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(72) Inventor: **Piggott, Trevor**
Watford, Hertfordshire WD2 4UB (GB)

(74) Representative: **Kensett, John Hinton**
Saunders & Dolleymore,
9 Rickmansworth Road
Watford,
Hertfordshire WD18 0JU (GB)

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(71) Applicant: **The UK Lift Company Limited**
Watford, Hertfordshire WD2 4UB (GB)

(54) **Scissor lift**

(57) A scissor lift comprising a load carrying platform, a base frame (7), a first and second leg unit situated between the platform and the frame, the leg units crossing each other at an axis (3) and being pivotally interconnected at said axis (3), the first leg (1) being connected at one end to the load carrying platform by first fixed pivot means (13) and provided at the other end with first freely rotatable roller means (14) contacting the base frame (7); the second leg unit (2) being connected at one end to the base frame by second fixed pivot means (12) and provided at the other end with second freely rotatable roller means (15) contacting the underside of the load carrying platform, wherein the distance between the first

fixed pivot means (13) and the inter connecting pivot (3) and the distance between the first freely rotatable roller means (14) and the interconnecting pivot axis (3) are different and the centre of the first fixed pivot (13) being above the line of an axis passing through the centre of the first freely rotatable roller means (14) and the centre of the said interconnecting pivot (3), and wherein the distance between the second fixed pivot means (12) and the interconnecting pivot (3) and the second rotatable roller means (15) and connecting pivot are different and the centre of the second fixed pivot means (12) being above a line projected from a straight axis passing through the centre of the second freely rotatable roller and the centre of the interconnecting pivot.

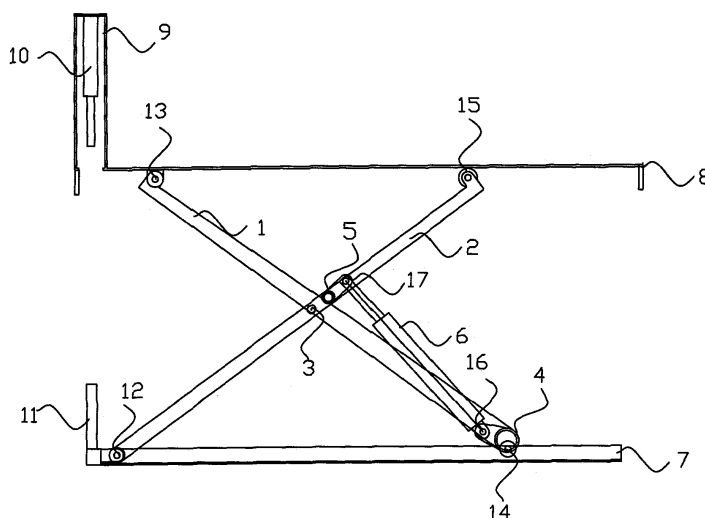


Figure 2a

Description

[0001] This invention relates to a scissor lift.

[0002] An example of a scissor lift is shown in GB 2 178 726 A. The present invention arose in an attempt to provide an improvement over the lift disclosed in this patent application.

[0003] The prior art scissor lift in Figure 1 is shown in the open, raised position with the platform and scissor legs superimposed, in dashed lines, in the lowered position. It comprises an inner scissor leg 1 comprising a pair of leg members spaced apart by rigid connecting member 5 and attached at one end to a lower frame 7 by fixed pivot 12 and at the opposite end is provided with a freely rotatable roller 15 which contacts an upper load carrying platform 8 and an outer scissor leg 2, comprising a pair of leg members spaced apart by rigid connecting member 4 and attached at one end to the upper load carrying platform 8 by a fixed pivot 13 and at the opposite end is provided with a freely rotatable wheel 14 which contacts the lower frame 7. The inner and outer legs 1 and 2 are interconnected by a common pivot 3. There is also at least one extendable force member or ram 6 connected at one end by a pivot means 17 to the inner scissor leg connecting member 5 and connected at the other end by a pivot means 16 to the outer scissor leg connecting member 4 such that when the force member 6 is extended or retracted the legs 1 and 2 rotate in opposite directions about the central pivot 3 causing the load carrying platform 8 to raise and lower.

