FORM 2

THE PATENT ACT 1970

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The Patents Rules, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

1. TITLE OF THE INVENTION:

"A Continuous Automatic Variable Transmission (CAVT) System "

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3. PREAMBLE TO THE DESCRIPTION:

~~**PROVISIONAL**~~ ~~The following specification describes the invention.~~	**COMPLETE** The following specification particularly describes the invention and the manner in which it is to be performed.

Field of the invention

[0001] The present invention relates to a continuous automatic variable transmission (CAVT) system. More particularly, the present invention relates to a continuous automatic variable transmission system for use in an automatic transmission for a vehicle or automobile or for industrial applications.

List of the elements

CAVT system	:	100
First spoked wheel	:	110
Spokes of the first spoked wheel	:	112
Second spoked wheel	:	120
Spokes of the second spoked wheel	:	122
Radial Cone	:	130
Slots	:	132
Cylindrical core	:	135
Sliders	:	140
Groove	:	145
Centrifugal Mass	:	150
Link	:	155
Biasing member	:	160
Belt	:	170
Belt Extension Mechanism	:	175

Roller	:	176
Pedal Gear	:	200

Background of the invention

[0002] Different types of continuously variable transmission systems have been developed over years for different platforms of applications. One such application is the use of CAVT in two wheelers and four wheelers. Even though CAVT has lot more usefulness in industrial applications, this technology is widely used in automobile industry. The advantage of CAVT is its ability to continuously change the gear ratio. This means that no matter what the engine speed is, it is always performing at its peak efficiency.

[0003] The impact of CAVT can be seen in bicycle industries as well to reduce the effort of manual transmission. Generally, a standard bicycle has a drive mechanism including a crank-and-pedal assembly for rotating a front gear assembly, a rear gear assembly attached to the rear wheel, and a chain coupling the front gear assembly to the rear gear assembly. A mechanism is usually provided to change the gearing ratio of the bicycle. These bicycles having automatic transmission system are provided with a limited number of gear ratios in fixed steps.

[0004] In some of the bicycles which have multiple sprockets and derailleurs in which the bicycle chain is moved from one sprocket to another and the gearing ratios have to be changed manually while pedalling of the bicycle

continues. Besides being inconvenient for a bicycle rider to have to manually shift gears all the time. As a result the bicycle rider may experience shocks when gear is being shifted in speed. Also, the rider need to change the gear manually every time when he require to change the speed.

[0005] Several attempts have been made to bring automatic transmission system in a bicycle. The automatic transmission system in some bicycles is made up of the front pulley, which is motorized to help with gear shifting, the rear pulley, and the belt. Some such systems may have a wireless or Bluetooth connection between the handle bars, which is where the actual gear switching occurs. As a result, the system is entirely wireless but it contains electronic and electrical components. The disadvantage of the prior art is that the system having electronic components may get damaged if water or mud or dust particles enters the system. Further these systems have complicated mechanism and assembly resulting in higher maintenance cost.

[0006] To overcome one or all drawbacks of the existing system, there is a need for a continuous automatic variable transmission (CAVT) system.

Object of the invention

[0007] An object of the present invention is to provide a continuous automatic variable transmission (CAVT) system.

[0008] Another object of the present invention is to provide a continuous automatic variable transmission (CAVT) system, which is fully automatic and mechanical without any need of electrical or electronic components that reduces the risk of part damage due to water.

[0009] Yet another object of the present invention is to provide a continuous automatic variable transmission (CAVT) system, where the user experiences no shift shocks and obtains quicker acceleration.

[0010] One more object of the present invention is to provide a continuous automatic variable transmission (CAVT) system which offers a whole range of gear ratios within limit due to seamless transmission.

[0011] Still one object of the present invention is to provide a continuous automatic variable transmission (CAVT) system where a user can focus more on running/riding than changing gears owing to its ability to adjust transmission ratio as per the required conditions.

[0012] Further object of the present invention is to provide a continuous automatic variable transmission (CAVT) system which doesn't have shifting delays that makes the system very comfortable especially when the system is implemented in bicycle while cycling on slope.

