

TRANSMISSION WHEEL SERIES WITH PERIODICALLY VARIED SPEED RATIO AND HAVING RECIPROCALLY DISPLACING AUXILIARY PULLEY FOR STORING/RELEASING KINETIC ENERGY

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BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention is to utilize an active pulley driven by a power source having unidirectional rotating output feature, or to install a unidirectional transmission device installed between the active pulley and a machine body or between an active wheel shaft combined with the active pulley and the machine body, so when a transmission belt is tightened while the active pulley driving a passive pulley in periodically varied speed ratios, meanwhile an auxiliary pulley (312) of an auxiliary pulley assembly for storing/releasing kinetic energy (700) is linked for storing energy to form a prestressed force, when the force applied by the active pulley to the passive pulley through the transmission belt is zero or relatively smaller, the auxiliary pulley (312) is enabled to release energy for recovering so as to apply force to the transmission belt, because the transmission belt is coupled to the active pulley and/or one end of the active wheel shaft combined with the active pulley is restrained by the unidirectional transmission device, the transmission belt is enabled to link the passive pulley to operate in the original revolving direction for feeding back the kinetic energy.

(b) Description of the Prior Art

A conventional transmission pulley set composed of an active chain wheel, a passive chain wheel and a transmission chain, or a transmission pulley set composed of an active tooth-shaped wheel, a passive tooth-shaped wheel, a tooth-shaped transmission belt or a tooth-shaped transmission chain both have features as followings: 1) a non-sliding synchronous transmission feature is formed between the active chain wheel and the passive chain

wheel and the transmission chain, or between the active tooth-shaped wheel and the passive tooth-shaped wheel and the tooth-shaped transmission belt or the tooth-shaped transmission chain; (2) if the length of the transmission chain or the tooth-shaped transmission belt or the tooth-shaped transmission chain is changed during the operation or during switching the speed ratio, a prestressed auxiliary idle wheel is often installed for randomly adjusting the tightness of the transmission chain, the tooth-shaped transmission belt or the tooth-shaped transmission chain, however, the tightness of transmission chain would be periodically varied during the operation, so the prestressed mechanism of the auxiliary idle wheel for storing/releasing kinetic energy is reciprocally displaced for storing energy and releasing energy, wherein one disadvantage of the prior art is that the increased load generated at the active side while the transmission chain pressing the auxiliary idle wheel cannot be fed back as a kinetic driving energy.

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SUMMARY OF THE INVENTION

The present invention discloses a driving device composed of an active pulley, a transmission belt and a passive pulley; the transmission wheel series is characterized in: (1) when the active pulley and the passive pulley are both formed as a noncircular synchronous transmission pulley, or (2) when one or both of the active pulley and the passive pulley are formed as a circular pulley and the other is formed as a noncircular synchronous transmission pulley, during each revolving period, the tightness of the transmission belt installed between the active pulley and the passive pulley is varied periodically, wherein the active pulley driven by a power source having unidirectional rotating output feature, or a unidirectional transmission device installed between the active pulley and a machine body or between an active wheel shaft combined with the active pulley and the machine body, when the transmission belt is tightened while the active pulley driving the passive pulley in periodically varied speed ratios,

meanwhile an auxiliary pulley of an auxiliary pulley assembly for storing/releasing kinetic energy is linked for storing energy to from a prestressed force, when the force applied by the active pulley to the passive pulley through the transmission belt is zero or relatively smaller, the auxiliary pulley is enabled to release energy for recovering so as to apply force to the transmission belt, because the end of the transmission belt coupled to the active pulley is restrained by the unidirectional transmission device, the transmission belt is enabled to link the passive pulley to operate in the original revolving direction for feeding back the kinetic energy.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic structural view of the present invention illustrating a unidirectional rotating transmission device (300) being installed between an active wheel shaft (111) and a machine body (800) for linking a passive pulley through a transmission belt (100) so as to drive the passive pulley in the original rotating direction while an auxiliary pulley (312) releasing energy for recovering.

FIG. 2 is a schematic view illustrating the embodiment of the present invention in which an elliptical pulley installed with the unidirectional rotating transmission device (300) between the wheel shaft and the machine body being adopted as the active pulley and a circular pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed.

FIG. 3 is a schematic view illustrating the embodiment of the present invention in which a circular pulley installed with the unidirectional rotating transmission device (300) between the wheel shaft and the machine body being adopted as the active pulley and an elliptical pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed.

FIG. 4 is a schematic view illustrating the embodiment of the present

invention in which the elliptical pulley installed with the unidirectional rotating transmission device (300) installed between the wheel shaft and the machine body being adopted as the active pulley and an elliptical pulley having 90 degree differentiation regarding to the active pulley being adopted
5 as the passive pulley, and a transmission belt and an auxiliary pulley being installed.

FIG. 5 is a schematic view illustrating the embodiment of the present invention in which the circular pulley installed with the unidirectional rotating transmission device (300) between the wheel shaft and the machine
10 body being adopted as the active pulley and an eccentric circular pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed.

FIG. 6 is a schematic view illustrating the embodiment of the present invention in which the bimodal elliptical active pulley (112) installed with
15 the unidirectional rotating transmission device (300) between the active wheel shaft (111) and the machine body (800) being adopted as the active pulley and an eccentric circular pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed.

