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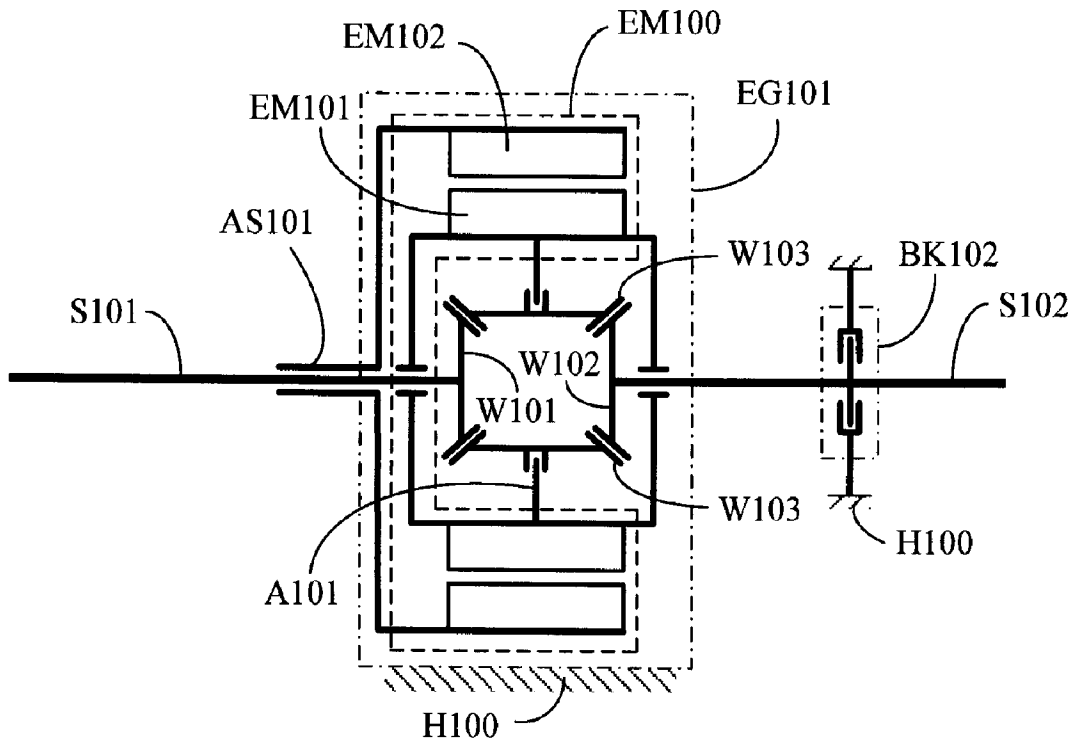
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(54) **Titre : MACHINE ELECTRIQUE A DOUBLE ENTRAINEMENT EQUIPEE D'UN JEU D'ENGRENAGES PLANETAIRES
EPICYCLOIDaux REGLABLE**

(54) **Title: DUAL-DRIVE ELECTRIC MACHINE HAVING CONTROLLABLE EPICYCLE GEAR SET**



(57) **Abrégé/Abstract:**

The present invention is structured by a dual-drive electric machine being combined with an epicycle gear set (EG101) and a controllable brake device, through controlling the controllable brake device to perform brake locking or releasing, the operations of transmission function of combining transmission or releasing between a rotation shaft (S101) at an output/input end, a rotation shaft (S102) at an output/input end and a sleeve type rotation shaft (AS101) at an output/input end of the epicycle gear set (EG101) are enabled to be controlled, and the interacting operation between the dual-drive electric machine (EM100) and the output/input ends are also enabled to be controlled.

ABSTRACT

The present invention is structured by a dual-drive electric machine being combined with an epicycle gear set (EG101) and a controllable brake device, through controlling the controllable brake device to perform
5 brake locking or releasing, the operations of transmission function of combining transmission or releasing between a rotation shaft (S101) at an output/input end, a rotation shaft (S102) at an output/input end and a sleeve type rotation shaft (AS101) at an output/input end of the epicycle gear set (EG101) are enabled to be controlled, and the interacting
10 operation between the dual-drive electric machine (EM100) and the output/input ends are also enabled to be controlled.

**TITLE: DUAL-DRIVE ELECTRIC MACHINE HAVING
CONTROLLABLE EPICYCLE GEAR SET**

BACKGROUND OF THE INVENTION

5 (a) Field of the Invention

The present invention is structured by a dual-drive electric machine being combined with an epicycle gear set and a controllable brake device, through controlling the controllable brake device to perform brake locking or releasing, the operations of transmission function of combining
10 transmission or releasing between a rotation shaft at an output/input end, a rotation shaft at an output/input end and a sleeve type rotation shaft at an output/input end of the epicycle gear set are enabled to be controlled, and the interacting operation between the dual-drive electric machine and the output/input ends are also enabled to be controlled.

15 (b) Description of the Prior Art

Conventionally, a friction type electromagnetic clutch device is often installed between the output/input end of a rotation electric machine and a load; and through electrically charging or breaking the friction type electromagnetic clutch device to perform operations of combining or
20 releasing, the load is enabled to engaged or released with the rotary electric machine. One primary disadvantage of the conventional arts is that residual rotary torque is often remained during the releasing, which may cause the kinetic energy loss and the ineffective operation.

25 **SUMMARY OF THE INVENTION**

The present invention is structured by a dual-drive electric machine being combined with an epicycle gear set and a controllable brake device, through controlling the controllable brake device to perform brake locking or releasing, the operations of transmission function of combining
30 transmission or releasing between a rotation shaft at an output/input end, a

rotation shaft at an output/input end and a sleeve type rotation shaft at an output/input end of the epicycle gear set are enabled to be controlled, and the interacting operation between the dual-drive electric machine and the output/input ends are also enabled to be controlled.

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In accordance with another aspect of the present invention there is provided a dual-drive electric machine installed with an epicyclic gear type clutch, comprising: an electric machine having an inner rotation part and an outer rotation part; an epicyclic gear set having an input wheel, an output wheel, and a rocker arm on which is rotatably mounted at least one epicyclic wheel rotatably engaged with the input wheel and the output wheel, said rocker arm being combined with the inner rotation part of the electric machine; a first rotation shaft connected to and rotatable with the input wheel; a second rotation shaft connected to and rotatable with the output wheel; a sleeve type rotation shaft rotatably sleeved on the first rotation shaft, said sleeve type rotation shaft being combined with the outer rotation part of the electric machine such that the outer rotation part faces and magnetically interacts with the inner rotation part; at least one controllable brake device; and a housing, wherein: the first rotation shaft serves as a first output/input end of the dual-drive electric machine, the second rotation shaft serves as a second output/input end of the dual-drive electric machine, and the sleeve type rotation shaft serves as a third output/input end of the dual-drive electric machine, a first action side of the at least one controllable brake device is controllable to lock and release at least one of the first, second, and third output/input ends of the dual-drive electric machine to control transmission of rotational energy between the first rotation shaft, the second rotation shaft and the sleeve type rotation shaft, and thereby control interactive operations between the

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dual-drive electric machine and the first, second, and third output/input ends, and a second action side of the at least one controllable brake device is connected to the housing.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end and connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

FIG. 2 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft

(AS101) sleeved on the rotation shaft (S101) being served as an output/input end, and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, the rotation shaft (S102) being connected to an
 5 action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

FIG. 3 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and
 10 the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end for connecting with an action side of the controllable brake device (BK103), the other action side of the controllable brake device (BK103) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in
 15 the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) being provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being served as an output/input end, and the output wheel (W102) of the
 20 epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

FIG. 4 is a schematic structural view showing the controllable brake device (BK102) being further installed between the rotation shaft (S102)
 25 and the housing (H100) as shown in FIG. 1.

FIG. 5 is a schematic structural view showing the controllable brake device (BK103) being further installed between the rotation shaft (S101) and the housing (H100) as shown in FIG. 2.

FIG. 6 is a schematic structural view showing the controllable brake
 30 device (BK101) being further installed between the sleeve type rotation

shaft (AS101) and the housing (H100) as shown in FIG. 3.

FIG. 7 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end, and served for connecting with an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) being fixed in the housing (H100), and the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, and the sleeve type rotation shaft (AS101) being connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) being fixed in the housing (H100), and the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, and served for connecting with an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

FIG. 8 is a schematic structural view showing the rotation shaft (S101) being combined with the input wheel (W101) of the epicycle gear set (EG101) for being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) being combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved

on the rotation shaft (S101) being served as an output/input end and provided for connecting to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

FIG. 9 is a schematic structural view showing the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) being combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) being connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

FIG. 10 is a schematic structural view showing the rotation shaft (S101) being combined with the input wheel (W101) of the epicycle gear set (EG101) and provided for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) being provided for linking the rocker arm (A101) and combined with the inner rotation

part of electric machine (EM101), the outer rotation part of electric machine (EM102) being connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end, and the output
 5 wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

FIG. 11 is a schematic structural view showing the controllable brake device (BK102) being further installed between the rotation shaft (S102)
 10 and the housing (H100) as shown in FIG. 8.

FIG. 12 is a schematic structural view showing the controllable brake device (BK103) being further installed between the rotation shaft (S101) and the housing (H100) as shown in FIG. 9.

FIG. 13 is a schematic structural view showing the controllable brake device (BK101) being further installed between the sleeve type rotation shaft (AS101) and the housing (H100) as shown in FIG. 10.
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FIG. 14 is a schematic structural view showing the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) being served as an output/input end and provided for connecting
 20 to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) being fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) being provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer
 25 rotation part of electric machine (EM102) being connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) being rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, the sleeve type rotation shaft (AS101) being connected to an action side of the controllable brake device (BK101) while the other
 30 action side of the controllable brake device (BK101) being fixed in the

housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end and provided for connecting to an action side of the
 5 controllable brake device (BK102) while the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

DESCRIPTION OF MAIN COMPONENT SYMBOLS

10 A101 : Rocker arm
 AS101 : Sleeve type rotation shaft
 BK101, BK102, BK103 : Controllable brake device
 EG101 : Epicycle gear set
 EM100 : Dual-drive electric machine
 15 EM101 : Inner rotation part of electric machine
 EM102 : Outer rotation part of electric machine
 H100 : Housing
 S101 、 S102 : Rotation shaft
 W101 : Input wheel
 20 W102 : Output wheel
 W103 : Epicycle wheel

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Conventionally, a friction type electromagnetic clutch device is often
 25 installed between the output/input end of a rotation electric machine and a load; and through electrically charging or breaking the friction type electromagnetic clutch device to perform operations of combining or releasing, the load is enabled to engaged or released with the rotary electric machine. One primary disadvantage of the conventional arts is
 30 that residual rotary torque is often remained during the releasing, which

may cause the kinetic energy loss and the ineffective operation.

The present invention provides a dual-drive electric machine having a controllable epicycle gear set, in which an inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is
 5 combined with an input wheel (W101) of an epicycle gear set (EG101) and a rotation shaft (S101) shared by the above two is served as an output/input end, a rotation shaft (S102) combined with an output wheel (W102) is served as an output/input end, and a rocker arm (A101) linked by an epicycle wheel (W103) of the epicycle gear set (EG101) combined
 10 with an outer rotation part of electric machine (EM102) and combined with a sleeve type rotation shaft (AS101) is served as an output/input end, so that a part or all of the three output/input ends are respectively connected to an action side of a corresponding controllable brake device, and the other action side of the controllable brake device is connected to a
 15 housing (H100); through controlling the controllable brake device to perform brake locking or releasing, the operations of transmission function of connecting transmission or releasing between the rotation shaft (S101) at the output/input end, the rotation shaft (S102) at the output/input end and the sleeve type rotation shaft (AS101) at the
 20 output/input end of the epicycle gear set (EG101) are enabled to be controlled, and the interactive operation between the dual-drive electric machine (EM100) and the output/input ends are also enabled to be controlled.