[0013] Furthermore object of the present invention is to provide a continuous automatic variable transmission (CAVT) system which uses minimum required parts which are light weight and require very less maintenance.

Summary of the invention

[0014] According to the present invention, which is provided with a continuous automatic variable transmission (CAVT) system, the system is adapted to couple with a driving mechanism for operation. The driving mechanism can be a driving pulley, coupled to a pedal system or a prime mover like electric motor or an engine. The system is driven manually by pedalling or driven electrically by an electric motor or by an engine. The output of the system is connected to a driven shaft, like a shaft connecting the wheels of the vehicle or the like. The system is provided with a first spoked wheel, a second spoked wheel, a radial cone, plurality of sliders and plurality of centrifugal mass. The first spoked wheel and the second spoked wheel are coaxially coupled to each other. In one aspect of the invention, the first spoked wheel and the second spoked wheel may have a diameter substantially equivalent to a sprocket used in the pedal cycle. In another aspect of the invention, the first spoked wheel and the second spoked wheel may have a variable diameter. In the present embodiment, the first spoked wheel and the second spoked wheel are provided with fifteen spokes. In an embodiment, the two wheels with spokes are having an offset therebetween and connected using a shaft to facilitate sliding of any object on it.

[0015] The radial cone is arranged between the first spoked wheel and the second spoked wheel. Specifically, the radial cone is engageably coupled with the first spoked wheel and the second spoked wheel. The cone is provided with a cylindrical core arranged at an inner central portion of the cone. In the present embodiment, a slanted surface of the cone faces towards the first spoked wheel. The slanted surface is the outer surface of the cone. The cone has slots arranged radially parallel to the spokes of the first spoked wheel. The slots are openings substantially enough to allow the spokes of the first spoked wheel to slide therethrough. The cone is adapted to slide between a first position and a second position. Specifically, the second spoked wheel is connected to the first spoked wheel co-axially, over which the cone performs sliding motion. In the present embodiment, fifteen slots are arranged on the cone. In an alternate embodiment, the number of slots arranged on the cone 130 may be more or less than fifteen depending upon the spokes of the wheels.

[0016] Plurality of sliders are slidably arranged on the spokes of the first spoked wheel. One portion of the slider is arranged in connection with the slanted surface of the cone. The sliders are adapted to slide on the slanted surface of the cone and the spokes of the first spoked wheel simultaneously. The sliders are configured on the spokes in a circular pattern so that the sliding movement of the sliders forms a circular pattern with small and larger diameters. Specifically, the sliders are arranged to create a large diameter circle when the cone is nearest to the first spoked wheel and small diameter circle when the cone is away from the first

spoked wheel. The sliders can be of any shape such as cuboidal or spherical or oval and the like. The sliders may be arranged with bearings to slide on the spokes with ease. In one aspect of the invention, the sliders are having a curved upper portion, having construction in such a way that allow a belt connecting to the driving pulley to rest on the upper surface where a groove is provided as a support for the belt to rest and slide thereon.

[0017] In another aspect of the invention, the belt may replaced with a chain and the like. Specifically, the outer surface of the sliders are provided with the groove, which is provided to engage with the belt and the belt is slidably arranged on the groove. In the present embodiment, the belt is a high strength belt that is wound over the sliders, passes through a belt extension mechanism connecting the driving mechanism. The groove on the slider must be in accordance with the belt and can be of any configuration. In the present embodiment, the grooves are “V” shaped to securely engage with the belt. It may be obvious to a person to provide any other shape for the grooves.

[0018] In another aspect of the invention, the sliders may have small projections on upper portion to engage with a chain instead of the belt. In such embodiment, the sliders act as sprockets and the chain connected therewith transmit the rotary motion therebetween. In another aspect, the upper projections may be flexible.

[0019] In another aspect of the invention, the sliders may have a hole to slide along a guiding rail and having a surface that facilitates its sliding over some other object.