FIG. 7 is the first schematic view illustrating the embodiment of the
20 present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 8 is the second schematic view illustrating the embodiment of the
25 present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 9 is the third schematic view illustrating the embodiment of the
30 present invention in which a kinetic energy storing/releasing state being

formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 10 is the fourth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 11 is the fifth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 12 is the sixth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 13 is the seventh schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 14 is the eighth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 15 is the ninth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being

formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 16 is the tenth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 17 is the eleventh schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 18 is the twelfth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

FIG. 19 is the thirteenth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

DESCRIPTION OF MAIN COMPONENT SYMBOLS

- 100: Transmission belt
- 101: First crank
- 102: First treadle
- 103: First treadle shaft
- 111: Active wheel shaft

- 112: Bimodal elliptical active pulley
- 113: Circular active pulley
- 201: Second crank
- 202: Second treadle
- 5 203: Second treadle shaft
- 211: Passive wheel shaft
- 212: Circular passive pulley
- 213: Bimodal elliptical passive pulley
- 300: Unidirectional rotating transmission device
- 10 301: Auxiliary wheel press helve
- 302: Prestressed energy storing/releasing spring
- 303: Swing shaft of auxiliary wheel press helve
- 311: Auxiliary wheel shaft
- 312: Auxiliary pulley
- 15 4021: Bidirectional inward-towards-outward-expanding prestressed spring for storing/releasing energy
- 4022: Bidirectional outward-towards-inward-retracting prestressed spring for storing/releasing energy
- 413: Circular eccentric passive pulley
- 20 500: Active pulley assembly
- 600: Passive pulley assembly
- 700: Auxiliary pulley assembly for storing/releasing kinetic energy
- 800: Machine body

25 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

A conventional transmission pulley set composed of an active chain wheel, a passive chain wheel and a transmission chain, or a transmission pulley set composed of an active tooth-shaped wheel, a passive tooth-shaped wheel, a tooth-shaped transmission belt or a tooth-shaped transmission chain

30 both have features as followings: 1) a non-sliding synchronous transmission

feature is formed between the active chain wheel and the passive chain wheel and the transmission chain, or between the active tooth-shaped wheel and the passive tooth-shaped wheel and the tooth-shaped transmission belt or the tooth-shaped transmission chain; (2) if the length of the transmission chain or the tooth-shaped transmission belt or the tooth-shaped transmission chain is changed during the operation or during switching the speed ratio, a prestressed auxiliary idle wheel is often installed for randomly adjusting the tightness of the transmission chain, the tooth-shaped transmission belt or the tooth-shaped transmission chain, however, the tightness of transmission chain would be periodically varied during the operation, so the prestressed mechanism of the auxiliary idle wheel for storing/releasing kinetic energy is reciprocally displaced for storing energy and releasing energy, wherein one disadvantage of the prior art is that the increased load generated at the active side while the transmission chain pressing the auxiliary idle wheel cannot be fed back as a kinetic driving energy;

The present invention is to utilize an active pulley driven by a power source having unidirectional rotating output feature, or to install a unidirectional transmission device installed between the active pulley and a machine body or between an active wheel shaft combined with the active pulley and the machine body, so when a transmission belt is tightened while the active pulley driving a passive pulley in periodically varied speed ratios, meanwhile an auxiliary pulley (312) of an auxiliary pulley assembly for storing/releasing kinetic energy (700) is linked for storing energy to form a prestressed force, when the force applied by the active pulley to the passive pulley through the transmission belt is zero or relatively smaller, the auxiliary pulley (312) is enabled to release energy for recovering so as to apply force to the transmission belt, because the transmission belt is coupled to the active pulley and/or one end of the active wheel shaft combined with the active pulley is restrained by the unidirectional transmission device, the transmission belt is enabled to link the passive pulley to operate in the

original revolving direction for feeding back the kinetic energy;

The present invention discloses a driving device composed of an active pulley, a transmission belt and a passive pulley; the transmission wheel series is characterized in: (1) when the active pulley and the passive pulley
5 are both formed as a noncircular synchronous transmission pulley, or (2) when one or both of the active pulley and the passive pulley are formed as a circular pulley and the other is formed as a noncircular synchronous transmission pulley, during each revolving period, the tightness of the transmission belt installed between the active pulley and the passive pulley
10 is varied periodically, wherein the active pulley driven by a power source having unidirectional rotating output feature, or a unidirectional transmission device installed between the active pulley and a machine body or between an active wheel shaft combined with the active pulley and the machine body, when the transmission belt is tightened while the active
15 pulley driving the passive pulley in periodically varied speed ratios, meanwhile an auxiliary pulley of an auxiliary pulley assembly for storing/releasing kinetic energy is linked for storing energy to from a prestressed force, when the force applied by the active pulley to the passive pulley through the transmission belt is zero or relatively smaller, the
20 auxiliary pulley is enabled to release energy for recovering so as to apply force to the transmission belt, because the end of the transmission belt coupled to the active pulley is restrained by the unidirectional transmission device, the transmission belt is enabled to link the passive pulley to operate in the original revolving direction for feeding back the kinetic energy;

25 Several embodiments for illustrating the transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy provided by the present invention are as followings:

FIG. 1 is a schematic structural view of the present invention
30 illustrating a unidirectional rotating transmission device (300) being

installed between an active wheel shaft (111) and a machine body (800) for linking a passive pulley through a transmission belt (100) so as to drive the passive pulley in the original rotating direction while an auxiliary pulley (312) releasing energy for recovering;

5 As shown in FIG. 1, mainly consists of:

The transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy is provided with a non-releasing synchronous transmission relation between the transmission belt and the transmission wheel thereby forming a
10 non-sliding synchronous transmission wheel set, the mentioned wheel set can be composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt; wherein:

