

A FREIGHT CARRIER

FIELD

Embodiments described herein relate to for example a freight carrier that can transport a quite heavy freight.

BACKGROUND

Previously, when a quite heavy freight is transported, for example, the heavy freight is put onto a hollow conveying platform, and two liftable projections arranged in front of a forklift are inserted from the lateral side of above-mentioned conveying platform, then lifted upwards and transported. However, in order to transport such a heavy freight, as shown in FIG. 1, a forklift 1 and a conveying platform 3 that carries a freight 2 are needed. Furthermore in order to insert two projections 4a, 4b of the forklift 1 into the above-mentioned conveying platform 3, a space 5 in order to drive back the forklift 1 and advance it and insert two projections 4a, 4b, is needed.

In addition, previously a transportation device in which a arranged handle is arranged at one side of the conveying platform having four corners therein is known. Furthermore, a conveying bogie as follow

is known: four rotatable casters are arranged at four corners of the undersurface of the conveying platform, and in the center there are a pair of arranged wheels and an operating lever that switches between the front-back direction and the transverse direction of the arranged wheels.

However, in these bogies, it is difficult to freely transport a comparatively heavy freight in a desired direction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram illustrating a problem occurs when a freight is transported by the forklift according to the prior art;

FIG. 2 is a perspective view when the freight is transported according to one embodiment;

FIG. 3 is a perspective view is seen from a back side of a conveying platform according to one embodiment;

FIG. 4 is a diagram illustrating a movement in a vertical direction of a central caster according to one embodiment;

FIG. 5 is a perspective view is seen from the back side of the central caster according to one embodiment;

FIG. 6 is a perspective view of a non-swivel

caster according to one embodiment;

FIG. 7 is a perspective view of a swivel caster according to one embodiment;

FIG. 8 is a perspective view showing the construction of a handle according to one embodiment;

FIG. 9 is a plan view showing one example of rotatable direction of the handle with respect to the conveying platform according to one embodiment;

FIG. 10 is a plan view showing another example of the rotatable direction of the handle with respect to the conveying platform according to one embodiment;

FIG. 11 is a side view showing one example of the direction of the handle with respect to the conveying platform according to one embodiment; and

FIG. 12 is a side view showing another example of the direction of the handle with respect to the conveying platform according to one embodiment.

DETAILED DESCRIPTION

According to one embodiment, a freight carrier comprises a conveying platform that is a rectangle and carries a transported freight, a handle that its lower end is connected to one side of a lateral side of the conveying platform, and vertically stands and arranged in a manner that an upper end can be brought

down in an oblique position, a pair of swivel casters that is arranged at an undersurfaces of each corner in one side of the above square shaped conveying platform where the handle is arranged, and their rotation directions are free, a pair of driven casters that are arranged at the undersurface of the two ends of another end opposite to one end of the freight carrying platform and a central caster that is arranged in the vicinity of the center of the freight carrying platform and its rotation direction is free.

Hereinafter, the embodiments of the present invention are illustrated by referring to the accompanying drawings. A perspective view of the usage state of the freight carrier according to one embodiment of the invention is shown in FIG. 2.

A transported freight 13 is carried on the square shaped conveying platform 12 in which casters 11a, 11b described below are arranged at the undersurface. One end 14a of the rod-like handle 14 is arranged at approximately center of the lateral face of one side of the conveying platform 13 by using a fixture 15. A porter can hold a holding portion 14b that is fixed perpendicular to the handle 14 arranged at another end of the handle 14 and transport the freight in the direction of arrow A. The handle 14 can turn in an

oblique position (arrow B) or a transverse direction (arrow C) with its one end 14a being the starting point.

A perspective view of the conveying platform 12 as seen from the back side is shown in FIG. 3. A fixture 15 that fixes one end of the handle 14 is arranged at the center of one side of the lateral side of the rectangular conveying platform 12. At the back side of the conveying platform 12, four casters are arranged at its four corners, and a central caster 11e is arranged at the center. A pair of 360 degree swivel casters 11a, 11c is arranged at the back side of the conveying platform 12 close to the two corners of the side where the handle 14 is arranged.

A pair of non-swivel casters 11b, 11d that can make a rotational movement only in a specified direction (the direction of arrow D of FIG. 3) is arranged at a location close to both corners of the opposing side where the fixture 15 is attached. These non-swivel casters are the driven casters that make rotational movements following the casters that first move when transportation. In this embodiment, the driven casters are the examples of the non-swivel casters. Also, the central caster 11e is a swivel caster with the rotational movement direction being free.

The position relationship of the five casters with regards to the ground is shown in FIG. 4. The swivel casters 11a, 11c and the non-swivel casters 11b, 11d project at the same height with respect to the ground 21 from the back side of the conveying platform 12. In contrast, the central caster 11e has a low height, and when freight is not carried by the conveying platform 12 the state of central caster 11e becomes to a position of floating.

