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(11) **EP 1 364 907 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.11.2003 Bulletin 2003/48

(51) Int Cl.7: **B66F 9/18**

(21) Application number: **03010554.8**

(22) Date of filing: **12.05.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

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(30) Priority: **22.05.2002 GB 0211681**

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(54) **Improvements in and relating to pallet handling**

(57) The invention provides a fork lift attachment apparatus (2), comprising a substantially rigid spacing member (4) having means (6) for connection to a fork lift, and having means (8) for connection to a pallet, and wherein at least one of the means for connecting to a fork lift and the means for connecting to a pallet are movably mounted relative to the spacing member. The in-

vention further provides A method of connecting a fork lift to a pallet, the method comprising the steps of: (a) providing a substantially rigid spacing member having a pallet connection means at one end thereof and a fork lift connection means at the other end thereof; (b) connecting the pallet connections means, to a pallet and connecting the fork lift connecting means to a fork lift, in any order.

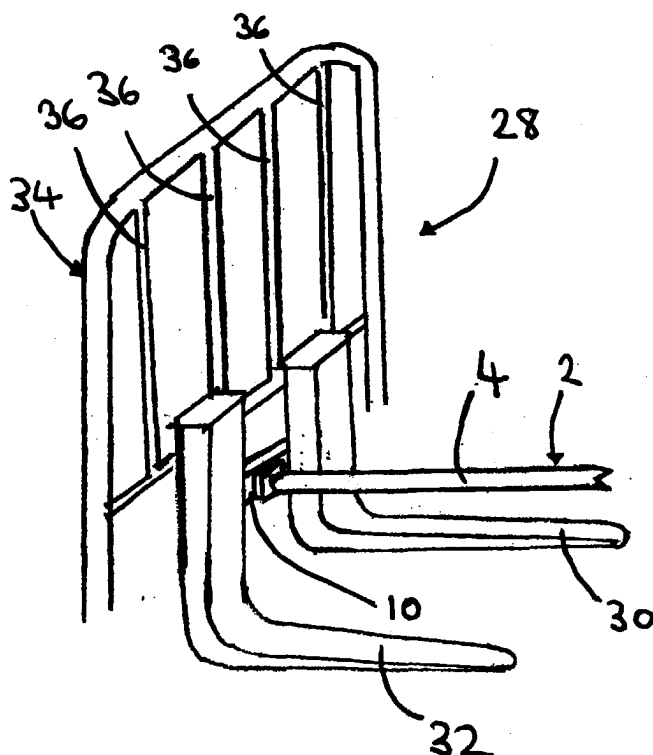


Fig 6

Description

Field of the Invention

[0001] The present invention relates to fork lift attachment apparatus, and to methods of connecting pallets to fork lifts.

Background to the Invention

[0002] Pallets for stacking goods generally comprise a substantially planar surface constructed from parallel elongate boards, mounted on a peripheral frame comprising a number of spacers connected at the bottom by strengthening boards extending therebetween. The strengthening boards are generally spaced apart from the pallet surface by the spacers, such that there is an open space defined by the stacking surface, the strengthening boards and two of the spacers.

[0003] Use of the pallets generally involve stacking desired goods onto the pallet, and manipulating the stacked pallets to a desired position by inserting the forks of a fork lift truck through the apertures defined by the spacers, strengthening boards and pallet surface, to a desired position. The goods stacked on the pallet may then be unloaded as desired and the fork lift truck used to reposition the pallet in the desired position for restacking.

[0004] Generally, pallets are stacked with goods, then moved by fork lift trucks into the cargo spaces of lorries or vans.

[0005] There are problems in orienting the stacked pallets into the cargo spaces of vans or lorries, due to accessibility of the distal area of the cargo space in the van or lorry, furthest away from the opening of the cargo space. Thus, a fork lift desiring to manipulate a stacked pallet to the back of the cargo space, generally has to deposit the stacked pallet as far as the forks will allow, followed by manual movement, generally by pushing or pulling the stack pallet to the back of the van or lorry.