--active pulley assembly (500): composed of an active wheel shaft (111), an active pulley and a unidirectional rotating transmission device
15 (300), the active pulley is combined with the active wheel shaft (111), the active wheel shaft (111) is served to input the rotational kinetic energy, the unidirectional rotating transmission device (300) is installed between the active wheel shaft (111) and the machine body, the active pulley is composed of various transmission pulleys having different transmission
20 radius and dimensions and formed in circular, or bimodal elliptical, or eccentric circular, or eccentric elliptical or eccentric bimodal elliptical shapes;

--passive pulley assembly (600): composed of a passive wheel shaft (211) and a passive pulley, the passive pulley is served to revolve on the
25 passive wheel shaft (211), the passive pulley is composed of various transmission pulleys having different transmission radius and dimensions and formed in circular, or bimodal elliptical, or eccentric circular, or eccentric elliptical or eccentric bimodal elliptical shapes;

--transmission belt (100): composed of a chain or a tooth-shaped
30 transmission belt, a non-releasing synchronous transmission relation is

formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the passive pulley and the transmission belt (100) being ready to be synchronously combined and the location where the active pulley being released from the transmission belt (100); when the active pulley of the active pulley assembly (500) periodically drives the passive pulley of the passive pulley assembly (600), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the active pulley and the passive pulley to be linked in the original rotating direction so as to perform energy releasing drive; and with the disclosed structure, the speed ratio of driving the passive pulley is varied periodically.

The transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic

energy of the present invention are applied extensively, and followings are several applications adopted in a treadle-drive bicycle or a fixed treadle-drive bicycle for exercising for further illustration.

FIG. 2 is a schematic view illustrating the embodiment of the present invention in which an elliptical pulley installed with the unidirectional rotating transmission device (300) between the wheel shaft and the machine body being adopted as the active pulley and a circular pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed;

As shown in FIG. 2, mainly consists of:

--bimodal elliptical active pulley (112): composed of a bimodal elliptical active pulley (112) (or a bimodal elliptical-like active pulley), installed with the active wheel shaft (111), the unidirectional rotating transmission device (300) is installed between the active wheel shaft (111) and the machine body (800), one side of the active wheel shaft (111) of the bimodal elliptical active pulley (112) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a circular passive pulley (212) having a passive wheel shaft (211) through the transmission belt (100);

--circular passive pulley (212): composed of a circular passive pulley (212) (or a circular-like passive pulley), served to be linked by the transmission belt (100) driven by the bimodal elliptical active pulley (112);

--transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and

a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the circular passive pulley (212) and the transmission belt (100) being ready to be synchronously combined and the location where the bimodal elliptical active pulley (112) being released from the transmission belt (100); when the bimodal elliptical active pulley (112) periodically drives the circular passive pulley (212), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the bimodal elliptical active pulley (112) to be linked in the original rotating direction so as to perform energy releasing drive;

With the disclosed structure, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the bimodal elliptical active pulley (112) and the circular passive pulley (212) is varied periodically during each period of the stepping.

FIG. 3 is a schematic view illustrating the embodiment of the present invention in which a circular pulley installed with the unidirectional rotating transmission device (300) between the wheel shaft and the machine body

being adopted as the active pulley and an elliptical pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed;

As shown in FIG. 3, mainly consists of:

5 --circular active pulley (113): composed of a circular active pulley (113) (or a circular-like active pulley), installed with the active wheel shaft (111), the unidirectional rotating transmission device (300) is installed between the active wheel shaft (111) and the machine body (800), one side of the active wheel shaft (111) of the circular active pulley (113) is driven by a first crank
10 (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a bimodal elliptical passive pulley (213) having a
15 passive wheel shaft (211) through the transmission belt (100);

 --bimodal elliptical passive pulley (213): composed of a bimodal elliptical passive pulley (213) (or a bimodal elliptical -like passive pulley), linked by the transmission belt (100) driven by the circular active pulley (113);

20 --transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and
25 a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

 --auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is
30 disposed at the portion of the transmission belt (100) defined between the

location where the bimodal elliptical passive pulley (213) and the transmission belt (100) being ready to be synchronously combined and the location where the circular active pulley (113) being released from the transmission belt (100); when the circular active pulley (113) periodically
5 drives the bimodal elliptical passive pulley (213), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the
10 rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the
15 unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the circular active pulley (113) and the bimodal elliptical passive pulley (213) to be linked in the original rotating direction so as to perform energy releasing drive;

With the disclosed structure, when the first treadle (102) and the second
20 treadle (202) are stepped for driving, the speed ratio between the circular active pulley (113) and the bimodal elliptical passive pulley (213) is varied periodically during each period of the stepping.

FIG. 4 is a schematic view illustrating the embodiment of the present invention in which the elliptical pulley installed with the unidirectional
25 rotating transmission device (300) installed between the wheel shaft and the machine body being adopted as the active pulley and an elliptical pulley having 90 degree differentiation regarding to the active pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed;

30 As shown in FIG. 4, mainly consists of:

--bimodal elliptical active pulley (112): composed of a bimodal elliptical active pulley (112) (or a bimodal elliptical-like active pulley), installed with the active wheel shaft (111), the unidirectional rotating transmission device (300) is installed between the active wheel shaft (111) and the machine body (800), one side of the active wheel shaft (111) of the bimodal elliptical active pulley (112) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a bimodal elliptical passive pulley (213) having a passive wheel shaft (211) through the transmission belt (100);

--bimodal elliptical passive pulley (213): composed of a bimodal elliptical passive pulley (213) (or a bimodal elliptical -like passive pulley), linked by the transmission belt (100) driven by the circular active pulley (113);

--transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the bimodal elliptical passive pulley (213) and the transmission belt (100) being ready to be synchronously combined and the location where the bimodal elliptical active pulley (112) being released from

the transmission belt (100); when the bimodal elliptical active pulley (112) periodically drives the bimodal elliptical passive pulley (213), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) to be linked in the original rotating direction so as to perform energy releasing drive;

With the disclosed structure, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) is varied periodically during each period of the stepping.

