

[DESCRIPTION]

[Title of Invention]

SWIVEL CASTER STRUCTURE

[Technical Field]

5 [0001]

The present invention relates to a swivel caster structure which is excellent in a silencing effect and is used as a wheel of carrier equipment, various types of carriers, carts, and the like.

10 [Background of the Invention]

[0002]

Conventionally, with respect to casters and carts illustrated in Japanese Patent Application Publication No. 2007-22254 indicated in Patent Literature 1, in a Second
15 Embodiment illustrated in FIG. 6 to FIG. 8 of the Patent Literature 1, the swivel shaft is inserted in order into a caster-mounting plate, a thrust bearing, a first washer, a radial bearing (a yoke part is fixed to an outer ring), and a second washer, which are disposed coaxially with the
20 swivel shaft, and an end part of the swivel shaft is caulking-processed.

As a result, each of members interposed between a flange part and the end part of the swivel shaft is fixed (clamped).

25 [0003]

However, with the above-described constitution, an

inner-ring upper surface of the radial bearing is made to abut on a first washer, which is a different body and has a large diameter, between the thrust bearing and the radial bearing, and an outer-ring lower surface of the radial bearing is supported by a recess part of the yoke of the radial bearing and thus, there is such a defect that, a load on the bearing is generated separately, and a noise at vibration cannot be prevented.

[Prior art reference]

10 [Patent Literature]

[0004]

[Patent Literature 1] Japanese Patent Application
Publication No. 2007-22254

15 [Summary of Invention]

[Problem to be Solved by the Invention]

[0005]

The present invention relates to a swivel caster structure which realizes silencing of a swivel caster having a thrust bearing and a radial bearing with a simple constitution.

[Means for Solving the Problem]

[0006]

25 In order to solve the above-described problem, the present invention is constituted by a mounting shaft having

a flange on an upper end, a mounting plate having a mounting hole into which the mounting shaft is inserted without a gap and by which the flange is hooked, a downward horizontal surface formed on a rear surface of the mounting plate, and a support yoke having a hole on the support yoke side, through which the mounting shaft is penetrated below the mounting plate and on which an upward horizontal surface facing the downward horizontal surface in parallel is formed, in which an upper ring of a thrust bearing is supported on the downward horizontal surface and a lower ring of the thrust bearing is supported on the upward horizontal surface, including:

an upward stepped part which rises on a base end side of the upward horizontal surface of the support yoke, extends in the swivel shaft direction, extends to the hole on the yoke side, and has an L-shaped section;

a corner part of the upward stepped part is constituted to hook an upper part of an outer ring of a radial bearing from above, while a part below the outer ring is open; and

a spacer part suspending along the swivel shaft in a space from the mounting hole to the upward stepped part and having a lower end abutting on an upper end of an inner ring of the radial bearing; and

the lower end of the inner ring of the radial bearing is fixed to a lower end side of the mounting shaft.

[Effect of the Invention]

[0007]

As a result, since each of the members clamped
5 between the flange part and the lower end part of the
swivel shaft can be integrally fixed without a gap, each of
the members does not individually swing but can efficiently
receive a load, suppress occurrence of vibration or a
noise, and certainly silence the sound during traveling.

10

[Brief Description of the Drawings]

[0008]

[FIG. 1] FIG. 1 is a sectional diagram of an essential
part of a swivel caster.

15 [FIG. 2] FIG. 2 is a sectional diagram of an essential
part to which a dust cover covering a bearing is added.

[FIG. 3] FIG. 3 is an enlarged diagram of the same
essential part.

[FIG. 4] FIG. 4 is a sectional diagram of an essential
20 part illustrating another Embodiment.

[FIG. 5] FIG. 5 is a longitudinal sectional diagram of a
caster.

[FIG. 6] FIG. 6 is a plan view of the same.

[FIG. 7] FIG. 7 is a front view of the same.

25

[Preferred Embodiment]

[0009]

Hereinafter, Preferred Embodiments of the present invention will be explained with reference to the drawings.

[Embodiment 1]

5 [0010]

With reference to a swivel caster 20 of the Embodiment 1, an example seen from a longitudinal section is illustrated in FIG. 5, and FIG. 6 shows a plan view, and FIG. 7 shows a front view.

10 An enlarged view of an essential part shown in FIG. 1 illustrates a sectional view along an axis of a swivel shaft 10 in a structure in a periphery of the swivel shaft 10.

The swivel shaft 10 has a substantially columnar shape, and a flange part 11 is formed on one side in an axial direction.

[0011]

In the swivel shaft 10, a bearing mechanism fixed by the flange part 11 and a caulking part 12 for retaining, whose diameter becomes larger on the lower end side, is incorporated between a caster-mounting plate 1 and a support yoke 3 for pivotally supporting a wheel W.