The structures and embodiments of the dual-drive electric machine
 25 having controllable epicycle gear set of the present invention are disclosed as followings:

FIG. 1 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive
 30 electric machine (EM100) being served as an output/input end, the rocker

arm (A101) linked by the epicycle wheel (W103) being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end and connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

As show in FIG 1, it mainly consists of:

--Epicycle gear set (EG101): constituted by an input wheel (W101) and an output wheel (W102) and at least an epicycle wheel (W103), and including by means of the bevel gears engaging with each other or the bevel friction wheels mutually performing friction transmissions to form the epicycle gear set function, and also constituted by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end axially extending toward the rotation shaft (S101) for being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is sleeved on one or both of the rotation shaft (S101) and the rotation shaft (S102) and capable of rotating thereon;

--Controllable brake device (BK101): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101) while the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric machine (EM102) is combined with the rocker arm (A101);

--The rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and

the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, and the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S101) connected with the input wheel (W101) is also served as an output/input end;

10 According to the embodiment shown in FIG. 1, the operations of the dual-drive electric machine having controllable epicycle gear set of the present invention include one or more than one of following functions:

--When the controllable brake device (BK101) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relations between the rotation shaft (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK101) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not

operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is
 5 operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations
 10 with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the rotation shaft (S102);

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the
 15 driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the
 20 driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 2 is a schematic structural view showing the rotation shaft (S101)
 25 shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the outer rotation part of electric machine (EM102) and combined with
 30 the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft

(AS101) sleeved on the rotation shaft (S101) being served as an output/input end, and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, the rotation shaft (S102) being connected to an
 5 action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

As show in FIG 2, it mainly consists of:

--Epicycle gear set (EG101): constituted by an input wheel (W101) and an
 10 output wheel (W102) and at least an epicycle wheel (W103), and including by means of the bevel gears engaging with each other or the bevel friction wheels mutually performing friction transmissions to form the epicycle gear set function, and also constituted by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type
 15 rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be
 20 the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the
 25 epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end axially extending toward the rotation shaft (S101) for being combined with the outer
 30 rotation part of electric machine (EM102) and combined with the sleeve

type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is sleeved on one or both of the rotation shaft (S101) and the rotation shaft (S102) and capable of rotating thereon;

--Controllable brake device (BK102): constituted by a brake device
 5 controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102) while the other action side is fixed in the
 10 housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end
 15 covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric
 20 machine (EM102) is combined with the rocker arm (A101);

--The rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel
 25 (W103) is combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is rotated and sleeved on the rotation shaft (S101) for being served as an output/input end;

--The output wheel (W102) of the epicycle gear set (EG101) is provided
 30 for driving the rotation shaft (S102) to be served as an output/input end,

and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

According to the embodiment shown in FIG. 2, the operations of the dual-drive electric machine having controllable epicycle gear set of the present invention include one or more than one of following functions:

--When the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relations between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) and the rotation shaft (S102) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation

part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 3 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end for connecting with an action side of the controllable brake device (BK103), and the other action side of the controllable brake device (BK103) being fixed in the housing (H100); the epicycle gear set (EG101) also being fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) being provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being served as an output/input end, and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the

rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

As show in FIG 3, it mainly consists of:

--Epicycle gear set (EG101): constituted by an input wheel (W101) and an
 5 output wheel (W102) and at least an epicycle wheel (W103), and
 including by means of the bevel gears engaging with each other or the
 bevel friction wheels mutually performing friction transmissions to form
 the epicycle gear set function, and also constituted by the rotation shaft
 (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type
 10 rotation shaft (AS101) and a bearing, as well as installed with a shell for
 being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel
 (W102) of the mentioned epicycle gear set (EG101) are the same, and the
 speed ratios between the above two and the epicycle wheel (W103) can be
 15 the same or different; or

The speed ratios of the input wheel (W101) and the output wheel
 (W102) of the mentioned epicycle gear set (EG101) are different, the
 speed ratios between the epicycle wheel (W103) and the output wheel
 (W102) can be the same or different, and the speed ratios between the
 20 epicycle wheel (W103) and the input wheel (W101) can be the same or
 different;

--Rocker arm (A101): having one end provided for allowing the epicycle
 wheel (W103) to rotate and link, and the other end axially extending
 toward the rotation shaft (S101) for being combined with the outer
 25 rotation part of electric machine (EM102) and combined with the sleeve
 type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is
 sleeved on one or both of the rotation shaft (S101) and the rotation shaft
 (S102) and capable of rotating thereon;

--Controllable brake device (BK103): constituted by a brake device
 30 controlled by a manual force or mechanical force or hydraulic force or

pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101) while the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric machine (EM102) is combined with the rocker arm (A101);

--The rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end for connecting with an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

--The epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S101) connected with the input wheel (W101) is also served as an output/input end;

The operations of the dual-drive electric machine having controllable epicycle gear set shown in FIG. 3 include one or more than one of following functions:

- 5 --When the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relations between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) and the rotation shaft (S102) are in the releasing state allowing idle rotation;
- 10 -- When the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);
- 15 --When the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the sleeve type rotation shaft (AS101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;
- 20 --When the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or
- 25 the motor function, for performing corresponding interactive operations
- 30

with the damping of external load or the externally inputted rotary kinetic energy sustained by the sleeve type rotation shaft (AS101) and the rotation shaft (S102);

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 4 is a schematic structural view showing the controllable brake device (BK102) being further installed between the rotation shaft (S102) and the housing (H100) as shown in FIG. 1.

As shown in FIG. 4, the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the sleeve type rotation shaft (AS101) is connected with an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the epicycle gear set (EG101) is also fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the

rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100), which mainly consists of:

- 5 --Epicycle gear set (EG101): constituted by an input wheel (W101) and an output wheel (W102) and at least an epicycle wheel (W103), and including by means of the bevel gears engaging with each other or the bevel friction wheels mutually performing friction transmissions to form the epicycle gear set function, and also constituted by the rotation shaft
10 (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100); or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the
15 speed ratios between the above two and the epicycle wheel (W103) can be the same or different;

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel
20 (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

- Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end axially extending
25 toward the rotation shaft (S101) for being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is sleeved on one or both of the rotation shaft (S101) and the rotation shaft (S102) and capable of rotating thereon;

- 30 --Controllable brake device (BK101): constituted by a brake device

controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected
 5 to the sleeve type rotation shaft (AS101) or the rocker arm (A101) while the other action side is fixed in the housing (H100);

--Controllable brake device (BK102): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable
 10 action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102) while the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush
 15 or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and
 20 the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric machine (EM102) is combined with the rocker arm (A101);

--The rotation shaft (S101) shared by the input wheel (W101) of the
 25 epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) combined with the rotation shaft (S102) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel
 30 (W103) is combined with the outer rotation part of electric machine

(EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, and the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) is fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

According to the embodiment shown in FIG. 4, the operations of the dual-drive electric machine having controllable epicycle gear set of the present invention include one or more than one of following functions:

- When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relations between the rotation shaft (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;
- When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation

shaft (AS101);

--When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the rotation shaft (S102);

--When the controllable brake device (BK101) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive

operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state.

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 5 is a schematic structural view showing the controllable brake device (BK103) being further installed between the rotation shaft (S101) and the housing (H100) as shown in FIG. 2.

As shown in FIG. 5, the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, and is connected to an action side of the controllable brake device (BK103), and the other action side of the controllable brake device (BK103) is fixed in the housing (H100), and the epicycle gear set (EG101) is also fixed in the housing (H100), and the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part

of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, and the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100), which mainly consists of:
--Epicycle gear set (EG101): constituted by an input wheel (W101) and an output wheel (W102) and at least an epicycle wheel (W103), and including by means of the bevel gears engaging with each other or the bevel friction wheels mutually performing friction transmissions to form the epicycle gear set function, and also constituted by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end axially extending toward the rotation shaft (S101) for being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve

type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is sleeved on one or both of the rotation shaft (S101) and the rotation shaft (S102) and capable of rotating thereon;

--Controllable brake device (BK102): constituted by a brake device
5 controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102) while the other action side is fixed in the
10 housing (H100);

--Controllable brake device (BK103): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a
15 releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101) while the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric
20 machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated,
25 wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric machine (EM102) is combined with the rocker arm (A101);

-- The rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an
30

output/input end, and is connected to an action side of the controllable brake device (BK103), and the other action side of the controllable brake device (BK103) is fixed in the housing (H100); the output wheel (W102) of the epicycle gear set (EG101) is combined with the rotation shaft (S102) for being served as an output/input end, and is connected to an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) is fixed in the housing (H100); the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end;

The operations of the dual-drive electric machine having controllable epicycle gear set as shown in FIG. 5 include one or more than one of following functions:

--When the controllable brake device (BK102) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relations between the rotation shaft (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK102) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, the corresponding interactive operation of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the

rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK103) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the sleeve type rotation shaft (AS101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function performed, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the sleeve type rotation shaft (AS101) and the rotation shaft (S102);

--When the controllable brake device (BK103) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part

of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state;

10 The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

15 The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 6 is a schematic structural view showing the controllable brake device (BK101) being further installed between the sleeve type rotation shaft (AS101) and the housing (H100) as shown in FIG. 3.

As shown in FIG. 6, the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end for connecting with an action side of the controllable brake device (BK103), and the other action side of the controllable brake device (BK103) is fixed in the housing (H100); the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for

linking the rocker arm (A101) and combined to the outer rotation part of electric machine (EM102) and combined to the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is rotated and combined on the rotation shaft (S101) for being served as an output/input
5 end, and the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) is fixed in the housing (H100), and the shell of the epicycle gear set (EG101) is also fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) is
10 provided for driving the rotation shaft (S102) to be served as an output/input end, which mainly consists of:

--Epicycle gear set (EG101): constituted by an input wheel (W101) and an output wheel (W102) and at least an epicycle wheel (W103), and including by means of the bevel gears engaging with each other or the
15 bevel friction wheels mutually performing friction transmissions to form the epicycle gear set function, and also constituted by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

20 The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel
25 (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

30 --Rocker arm (A101): having one end provided for allowing the epicycle

wheel (W103) to rotate and link, and the other end axially extending toward the rotation shaft (S101) for being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is sleeved on one or both of the rotation shaft (S101) and the rotation shaft (S102) and capable of rotating thereon;

--Controllable brake device (BK101): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101) while the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101) while the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric machine (EM102) is combined with the rocker arm (A101);

--The rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, and is served for connecting to an action side of the
 5 controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

--The epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type
 10 rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, and the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the
 15 housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end.

The operations of the dual-drive electric machine having controllable epicycle gear set as shown in FIG. 6 include one or more than one of
 20 following functions:

--When the controllable brake device (BK101) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relations between the rotation shaft
 25 (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK101) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric
 30 machinery function, the corresponding interactive operation of the power

generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the rotation shaft (S102);

--When the controllable brake device (BK101) is controlled to be in the releasing state and the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S102) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the

releasing state and the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

- 10 --When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state.

