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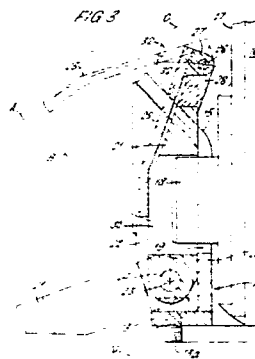
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(54) **Device for locating a battery or like heavy component on a chassis e.g. of an industrial lift truck.**

(57) Device for locating a heavy component such as an electrical battery on a chassis such as that of an industrial lift truck, and for preventing dislodgement of the battery even during excessive tilting of the chassis.

The apparatus includes a frame formed from two spaced parallel channel members which extend longitudinally of the truck and are bolted to the chassis (10). In the upper surface of each channel member is a downwardly extending slot (19) in which a respective spigot (18) of the battery (16) is received when the battery (16) is located between the two channel members. A respective flap (21) pivotally attached to each channel member adjacent its slot (19) is then rotated about its pivot into an operative position in which it covers a substantial portion of the slot (19) the end of spigot (18) being accommodated in an aperture (30) in the flap (21). To retain the flap (21) in its operative position, a second flap or latch (25) pivotally mounted on flap (21) is rotated about its pivot until wings on flap (25) engage an inclined surface (15) of the respective channel member. Thus the flap (21) cannot be released from its operative position until the wings of the flap (25) are disengaged from surfaces (15).

As long as the flaps (21) are held in their operative positions by the respective flaps (25), the engagement of the spigots (18) in slots (19) and apertures (30) prevents dislodgement of the battery (16) even during excessive tilting of the chassis (10).



1.

TITLE MODIFIED
see front page

"BATTERY LOCATING DEVICE"

1 This invention relates to a device for locating
an electrical battery or like heavy component on a
chassis, particularly on the chassis of an industrial
lift truck.

5 A battery of an industrial or fork lift truck
is usually mounted on the truck chassis by means of a
number of locating pins which protrude from the under-
side of the battery for engagement with correspondingly
placed holes in the upper surface of the chassis, the
10 weight of the battery being usually sufficient to retain
the battery in place. However, if the truck is likely
to be excessively tilted, as may occur for example if
the truck is slung from a crane or helicopter, during



1 transit to an oil rig, say, then there is a danger that
the line of action of the centre of gravity will shift
sufficiently relatively to the locating pins to pull
the pins out of their respective holes and the battery
5 will fall off the truck. The present invention is
concerned with the position of a locating device for
retaining a battery, or like component, on the truck
chassis even during excessive tilting thereof.

According to the invention, there is provided an
10 assembly for locating on a chassis a heavy component
having a laterally extending location spigot, the
assembly comprising a frame, adapted to be mounted on
a chassis, for receiving such a heavy component, there
being a slot formed in a side member of the frame,
15 which slot extends downwardly from an upward facing
surface of said side member when the frame is mounted
on a chassis for the accommodation of said location
spigot of a heavy component received by the frame, and
a spigot restraining means adjacent said slot comprising
20 a flap member which is pivotably mounted on the side
member of the frame adjacent said slot for pivotal
movement relative to the frame between an inoperative
position in which it extends laterally outwardly of the
side member of the frame and an operative position in
25 which it covers a substantial portion of the slot,
there being a recess in the flap member for accommodating
the end of said location spigot of a heavy component
received by said frame with its location spigot when
the flap member is in its operative position, and a
30 latch device for releasably securing the flap member to
said side member of the frame when the flap member is
in said operative position, the latch device being
mounted on the flap member on the side of the recess

1 wherein remote from the pivotal connection between the
side member of the frame and the flap member and being
arranged for movement relative to the flap member to
engage an adjacent portion of the side member of the
5 frame when the flap member is in its operative position.

Conveniently, the latch device is a second flap
member which is mounted on the first-mentioned flap
member for pivotal movement relative thereto about an
axis parallel to that of the pivotal connection between
10 the first flap member and the side member of the frame
into a locking position in which it lies over at least a
part of the first flap member and engages the side
member of the frame adjacent said slot therein when the
first flap member is in its operative position.