It is shown in the scissor lift disclosed in GB 2 178 276 A that it is in some cases desirable to reduce the height of the load carrying platform 8 above the ground when in the fully lowered position and that when in the lowest possible position the axes of the inner and outer scissor leg members are parallel or nearly parallel to each other such that the opening force of the member 6 acting about the central pivot 3 is required to be very large. This disadvantage is successfully overcome by providing one or more additional force members 10 acting at one upper end on a member 9 attached to the load carrying platform 8 and acting at the other lower end on the lower frame 7 and preferably through an extension 11 to the lower frame so that the force required by the member 10 to cause the scissor lift to rise is only that which is required to overcome the weight of the load and the load carrying platform and the scissor legs with no mechanical disadvantage. As the scissor leg members 1 and 2 rotate about the common connecting pivot 3 the position of the pivots 16 and 17 changes in relation to the common connecting pivot 3 such that the distance between line of action of the force member 6 about the common connecting pivot 3 increases thus improving the mechanical advantage of the force member 6.

[0004] It is a feature of the prior art scissor lift described that the position of the common connecting pivot 3 of the scissor leg members 1 and 2 is not centrally positioned between the fixed pivots 12 and 13 and the rollers 15 and

16 respectively to allow the inner and outer scissor legs 1 and 2 to nest with each other when the scissor lift is fully lowered. A disadvantage of this arrangement is that during the raising and lowering of the load carrying platform the path along which the pivot connection 13 between scissor leg 2 and the load carrying platform 8 travels is not vertical but is displaced horizontally causing the load carrying platform also to move horizontally during raising and lowering of the scissor lift as shown in Figure 1.

[0005] The present invention arose in an attempt to avoid the disadvantages of the described prior art scissor lift. This is achieved by a scissor lift according to the invention having the features claimed in the appended claims.

[0006] According to the present invention, in one aspect, there is provided a scissor lift comprising a load carrying platform, a base frame, a first and second leg unit situated between the platform and the frame, the leg units crossing each other at an axis and being pivotally interconnected at said axis, the first leg being connected at one end to the load carrying platform by first fixed pivot means and provided at the other end with first freely rotatable roller means contacting the base frame; the second leg unit being connected at one end to the base frame by second fixed pivot means and provided at the other end with second freely rotatable roller means contacting the underside of the load carrying platform, wherein the distance between the first fixed pivot means and the interconnecting pivot and the distance between the first freely rotatable roller means and the interconnecting pivot are different and the centre of the first fixed pivot being above the line of an axis passing through the centre of the first freely rotatable roller means and the centre of the said interconnecting pivot, and wherein the distance between the second fixed pivot means and the interconnecting pivot and the second rotatable roller means and connecting pivot are different and the centre of the second fixed pivot means being above a line projected from a straight axis passing through the centre of the second freely rotatable roller and the centre of the interconnecting pivot.

[0007] Other aspects of the invention are claimed and/or disclosed in the specification and drawings.

[0008] In a further aspect the invention provides a scissor lift comprising one or more of the novel features and/or combinations of features herein disclosed.

[0009] Embodiments of the invention will now be described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of a previously proposed scissor lift;

Figure 2a is a side elevation of a scissor lift according to the invention in a raised position;

Figure 2b is a side elevation of the scissor lift of Figure 2a in a lowered position; and

Figure 3 is a diagrammatic representation the scissor

leg arrangement in the partly raised position.

[0010] A scissor lift embodying the invention is shown in Figures 2a, 2b and 3. Components having similar functions to those of the lift of Figure 1 have been given like reference numerals.

