

INTELLIGENT NECK MASSAGER

THCHNICAL FIELD

The present application relates to the technical field of massager devices, and more particularly, relates to an intelligent neck massager.

BACKGROUND

For an existing neck massager, when it operates, a neck needs to be massaged in multi-position and multi-angle. As a result, the neck massager has a complicated inner structure, it is not light and handy enough and has a large weight, and thus it will bring uncomfortable feelings to a person when he/she enjoys a neck massage service; moreover, a position adjustment for the massage wheel sets in the existing neck massager has to be accomplished manually, in a massage process, the person has to hold the neck massager with both hands, for this reason, it is inconvenient to operate a manual adjustment.

BRIEF SUMMARY

The present application provides an intelligent neck massager, aiming at solving the problem in the prior art that a neck massager requires being adjusted manually.

In order to solve aforementioned problem, the technical solution of the present invention is that: providing an intelligent neck massager, which comprises a C-shaped pillowcase, two massager subassemblies mounted symmetrically in the C-shaped pillowcase, and a control apparatus; wherein the intelligent neck massager further comprises a regulating motor mounted at the center of the C-shaped pillowcase and two first supports mounted on two sides of the regulating

motor respectively, an output shaft of the regulating motor is provided with a first synchronomesh gear with a double-decked gear structure, each of the two first supports is provided therein with a synchronous belt driven by the two first synchronomesh gears, each massager subassembly comprises a massager motor, a gear box driven by the massager motor, and a massage wheel set mounted on an output shaft of the gear box, each gear box is provided with a basal ridge lock subassembly, each gear box respectively makes a reciprocating movement on a corresponding synchronous belt or is locked to be positioned on the synchronous belt by the basal ridge lock subassembly thereof, and the control apparatus takes control of coordinated operation of aforementioned mechanical components.

Specifically, the intelligent neck massager further comprises a second support located intermediately between the two first supports, the two first supports are connected to the second support to form a U-shaped structure, the second support has a first receiving cavity for receiving the regulating motor; each side of the second support is provided with a connecting end, each connecting end is fixedly connected with one of the first supports, or the second support is molded integrally with one of the first supports and the second support is fixedly connected to the other one of the first supports.

Specifically, each of the first supports is strip-shaped and has a second receiving cavity communicating with the first receiving cavity, one end of the second receiving cavity is provided with a second synchronomesh gear, one end of the synchronous belt is sheathed on the first synchronomesh gear, and the other end of the synchronous belt is sheathed on the second synchronomesh gear; the second receiving cavity is further provided therein with a third synchronomesh gear, the third synchronomesh gear is arranged between the first synchronomesh gear and the second synchronomesh gear, an inclined angle formed by a line which connects the first synchronomesh gear with the third synchronomesh gear and a line which connects the

second synchronomesh gear with the third synchronomesh gear is an obtuse angle, there are a plurality of pulleys arranged on an outer side of the synchronous belt for limiting the position of the synchronomesh belt; the massager motor and the gear box are positioned inside the second receiving cavity of the first support, the second receiving cavity is provided with a strip-shaped spacing slot formed on an inner sidewall of the second receiving cavity and passing through the inner sidewall, an output shaft of the gear box protrudes from the spacing groove, and the massage wheel set is mounted on one end of the output shaft of the gear box.

Further, there are three pulleys, wherein two of the three pulleys are placed adjacently to the regulating motor and arranged oppositely on outer sides of the synchronomesh belt; the rest one of the three pulleys is mounted on an outer side of the synchronous belt and is opposite to the third synchronomesh gear.

Specifically, each massager subassembly further comprises a gear subassembly, the gear subassembly comprises a first gear and a second gear meshed with the first gear, the first gear is sheathed on one end of the output shaft of the massager motor, the second gear is sheathed on a middle portion of an output shaft of the gear box, and the output shaft of the massager motor is perpendicular to the output shaft of the gear box.

Specifically, each synchronous belt is provided thereon with a limit switch configured for limiting the position of the basal ridge lock subassembly, the limit switch communicates with the control apparatus.

Further, the basal ridge lock subassembly comprises a lock block and a lock cover that are fixed on the gear box, the lock block has a horizontal lock tooth surface and a side plate arranged on one side of the lock tooth surface, the lock cover is fixed to the lock block, and the lock cover has a cover plate which is opposite to the lock tooth surface and is inclined outward, the synchronous belt passes through the space formed among the side plate, the lock tooth surface and

the cover plate, and the belt tooth of the synchronous belt is opposite to the lock tooth surface.