15 Preferably said surface of the side member of a
portion which, at least adjacent said slot, is inclined
downwardly and inwardly when the frame is mounted on
a chassis. Preferably, the frame is adapted to provide
a seating for a heavy component to be located, a substan-
20 tial portion of the surface of the frame which is upper-
most when the frame is mounted on a chassis, including
said surface of the frame which is uppermost when the
frame is mounted on a chassis, including said surface
of said side member, being inclined inwardly and
25 downwardly to facilitate correct location of a heavy
component on said frame. Preferably also the first flap
member is pivotally connected to the side member of the
frame adjacent the end of said slot which is lowermost
when the frame is mounted on a chassis, for pivotal
30 movement outwardly and upwardly from said inoperative
to said operative position, said second flap member
being pivotable relative to the first flap member out-
wardly and downwardly into its locking position once the

1 first flap member is in its operative position, the
second flap member having at least one projection for
engaging the inclined surface of the side member of the
frame adjacent the slot to inhibit pivotal movement of
5 the first flap member out of its operative position
until the second flap member is moved out of its locking
position. In addition the walls of the slot are
preferably inclined inwardly so that the slot is widest
at its opening in said surface of said side member of
10 the frame to facilitate the correct location of said
spigot therein.

In practice, it is convenient for the frame to
have a second side member on the opposite side of the
frame to said first-mentioned side member, the second
15 side member being formed with a slot identical to said
slot in said first side member, there being second
respective spigot restraining means, identical to said
first-mentioned spigot restraining means, located
adjacent said slot in said second side member. In this
20 way, it is possible for the frame to accommodate heavy
components having a respective spigot extending laterally
from each of a pair of opposite sides thereof. Preferabl
the frame comprises a pair of parallel spaced strip
members which constitute said first and second side
25 members of the frame and which are adapted to be fixedly
mounted on a chassis, each strip member being convenientl
bent along its length to provide said inclined portion
of the surface of the frame.

Reference will now be made to the accompanying
30 drawings which illustrate, by way of example, one
embodiment of the invention, and of which:

Figure 1 is a diagrammatic plan view of a part
of the rear end of a lift truck, showing one locating



1 assembly according to the invention;

Figure 2 is a diagrammatic view of the locating assembly of Figure 1 viewed in the direction of arrow II; and

5 Figure 3 is a sectional view of the locating assembly of Figure 2, taken along line III - III therein.

In the drawings, on the rear end of the chassis 10 of a lift truck are bolted two laterally spaced, parallel channel members 11 (only one being illustrated since the rear end of the truck is symmetrical about its longitudinal centre line 12) which extend longitudinally of the truck. Each channel member 11 faces outwardly, being formed by a strip 13 which is bolted to the chassis 15 by bolts 13a, and a second strip 14, which is welded to strip 13 and is upright with respect thereto. The strip 14 is bent at an oblique angle along its length to form the channel section so that the upper surface 15 of the strip 14 is downwardly and inwardly inclined, an arrangement which facilitates the correct locating of 20 a battery 16 (Figure 3) on the chassis 10 between the members 11. The sides 17 of the battery 16 which are arranged to be adjacent the members 11 when the battery is thus located on the chassis are each provided with a respective laterally extending spigot 18, which is 25 accommodated in a respective downwardly extending slot 19 in the adjacent strip 14. The sides of each slot 19 have portions 20 which, as best seen in Figure 2, are inclined inwardly and downwardly in order to facilitate the correct location of the respective spigot 18 therein 30 as the battery is inserted between the members 11 during its mounting on the chassis.

Since the means by which each spigot is retained

1 in its respective slot 19 are identical, only one will
now be described.

As shown in Figures 2 and 3, a flap 21 is pivotally
mounted between two flanges 22 which extend laterally
5 outwardly of the strip 14, the flanges 22 being welded
to the strips 13 and 14, the axis 23 of the pivotal
connection 24 extending generally horizontally and being
located adjacent the lower end of the slot 19. A
second flap 25 is pivotally connected by a pin 26 to
10 the free end of the flap 21. The pin 26 passes through
aligned holes in two spaced projections 27 which are
fixedly mounted on flap 25, and in a third projection
28 which is fixedly mounted on the flap 21, and is
located between the projections 27. The projection 28
15 is oriented at an angle to the flap 21, for a purpose
to be described hereinafter.

