Title: LIFTING TROLLEY

Abstract: A lifting trolley comprising a wheeled trolley having a front end and a rear end, the wheeled trolley supporting a platform, lifting means to effect lifting and lowering of the platform relative to the trolley, the platform including a load support mounted on a turntable, the load support including a cantilevered extension that enables in use, the load to be displaced laterally of the platform.
Title: LIFTING TROLLEY

Introduction
This invention relates to a lifting trolley, in particular a wheeled trolley that incorporates a scissor lift.

Background of the Invention
Modern day health and safety requirements have placed significant restrictions on the lifting of heavy weights, the limit to what the average human being can safely lift without risk of injury is well known, as is the need to execute the act of lifting in a particular manner that does not place unacceptable strain upon the elements of the human body.

In the larger industrial sphere the handling of goods is carried out with suitable mechanized cranes, hoists, forklifts, conveyors and other mechanized means in buildings suitably designed for their appropriate use. However in many commercial premises and small factory environments it may be impossible to access or use existing mechanised means of lifting such as fork lifts, either walking or ride on stackers or other mechanical means. Such conditions exist in buildings not designed for the purpose or where aisles and doorways are too narrow for the access of conventional powered or hand operated stackers or where the movement of people in the locations in which the transfer and retrieval of such goods is required to take place may preclude the safe use of such equipment as is currently available.

There nevertheless remains the need to safely place and retrieve loads in such environments that may either exceed the permissible lifting capacity or height or reach of lifting as may be safe or defined under applicable occupational health and safety regulations.
It is these issues that have brought about the present invention.

Summary of the Invention

According to a first aspect of the present invention there is provided a lifting trolley comprising a wheeled trolley having a front end and a rear end, the wheeled trolley supporting a platform, lifting means to effect lifting and lowering of the platform relative to the trolley, the platform including a load support mounted on a turntable, the load support including a cantilevered extension that enables in use, a load to be displaced laterally of the platform.

Preferably, the means to effect lifting comprises a scissor lift operated by a hydraulic ram.

Preferably, the wheeled trolley has castor wheels on one end and centrally positioned wheels on either side. The load support preferably comprises a displaceable carriage constrained by rails displaceable laterally of the support. The load support may, in a preferred embodiment, support a wheeled pallet.

In accordance with a further aspect of the present invention there is provided a trolley comprising a frame having front and rear ends, the frame being supported at the front end by fixed wheels on either side of the frame and at the rear end by castor wheels on either side of the frame, whereby auxiliary wheels of greater diameter than the fixed and castor wheels are positioned on either side of the frame near or at the transverse centre line of the trolley to improve manoeuvrability of the trolley.

Description of the Drawings

An embodiment of the present invention will now be described by way of example only with reference to the
accompanying drawings, in which:

Figure 1 is a side elevational view of a lifting trolley in accordance with an embodiment of the invention;

Figure 2 is an end elevational view of the trolley;

Figure 3 is an end elevational view of the trolley in the collapsed position;

Figure 4 is a side elevational view of the trolley in the collapsed position;

Figure 5 is a side elevational view of the trolley illustrating the operation of a brake;

Figure 6 is a plan view of the trolley;

Figure 7 is a plan view of the trolley showing a carriage in an extended position;

Figure 8 is a side elevational view of the carriage;

Figure 9 is a cross sectional view of the carriage;

Figure 10a is a plan view of a wheeled pallet for use with the trolley;

Figure 10b is an end elevational view of the wheeled pallet;

Figure 10c is a cross sectional view of the wheeled pallet;

Figure 11a is a plan view of the trolley carrying the wheeled pallet;
Figure 1b is a side elevational view of the carriage supporting the pallet; and

Figure 1e is a cross sectional view of the carriage supporting the wheeled pallet.

