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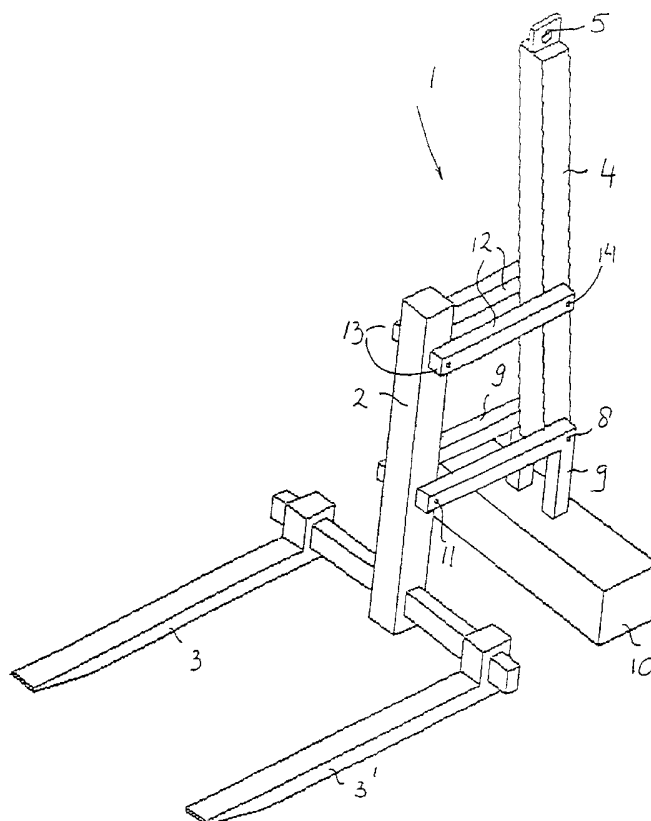
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[Continued on next page]

(54) Title: DEVICE FOR MOVING A LOAD BY MEANS OF A HOISTING CRANE OR THE LIKE



(57) Abstract: A device for moving a load by means of a hoisting crane or the like, which device comprises a hoisting member to be coupled to the hoisting crane or the like, a pick-up element for picking up a load to be moved, as well as a lever which is pivotally connected to the hoisting member about a pivoting point, which lever is pivotally connected to the pick-up element on one side of said pivoting point and which is connected to a ballast on another side of said pivoting point, a special feature being the fact that the device comprises at least one pivoting arm for keeping the pick-up element at least substantially in vertical position, wherein the pivoting arm is pivotally connected to the pick-up element near one end and to the hoisting member near its other end, wherein the pivoting arm is disposed at least substantially parallel to a part of the lever extending between the pivoting points of the lever.



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DEVICE FOR MOVING A LOAD BY MEANS OF A HOISTING CRANE OR THE
LIKE

5 The invention relates to a device for moving a load by means
of a hoisting crane or the like, which device comprises a
hoisting member to be coupled to the hoisting crane or the
like, a pick-up element for picking up a load to be moved, as
well as a lever which is pivotally connected to the hoisting
10 member about a pivoting point, which lever is pivotally
connected to the pick-up element on one side of said pivoting
point and which is connected to a ballast on another side of
said pivoting point.

15 In practice such a device is occasionally used under the name
of "combination lift" in the construction industry, in
particular for moving a pack of bricks from ground level to a
higher level of a building under construction. This known
device comprises a hoisting member fitted with a hoisting
20 eye, by means of which the hoisting member can be coupled to
a hoisting crane. A lever, which is pivotally connected to
the hoisting member about a pivoting point, is fixedly
connected to a ballast functioning as a balance weight on one
side of the pivoting point, whilst a pick-up element is
25 pivotally connected to the lever on another side of the
pivoting point. The pick-up element of the known device is
fitted with, for example, two support members forming a fork
for supporting a load. The lever engages the pick-up element
above the load.

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Since the lever of the known device engages the pick-up
element above a load, the "combination lift" has two main
drawbacks. In the first place, two piston/cylinder devices

are used for keeping the pick-up element in a vertical position in loaded condition as much as possible so as to ensure a horizontal position of a load present on the fork-shaped support members as much as possible. In other words, said piston/cylinder devices correct any tendency of the pick-up element to take up an inclined position with respect to the vertical in loaded condition. Said piston/cylinder devices thus function to damp any oscillating movements of the pick-up element in loaded condition, for example.

