horizontal mode on the trestles and the upper element is hooked over a first and second crosspiece of the ladder. The upper element is secured with for instance a stretch belt. The ladder including the upper element is now put in vertical position against a wall. The upper part of the ladder, i.e. the upper element, is located above a window. One of the trestles is place aside, such as to a right side of, the ladder. The lower element is placed with a lift, typically an electromotor, or the like, on the trestle. The cable of the protection of the upper element is plugged into the electromotor. The cable thereof is unwind partly. The cable is now taken in the right hand and the user climbs the ladder, pulling the cable over the hinges and securing the cable in the protection. The user descends, attaches the lower element to the ladder and secures the lower element thereto. The electromotor can now be activated, the suction can be placed on the window and the window can be lifted to the correct height. Demounting is typically done by making sure the cable is on the surface (of the earth), removing the lower element and attaching the lower element to the trestle. Ascend the ladder, remove the cable and descend the ladder. Thereafter fully winding the cable and moving the lower element away. Now the upper element, which may still be on the ladder, and the ladder are removed.

Claims

1. Assembly for lifting windows comprising an upper element (A), the upper element comprising

two or more wheels (11) attached to at least one first bar (12a) such that the wheels can rotate around a virtual longitudinal axis of the first bar, attached to the bar at least two first arms (12),

wherein the at least two first arms comprise an optional first pulley (13a) arranged at a distance of the first bar, and a motor protection (14), the motor protection being in wireless or electrical contact with an electromotor (21),

attached to the first arms at least two second arms (16),

wherein the at least two second arms comprise a second pulley (13b) arranged at an intersection of the first arms and second arms, a second bar (12b) connecting the at least two arms and a closable guiding element (18) attached to the second bar, and at least two securing elements (17a,b) for securing the upper element to a ladder located at a lower side of the upper element, wherein optionally a distance of the at least

two securing elements can be varied, wherein the at least two first arms and the at least two second arms are located under an angle of 100-170°, preferably an angle of 110-160°, more preferably 120-150°,

wherein in use the upper element can be attached to an upper side of a ladder, a lower element (B), the lower element comprising at an upper end a hook (22) for attaching the lower element to a crosspiece of a ladder, at least one movable grip (23) for attaching to a lower crosspiece of the ladder and securing the lower element to the ladder, an electromotor (21), a cable (25), wherein the electromotor is adapted to wind and unwind the cable, and a hook (26) attached to the cable.

2. Assembly according to claim 1, wherein the first pulley (13a) and the motor protection (14) are releasable attached.
3. Assembly according to any of the preceding claims, wherein the at least two securing elements (17a,b) are each individually integrated in the respective arm of the at least two second arms (16).
4. Assembly according to any of the preceding claims, wherein arms (12) are extendable, preferably over a horizontal h distance of 10-50 cm, and wherein in not extended position the wheels (11) remain within a ladder width w.
5. Assembly according to any of the preceding claims, comprising two wheels.
6. Assembly according to any of the preceding claims, wherein at least one of the first pulley (13a) is arranged at a distance of 5-20 cm from the first bar, the motor protection being in electrical contact with the electro-motor through a cable, which cable may be detachable, the motor protection preferably using 24 V or 12 V, the motor protection preferably comprising a tilt sensor, the at least two securing elements (17a,b) being removably attached and fixed to the upper element, the lower element comprises two movable grips, and the at least one grip being an upside down clamp.
7. Assembly according to any of the preceding claims, wherein the distance of the at least two securing elements can be varied to at least two, preferably at least three distances, such as a distance of 20 cm to 35 cm.
8. Assembly according to any of the preceding claims, wherein the electromotor comprises a socket (21a) for receiving a plug (14a) from the electrical contact of the motor protection, wherein the electromotor

comprises a lock (21b) for preventing the electromotor from running, which lock can be opened by connecting the plug (14a) to the socket (21a).