Description of the Preferred Embodiment

The lifting trolley 10 illustrated in the accompanying drawings essentially comprises a proprietary scissor lift trolley 20 that has been modified to enhance its versatility and safety in use. The proprietary scissor lift trolley 20 comprises a base frame 11 that supports the lower end of two pairs of diagonally opposed scissor lifting arms 12, 13 that are in turn connected to an upper platform 15. A hydraulic ram 16 extends along the base frame 11 to engage via a crank 14 one side of the base of the lifting arms to, in use, cause the scissor lifting arms 12, 13 to move up and down from a lower to a fully extended position shown in Figures 1 to 4. The underside of the frame 11 of the trolley 20 supports fixed wheels 18 at a forward end and castor wheels 19 at the rear end which has been modified to include an upstanding U shaped handle 21 that is bolted to the rear of the base frame 11. The proprietary scissor lift trolley includes a jacking handle (not shown) that projects from the rear of the frame 11 to control operation of the hydraulic ram 16.

The major modifications that have been made to the scissor lift trolley 20 concern the addition of a auxiliary wheel structure 50 to the base frame 11 and the provision of a load support carriage 70 that is mounted parallel to the upper platform 15 via a turntable 80 that allows the carriage 70 to rotate relative to the platform 15.

The auxiliary wheel structure 50 comprises a pair of side plates 51, 52 that are bolted to the base frame 11 of the scissor lift trolley 20 to support an axle 56 that
supports on each side wheels 53, 54 that are of larger diameter than the fixed and castor wheels 18, 19 of the trolley 20. The castor wheels 19 at the rear of the trolley are lowered by the insertion of a plate 55 against their mounts so that the effect of the auxiliary wheels 53, 54 and the lowered castor wheels 19 is to lift the forward fixed wheels 18 off the ground so that, in effect, they become redundant and only serve as a safety feature should the trolley 20 tilt forwards. By providing the central wheels 53, 54 of larger diameter which are much closer to the castor wheels 19 and through use of the handle 21, the trolley 10 becomes very manoeuvrable in tight spaces and can be turned sharply through 90° without having to complete the arc of turn that would be required with the conventional wheels 18, 19.

A further modification shown in Figures 4 and 5 is a incorporation of a brake member 60 that is pivotaly secured to the base frame 11 and is engaged by an over centre ramp 61 on one end of a lever 62 that is pivoted at its mid span 63 to the frame 11 and terminates in a foot pedal 64 that is held up with the brake off by a spring 65. The brake member 60 when displaced engages with the periphery of both wheels 53, 54 to prevent rotation of the wheel and brake the assembly.

The modification that has been made to the lifting platform 15 of the scissor lift trolley 20 essentially comprises securing a turntable 80 to the upper surface of the trolley, the turntable 80 in turn supports a load support carriage 70 of rectangular profile.

The load support carriage 70 is mounted parallel to the upper lifting platform 15 via the turntable 80, details of which are shown in Figure 9. Turntable 80 comprises a pair of circular plates 81, 82 separated by an annular array of roller bearings 83. The plate 81 is bolted to
the upper surface of the platform 15 and the plate 82 is bolted to the under surface of a rectangular elongate channel member 71 that forms part of the carriage 70. The elongate channel member 71 has upstanding parallel sides 72 that support an outer track runner 73 that, through appropriate bearings 75, 76, engages an inner track runner 74 via an intermediate extension track runner 77. The inner track runner 74 is secured to a sub carriage 78 that has an upstanding handle 79 at one end and downwardly extending support rollers 83 at the other (see Figure 8). The sub carriage 78 is arranged to be a longitudinal sliding fit relative to the main carriage 71 via the runners and bearings. In this way, the carriage 70 has a capacity to cantilever off the side of the trolley 10 as shown in Figures 7 and 8. The rollers 83 at the forward end of the sub carriage 78 provide support for that carriage if it is displaced transversely onto a support platform that can engage the rollers 83. The rollers 83 also facilitate displacement of the sub carriage 78 relative to the outer carriage 71 which, via the turntable 80, is capable of rotation through 360° relative to the scissor trolley 20.