[0020] Further, the system also includes the belt extension mechanism. The belt extension mechanism is having a roller with a groove that guides the movement of the belt. In one embodiment, the roller is a toothless curved roller. In another embodiment, it may be a pulley or a gear mechanism. The main function of the belt extension mechanism is to provide the length of the belt as per requirement. Also, the belt extension mechanism keeps the belt taut whenever there is a change in diameter of the circular pattern configured by the sliders due to the sliding of the cone. Specifically, the change in diameter of the circle formed by the sliders requires extra belt to be fed in, to compensate the change in circumference of the circle. The belt extension mechanism is required to provide the extra amount of required belt. The belt extension mechanism uses a spring-loaded mechanism, to keep the belt always taut either in the low diameter or the high diameter. Hence, with the help of the entire process, provides required torque and speed to the cycle.

[0021] The plurality of centrifugal mass are slidably attached to the spokes of the second spoked wheel. The centrifugal masses have a slot that allows sliding on the spokes of the second spoked wheel. The centrifugal masses can be of any cross-sectional shapes like a spherical shape or cuboidal shape or the like depending on the cross-section of the spokes of the second spoked wheel. The

centrifugal masses may also have bearings in the engaging side to provide smooth sliding over the spokes of the second spoked wheel thereby reducing the friction therebetween. The function of the centrifugal mass is to provide enough centrifugal force to displace the cone along its axis and against the force of the biasing member. The centrifugal masses are having an extruded portion for attachment of links.

[0022] In the present embodiment, the centrifugal mass is connected to the cylindrical core of the cone through respective links arranged on the cylindrical core. The links are connecting members which extends from the cylindrical core of the cone. In the present embodiment the links are binary links that is adapted to be connected to the centrifugal masses and the internal portion of the cone. The links are provided to allow the cone to displace against the biasing member due to the centrifugal force generated by the centrifugal masses. In the present embodiment, the links are light weight binary links.

[0023] The centrifugal mass slides radially outwards when the speed of the driving mechanism increases. Specifically, the centrifugal mass is adapted to slide radially outwards on the spokes of the second spoked wheel pulling the cones towards the first position wherein the cone moves towards the second spoked wheel and away from the first spoked wheel. When the centrifugal mass slides radially outwards, the slider radially slides down along the slanted surface of the cone. Specifically, in the first position, the centrifugal mass forms a circular pattern with larger diameter whereas the sliders configure the circular pattern with

a smaller diameter. When the sliders form a smaller diameter circular pattern, low torques can be achieved at high speed. Similarly, when the sliders form a larger diameter circular pattern, higher torques can be achieved at low speed. The movement of the cone between first positions to second position provides different gear ratio to the belt that resides over the sliders which slides over the outer surface.

[0024] The centrifugal mass slides radially inwards due to the force exerted by the biasing member on the cone when the speed of the driving mechanism decreases. When the centrifugal mass slides radially inwards on the spokes of the second spoked wheel cone~~s~~ moves toward the second position, i.e. away from the second spoked wheel and towards the first spoked wheel. When the centrifugal mass slides radially inwards, the cone slides inside the spokes of the first spoked wheel allowing the slider to slide radially outwards along the slanted surface of the cone, hence achieving maximum diameter and ~~hence~~ delivering maximum torque at lower speeds.

[0025] Further the system includes a biasing member. The biasing member is a restoring spring with two plates which restores the position of the cone. The biasing member is arranged between the second spoked wheel and the cone. Precisely, the biasing member moves the cone slidably inside the spokes of the first spoked wheel causing the centrifugal masses to slide~~s~~ radially inwards. The main function of the biasing member is to restore the position of the cone giving the maximum diameter of the belt.

[0026] In one aspect of the invention, the system is configured on a pedal cycle with the driving mechanism being the pedal system of the cycle. For illustrative purpose as an example, the system is further described when the system being configured on the pedal cycle. When the system is used on the pedal cycle, the system is configured on a rear portion of the cycle. Specifically, the system is arranged in connection with a rear tyre or a rear wheel of the pedal cycle and coupled to the pedal system of the cycle.