Furthermore, one consequence of the fact that the lever engages the pick-up element above a load is that in practice a minimum height equal to that between the pivoting point of the lever above the pick-up element and the support members must be present at all times in order to enable movement of a load.

The object of the invention is to obviate the drawbacks of the prior art, i.e. to provide a compact device, by means of which it is possible to move a load by means of a hoisting crane or the like, in which no part of the device, such as the aforesaid lever of the "combination lift", engages the pick-up element above a load.

In order to achieve that objective, a device of the kind referred to in the introduction is according to the invention characterized in that the device comprises at least one pivoting arm for keeping the pick-up element at least substantially in vertical position, wherein the pivoting arm is pivotally connected to the pick-up element near one end and to the hoisting member near its other end, wherein the pivoting arm is disposed at least substantially parallel to a part of the lever extending between the pivoting points of

the lever, and wherein a part of the lever extending between the ballast and the pivoting point includes an angle of 0 - 45°, preferably 0 - 30°, with the vertical in unloaded condition. The present invention in particular comprises two
5 pivoting arms arranged on either side of the pick-up element, each pivoting arm being disposed at least substantially parallel to a part of the lever extending between the pivoting points of the lever. A balanced and solid construction is obtained by arranging the pick-up element
10 between pivoting arms/lever parts disposed on either side thereof. The effect obtained by the invention is that no constructional obstruction, i.e. neither the connection between the hoisting member and the hoisting crane, nor the pivotable connection between the pivoting arm and the pick-up
15 element, nor any part of the lever, needs to be present above the centre of gravity of a load being hoisted. This makes it possible to move a load from ground level to a higher level, for example a warehouse rack, and vice versa, by means of the present device without any problem. The invention is based on
20 a "scales principle", which in principle utilizes purely mechanical means, without any pneumatically, hydraulically or electrically fed driving components being used. The present pick-up element is preferably fitted with at least one support member to be placed under the load. The part of the
25 lever extending between the ballast (in the unloaded condition) and the pivoting point includes a relatively small angle - as indicated above - with the vertical, which leads to a centre of gravity of the overall construction such that the pick-up element will maintain an at least substantially
30 vertical position, in particular a position in which it includes an angle of 0-10° with the vertical. As a result, an additional (passive) ballast, for example connected to the

pick-up element, is not necessary.

It is noted that the invention is not limited to the use thereof in the construction industry, but that it can be used
5 mainly for moving all kinds of products (such as boxes containing foodstuffs, pallets with manufacturing parts, etc) from ground level to, for example, shelves of warehouse racks and the like disposed at a higher level. The present invention can excellently be used as a self-balancing
10 warehouse pallet hook, for example. It is not absolutely necessary in that connection to make use of a hoisting crane; depending on the application, any type of hoisting installation may be used.

15 In one preferred embodiment of a device according to the invention, the pivoting arms extend parallel to each other. Preferably, a combination of a pivoting arm, a part of the lever and parts of the pick-up element and the hoisting member on either side of the pick-up element at least
20 substantially forms a parallelogram in unloaded condition.

In another preferred embodiment of a device according to the invention, the pivoting arm(s) include(s) an angle of 0-20°, in particular 0-10°, with the part(s) of the lever extending
25 between the pivoting points of the lever in unloaded condition.

In another preferred embodiment of a device according to the invention, the pick-up element includes an angle of 0-10°
30 with the vertical in unloaded condition and in loaded condition (i.e. also in all kinds of operating conditions). The effect that is achieved in this manner is that a load

cannot easily slide off the supporting support members of the pick-up element of its own accord, whilst on the other hand it will not be difficult to remove the load therefrom at a higher level.

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The invention will now be explained in more detail with reference to figures illustrated in the drawing, in which:

- 10 - Figure 1 is a perspective view of a prior art hoisting device in the form of a pallet hook;
 - Figure 2 is a side elevation of a "combination lift" hoisting device as already discussed before;
 - Figure 3 is a schematic, perspective view of a hoisting device according to the invention, likewise in the form of a pallet hook; and
 - 15 - Figure 4 is a schematic side elevation of the hoisting device of Figure 3, with this difference that the hoisting device is fitted with a piston/cylinder device which functions to prevent the pick-up element taking up an inclined position.
- 20

Figure 1 shows a known steel pallet hook 1, comprising a pick-up element 2 having two support members 3, 3' (forming a "fork"), as well as a hoisting member 4 including a hoisting eye 5, which is welded to the pick-up element 2. A pallet engaged by the hoisting members 3, 3', on which a load is present (not shown), can be lifted and lowered by means of a hoisting crane (likewise by shown), with handles 6 welded to the pick-up element 2 functioning to enable easy engagement of the pallet hook 1 by hand. Since the hoisting eye 5 is present above the pallet supporting the load, it is not possible to place the pallet supporting the load into a

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warehouse rack, for example, or removing it therefrom by means of the pallet hook 1.

