## CLAIMS

1. A railcar bogie comprising:

a cross beam configured to support a carbody of a railcar;

a pair of front and rear axles sandwiching the cross beam and respectively arranged in front of and behind the cross beam in a railcar longitudinal direction so as to extend in a railcar width direction;

bearings respectively provided at both railcar width direction sides of each of the axles and configured to rotatably support the axles:

axle boxes configured to respectively accommodate the bearings;

plate springs extending in the railcar longitudinal direction so as to respectively support both railcar width direction end portions of the cross beam and each including both railcar longitudinal direction end portions respectively supported by the axle boxes; and

an auxiliary supporting mechanism configured to, in a case where at least one of the railcar width direction end portions of the cross beam is displaced downward beyond a predetermined elastic deformation range of the plate spring, receive and support from below a load, applied from the cross beam, via said one end portion or the plate spring to support said one end portion of the cross beam.

2. The railcar bogie according to claim 1, wherein the auxiliary supporting mechanism is provided at such a position as not to contact the railcar width direction end portion of the cross beam in a case where the railcar width direction end portion of the cross beam is displaced in an upper-lower direction within the elastic deformation range of the plate spring.

3. The railcar bogie according to claim 1 or 2, wherein:

the auxiliary supporting mechanism includes a first auxiliary supporting member provided integrally with the cross beam and arranged under the plate spring so as to overlap the railcar width direction end portion of the cross beam in a plan view; and

in a case where the plate spring inclines beyond the elastic deformation range, the railcar width direction end portion of the cross beam supports an upper surface of the plate spring, and the first auxiliary supporting member supports a lower surface of

the plate spring.

4. The railcar bogie according to claim 1 or 2, wherein:

the auxiliary supporting mechanism includes a second auxiliary supporting member that extends between the axle box at a front side in the railcar longitudinal direction and the axle box at a rear side in the railcar longitudinal direction and extends under the end portion of the cross beam in the railcar longitudinal direction; and

in a case where the end portion of the cross beam is displaced downward beyond the elastic deformation range of the plate spring, the second auxiliary supporting member receives and supports from below the end portion of the cross beam to support the end portion of the cross beam from below.

5. The railcar bogie according to any one of claims 1 to 4, wherein:

spring seats each configured to support a front-rear direction end portion of the plate spring are respectively provided at upper end portions of the axle boxes;

the railcar longitudinal direction end portions of the plate springs are respectively disposed on the spring seats from above to respectively contact upper surfaces of the spring seats;

fitting portions that are fitted to each other in an upper-lower direction with a play are provided at each of portions at each of which a lower surface of the front-rear direction end portion of the plate spring and the upper surface of the spring seat contact each other; and

covers each configured to cover the railcar longitudinal direction end portion of the plate spring are respectively provided at the axle boxes so as to each maintain a fit state between the fitting portions and be spaced apart from an upper surface of the plate spring.

6. The railcar bogie according to any one of claims 1 to 5, wherein:

the auxiliary supporting mechanism includes a bar member extending in the railcar longitudinal direction; and

an attaching portion to which a peripheral device is attached is provided at the bar member.

# CLAIMS

1. A railcar bogie comprising:

a cross beam configured to extend in a railcar width direction and support a carbody of the railcar;

a pair of front and rear axles respectively arranged at both sides of the cross beam in a railcar longitudinal direction so as to extend in the railcar width direction;

bearings respectively provided at both railcar width direction sides of each of the axles and configured to rotatably support the axles;

axle boxes configured to respectively accommodate the bearings;

plate springs extending in the railcar longitudinal direction so as to respectively support both railcar width direction end portions of the cross beam and load applied to the cross beam by the earbody, each plate spring including both railcar longitudinal direction end portions respectively supported by the axle boxes;

contact members respectively provided at both railcar width direction end portions of the cross beam and respectively disposed on railcar longitudinal direction middle portions of the plate springs so as not to be fixed to the plate springs in an upper-lower direction by separably contacting the railcar longitudinal direction middle portions of the plate springs; and

an auxiliary supporting mechanism configured to, in a case where the railcar width direction end portion of the cross beam is displaced downward beyond a predetermined elastic deformation range of the plate spring, receive from below and support a load applied from the cross beam, via the plate spring or one end portion of the cross beam.

2. The railcar bogie according to claim 1, wherein the auxiliary supporting mechanism is provided at such a position as not to contact the railcar width direction end portion of the cross beam in a case where the railcar width direction end portion of the cross beam is displaced in an upper-lower direction within the elastic deformation range of the plate spring.