15 The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

20 The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

25 FIG. 7 is a schematic structural view showing the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) being served as an output/input end, and served for connecting with an action side of the controllable brake device (BK103) while the other action side of the controllable brake device

30

(BK103) being fixed in the housing (H100), and the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) being rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, and the sleeve type rotation shaft (AS101) being connected to an action side of the controllable brake device (BK101), and the other action side of the controllable brake device (BK101) being fixed in the housing (H100), and the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, and served for connecting with an action side of the controllable brake device (BK102), and the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

As shown in FIG. 7, the rotation shaft (S101) shared by the input wheel (W101) of the epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, and served for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100); the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, and the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the

housing (H100); the epicycle gear set (EG101) is also fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action
 5 side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100), which mainly consists of:

--Epicycle gear set (EG101): constituted by an input wheel (W101) and an output wheel (W102) and at least an epicycle wheel (W103), and
 10 including by means of the bevel gears engaging with each other or the bevel friction wheels mutually performing friction transmissions to form the epicycle gear set function, and also constituted by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for
 15 being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

20 The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or
 25 different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end axially extending toward the rotation shaft (S101) for being combined with the outer rotation part of electric machine (EM102) and combined with the sleeve
 30 type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is

sleeved on one or both of the rotation shaft (S101) and the rotation shaft (S102) and capable of rotating thereon;

--Controllable brake device (BK101): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or
5 pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101) while the other action side is fixed in the housing (H100);

10 --Controllable brake device (BK102): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected
15 to the rotation shaft (S102) while the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or
20 pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101) while the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): constituted by a DC or AC, brush
25 or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and
30 the outer rotation part of electric machine (EM102) are coaxially rotated,

wherein the inner rotation part of electric machine (EM101) is combined with the rotation shaft (S101), and the outer rotation part of electric machine (EM102) is combined with the rocker arm (A101);

--The rotation shaft (S101) shared by the input wheel (W101) of the
 5 epicycle gear set (EG101) and the inner rotation part of electric machine (EM101) of the dual-drive electric machine (EM100) is served as an output/input end, and is served for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

10 --The epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the outer rotation part of electric machine (EM102) and combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end,
 15 and the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100); the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and
 20 the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

The operations of the dual-drive electric machine having controllable epicycle gear set as shown in FIG. 7 include one or more than one of
 25 following functions:

--When the controllable brake device (BK101) and the controllable brake device (BK102) and the controllable brake device (BK103) are all controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the
 30 transmission relations between the rotation shaft (S101) and the rotation

shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK101) and the controllable brake device (BK102) and the controllable brake device (BK103) are all
5 controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of
10 electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

15 --When the controllable brake device (BK101) is controlled to be in the brake locking state, the controllable brake device (BK102) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the
20 rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the brake locking state, the controllable brake device (BK102) and the controllable brake device (BK103) are controlled to be in the releasing
25 state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing correspondingly interactive operations with the
30 damping of external load or the externally inputted rotary kinetic energy

sustained by the rotation shaft (S101) and rotation shaft (S102);

--When the controllable brake device (BK102) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK102) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK103) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK102) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated with the electric machinery function, the transmission relation between the rotation shaft (S102) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK102) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the

electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the
 5 damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When two or all of the controllable brake device (BK101) and the controllable brake device (BK102) and the controllable brake device
 10 (BK103) are controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state.

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the
 15 driving control of externally inputted electric energy, operating as the motor function for individually driving the load, or working with the externally inputted rotation kinetic energy for driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the
 20 driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

The dual-drive electric machine having controllable epicycle gear set
 25 can be applied to various load devices which require mechanical output for driving, such as a ground vehicle, rail vehicle, agriculture machineries or agriculture vehicles, excavator, dozer, construction vehicles, transport vehicle, garbage truck, crane, hoisting machine, jack, forklift, water or underwater boat, aircraft, industrial machineries, tool machine, power
 30 device, hand-operated tool, robot or mechanical arm, gardening power

tool, domestic electric equipment;

According to the dual-drive electric machine having controllable epicycle gear set of the present invention, the sources of externally inputted rotary kinetic energy include an inner combustion engine, an
 5 outer combustion engine, a Sterling engine, a steam engine, electric engine, hydraulic engine, pneumatic engine, wind-driven blade device, flow-driven blade device, vapor-driven blade device, human or animal forces.

An inner rotation part of electric machine (EM101) of the dual-drive
 10 electric machine (EM100) is combined with a rocker arm (A101) and an epicycle wheel (W103) of an epicycle gear set (EG101) installed in the inner rotation part of electric machine (EM101), and a rotation shaft (S101) connected to an input wheel (W101) is served as an output/input end; a rotation shaft (S102) connected to an output wheel (W102) is
 15 served as an output/input end; an outer rotation part of electric machine (EM102) is connected to a sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) is rotated and sleeved on the rotation shaft (S101) for being served as an output/input end; thereby a part or all of the three output/input ends are respectively connected to an action side
 20 of a corresponding controllable brake device, and the other action side of the controllable brake device is connected to a housing (H100); through controlling the controllable brake device to perform brake locking or releasing, the operations of transmission function of connecting transmission or releasing between the rotation shaft (S101) at the
 25 output/input end, the rotation shaft (S102) at the output/input end and the sleeve type rotation shaft (AS101) at the output/input end of the epicycle gear set (EG101) are enabled to be controlled, and the interactive operations between the dual-drive electric machine (EM100) and the output/input ends are also enabled to be controlled.

30 The structures and embodiments of the dual-drive electric machine

having controllable epicycle gear set of the present invention are disclosed as followings:

FIG. 8 is a schematic structural view showing the rotation shaft (S101) being combined with the input wheel (W101) of the epicycle gear set (EG101) for being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) being combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end and provided for connecting to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

As show in FIG 8, it mainly consists of:

--Epicycle gear set (EG101): which is constituted by an sun wheel (W101) and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through friction wheels mutually performing friction transmissions to form an planetary gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

- Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end being combined with the inner rotation part of electric machine (EM101);
- 10 --Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);
- Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);
- 25 --The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the inner
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rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the sleeve type
 5 rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S101)
 10 combined with the input wheel (W101) is also served as an output/input end;

According to the embodiment shown in FIG. 8, the operations include one or more than one of following functions:

- When the controllable brake device (BK101) is controlled to be in the
 15 releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relations between the rotation shaft (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;
- 20 -- When the controllable brake device (BK101) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric
 25 machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);
- 30 --When the controllable brake device (BK101) is controlled to be in the

brake locking state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

- 5 --When the controllable brake device (BK101) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or
10 the motor function for performing interactive operations according to the damping of the external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the rotation shaft (S102);

The interactive operations of corresponding function performed by the
15 mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the
20 mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

- 25 FIG. 9 is a schematic structural view showing the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) being served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) being combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine
30 (EM102) being combined with the sleeve type rotation shaft (AS101), the

sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation
 5 shaft (S102) being connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

As show in FIG 9, it mainly consists of:

10 --Epicycle gear set (EG101): which is constituted by an sun wheel (W101) and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through friction wheels mutually performing friction transmissions to form an planetary gear set function, and structured by the rotation shaft (S101), the
 15 rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the
 20 speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel
 25 (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end being combined with
 30 the inner rotation part of electric machine (EM101);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);

--The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end;

--The output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

According to the embodiment shown in FIG. 2, the operations include one or more than one of following functions:

- 5 --When the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relations between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) and the rotation shaft (S102) are in the releasing state allowing idle rotation;
- 10 -- When the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine
15 (EM102), according to the damping of the external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);
- 20 --When the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;
- 25 --When the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function for performing interactive operations according to
30 the damping of the external load or the externally inputted rotary kinetic

energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 10 is a schematic structural view showing the rotation shaft (S101) being combined with the input wheel (W101) of the epicycle gear set (EG101) and provided for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) being fixed in the housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) being provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) being connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) being served as an output/input end, and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end, according to one embodiment of the present invention.

As show in FIG 10, it mainly consists of:

--Epicycle gear set (EG101): which is constituted by an sun wheel (W101)

and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through friction wheels mutually performing friction transmissions to form an planetary gear set function, and structured by the rotation shaft (S101), the
 5 rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the
 10 speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel
 15 (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end being combined with
 20 the inner rotation part of electric machine (EM101);

--Controllable brake device (BK103): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for
 25 engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101), and the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive
 30 electric machine, having an inner rotation part of electric machine

(EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);

--The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

--The epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved with the rotation shaft (S101) is served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S101) combined with the input wheel (W101) is also served as an output/input end;

According to the embodiment shown in FIG. 10, the operations include one or more than one of following functions:

--When the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) and the rotation shaft (S102) are in the releasing state allowing

idle rotation;

-- When the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive
5 operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of the external load or the rotation torque, the rotation speed and the rotation direction of the externally
10 inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation
15 between the sleeve type rotation shaft (AS101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation
20 part of electric machine (EM101) and the outer rotation part of electric machine (EM102) is operated as the power generator function or the motor function for performing interactive operations according to the damping of the external load or the externally inputted rotary kinetic energy sustained by the sleeve type rotation shaft (AS101) and the
25 rotation shaft (S102);

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the
30 externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator
 5 function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 11 is a schematic structural view showing the controllable brake device (BK102) being further installed between the rotation shaft (S102) and the housing (H100) as shown in FIG. 8.

10 As shown in FIG. 11, the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is combined
 15 with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the
 20 housing (H100), the epicycle gear set (EG101) is also fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side
 25 of the controllable brake device (BK102) is fixed in the housing (H100), which mainly consists of:

--Epicycle gear set (EG101): which is constituted by an sun wheel (W101) and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through
 30 friction wheels mutually performing friction transmissions to form an

planetary gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

- 5 The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

10 The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

- 15 --Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end being combined with the inner rotation part of electric machine (EM101);

20 --Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

- 25 --Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action
30 sides is connected to the rotation shaft (S102), and the other action side is

fixed in the housing (H100);

--Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);

--The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) combined with the rotation shaft (S102) is served as an output/input end, the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

According to the embodiment shown in FIG. 11, the operations

include one or more than one of following functions:

- When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relations between the rotation shaft (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;
- When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of the external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);
- When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;
- When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) is operated as the power generator function or

the motor function for performing corresponding interactive operations with the damping of the external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the rotation shaft (S102);

5 --When the controllable brake device (BK101) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation
10 shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation
15 part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation
20 shaft (AS101);

--When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state;

25 The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

30 The interactive operations of corresponding function performed by the

mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 12 is a schematic structural view showing the controllable brake device (BK103) being further installed between the rotation shaft (S101) and the housing (H100) as shown in FIG. 9.

As shown in FIG. 12, the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100), the epicycle gear set (EG101) is also fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100), which mainly consists of:

--Epicycle gear set (EG101): which is constituted by an sun wheel (W101) and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through friction wheels mutually performing friction transmissions to form an planetary gear set function, and structured by the rotation shaft (S101), the

rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end being combined with the inner rotation part of electric machine (EM101);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101), and the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and
 5 installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation
 10 part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);

-- The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to an action side of the controllable brake device (BK103)
 15 while the other action side of the controllable brake device (BK103) is fixed in the housing (H100); the output wheel (W102) of the epicycle gear set (EG101) is combined with the rotation shaft (S102) for being served as an output/input end and provided for connecting to an action side of the controllable brake device (BK102) while the other action side of the
 20 controllable brake device (BK102) is fixed in the housing (H100), the rocker arm (A101) linked by the epicycle wheel (W103) is combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101), and the sleeve type rotation shaft (AS101) rotated and
 25 sleeved on the rotation shaft (S101) is served as an output/input end;

According to the embodiment shown in FIG. 12, the operations include one or more than one of following functions:

--When the controllable brake device (BK102) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the
 30 dual-drive electric machine (EM100) is not operated as the electric

machinery function, the transmission relations between the rotation shaft (S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK102) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive operation of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of the external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK103) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the sleeve type rotation shaft (AS101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the brake locking state and the controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the sleeve type rotation shaft (AS101)

and the rotation shaft (S102);

--When the controllable brake device (BK103) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the releasing state and the controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator

function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 13 is a schematic structural view showing the controllable brake device (BK101) being further installed between the sleeve type rotation shaft (AS101) and the housing (H100) as shown in FIG. 10.