[0027] In such embodiment, the pedal is the driving mechanism. The pedal of the cycle is provided with a toothless curved gear as shown in the figure 3 where a rider gives power by peddling. The pedal gear is the primary gear which is given power by the rider. Specifically, the rider provides power to the pedal gear which is wound by the belt and the belt is wound to the grooves of the sliders. The system automatically varies the speed or the gear ratio of the cycle according to the pedalling of the cycle.

[0028] In another aspect of the invention, the system can be enclosed in an enclosure or housing of suitable shape and size to protect the system from dust and moisture. The enclosure can also act as lubricant reservoir for lubrication of components of the system.

Brief Description of the Drawings

[0029] The advantages and features of the present invention will become better understood with reference to the following detailed description and claims taken in conjunction with the accompanying drawings, wherein like elements are identified with like symbols, and in which:

[0030] Figure 1 illustrates an exploded view of a continuous automatic variable transmission (CAVT) system in accordance with the present invention;

[0031] Figure 2 illustrates an exploded close up view of the continuous automatic variable transmission (CAVT) system;

[0032] Figure 3 illustrates an assembled view of continuous automatic variable transmission (CAVT) system;

[0033] Figures 4a and 4b illustrates a perspective view and a side view respectively of the cone in a first position; and

[0034] Figures 5a and 5b illustrates a perspective view and a side view respectively of the cone in a second position.

Detail Description of the Invention

[0035] An embodiment of this invention, illustrating its features, will now be described in detail. The words "comprising," having, "containing," and "including," and other forms thereof, are intended to be equivalent in meaning and be open-ended in that an item or items following any one of these words is not meant to be an exhaustive listing such item or items or meant to be limited to only the listed item or items.

[0036] The terms “first,” “second,” and the like, herein do not denote any order, quantity, or importance, but rather are used to distinguish one element from another, and the terms “an” and “a” herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item.

[0037] The present invention provides a continuous automatic variable transmission (CAVT) system. The CAVT system is an automatic transmission type of system which is primarily seen in light vehicles (LMV). The CAVT system provides an automatic transmission that shifts ratios without the need for the driver to intervene. In contrast to other automatic transmissions that provide a limited number of gear ratios in fixed steps, a continuously automatic variable transmission (CAVT) can change seamlessly through a continuous range of transmission ratios.

[0038] The CAVT system is fully automatic and mechanical without any need of electrical or electronic components that reduces the risk of part damage while washing due to water, also the user experiences no shift shocks and obtain quicker acceleration. In one aspect of the invention, the CAVT system is designed in accord with for belt drive system in bicycles and the like can be used for power transmission in any belt drive system where smooth gear transition is required. In another aspect, the CAVT system can be used industrially or in automobiles where smooth gear transition is required.

[0039] Also, the CAVT system offers a whole range of gear ratios within limit due to seamless transmission. The transmission system of the CAVT system is having no shifting delays that makes this system very comfortable for a user especially while bicycling on slope. The user can focus more on riding than changing gears owing to its ability to change transmission ratio as per the required conditions in the CAVT system. Also, the CAVT system uses minimum required parts which are light weight and require very less maintenance.

[0040] The disclosed embodiments are merely exemplary of the invention, which may be embodied in various forms.

[0041] Referring now to figures 1, 2, 3, 4a, 4b, 5a and 5b, a continuous automatic variable transmission (CAVT) system, herein after referred as system (100) is illustrated in accordance with the present invention. The system

is adapted to couple with a driving mechanism for operation. The driving mechanism can be a driving pulley coupled to a pedal system or a prime mover like electric motor or an engine. The system is driven manually by pedalling or driven electrically by an electric motor or by an engine. The output of the system is connected to a driven shaft, like a shaft connecting the wheels of the vehicle or the like. In the present embodiment, the system 100 includes a first spoked wheel 110, a second spoked wheel 120, a radial cone 130, plurality of sliders 140 and plurality of centrifugal mass 150.