[0006] Furthermore, there are problems in removing stacked pallets from the back of vans or lorries. As the blades of the fork lift cannot reach the rear portion of the cargo space of vans and lorries, in order to remove stacked pallets from the rear portions, known methods involve connecting a flexible strap to the pallet and the blades of the fork lift, the fork lift then being reversed away from the van to pull the stacked pallet from the rear area of the cargo space in the van to near the entrance to the cargo space. The strap is then disconnected from both the pallet and the fork lift and the fork lift driven forward such that the blades of the fork lift then insert into the apertures of the pallet as described hereinabove. The use of flexible straps, which are generally tied to pallets and the blades of the fork lift, can be very dangerous, due to the tension created in the flexible strap as the fork lift is reversed away from the van. The strap may become disconnected during reversal of the

fork lift, and be catapulted with some force away from or towards the pallet due to the release of tension in the taut strap, which may produce injury to the fork lift operator or any operators working in the back of the van or lorry, or working in the area around the opening to the back of the van or lorry.

[0007] It is therefore an aim of preferred embodiments of the present invention to overcome or mitigate at least one of the problems of the prior art, whether expressly disclosed herein or not.

Summary of the Invention

[0008] According to a first aspect of the present invention there is provided a fork lift attachment apparatus, comprising a substantially rigid spacing member having means for connection to a fork lift, and having means for connection to a pallet, and wherein at least one of the means for connecting to a fork lift and the means for connecting to a pallet are movably mounted relative to the spacing member.

[0009] Suitably the spacing member is a bar or rod.

[0010] Preferably the fork lift connection means are situated at or near one end of the bar or rod and preferably the pallet attachment means are situated at or near the other end of the bar or rod.

[0011] Preferably the spacing member is movable to increase and decrease the length of the spacing member. Suitably the spacing member is a telescopic elongate member.

[0012] Suitably the means for connection to a fork lift comprises means for connection to at least one blade of the fork lift, preferably both blades of the fork lift. Suitably the fork lift connection means comprises a cross-bar oriented substantially perpendicular to the spacing member. The cross-bar is preferably oriented to provide two diametrically opposed arms extending from the spacing member. The cross-bar may be connected to the spacing member at one end thereof, preferably by a stem, thereby forming a T-shaped member.

[0013] Alternatively the fork lift connection means may comprise an arm, protruding from the spacing member. The arm may be oriented substantially perpendicular to the spacing member. The arm may be positioned at or near one end of the spacing member thereby forming an L-shaped at one end thereof.

[0014] In a preferred embodiment of the apparatus of the invention the fork lift connection means and spacing member are rotatably movable relative to one another between a first orientation in which the connection means can be operatively connected to a fork lift and a second orientation in which the connection means can be disconnected from the fork lift.

[0015] Suitably the means for connection to a pallet comprises a cross-bar oriented substantially perpendicular to the spacing member. The cross-bar is preferably oriented to provide two diametrically opposed arms extending from the spacing member. The cross-bar may

be connected to the spacing member at one end thereof, preferably by a stem, thereby forming a T-shaped member.

[0016] Alternatively the pallet connection means may comprise an arm protruding from the spacing member. The arm may be oriented substantially perpendicular to the spacing member. The arm may be located at or near one end of the spacing member thereby forming a substantially L-shape at the end thereof.

[0017] In a preferred embodiment of the apparatus of the invention the pallet connection means and spacing member are rotatably movable relative to one another between a first orientation in which the connection means can be operatively connected to a pallet and a second orientation in which the connection means can be disconnected from the pallet.

[0018] Preferably both the fork lift connection means and the pallet connection means are independently movable relative to the spacing member between their respective first and second orientations.

[0019] Suitably the fork lift attachment apparatus is constructed from metal (including alloy), such as iron, aluminium, stainless steel and the like, for example.

[0020] Suitably the fork lift connection means comprises a cross-bar or arm, rotatably mounted to the spacing member and rotatable such that the arm in the first orientation the cross-bar or arm can be inserted behind the forks or a fork lift, and in the second orientation is oriented such that the arm or at least one of the arms of the cross-bar, are retained behind at least one of the forks of the fork lift.

[0021] Suitably the pallet connection means comprises a cross-bar or arm, rotatably mounted to the spacing member and rotatable such that in the first orientation the cross-bar or arm can be inserted through an aperture in the structure of the pallet and a second orientation in which the arm, or at least one of the arms of the cross-bar, is retained behind a structural element of the pallet.

[0022] In an alternative embodiment of the invention the fork lift connection means and the pallet connection means both comprise cross-bars or an arm, fixedly connected to the spacing member, and connected such that the arm, or arms of the respective cross-bars, are oriented substantially perpendicular to one another, the apparatus being rotatable about the axis of the spacing member to effect movement of the connection means between the first and second orientations.