FIG. 5 is a schematic view illustrating the embodiment of the present invention in which the circular pulley installed with the unidirectional rotating transmission device (300) between the wheel shaft and the machine body being adopted as the active pulley and an eccentric circular pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed;

As shown in FIG. 5, mainly consists of:

--circular active pulley (113): composed of a circular active pulley (113) (or a circular-like active pulley), installed with the active wheel shaft (111), the unidirectional rotating transmission device (300) is installed between the active wheel shaft (111) and the machine body (800), one side of the active

wheel shaft (111) of the circular active pulley (113) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking an eccentric circular passive pulley (413) having a passive wheel shaft (211) through the transmission belt (100);

--eccentric circular passive pulley (413): composed of an eccentric circular passive pulley (413) (or an eccentric circular-like passive pulley), linked by the transmission belt (100) driven by the circular active pulley (113);

--transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the eccentric circular passive pulley (413) and the transmission belt (100) being ready to be synchronously combined and the location where the circular active pulley (113) being released from the transmission belt (100); when the circular active pulley (113) periodically drives the eccentric circular passive pulley (413), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a

prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having
5 plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the circular active pulley (113) and the eccentric circular passive pulley (413) to be linked in the original rotating direction so as to
10 perform energy releasing drive;

With the disclosed structure, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the circular active pulley (113) and the eccentric circular passive pulley (413) is varied periodically during each period of the stepping.

15 According to the transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy, the structure of the auxiliary pulley assembly for storing/releasing kinetic energy (700) is illustrated as followings:

20 FIG. 6 is a schematic view illustrating the embodiment of the present invention in which the bimodal elliptical active pulley (112) installed with the unidirectional rotating transmission device (300) between the active wheel shaft (111) and the machine body (800) being adopted as the active pulley and an eccentric circular pulley being adopted as the passive pulley,
25 and a transmission belt and an auxiliary pulley being installed.

As shown in FIG. 6, mainly consists of:

--bimodal elliptical active pulley (112): composed of a bimodal elliptical active pulley (112) (or a bimodal elliptical-like active pulley) for being formed as the active pulley assembly (500), installed with the active
30 wheel shaft (111), the unidirectional rotating transmission device (300) is

installed between the active wheel shaft (111) and the machine body (800), one side of the active wheel shaft (111) of the bimodal elliptical active pulley (112) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a bimodal elliptical passive pulley (213) having a passive wheel shaft (211) through the transmission belt (100); the phase angle of the periodically varied speed ratio of the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) being combined with the transmission belt (100) is relevant to the phase angle of the first crank (101) and the first treadle (102) and the second crank (201) and the second treadle (202), and enabled to be selected when the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) are combined with the transmission belt (100);

--unidirectional rotating transmission device (300): composed of a structural member having the unidirectional rotating transmission function, such as a single way clutch, an over running clutch or a ratchet structure having the same function;

--eccentric circular passive pulley (413): composed of an eccentric circular passive pulley (413) (or an eccentric circular-like passive pulley) for being formed as the passive pulley assembly (600), linked by the transmission belt (100) driven by the bimodal elliptical active pulley (112);

--transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt, the bimodal elliptical active pulley (112) and the eccentric circular passive pulley (413) thereby forming a non-sliding synchronous transmission wheel set, wherein the mechanical angle phase relation of the active pulley assembly (500) and the passive pulley assembly (600) relative to the transmission belt (100) is enabled to be

selected with respect to the function; the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700):
5 installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the eccentric circular passive pulley (413) and the transmission belt (100) being ready to be synchronously combined and the
10 location where the bimodal elliptical active pulley (112) being released from the transmission belt (100), the auxiliary pulley (312) is composed of a synchronizing transmission pulley or a non-synchronizing transmission pulley; when the bimodal elliptical active pulley (112) periodically drives the eccentric circular passive pulley (413), the tightness of the transmission
15 belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, with the auxiliary wheel press helve having plate-shaped spring function and/or a prestressed spring for prestressing, the auxiliary pulley (312) is displaced for storing energy; when being loosened, with the auxiliary wheel press helve having plate-shaped spring function
20 and/or the prestressed spring for displacing and releasing energy, and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the bimodal elliptical active pulley (112) and the eccentric circular passive pulley (413) to be linked in the original rotating direction so as to perform
25 energy releasing drive;

With the disclosed structure, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the bimodal elliptical active pulley (112) and the eccentric circular passive pulley (413) is varied periodically during each period of the stepping.

30 According to the transmission wheel series with periodically varied

speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy, the structure of the prestressing device of the auxiliary pulley assembly for storing/releasing energy (700) is illustrated by following examples:

- 5 (1) One end of the auxiliary wheel press helve (301) formed as a rigid and swingable support arm structure is swingably combined with the machine body (800), and an prestressed energy storing/releasing spring (302) is installed between the above two, the other end thereof is installed with an auxiliary wheel shaft (311) for being installed with
10 the auxiliary pulley (312); or
- (2) One end of the auxiliary wheel press helve having plate-shaped spring function is combined with the machine body (800) for replacing the auxiliary wheel press helve (301) and the prestressed energy storing/releasing spring (302), the other end of the auxiliary wheel
15 press helve having plate-shaped spring function is installed with the auxiliary wheel shaft (311), the auxiliary pulley (312) is enabled to receive the prestressing force applied by the auxiliary wheel press helve having plate-shaped spring function.