[0011] The scissor lift in Figures 2a and 2b comprises a load carrying platform with bracing members 8 and with an upright member 9 housing a force member 10 and a base frame 7. Between the platform 8 and the base frame 7 is arranged a first leg 1 comprising two spaced apart parallel outer leg members with a connecting member 4, each outer leg member being connected at one end to the load carrying platform 8 by means of a fixed pivot 13 and at the other end provided with freely rotating roller 14 rotating on a central pivot and contacting the base frame 7 and a second leg 2 comprising two spaced apart parallel inner leg members with a connecting member 5 each inner leg being connected at one end to the base frame by a fixed pivot 12 and at the other end provided with a freely rotatable roller 15 rotating on a central pivot and contacting the load carrying platform 8. The outer leg 1 and the inner leg 2 are connected to and rotate about a common pivot 3 and at least one extending force member, ram 16 is pivotally connected between connecting members 4 and 5 by pivots 16 and 17 respectively. As the said extending force member 6 is extended and retracted the inner and outer legs 1 and 2 rotate about the common pivot 3 causing the load carrying platform 8 to raise and lower.

[0012] Figure 3 shows the arrangement of the pivots 13, 14 of the inner leg 1 and pivots 15, 16 of the outer leg 2 and connected to each other by a common pivot 3. It can be seen that the pivot 13 is off set from the projected line of an axis passing through pivots 14 and 3 respectively and that pivot 15 is off set from the projected line of an axis passing through pivots 12 and 3 respectively. Furthermore, the distance between the pivots 14 and 3 of outer leg 1 are greater than the distance between the pivots 13 and 3 and the distance between the pivots 12 and 3 of the inner leg 2 are greater than the distance between the pivots 15 and 3.

[0013] The offsetting in this embodiment is done by mounting the pivots 13 and 15 on projecting or protruding parts 21, 22 respectively at the ends of the legs remote from pivots 14 and 12 respectively. These may extend generally outwardly as shown from the elongate direction of each leg, preferably at 90° although they may be at other non-zero angles to the longitudinal leg axis. They may be protruding bosses or protrusions as shown.

[0014] The arrangement of inner and outer legs, could of course be varied or transposed so that references to an 'inner' leg could be an outer leg and vice versa, ie the arrangement could be reversed or otherwise altered.

[0015] It can be ascertained in Figure 1 that due to the dissimilar distances between the connecting pivot 3 and the fixed pivots 13 and 12 and the dissimilar distances between the connecting pivot 3 and the freely rotatable

roller pivots 14 and 15 the load carrying platform 8 will not travel in a truly vertical path when the said pivots 13, 3 and 14 lay on a common axis and the pivots 15, 3 and 12 lay on a common axis. However it can be shown that the offsetting of the pivot 13 from an axis projecting through pivots 14 and 3 on the outer leg 1 (shown most clearly in Figure 3) and the offsetting of the pivot 15 from an axis projecting through pivots 12 and 3 of the inner leg 2 as shown in Figure 3 will reduce the horizontal movement and a person skilled in the art of scissor lift design can easily arrange the said pivots 13, 3 and 14 of the outer leg 1 and the said pivots 15, 3 and 16 of the inner leg 2 to reduce or virtually eliminate the horizontal movement of the load carrying platform 8 and hence reduce the undesirable forces induced on the lifting member 10.

Claims

1. A scissor lift comprising a load carrying platform, a base frame, a first and second leg unit situated between the platform and the frame, the leg units crossing each other at an axis and being pivotally interconnected at said axis, the first leg being connected at one end to the load carrying platform by first fixed pivot means and provided at the other end with first freely rotatable roller means contacting the base frame; the second leg unit being connected at one end to the base frame by second fixed pivot means and provided at the other end with second freely rotatable roller means contacting the underside of the load carrying platform, wherein the distance between the first fixed pivot means and the interconnecting pivot and the distance between the first freely rotatable roller means and the interconnecting pivot are different and the centre of the first fixed pivot being above the line of an axis passing through the centre of the first freely rotatable roller means and the centre of the said interconnecting pivot, and wherein the distance between the second fixed pivot means and the interconnecting pivot and the second rotatable roller means and connecting pivot are different and the centre of the second fixed pivot means being above a line projected from a straight axis passing through the centre of the second freely rotatable roller and the centre of the interconnecting pivot.
2. A scissor lift as claimed in Claim 1, where at least one extending force member is permanently attached to, or acts on, at one of its ends to the base frame or an extension to it and is permanently attached or acts on at the other end to the load carrying platform or an extension to it.
3. A scissor lift as claimed in Claim 1 or 2, where at least one extending force member is pivotally con-