[0023] The or each cross-bar may have only one arm, arranged to be retained behind a structural element of a pallet and/or fork lift, in the second orientation.

[0024] According to a second aspect of the present invention there is provided a method of connecting a fork lift to a pallet, the method comprising the steps of:

(a) providing a substantially rigid spacing member having a pallet connection means at one end thereof and a fork lift connection means at the other end

thereof;

(b) connecting the pallet connection means, to a pallet and connecting the fork lift connection means to a fork lift, in any order.

[0025] Preferably the fork lift connection means is connected to one or both of the forks of the fork lift.

[0026] Suitably the method comprises connecting the fork lift to a pallet which is unreachable by the forks of the fork lift, and the method further comprises after step (b), moving the fork lift to effect movement of the pallet to a position wherein the forks of the fork lift can connect to the pallet, after disconnection of the fork lift attachment apparatus.

[0027] Suitably the fork lift attachment apparatus is as described for the first aspect of the invention.

[0028] According to a third aspect of the invention there is provided a method of connecting a fork lift to a pallet of the second aspect of the invention, using a fork lift attachment apparatus of the first aspect of the invention.

Brief Description of the Drawings

[0029] For a better understanding of the invention and to show how embodiments of the same may be put into effect the various aspects of the invention will now be described by example with reference to the accompanying drawings in which:

Figure 1 illustrates a perspective view of a preferred embodiment of a fork lift attachment apparatus of the invention;

Figure 2 illustrates a top plan view of the fork lift attachment apparatus of Figure 1;

Figure 3 illustrates the pallet connection means of the fork lift attachment apparatus of Figures 1 and 2 in the second orientation disconnected from a pallet;

Figure 4 illustrates the pallet connection means of the fork lift attachment apparatus of Figures 1 and 2 in the first orientation connected to a pallet;

Figure 5 illustrates the fork lift connection means of the fork lift attachment apparatus of Figures 1 and 2 in the second disconnected orientation between the forks of a fork lift;

Figure 6 illustrates the fork lift connection means of Figure 5 in the first orientation, connected between the forks of the fork lift; and

Figure 7 illustrates a top plan of a second preferred embodiment of a fork lift attachment apparatus of the invention.

Description of Preferred Embodiments

[0030] We refer firstly to Figures 1 and 2 which illustrate a preferred embodiment of a fork lift attachment apparatus 2 of the invention. The attachment apparatus 2 comprises a spacing member in the form of a rigid bar 4. The rigid bar 4 has at one end thereof a fork lift connection means in the form of a T-bar 6, which comprises a cross-bar 10, perpendicular to the rigid bar 4, and a stem 12 connected to the rigid bar 4. At the other end of the rigid bar 4 to T-bar 6 is a pallet connection means in the form of a T-bar 8, which comprises a cross-bar 14 and stem 16, the cross-bar 14 being perpendicular to the rigid bar 4 of the attachment apparatus 2.

[0031] Both of the T-bars 6 and 8 are rotatably connected to the respective ends of the rigid bar 4, such that they may be rotated round the longitudinal axis of the rigid bar 4.

[0032] Use of the attachment apparatus 2 will now be described with reference to Figures 3 to 6. Referring firstly to Figures 3 and 4, where it is desired to connect the attachment apparatus 2 to a pallet 18, especially when the pallet is in a hard to reach position, such as at the back of the cargo space of a lorry or van, the attachment apparatus 2 is used as follows. A pallet 18 generally comprises spaced apart and parallel top surface beams 20, which are connected at either end thereof by cross beams 24 perpendicular to the top surface beams 20. Extending from the cross beams 24 are corner spacers 22, attached to the bottom of which are spaced apart bottom surface beams 26. Thus, the top surface beams 20 are separated from the bottom surface beams 26 by a cavity 27.

[0033] In use, the pallet 18 is loaded with desired goods, and for example, transported on the back of a lorry or van. When it is desired to remove the loaded pallet 18 from the back of the lorry or van, the attachment apparatus 2 is oriented towards the pallet 18 and the T-bar 8 rotated such that the cross-bar 14 fits between the top surface beams 20 and bottom surface beams 26 of the pallet 18. In this orientation, the cross-bar 14 is inserted between the top 20 and bottom 26 surface beams, into the cavity 27 of the pallet 18. The T-bar 8 is then rotated such that the cross-bar 14 extends through the gap 23 between parallel and spaced apart top surface beams 20, and through the gap 23 located between parallel and spaced apart bottom surface beams 26. One of the arms of the cross-bar 14 thus protrudes above the plane of the top surface beams 20 and the end of the other of the arms of the cross-bar 14 abuts the floor of the lorry or van, parallel with the bottom surface beam 26. In this orientation, if the attachment apparatus 2 is pulled out of the cargo space of the van or lorry, the arms of the cross-bar 14 abut the side surface of one of the top 20 and bottom 26 surface beams, therefore pulling the pallet out of the van or lorry at the same time.

