

BI-ROTATING DIRECTIONAL INPUT AND CONSTANT ROTATING DIRECTIONAL OUTPUT WHEEL SYSTEM CAPABLE OF PREVENTING REVERSE ROTATION WHEEL SYSTEM FROM GENERATING FOLLOWING DAMP

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BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to an improved bi-rotating directional input and constant rotating directional output wheel system, applied in a power system driven by a manual force or engine or electric motor or fluid motor; through controlling the changing of the rotating direction of an input shaft, the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp is enabled to generate output with the same or different speed ratio while being in different input rotating direction, and characterized in that: a unidirectional transmission device is respectively installed between a first driving rotating directional input wheel set and a bi-rotating directional joint input shaft, between a first driving rotating directional output wheel set and a constant rotating directional output rotation part and between the constant rotating directional output rotation part and the joint input shaft, thereby preventing the transmission set in the first driving rotating direction from being linked and generating the following damp while being driven in a second driving rotating direction.

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(b) Description of the Prior Art

In a conventional bi-rotating directional input and constant rotating directional output wheel system, while being operated in one of the two bi-rotating input directions, the wheel set in another input direction would be driven, the disadvantages is that a part of the wheel set generates idle

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rotating following damp which is an ineffective load.

SUMMARY OF THE INVENTION

In a conventional bi-rotating directional input and constant rotating
5 directional output wheel system, while being operated in one of the two
bi-rotating input directions, the wheel set in another input direction would
be driven, the disadvantages is that a part of the wheel set generates idle
rotating following damp which is an ineffective load;

The present invention relates to an improved bi-rotating directional
10 input and constant rotating directional output wheel system, applied in a
power system driven by a manual force or engine or electric motor or
fluid motor; through controlling the changing of the rotating direction of
an input shaft, the bi-rotating directional input and constant rotating
directional output wheel system capable of preventing reverse rotation
15 wheel system from generating following damp is enabled to generate
output with the same or different speed ratio while being in different input
rotating direction, and characterized in that: a unidirectional transmission
device is respectively installed between a first driving rotating directional
input wheel set and a bi-rotating directional joint input shaft, between a
20 first driving rotating directional output wheel set and a constant rotating
directional output rotation part and between the constant rotating
directional output rotation part and the joint input shaft, thereby
preventing the transmission set in the first driving rotating direction from
being linked and generating the following damp while being driven in a
25 second driving rotating direction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view showing the bi-rotating directional input
and constant rotating directional output wheel system capable of
30 preventing reverse rotation wheel system from generating following damp

according to one embodiment of the present invention.

FIG. 2 is the second schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention.

FIG. 3 is the third schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention.

FIG. 4 is the fourth schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention.

FIG. 5 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 1 and a revolving load (3001) according to one embodiment of the present invention.

FIG. 6 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 2 and the revolving load (3001) according to one embodiment of the present invention.

FIG. 7 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 3 and the revolving load (3001) according to one embodiment of the present invention.

FIG. 8 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 4 and the revolving load (3001) according to one embodiment of the present invention.

DESCRIPTION OF MAIN COMPONENT SYMBOLS

- 201: Planetary gear shaft
- 202: Sun gear
- 203: Planetary gear
- 5 204: Outer annular wheel
- 301, 302, 303: Unidirectional transmission device
- 400: Annular support rack of epicycle gear
- 401: Epicycle gear shaft
- 402: Inner bevel wheel
- 10 403: Epicycle gear
- 404: Outer bevel wheel
- 500: Housing of transmission wheel system
- 600: Machine body
- 602, 603, 605, 606, 615, 616, 617: Transmission wheel
- 15 604, 618: Rotation shaft
- 607: Transmission belt
- 2000: Input shaft
- 3000: Output shaft
- 3001: Revolving load
- 20 CL100: Clutch device

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In a conventional bi-rotating directional input and constant rotating directional output wheel system, while being operated in one of the two
25 bi-rotating input directions, the wheel set in another input direction would be driven, the disadvantages is that a part of the wheel set generates idle rotating following damp which is an ineffective load;

The present invention relates to an improved bi-rotating directional input and constant rotating directional output wheel system, applied in a
30 power system driven by a manual force or engine or electric motor or

fluid motor; through controlling the changing of the rotating direction of an input shaft, the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp is enabled to generate
5 output with the same or different speed ratio while being in different input rotating direction, and characterized in that: a unidirectional transmission device is respectively installed between a first driving rotating directional input wheel set and a bi-rotating directional joint input shaft, between a first driving rotating directional output wheel set and a constant rotating
10 directional output rotation part and between the constant rotating directional output rotation part and the joint input shaft, thereby preventing the transmission set in the first driving rotating direction from being linked and generating the following damp while being driven in a second driving rotating direction.