In a preferred embodiment, the auxiliary carriage is specifically designed to accommodate an especially built wheeled pallet 100 shown in Figure 10. The wheeled pallet comprises a rectangular substantially flat structure with wheels 101, 102 at one end and spaced feet 103, 104 at the other. The feet and wheels extend downwardly to the same extent so that the platform is parallel to a horizontal support surface. Rearwardly of the wheels 101, 102 is a centrally mounted stepped block 105 that forms a latch fitting and the step 106 on the latch is arranged to engage a stop 110 that is mounted on the upper surface of the sub carriage 78, see Figures 11a and 11b. The stop 110, by engaging the step 106 on the pallet 100 prevents the pallet from being displaced laterally of the carriage
70. As shown in Figure 11a the wheel span of the pallet 100 is the same as the span of the support rollers 83 of the sub carriage 78 and the planar body of the pallet 100 sits on the arms of the sub carriage 78, tilted slightly down in the latched position as shown in Figure 11b. To release the carriage, the latch is released allowing the pallet 100 to roll longitudinally off the sub carriage 78 until it is totally clear of the carriage 70.

Whilst the lifting trolley 10 described above has been specifically designed to transport a variety of different goods, the preferred embodiment has been specifically designed to facilitate the movement and lifting of a cumbersome product such as a full wine barrel.

The wheeled pallet 100 is provided with arcuate chocks that support the underside of the wine barrel and, on the assumption that the barrel is sitting on the pallet 100 on the trolley 10 in a lowered position, the use of the handle 21 and the auxiliary wheels 53, 54 makes the trolley 10 very manoeuvrable for displacement in narrow isles of supermarkets, shops and storage areas.

If the barrel is to be transported to a point of use, the trolley 10 is manoeuvred to the desired position at which time the jacking mechanism is effected so that the scissor lift lifts the platform 15 up to the level of the surface on which the barrel is to be placed. The platform is lifted to a position whereby the wheels 101, 102 on the end of the pallet 100 are slightly clear of the support surface. The turntable 80 is rotated through 90° so that the wheels 101, 102 of the pallet 100 are positioned clear of and above the support surface. The lift is slightly lowered thereby allowing the wheels 101, 102 to engage the support surface which, at the same time, releases the latch 110 on the sub carriage 78. The handle 79 on the sub carriage 78 can then be pushed, displacing the wheeled
pallet 100 and sub carriage 78 of the main carriage 70 across the support surface 15 of the trolley 10. When the wheeled pallet 100 and barrel, still supported by the sub carriage 78, have been fully displaced across the work surface the platform 15 is then lowered so that the sub carriage 78 becomes parallel to the work surface which allows simple retraction of the sub carriage 78 which can then be slid back onto the carriage 70, the turntable 80 rotated through 90° and the trolley 10 taken away. This leaves the barrel resting on the wheeled pallet 100 on a required surface and the transfer has taken place in a confined environment without the need for any lifting action.

Although as shown in Figure 6, the carriage 70 is not as wide as the upper platform 15 of the scissor lift 20 and is not as long as that platform, the width of the carriage and the load pallet can be any width within reason. The determining factors are that when the rotary carriage is rotated to either side, the load wheels of the pallet must be vertically above the support table on which the load is to be placed. This requirement is specifically for safety as the inherent flexibility of a scissor lift trolley table (particularly when elevated), and the uncertainty of the trolley being on level ground, means that the extendable carriage cannot be allowed to extend unless the cantilevering load is supported or the load would extend at an ever increasing velocity tipping the trolley over. The projection of the rollers "83" to the side of the trolley is determined by the location of the vertical pivot in relation to the rotary and extending load carrying carriage arrangement. It needs to be sufficient to allow a reasonable clearance between the trolley and the load support table that the load is being transferred onto. A clearance of the order of 40 millimetres has been assumed. The projection of the wheels 83 over the platform onto which the load is being transferred is not necessary
as the wheels 83 do not carry any load at this stage and are only a means of ensuring that the extending carriage frame end cannot snag the platform receiving the load. In the preferred embodiment, the carriage projects towards the trolley back by 300 mms and is in line with the trolley table back edge which allows the carriage to rotate just clear of the trolley inverted "U" handle when it is the width used in this instance. Because the load is much wider, about 500mm in the case of the barrel, the load is placed further forward on the carriage so that it too will clear the trolley handles when rotated at a minimum scissor lift height. The existing design has a trolley table 500 mms wide, the main wheels 588 mms overall width (for increased side stability and fitting convenience) with the pallet rollers projecting 365 mms (to their centreline of the roller) and the carriage rollers "83" projecting 313 mms from the carriage vertical axis.