[0034] Once the T-bar 8 is in position on the pallet 18,

a fork lift is then manoeuvred adjacent to the fork lift connection T-bar 6 at the other end of the rigid bar 4 of the attachment apparatus 2.

[0035] We refer now to Figures 5 and 6. Figures 5 and 6 illustrate the fork lift blades of a fork lift which comprises left and right fork lift blades 30 and 32, which include substantially upright portions 29 and 31 respectively. The upright portions 29 and 31 are connected to a fork support frame 34 which include a plurality of substantially upright support bars 36. The cross-bar 10 of the T-bar 6 is rotated about the rigid bar 4, such that the arms of the cross-bar 10 are parallel with the substantially vertical portions 29 and 31 of the forks 30 and 32 of the fork lift 28, and are positioned in the gap between the forks 30 and 32. The fork lift 28 is then moved forward such that the cross-bar 10 extends between the forks 30 and 32, behind the forks. The cross-bar 10 is then rotated about the rigid bar 4 such that the arms of the cross-bar 10 extend perpendicular to the substantially vertical portions 29 and 30 of the fork lift 28, behind the forks 30 and 32, as shown in Figure 6.

[0036] When the pallet 18 is desired to be removed from the back of the truck or lorry, the fork lift 28 is reversed, such that the arms of the cross-bar T abut the substantially vertical portions 29 and 31 of the forks 30 and 32. Further reverse movements of the fork lift 28 results in movement of the pallet 18 from the back of the truck or lorry, until the pallet 18 is at the opening to the cargo bay of the truck or lorry. The attachment apparatus 2 is then disconnected from both the pallet and the fork lift by rotating the T-bars 6 and 8 to their respective first orientations as described above. The attachment apparatus 2 is then removed, and the forks of the fork lift 28 manoeuvred such that they extend into the cavity 27 between the top 20 and bottom 26 surface beams of the pallet 18. The pallet 18 may then be completely removed from the back of the truck or lorry by the fork lift 28.

[0037] It will be apparent to the person skilled in the art that the T-bar 8 of the pallet connection means may be oriented at different positions with respect to the pallet 18, such that only one of the arms of the cross-bar 14 may connect to the pallet 18, such as extending into the gap 23 between parallel top surface beams 20 from above the top surface beams 20.

[0038] It will be apparent to a person skilled in the art that the fork lift connection T-bar 6 may also be inserted in the spaces between the support bars 36 of the fork lift fork back support 34. Furthermore, the fork lift connection T-bar 6 may be oriented such that only one of the arms of the cross-bar 10 connects to a fork 30 or 32, or a support bar 36 of the fork lift back support 34.

[0039] The rigid bar 4 of the attachment apparatus 2 may also be extendable and retractable, such as by utilising a telescopic bar 4 such that the distance between the T-bar 6 and 8 may be extended and shortened depending on the access distance of a pallet 18 to be removed from, for example, the back of a truck or lorry.

[0040] We turn now to Figure 7 which illustrates a second preferred embodiment of a fork lift attachment apparatus 2 of the invention. The fork lift attachment apparatus 2 of Figure 7 is similar to that of Figures 1 and 2 and like numerals represent like components. In this embodiment, the fork lift connection means 6 comprises a single member having a single protruding arm 40, extending perpendicular to the rigid bar 4. Also, the pallet connection means 8 comprises a single member having a single protruding arm 42, extending perpendicular from the rigid bar 4. Both the fork lift connection means 6 and the pallet connection means 8 are rotatable about the rigid bar 4, such that they may be rotated around the longitudinal axis of the rigid bar 4.

[0041] Use of the apparatus 2 of Figure 7 is substantially the same as use of the apparatus 2 of the embodiments shown in Figures 1 and 2, except that the single members 40 and 42 are arranged to be connected to a fork lift and pallet respectively behind a single structural element of each of the fork lift and pallets. In alternative embodiments to that shown in Figure 7, the rigid bar 4 may be telescopic, the fork lift connection means 6 and pallet connection means 8 may be rigidly connected to the rigid bar 4, but oriented such that the protruding arms 40 and 42 extend diametrically opposed on the rigid bar 4.