20 FIG. 7 is the first schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

25 As shown in FIG. 7, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the
30 unidirectional rotating transmission device (300) is combined with the

machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 8 is the second schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700);

As shown in FIG. 8, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 9 is the third schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley

assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 9, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 10 is the fourth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 10, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100)

releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 11 is the fifth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 11, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 12 is the sixth schematic view illustrating the embodiment of the

present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

5 As shown in FIG. 12, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the
10 unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the
15 auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with
20 the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 13 is the seventh schematic view illustrating the embodiment of
25 the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 13, the main configuration is that the rotation part of
30 the active pulley assembly of the present invention is installed with the

unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 14 is the eighth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 14, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first

auxiliary pulley (312), engaged at the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and expanded
5 from inward towards outward, and the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a second auxiliary pulley (312), engaged at the engaging portion of the transmission belt (100) being ready to be engaged with the passive pulley assembly (600), with the function of the prestressed spring for
10 storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and expanded from inward towards outward, and an bidirectional inward-towards-outward-expanding prestressed spring for storing/releasing energy (4021) is additionally installed between the two auxiliary pulleys (312) and the auxiliary wheel press helve (301).

15 FIG. 15 is a ninth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

20 As shown in FIG. 15, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the
25 unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the
30 auxiliary wheel press helve (301) capable of swinging along the machine

body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the
5 auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312).

FIG. 16 is a tenth schematic view illustrating the embodiment of the
10 present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 16, the main configuration is that the rotation part of
15 the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the
20 machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), engaged at the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the
25 mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, and at the distal end of the other auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a second auxiliary pulley (312), engaged at the engaging portion of the transmission belt (100) being ready to be engaged with the passive pulley
30 assembly (600), with the function of the prestressed spring for

storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, and an bidirectional outward-towards-inward-retracting prestressed spring for storing/releasing energy (4022) is additionally installed between the two auxiliary pulleys (312) and the auxiliary wheel press helve (301).

FIG. 17 is the eleventh schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).

As shown in FIG. 17, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the two auxiliary pulleys (312) are respectively installed at one end of the corresponding auxiliary wheel press helves (301), the other end of the individual auxiliary wheel press helves (301) is swingably combined with the machine body (800) through the swing shaft of auxiliary wheel press helve (303), prestressed springs for storing/releasing energy (302) are respectively installed between the two auxiliary wheel press helves (301) and the machine body (800), the two auxiliary pulleys (312) are engaged at the outer side of the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), the two auxiliary pulleys (312) respectively press the transmission belt (100) inward thereby forming a concave bending angle, and with function of prestressed springs for storing/releasing energy (302), the mentioned auxiliary wheel press helves (301) are prestressed and pressed from outward towards inward.

FIG. 18 is the twelfth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).
5

As shown in FIG. 18, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the two auxiliary pulleys (312) are respectively installed at one end of the corresponding auxiliary wheel press helves (301), the other end of the corresponding auxiliary wheel press helves (301) are swingably combined with the machine body (800) through the swing shaft of auxiliary wheel press helve (303), prestressed springs for storing/releasing energy (302) are respectively installed between the two auxiliary wheel press helves (301) and the machine body (800), the two auxiliary pulleys (312) are engaged at the inner side of the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), the two auxiliary pulleys (312) respectively expand outward for pressing the transmission belt (100) thereby forming a convex bending angle, and with the function of prestressed springs for storing/releasing energy (302), the mentioned auxiliary wheel press helves (301) are prestressed and expanded from inward towards outward.
10
15
20
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FIG. 19 is the thirteenth schematic view illustrating the embodiment of the present invention in which a kinetic energy storing/releasing state being formed between the active pulley assembly (500), the passive pulley assembly (600) and the auxiliary pulley assembly for storing/releasing kinetic energy (700).
30

As shown in FIG. 19, the main configuration is that the rotation part of the active pulley assembly of the present invention is installed with the unidirectional rotating transmission device (300), the active side of the unidirectional rotating transmission device (300) is combined with the rotation part of the active pulley assembly (500), the passive side of the unidirectional rotating transmission device (300) is combined with the machine body (800), the distal end of the auxiliary wheel press helve (301) swingably installed on the passive wheel shaft (211) is installed with a first auxiliary pulley (312), engaged at the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, thereby the engaged transmission belt (100) is formed with a concave bending angle; and the distal end of the other auxiliary wheel press helve (301) swingably installed on the passive wheel shaft (211) is installed with a second auxiliary pulley (312), engaged at the engaging portion of the transmission belt (100) being ready to be engaged with the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, thereby the engaged transmission belt (100) is formed with a concave bending angle, and an bidirectional outward-towards-inward-retracting prestressed spring for storing/releasing energy (4022) is additionally installed between the two auxiliary pulleys (312) and the auxiliary wheel press helve (301).

CLAIMS

1. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley (312) for storing/releasing kinetic energy, which has a power source driving an active pulley (112,113) having a unidirectional rotating output feature, wherein when a transmission belt (100) is tightened while the active pulley drives a passive pulley (212,213) in periodically varied speed ratios, the auxiliary pulley (312) of an auxiliary pulley assembly for storing/releasing kinetic energy (700) is arranged for storing energy to form a prestressed force and when the force applied by the active pulley to the passive pulley through the transmission belt is zero or relatively smaller, the auxiliary pulley (312) is enabled to release energy so as to apply force to the transmission belt, because the active pulley that the transmission belt (100) is coupled to, is restrained by the unidirectional transmission feature, the transmission belt is enabled to drive the passive pulley to operate in the original revolving direction for feeding back the kinetic energy, wherein