When the spigot is correctly located within its
respective slot 19, the flap 21 is rotated about pin 24
relative to the strip 14 from an inoperative position,
20 shown in chain dot lines in Figure 3, in which it extends
laterally outwardly of the strip 14, into an operative
position, shown in full lines in Figure 3, in which it
abuts against the upright lower portion 29 of the strip
14, so as to cover a substantial portion of the slot 19.
25 The flap 21 is recessed, having an aperture 30 located
between the two pins 24 and 26, the spigot 18 being
accommodated within the aperture 30 when the flap 21
reaches its operative position. It will be seen from
Figure 2 that when the flap 21 is in its operative
30 position, the spigot 18 is supported on the sloping walls
20 of the slot 19, and is prevented from upward movement
out of the slot 19 by its engagement within the aperture
30 in flap 21.

1 During the outward and upward rotation of the
flap 21 into its operative position, the axis of pin 26
between the flaps 21 and 25 follows a locus indicated in
chain dot line A in Figure 3, which passes above the
5 level of the uppermost edge of surface 15 on the strip
14. Until the flap 21 reaches its operative position,
the flap 25 is disposed at an angle to the flap 21, as
shown in chain dot lines in Figure 3, in order that
wings or projections 31, best seen in Figure 2, on the
10 flap 25 can clear the uppermost edge of surface 15 of
strip 14 during this rotation of the flap 21. Once flap
21 is in its operative position, the flap 25 is rotated
downwardly and outwardly, its free end following the
locus indicated by the chain dot line B in Figure 3,
15 until it lies over the outer surface of the flap 21.
During this rotation of flap 25, the lower edges 32
of wings 31 thereof follow a locus indicated by chain
dot lines C shown in Figure 3, the dimensions of the
flap 25 and its wings 31 being such that when the free
20 end of the flap 25 contacts the outer surface of flap 21,
the lower edges 32 of the wings 31 abut against the
inclined surface 15 of the strip 14 on either side of
the slot 19. The edges 32 are appropriately bevelled in
order that the rotational movement of the flap 25 is not
25 impeded by premature engagement between edges 32 and
the surface 15 yet providing sufficient engagement between
edges 32 and the surface 15 when the rotation of the flap
25 is completed to prevent outward rotation of the flap
21 out of its operative position unless the flap 25 is
30 again raised. The angular orientation between the pro-
jection 28 and the flap 21 helps the wings on flap 25
to clear the upper edge of the surface 15 during rotation
of flap 21 into its operative position.

1 Thus using the battery locating assembly
described above, the battery can be guided into its
correct position on the chassis 10 by means of the
sloping surfaces 15 on the two strips 14, and also the
5 sloping walls 20 of the two slots 19, and once the
battery is in position, the spigots 18 can be readily
and quickly retained in the slots 19 by the rotation
first of the flaps 21 and subsequently of the flaps 25.
The particular arrangement of the pairs of flaps 21, 25
10 enables quick release of the battery from its mounting
on the chassis, yet providing retention of the battery
in its mounting even if the truck is excessively tilted.

1 CLAIMS:

1. An assembly for locating on a chassis a heavy component having a laterally extending location spigot, the assembly comprising a frame, adapted to be
5 mounted on a chassis, for receiving such a heavy component, there being a slot formed in a side member of the frame, which slot extends downwardly from an upward facing surface of said side member when the frame is mounted on a chassis for the accommodation of said
10 location spigot of a heavy component received by the frame, and a spigot restraining means adjacent said slot comprising a flap member which is pivotally mounted on the side member of the frame adjacent said slot for pivotal movement relative to the frame between an
15 inoperative position in which it extends laterally outwardly of the side member of the frame and an operative position in which it covers a substantial portion of the slot, there being a recess in the flap member for accommodating the end of said location spigot of a heavy
20 component received by said frame with its location spigot in said slot when the flap member is in its operative position, and a latch device for releasably securing the flap member to said side member of the frame when the flap member is in said operative position, the
25 latch device being mounted on the flap member on the side of the recess therein remove from the pivotal connection between the side member of the frame and the flap member and being arranged for movement relative to the flap member to engage an adjacent portion of the side member
30 of the frame when the flap member is in its operative position.