nected to, or acts on, at one end the said first leg member and at the other end is pivotally connected, or acts on, the said second leg member.

4. A scissor lift as claimed in Claim 3, where at least one said extending force member is pivotally connected at one end to the load carrying platform or an extension to it and the other end acts on the base frame or an extension to it for a part or all of the movement of the platform. 5 10
5. A scissor lift as claimed in Claim 3, where at least one said extending force member is pivotally connected at one end to the base frame or an extension to it and the other end acts on the load carrying platform or an extension to it for a part of the movement of the platform. 15

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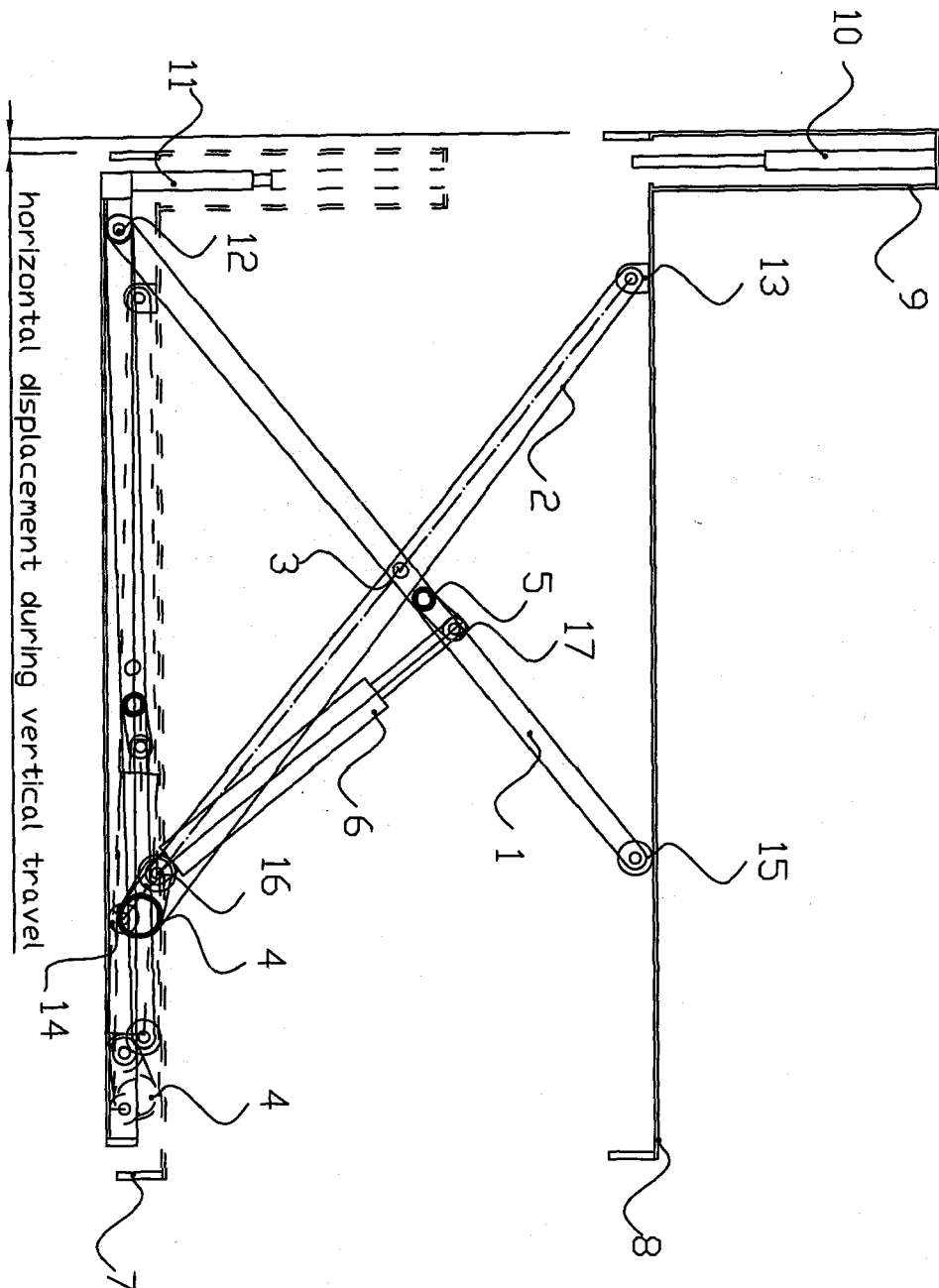