The transmission wheel series includes the following features; reciprocally displacing auxiliary pulley for storing/releasing kinetic energy is provided with a non-releasing synchronous transmission relation between the transmission belt (100) and the transmission wheel thereby forming a non-sliding synchronous transmission wheel set, the wheel set being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt; and wherein:

--the active pulley assembly (500) is composed of an active wheel shaft (111) and the active pulley, the active pulley being combined with the active wheel shaft (111), the active wheel shaft (111) being arranged to input the rotational kinetic energy, the active pulley being composed of various

transmission pulleys having different transmission radius and dimensions and formed in a circular shape if the passive pulley is not circular or else having a shape that is bimodal elliptical, or eccentric circular, or eccentric elliptical or eccentric bimodal elliptical;

5 the active pulley having the unidirectional rotating output feature comprising one or more than one of following arrangements, including 1) a unidirectional rotating transmission device (300) installed between the active pulley assembly (500) and the machine body; and 2) a unidirectional rotating transmission device (300) installed between the wheel shaft of the active pulley assembly
10 (500) and the machine body;

--a passive pulley assembly (600): comprising a passive wheel shaft (211) and the passive pulley, the passive pulley being arranged to revolve on the passive wheel shaft (211), the passive pulley being composed of various transmission pulleys having different transmission radius and dimensions and
15 formed in a circular shape if the active pulley is not circular or else having a shape that is bimodal elliptical, or eccentric circular, or eccentric elliptical or eccentric bimodal elliptical shapes;

--an auxiliary pulley assembly for storing/releasing kinetic energy (700) comprising the auxiliary pulley (312) arranged for providing the prestressing
20 force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the passive pulley and the transmission belt (100) are synchronously combined and the location where the active pulley is released from the transmission belt (100); such that when the active pulley of the active pulley assembly (500) periodically drives
25 the passive pulley of the passive pulley assembly (600), the tightness of the transmission belt (100) is varied correspondingly and when the transmission

belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) installed between a rigid press helve and the machine body (800), the auxiliary wheel press helve (301) is displaced for storing energy, and when the transmission belt (100) is gradually loosened, the energy releasing displacement of the auxiliary wheel press helve (301) acts on the transmission belt (100) which is enabled to pull the active pulley and the passive pulley in the original rotating direction so as to perform energy releasing drive; and with the disclosed structure, the speed ratio of driving the passive pulley is varied periodically.

2. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in claim 1, wherein including being adopted in a treadle-drive bicycle or a fixed treadle-drive bicycle for exercising, and an elliptical pulley adopted as the active pulley and a circular pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed, which consists of:

--bimodal elliptical active pulley (112): composed of a bimodal elliptical-like active pulley (112), installed with the active wheel shaft (111), one side of the active wheel shaft (111) of the bimodal elliptical active pulley (112) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a circular passive pulley (212) having a passive wheel shaft (211) through the transmission belt (100);

--circular passive pulley (212): composed of a circular-like passive pulley (212), served to be linked by the transmission belt (100) driven by the bimodal elliptical active pulley (112);

--transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the circular passive pulley (212) and the transmission belt (100) being ready to be synchronously combined and the location where the bimodal elliptical active pulley (112) being released from the transmission belt (100); when the bimodal elliptical active pulley (112) periodically drives the circular passive pulley (212), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the

unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the bimodal elliptical active pulley (112) to be linked in the original rotating direction so as to perform energy releasing drive;

Wherein, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the bimodal elliptical active pulley (112) and the circular passive pulley (212) is varied periodically during each period of the stepping.

3. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in claim 1, wherein including being adopted in a treadle-drive bicycle or a fixed treadle-drive bicycle for exercising, and a circular pulley being adopted as the active pulley and an elliptical pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed, which consists of:

--circular active pulley (113): composed of a circular-like active pulley (113), installed with the active wheel shaft (111), one side of the active wheel shaft (111) of the circular active pulley (113) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a bimodal elliptical passive pulley (213) having a passive wheel shaft (211) through the transmission belt (100);

--bimodal elliptical passive pulley (213): composed of a bimodal elliptical passive pulley (213) or a bimodal elliptical -like passive pulley, linked by the transmission belt (100) driven by the circular active pulley (113);

--transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the bimodal elliptical passive pulley (213) and the transmission belt (100) being ready to be synchronously combined and the location where the circular active pulley (113) being released from the transmission belt (100); when the circular active pulley (113) periodically drives the bimodal elliptical passive pulley (213), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the circular active pulley (113) and the bimodal elliptical passive pulley (213) to be linked in the original rotating direction so as to perform

energy releasing drive;

Wherein, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the circular active pulley (113) and the bimodal elliptical passive pulley (213) is varied periodically during each
5 period of the stepping.

4. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in claim 1, wherein including being adopted in a treadle-drive bicycle or a fixed treadle-drive bicycle for exercising, and the elliptical pulley being
10 adopted as the active pulley and an elliptical pulley having 90 degree differentiation regarding to the active pulley being adopted as the passive pulley, and a transmission belt and an auxiliary pulley being installed, which consists of:

--bimodal elliptical active pulley (112): composed of a bimodal
15 elliptical-like active pulley (112), installed with the active wheel shaft (111), one side of the active wheel shaft (111) of the bimodal elliptical active pulley (112) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a
20 second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a bimodal elliptical passive pulley (213) having a passive wheel shaft (211) through the transmission belt (100);

--bimodal elliptical passive pulley (213): composed of a bimodal
elliptical-like passive pulley (213), linked by the transmission belt (100) driven
25 by the circular active pulley (113);

--transmission belt (100): composed of a chain or a tooth-shaped

transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel,
5 or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the
10 bimodal elliptical passive pulley (213) and the transmission belt (100) being ready to be synchronously combined and the location where the bimodal elliptical active pulley (112) being released from the transmission belt (100); when the bimodal elliptical active pulley (112) periodically drives the bimodal elliptical passive pulley (213), the tightness of the transmission belt (100) is
15 varied correspondingly, when the transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually
20 loosened, with the energy releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the bimodal elliptical active pulley (112) and the
25 bimodal elliptical passive pulley (213) to be linked in the original rotating direction so as to perform energy releasing drive;

Wherein, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) is varied periodically during each period of the stepping.