[0042] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0043] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0044] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0045] The invention is not restricted to the details of the foregoing embodiment(s). The invention extend to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A fork lift attachment apparatus, comprising a substantially rigid spacing member having means for

connection to a fork lift, and having means for connection to a pallet, and wherein at least one of the means for connecting to a fork lift and the means for connecting to a pallet are movably mounted relative to the spacing member.

2. A fork lift attachment apparatus as claimed in claim 1, wherein the spacing member is movable to increase and decrease the length of the spacing member.

3. A fork lift attachment apparatus as claimed in claim 1 or claim 2, wherein the means for connection to a fork lift comprises means for connection to at least one blade of the fork lift.

4. A fork lift attachment apparatus as claimed in any one of claims 1 to 3, wherein the fork lift connection means comprises a cross bar oriented substantially perpendicular to the spacing member.

5. A fork lift attachment apparatus as claimed in claim 4, wherein the cross bar is oriented to provide two diametrically opposed arms extending from the spacing member.

6. A fork lift attachment apparatus as claimed in any one of claims 1 to 3, wherein the fork lift connection means comprises an arm protruding from the spacing member.

7. A fork lift attachment apparatus as claimed in any preceding claim wherein the fork lift connection means and spacing member are rotatably movable relative to one another between a first orientation in which the connection means can be operatively connected to a fork lift and a second orientation in which the connection means can be disconnected from the fork lift.

8. A fork lift attachment apparatus as claimed in any preceding claim, wherein the means for connection to a pallet comprises a cross bar oriented substantially perpendicular to the spacing member.

9. A fork lift attachment apparatus as claimed in claim 8, wherein the cross bar is oriented to provide two diametrically opposed arms extending from the spacing member.

10. A fork lift attachment apparatus as claimed in any one of claims 1 to 7, wherein the pallet connection means comprises an arm protruding from the spacing member.

11. A fork lift attachment apparatus as claimed in any preceding claim, wherein the pallet connections means and spacing member are rotatably movable

relative to one another between a first orientation in which the connection means can be operatively connected to a pallet and a second orientation in which the connection means can be disconnected from the pallet.

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erence to the accompanying drawings.

12. A fork lift attachment apparatus as claimed in any preceding claim, wherein both the fork lift connection means and the pallet connection means are movable independently relative to the spacing member between respective first and second orientations.

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13. A fork lift attachment apparatus as claimed in claim 1, wherein the fork lift connection means and the pallet connection means both comprise a cross bar or an arm, fixedly connected to the spacing member, and connected such that the arm or arms of the cross bars are oriented substantially perpendicular to the spacing member, the apparatus being rotatable about the axis of the spacing member to effect movement of the connection means between respective fork lift connection and disconnection, and pallet connection and disconnection, orientations.

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14. A method of connecting a fork lift to a pallet, the method comprising the steps of:

(a) providing a substantially rigid spacing member having a pallet connection means at one end thereof and a fork lift connection means at the other end thereof;

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(b) connecting the pallet connections means, to a pallet and connecting the fork lift connecting means to a fork lift, in any order.

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15. A method as claimed in claim 14, wherein the fork lift connection means is connected to one or both of the forks of the fork lift.

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16. A method as claimed in claim 14 or 15, comprising connecting the fork lift to a pallet which is unreachable by the forks of a fork lift, the method further comprising after step (b) moving the fork lift to effect movement of the pallet to a position where the force of the fork lift can connect to the pallet after disconnection of fork lift attachment apparatus.