Thus assuming the trolley main wheel is 40 mms clear of the platform table receiving the load, the trolley table will project 32 mms onto the platform allowing disengagement of the extendable carriage. Another consideration of the relative widths and extensions is that it is desirable to be able to swing a load 90 degrees to discharge it but into a width not much wider than the load being swung. The wider the load, the greater the width required. The proportions for the barrel pallet actually allow barrels to be placed side by side with perhaps 50 mms between them.

The scissor lift trolley that is used in the preferred embodiment operates through a hydraulic ram. It is however understood that it could be electrically operated by either mains or battery power. Trolleys of this kind usually have a lifting capacity in the range of 150kg - 500kg. The lift of the platform is usually between 0.3 -
0.9 metres and in some cases up to 1.6 metres. In the preferred embodiment the trolley is made to be highly manoeuvrable by hand by the addition of independent rotatable wheels situated close to the mean length of the trolley to carry the bulk of the load as imposed by the weight of the trolley and the load it is transporting. These wheels, in combination with the castor wheels towards either end of the trolley, allow exceptional manoeuvrability of the trolley through obstacles, doorways, narrow isles or obstructions. In such an arrangement, the wheels allow for the controlled rotation of the trolley about a vertical axis situated near the centre footprint of the trolley. This is a motion not possible in conventional trolleys having one set of fixed wheels at one end and castors at the other. Such a wheel arrangement requires specific positioning of the trolley by substantial to and fro movements to locate the fixed castors in a particular position while facing the trolley in the desired orientation. This drawback is overcome by the addition of wheels of the trolley described above. The addition of the centrally placed wheels allows for the wheels being of larger diameter than is typical in the castor and fixed wheels. This makes the trolley substantially easier to move on rough paving or on soft terrain as may occur on a carpeted surface within a building.

The additional wheels also have the effect of lifting the fixed wheels off the ground so that these wheels act in an emergency to support the trolley if it is tipped forwardly or sometimes to assist displacement of the trolley over very rough terrain.

In using the trolley described above, small lifting and lowering motions of the support platform are required and these can be either done manually through use of the hydraulic ram or alternatively a control mechanism may be
incorporated that provides automated incremental lifting and lowering to facilitate the discharge of the barrel as described above.

In a further modification, it is understood that one or more adjustable feet can be utilised with the trolley that can be lowered and locked by an over centre linkage to keep the trolley rigidly supported by its main wheels and auxiliary castor wheels when the trolley table lift is raised for transferring a load. This mechanism may be in the form of either a hand or foot operated linkage. The stabiliser feet can be lowered against a spring and returned to lift them by means of a small hydraulic ram coupled in parallel to the main scissor lift ram such that when the table is pumped up, the back hydraulic pressure will automatically extend the stabilizer feet. This has a distinct advantage in forcing the operator to only move a trolley when the lift table is fully collapsed.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A lifting trolley comprising a wheeled trolley having a front end and a rear end, the wheeled trolley supporting a platform, lifting means to effect lifting and lowering of the platform relative to the trolley, the platform including a load support mounted on a turntable, the load support including a cantilevered extension that enables in use, a load to be displaced laterally of the platform.

2. The lifting trolley according to claim 1, wherein the lifting means comprises a scissor lift operated by a hydraulic ram.

3. The lifting trolley according to either claim 1 or claim 2, wherein the wheeled trolley has castor wheels on either side of the rear end and a pair of auxiliary wheels positioned on either side of the trolley substantially centrally of the trolley.

4. The lifting trolley according to claim 3, wherein fixed wheels are provided on either side of the front end of the trolley.

5. The lifting trolley according to claim 4, wherein the auxiliary wheels are of greater diameter than the fixed and castor wheels.