[0012]

That is, the caster-mounting plate 1 has a substantially horizontal flat surface 2a, a mounting hole 1b having an inner diameter smaller than the outer diameter

of the flange part 11 at a head part of the swivel shaft 10 substantially at the center thereof and capable of insertion of the shaft part 10A of the swivel shaft 10, and a recessed part 1c extending along an outer periphery of an opening end of the mounting hole 1b and continuing to a flat surface 1a are formed.

[0013]

The recessed part 1c is recessed such that a thickness of the flange part 11 is substantially at the same position with respect to a horizontal flat surface 2a on an outer side of the periphery.

In addition, a peripheral edge part of the mounting hole 1b is a horizontal surface for hooking the upper surface of the flange part 11 of the swivel shaft 10 horizontally, and an upper surface of the flange part 11 hooked by the mounting hole 1b is set so as to be substantially the same planar state as the flat surface 2a (see FIG. 5).

[0014]

Subsequently, the thrust bearing S is disposed on the outer peripheral side of a radial bearing R on an upper stage of the radial bearing R and is interposed between the caster-mounting plate 1 and the support yoke 3.

In the illustrated example, they are disposed in close contact in a height direction such that an upper surface of the lower ring S2 of the thrust bearing and

upper end surfaces of the inner ring R1, an outer ring R2
of the radial bearing become substantially the same plane.
[0015]

Then, an upper ring S1 of the thrust bearing S has
5 its upper surface abutting against the downward horizontal
surface 1a of a rear surface of the caster-mounting plate
1, a bottom surface side of the lower ring S2 of the thrust
bearing S abuts against an upward horizontal surface 3a
formed on an intermediate stage, which will be described
10 later, of the support yoke 3 and becomes a suspended wall
3a' substantially at a right angle on a distal end of the
upward horizontal surface 3a.

In addition, on an upper part of the support yoke 3,
a hole 30 on a yoke side having the same axis as and a
15 larger diameter than the mounting hole 1b is drilled and is
drilled substantially at an intermediate position of the
upper surface of the support yoke 3.
[0016]

In addition, an opening-edge part of the hole 30 is
20 formed on the yoke side at a distal end of an upward
stepped part 3b adjacent to the upward horizontal surface
3a, and an upward stepped part 3b of the support yoke 3 and
a corner part 3c on the inner surface side are formed to be
an upward stepped part 3L, which has an L-shaped section,
25 and abuts against an upper end of the outer ring R2 of the
radial bearing R.

On the other hand, directly below the mounting hole 1b, a spacer part 4 having a cylindrical sectional shape and made of a washer abutting against the opening-edge part of the mounting hole 1b, fitted with the swivel shaft 10 without a gap, and suspended to the same position as the corner part 3c on the inner surface side of the upward stepped part 3b is mounted, and a lower end of the spacer part 4 abuts against the upper end of the inner ring R1 of the radial bearing R.

10 [0017]

And the lower end of the inner ring R1 of the radial bearing R is fixed by the caulking part 12 at a lower end of the mounting shaft 10 or a lower-stage spacer part 5 constituted by a lower-stage washer hooked by the caulking part 12 and fixed.

On the other hand, the outer ring R2 of the radial bearing R has a lower end opened at a hollow position.

In the thrust bearing S, since it is formed of the above-described constitution, an outward side of each of its upper ring S1 and lower ring S2 is open, and is constituted such that a lower end of the outer ring R2 of the radial bearing R is open, a silencing effect can be exerted with a simple constitution.

It is to be noted that the upward stepped part 3b and the corner part 3c on the inner surface side of the support yoke 3 on a wheel rearward side become an upward stepped

part 3L having an L-shaped section and becomes a suspended wall 3e' substantially at a right angle at a distal end from the upward horizontal surface 3a via an intermediate stepped part 3d and via a rear horizontal-surface part 3e.

5 [Embodiment 2]

[0018]

In the Embodiment 2 illustrated in FIG. 2, a dust cover 6 made of a synthetic resin or the like having flexibility and elasticity and covering an outer periphery except a bottom surface of the thrust bearing S is attached
10 below the mounting plate 1.

The dust cover 6 is mounted by overlapping the rear surface of the mounting plate 1, overlaps the downward horizontal surface 1a and exerts the same function as that
15 of the mounting plate 1 and thus, explanation thereof will be omitted.

Since the other constitutions are similar to those of the Embodiment 1, explanation thereof will be omitted.

[Embodiment 3]

20 [0019]

In the Embodiment 3 illustrated in FIG. 3, instead of the washer-state spacer part 4, which is the different body, a suspended wall part formed integrally with the mounting hole 1b, having the same inner diameter as a hole
25 edge part and extending cylindrically downward is formed as a spacer part 4'.