Specifically, each massage wheel set comprises a holder having a hollowed third receiving cavity, a universal joint, a holder cover, an elastic element, and a plurality of massage wheels; the universal joint comprises a joint base and a universal ball rotatably connected with the joint base, the universal ball is embedded from the bottom of the third receiving cavity, the holder cover is sheathed on the holder at the top of the third receiving cavity, the universal ball is sheathed in the holder cover and then fixed inside the third receiving cavity, the elastic element is arranged between the joint base and the universal ball, there are at least two massage wheel sets mounted uniformly on an outside of the holder, each massage wheel set comprises a rotatable massage wheel and a plurality of massager touch points distributed uniformly around a circumference of the massage wheel.

Further, the holder cover comprises a cover plate and at least two fixture blocks arranged uniformly around the circumference of the cover plate, an inner surface of each fixture block is sphere-shaped, each fixture block inserts into the third receiving cavity from above of the holder body, the third receiving cavity is provided with at least two fixture bases arranged uniformly around an inner cavity wall thereof, an inner surface of each fixture base is sphere-shaped, each fixture block get stuck by a corresponding fixture base, and an inner surface of each fixture block is fit with the sphere surface of the universal ball .

Or, each massage wheel set comprises a holder and three massage wheels, the holder is axially provided with a shaft hole configured for allowing the output shaft of the gear box to be inserted and fixed therein, there are three mounting holes defined uniformly along a radical direction of the holder and taking the shaft hole as the center; each massage wheel is fixed into a corresponding mounting hole by rotating a fastening piece.

In the present invention, when the control apparatus takes control of the aforementioned mechanical components, the control of aforementioned mechanical components can be achieved by a press button or a remote control, or by communicating with an application software installed inside an electronic product, so that various control methods can be achieved; via control functions of the control apparatus, each massage wheel set is controlled to make a reciprocating movement along a corresponding synchronous belt, thereby providing a massage for a neck in multi-position; at the same time, the massage wheel set can also be forced to provide a fixed point massage after the fixed point is selected, thereby solving the problem that it is inconvenient to use a hand to adjust the positions of the massage wheel sets when using smart electronic products; moreover, the two synchronous belts make little noise in adjusting processes and occupy small space.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a top view of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 2 illustrates a schematic structural diagram of an intelligent neck massager provided by one embodiment of the present invention, wherein a C-shaped pillowcase thereof is removed;

FIG. 3 illustrates a disassembled schematic diagram of the intelligent neck massager illustrated in FIG. 2;

FIG. 4 illustrates a schematic diagram of a joint structure between a synchronous belt and a gear box of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 5 illustrates a disassembled schematic diagram of a synchronous belt and a gear box of an intelligent neck massager provided by one embodiment of the

present invention;

FIG. 6 illustrates a cut-away view of a joint structure between a gear box and a basal ridge lock subassembly of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 7 illustrates a schematic structural diagram of a massage wheel set of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 8 illustrates a disassembled schematic diagram of a massage wheel set of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 9 illustrates a cut-away view of a massage wheel set of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 10 illustrates another schematic structural diagram of a massage wheel set of an intelligent neck massager provided by one embodiment of the present invention;

FIG. 11 illustrates a disassembled schematic diagram of the massage wheel set illustrated in FIG. 10;

FIG. 12 illustrates a schematic diagram of an intelligent neck massager provided by one embodiment of the present invention, wherein the intelligent neck massage is in a first working status;

FIG. 13 illustrates a schematic diagram of an intelligent neck massager provided by one embodiment of the present invention, wherein the intelligent neck massage is in a second working status.

100-a C-shaped pillowcase; 200-massager subassembly; 201- massager motor; 211- output shaft of the massager motor; 220- gear box; 221-output shaft of the gear box; 222-boss; 230-massage wheel set; 231-universal joint; 2311-joint base; 2312-universal ball; 2313-shaft hole; 232-holder; 2321-holder body; 2322-holder cover; 2323- third receiving cavity; 2324-cover plate; 2325-fixture block; 2326-fixture base; 2327-convex rib; 2328-erection column; 2329-mounting hole;

235-location hole; 236-fixing block; 234-massage wheels; 2341-massage touch points; 2342-center hole; 240-gear subassembly; 241-first gear; 242-second gear; 300-regulating motor; 310-output shaft of the regulating motor; 400-first support; 410-spacing slot; 500-first synchromesh gear; 510-second synchromesh gear; 520-third synchromesh gear; 530-pulley; 600-synchronous belt; 610-limit switch; 700-basal ridge lock subassembly; 710-lock block; 711-groove; 712-lock tooth surface; 713-side plate; 720-lock cover; 721-lock cover plate; 800-second support; 810-first receiving cavity; 820-connecting end; 900-first fastening piece; 910-convex cap; 920- external thread.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In order to make the purpose, the technical features, and the advantages of the present invention be clearer and more comprehensible, the present invention will be described clearly and completely with reference to the accompanying drawings and the embodiments of the present invention. It should be understood that the detailed embodiments described herein are only used for explaining the present invention, rather than limitation to the present invention.