3. The railcar bogie according to claim 1, wherein:

the auxiliary supporting mechanism includes a second auxiliary supporting member that extends between the axle box at a front side in the railcar longitudinal direction and the axle box at a rear side in the railcar longitudinal direction and extends under the end portion of the cross beam in the railcar longitudinal direction; and

in a case where the end portion of the cross beam is displaced downward beyond the elastic deformation range of the plate spring, the second auxiliary supporting member receives and supports from below the end portion of the cross beam to support the end portion of the cross beam from below.

4. The railcar bogie according to claim 1, wherein:

the auxiliary supporting mechanism includes a bar member extending in the railcar longitudinal direction; and

an attaching portion to which a peripheral device is attached is provided at the bar member.

5. A railcar bogie comprising:

a cross beam configured to extend in a railcar width direction and support a carbody of the railcar;

a pair of front and rear axles respectively arranged at both sides of the cross beam in a railcar longitudinal direction so as to extend in the railcar width direction;

bearings respectively provided at both railcar width direction sides of each of the axles and configured to rotatably support the axles;

axle boxes configured to respectively accommodate the bearings;

plate springs extending in the railcar longitudinal direction so as to respectively support both railcar width direction end portions of the cross beam and load applied to the cross beam by the carbody, each plate spring including both railcar longitudinal direction end portions respectively supported by the axle boxes; and

an auxiliary supporting mechanism configured to, in a case where the railcar width direction end portion of the cross beam is displaced downward beyond the predetermined elastic deformation range of the plate spring, receive from below and support a load applied from the cross beam, via the plate spring or one end portion of the cross beam, wherein:

the auxiliary supporting mechanism includes a first auxiliary supporting member provided integrally with the cross beam and arranged under the plate spring so as to overlap the railcar width direction end portion of the cross beam in a plan view; and

in a case where the plate spring inclines beyond the elastic deformation range, the railcar width direction end portion of the cross beam supports an upper surface of the plate spring, and the first auxiliary supporting member supports a lower surface of the plate spring.

6. A railcar bogie comprising:

a cross beam configured to extend in a railcar width direction and support a carbody of the railcar;

a pair of front and rear axles respectively arranged at both sides of the cross beam in a railcar longitudinal direction so as to extend in the railcar width direction;

bearings respectively provided at both railcar width direction sides of each of the axles and configured to rotatably support the axles;

axle boxes configured to respectively accommodate the bearings;

plate springs extending in the railcar longitudinal direction so as to respectively support both railcar width direction end portions of the cross beam and load applied to the cross beam by the carbody, each plate spring including both railcar longitudinal direction end portions respectively supported by the axle boxes; and

an auxiliary supporting mechanism configured to, in a case where the railcar width direction end portion of the cross beam is displaced downward beyond the predetermined elastic deformation range of the plate spring, receive from below and support a load applied from the cross beam, via the plate spring or one end portion of the cross beam, wherein:

spring seats each configured to support a front-rear direction end portion of the plate spring are respectively provided at upper end portions of the axle boxes;

the railcar longitudinal direction end portions of the plate springs are respectively disposed on the spring seats from above to respectively contact upper surfaces of the spring seats;

fitting portions that are fitted to each other in an upper-lower direction with a play are provided at each of portions at each of which a lower surface of the front-rear direction end portion of the plate spring and the upper surface of the spring seat contact each other; and

covers each configured to cover the railcar longitudinal direction end portion of the plate spring are respectively provided at the axle boxes so as to each maintain a fit state between the fitting portions and be spaced apart from an upper surface of the plate spring.

7. A railcar bogie comprising:

a cross beam configured to extend in a railcar width direction and support a carbody of a railcar;

a pair of front and rear axles respectively arranged at both sides of the cross beam in a railcar longitudinal direction so as to extend in the railcar width direction;

bearings respectively provided at both railcar width direction sides of each of the axles and configured to rotatably support the axles;

axle boxes configured to respectively accommodate the bearings;

plate springs extending in the railcar longitudinal direction so as to respectively support both railcar width direction end portions of the cross beam and load applied to the cross beam by the carbody, each plate spring including both railcar longitudinal direction end portions respectively supported by the axle boxes; and

an auxiliary supporting mechanism configured to, in a case where the railcar width direction end portion of the cross beam is displaced downward beyond the predetermined elastic deformation range of the plate spring, receive from below and support a load applied from the cross beam, via the plate spring or one end portion of the cross beam, wherein:

the auxiliary supporting mechanism includes an auxiliary supporting member arranged under the plate spring so as to overlap the end portion of the cross beam in a plan view, the auxiliary supporting member being configured not to contact the railcar width direction end portion of the cross beam in a case where the railcar width direction end portion of the cross beam is displaced in an upper-lower direction within the predetermined elastic deformation range of the plate spring.