- 5 9. Assembly according to any of the preceding claims, wherein the cable further comprises a restricting element (25a) for securing the cable to the motor protection (14).
- 10 10. Assembly according to any of the preceding claims, wherein the electromotor comprises a remote control for lifting and lowering the cable.
- 15 11. Assembly according to any of the preceding claims, wherein the at least one movable grip is adaptable such that it when in use it is firmly attached to a crosspiece of the ladder.
- 20 12. Assembly according to any of the preceding claims, wherein the at least one movable grip (23) for attaching to a lower crosspiece of the ladder and securing the lower element to the ladder comprises at least one and preferably two grip(s), the grip(s) being attached to at least one stretch belt, the stretch belt preferably comprising a tensioner, wherein lower element B comprises at least one element for securing the stretch belt, preferably two securing elements, such as a hole.
- 25 13. Kit of parts comprising an assembly according to any of the preceding claims, at least one glass suction, a table, at least two trestles, and optionally a roll of marketing ribbon, and a leveler.
- 30 14. Subassembly comprising a ladder and upper element A, an upper element (A), the upper element comprising

two or more wheels (11) attached to at least one first bar (12a) such that the wheels can rotate around a virtual longitudinal axis of the first bar, attached to the bar at least two first arms (12),

wherein the at least two first arms comprise an optional first pulley (13a) arranged at a distance of the first bar, and a motor protection (14), the motor protection being in wireless or electrical contact with an electromotor (21),

attached to the first arms at least two second arms (16),

wherein the at least two second arms comprise a second pulley (13b) arranged at an intersection of the first arms and second arms, a second bar (12b) connecting the at least two arms and a closable guiding ele-

ment (18) attached to the second bar, and
at least two securing elements (17a,b) for
securing the upper element to a ladder lo-
cated at a lower side of the upper element,
wherein optionally a distance of the at least
two securing elements can be varied,
wherein the at least two first arms and the
at least two second arms are located under
an angle of 100-170°.

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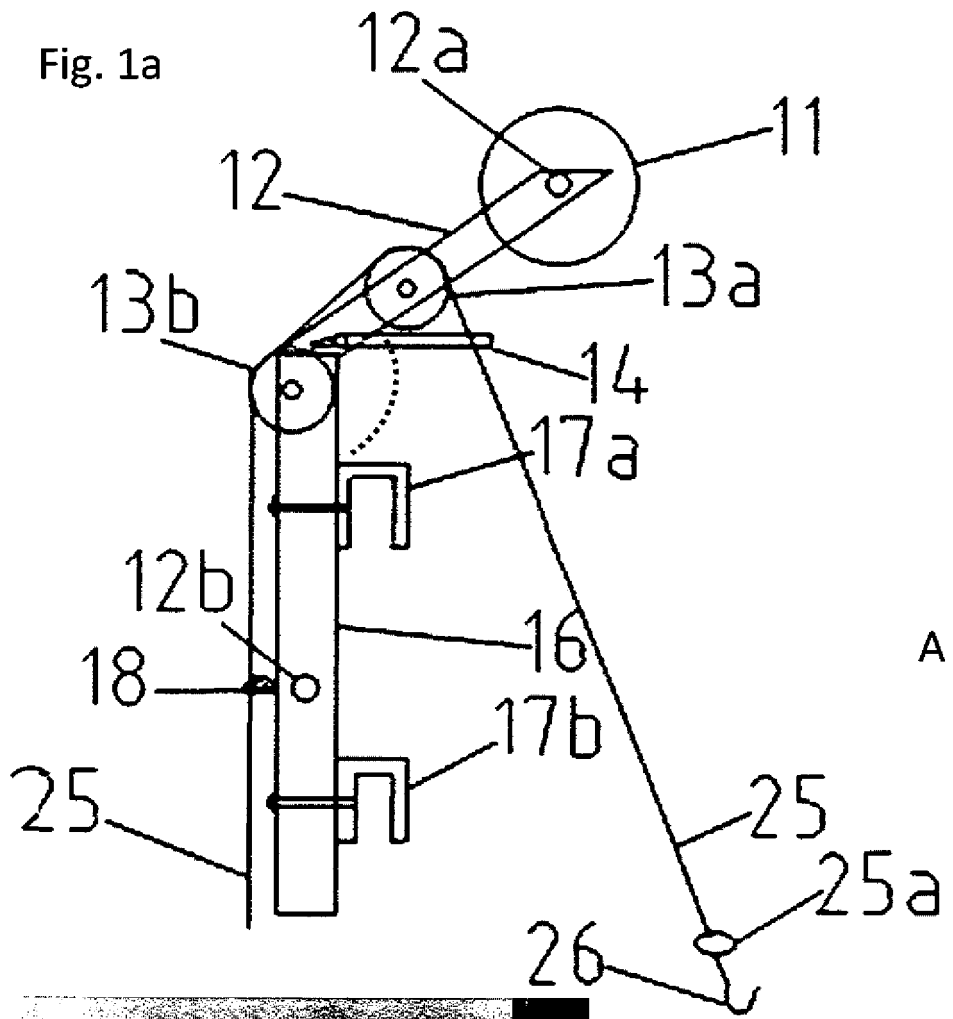