1 2. An assembly as claimed in claim 1, in
which the latch device is a second flap member which is
mounted on the first-mentioned flap member for pivotal
movement relative thereto about an axis parallel to
5 that of the pivotal connection between the first flap
member and the side member of the frame into a locking
position in which it lies over at least a part of the
first flap member and engages the side member of the
frame adjacent said slot therein when the first flap
10 member is in its operative position.

 3. An assembly as claimed in claim 2, in
which said surface of the side member of the frame has
a portion which, at least adjacent said slot is inclined
downwardly and inwardly when the frame is mounted on a
15 chassis.

 4. An assembly as claimed in claim 3, in
which the frame is adapted to provide a seating for a
heavy component to be located, a substantial portion of
the surface of the frame which is uppermost when the
20 frame is mounted on a chassis, including said surface of
said side member, being inclined inwardly and downwardly
to facilitate correct location of a heavy component
on said frame.

 5. An assembly as claimed in claim 3 or
25 claim 4, in which the first flap member is pivotally
connected to the side member of frame adjacent the end
of said slot which is lowermost when the frame is mounted
on a chassis, for pivotal movement outwardly and upwardly
from said inoperative to said operative position, said
30 second flap member being pivotable relative to the first

11.

1 flap member outwardly and downwardly into its locking
position once the first flap member is in its operative
position, the second flap member having at least one
projection for engaging the inclined surface of the
5 side member of the frame adjacent the slot to inhibit
pivotal movement of the first flap member out of its
operative position until the second flap member is moved
out of its locking position.

6. An assembly as claimed in any of claims
10 3 to 5, in which the walls of the slot are inclined
inwardly so that the slot is widest at its opening in
said surface of said side member of the frame.

7. An assembly as claimed in any of claims
1 to 5, in which the frame has a second side member on
15 the opposite side of the frame to said first-mentioned
side member, the second side member being formed with a
slot identical to said slot in said first side member,
there being second respective spigot restraining means,
identical to said first-mentioned spigot restraining
20 means, located adjacent said slot in said second side
member.

8. An assembly as claimed in claim 7, in
which the frame comprises a pair of parallel spaced
strip members constituting said first and second side
25 members of the frame which are adapted to be fixedly
mounted on a chassis.

9. An assembly as claimed in claim 8,
including the features claimed in claim 4 in which each
strip member is bent along its length to provide said
30 inclined portion of the surface of the frame.

1 10. An assembly as claimed in any of
claims 1 to 9, in combination with a chassis on which
the frame is fixedly mounted.

5 11. An industrial lift truck including a
chassis, and an assembly as claimed in any of claims
1 to 9 of which the frame is fixedly mounted on the
chassis.

10 12. An industrial lift truck including a
chassis, and an assembly as claimed in any of claims
1 to 6 of which the frame is fixedly mounted on the
chassis, in combination with a heavy component having
a laterally extending location spigot, which component
is located on the chassis of the truck by the engagement
of said spigot within said slot in the frame, with the
15 flap member of said assembly in its operative position
and the latch device engaging an adjacent portion of
the frame side member.