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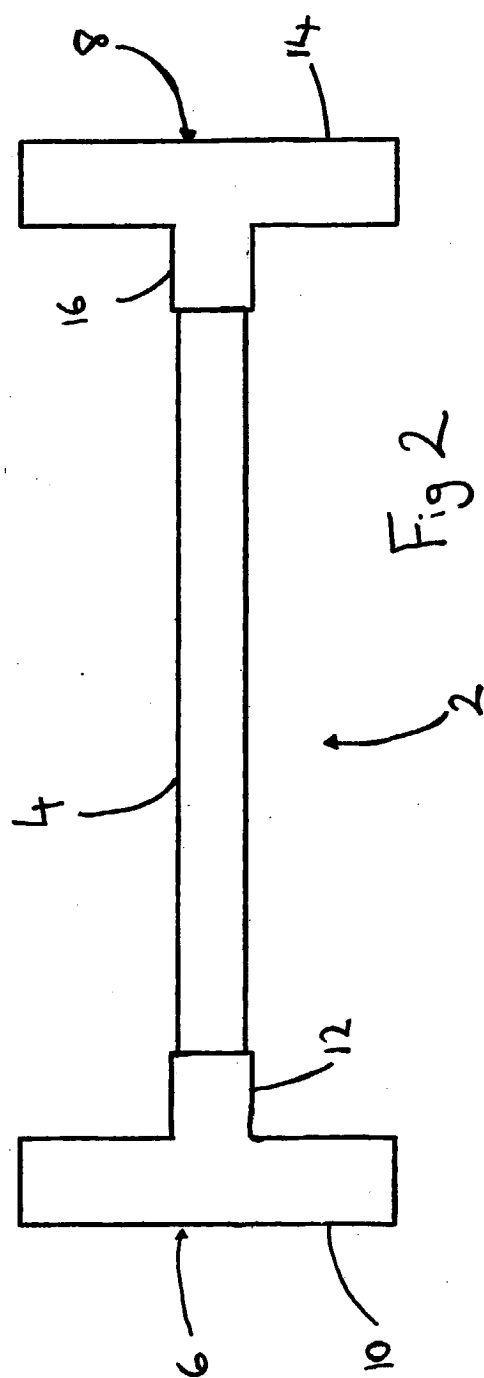
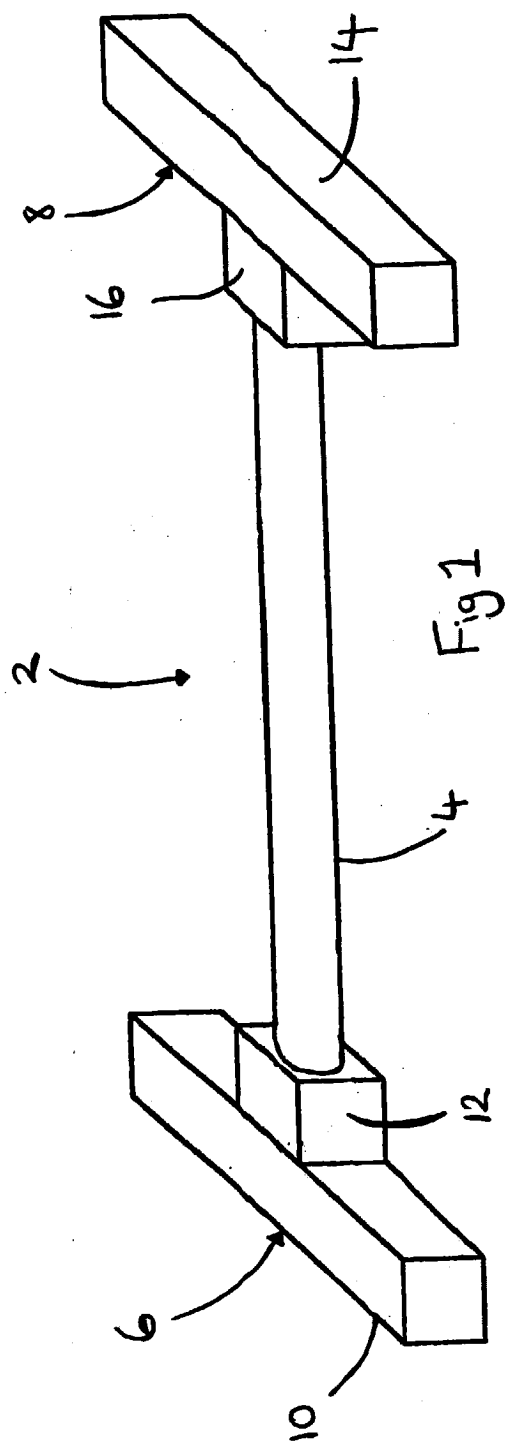
17. A method of connecting a fork lift as claimed in any one of claims 14 to 16 using the fork lift attachment apparatus as claimed in any one of claims 1 to 13.

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18. A fork lift attachment apparatus substantially as described herein with reference to the accompanying drawings.