And a lower end of the spacer part 4', which becomes the suspended wall part, abuts against the upper end surface of the inner ring R1 of the radial bearing R without a gap and distributes a load on the center side applied to the caster-mounting plate 1 to the inner ring R1 side of the radial bearing R.

Since the other constitutions are similar to those of the Embodiment 1, explanation thereof will be omitted.

[Embodiment 4]

10 [0020]

In the Embodiment 4 illustrated in FIG. 4, similarly to the Embodiment 3 illustrated in FIG. 3, instead of the washer-state spacer part 4, which is a different body, a suspended wall part formed integrally with the mounting hole 1b, having the same inner diameter as that of the hole edge part, and extending cylindrically downward is formed as a spacer part 4'.

[0021]

And the lower end of the spacer part 4', which is the suspended wall part, abuts against the upper end surface of the inner ring R1 of the radial bearing R without a gap and distributes a load on the center side applied to the caster-mounting plate 1 to the inner ring R1 side of the radial bearing R.

25 In addition, the lower end of the inner ring R1 of the radial bearing R is hooked by a stepped part 12a formed

at the caulking part 12 on the lower end of the mounting shaft 10 without providing the lower-stage spacer part 5 and is fixed.

Since the other constitutions are similar to those in the above-described Embodiments, explanation thereof will be omitted.

[Explanation of Reference Numerals]

[0022]

1	Mounting plate
10	1a Downward horizontal surface
	1b Mounting hole
3	Support yoke
	3a Upward horizontal surface
	3b Upward stepped part
15	4, 4' Spacer part
	5 Lower-stage spacer part
	10 Mounting shaft
	11 Flange part
	12 Caulking part
20	13 Lower-end hooking part
	30 Hole on the support yoke side
	S Thrust bearing
	S1 Upper ring
	S2 Lower ring
25	R Radial bearing
	R1 Inner ring

R2 Outer ring

W Wheel

[Claims]

[Claim 1]

A swivel-caster structure, comprising:

a mounting shaft having a flange on an upper end;

5 a mounting plate having a mounting hole into which
said mounting shaft is inserted without a gap and by which
the flange is hooked;

a downward horizontal surface formed on a rear
surface of said mounting plate, and

10 a support yoke having a hole on the support yoke
side, through which said mounting shaft is penetrated below
said mounting plate and on which an upward horizontal
surface facing said downward horizontal surface in parallel
is formed, wherein

15 an upper ring of a thrust bearing is supported on
said downward horizontal surface and a lower ring of a
thrust bearing is supported on the upward horizontal
surface, including:

20 an upward stepped part which rises on a base end side
of the upward horizontal surface of said support yoke,
extends in a swivel shaft direction, extends to the hole on
the yoke side, and has an L-shaped section;

a corner part of said upward stepped part is
constituted to hook an upper part of an outer ring of a
25 radial bearing from above, and a part below the outer ring
is open; and

a spacer part suspending along the swivel shaft in a space from said mounting hole to the upward stepped part and having a lower end abutting against an upper end of an inner ring of the radial bearing; and

5 the lower end of the inner ring of the radial bearing is fixed to a lower end side of said mounting shaft;

 an outward side of each of an upper ring and a lower ring of said thrust bearing vertically clamped by the mounting plate and the support yoke is open without being
10 hooked; and

 a lower end of an outer ring of the radial bearing is not hooked but is open.

[Claim 2]

 The swivel caster structure according to claim 1,
15 wherein

 the spacer part is a body different from the mounting plate, is formed in a washer shape and is fitted with the mounting shaft.

[Claim 3]

20 The swivel caster structure according to claim 1, wherein

 the spacer part is formed of a suspended wall which is suspended along an opening-edge part of a mounting hole of the mounting plate and is externally fitted with a
25 mounting shaft.

[Claim 4]

The swivel caster structure according to claim 1,
wherein

a lower end of an inner ring of a radial bearing is
fixed to a stepped part of a caulking part on a lower end
5 of the mounting shaft.

[Claim 5]

The swivel caster structure according to claim 1,
wherein

a lower end of an inner ring of a radial bearing is
10 formed of a lower-stage spacer part fitted with a lower end
of the mounting shaft and fixed by a caulking part.

[Claim 6]

The swivel caster structure according to any one of
claims 1 to 5, wherein

15 an upper surface of a lower ring of a thrust bearing
and upper end surfaces of an inner ring, an outer ring of a
radial bearing are disposed in close contact in a height
direction such that the upper surface of the lower ring of
the thrust bearing and upper end surfaces of the inner
20 ring, the outer ring of the radial bearing become the same
surface.