5 5. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in claim 1, wherein including being adopted in a treadle-drive bicycle or a fixed treadle-drive bicycle for exercising, and the circular pulley being adopted as the active pulley and an eccentric circular pulley being adopted as
10 the passive pulley, and a transmission belt and an auxiliary pulley being installed, which consists of:

--circular active pulley (113): composed of a circular-like active pulley (113), installed with the active wheel shaft (111), the unidirectional rotating transmission device (300) is installed between the active wheel shaft (111) and
15 the machine body (800), one side of the active wheel shaft (111) of the circular active pulley (113) is driven by a first crank (101) linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for
20 performing the revolving driving, thereby linking an eccentric circular passive pulley (413) having a passive wheel shaft (211) through the transmission belt (100);

--eccentric circular passive pulley (413): composed of an eccentric circular-like passive pulley (413), linked by the transmission belt (100) driven
25 by the circular active pulley (113);

--transmission belt (100): composed of a chain or a tooth-shaped

transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt and the transmission wheel, thereby structuring a non-sliding synchronous transmission wheel set, the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel,
5 or a tooth-shaped pulley and a tooth-shaped transmission belt;

--auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the
10 eccentric circular passive pulley (413) and the transmission belt (100) being ready to be synchronously combined and the location where the circular active pulley (113) being released from the transmission belt (100); when the circular active pulley (113) periodically drives the eccentric circular passive pulley (413), the tightness of the transmission belt (100) is varied correspondingly, when the
15 transmission belt (100) is gradually tightened, an auxiliary wheel press helve (301) having plate-shaped spring function and/or the auxiliary pulley (312) having a prestressed energy storing/releasing spring (302) and installed between the rigid press helve and the machine body (800) is displaced for storing energy, when the transmission belt (100) is gradually loosened, with the energy
20 releasing displacement by the auxiliary wheel press helve (301) having plate-shaped spring function and/or the prestressed energy storing/releasing spring (302), and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the circular active pulley (113) and the eccentric circular passive
25 pulley (413) to be linked in the original rotating direction so as to perform energy releasing drive;

Wherein, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the circular active pulley (113) and the eccentric circular passive pulley (413) is varied periodically during each period of the stepping.

- 5 6. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in claim 1, wherein including being adopted in a treadle-drive bicycle or a fixed treadle-drive bicycle for exercising, and the bimodal elliptical active pulley (112) being adopted as the active pulley and an eccentric circular pulley
10 being adopted as the passive pulley, which consists of:
- bimodal elliptical active pulley (112): composed of a bimodal elliptical-like active pulley (112) for being formed as the active pulley assembly (500), installed with the active wheel shaft (111), , one side of the active wheel shaft (111) of the bimodal elliptical active pulley (112) is driven by a first crank (101)
15 linked by a first treadle (102) revolving on a first treadle shaft (103) for performing the revolving driving, the other side of the active wheel shaft (111) is driven by a second crank (201) linked by a second treadle (202) revolving on a second treadle shaft (203) for performing the revolving driving, thereby linking a bimodal elliptical passive pulley (213) having a passive wheel shaft (211) through the transmission belt (100); the phase angle of the periodically varied speed ratio of the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) being combined with the transmission belt (100) is relevant to the phase angle of the first crank (101) and the first treadle (102) and the second crank (201) and the second treadle (202), and enabled to be
20 selected when the bimodal elliptical active pulley (112) and the bimodal elliptical passive pulley (213) are combined with the transmission belt (100);
25

--unidirectional rotating transmission device (300): composed of a structural member having the unidirectional rotating transmission function, such as a single way clutch, an over running clutch or a ratchet structure having the same function;

5 --eccentric circular passive pulley (413): composed of an eccentric circular-like passive pulley (413) for being formed as the passive pulley assembly (600), linked by the transmission belt (100) driven by the bimodal elliptical active pulley (112);

10 --transmission belt (100): composed of a chain or a tooth-shaped transmission belt, a non-releasing synchronous transmission relation is formed between the transmission belt, the bimodal elliptical active pulley (112) and the eccentric circular passive pulley (413) thereby forming a non-sliding synchronous transmission wheel set, wherein the mechanical angle phase relation of the active pulley assembly (500) and the passive pulley assembly
15 (600) relative to the transmission belt (100) is enabled to be selected with respect to the function; the mentioned wheel set includes being composed of a chain-shaped transmission belt and a chain wheel, or a tooth-shaped pulley and a tooth-shaped transmission belt;