It needs to be noted that when one component is described as to be “fixed to” or “mounted on” another component, it means that the component can be fixed to or mounted on the another component directly, or an intermediate component may exist simultaneously; and when a component is described as to be “connected to” another component, it means that the component can be connected to the another component directly, or an intermediate component may exist simultaneously.

It also needs to be noted that terms for describing directions, such as left, right, up, down, and so on in the present embodiment are relative concepts merely or with reference to normal conditions of products, and should not be considered

as limitations.

Referring to figure 1 and figure 2, the present invention provides an intelligent neck massager which comprises a C-shaped pillowcase 100, two massage subassemblies 200 arranged symmetrically inside the C-shaped pillowcase, and a control apparatus (not shown in the figures), the intelligent neck massager further comprises a regulating motor 300 located in the center of the C-shaped pillowcase and two first supports 400 arranged respectively at both sides of the regulating motor, an output shaft of the regulating motor 300 is provided with a first synchromesh gear 500 with a double-decked gear structure, and each first support 400 is provided therein with a synchronous belt 600 that can be driven by a corresponding first synchromesh gear 500. The two massager subassemblies 200 have a same structure, each massage assembly 200 comprises a massage motor 210, a gear box 220 driven by the massage motor 210, and a massage wheel set 230 mounted on an output shaft 221 of the gear box 220; each gear box 220 is provided with a basal ridge lock subassembly 700 and makes a reciprocating movement along a corresponding synchronous belt 600 respectively or is locked and fixed on the corresponding synchronous belt 600 by use of the basal ridge lock subassembly 700, the control apparatus takes control of a coordinated operation of the aforementioned mechanical components. In the present invention, when the control apparatus takes control of the aforementioned mechanical components, the control of the mechanical components can be achieved by a press button, or a remote control, or by communicating with an application software installed in an electronic product, so that multiple control ways can be achieved. Via the control function of the control apparatus, a massage wheel set 230 can be forced to make a reciprocating movement along a corresponding synchronous belt 600 so as to provide a multi-position massage for a neck; at the same time, the massage wheel set can also be controlled to provide a

fixed point massage after the fixed point is selected, a problem that it is inconvenient for a person to free his/her hands to adjust a position of the massage wheel set 230 when he/she is using an intelligent electronic product can be solved; moreover, the adoption of the synchronous belt 600 generates low noises in the position adjusting process and occupies small space.

With reference to figure 3, the intelligent neck massager further comprises a second support 800 located intermediately between the two first support 400. The two first supports 400 and the second support 800 are connected to form a U-type structure, the second support 800 has a first receiving cavity 810 configured for receiving the regulating motor 300. In the embodiment, the second support 800 is integrally shaped with one of the two first supports 400, one end of the second support 800 adjacent to the other of the first supports 400 is provided with a connecting end 820, the second support 800 is fixed to the other of the first supports 400 via the connecting end 820, for example, thread connection or snap-fit connection can be adopted. Of course, the second support 800 can also be used independently as a third component, two connecting ends are provided on both sides of the second support 800 respectively, via the two connecting ends, the second support 800 is fixedly connected to the two first supports 400 respectively.

In the present invention, the two first support 400 have a same structure, each first support 400 is strip-shaped and has a second receiving cavity (not shown in the figures), the second receiving cavity communicates with the first receiving cavity 810. The regulating motor 300 is fixed in the first receiving cavity 810 of the second support 800 which is located intermediately between the two first supports 400, two first synchromesh wheels 500 are overlapping structured and are fixed to an output shaft 310 of the regulating motor 300. An end of the second receiving cavity of each first support 400 far away from the second