[0042] Referring now to figure 1, the first spoked wheel 110 and the second spoked wheel 120 are coaxially coupled to each other. In one aspect of the invention, the first spoked wheel and the second spoked wheel may have a diameter substantially equivalent to a sprocket used in two wheelers. In another aspect of the invention, the first spoked wheel and the second spoked wheel may have a diameter of any dimensions. For example, the first spoked wheel may have a larger diameter than the second spoked wheel or vice versa. In the present embodiment, the first spoked wheel 110 is provided with spokes of the first spoked wheel 112 and the second spoked wheel 120 is provided with spokes of the second spoked wheel 122. In the present embodiment, the first spoked wheel 110 and the second spoked wheel 120 are provided with fifteen spokes. It may be obvious to a person to arrange more than fifteen or less than fifteen spokes in the wheels 110, 120. In an embodiment, the two wheels with spokes are having an offset therebetween and connected using a shaft to facilitate sliding of any object on it.

[0043] The radial cone 130 hereinafter referred as the cone 130, is arranged between the first spoked wheel 110 and the second spoked wheel 120. Specifically, the radial cone is engageably coupled with the first spoked wheel and the second spoked wheel. In one embodiment, the cone 130 is a metal cone. It may be obvious to a person to make the cone with any other material such as any polymer or composite materials or the like to reduce the weight thereby improving the efficiency of the system. The cone is provided with a cylindrical core 135 arranged at an inner central portion of the cone 130. In an embodiment, the cone is slidable over the shaft connecting the two wheels. In another embodiment, brackets are arranged on the cone to allow connection of cone to any other part.

[0044] In the present embodiment, a slanted surface of the cone 130 faces towards the first spoked wheel 110. The slanted surface is the outer surface of the cone. It may be obvious to a person to arrange the slanted surface of the cone 130 facing towards the second spoked wheel 120. The cone 130 has slots arranged radially parallel to the spokes of the first spoked wheel 110. The slots are openings substantially enough to allow the spokes of the first spoked wheel to slide therethrough. The cone 130 is adapted to slide through the slots between a first position and a second position.

[0045] Specifically, the second spoked wheel 120 is connected to the first spoked wheel 110 co-axially, over which the cone 130 performs sliding motion. In the present embodiment, fifteen slots 132 are arranged on the cone 130.

In an alternate embodiment, the number of slots arranged on the cone 130 may be more or less than fifteen depending upon the spokes of the wheels.

[0046] Referring now to figures 1 and 2, plurality of sliders 140 are slidably arranged on the spokes of the first spoked wheel 110. One portion of the slider is arranged in connection with the slanted surface of the cone. The sliders 140 are adapted to slide on the slanted surface of the cone 130 and the spokes of the first spoked wheel 110 simultaneously. The sliders 140 are configured on the spokes in a circular pattern so that the sliding movement of the sliders 140 forms a circular pattern with small and larger diameters. Specifically, the sliders 140 are arranged to create a large diameter circle when the cone 130 is nearest to the first spoked wheel 110 and small diameter circle when the cone 130 is away from the first spoked wheel 110.

[0047] The sliders can be of any shape such as cuboidal or spherical or oval and the like. The sliders may be arranged with bearings to slide on the spokes with ease. In one aspect of the invention, the sliders 140 are having a curved upper portion, having construction in such a way that allow a belt 170 connecting to the driving pulley to rest on the upper surface where a groove 145 is provided as a support for the belt 170 to rest and slide thereon. In another aspect of the invention, the sliders 140 are of cubical, or oval shape. It may be obvious to a person to use the sliders of any other suitable shape.

[0048] In an alternate embodiment, the belt 170 may replaced with a chain and the like. Specifically, the outer surface of the sliders 140 are provided with the groove 145, which is provided to engage with the belt 170 and the belt 170 is slidably arranged on the groove 145. In an embodiment, the belt 170 is a high strength belt that is wound over the sliders 140, passes through a belt extension mechanism 175 connecting the driving mechanism. The groove on the slider must be in accordance with the belt and can be of any configuration. In the present embodiment, the grooves are “V” shaped to securely engage with the belt. It may be obvious to a person to provide any other shape for the grooves.