6. The lifting trolley according to any claim 5, wherein the castor wheels have their rotational axes lower than the rotational axes of the fixed wheels so that when the trolley is resting on the auxiliary wheels and the castor wheels, the fixed wheels are off the ground.

7. The lifting trolley according to any one of claims 3 to 6, wherein a foot operated brake is fitted to the trolley to be engageable with one of the auxiliary wheels.
8. The lifting trolley according to any one of the preceding claims, wherein an upwardly extending handle extends from the rear end of the trolley.

9. The lifting trolley according to any one of the preceding claims, wherein the load support includes a displaceable carriage constrained by rails to be displaceable laterally of the platform.

10. The lifting trolley according to any one of the preceding claims, wherein the load support is a wheeled pallet.

11. The lifting trolley according to any one of the preceding claims, wherein stops are provided on the load support to prevent unintentional cantilevered extension.

12. A trolley comprising a frame having front and rear ends, the frame being supported at the front end by fixed wheels on either side of the frame and at the rear end by castor wheels on either side of the frame, whereby auxiliary wheels of greater diameter than the fixed and castor wheels are positioned on either side of the frame near or at the transverse centre line of the trolley to improve manoeuvrability of the trolley.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B66F 5/00 (2006.01)  B66F 7/28 (2006.01)  B66F9/14 (2006.01)
B66F 7/08 (2006.01)  B66F 9/065 (2006.01)  B66F 9/19 (2006.01)

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)

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 practicable, search terms used)

DWP: B66F5/IC, 7/IC, 9/IC and Keywords (trolley, troll+, wheel+, mobile, cart+, turntable+, rotary, turn+, spin+, rotat+, lateral+, exten+, cantilever-, arm+, project+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<td>U S 4655466 A (HANAOKA) 7 April 1987</td>
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<td>A</td>
<td>EP 089389 B 1 (COATES MANAGEMENT PTY LTD) 26 November 1986</td>
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<td>A</td>
<td>SU 992417 A (MEDINSTRUMENT TRUST) 5 February 1983</td>
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[X] Further documents are listed in the continuation of Box C  [X] See patent family annex

Special categories of cited documents:

A* document defining the general state of the art which is not considered to be of particular relevance
E earlier application or patent but published on or after the international filing date
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P document published prior to the international filing date but later than the priority date claimed
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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
A document member of the same patent family

Date of the actual completion of the international search
28 March 2007

Date of mailing of the international application
30 March 2007

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Form PCT/ISA/210 (second sheet) (April 2005)
### DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<td>A</td>
<td>AU 199480441 (660271) A1 (SZANTO) 15 June 1995</td>
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</table>
This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This International Searching Authority has found that there are different inventions as follows:

- Claims 1 to 11 are directed to a wheeled trolley supporting a platform with lifting means to effect lifting and lowering of the platform. It is considered that the feature of the platform including a load support mounted on a turntable, the load support further including a cantilevered extension so as to displace a load laterally of the platform comprises a first distinguishing feature.

- Claim 12 is directed to a trolley comprising a frame supported at the front end by a pair of fixed wheels and at the rear end by a pair of castor wheels. It is considered that the feature of providing auxiliary wheels of greater diameter than the fixed and castor wheels near or at the transverse centre line of the trolley comprises a second distinguishing feature.

Each of the abovementioned groups of claims has a different distinguishing feature and they do not share any feature which could satisfy the requirement for being a special technical feature. Therefore the claims do not satisfy the requirement of unity of invention a priori.

The International Searching Authority believes that a search and examination for the second invention will not involve more than negligible additional search and examination effort over that for the first invention and so no additional search fee is required in order to search and examine that invention.
# International Search Report

## Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. 
   - Claims Nos.: [ ]
   - because they relate to subject matter not required to be searched by this Authority, namely:

2. 
   - Claims Nos.: [ ]
   - because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. 
   - Claims Nos.: [ ]
   - because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

## Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See supplemental sheet

1. 
   - As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. 
   - As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. 
   - As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. 
   - No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

## Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

- No protest accompanied the payment of additional search fees.