support 800 is provided with a second synchronomesh gear 510, one end of the synchronous belt 600 is sheathed on the first synchronomesh gear 500, the other end of the synchronous belt 600 is sheathed on the second synchronomesh gear 510, each second receiving cavity is provided therein with a third synchronomesh gear 520, the third synchronomesh gear 520 is arranged between the first synchronomesh gear 500 and the second synchronomesh gear 510, and an inclined angle formed by a line which connects the first synchronomesh gear 500 with the third synchronomesh gear 520 and a line which connects the second synchronomesh gear 510 with the third synchronomesh gear 520 is an obtuse angle. An outside of the synchronous belt 600 is provided with at least one pulley 530 configured for limiting the position of the synchronous belt 600, the third synchronomesh gear 520 and the pulley 530 are configured for defining the shape of the synchronous belt 600, such that the synchronous belt 600 matches with the first receiving cavity 810 and the second receiving cavity connected with the first receiving cavity 810, and the synchronous belt 600 can be justly received in the first receiving cavity 810 and the second receiving cavity. There may be one pulley 530 or a plurality of pulleys 530, in the embodiment, there are three pulleys 530. Wherein, one of the pulleys 530 is located at the outside of the synchronous belt 600 and is opposite to the third synchronomesh gear 520 for preventing the synchronous belt 600 from becoming loose, and via position changes of the pulley 530, providing a tightening function on the synchronous belt 600. The rest two of the three pulleys 530 are positioned between the first synchronomesh gear 500 and the second synchronomesh gear 510 and are adjacent to the output shaft 310, and they are positioned to be opposite to each other with a main purpose of preventing the synchronous belt 600 from sliding away from above-mentioned synchronomesh gears. With respect to the three pulleys 530, except for above-mentioned shape defining function, when the two supports 400 and the second support 800 are connected to form a mobile

hinge structure, if the second support 800 is in a fixing status, the two first supports 400 can serve as two curved bars that take the output shaft 310 as a circle center and can make a symmetrical circular movement in a limited angle range, so that massage angle can be adjusted in a wider angle range, for example, an angle range from 90 degrees to 180 degrees; at this time, the three corresponding pulleys 530 rotate in a limited angle around the first synchromesh gear 500 simultaneously, for example, from 90 degrees to 180 degrees, and center distances of all pulleys 530 doesn't change, so that an actual use of the intelligent neck massager product isn't effected at all. Various functions can be implemented more flexibly.

Meanwhile, a massage motor 210 and a gear box 220 are received in the second receiving cavity, an inside wall of each second receiving cavity is provided with a long strip shaped spacing slot 410, an output shaft 221 of the gearbox 220 protrudes from the inside of the spacing slot 410, the massage wheel set 230 is mounted on an end of the output shaft 221 of the gear box 220, that is, the massage wheel set 230 is positioned on an inner side of the C-shaped pillowcase 100.

Specifically, the massage subassembly 200 further comprises a gear subassembly 240, the gear assembly 240 comprises a first gear 241 and a second gear 242 meshed with the first gear 241, the first gear 241 is sheathed on one end of an output shaft 211 of the massage motor 210, the second gear 242 is sheathed on a middle part of an output shaft 221 of the gear box 220, the output shaft 211 of the massage motor 210 is perpendicular to the output shaft 221 of the gear box 220. In this way, the circular movement of the massage motor 210 is perpendicularly redirected by the gear subassembly 240, and then is transmitted to the massage wheel set 230 through the output shaft 221 of the gear box 220, thereby causing the massage wheel set 230 to make a circular movement and saving a space usage of the C-shaped pillowcase 100 furthest.

Further, please refer to figure 4, figure 5 and figure 6, each synchronous belt 600 is provided with a limit switch 610 configured for limiting displacements of a basal ridge lock subassembly 700, and the limit switch 610 is in communication with the control apparatus. Specifically, the limit switch 610 is received in the second receiving cavity and is adjacent to the third synchronomesh gear 520. When the gear box 220 moves, through the basal ridge lock subassembly 700, along the synchronous belt 600 and toward the third synchronomesh gear 520 and reaches the position where the limit switch 610 lies, the limit switch 610 sends a signal to the control apparatus, and the control apparatus controls the gear box 220 to return back. Speak of the basal ridge lock subassembly 700, except for the function of forcing the gear box 220 to move along the synchronous belt 700, when the massage wheel set 230 needs to perform a massage at a fixed point, the gear box 220 can be locked on the synchronous belt 600 by the basal ridge lock assembly 700, so that a fixed point massage can be performed.

