

OVERHEAD TRAVELING VEHICLE SYSTEM AND CONSTRUCTION METHOD OF BUFFER IN THE SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

[0001]

The present invention relates to construction of side buffers in an overhead traveling vehicle system.

Description of the Related Art

[0002]

In an overhead traveling vehicle system, it is known to provide a side buffer beside a traveling rail for overhead traveling vehicles to be able to receive and hand articles from and to the overhead traveling vehicles (Patent Document 1: Japanese Laid-Open Patent Publication No. 2006-324469). Because the side buffer is hung from a ceiling of a clean room or the like by using hanger bolts or the like, construction involves work in high places near the ceiling. If there are many side buffers, mounting of the hanger bolts requires many labor hours.

[0003]

Objects of the present invention are to make construction of the side buffer easy and especially to reduce the number of struts to be mounted to the ceiling.

It is additional object of the invention to make construction of the side buffer easier.

It is additional object of the invention to make construction of an under buffer easy.

SUMMARY OF THE INVENTION

[0004]

An overhead traveling vehicle system according to the invention is a system with an overhead traveling vehicle traveling along traveling rails hung from a ceiling and a side buffer provided beside the traveling rails so as to be able to hand and receive an article from and to the overhead traveling vehicle, the two traveling rails being disposed parallel while spaced from each other and the side buffer being disposed between the two traveling rails when viewed in a plan view to be supported by the two traveling rails.

[0005]

Preferably, the side buffer includes: a beam supported by the two rails; a raceway fixed to the beam and having a long groove that opens downward and is wider at its upper portion; a strut hung from the raceway; and a side buffer main body supported by the strut.

Particularly, it is preferable to further include a mounting member supported by the side buffer main body and extending downward from the side buffer main body and an under buffer main body supported under at least one of the two traveling rails by the mounting member.

[0006]

The construction method of a buffer in an overhead traveling vehicle system according to the invention includes the steps of fixing two traveling rails with a space between them by hanging them from a ceiling and disposing a side buffer between the two traveling rails so that it is supported by the two traveling rails in order to provide the side buffer in a system for traveling an overhead traveling vehicle along the

traveling rail hung from a ceiling.

[0007]

In the invention, the side buffer need not be hung from the ceiling. Therefore, it is possible to reduce members such as hanger bolts and mounting of the side buffer becomes easy.

[0008]

If the side buffer is provided with the beam supported by the two rails, the raceway fixed to the beam, the strut hung from the raceway, and the side buffer main body supported by the strut, it is possible to easily change a position of the side buffer main body by changing a position of the strut with respect to the raceway.

If the mounting member supported by the side buffer main body and extending diagonally downward from the side buffer main body and the under buffer main body supported under at least one of the two traveling rails by the mounting member are also provided, it is possible to provide the under buffer by utilizing the side buffer. Moreover, because a position of the under buffer is determined by the side buffer, it becomes unnecessary to adjust the position of the under buffer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a front view of an essential portion of an overhead traveling vehicle system of an embodiment.

FIG. 2 is a view showing mounting structures of struts of a side buffer to beams in the embodiment.

FIG. 3 is a perspective view of the overhead traveling vehicle system of the embodiment viewed diagonally from above.

FIG. 4 is a perspective view of the overhead traveling vehicle system of the embodiment viewed diagonally from below.

FIG. 5 is a front view of an essential portion of an overhead traveling vehicle system of a variation.

FIG. 6 is a perspective view of the overhead traveling vehicle system of the variation viewed diagonally from above.

FIG. 7 is a perspective view of the overhead traveling vehicle system of the variation viewed diagonally from below.

EXPLANATION OF REFERENCE NUMERALS

[0010]

2	Overhead traveling vehicle system
4, 5	Traveling rail
6, 7	Power feeding rail
8	Hanger bolt
10	Overhead traveling vehicle
11	Traveling portion
12	Power receiving portion
13	Lateral drive
14	Turning portion
15	Elevation drive
16	Elevation frame
17	Chuck
18	Cover
20	Side buffer

22	Beam
24	Bracket
26	Raceway
27	Long groove
28	Connecting fitting
30	Strut
32	Girder
34	Seat
36	Side wall
40	Foup
41	Mounting plate
42	Reinforcing plate
45, 47	Bolt
46	Nut
50	Under buffer
51	Mounting member
52	Bolt
53	Beam
54	Girder
55	Seat
56 to 58	Side