20 --auxiliary pulley assembly for storing/releasing kinetic energy (700): installed with an auxiliary pulley (312), the mentioned auxiliary pulley (312) served for bearing the prestressing force applied by a prestressing device is disposed at the portion of the transmission belt (100) defined between the location where the eccentric circular passive pulley (413) and the transmission belt (100) being ready to be synchronously combined and the location where the bimodal
25 elliptical active pulley (112) being released from the transmission belt (100), the auxiliary pulley (312) is composed of a synchronizing transmission pulley

or a non-synchronizing transmission pulley; when the bimodal elliptical active pulley (112) periodically drives the eccentric circular passive pulley (413), the tightness of the transmission belt (100) is varied correspondingly, when the transmission belt (100) is gradually tightened, with the auxiliary wheel press helve having plate-shaped spring function and/or a prestressed spring for prestressing, the auxiliary pulley (312) is displaced for storing energy; when being loosened, with the auxiliary wheel press helve having plate-shaped spring function and/or the prestressed spring for displacing and releasing energy, and with the rotating direction restrain provided by the unidirectional rotating transmission device (300), the transmission belt (100) is enabled to pull the bimodal elliptical active pulley (112) and the eccentric circular passive pulley (413) to be linked in the original rotating direction so as to perform energy releasing drive;

With the disclosed structure, when the first treadle (102) and the second treadle (202) are stepped for driving, the speed ratio between the bimodal elliptical active pulley (112) and the eccentric circular passive pulley (413) is varied periodically during each period of the stepping.

7. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in any of claims 1~6, wherein the structure of the prestressing device of the auxiliary pulley assembly for storing/releasing energy (700) are as followings:

1) One end of the auxiliary wheel press helve (301) formed as a rigid and swingable support arm structure is swingably combined with the machine body (800), and an prestressed energy storing/releasing spring (302) is installed between the above two, the other end thereof is installed with an

auxiliary wheel shaft (311) for being installed with the auxiliary pulley (312);
or

2) One end of the auxiliary wheel press helve having plate-shaped spring function is combined with the machine body (800) for replacing the auxiliary wheel press helve (301) and the prestressed energy storing/releasing spring (302), the other end of the auxiliary wheel press helve having plate-shaped spring function is installed with the auxiliary wheel shaft (311), the auxiliary pulley (312) is enabled to receive the prestressing force applied by the auxiliary wheel press helve having plate-shaped spring function.

8. A transmission wheel series with periodically varied speed ratio and having reciprocally displacing auxiliary pulley for storing/releasing kinetic energy as claimed in any of claims 1~7, wherein the constitution means of the auxiliary pulley assembly for storing/releasing kinetic energy (700) includes:

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing

force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from

the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to expand the prestressing force outwardly from the interior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), engaged at the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and expanded from inward towards outward, and the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a second auxiliary pulley (312), engaged at the engaging portion of the transmission belt (100) being ready to be engaged with the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and expanded from inward towards outward, and an bidirectional inward-towards-outward-expanding prestressed spring for storing/releasing energy (4021) is additionally installed between the two auxiliary pulleys (312) and the auxiliary wheel press helve (301); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302) and the auxiliary pulley (312), and the engaging portion of the transmission belt (100) being ready to enter the passive pulley assembly (600) is installed with the auxiliary wheel press helve (301) capable of swinging along the machine body (800) to inwardly put prestressing force from the exterior in normal state, the prestressed energy storing/releasing spring (302)

and the auxiliary pulley (312); or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a first auxiliary pulley (312), engaged at the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, and at the distal end of the other auxiliary wheel press helve (301) swingably installed on the machine body (800) is installed with a second auxiliary pulley (312), engaged at the engaging portion of the transmission belt (100) being ready to be engaged with the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, and an bidirectional outward-towards-inward-retracting prestressed spring for storing/releasing energy (4022) is additionally installed between the two auxiliary pulleys (312) and the auxiliary wheel press helve (301); or

-- the two auxiliary pulleys (312) are respectively installed at one end of the corresponding auxiliary wheel press helves (301), the other end of the individual auxiliary wheel press helves (301) is swingably combined with the machine body (800) through the swing shaft of auxiliary wheel press helve (303), prestressed springs for storing/releasing energy (302) are respectively installed between the two auxiliary wheel press helves (301) and the machine body (800), the two auxiliary pulleys (312) are engaged at the outer side of the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), the two auxiliary pulleys (312) respectively press the transmission belt (100) inward thereby forming a concave bending angle, and

with function of prestressed springs for storing/releasing energy (302), the mentioned auxiliary wheel press helves (301) are prestressed and pressed from outward towards inward; or

-- the two auxiliary pulleys (312) are respectively installed at one end of the corresponding auxiliary wheel press helves (301), the other end of the corresponding auxiliary wheel press helves (301) are swingably combined with the machine body (800) through the swing shaft of auxiliary wheel press helve (303), prestressed springs for storing/releasing energy (302) are respectively installed between the two auxiliary wheel press helves (301) and the machine body (800), the two auxiliary pulleys (312) are engaged at the inner side of the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), the two auxiliary pulleys (312) respectively expand outward for pressing the transmission belt (100) thereby forming a convex bending angle, and with the function of prestressed springs for storing/releasing energy (302), the mentioned auxiliary wheel press helves (301) are prestressed and expanded from inward towards outward; or

-- the distal end of the auxiliary wheel press helve (301) swingably installed on the passive wheel shaft (211) is installed with a first auxiliary pulley (312), engaged at the releasing portion of the transmission belt (100) releasing from the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, thereby the engaged transmission belt (100) is formed with a concave bending angle; and the distal end of the other auxiliary wheel press helve (301) swingably installed on the passive wheel shaft (211) is installed with a second auxiliary pulley (312), engaged at the engaging portion of the transmission belt (100) being

ready to be engaged with the passive pulley assembly (600), with the function of the prestressed spring for storing/releasing energy (302), the mentioned auxiliary wheel press helve (301) is prestressed and pressed from outward towards inward, thereby the engaged transmission belt (100) is formed with a concave bending angle, and an bidirectional outward-towards-inward-retracting prestressed spring for storing/releasing energy (4022) is additionally installed between the two auxiliary pulleys (312) and the auxiliary wheel press helve (301).