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19. A method substantially as described herein with ref-



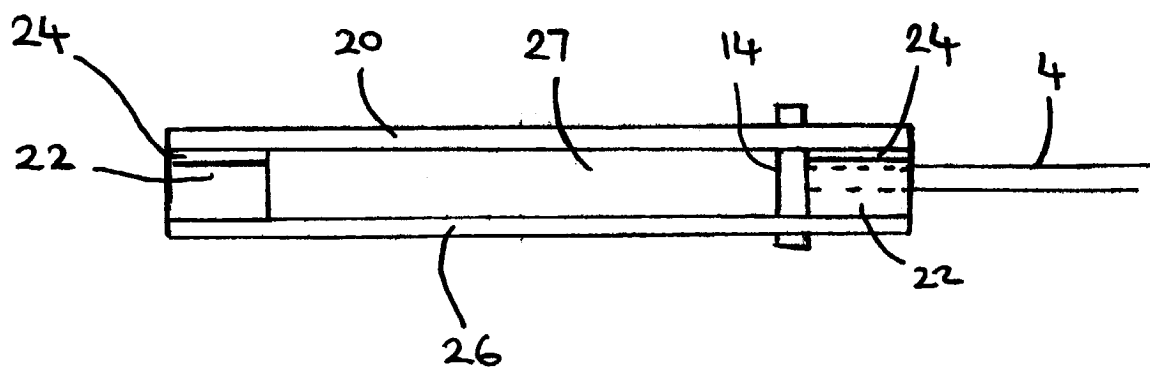