15 FIG. 1 is a schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention;

As shown in FIG. 1, configured by a planetary gear system, the input
20 shaft and the output shaft are coaxially sleeved, it mainly consists:

--one end of the input shaft (2000) is installed to penetrate through a housing of transmission wheel system (500) through a bearing structure, the other end of the input shaft (2000) is installed to penetrate through the output shaft (3000) through a unidirectional transmission device (302),
25 and a bearing is installed between the output shaft (3000) and the housing of transmission wheel system (500);

--housing of transmission wheel system (500): combined in a machine body (600), the housing of transmission wheel system (500) is served to be installed with the machinery components which are adopted by
30 assembling the bi-rotating directional input and constant rotating

directional output wheel system capable of preventing reverse rotation wheel system from generating following damp;

--machine body (600): formed as a relatively static machinery structural body;

5 --a unidirectional transmission device (303) is installed between the input shaft (2000) and a sun gear (202);

--a planetary gear (203) is installed between an outer annular wheel (204) and the sun gear (202); the center of the planetary gear (203) revolves on a planetary gear shaft (201), and one end of the planetary gear shaft (201)

10 is fastened in the housing of transmission wheel system (500);

--a unidirectional transmission device (301) is installed between the annular structural body of the outer annular wheel (204) and the output shaft (3000);

--the sun gear (202), the planetary gear (203) and the outer annular wheel (204) are configured by gears or friction wheels;

15 --according to the disclosed structure, the input shaft (2000) is driven in the first driving rotating direction, and through the unidirectional transmission device (302), the output shaft (3000) is driven for performing the first driving rotating directional output thereby forming a first transmission wheel system; at this moment, the unidirectional transmission device (301) and the unidirectional transmission device (303) are in the idle rotating state;

--according to the disclosed structure, the input shaft (2000) is driven in the second driving rotating direction; through the unidirectional transmission device (303), the sun gear (202) is driven then the planetary gear (203) and the outer annular wheel (204) are driven; further through the annular structural body of the outer annular wheel (204) and the unidirectional transmission device (301), the output shaft (3000) is driven for outputting in the same rotating direction as the first driving rotating direction thereby forming a second transmission wheel system; at this

moment, the unidirectional transmission device (302) is in the idle rotating state.

FIG. 2 is the second schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention;

As shown in FIG. 2, configured by an epicycle gear system, the input shaft and the output shaft are coaxially sleeved, it mainly consists:

--one end of the input shaft (2000) is installed to penetrate through a housing of transmission wheel system (500) through a bearing structure, the other end of the input shaft (2000) is installed to penetrate through the output shaft (3000) through a unidirectional transmission device (302), and a bearing is installed between the output shaft (3000) and the housing of transmission wheel system (500);

--housing of transmission wheel system (500): combined in a machine body (600), the housing of transmission wheel system (500) is served to be installed with the machinery components which are adopted by assembling the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp;

--machine body (600): formed as a relatively static machinery structural body;

--the unidirectional transmission device (303) is installed between the input shaft (2000) and an inner bevel wheel (402);

--an epicycle gear (403) is installed between an outer bevel wheel (404) and the inner bevel wheel (402); the center of the epicycle gear (403) revolves on an epicycle gear shaft (401); one end of the epicycle gear shaft (401) is combined on an annular support rack of epicycle gear (400), and the annular support rack of epicycle gear (400) is fastened in the housing of transmission wheel system (500);

--the unidirectional transmission device (301) is installed between the outer bevel wheel (404) and the output shaft (3000);

--the inner bevel wheel (402), the epicycle gear (403) and the outer bevel wheel (404) are configured by gears or friction wheels;

5 --the relation of transmission ratio of the inner bevel wheel (402) driving the epicycle gear (403) can be acceleration, deceleration or equal speed;