[0049] In another aspect of the invention, the sliders may have small projections on upper portion to engage with a chain instead of belt. In such embodiment, the sliders act as sprockets and the chain connected therewith transmit the rotary motion therebetween. In another aspect, the upper projections may be flexible.

[0050] In another aspect of the invention, the sliders may have a hole to slide along a guiding rail and having a surface that facilitates its sliding over some other object.

[0051] Further, the system 100 also includes the belt extension mechanism 175, as shown in figures 1 and 3. The belt extension mechanism 175 is having a roller 176 with a groove that guides the movement of the belt 170. In one

embodiment, the roller 176 is a toothless curved roller. In another embodiment, it may be a pulley or a gear mechanism. The main function of the belt extension mechanism 175 is to provide the length of the belt 170 as per requirement. Also, the belt extension mechanism 175 keeps the belt 170 taut whenever there is a change in diameter of the circular pattern configured by the sliders due to the sliding of the cone 130. Specifically, the change in diameter of the circle formed by the sliders 140 requires extra belt to be fed in, to compensate the change in circumference of the circle. The belt extension mechanism 175 is required to provide the extra amount of required belt. The belt extension mechanism 175 uses a spring-loaded mechanism, to keep the belt always taut either in the low diameter or the high diameter. Hence, with the help of the entire process providing required torque and speed to the system.

[0052] Referring again to the figures 1, 2 and 3, a plurality of centrifugal mass 150 are slidably attached to the spokes of the second spoked wheel 120. The centrifugal masses 150 has a slot that allows sliding on the spokes of the second spoked wheel 120. The centrifugal masses can be of any cross-sectional shapes like a spherical shape or cuboidal shape or the like depending on the cross-section of the spokes of the second spokes wheel. The centrifugal masses may also have bearings in the engaging side to provide smooth sliding over the spokes of the second spoked wheel thereby reducing the friction therebetween. The function of the centrifugal mass 150 is to provide enough centrifugal force to displace the cone 130 along its axis and against the force of the biasing member 160. The centrifugal

masses 150 are having an extruded portion for attachment of links 155. In the present embodiment, the centrifugal mass 150 is connected to the cylindrical core 135 of the cone 130 through respective links 155 arranged on the cylindrical core 135. The links 155 are connecting members which extends from the cylindrical core 135 of the cone 130 as shown in the figure 2. In the present embodiment the links 155 are adapted to be connected to the centrifugal masses 150 and the internal portion of the cone 130. The links 155 are provided to allow the cone 130 to displace against the biasing member 160 due to the centrifugal force generated by the centrifugal masses 150. In the present embodiment, the links are light weight binary links.

[0053] In another embodiment, the links can be cable or wire, or any ropes made of flexible material or rigid material or chain or the like. It may be obvious to a person to configure the links with any other suitable materials.

[0054] The centrifugal mass 150 slides radially outwards when the speed of the driving mechanism increases. Specifically, the centrifugal mass 150 is adapted to slide radially outwards on the spokes of the second spoked wheel 120 pulling the cones 130 towards the first position wherein the cone 130 moves towards the second spoked wheel 120 and away from the first spoked wheel 110 as shown in figures 4a and 4b. When the centrifugal mass 150 slides radially outwards, the slider 140 radially slides down along the slanted surface of the cone 130. Specifically, in the first position, the centrifugal mass forms a circular pattern

with larger diameter whereas the sliders configure the circular pattern with a smaller diameter. When the sliders form a smaller diameter circular pattern, low torques can be achieved at high speed. Similarly, when the sliders form a larger diameter circular pattern, higher torques can be achieved at low speed. The movement of the cone 130 between first positions to second position provides different gear ratio to the belt 170 that resides over the sliders 140 which slides over the outer surface.