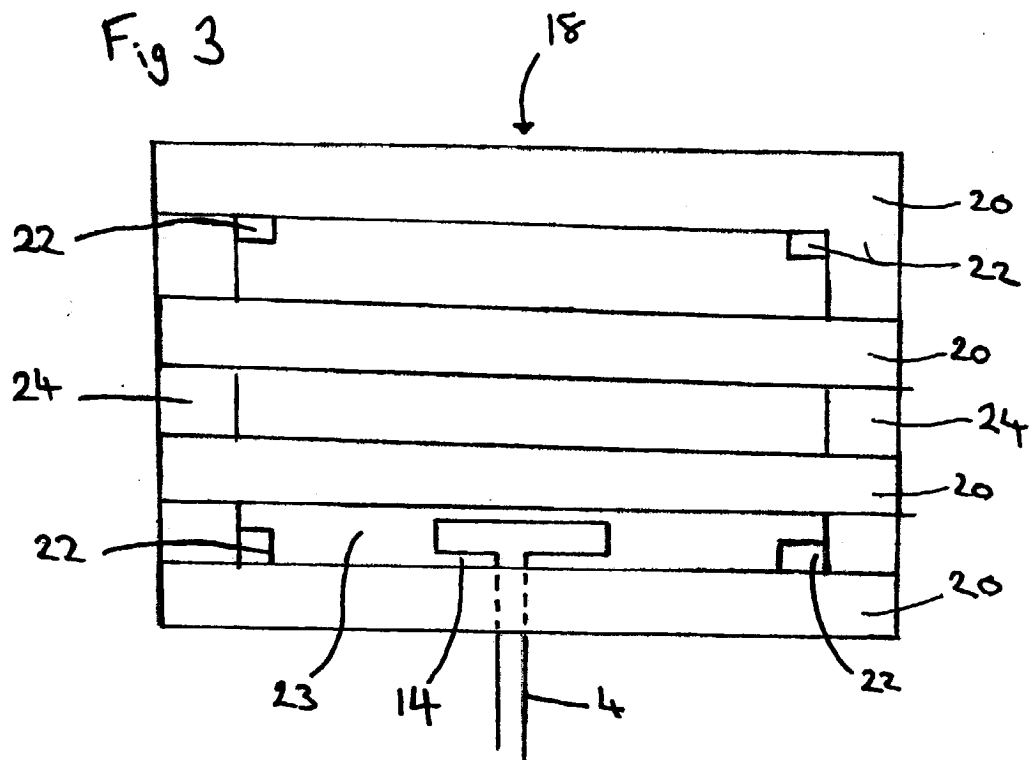
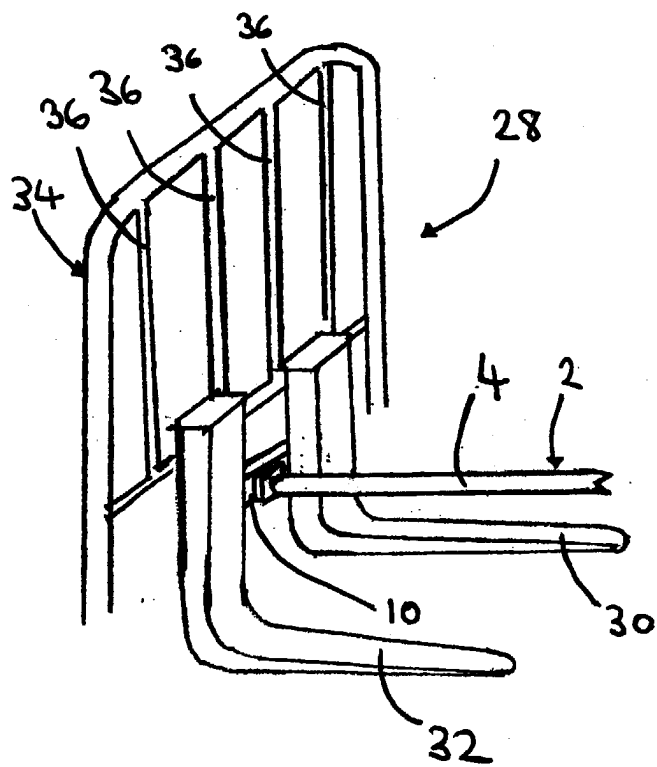
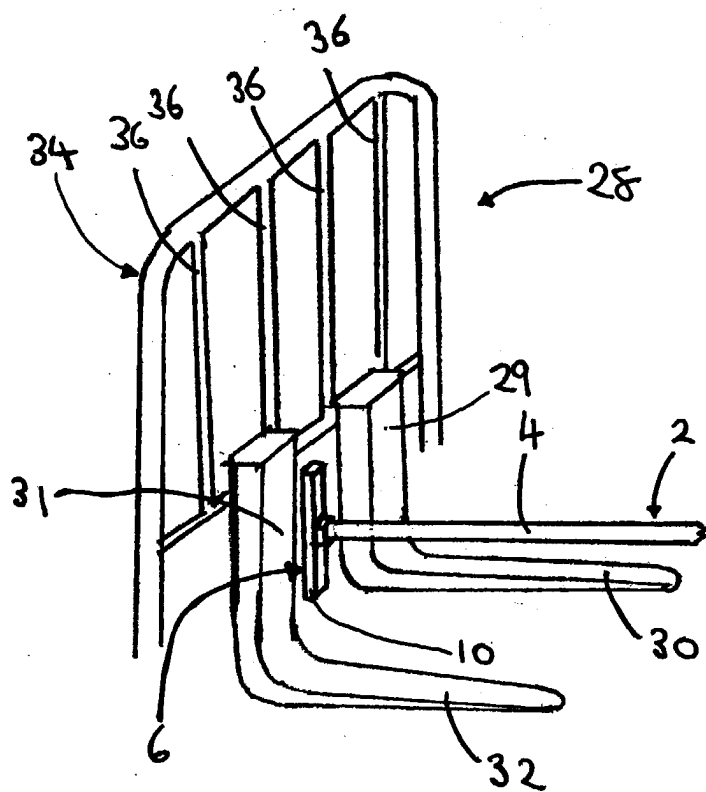


Fig 4



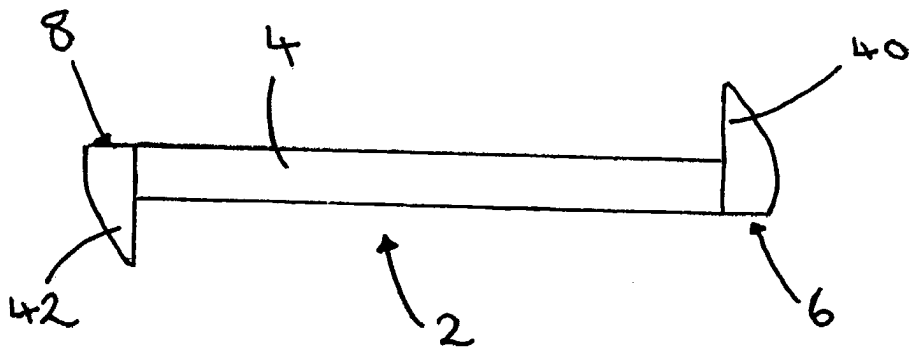


Fig. 7