Figure 1

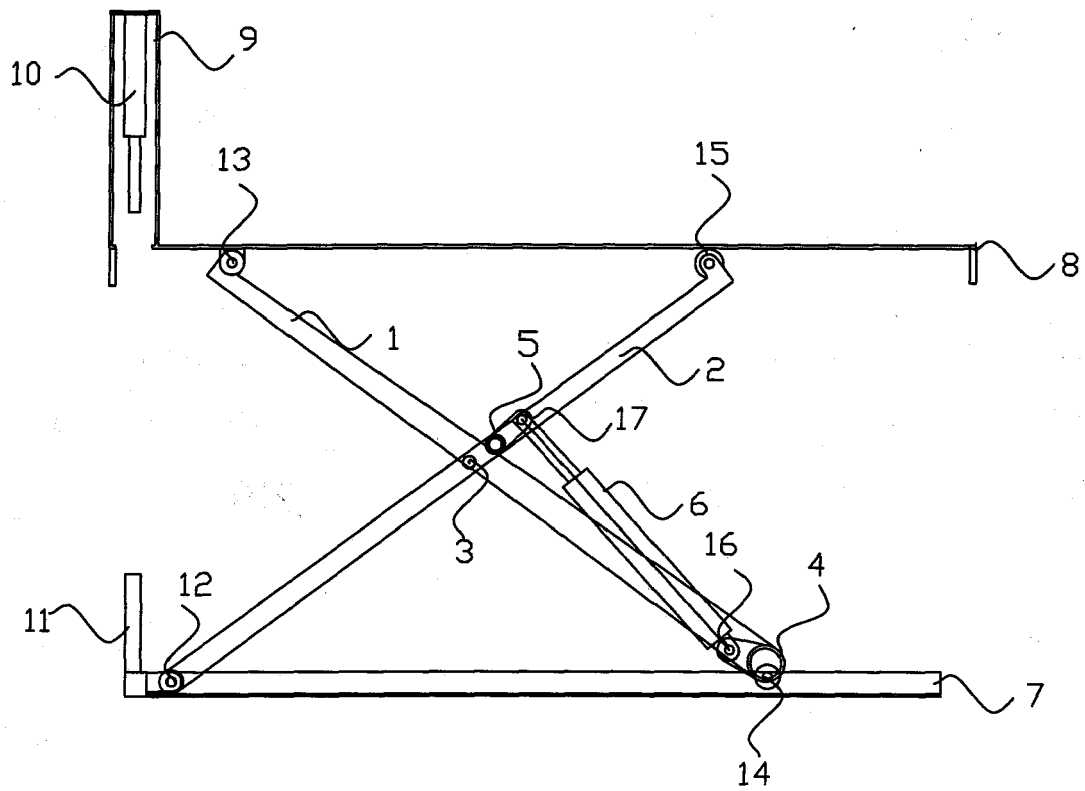


Figure 2a

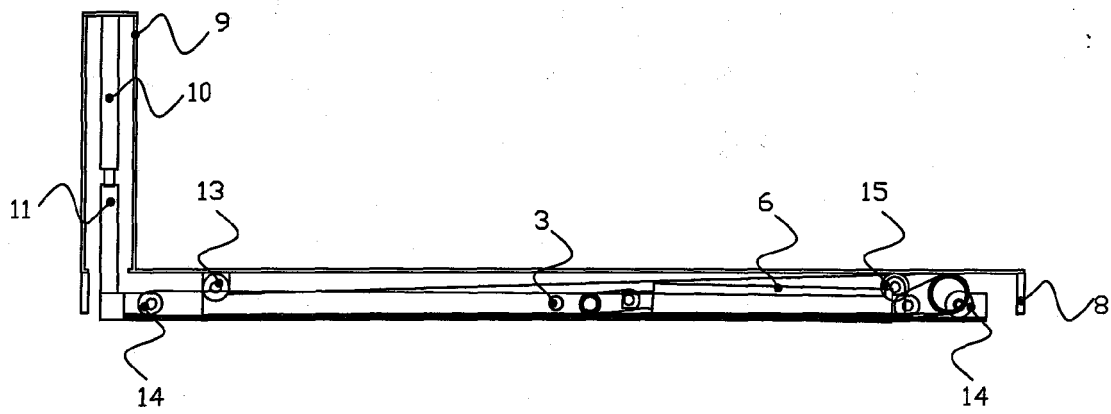


Figure 2b

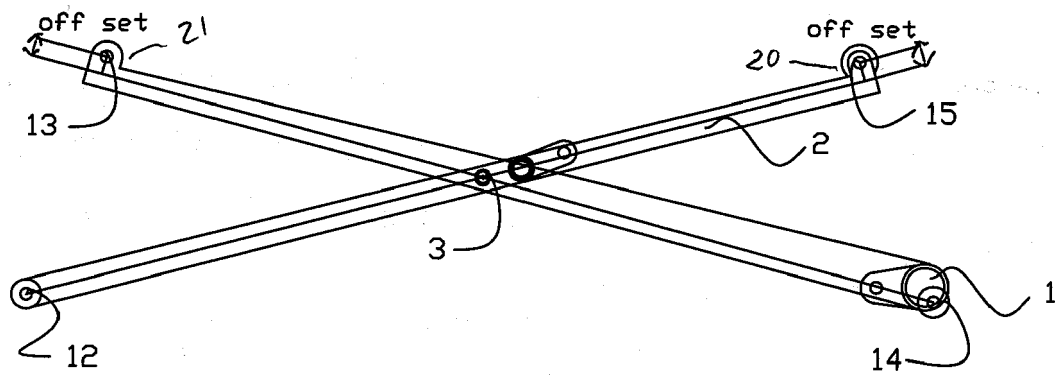


Figure 3



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 5753

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	GB 2 178 726 A (UK LIFT COMPANY LIMITED THE) 18 February 1987 (1987-02-18) * the whole document *	1	INV. B66F7/08
A	EP 0 167 434 A (EQUIP TECH APP MANUTENT IND [FR]) 8 January 1986 (1986-01-08) * abstract; figures 1,2 *	1	
A	DE 92 05 900 U1 (OTTO NUSSBAUM GMBH & CO KG, 7640 KEHL, DE) 1 October 1992 (1992-10-01) * figures 1,2 *	1	
A	DE 94 13 187 U1 (HALDENWANG GMBH & CO KG [DE]) 13 October 1994 (1994-10-13) * figures 1,2 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B62B B66F
Place of search		Date of completion of the search	Examiner
Munich		5 December 2008	Ferrien, Yann
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.**

EP 08 16 5753

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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05-12-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- GB 2178276 A [0003]