As shown in FIG. 13, the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) is rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the epicycle gear set (EG101) also is fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, which mainly consists of:

--Epicycle gear set (EG101): which is constituted by an sun wheel (W101) and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through friction wheels mutually performing friction transmissions to form an planetary gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

5 The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or
10 different;

--Rocker arm (A101): having one end provided for allowing the epicycle wheel (W103) to rotate and link, and the other end being combined with the inner rotation part of electric machine (EM101);

--Controllable brake device (BK101): which is constituted by a brake
15 device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker
20 arm (A101), and the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for
25 engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101), and the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive
30 electric machine, having an inner rotation part of electric machine

(EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102) are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);

--The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to an action side of the controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100);

--The epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end;

According to the embodiment shown in FIG. 13, the operations include one or more than one of following functions:

--When the controllable brake device (BK101) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relations between the rotation shaft

(S101) and the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK101) and the controllable brake device (BK103) are both controlled to be in the releasing state, and the
 5 dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive operation of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102), according to the damping of the external
 10 load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) is controlled to be in the
 15 brake locking state and the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation allowing for transmission;

20 --When the controllable brake device (BK101) is controlled to be in the brake locking state and the controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part
 25 of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and rotation shaft (S102);

30 --When the controllable brake device (BK101) is controlled to be in the

releasing state and the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S102) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the releasing state and the controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated with the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) and the controllable brake device (BK102) are both controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state.

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

FIG. 14 is a schematic structural view showing the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) being served as an output/input end and provided for connecting to an action side of the controllable brake device (BK103) while the other
 5 action side of the controllable brake device (BK103) being fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) being provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) being connected to the sleeve
 10 type rotation shaft (AS101), the sleeve type rotation shaft (AS101) being rotated and sleeved on the rotation shaft (S101) for being served as an output/input end, the sleeve type rotation shaft (AS101) being connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) being fixed in the
 15 housing (H100), the epicycle gear set (EG101) also being fixed in the housing (H100), and the output wheel (W102) of the epicycle gear set (EG101) being provided for driving the rotation shaft (S102) to be served as an output/input end and provided for connecting to an action side of the controllable brake device (BK102) while the other action side of the
 20 controllable brake device (BK102) being fixed in the housing (H100), according to one embodiment of the present invention.

As shown in FIG. 14, the rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to an action side of the
 25 controllable brake device (BK103) while the other action side of the controllable brake device (BK103) is fixed in the housing (H100), the epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine
 30 (EM102) is connected to the sleeve type rotation shaft (AS101), the sleeve

type rotation shaft (AS101) rotated and sleeved on the rotation shaft (S101) is served as an output/input end, the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the epicycle gear set (EG101) is also fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102) to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100), which mainly consists of:

--Epicycle gear set (EG101): which is constituted by an sun wheel (W101) and an outer annular wheel (W102) and at least an planetary wheel (W103), and including through gears engaging with each other, or through friction wheels mutually performing friction transmissions to form an planetary gear set function, and structured by the rotation shaft (S101), the rotation shaft (S102), the rocker arm (A101), the sleeve type rotation shaft (AS101) and a bearing, as well as installed with a shell for being combined in the housing (H100);

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are the same, and the speed ratios between the above two and the epicycle wheel (W103) can be the same or different; or

The speed ratios of the input wheel (W101) and the output wheel (W102) of the mentioned epicycle gear set (EG101) are different, the speed ratios between the epicycle wheel (W103) and the output wheel (W102) can be the same or different, and the speed ratios between the epicycle wheel (W103) and the input wheel (W101) can be the same or different;

--Rocker arm (A101): having one end provided for allowing the epicycle

wheel (W103) to rotate and link, and the other end being combined with the inner rotation part of electric machine (EM101);

--Controllable brake device (BK101): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the sleeve type rotation shaft (AS101) or the rocker arm (A101), and the other action side is fixed in the housing (H100);

--Controllable brake device (BK102): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S102), and the other action side is fixed in the housing (H100);

--Controllable brake device (BK103): which is constituted by a brake device controlled by a manual force or mechanical force or hydraulic force or pneumatic force or electromagnetic force, and having two controllable action sides for the operations of a brake locking state for engagement or a releasing state for separation, wherein one of the action sides is connected to the rotation shaft (S101), and the other action side is fixed in the housing (H100);

--Dual-drive electric machine (EM100): which is constituted by a DC or AC, brush or brushless, synchronous or non-synchronous dual-drive electric machine, having an inner rotation part of electric machine (EM101) and an outer rotation part of electric machine (EM102), and installed with end covers, bearings and related electric conduction devices used to introduce electric energy, the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine (EM102)

are coaxially rotated, wherein the inner rotation part of electric machine (EM101) is combined with the rocker arm (A101), and the outer rotation part of electric machine (EM102) is combined with the sleeve type rotation shaft (AS101);

- 5 --The rotation shaft (S101) combined with the input wheel (W101) of the epicycle gear set (EG101) is served as an output/input end and provided for connecting to one action side of the controllable brake device (BK103) while an action side of the controllable brake device (BK103) is fixed in the housing (H100);
- 10 --The epicycle wheel (W103) of the epicycle gear set (EG101) is provided for linking the rocker arm (A101) and combined with the inner rotation part of electric machine (EM101), the outer rotation part of electric machine (EM102) is connected to the sleeve type rotation shaft (AS101), the sleeve type rotation shaft (AS101) rotated and sleeved on the rotation
15 shaft (S101) is served as an output/input end, the sleeve type rotation shaft (AS101) is connected to an action side of the controllable brake device (BK101) while the other action side of the controllable brake device (BK101) is fixed in the housing (H100), the output wheel (W102) of the epicycle gear set (EG101) is provided for driving the rotation shaft (S102)
20 to be served as an output/input end, and the rotation shaft (S102) is connected to an action side of the controllable brake device (BK102) while the other action side of the controllable brake device (BK102) is fixed in the housing (H100);

According to the embodiment shown in FIG. 14, the operations
25 include one or more than one of following functions:

- When the controllable brake device (BK101) and the controllable brake device (BK102) and the controllable brake device (BK103) are all controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the
30 transmission relations between the rotation shaft (S101) and the rotation

shaft (S102) and the sleeve type rotation shaft (AS101) are in the releasing state allowing idle rotation;

-- When the controllable brake device (BK101) and the controllable brake device (BK102) and the controllable brake device (BK103) are all
5 controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, the corresponding interactive operations of the power generator function or the motor function are correspondingly performed between the inner rotation part of electric machine (EM101) and the outer rotation part of electric machine
10 (EM102), according to the damping of the external load or the rotation torque, the rotation speed and the rotation direction of the externally inputted rotary kinetic energy sustained by the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK101) is controlled to be in the
15 brake locking state, the controllable brake device (BK102) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the rotation shaft (S102) is in a connecting relation
20 allowing for transmission;

--When the controllable brake device (BK101) is controlled to be in the brake locking state, the controllable brake device (BK102) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the
25 electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy
30 sustained by the rotation shaft (S101) and rotation shaft (S102);

--When the controllable brake device (BK102) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S101) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK102) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK103) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of the electric machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S101) and the sleeve type rotation shaft (AS101);

--When the controllable brake device (BK103) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK102) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as the electric machinery function, the transmission relation between the rotation shaft (S102) and the sleeve type rotation shaft (AS101) is in a connecting relation allowing for transmission;

--When the controllable brake device (BK103) is controlled to be in the brake locking state, the controllable brake device (BK101) and the controllable brake device (BK102) are controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as the electric machinery function, between the inner rotation part of the electric

machine (EM101) and the outer rotation part of the electric machine (EM102) is operated as the power generator function or the motor function, for performing corresponding interactive operations with the damping of external load or the externally inputted rotary kinetic energy sustained by the rotation shaft (S102) and the sleeve type rotation shaft (AS101);

--When two or all of the controllable brake device (BK101) and the controllable brake device (BK102) and the controllable brake device (BK103) are controlled to be in the brake locking state, the relations between the rotation shaft (S101), the rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all in the brake locking state;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving control of externally inputted electric energy to operate as the motor function for individually driving the load, or working with the externally inputted rotary kinetic energy for commonly driving the load;

The interactive operations of corresponding function performed by the mentioned dual-drive electric machine (EM100) include receiving the driving of the externally inputted rotary kinetic energy or the driving of the load inertia kinetic energy for being operated as the power generator function, so as to output the electric energy to drive the external electric load or charge the external electric energy storing device.

The dual-drive electric machine installed with epicycle gear type clutch of the present invention can be applied to various load devices which require mechanical output for driving, such as a ground vehicle, rail vehicle, agriculture machineries or agriculture vehicles, excavator, dozer, construction vehicle, transportation vehicle, garbage truck, hoisting machinery, lifting machinery, forklift machinery, water or underwater boat, aircraft, industrial machineries, tool machine, power device, hand-operated tool, robot or mechanical arm, gardening power tool,

domestic electric equipment;

According to the dual-drive electric machine installed with epicycle gear type clutch of the present invention, the sources of externally inputted rotary kinetic energy include an inner combustion engine, an
5 outer combustion engine, a Sterling engine, a steam engine, electric engine, hydraulic engine, pneumatic engine, wind-driven blade device, flow-driven blade device, vapor-driven blade device, human or animal forces.

Claims

1. A dual-drive electric machine apparatus having a controllable epicyclic gear set (EG101), comprising:

5 an inner rotation part (EM101) combined with an input wheel (W101) of the epicyclic gear set (EG101),

an outer rotation part (EM102) combined with a rocker arm (A101) of the epicyclic gear set (EG101), wherein:

the inner rotation part (EM101) and outer rotation part (EM102) magnetically interact to form an
10 electric machine (EM100),

the input wheel (W101) engages at least one epicyclic wheel (W103) rotatably mounted on the rocker arm (A 101), and the at least one epicyclic wheel (W103) engages an output wheel (W102), to form the epicyclic gear set (EG101), said input wheel (W101), said output wheel (W102), and said epicyclic wheel (W103) each including one of a bevel gear and a bevel
15 friction wheel, and

said input wheel (W101) is mounted on a first rotation shaft (S101) that forms a first input/output end, said output wheel (W102) is mounted on a second rotation shaft (S102) that forms a second input/output end, and said rocker arm (A101) is combined with a sleeve type rotation shaft (AS101) that surrounds and is rotatable relative to at least one of said first rotation shaft (S101) and said second rotation shaft (S102) to form a third input/output end; and
20

at least one of a first, second, and third controllable brake device (BK101, BK102, or BK103) having a first side fixed to a housing (H100) and action side that is fixed to at least one of the sleeve-shaped rotation shaft (AS101) or the rocker arm (A 101), the first rotation shaft (S101), and the second rotation shaft (S102) for controlling operation interactive operations
25 between the first, second, and third input/output ends and the electric machine (EM100) by locking or releasing said one of the sleeve-shaped rotation shaft (AS101), first rotation shaft (S101), and second rotation shaft (S102).

2. An electric machine apparatus having the controllable epicyclic gear set as claimed in
30 claim 1, wherein a speed ratio between the input wheel (W101) and the output wheel (W102) is 1:1, and respective speed ratios of the input wheel (W101) and the output wheel (W102) to the

epicyclic wheel (W103) are the same or different.

3. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein a speed ratio between the input wheel (W101) and the output wheel (W102) is different than 1:1, and respective speed ratios of the input wheel (W101) and the output wheel (W102) to the epicyclic wheel (W103) are the same or different.

4. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device (BK101,BK102,BK103) is controllable by at least one of a manual force, a mechanical force, a hydraulic force, a pneumatic force, and an electromagnetic force.

5. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device includes said first controllable brake device (BK101), and wherein said first controllable brake device (BK101) is arranged to lock and release the sleeve-shaped rotation shaft (AS101) or the rocker arm (A101).

6. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 5, wherein the electric machine apparatus carries out the following operations:

when the first controllable brake device (BK101) is controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101) is controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a locking state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the second rotation shaft (S102) are connected for transmission; and

when the first controllable brake device (BK101) is controlled to be in a brake locking state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102).

7. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 2, wherein said at least one controllable brake device includes said second controllable brake device (BK102), and wherein said second controllable brake device (BK102) is arranged to lock and release the second rotation shaft (S102).

8. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 7, wherein the electric machine apparatus carries out the following operations:

when the second controllable brake device (BK102) is controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the second controllable brake device (BK102) is controlled to be in the releasing state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the second controllable brake device (BK102) is controlled to be in a brake locking state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the sleeve type rotation shaft (AS101) are connected for transmission; and

when the second controllable brake device (BK102) is controlled to be in the brake locking state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101) and the sleeve type rotation shaft (AS101).

9. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device includes said first controllable brake device (BK101) and said second controllable brake device (BK102), and wherein said first controllable brake device (BK101) is arranged to lock and release the sleeve-shaped rotation shaft (AS101) or the rocker arm (A101) and said second controllable brake device (BK102) is arranged to be engage and release the second rotation shaft (S102).

10. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 9, wherein the electric machine apparatus carries out the following operations:

when the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in the releasing state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a brake locking state, the second controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the second rotation shaft (S102) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the brake locking state, the second controllable brake device (BK102) is controlled to be in the releasing state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102);

when the first controllable brake device (BK101) is controlled to be in the releasing state, the second controllable brake device (BK102) is controlled to be in the brake locking state, and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the sleeve type rotation shaft (AS101) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the releasing state, the second controllable brake device (BK102) is controlled to be in the brake locking state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101) and the sleeve type rotation shaft (AS101); and

when the first controllable brake device (BK101) and the second controllable brake device (BK102) are both in the brake locking state, the first rotation shaft (S101), the second rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all locked.

11. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device includes said third controllable brake device (BK103), and there said third controllable brake device (BK103) locks and releases the first rotation shaft (S101).

12. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 11, wherein the electric machine apparatus carries out the following operations:

when the third controllable brake device (BK103) is controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft

(S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the third controllable brake device (BK103) is controlled to be in the releasing state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the third controllable brake device (BK103) is controlled to be in a brake locking state and the electric machine (EM100) is not operated as an electric machine, the sleeve type rotation shaft (AS101) and the second rotation shaft (S102) are connected for transmission; and

when the third controllable brake device (BK103) is controlled to be in the brake locking state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the sleeve type rotation shaft (AS101) and the second rotation shaft (S102).

13. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device includes said second controllable brake device (BK102) and said third controllable brake device (BK103), and wherein said second controllable brake device (BK102) locks and releases the second rotation shaft (S102) and said third controllable brake device (BK103) locks and releases the first rotation shaft (S101).

14. An electric machine apparatus having the controllable epicyclic gear set set as claimed in claim 13, wherein the electric machine apparatus carries out the following operations:

when the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in the releasing state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping
5 external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the second controllable brake device (BK102) is controlled to be in a brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and
10 the electric machine (EM100) is not operated as an electric machine, the sleeve type rotation shaft (AS101) and the first rotation shaft (S101) are connected for transmission;

when the second controllable brake device (BK102) is controlled to be in the brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101)
15 and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the sleeve type rotation shaft (AS101) and the first rotation shaft (S101);

when the second controllable brake device (BK102) is controlled to be in the releasing state, the third controllable brake device (BK103) is controlled to be in the brake locking state, and the electric machine (EM100) is not operated as an electric machine, the second rotation
20 shaft (S102) and the sleeve type rotation shaft (AS101) are connected for transmission;

when the second controllable brake device (BK102) is controlled to be in the releasing state, the third controllable brake device (BK103) is controlled to be in the brake locking state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor
25 function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the second rotation shaft (S102) and the sleeve type rotation shaft (AS101); and

when the second controllable brake device (BK102) and the third controllable brake device (BK103) are both in the brake locking state, the first rotation shaft (S101), the second rotation
30

shaft (S102) and the sleeve type rotation shaft (AS101) are all locked.

15. A dual drive electric machine having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device includes said first controllable brake
5 device (BK101) and said third controllable brake device (BK103), and wherein said first controllable brake device (BK101) locks and releases the sleeve-shaped rotation shaft (AS101) or the rocker arm (A101) the third controllable brake device (BK103) locks and releases the first rotation shaft (S101).

10 16. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 15, wherein the electric machine apparatus carries out the following operations:

when the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102),
15 and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in the releasing state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping
20 external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and
25 the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the second rotation shaft (S102) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101)
30 and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and

rotational direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102);

when the first controllable brake device (BK101) is controlled to be in the releasing state, the third controllable brake device (BK103) is controlled to be in the brake locking state, and the electric machine (EM100) is not operated as an electric machine, the second rotation shaft (S102) and the sleeve type rotation shaft (AS101) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the releasing state, the third controllable brake device (BK103) is controlled to be in the brake locking state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the second rotation shaft (S102) and the sleeve type rotation shaft (AS101); and

when the first controllable brake device (BK101) and the third controllable brake device (BK103) are both in the brake locking state, the first rotation shaft (S101), the second rotation shaft (S102) and the sleeve type rotation shaft (AS101) are all locked.

17. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 1, wherein said at least one controllable brake device includes said first controllable brake device (BK101), said second controllable brake device (BK102), and said third controllable brake device (BK103), and wherein the first controllable brake device (BK101) locks and releases the sleeve-shaped rotation shaft (AS101) or the rocker arm (A101), the second controllable brake device (BK102) locks and releases the second rotation shaft (S102), and the third controllable brake device (BK103) locks and releases the first rotation shaft (S101).

18. An electric machine apparatus having the controllable epicyclic gear set as claimed in claim 17, wherein the electric machine apparatus carries out the following operations:

when the first controllable brake device (BK101), the second controllable brake device (BK102), and the third controllable brake device (BK103) are all controlled to be in a releasing state and the electric machine (EM100) is not operated as an electric machine, the first rotation

shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101), and the second controllable brake device (BK102), and the third controllable brake device (BK103) are all controlled to be in the releasing state and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a brake locking state, the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in the releasing state, and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the second rotation shaft (S102) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the brake locking state, the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in the releasing state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102);

when the second controllable brake device (BK102) is controlled to be in the brake locking state, the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in the releasing state, and the electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the sleeve type rotation shaft (AS101) are connected for transmission;

when the second controllable brake device (BK102) is controlled to be in the brake locking state, the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in the releasing state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping

external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the first rotation shaft (S101) and the sleeve type rotation shaft (AS101);

when the third controllable brake device (BK103) is controlled to be in the brake locking state, the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as an electric machine, the second rotation shaft (S102) and the sleeve type rotation shaft (AS101) are connected for transmission;

when the third controllable brake device (BK103) is controlled to be in the brake locking state, the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in the releasing state, and the electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotational torque, rotational speed, and rotational direction applied to at least one of the second rotation shaft (S102) and the sleeve type rotation shaft (AS101); and

when at least two of the first controllable brake device (BK101), the second controllable brake device (BK102), and the third controllable brake device (BK103) are in the brake locking state, the first rotation shaft (S101), the second rotation shaft (S102) and the sleeve type rotation shaft (S103) are all locked.

19. A dual-drive electric machine installed with an epicyclic gear type clutch, comprising:

an electric machine (EM100) having an inner rotation part (EM101) and an outer rotation part (EM102);

an epicyclic gear set (EG101) having an input wheel (W101), an output wheel (W102), and a rocker arm (A101) on which is rotatably mounted at least one epicyclic wheel (W103) rotatably engaged with the input wheel (W101) and the output wheel (W102), said rocker arm (A101) being combined with the inner rotation part (EM101) of the electric machine (EM100);

a first rotation shaft (S101) connected to and rotatable with the input wheel (W101);

a second rotation shaft (S102) connected to and rotatable with the output wheel (W102);

a sleeve type rotation shaft (AS101) rotatably sleeved on the first rotation shaft (S101), said sleeve type rotation shaft (AS101) being combined with the outer rotation part (EM102) of the electric machine (EM100) such that the outer rotation part (EM102) faces and magnetically interacts with the inner rotation part (EM101);

5 at least one controllable brake device (BK101, BK102, and/or BK103); and

a housing (H100), wherein:

the first rotation shaft (S101) serves as a first output/input end of the dual-drive electric machine,

10 the second rotation shaft (S102) serves as a second output/input end of the dual-drive electric machine, and

the sleeve type rotation shaft (AS101) serves as a third output/input end of the dual-drive electric machine,

15 a first action side of the at least one controllable brake device (BK101, BK102, and/or BK103) is controllable to lock and release at least one of the first, second, and third output/input ends of the dual-drive electric machine to control transmission of rotational energy between the first rotation shaft (S101), the second rotation shaft (S102) and the sleeve type rotation shaft (AS102), and thereby control interactive operations between the dual-drive electric machine (EM100) and the first, second, and third output/input ends, and

20 a second action side of the at least one controllable brake device (BK101, BK102, and/or BK103) is connected to the housing (H100).

20. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the at least one controllable brake device (BK101, BK102, and/or BK103) is a controllable brake device controlled by at least one of a manual, mechanical, hydraulic,
25 pneumatic, or electromagnetic force.

21. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the dual-drive electric machine (EM100) is a DC or AC, brush or brushless, synchronous or asynchronous dual-drive electric machine and the inner rotation part (EM101) is coaxial with the outer rotation part (EM102).

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22. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 21, wherein the dual-drive electric machine (EM100) is arranged to receive externally input electric energy to operate as a motor for individually driving a load or for driving the load in common with an external rotary kinetic energy source, and wherein the dual-drive electric
10 machine is arranged to receive the external rotary kinetic energy or inertial kinetic energy of the load for operating the electric machine as a power generator for driving an external electric load or for charging an external electric storing device.

23. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in
15 claim 19, wherein the input wheel (W101), the output wheel (W102), and the epicyclic wheel (W103) have one of the following speed ratio relationships:

the input wheel (W101) rotates at a same speed as the output wheel (W102) and at either a same or different speed than the epicyclic wheel (W103), and

the input wheel (W101) rotates at a different speed than the output wheel (W102) and at a
20 same or different speed than the epicyclic wheel (W103), and the output wheel (W102) also rotates at a same or different speed than the epicyclic wheel (W103).

24. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the first action side of a first said at least one controllable brake device
25 (BK101) is fixed to the sleeve type rotation shaft (AS101), which serves as the third output/input end of the dual-drive electric machine, and the second action side of the first controllable brake device (BK101) is fixed to the housing (H100).

25. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 24, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

when the first controllable brake device (BK101) is controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101) is controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101); and

when the first controllable brake device (BK101) is controlled to be in a brake locking state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102).

26. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the sleeve type rotation shaft is rotatably sleeved on the first rotation shaft (S101), the first action side of a second said at least one controllable brake device (BK102) is fixed to the second rotation shaft (S102), which serves as the second output/input end of the dual-drive electric machine and the epicyclic gear set assembly, and the second action side of the second controllable brake device (BK102) is fixed to the housing (H100).

27. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 26, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

when the second controllable brake device (BK102) is controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the second controllable brake device (BK102) is controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101); and

when the second controllable brake device (BK102) is controlled to be in a brake locking state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the sleeve type rotation shaft (AS101).

28. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the sleeve type rotation shaft is rotatably sleeved on the first rotation shaft (S101), the first action side of a third said at least one controllable brake device (BK103) is fixed to the first rotation shaft (S101), which serves as the first output/input end of the dual-drive electric machine and the epicyclic gear set assembly, and the second action side of the third controllable brake device (BK103) is fixed to the housing (H100).

29. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 28, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

when the third controllable brake device (BK103) is controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the third controllable brake device (BK103) is controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101); and

when the third controllable brake device (BK103) is controlled to be in a brake locking state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the sleeve type rotation shaft (AS101) and the second rotation shaft (S102).

30. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the sleeve type rotation shaft is rotatably sleeved on the first rotation shaft (S101), the first action side of a first said at least one controllable brake device (BK101) is fixed to the sleeve type rotation shaft (AS101), which serves as the third output/input end of the dual-drive electric machine and the epicyclic gear set assembly, the first action side of a second said at least one controllable brake device (BK102) is fixed to the second rotation shaft (S102), which serves as the second output/input end of the dual-drive electric machine and the epicyclic gear set assembly, and the second action side of each of the first controllable brake device (BK101) and the second controllable brake device (BK102) is fixed to the housing (H100).

31. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 30, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

5 when the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

10 when the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one
15 of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a brake locking state, the second controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation
20 shaft (S101) and the second rotation shaft (S102) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the brake locking state, the second controllable brake device (BK102) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor
25 function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102);

when the first controllable brake device (BK101) is controlled to be in the releasing state, the second controllable brake device (BK102) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation

part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the sleeve type rotation shaft (AS101); and

5 when the first controllable brake device (BK101) and the second controllable brake device (BK102) are both in the brake locking state, the dual-drive electric machine (EM100) is neither operated as an electric machine nor as a power generator and the first rotation shaft (S101) is in idle rotation, the dual-drive electric machine (EM100) is operated as an electric machine to drive the first rotational shaft (S101), or the first rotational shaft (S101) is arranged to
10 drive the dual-drive electric machine (EM100) to provide a power generator function.

32. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the sleeve type rotation shaft is rotatably sleeved on the first rotation shaft (S101), the first action side of a second said at least one controllable brake device (BK102) is
15 fixed to the second rotation shaft (S102), which serves as the second output/input end of the dual-drive electric machine and the epicyclic gear set assembly, the first action side of a third said at least one controllable brake device (BK103) is fixed to the first rotation shaft (S101), which serves as the first output/input end of the dual-drive electric machine and the epicyclic gear set assembly, and the second action side of each of the second controllable brake device
20 (BK102) and the third controllable brake device (BK103) is fixed to the housing (H100).

33. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 32, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

25 when the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the second controllable brake device (BK102) is controlled to be in a brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the sleeve type rotation shaft (AS101) and the first rotation shaft (S101); and

when the second controllable brake device (BK102) is controlled to be in the releasing state, the third controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the second rotation shaft (S102) and the sleeve type rotation shaft (AS101).

34. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the sleeve type rotation shaft is rotatably sleeved on the first rotation shaft (S101), the first action side of a first said at least one controllable brake device (BK101) is fixed to the sleeve type rotation shaft (AS101), which serves as the third output/input end of the dual-drive electric machine and the epicyclic gear set assembly, the first action side of a third said at least one controllable brake device (BK103) is fixed to the first rotation shaft (S101), which serves as the first output/input end of the dual-drive electric machine and the epicyclic gear set

assembly, and the second action side of each of the first controllable brake device (BK101) and the third controllable brake device (BK103) is fixed to the housing (H100).

35. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 34, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

when the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101) and the second rotation shaft (S102) are connected for transmission;

when the first controllable brake device (BK101) is controlled to be in the brake locking state, the third controllable brake device (BK103) is controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102); and

when the first controllable brake device (BK101) is controlled to be in the releasing state, the third controllable brake device (BK103) is controlled to be in the brake locking state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the second rotation shaft (S102) and the sleeve type rotation shaft (AS101).

36. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 19, wherein the sleeve type rotation shaft is rotatably sleeved on the first rotation shaft (S101), the first action side of a first said at least one controllable brake device (BK101) is fixed to the sleeve type rotation shaft (AS101), which serves as the third output/input end of the dual-drive electric machine and the epicyclic gear set assembly, the first action side of a second said at least one controllable brake device (BK102) is fixed to the second rotation shaft (S102), which serves as the second output/input end of the dual-drive electric machine and the epicyclic gear set assembly, the first action side of a third said controllable brake device (BK103) is fixed to the first rotation shaft (S101), which serves as the first output/input end of the dual-drive electric machine and the epicyclic gear set assembly, and the second action side of each of the first controllable brake device (BK101) and the second controllable brake device (BK102) and the third said controllable brake device (BK103) is fixed to the housing (H100).

37. A dual-drive electric machine installed with the epicyclic gear type clutch as claimed in claim 35, wherein the dual-drive electric machine installed with the epicyclic gear type clutch is arranged to carry out at least one of the following operations:

when the first controllable brake device (BK101), the second controllable brake device (BK102), and the third controllable brake device (BK103) are all controlled to be in a releasing state and the dual-drive electric machine (EM100) is not operated as an electric machine, the first rotation shaft (S101), the second rotation shaft (S102), and the sleeve type rotation shaft (AS101) are in a released state of idle rotation;

when the first controllable brake device (BK101), and the second controllable brake device (BK102), and the third controllable brake device (BK103) are all controlled to be in the releasing state and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101), second rotation shaft (S102), and the sleeve like rotation shaft (AS101);

when the first controllable brake device (BK101) is controlled to be in a brake locking state, the second controllable brake device (BK102) and the third controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the second rotation shaft (S102);

when the second controllable brake device (BK102) is controlled to be in the brake locking state, the first controllable brake device (BK101) and the third controllable brake device (BK103) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the first rotation shaft (S101) and the sleeve type rotation shaft (AS101); and

when the third controllable brake device (BK103) is controlled to be in the brake locking state, the first controllable brake device (BK101) and the second controllable brake device (BK102) are both controlled to be in the releasing state, and the dual-drive electric machine (EM100) is operated as an electric machine, the inner rotation part (EM101) and the outer rotation part (EM102) interact to provide a power generator or motor function according to a damping external load or an external rotation torque, speed, or direction applied to at least one of the second rotation shaft (S102) and the sleeve type rotation shaft (AS101).

FIG. 1

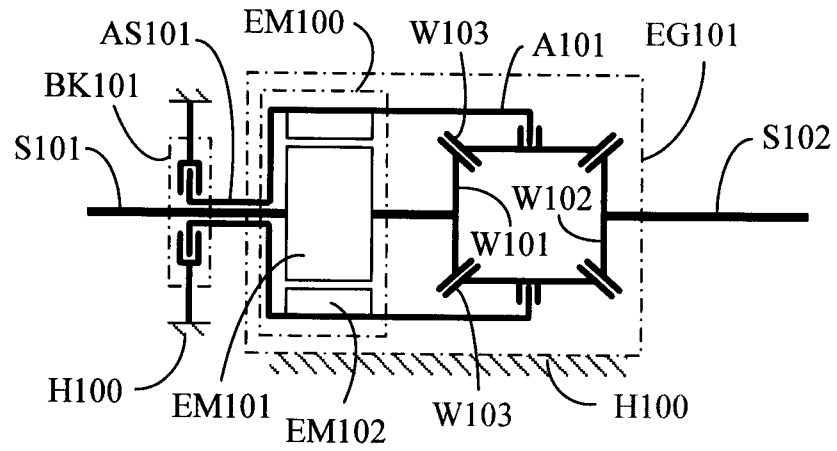


FIG. 2

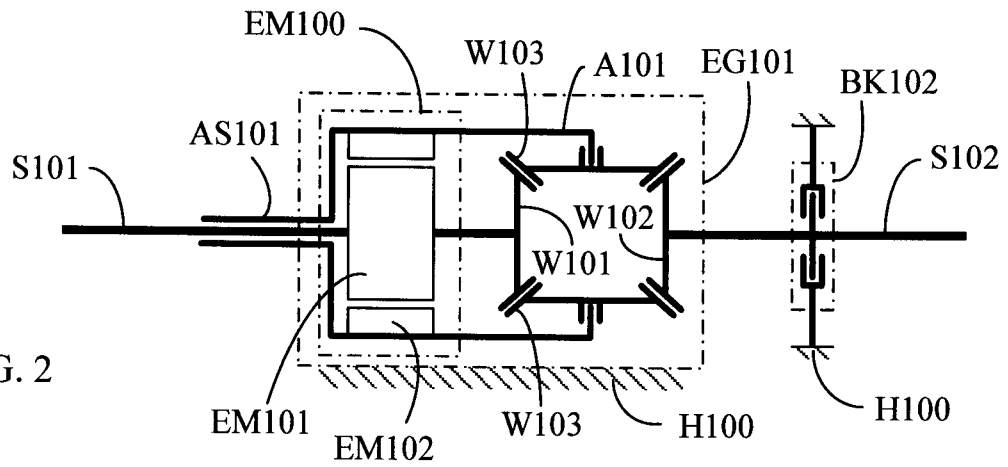
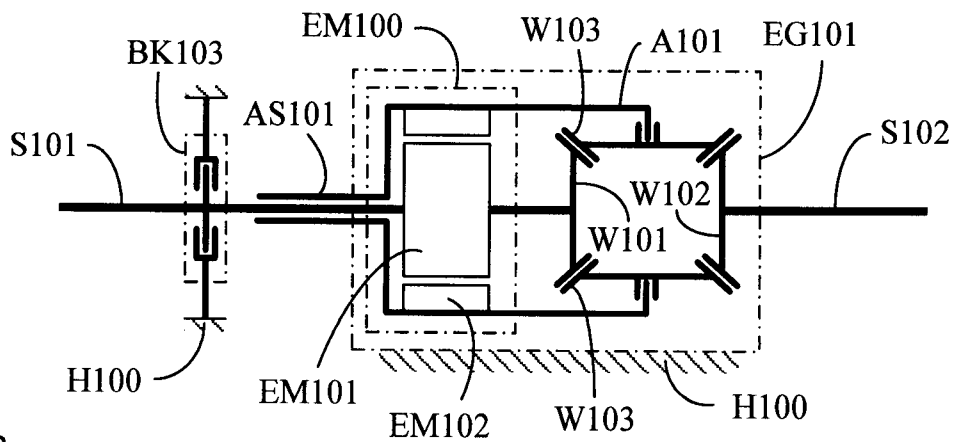