Fig. 1b

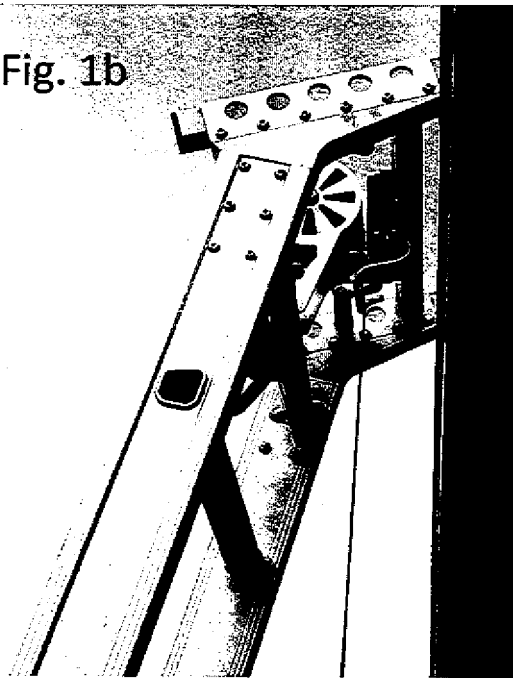


Fig. 2a

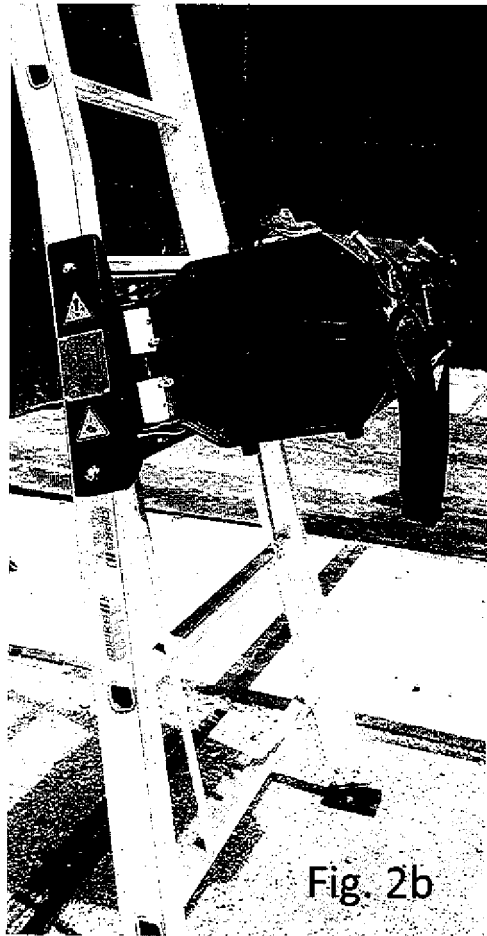
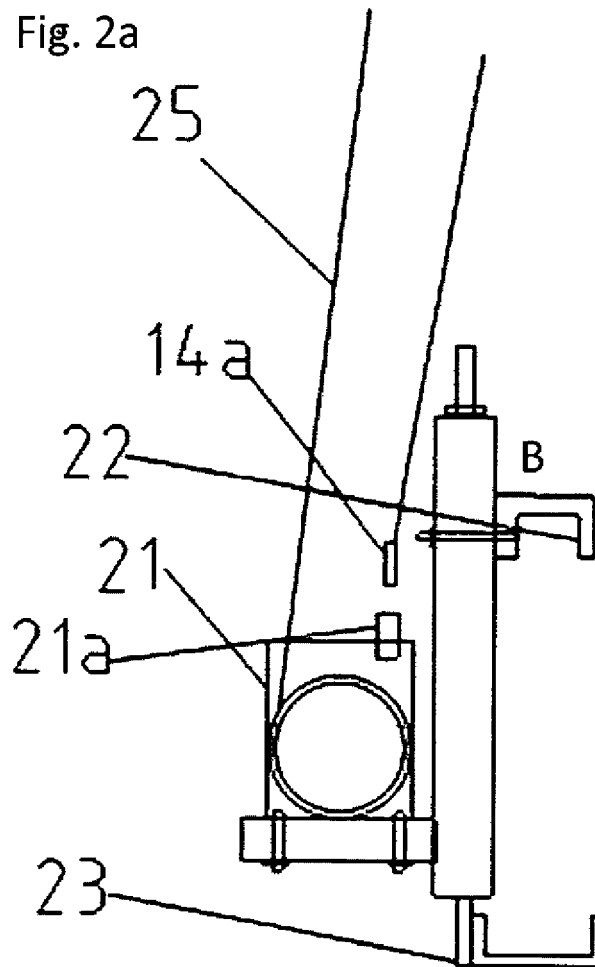