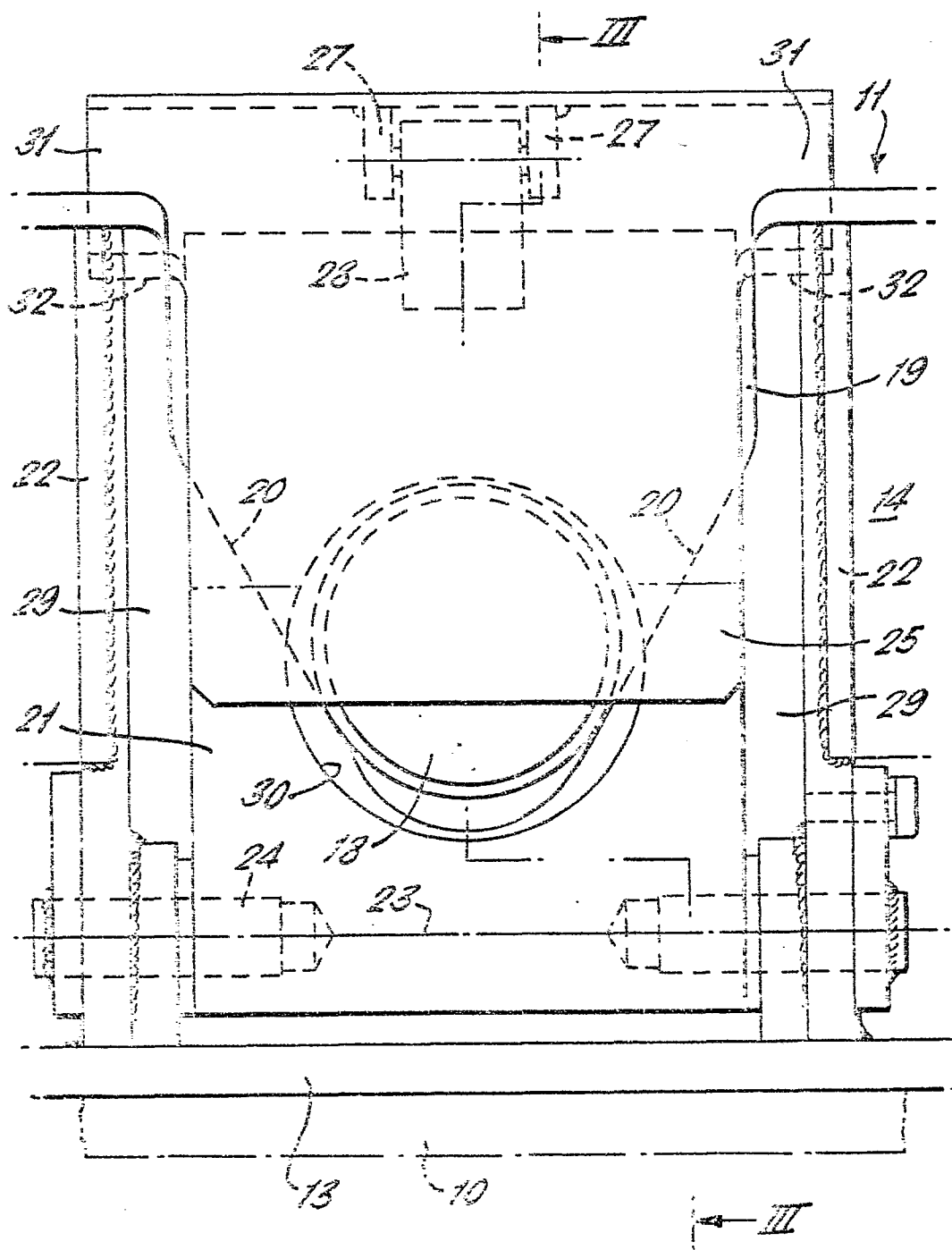
20 13. An industrial lift truck including a
chassis, and an assembly as claimed in any of claims 7
to 9 of which the frame is fixedly mounted on the chassis
in combination with a heavy component having two laterally
extending location spigots projecting one from each side
thereof, said component being located on the chassis of
the truck by the engagement of said spigots in the
25 respective slots in the first and second side members
of the frame, with the respective flap members of said
assembly in their operative positions and each associated
latch device engaging an adjacent portion of the
respective frame side member.

13.

- 1 14. The combination of claim 12 or claim
13, in which the heavy component is an electrical
battery for providing electrical power to operate the
truck.

2/3

FIG. 2.





DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	<u>US - A - 3 628 222 (PALEN)</u> * Column 2, lines 26 to 48; figures 1 to 4 * -----	1

SEARCHED
APPROX.

B 60 R
B 60 R
B 60 R

TECHNICAL FIELDS
SEARCHED (Int.Cl.⁷)

B 60 R 18/02
B 60 R 9/04
B 60 R 7/04
B 60 R 15/02
B 60 R 11/00
B 60 K 1/04

CATEGORY OF
CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying
the invention
E: conflicting application
D: document cited in the
application
L: citation for other reasons

&: member of the same patent
family
corresponding document

X

The present search report has been drawn up for all claims

Place of search

Date of completion of the search

Examiner

The Hague

18-09-1978

INT. EX. 1

BAD ORIGINAL