--the relation of transmission ratio of the epicycle gear (403) driving the outer bevel wheel (404) can be acceleration, deceleration or equal speed;

--according to the disclosed structure, the input shaft (2000) is driven in

10 the first driving rotating direction, and through the unidirectional transmission device (302), the output shaft (3000) is driven for performing the first driving rotating directional output thereby forming a first transmission wheel system; at this moment, the unidirectional transmission device (301) and the unidirectional transmission device (303)

15 are in the idle rotating state;

--according to the disclosed structure, the input shaft (2000) is driven in the second driving rotating direction, through the unidirectional transmission device (303), the inner bevel wheel (402) is driven then the epicycle gear (403) and the outer bevel wheel (404) are driven; further

20 through the outer bevel wheel (404) and the unidirectional transmission device (301), the output shaft (3000) is driven for outputting in the same rotating direction as the first driving rotating direction thereby forming a second transmission wheel system; at this moment, the unidirectional transmission device (302) is in the idle rotating state.

25 FIG. 3 is the third schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention;

As shown in FIG. 3, configured by transmission devices in different

30 transmission rotating directions, the input shaft and the output shaft are

coaxially sleeved, it mainly consists:

--one end of the input shaft (2000) is installed to penetrate through a housing of transmission wheel system (500) through a bearing structure, the other end of the input shaft (2000) is installed to penetrate through the output shaft (3000) through a unidirectional transmission device (302); a bearing is installed between the output shaft (3000) and the housing of transmission wheel system (500);

--housing of transmission wheel system (500): combined in a machine body (600), the housing of transmission wheel system (500) is served to be installed with the machinery components which are adopted by assembling the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp;

--machine body (600): formed as a relatively static machinery structural body;

--the input shaft (2000) penetrates a transmission wheel (602), and the unidirectional transmission device (303) is installed between the above two;

--the transmission wheel (602) and a transmission wheel (603) perform transmission in different rotating directions, the transmission wheel (603) and a transmission wheel (606) are jointly combined on a rotation shaft (604), and a bearing is installed between the rotation shaft (604) and the housing of transmission wheel system (500);

--the transmission wheel (602), (603) is configured by a gear or friction wheel;

--the transmission wheel (605), (606) is configured by a pulley or chain wheel;

--the transmission wheel (606) and the transmission wheel (605) is configured by a pulley driven by a transmission belt (607) or chain wheel or an inner gear set of a transmission wheel set in the same rotating

direction;

--the unidirectional transmission device (301) is installed between the transmission wheel (605) and the output shaft (3000);

--the relation of transmission ratio between the transmission wheel sets in
5 different rotating directions can be acceleration, deceleration or equal speed;

--the relation of transmission ratio between the transmission wheel sets in the same rotating direction can be acceleration, deceleration or equal speed;

10 --the transmission wheel set in the same rotating direction includes being installed with the transmission belt (607) including being configured by a pulley with a flat belt, V-shaped belt, tooth belt or steel belt, or a chain wheel provided with a chain;

--according to the disclosed structure, the input shaft (2000) is driven in
15 the first driving rotating direction, and through the unidirectional transmission device (302), the output shaft (3000) is driven for performing the first driving rotating directional output thereby forming a first transmission wheel system; at this moment, the unidirectional transmission device (301) and the unidirectional transmission device (303)
20 are in the idle rotating state;

--according to the disclosed structure, the input shaft (2000) is driven in the second driving rotating direction, through the unidirectional transmission device (303), the transmission wheel (602) is driven, then the transmission wheel (602) drives the transmission wheel (603) and the
25 transmission wheel (606), then the transmission wheel (606) further drives the transmission wheel (605), so as to drive the output shaft (3000) through the unidirectional transmission device (301) for outputting in the first driving rotating direction thereby forming a second transmission wheel system; at this moment, the unidirectional transmission device (302)
30 is in the idle rotating state.