That is, in the state of the freight 13 being not carried in the conveying platform 12 or a lightweight freight 13 being carried, the swivel casters 11a, 11c and the non-swivel casters 11b, 11d contact with the ground 21, but the central caster 11e does not contact with the ground 21.

On the other hand, if a heavy freight 13 is carried by the conveying platform 12, then for example the conveying platform 12 is bent downward in vicinity of the center due to the weight of the freight 13, and the central caster 11e contacts with the ground.

In this way, in a state of the freight being not carried or a lightweight freight is carried, the central caster 11e is floating, in this case the four casters contact with the ground. When the conveying platform is moved, the more casters that contact with

the ground the greater the resistance will become, thus if above-mentioned construction is formed, then in the normal state of the freight being not carried the conveying platform is lightweight and the movement during transportation is easy.

On the other hand, there are following advantages: when certain freight with a certain level of weight is carried and transported, the central caster 11e also contributes to supporting its weight, thus a freight carrier that can easily convey the heavy freight is obtained.

A perspective view of a state of the central caster 11e being turned upside down is shown in FIG. 5. In FIG. 5, for example a rectangular retaining plate 33 on which a relatively rotatable rotating plate 32a because of intervening a ball bearing (not shown) being arranged is retained on an octagonal metal base-plate 31 by using screws 34a, 34b. A rotating plate 32b is arranged opposite to the rotating plate 32a, and a rotating roller 35 is pivotally supported on the rotating plate 32b at a specified location by using a supporting member 36. The central caster 11e consists of the retaining plate 33, the rotating plates 32a, 32b, the rotating roller 35, and the supporting member 36.

In the base-plate 31, plate-shaped members are

arranged at alternate each sides, these members are folded and inserted into the center of the back side of the conveying platform. The central caster 11e is a swivel caster that can rotate by 360 degrees.

A perspective view of the non-swivel caster 11d in a state of being installed at the conveying platform 12 is shown in FIG. 6. In FIG. 6, for example, a retaining plate is arranged in the vicinity of the bend portion of a "L" shaped metal base-plate 41 by using screws 44a, 44b. The lateral side of the retaining plate is folded, and a supporting member 46 that pivotally supports a rotating roller 45 at a location of specified distance is formed. In FIG. 6, the rotating roller 45 rotates in the direction of arrow E in a movable manner. The non-swivel caster 11d consists of the retaining plate, the rotating roller 45, and the supporting member 46.

The lateral side of the base-plate 41 is folded and inserted into the corner portion of the back side of the conveying platform. The non-swivel caster 11d is a non-swivel caster in which the roller rotates in a manner of being movable in the direction of arrow E.

The non-swivel caster 11b is also constructed in a similar way and arranged at the corner of the back side of the conveying platform 12.

A perspective view of the swivel caster 11a in a state of being installed at the backside of the conveying platform 12 is shown in FIG. 7. In FIG. 7, for example a rectangular retaining plate on which a relatively rotatable rotating plate 52a due to intervening a ball bearing (not shown) being arranged is arranged in the vicinity of a bend portion of a "L" shaped mental base-plate 51 by using screws 54a, 54b. A rotating plate 52b is arranged opposite to the rotating plate 52a, and the rotating roller 55 is pivotally supported at a specified location on the rotating plate 52b in a movable manner by using a supporting member 56. The swivel caster 11a consists of the retaining plate, the rotating plates 52a, 52b, the rotating roller 55, and the supporting member 56.

The lateral side of the base-plate 51 is bent and inserted into the center of the back side of the conveying platform 12. The swivel caster 11a is a free swivel caster that can rotate by 360 degrees.

A swivel caster 11c also has the same construction as the swivel caster 11a, and arranged at the corner of the opposite side of the side where the handle 14 is arranged.

A perspective view of the handle 14 comprising a holding portion 14b and a fixture 15 is shown in FIG. 8. In FIG. 8, the fixture 15 has a base-plate

62 having a upward projection 61 and the end being arranged at the center of the lateral side of one side of the conveying platform 12; a cylinder portion 63 having a hole through which the above-mentioned projection 61 passes; a retaining portion 64 that retains the handle 14 to a cylinder portion 63 in a manner of freely rotating in a vertical direction; a compression spring 65 that compresses one end of the handle of the retaining portion 64.

The rotation of the handle 14 in a vertical direction (arrow B) is conducted by using the compression spring 65, and the rotation in a horizontal direction (arrow C) is conducted by making the projection 61 being inserted into the cylinder portion 63 rotate.

A top view of the relationship between the handle 14 and the conveying platform 12 is shown in FIG. 9. This example shows a state of the handle 14 in a horizontal plane approximately vertically extends with respect to one end 71 of the conveying platform 12. The projection 61 that vertically arranged on the base-plate 62 is inserted into the cylinder portion 63. The wagoner holds the holding portion 14b of the handle 14 and pulls in a direction of arrow J. During transportation of the freight 13, this state is generally achieved.