Specifically, the basal ridge subassembly 700 comprises a lock block 710 and a lock cover 720. Wherein, one side of the lock block 710 is provided with a groove 711, the top of the lock block 710 is provided with a lock tooth surface 712, the lock tooth surface 712 is provided with a side plate 713 on its one side adjacent to the groove 711, the gear box 220 is provided with a boss 222, the lock block 710 is sheathed on the boss 222, the boss 222 and the groove 711 are inserted correspondingly, the lock cover 720 is fixed to one end of the lock block 710 far away from the groove 711, the boss 222, the lock block 710 and the lock cover 720 are locked together via a fixing device. The top of the lock cover 720 is bent toward a side where the side piece 713 of the lock block 710 is located to form a cover plate 721, the cover plate 721 is opposite to the lock tooth surface on the top of the lock block 710, and the cover plate 721 is slightly inclined outwardly relative to the lock tooth surface 712. In this way, a space is formed

among the lock tooth surface 712, the side plate 713 and the cover plate 721, which is passed through by the synchronous belt 600, besides, belt teeth of the synchronous belt 600 face to the lock tooth surface 712. The belt teeth is meshed with the lock tooth surface 712, when the synchronous belt 600 makes a circular movement along with the rotation of the above-mentioned synchromesh gears, via the meshing function, the gear box 220 is driven by the lock block 710 and moves along the synchronous belt 600; when a fixed point massage needs to be provided, since the cover plate 721 is designed to be sloped, a pre-intervention state among the cover plate 721, the lock block 710 and the mating surface of the synchronous belt 600 is generated; moreover, the side plate 713 of the lock block 710 and the lock tooth surface 712 form a toggle clip, which locks several belt teeth of the synchronous belt 600; when the lock cover 720 and the lock block 710 are completely tightened, the synchronous belt 600 is pressed and tightened by the side plate 713, so that the lock block 710 and the synchronous belt 600 are fixed firmly and reliably, the gear box 220 is locked accordingly, and a movement of the gear in a massage process is avoided.

Please refer to figure 7, figure 8 and figure 9, in the present embodiment, the massage wheel set 230 is a floating type massage wheel set. The floating type massage wheel set comprises a universal base 231 connected to the output shaft 221 of the gear box 220, a holder 232 arranged on the universal joint 231, an elastic piece 233 arranged between the universal joint 231 and the holder 232, and a plurality of massage wheels 234 (in the present embodiment, there are three massage wheels) rotatably connected with the holder 232, each massage wheel 234 has a plurality of massage touch points 2341 (in the present embodiment, there are six massage touch points) distributed uniformly on a circumference thereof. When the floating type massage wheel set is adopted for massaging, the massage wheels 234 rotate, and in the rotating process, the plurality of massage

touch points 2341 are driven to rotate and act on the skin of a user in sequence; this massage method can not only provide a targeted massage for acupuncture point touching and pressing, meanwhile, the massage touch points 2341 rotating in sequence shall not hurt epidermis of the user's body, so that a bruise caused by a direct displacement and a friction between the massage wheel sets 230 and the skin of the user can be avoided.

In the present embodiment, the universal joint 231 comprises a universal joint base 2311 and a universal ball 2312 rotatably connected with the universal joint base 2311. The holder 232 comprises a holder body 2321 and a holder cover 2322, the holder body 2321 has a circular third receiving cavity 2323 with a hollowed structure, the universal ball 2312 is inserted from the bottom of the third receiving cavity 2323 and is fixed inside the third receiving cavity 2323 through the holder cover 2322.

Specifically, the holder cover 2322 comprises a cover body 2324 and at least two fixture blocks 2325 (in the present embodiment, there are four fixture blocks 2325) positioned uniformly along a circumference of the cover body 2324, the four fixture blocks 2325 are spaced and cooperate with the cover body 2324 to form a bayonet (not shown in the figures) with an open end structure, and each fixture block 2325 has a spherical inner surface. In assembly, the universal ball 2312 is inserted from the bottom of the third receiving cavity 2323 and upwardly into the third receiving cavity 2323, and each fixture block 2325 is inserted from the top of the holder body 2321 and downwardly into the third receiving cavity 2323; since the holder body 2322 is made from a plastic material possessing elasticity, the four spaced fixture blocks 2325 are not connected with each other and have much better elastic force, so that the universal ball 2312 can be stuck into the bayonet formed by enclosing of the four fixture blocks 2325 and a cover body 2324, each fixture block 2325 is stuck between the universal ball 2312 and