Figure 2 is a side elevation of the aforesaid "combination lift" 1, in which parts corresponding to parts that are shown in Figure 1 are indicated by the same numerals. The "combination lift" 1 consists of a hoisting member 4, which is to be connected to a hoisting crane 7 (only partially shown) via a hoisting eye 5, a pick-up element 2 including two support members 3 for supporting a load present on a pallet, as well as a lever 9 which is pivotally connected to the hoisting member 4 about a pivoting point 8. Said lever 9 is pivotally connected to the pick-up element 2 on one side of the pivoting point 8 and fixedly connected to a balance weight 10 on the other side of the pivoting point 8. Depending on the weight of a load to be hoisted, the balance weight 10 will pivot to a greater or lesser extent in a direction away from the pick-up element 2 in order to keep the pack of bricks supported by the support members 3, 3' in a horizontal position, i.e. keep the entire construction in equilibrium. Since the lever 9 engages the pick-up element 2 above the load, viz. at the location of a pivoting point 11, there is a risk that the support members with the load will oscillate about the pivoting point 11, which movement is damped by the piston/cylinder devices as shown. In such a case it is attempted to keep the pick-up element 2 in a vertical position as much as possible, therefore.

Figure 3 is a perspective view of a hoisting device according to the invention in the form of a pallet hook 1, in which parts corresponding to parts that are shown in Figures 1 and 2 are indicated by the same numerals. The present steel

pallet hook 1 comprises a hoisting member 4 in the form of a beam, which is provided with a hoisting eye 5 at one end and which is pivotally connected to two levers 9, one on either side of the hoisting member 4, about pivoting points 8 at its other end. Each lever 9 is fixedly connected on one side of its pivoting point 8 to a ballast 10 functioning as a balance weight, whilst each lever 9 is pivotally connected to a pick-up element 2 about a pivoting point 11 on another side of its pivoting point 8. Said pick-up element 2 may in turn have two support members 3, 3', which jointly form a "fork" for supporting a load present on a pallet. The present pallet hook 1 furthermore comprises two pivoting arms 12 for keeping the pick-up element 2 in an at least substantially vertical position. Each pivoting arm 12 is pivotally connected to the pick-up element 2 about a pivot point 13 near one end whilst being pivotally connected to the hoisting member 4 about a pivot point 14 near its other end. The pivoting arms 12 extend parallel to parts of the levers 9 positioned between the pivoting points 8, 11. In unloaded condition, a combination of the pivoting arm 12 and the parts of the lever 9 between the pivoting points 8, 11, the pick-up element 2 and the hoisting member 4 form a parallelogram, as it were, on either side of the pick-up element 2. Consequently, no constructional obstruction is present above the centre of gravity of a load present on the support members 3, 3', as a result of which a load can be moved from ground level to a higher level, for example a warehouse rack, and vice versa by means of the pallet hook 1 without limitations. The tendency of the pick-up element 2 to take up an inclined position with respect to the vertical in loaded condition (as a result of which the support members 3 tend to include a substantial angle with the horizontal) is corrected by means of the

pivoting arms 12 on the other side of the pick-up element 2, i.e. the side remote from the load. As Figure 3 shows, no separate hydraulic, pneumatic or electrical driving means are used with the pallet hook 1.

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In principle the levers 9 are L-shaped, so that parts of said levers 9 extending between the ballast 10 and the pivoting points 8 will include a small angle, in particular an angle of 0-30°, with the vertical in unloaded condition. As a result, the ballast 10 will lie in an at least substantially vertical plane through the composite centre of gravity of the entire balance construction in unloaded condition. As a result, an additional passive balance on the pick-up element for keeping the whole in equilibrium and compensating a deviation from the vertical position of the pick-up element 2 is not required in that case.

Figure 4 is a schematic side elevation of the hoisting device 1 of Figure 3, in which corresponding parts are indicated by the same numerals. However, a piston/cylinder device 15 in the form of a gas spring operating according to the "door-spring principle" provides a correction of a possible inclined position of the support members 3, 3' (and thus of the tendency of the pick-up element 2 to take up an inclined position with respect to the vertical in unloaded condition), whilst the cylinder/piston device 15 ceases to perform an active function with loads in excess of 75 kg already, and consequently does not have any influence on the situation of equilibrium. The pick-up element comprises a catch hook 16.