FIG. 4 is the fourth schematic view showing the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp according to one embodiment of the present invention;

5 As shown in FIG. 4, configured by a gear set or friction wheel set in different transmission rotating directions, the input shaft and the output shaft are coaxially sleeved, it mainly consists:

--one end of the input shaft (2000) is installed to penetrate through a housing of transmission wheel system (500) through a bearing structure,
10 the other end of the input shaft (2000) is installed to penetrate through the output shaft (3000) through a unidirectional transmission device (302), and a bearing is installed between the output shaft (3000) and the housing of transmission wheel system (500);

--housing of transmission wheel system (500): combined in a machine
15 body (600), the housing of transmission wheel system (500) is served to be installed with the machinery components which are adopted by assembling the bi-rotating directional input and constant rotating directional output wheel system capable of preventing reverse rotation wheel system from generating following damp;

20 --machine body (600): formed as a relatively static machinery structural body;

--the input shaft (2000) penetrates a transmission wheel (602), and the unidirectional transmission device (303) is installed between the above two;

25 --the transmission wheel (602) and a transmission wheel (603) perform transmission in different rotating directions, the transmission wheel (603) and a transmission wheel (616) are jointly combined on a rotation shaft (604), and a bearing is installed between the rotation shaft (604) and the housing of transmission wheel system (500);

30 --a transmission wheel (616) drives the transmission wheel (617)

revolving on the rotation shaft (618) then drives the transmission wheel (615) thereby forming the transmission wheel set in the same rotating direction;

--the rotations shaft (618) is combined in the housing of transmission wheel system (500), the transmission wheel (617) revolves on the rotation shaft (618); or the transmission wheel (617) is combined on the rotation shaft (618) and the transmission wheel (617) and the rotation shaft (618) jointly perform the revolving operation, and a bearing is installed between the rotation shaft (618) and the housing (500);

--the transmission wheel (615) is sleeved on the output shaft (3000), and the unidirectional transmission device (301) is installed between the above two;

--the transmission wheel (602), (603), (615), (616), (617) is configured by a gear or friction wheel;

--the relation of transmission ratio between the transmission wheel sets in different rotating directions can be acceleration, deceleration or equal speed;

--the relation of transmission ratio between the transmission wheel sets in the same rotating direction can be acceleration, deceleration or equal speed;

--the transmission wheel set in the same rotating direction includes being installed with an inner gear set or inner friction wheel set;

--according to the disclosed structure, the input shaft (2000) is driven in the first driving rotating direction, and through the unidirectional transmission device (302), the output shaft (3000) is driven for performing the first driving rotating directional output thereby forming a first transmission wheel system; at this moment, the unidirectional transmission device (301) and the unidirectional transmission device (303) are in the idle rotating state;

--according to the disclosed structure, the input shaft (2000) is driven in

the second driving rotating direction, through the unidirectional transmission device (303), the transmission wheel (602) is driven, then the transmission wheel (602) drives the transmission wheel (603) and the transmission wheel (616), then the transmission wheel (616) further drives
5 the transmission wheel (615) through the transmission wheel (617); and through the unidirectional transmission device (301), the transmission wheel (615) drives the output shaft (3000) for outputting in the first driving rotating direction thereby forming a second transmission wheel system; at this moment, the unidirectional transmission device (302) is in
10 the idle rotating state.

According to the embodiment disclosed from FIG. 1 to FIG. 4, a clutch device (CL100) can be further installed between the output shaft (3000) and a revolving load (3001) for controlling the operations of coupling or releasing to the output;

15 FIG. 5 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 1 and a revolving load (3001) according to one embodiment of the present invention;

As shown in FIG. 5, the main characteristic is that the clutch device
20 (CL100) is further installed between the output shaft (3000) shown in FIG. 1 and the revolving load (3001).

FIG. 6 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 2 and the revolving load (3001) according to one embodiment of the present
25 invention;

As shown in FIG. 6, the main characteristic is that the clutch device (CL100) is further installed between the output shaft (3000) shown in FIG. 2 and the revolving load (3001).

FIG. 7 is a schematic view illustrating a clutch device (CL100) being
30 further installed between the output shaft (3000) shown in FIG. 3 and the

revolving load (3001) according to one embodiment of the present invention;

As shown in FIG. 7, the main characteristic is that the clutch device (CL100) is further installed between the output shaft (3000) shown in FIG. 3 and the revolving load (3001).

FIG. 8 is a schematic view illustrating a clutch device (CL100) being further installed between the output shaft (3000) shown in FIG. 4 and the revolving load (3001) according to one embodiment of the present invention;

As shown in FIG. 8, the main characteristic is that the clutch device (CL100) is further installed between the output shaft (3000) shown in FIG. 4 and the revolving load (3001).