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0011]

FIGS. 1 to 7 show an embodiment and a variation. In the drawings, a

reference numeral 2 designates an overhead traveling vehicle system provided with a pair of traveling rails 4, 5 hung parallel to and spaced from each other from a ceiling of a clean room and a pair of power feeding rails 6, 7 provided under the traveling rails 4, 5. A space between the traveling rails 4, 5 in a horizontal plane is uniform and the traveling rails 4, 5 are parallel in a plan view. The traveling rails 4, 5 are supported on the ceiling (not shown) of the clean room by hanger bolts 8. A reference numeral 10 designates an overhead traveling vehicle, 11 designates a traveling portion of the vehicle, 12 designates a power receiving portion, and 13 designates a lateral drive that moves a turning portion 14 and portions under it in a left-right direction of the traveling rails 4, 5. Here, the left-right direction refers to a direction perpendicular to a traveling direction in the horizontal plane. The turning portion 14 turns an elevation drive 15, an elevation frame 16, and the like in the horizontal plane. The elevation drive 15 moves the elevation frame 16 up and down. A reference numeral 17 designates a chuck that grasps an article such as a foup 40. A reference numeral 18 designates a cover provided to each of the front and rear of the overhead traveling vehicle 10 to prevent falling of the article.

[0012]

A reference numeral 20 designates a side buffer that is provided in the space between the right and left traveling rails 4, 5. If three traveling rails are provided parallel, it is possible to provide two parallel lines of side buffers 20 between them. A reference numeral 22 designates beams that are fastened to the right and left traveling rails 4, 5 by bolts or the like with brackets 24 or the like disposed therebetween. Each of the beams 22 is provided with a pair of left and right raceways 26, 26, for example, and left and right struts 30, 30 are mounted to the raceways 26 by coupling fittings 28. Then, girders 32 are fixed to lower portions of the struts 30 and seats 34 on which the

articles such as the fouds 40 are placed are mounted onto the girders 32. Along a traveling direction of the overhead traveling vehicle 10, side walls 36 are mounted to front and rear opposite ends of the side buffer 20. Out of the members of the side buffer 20, the girders 32, the seats 34 on the girders 32, and the side walls 36 are referred to as a side buffer main body. The side buffer main body is fixed to the raceways 26 by the struts 30 and the coupling fittings 28.

[0013]

FIG. 2 shows the beam 22, the raceways 26, and members around them. The beam 22 is fixed to the traveling rails 4, 5 by the bolts or the like with the brackets 24 interposed therebetween. To support the beam 22 by the traveling rails 4, 5 also includes fixing of opposite ends of the beam 22 to the hanger bolts 8 for supporting the traveling rails 4, 5. The raceways 26 are long members having long grooves 27. Each of the long grooves 27 has a downward opening at a center of a bottom face of the raceway 26 and is wider at an upper portion of its opening. A nut 46 or the like is housed in the groove 27 and the coupling fittings 28 are mounted by using bolts 45 or the like. Furthermore, each of the struts 30 is fixed by bolts 47 or the like in such a manner as to sandwich the strut 30 between the pair of coupling fittings 28 provided in a depth direction of FIG. 2. As a result, the left and right struts 30, 30 are fixed by the coupling fittings 28 and are mounted to the raceways 26. The coupling fittings 28 are provided with a horizontally extending mounting plate 41 and vertically extending reinforcing plates 42 and the bolts 45 or the like are mounted to the mounting plate 41.

[0014]

FIGS. 3 and 4 show illustrations of the side buffer 20. The beams 22 are mounted to the right and left traveling rails 4 and 5 and the side buffer main body is mounted to the beams 22 with the raceways 26 and the coupling fittings 28 interposed

therebetween. The articles can be freely received and handed from and to the overhead traveling vehicles traveling under the traveling rails 4, 5 to and from the seats 34. With reference to FIG. 1 again, the seats 34 are slightly lower than bottom faces of the articles such as founs 40 transferred by the overhead traveling vehicles 10 traveling under the traveling rails 4, 5. Each of the overhead traveling vehicles 10 traveling under the right and left traveling rails 4, 5 laterally moves the turning portion 14, the elevation drive 15, and the elevation frame 16 with the lateral drive 13 to a position over the side buffer 20, moves the elevation frame up and down with the elevation drive 15, and actuates the chuck 17, to thereby receive and hand the articles from and to the seats 34 of the side buffer 20 to and from the overhead traveling vehicles 10.