the third receiving cavity 2323, a sphere inner surface of each fixture block 2325 sticks on a sphere surface of the universal ball 2312. In order to achieve a more firmly connection between the universal ball 2312, the fixture blocks 2325 and the third receiving cavity 2323, and avoid the universal ball 2312 dropping from the bayonet, at least two fixture bases 2326 (in the present embodiment, there are four fixture bases 2326) are provided and positioned uniformly along an inner wall of the third receiving cavity 2323, and the four fixture bases are spaced from each other and correspond to four fixture block 2325 respectively, an inner surface of each fixture base 2326 is sphere-shaped, each fixture 2325 is inserted from top to bottom and get stuck at the place of a corresponding fixture base 2326; in this way, a firm connection between the four fixture blocks 2325 and the receiving cavity 2323 can be ensured, so that the universal joint 231 is fixed firmly inside the third receiving cavity 2323, and it can be further ensured that the universal joint 231 will not drop when it is rotated and/or sloped in any way within the third receiving cavity 2323. By the adoption of aforementioned structure, the universal joint 231 is received in the space formed by enclosing the holder body 2321 and the holder cover 2322, the problem that a massage angle of a normal massage wheel set 230 is fixed and unchangeable and that a required massage direction can't be identified during massaging for different parts of a person can be solved; an intelligent identification of massage direction is achieved by the massage wheel set 230, so that the intelligent level of the massage wheel set 230 is improved.

Please refer to figure 8, a lower part sphere universal ball 2312 is provided with at least two convex ribs 2327 (in the present embodiment, there are four convex ribs), the convex ribs 2327 get stuck respectively in gaps between two adjacent fixture bases 2326. Via clamp connections between the convex ribs 2327 and the gaps, when the universal ball 2312 makes a rotary movement, the holder body 2321 is driven at clamping positions, so that the massage wheel 234

sets are forced to make a circumferential movement, and a function of rolling massage is achieved.

In the present embodiment, a connection between the plurality of massage wheels 234 and the holder body 2321 is achieved by the following structures: there are three erection columns 2328 extended outwardly in a radial direction from an circumferential outer wall of the third receiving cavity 2323, each erection column 2328 is provided with a mounting hole 2329; each massage wheel 234 is axially provided with a center hole 2342, and each massage wheel 234 is respectively fixed to a corresponding erection column 2328 by a first fastening piece 900 which passes through a corresponding center hole 2342. Preferably, the first fastening piece 900 is a T-type screw. An external end of the T-type screw has a convex cap 910, and an internal end of the T-type screw has an external thread, and the mounting hole 2329 of each erection column 2328 is provided therein with an internal thread (not shown in the figure) matched with the external thread; when a T-type screw is used for locking a massage wheel 234, the convex caps 910 of the T-type screw get stuck outside the center hole 2342 of the massage wheel 234 to ensure that the massage wheel 234 won't drop when it rotates, and the external thread 920 of the T-type screw is matched with the internal thread of the erection column 2329; since an outer surface of a part of the T-type screw passing through the center hole 2342 is smooth, and the internal surface of the center hole 2342 is smooth too, in this way, it is ensured that the massage wheel 234 is able to rotate around the T-type screw.

In the present embodiment, a top of a cavity wall of the third receiving cavity 2323 is provided with three locating holes 235, the cover body 2324 is provided with three fixed blocks 236 around its circumference accordingly, the three fixed blocks 236 are fixed into the three locating holes 235 via three second fastening pieces (not shown in the figure). Each second fastening piece is a screw.

Although four fixture blocks 2325 are stuck firmly between the universal joint 231 and the third receiving cavity, by above-mentioned screw fastening, the holder body 2321 and the cover body 2324 are further fixed firmly and integrally.

In the present embodiment, the elastic piece 233 is a spring, the spring appears like an inverted cone, an upper opening of the spring is slightly larger than an bottom opening of the spring, the spring is sheathed on the universal joint base 2311 of the universal joint 231, the holder body 2321 is located on the top of the spring and bears on the top of the spring. In this way, when the universal ball 2312 drives the holder body 2321 to rotate, due to the elasticity of the spring, an elastic interaction acts on the holder body 2321, as a result, a floating effect can be generated when the holder body 2321 rotates, so that the holder body 2321 operates more stably, and the massage is more comfortable.

In the present embodiment, the bottom of the universal joint base 2311 of the universal joint 231 is provided with a shaft hole 2313, the shaft hole 2313 extends from the universal joint base 2311 to the universal ball 2312. The shaft hole 2313 is configured for connecting with the output shaft 221 of the gear box 220, in this way, the universal joint base 231 is driven to rotate by the output shaft 221 of the gear box 220, in the rotating process, the holder body 2321 and the massage wheels 234 on the holding body 2321 are driven to rotate along with the universal joint base 231, meanwhile, the universal joint base 231 rolls over and slopes in the third receiving cavity during its rotating process, and the massage wheels 234 rotate around the T-type screws taken as rotation axles to provide massages, thereby achieving a rotated/sloped massage in omni-direction and multi-angle by the massage wheel sets 234.