A top view of another example of the relationship between the handle 14 and the conveying platform 12 is shown in FIG. 10. In this case, as shown by arrow K, in a horizontal plane the handle 14 leans with respect to one end 71 of the conveying platform 12. Also in this case, the projection 61 vertically arranged on the base-plate 62 is inserted into the cylinder portion 63.

When the transport of the freight 13 is started and when the direction is to be altered during transportation, such a state is generally obtained.

A side view of one example of the relationship between the handle 14 and the conveying platform 12 is shown in FIG. 11. This state shows that the handle 14 becomes a state of vertically standing. In a state of the compression spring 65 of the fixture 15 extends, the handle 14 becomes to a state of approximately vertically standing. In a pre-transportation state before the freight 13 is put onto the conveying platform 12 or in a state of the transportation is finished, the handle 14 in this way approximately vertically stands. Vertical position of the handle can also be used to transport the freight in the direction.

A side view of another example of the relationship between the handle 14 and the conveying

platform 12 is shown in FIG. 12. This state shows a state of the handle 14 being laid down in an oblique position. In a state of the compression spring 65 of the fixture 15 is compressed, therefore the state of the handle 14 being maintained in an oblique position is obtained. When a wagoner intends to start a transportation of the freight 13, in a state shown in FIG. 11, he holds the holding portion 14b and pulls it, thereby the handle 14 leans as shown by arrow M, and the transportation is stopped, if the wagoner takes his hand off the holding portion 14b as shown by arrow N, the handle 14 automatically returns to a state of being perpendicular to the superior surface of the conveying platform 12.

Use of non-swivel caster is a function to brake the a conveying platform.

In the above-mentioned embodiment, as shown in FIG. 4, because of the curvature due to the load of the conveying platform, a central caster 11e with a degree of projection being smaller than other non-swivel casters and the swivel casters contacts with the ground. That is, contacts with the ground. However, the weight of loaded freight may also be detected electrically or mechanically and then make the central caster contact with the ground.

Also, in the above-mentioned embodiment,

generally, when the load is small the degree of projection of the central caster is smaller than other non-swivel casters and the swivel casters, and when a freight with considerable weight is loaded this caster reaches the ground. However, the central caster may also constantly have the same level of degree of projection with other casters.

In the above-mentioned embodiment, the case of the driven casters being the non-swivel casters has been described. According to the transport direction, the casters rotate in this direction, and stable transport can be conducted. However, the driven casters may also be the swivel caster of which the movement direction is free. If in this way the driven casters act as a swivel caster, there is following advantage: in case of the rear of the conveying platform is slightly moved, the transport within a small space is easy.

According to the above-mentioned embodiments of the invention, a freight carrier as follow is obtained: it is easy to freely transport a comparatively heavy freight in a desired direction.

While several embodiments of the invention have been illustrated, these embodiments are presented as examples, and they are not intended to limit the scope of the invention. These new embodiments can be

implemented in other various forms. Various omissions, replacements and modifications can be made without departing from the gist of the invention. These embodiments or their variations are included in the scope or gist of the invention and also included in the invention recited in the claims or its equivalent.

While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions. Indeed, the novel embodiments described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the embodiments described herein may be made without departing from the spirit of the inventions. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the inventions.

WHAT IS CLAIMED IS:

1. A freight carrier, comprising:

a conveying platform that is a rectangle and carries a transported freight;

a handle that its lower end is connected to one side of a lateral side of the conveying platform, and vertically stands and arranged in a manner that an upper end can be brought down in an oblique position;

a pair of swivel casters that is arranged at an undersurfaces of each corner in one side of the above square shaped conveying platform where the handle is arranged, and their rotation directions are free;

a pair of driven casters that are arranged at the undersurface of the two ends of another end opposite to one end of the freight carrying platform; and

a central caster that is arranged in the vicinity of the center of the freight carrying platform and its rotation direction is free.

2. The freight carrier according to claim 1, wherein

the lower end of the handle is arranged in vicinity of the center of one end of the lateral side of the conveying platform in a manner of being rotatable in a horizontal direction.

3. The freight carrier according to claim 1, wherein

when a relatively small freight is carried on the conveying platform the central caster remains above the ground, and when the freight with a specified weight or more is carried the central caster moves downward and contacts with the ground.

4. The freight carrier according to claim 3, wherein the pair of driven casters are the swivel casters of which the rotation directions are free.

5. The freight carrier according to claim 3, wherein the pair of driven casters are the non-swivel casters of which the rotation directions are arranged directions.

6. The freight carrier according to claim 5, wherein when the freight is carried onto the conveying platform, the central caster moves downward and contacts with the ground by the curvature of the conveying platform.