FIG. 3



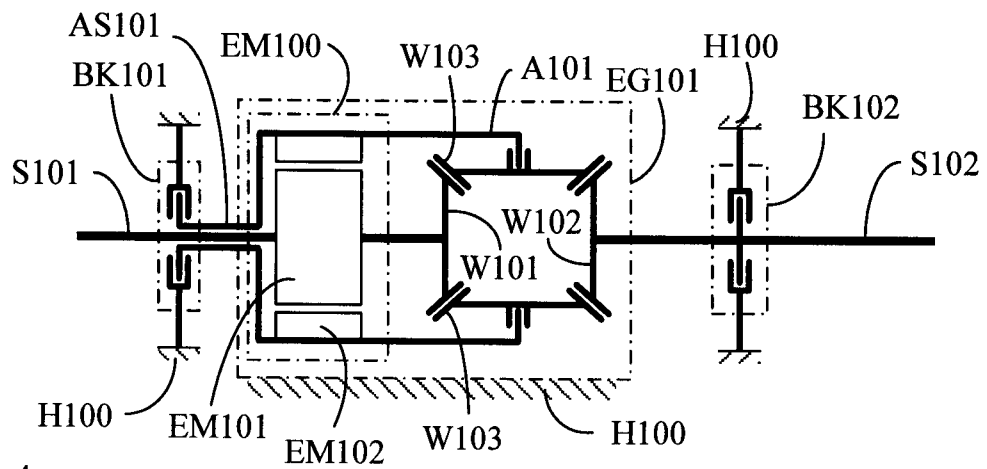


FIG. 4

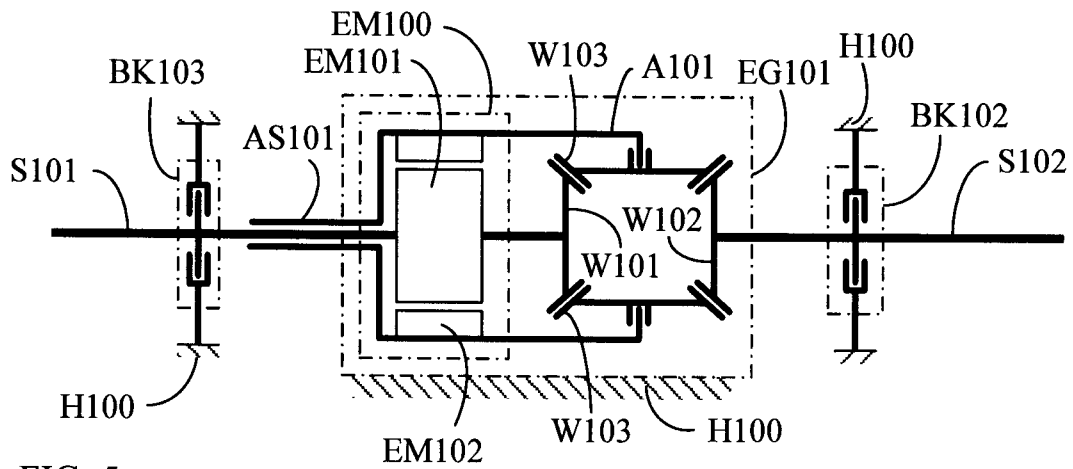


FIG. 5

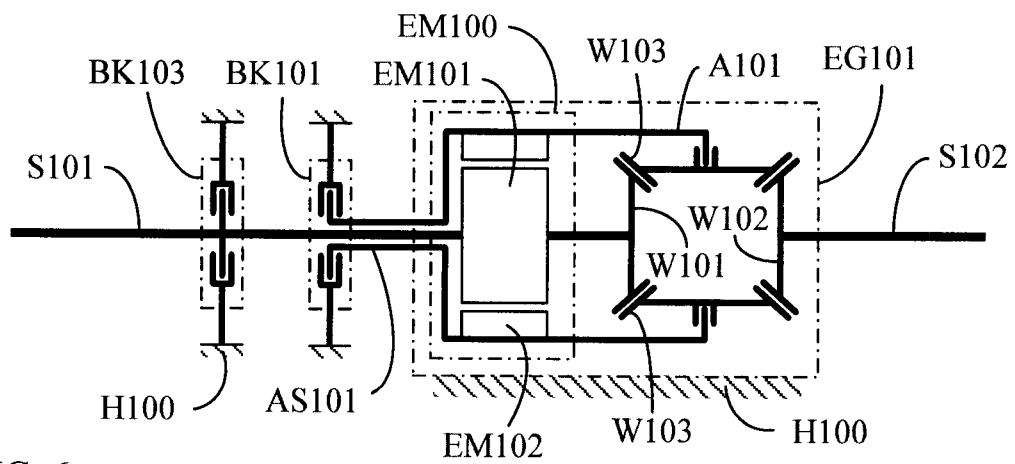


FIG. 6

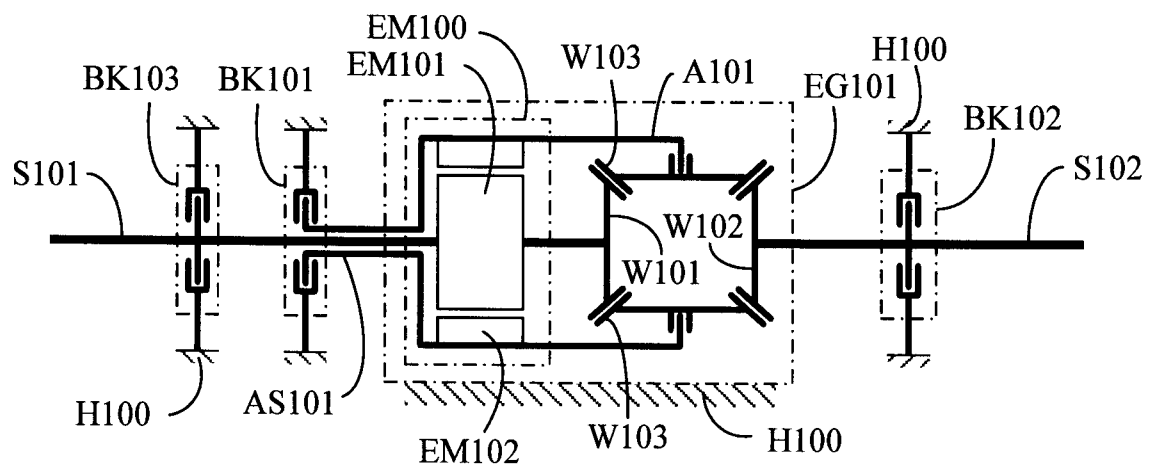


FIG. 7

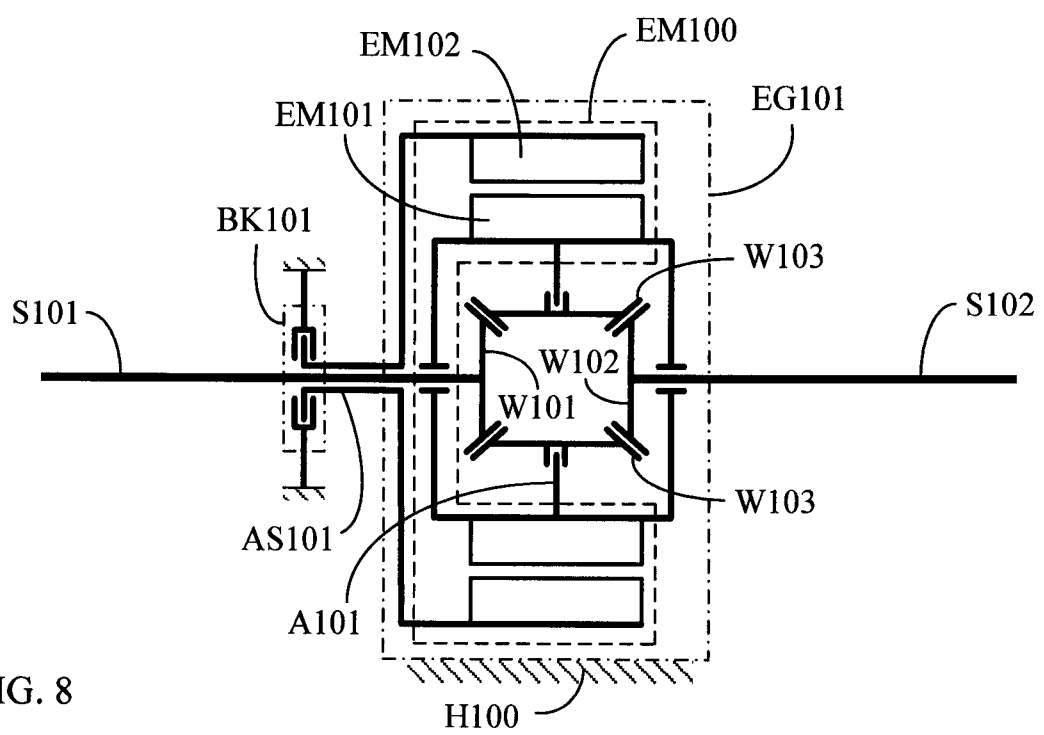