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The invention is not limited to the embodiment as described above, it also extends to other variants falling within the

scope of the appended claims.

CLAIMS

1. A device (1) for moving a load by means of a hoisting crane or the like, which device (1) comprises a hoisting member (4) to be coupled to the hoisting crane or the like, a pick-up element (2) for picking up a load to be moved, as well as a lever (9) which is pivotally connected to the hoisting member (4) about a pivoting point (8), which lever (9) is pivotally connected to the pick-up element (2) on one side of said pivoting point (8) and which is connected to a ballast (10) on another side of said pivoting point (8), **characterized in that** the device (1) comprises at least one pivoting arm (12) for keeping the pick-up element (2) at least substantially in vertical position, wherein the pivoting arm (12) is pivotally connected to the pick-up element (2) near one end and to the hoisting member (4) near its other end, wherein the pivoting arm (12) is disposed at least substantially parallel to a part of the lever extending between the pivoting points of the lever (9), and wherein a part of the lever (9) extending between the ballast (10) and the pivoting point (8) includes an angle of 0 - 45°, preferably 0 - 30°, with the vertical in unloaded condition.
2. A device (1) according to claim 1, wherein the device (1) comprises two pivoting arms (12) arranged on either side of the pick-up element (2) for keeping the pick-up element (2) in an at least substantially vertical position, and wherein each pivoting arm (12) is disposed at least substantially parallel to a part of the lever (9) extending between the pivoting points of the lever

(9).

3. A device (1) according to claim 2, wherein the pivoting arms (12) extend parallel to each other.

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4. A device (1) according to claim 1, 2 or 3, wherein the pivoting arm(s) (12) include(s) an angle of 0-20°, in particular 0-10°, with the part(s) of the lever (9) extending between the pivoting points of the lever (9) in unloaded condition.

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5. A device (1) according to any one of the preceding claims 1 - 4, wherein the pick-up element (2) includes an angle of 0-10° with the vertical in unloaded condition and in loaded condition.

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6. A device (1) according to any one of the preceding claims 1 - 5, wherein a piston/a cylinder device (15), in particular a gas spring, is provided for forcing the pick-up element (2) to take up a more vertical position in unloaded condition when said pick-up element (2) includes an angle of 0 - 10° with the vertical.

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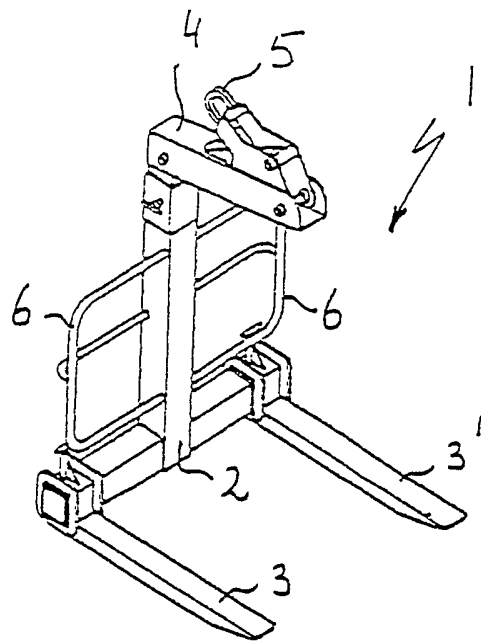