Preferably, in the present embodiment, the massage touch points 2341 are hemispheric protruding points. The massage touch points 2341 are designed to have hemisphere shapes, so that not only won't they hurt skins, but also an

excellent massage effect can be obtained; of course, the massage touch points can also be designed to be protruding points with cambered surfaces.

Of course, the massage wheel set 230 can also adopt massage wheel sets with other structural types. As shown in figure 10 and figure 11, another type of massage wheel set is illustrated. This kind of massage wheel set has a simplified structure, from which the universal joint 231 and the elastic piece 233 are removed. Specifically, the massage wheel set 230 comprises an irregular holder 232 and three massage wheels 234, the irregular holder 232 is axially provided with a shaft hole 2313 connected with the output shaft 221 of the gear box 220, taking the shaft hole 2313 as a center, there are three mounting holes 2329 arranged on an end face of the holder 232 and distributed uniformly in a radial direction around the shaft hole 23, each massage wheel 234 is axially provided with a hollow center hole 2342, each massage wheel 234 is fixed to the holder 232 by screwing a T-type screw which passing through the center hole 2342 and the mounting hole 2329 in sequence.

Please refer to figure 12 and figure 13, when a neck massager operates, by an operation of a regulating motor 300, two synchronous belts 600 are driven to rotate, so that an electronic position adjusting for a massage wheel set 230 and a reciprocating and circular massage along the synchronous belts 600 provided by the massage wheel set 230 can be achieved. When the regulating motor 300 stops, via the basal ridge lock subassembly 700, the massage wheel set 230 is locked, so that a fixed position massage is achieved; in a circular massage process or a fixed position massage process, via changing rotation directions or rotation speeds of the output shaft of the massage motor 210, and via the transmission of the gear box 220, a forward rotation and a reverse rotation of the massage wheels 234 and a rapid speed or a slow speed of massage can be achieved. Moreover, when the massage wheels 234 rotate forwardly or reversely, the universal joint

231 can roll over and slope in the third receiving cavity 2323, the massage wheels 234 provide massage simultaneously by rotating around corresponding T-type screws that are taken as rotation axles, each massage touch point 2341 bring slightly centripetal force when they act on the skin, the centripetal force generates a pinching feeling on the surface layer of the skin , so that diversification of massage effects is enhanced, and a rotated/sloped massage with omni-direction and multiple bottom angles is achieved using the massage wheel set 230. Moreover, when the movement of the basal ridge driven by the regulating motor 300 is transferred to the gear box 220 to drive the reciprocating movement, the basal ridge makes a low noise in a adjustment process, and small space in the neck massage product is occupied; besides, in the intelligent neck massager with the function of diversified position adjustment in the present embodiment, the basal ridge transmission perfectly solves the angle adjustment problem and doesn't consume energy transfer.

The aforementioned embodiments are preferred embodiments in the present invention, and the embodiments should not be regarded as being limitation to the present invention, any modification, equivalent replacement, improvement, and so on made within the spirit and the principle of the present invention should fall within the protection scope of the present invention.

CLAIMS

1. An intelligent neck massager comprising a C-shaped pillowcase, two massager subassemblies mounted symmetrically in the C-shaped pillowcase and a control apparatus, wherein the intelligent neck massager further comprises a regulating motor mounted at the center of the C-shaped pillowcase and two first supports mounted on two sides of the regulating motor respectively, an output shaft of the regulating motor is provided with a first synchromesh gear with a double-decked gear structure, each of the two first supports is provided therein with a synchronous belt driven by the two first synchromesh gears, each massager subassembly comprises a massager motor, a gear box driven by the massager motor, and a massage wheel set mounted on an output shaft of the gear box, each gear box is provided with a basal ridge lock subassembly, each gear box respectively makes a reciprocating movement on a corresponding synchronous belt or is locked and fixed on the synchronous belt by the basal ridge lock subassembly thereof, and the control apparatus takes control of coordinated operation of aforementioned mechanical components..