[0055] The centrifugal mass 150 slides radially inwards due to the force exerted by biasing member 160 on the cone 130 when the speed of the driving mechanism decreases. When the centrifugal mass 150 slides radially inwards on the spokes of the second spoked wheel 120 cone 130 moves toward the second position, i.e. away from the second spoked wheel 120 and towards the first spoked wheel 110 as shown in the figures 5a and 5b. When the centrifugal mass 150 slides radially inwards, the cone 130 slides inside the spokes of the first spoked wheel 110 allowing the slider 140 to slide radially outwards along the slanted surface of the cone 130, hence–achieving maximum diameter and delivering maximum torque at lower speeds.

[0056] Further the system 100 includes a biasing member 160. The biasing member 160 is a restoring spring with two plates which restores the position of the cone 130. The biasing member 160 is arranged between the second spoked wheel 120 and the cone 130. Precisely, the biasing member 160 moves the cone 130 slidably inside the spokes of the first spoked wheel 110 causing the

centrifugal masses 150 to slide radially inwards. Specifically, the main function of the biasing member 160 is to restore the position of the cone 130 giving the maximum diameter of the belt 170.

[0057] In one aspect of the invention, the system (100) is configured on a pedal cycle with the driving mechanism being the pedal system of the cycle. For illustrative purpose as an example, the system is further described when the system being configured on the pedal cycle. When the system is used on the pedal cycle, the system 100 is configured on a rear portion of the cycle (not shown). Specifically, the system 100 is arranged in connection with a rear tyre or a rear wheel of the pedal cycle and coupled to the pedal system of the cycle.

[0058] In such embodiment, the pedal is the driving mechanism. The pedal of the cycle is provided with a toothless curved gear as shown in the figure 3 where a rider gives power by peddling. The pedal gear 200 is the primary gear which is given power by the rider. Specifically, the rider provides power to the pedal gear 200 which is wound by the belt 170 and the belt 170 is wound to the grooves 145 of the sliders 140. The system automatically varies the speed or the gear ratio of the cycle according to the pedalling of the cycle.

[0059] In another aspect of the invention, the system can be enclosed in an enclosure or housing of suitable shape and size to protect the system

from dust and moisture. The enclosure can also act as lubricant reservoir for lubrication of components of the system.

[0060] Therefore the advantage of the present invention is to provide a continuous automatic variable transmission (CAVT) system 100. The system 100 is fully automatic and mechanical without any need of electrical or electronic components that reduces the risk of part damage due to water, also the user experiences no shift shocks and obtains quicker acceleration. Also, the system 100 offers a whole range of gear ratios within limit due to seamless transmission. The system 100 doesn't have shifting delays that makes the system 100 very comfortable especially while cycling. Also, the system 100 used minimum required parts which are light weight and require very less maintenance.

[0061] The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the present invention to the precise forms disclosed, and obviously, many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to explain the principles of the present invention best and its practical application, to thereby enable others best utilize the present invention and various embodiments with various modifications as are suited to the particular use contemplated. It is understood that various omission and substitutions of equivalents are contemplated as circumstance may suggest or render expedient, but

such are intended to cover the application or implementation without departing from the spirit or scope of the present invention.

We Claim

1. A continuous automatic variable transmission (CAVT) system 100, the system 100 being adapted to couple with a driving mechanism, the system 100 comprising:

a first spoked wheel 110 and a second spoked wheel 120 arranged coaxially to each other;

a radial cone 130 arranged between the first spoked wheel 110 and the second spoked wheel 120, the radial cone is engageably coupled therewith;

wherein a slanted surface of the radial cone 130 facing towards the first spoked wheel 110 and the radial cone 130 having slots arranged radially parallel to the spokes of the first spoked wheel 110, wherein the radial cone 130 is adapted to slide between a first position and a second position;

a plurality of sliders 140 slidably arranged on the spokes of the first spoked wheel 110 and adapted to slide on the slanted surface of the radial cone 130, wherein the sliders 140 are having a groove 145 to engage with a belt 170 coupled to the driving mechanism;