[0015]

Operation of the embodiment will be described. Because the side buffer 20 is supported by the right and left traveling rails 4, 5, it need not be mounted to the ceiling by hanger bolts 8 or the like. Therefore, it is possible to save labor hours for mounting the hanger bolts 8 and costs of the hanger bolts 8. If the raceways 26 are fixed to the beams 22, an installed position of the side buffer 20 can be changed along the raceways 26. Moreover, the coupling fittings 28 and the struts 30 are mounted to the raceways 26. Therefore, it is possible to easily mount them by using a stepladder or the like and work in high places is unnecessary as compared with mounting them to the ceiling.

[0016]

FIGS. 5 to 7 show a variation in which an under buffer 50 is further mounted to the side buffer 20. Reference numerals 51 designate mounting members that have triangular shapes each formed of three sides 56, 57, and 58 and each side 56 is fixed to the girders 32 by using bolts 52 and the like. Beams 53 are fixed to the mounting members 51. The mounting member 51 and the beam 53 may be formed integrally.

Left and right girders 54, 54 are disposed on the beams 53 and seats 55 are fixed onto the girders 54, 54. The seats 55 are directly under the traveling rail 4 or 5 and in such positions that the overhead traveling vehicle can receive and hand the articles by moving down the elevation frame 16. The beams 53, the girders 54, and the seats 55 form an under buffer main body. Although the under buffer 50 is provided under one of the right and left traveling rails 4, 5 in the embodiment, the under buffer 50 may be provided under each of the traveling rails 4, 5. Although it is inferior in mounting strength, the beams 53, the girders 54, and the seats 55 may be mounted by using L-shaped members that are the mounting members 51 without the sides 58. FIGS. 6 and 7 show illustrations of the side buffer 20 and the under buffer 50.

[0017]

In the variation in FIGS. 5 to 7, the under buffer 50 can be mounted to the girders 32 at lower ends of the side buffer 20 and is easier to install as compared with a case where the under buffer is mounted directly to the ceiling or to the traveling rail 4 or 5. Furthermore, because the side buffer 20 is at a predetermined height with respect to the traveling rails 4, 5, the seats 55 are naturally in suitable positions for reception and handing of the articles with respect to the traveling rails 4, 5 when the under buffer is mounted to the side buffer 20 with the mounting members 51 interposed therebetween. In other words, it is substantially unnecessary to adjust a position of the under buffer 50 in height and in the horizontal plane.

What is claimed is:

1. An overhead traveling vehicle system comprising:
 - at least two traveling rails disposed substantially parallel to one another while being spaced apart from each other;
 - a side buffer disposed between the at least two traveling rails in a plan view and supported by the at least two traveling rails; and
 - an overhead traveling vehicle arranged to travel along the at least two traveling rails hung from a ceiling and the side buffer provided adjacent to the at least two traveling rails to supply and receive an article from and to the overhead traveling vehicle, wherein
 - the side buffer includes:
 - beams supported by the at least two traveling rails;
 - raceways fixed to the beams and having grooves that open downward and are wider at an upper portion than at a lower portion;
 - struts hung from the raceways; and
 - a side buffer main body supported by the struts.
2. The overhead traveling vehicle system according to claim 1, further comprising:
 - mounting members supported by the side buffer main body and extending downward from the side buffer main body; and
 - an under buffer main body supported under at least one of the at least two traveling rails by the mounting members.
3. A method for constructing a side buffer in an overhead traveling vehicle system for supporting an overhead traveling vehicle along traveling rails hung from a ceiling with a side buffer, comprising the steps of:
 - fixing traveling rails with a space between them by hanging the traveling rails from a ceiling; and

disposing and fixing the side buffer between the traveling rails in such a way that the side buffer is supported by the traveling rails; wherein the side buffer includes:

- beams supported by the at least two traveling rails;
- raceways fixed to the beams and having grooves that open downward and are wider at an upper portion than at a lower portion;
- struts hung from the raceways; and
- a side buffer main body supported by the struts.