2. The intelligent neck massager according to claim 1, further comprising:

a second support located intermediately between the two first supports, the two first supports are connected to the second support to form a U-shaped structure, the second support has a first receiving cavity for receiving the regulating motor; each side of the second support is provided with a connecting end, each connecting end is fixedly connected with one of the first supports, or the second support is molded integrally with one of the first supports, and the second support is fixedly connected to the other one of the first supports.

3. The intelligent neck massager according to claim 2, wherein:

each of the first supports is strip-shaped and has a second receiving cavity communicating with the first receiving cavity, one end of the second receiving

cavity is provided with a second synchronomesh gear, one end of the synchronous belt is sheathed on the first synchronomesh gear, and the other end of the synchronous belt is sheathed on the second synchronomesh gear; the second receiving cavity is further provided therein with a third synchronomesh gear, the third synchronomesh gear is arranged between the first synchronomesh gear and the second synchronomesh gear, an inclined angle formed by a line which connects the first synchronomesh gear with the third synchronomesh gear and a line which connects the second synchronomesh gear with the third synchronomesh gear is an obtuse angle, there are a plurality of pulleys arranged on an outer side of the synchronous belt for limiting the position of the synchronomesh belt; the massager motor and the gear box are positioned inside the second receiving cavity of the first support respectively, the second receiving cavity has a strip-shaped spacing slot formed on an inner sidewall of the second receiving cavity and passing through the inner sidewall, an output shaft of the gear box protrudes from the spacing groove, and the massage wheel set is mounted on one end of the output shaft of the gear box.

4. The intelligent neck massager according to claim 3, wherein:

there are three pulleys, wherein two of the three pulleys are placed adjacently to the regulating motor and are arranged oppositely on outer sides of the synchronomesh belt; the rest one of the three pulleys is mounted on an outer side of the synchronous belt and is opposite to the third synchronomesh gear.

5. The intelligent neck massager according to any one of claims 1-4, wherein:

each massager subassembly further comprises a gear subassembly, the gear subassembly comprises a first gear, and a second gear meshed with the first gear, the first gear is sheathed on one end of the output shaft of the massager motor, the second gear is sheathed on a middle portion of an output shaft of the gear box, the output shaft of the massager motor is perpendicular to the output shaft of the gear box.

6. The intelligent neck massager according to any one of claims 1-4, wherein:
each synchronous belt is provided with a limit switch configured for limiting the position of a basal ridge lock subassembly, the limit switch communicates with the control apparatus.

7. The intelligent neck massager according to claim 6, wherein:
the basal ridge lock subassembly comprises a lock block and a lock cover that are fixed on the lock block, the lock block has a horizontal lock tooth surface and a side plate arranged on one side of the lock tooth surface, the lock cover is fixed to the lock block, and the lock cover has a cover plate which is opposite to the lock tooth surface and is inclined outward, the synchronous belt passes through the room formed among the side plate, the lock tooth surface and the cover plate, the belt tooth of the synchronous belt is opposite to the lock tooth surface.

8. The intelligent neck massager according to any one of claims 1-4, wherein:
each massage wheel set comprises a holder having a hollowed third receiving cavity, a universal joint, a holder cover, an elastic element, and a plurality of massage wheels; the universal joint comprises a joint base and a universal ball rotatably connected with the joint base, the universal ball is embedded from the bottom of the third receiving cavity, the holder cover is sheathed on the holder at the top of the third receiving cavity, the universal ball is sheathed in the holder cover and then fixed inside the third receiving cavity, the elastic element is arranged between the universal joint base and the universal ball, there are at least two massage wheel sets mounted uniformly on an outside of the holder, each massage wheel set comprises a rotatable massage wheel and a plurality of massager touch points distributed uniformly around a circumference of the massage wheel.

9. The intelligent neck massager according to claim 8, wherein:
the holder cover comprises a cover plate and at least two fixture blocks arranged uniformly around the circumference of the cover plate, an inner surface of

each fixture block is sphere-shaped, each fixture block inserts into the third receiving cavity from above of the holder body, the third receiving cavity is provided with at least two fixture bases arranged uniformly around an inner cavity wall thereof, an inner surface of each fixture base is sphere-shaped, each fixture block get stuck by a corresponding fixture base, and an inner surface of each fixture block is fit with the sphere surface of the universal ball .

10. The intelligent neck massager according to claim 1, wherein:

each massage wheel set comprises a holder and three massage wheels, the holder is axially provided with a shaft hole configured for allowing the output shaft of the gear box to be inserted and fixed therein, there are three mounting holes defined uniformly along a radial direction of the holder and taking the shaft hole as the center; each massage wheel is fixed into a corresponding mounting hole by rotating a fastening piece.