Fig. 2b

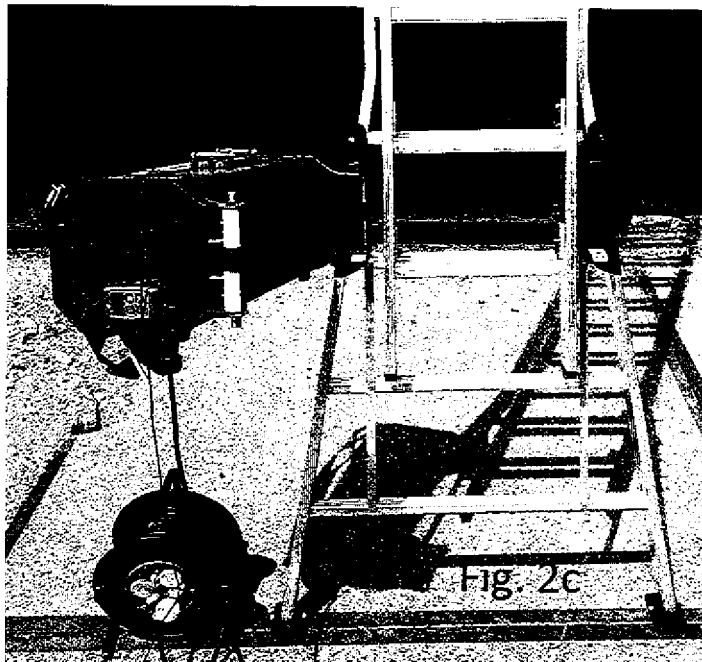


Fig. 2c

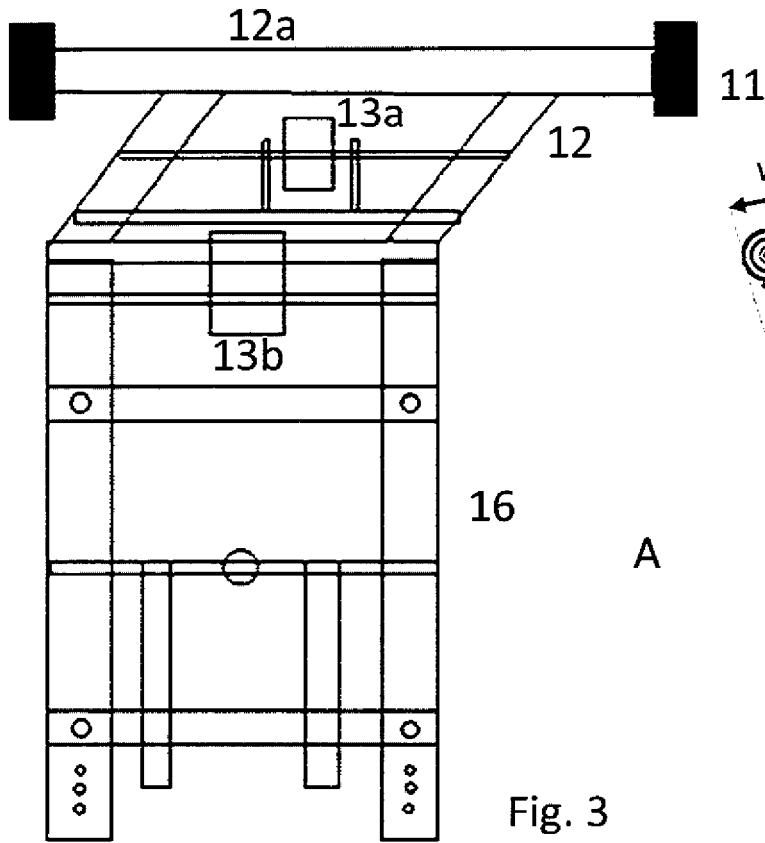


Fig. 3

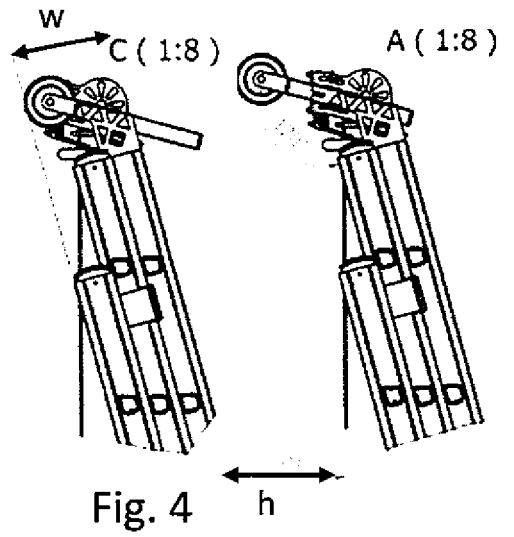


Fig. 4

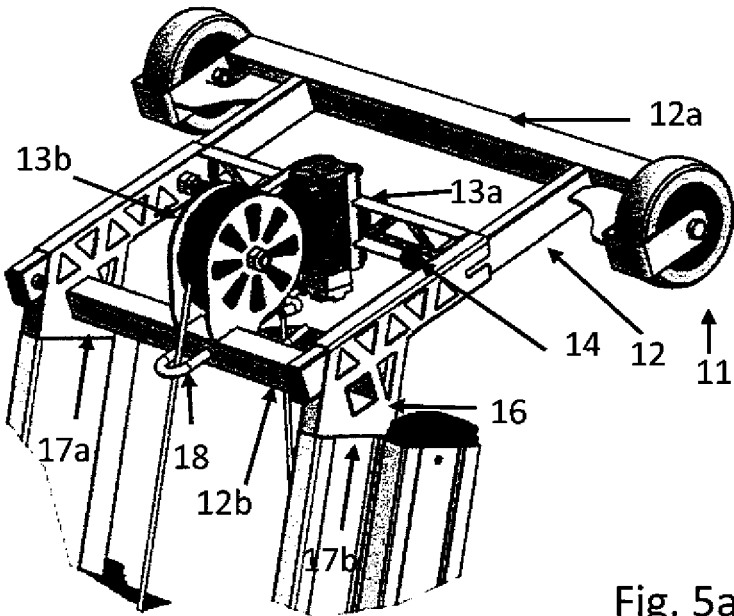


Fig. 5a

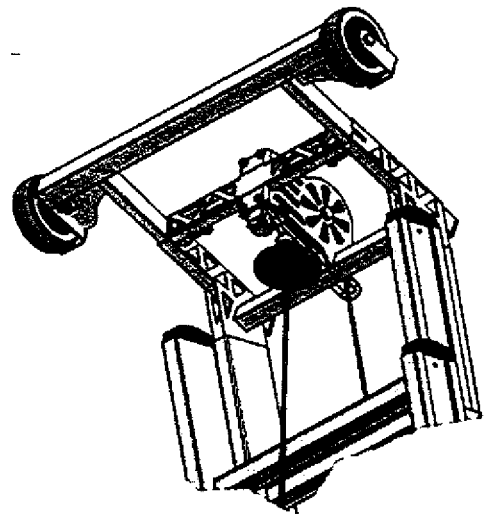


Fig. 5b



EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 310 243 A (BAR IT [GB]) 20 August 1997 (1997-08-20) * abstract * * page 3, last paragraph - page 5, paragraph 3 *	1,13,14	INV. E06C7/12
A	----- GB 2 323 117 A (WEBB TERENCE JAMES [GB]; HOBSON ROBERT CLIVE [GB]; MOULAND STEPHEN ANT) 16 September 1998 (1998-09-16) * abstract * * figures *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06C B66D B66C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 November 2018	Examiner Sheppard, Bruce
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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