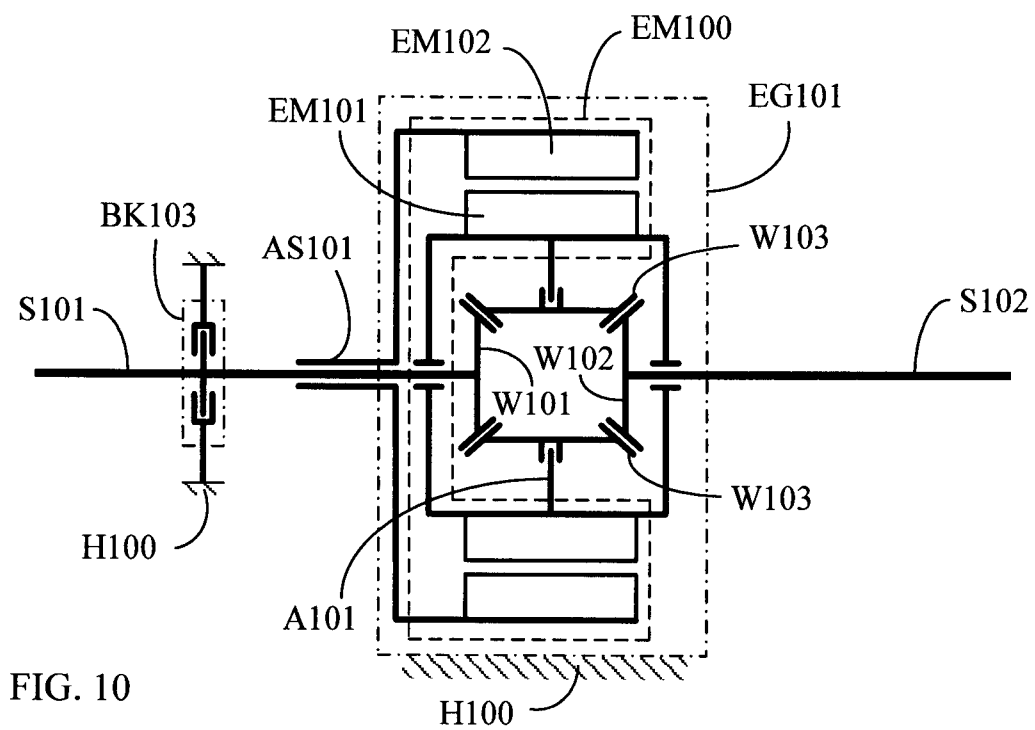
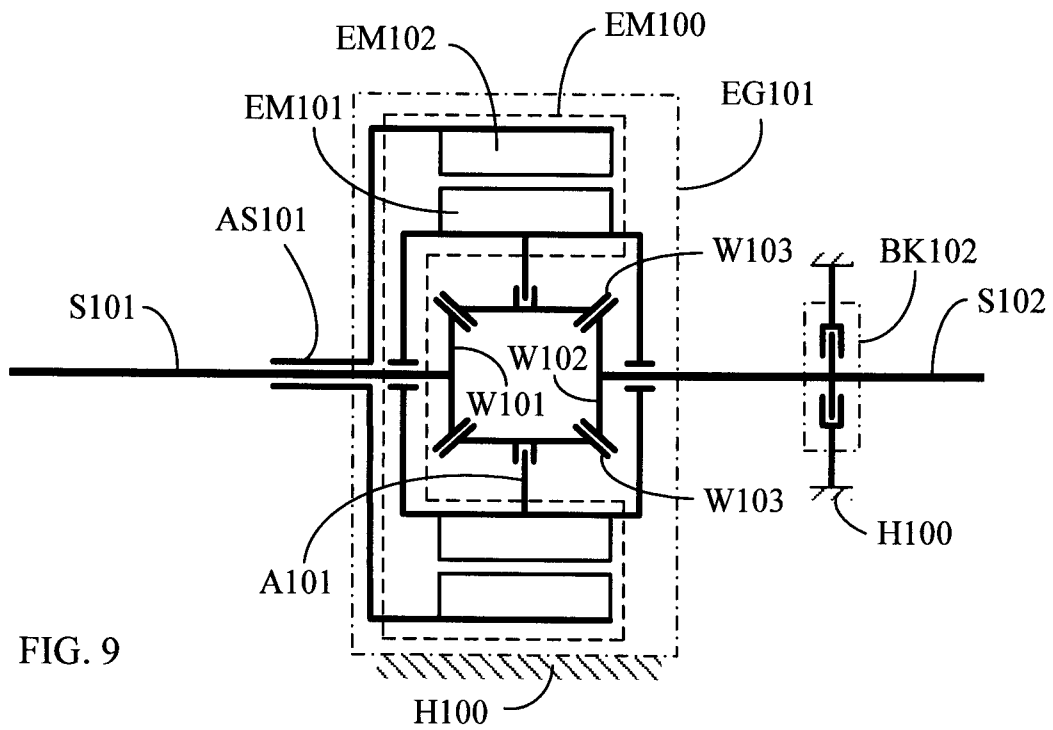
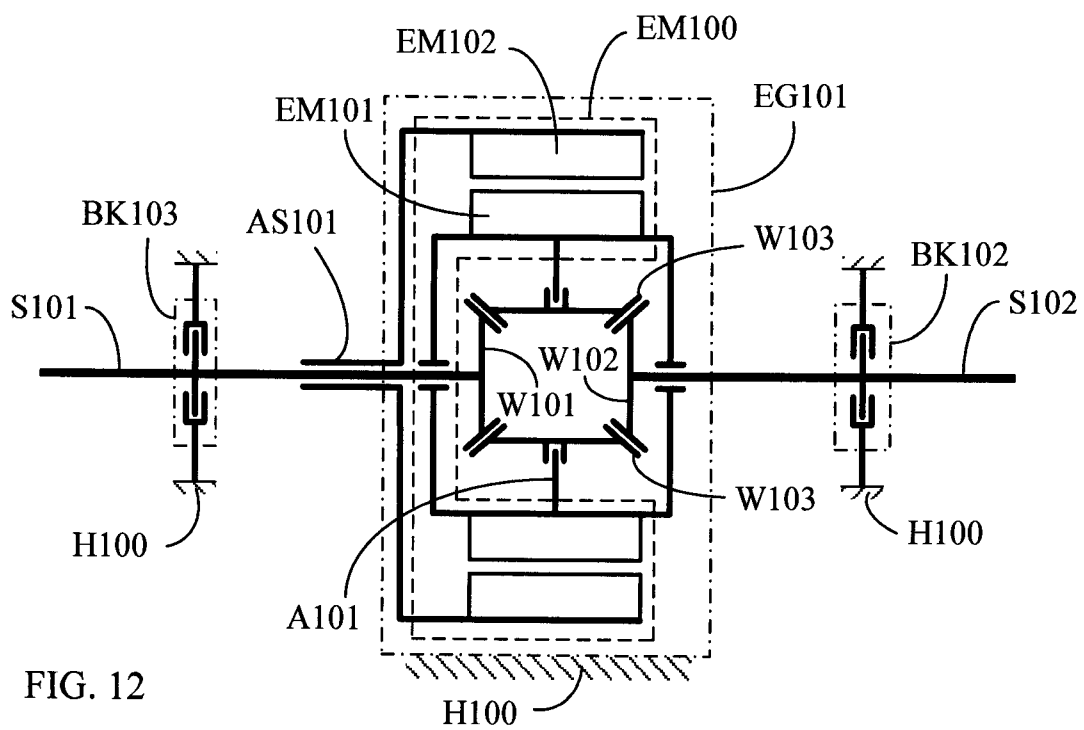
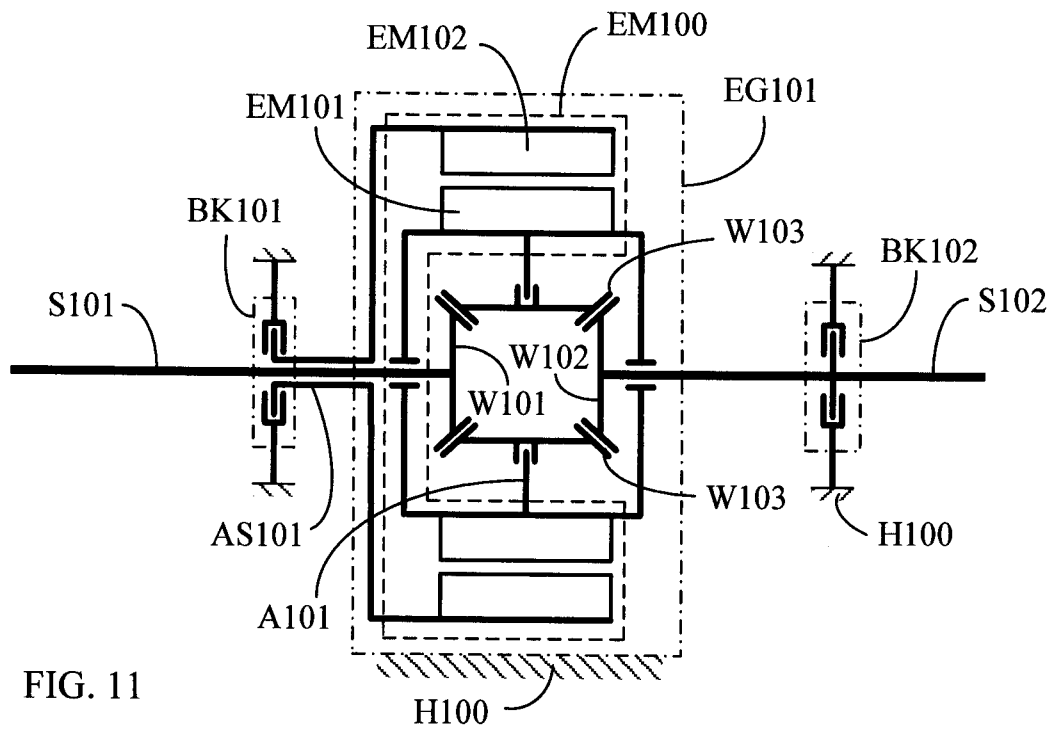


FIG. 8





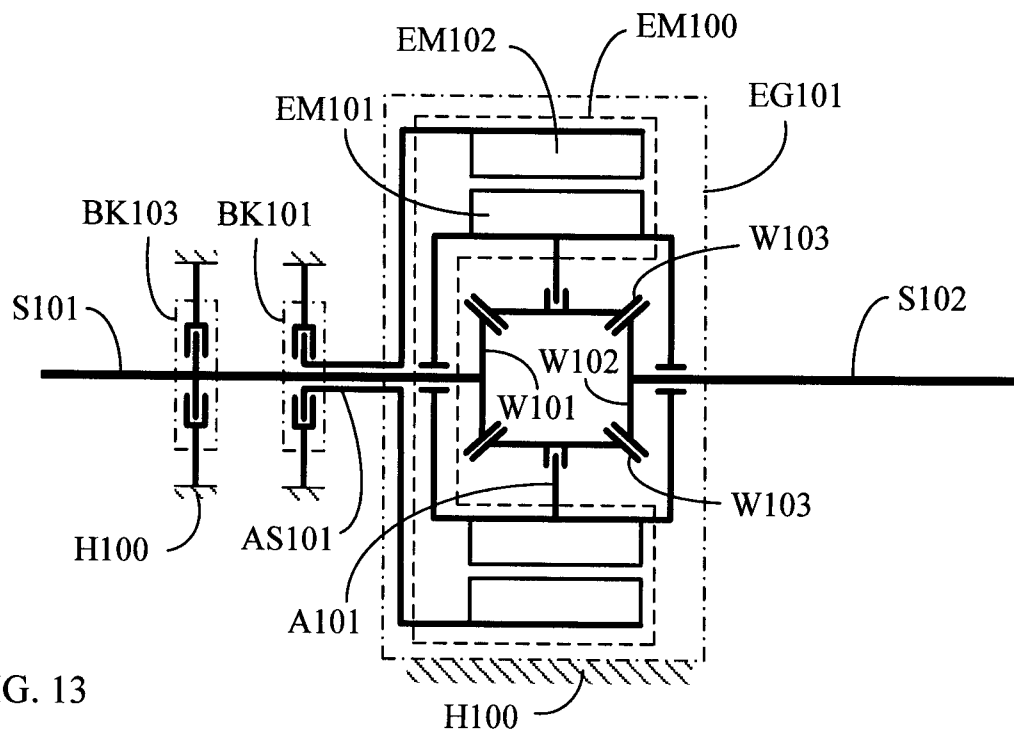


FIG. 13

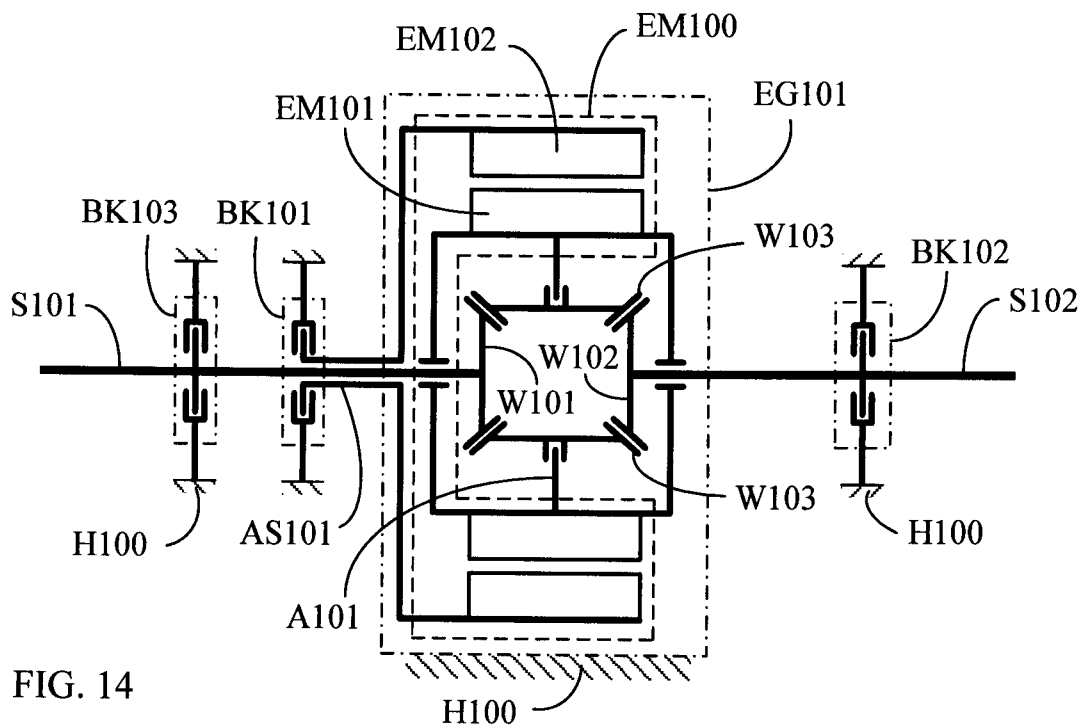


FIG. 14