FIG. 1

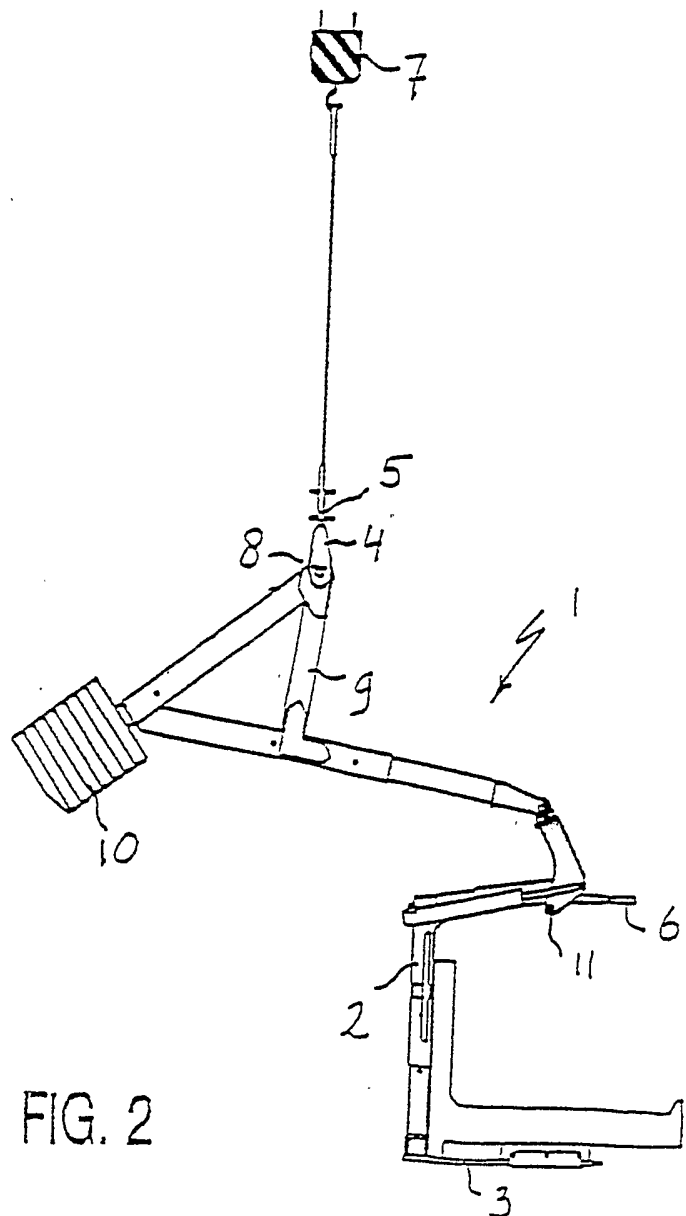


FIG. 2

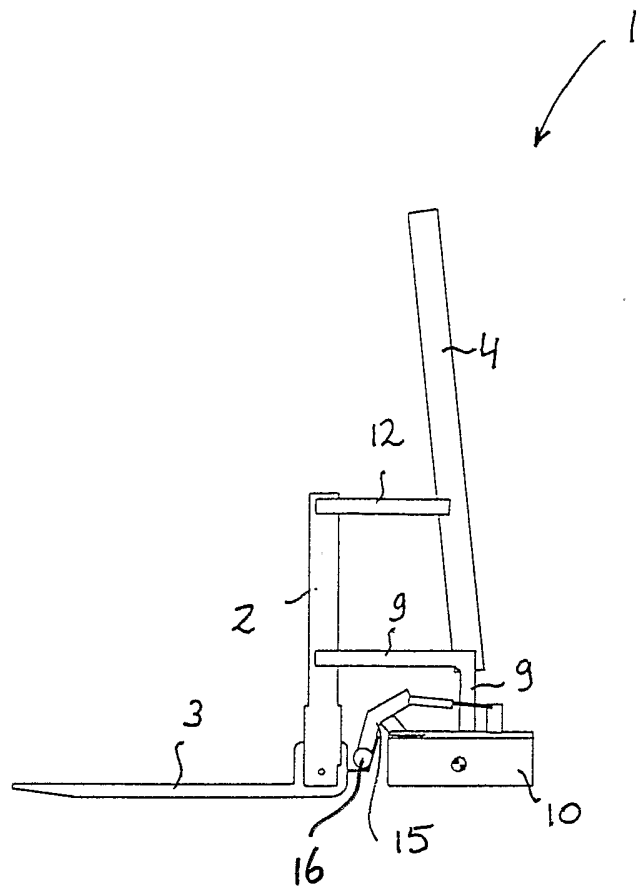


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No

PCT/IN J2/00858

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B66C1/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B66C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 837 027 A (JOSEF BERGMEISTER GMBH & CO BA) 22 April 1998 (1998-04-22)	1-5
Y	the whole document	6
X	US 3 341 243 A (JEAN-MARIE ARCHER MICHEL) 12 September 1967 (1967-09-12)	1-5
Y	column 5, line 70 -column 7, line 24; figures 1,2,4,5	6
Y	AU 81082 75 A (JACRO IND PTY LTD) 18 November 1976 (1976-11-18) page 4, line 8 - line 21; figure 2	6
Y	US 5 094 495 A (LITTELL EDMUND R) 10 March 1992 (1992-03-10) column 3, line 55 -column 4, line 2; figure 4	6



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

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INTERNATIONAL SEARCH REPORT

International Application No

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