The clutch device (CL100) disclosed from FIG. 5 to FIG. 8 includes utilizing the manual force, or mechanical force, or torque, or centrifugal force, or electromagnetic force or hydraulic force for controlling the engaged operation for connecting the output shaft (3000) and the revolving load (3001) for transmission, or the disengaged operation for terminating the transmission relation between the output shaft (3000) and the revolving load (3001).

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CLAIMS

1. A bi-rotating directional input and constant rotating directional output wheel device
for a power system driven by a manual force or engine or electric motor or fluid motor comprising:
an unidirectional output shaft (3000);
a bi-directional input shaft (2000) being coaxially sleeved within the output shaft,
the device characterized by further comprising:
a first unidirectional transmission device (303) located
between an input wheel (202; 402; 602) and the input shaft, the input shaft being
arranged to rotate bi-directionally and the first unidirectional transmission device
being arranged to rotate the input wheel in a non-driving direction when the input
shaft is rotating in the
non-driving direction and to disengage from the input shaft when the input shaft is
rotating in the driving direction;
a second unidirectional transmission device (301) located between an output
wheel (204; 404; 605; 615) and the output shaft, the second
unidirectional transmission device being arranged to rotate the output shaft in the
driving direction when the output wheel is rotating in the driving direction and to
disengage the output shaft when the output wheel is rotating in the non-driving
direction;
a third unidirectional transmission device (302) located between the
output shaft and the input shaft, the third unidirectional transmission device arranged to
rotate the output shaft in the driving direction when the input shaft is rotating in the
driving direction and disengage the output shaft when the input shaft is rotating in the
non-driving direction; and
direction of rotation reversing means (203; 403; 603, 606, 607; 603, 616, 617)
located between the input wheel and the output wheel, the direction of rotation
reversing means arranged to reverse the direction of rotation between the input wheel
and the output wheel.
2. The device of claim 1, wherein:
the input wheel comprises a sun gear (202);
the output wheel comprises an outer annular wheel (204);

the direction of rotation reversing means comprises a planetary gear (203) rotationally engaged between the sun gear and the outer annular wheel.

3. The device of claim 1, wherein:

the input wheel comprises a first bevel wheel (402);

the output wheel comprises a second bevel wheel (404);

the direction of rotation reversing means comprises an epicycle gear (403) rotationally engaged between the first and the second bevel wheels.

4. The device of claim 3, wherein the transmission ratio of the epicycle gear (403) can cause the output wheel to rotate at a faster, slower, or the same speed as the input wheel.

5. The device of claim 1, wherein:

the input wheel comprises a first transmission wheel (602);

the output wheel comprises a second transmission wheel (615);

the direction of rotation reversing means comprises:

a third transmission wheel (603) arranged to rotationally engage the first transmission wheel;

a transmission belt (607) arranged to rotationally engage the second transmission wheel; and

a fourth transmission wheel (606) rotationally fixed to the third transmission wheel and arranged to rotationally engage the transmission belt.

6. The device of claim 5, wherein the transmission ratios of the transmission wheels (602, 615, 603, 606) can cause the output wheel to rotate at a faster, slower, or the same speed as the input wheel.

7. The device of claim 1, wherein:

the input wheel comprises a first transmission wheel (602);

the output wheel comprises a second transmission wheel (615);

the direction of rotation reversing means comprises:

a third transmission wheel (603) arranged to rotationally engage the first transmission wheel;

a fourth transmission wheel (606) rotationally fixed to the third transmission

wheel; and

a fifth transmission wheel (617) arranged to rotationally engage the second transmission wheel.

8. The device of claim 7, wherein the transmission ratios of the transmission wheels (602, 615, 603, 606, 617) can cause the output wheel to rotate at a faster, slower, or the same speed as the input wheel.

9. The device of any of the preceding claims, wherein a clutch device (CL100) is included between the output shaft (3000) and a revolving load (3001) for controlling the operations of coupling or releasing the revolving load to the output shaft.

10. The device of claim 9, wherein the clutch device (CL100) is operable by way of manual force, or mechanical force, or torque, or centrifugal force, or electromagnetic force or hydraulic force.