a plurality of centrifugal mass 150 slidably attached to the spokes of the second spoked wheel 120, wherein the centrifugal mass 150 is connected to a cylindrical core 135 arranged at an inner central portion of the radial cone 130 through respective links 155 arranged on the cylindrical core 135;

wherein the centrifugal mass 150 is adapted to slide radially outwards on the spokes of the second spoked wheel 120 pulling the radial cones 130 towards the first position wherein the radial cone 130 moves towards the second spoked wheel 120 and away from the first spoked wheel 110, wherein when the centrifugal mass 150 slides radially outwards, the slider 140 radially slides down along the slanted surface of the radial cone 130; and

when the centrifugal mass 150 slides radially inwards on the spokes of the second spoked wheel 120 due to the force exerted by biasing member 160 on the cone 130, radial cone 130 moves toward the second position, i.e. away from the second spoked wheel 120 and towards the first spoked wheel 110, the radial cone 130 slides inside the spokes of the first spoked wheel 110 allowing the slider 140 to slide radially outwards along the slanted surface of the radial cone 130.

2. The system 100 as claimed in claim 1, wherein the system 100 includes a biasing member 160 arranged between the second spoked wheel 120 and the radial cone 130 to move the radial cone 130 slidably inside the spokes of the first spoked wheel 110 when the centrifugal mass 150 slides radially inwards.

3. The system 100 as claimed in claim 1, wherein the centrifugal mass 150 slides radially outwards when the speed of the driving mechanism increases and due to the force exerted by biasing member 160 on the cone 130, the centrifugal mass 150 slides down when the speed of the driving mechanism decreases.

4. The system 100 as claimed in claim 1, wherein the system 100 includes a belt extension mechanism 175 having a roller 176 with a groove that guides the movement of the belt 170.

5. The system 100 as claimed in claim 1, wherein the biasing member 160 is a restoring spring with two plates which restores the position of the radial cone 130.

6. The system as claimed in claim 1, wherein the links 155 are connecting members which extends from the cylindrical core 135 of the radial cone 130.

7. The system 100 as claimed in claim 1, wherein the sliders 140 are provided with the groove 145 which provide support for the belt 170 to rest and slide thereon.

8. The system 100 as claimed in claim 1, wherein the centrifugal masses 150 has a slot that allows its sliding on the spokes of the second spoked wheel 120 and also having an extruded portion for attachment of the links 155.

9. The system 100 as claimed in claim 1, wherein the sliders 140 are arranged to create a large diameter circle when the radial cone 130 is nearest to the first spoked wheel 110 and small diameter circle when the radial cone 130 is away from the first spoked wheel 110.

10. The system 100 as claimed in claim 1, wherein the movement of the radial cone 130 between first position to second position provides different transmission ratio to the belt 170 that resides over the sliders 140 which slides over the outer surface.

11. The system 100 as claimed in claim 5, wherein the belt extension mechanism 175 uses a spring-loaded mechanism to keep the belt always taut either in the low diameter or the high diameter.

12. The system 100 as claimed in claim 1, wherein the system is driven manually by pedaling or driven electrically by an electric motor or by an engine.

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Abstract

Title: A continuous automatic variable transmission (CAVT) system

The present invention provided a continuous automatic variable transmission (CAVT) system 100 being adapted to couple with a driving mechanism. The system is having a first spoked wheel 110 and a second spoked wheel 120 arranged coaxially. A radial cone 130 is arranged between the both spoked wheels. Plurality of sliders 140 and centrifugal mass 150 are slidably arranged on the spokes of the first and the second spoked wheel respectively. The centrifugal mass is adapted to slide radially outwards on the spokes of the second spoked wheel pulling the cones towards a first position wherein the cone moves towards the second spoked wheel. When the centrifugal mass slides radially inwards on the spokes of the second spoked wheel due to the force exerted by biasing member 160 on the cone, radial cone moves toward the second position, i.e. away from the second spoked wheel and towards the first spoked wheel.

Figure 1