Title: FOLDING TYPE ROLLER ASSEMBLY AND FOOTWEAR EQUIPPED WITH THEM

Abstract: The present invention provides a shoe having a folding roller assembly which is mounted in a receiving seat formed in an outsole of the shoe. The folding roller assembly includes a frame (310) which is mounted in the receiving seat, a swing case (320) which is rotatably coupled to the frame, a turning shaft (332) which is rotatably inserted into a cylindrical hole of the swing case (320), a yoke (331) which is coupled to an end of the turning shaft (332), and the roller (340) which is rotatably coupled to the yoke (331). The folding roller assembly further includes a first locking means which locks the swing case (320) and the yoke (331) to the frame (310) while the roller (340) is extended to the outside, and second locking means which locks and releases the swing case (320) to and from the frame (310).
Description

FOLDING TYPE ROLLER ASSEMBLY AND FOOTWEAR EQUIPPED WITH THEM

Technical Field

[1] The present invention relates, in general, to folding roller assemblies and, more particularly, to a folding roller assembly which has a simple structure and is resistant to impact, thus stably supporting a roller.

[2] Furthermore, the present invention relates to a shoe having a plurality of folding roller assemblies.

Background Art

[3] Generally, to roller-skate, users must have exchanged his/her shoes with separate roller skates or inline skates. There is inconvenience of carrying a separate roller skate or inline skate. In an effort to overcome the problems experienced with the separate roller skate or inline skate, a shoe with a folding roller assembly, which is used as a typical shoe in normal conditions and used as a roller skate or inline skate, as required, was proposed.

[4] FIG. 1 is a bottom perspective view showing a conventional shoe having folding roller assemblies. FIG. 2 is a sectional view schematically showing the operation of the folding roller assembly of FIG. 1. As shown in FIGS. 1 and 2, the conventional shoe includes two folding roller assemblies which are provided in receiving seats formed in an outsole of the shoe. Furthermore, the conventional shoe has a structure such that the rollers are extracted to the outside, as required.

[5] Each folding roller assembly 100 includes a frame 110 which is mounted in each of the receiving seats of the outsole of the shoe, and a swing case 120 which is coupled to the frame 110 and is rotatable outwards, with an inner space defined in the swing case 120. The folding roller assembly 100 further includes a locking means 130 which locks the swing case 120 to the frame 110 or releases the swing case 120 from the frame 110, and a first bevel gear 140 which is placed in the swing case 120 and rotatably coupled to the frame 110 so that the first bevel gear 140 is rotated along with the swing case 120. The folding roller assembly 100 further includes a support 150 which is rotatably disposed along a longitudinal axis of the swing case 120. The support 150 has a second bevel gear 151 which is provided at a first end of the support 150 and engages with the first bevel gear 140, and a yoke 152 which is provided at a second end of the support 150. The folding roller assembly 100 further includes a roller 160 which is rotatably coupled to the yoke 152 of the support 150.

[6] The operation of the conventional roller assembly 100 having the above-mentioned
construction will be explained herein below. First, to extract each roller 160, which has been seated in the receiving seat of the outsole, to the outside, a user releases the locking state of the locking means 130 and pulls the roller 160 outwards. Then, the swing case 120 is turned outwards, and the first bevel gear 140, which is provided in an end of the swing case 120, is rotated. Thereby, the second bevel gear 151, which engages with the first bevel gear 140, is also rotated. As a result, the roller 160, which is coupled to the yoke 152 of the support 150, is turned in a direction perpendicular to the outsole of the shoe. Thereby, the use of the roller 160 is allowed.

Conversely, to retract each roller 160 into the receiving seat of the outsole, the user pushes the swing case 120 towards the outsole. Then, the first bevel gear 140, which is provided in the end of the swing case 120, is rotated. Thereby, the second bevel gear 151, which engages with the first bevel gear 140, is also rotated. As a result, the roller 160, which is coupled to the yoke 152 of the support 150, is turned until being parallel with the outsole and, simultaneously, is retracted into the receiving seat of the outsole. When the roller 160 is completely retracted into the receiving seat, the swing case 120 is locked by the locking means 130, so that the roller 160 maintains the state of being stably seated in the receiving seat.

However, in the conventional folding roller assembly, the support, to which impact is directly transferred, is merely connected to the swing case through the bevel gears without being stably supported. That is, the support is indirectly supported on the swing case by the locking means. Therefore, the conventional folding roller assembly has a disadvantage of structural weakness.

Furthermore, because the conventional folding roller assembly uses the bevel gears as a means for turning the roller in a direction perpendicular to or parallel with the outsole, its structure is complicated and, as well, there is a difficult in assembling the folding roller assembly.

Moreover, in the conventional folding roller assembly, a large torsional force due to the weight of the user and the turning motion of the roller is directly transferred to the support, the bevel gears and a connection part of the swing case. Accordingly, there is a probability of damage to the bevel gears and the connection part of the swing case.

FIG. 3 is an exploded perspective view showing another conventional folding roller assembly. As shown in FIG. 3, the folding roller assembly 200 includes a frame 210 which is mounted in a receiving seat of an outsole of a shoe, a swing case 220 which is rotatably coupled to the frame 210 and is elastically biased outwards, and a yoke 230 which is rotatably coupled to the swing case 220. The yoke 230 has a second gear 231 which is provided on an outer surface of a proximal end of the yoke 230 and engages with a first gear 211, which is provided at a predetermined position on the frame 210. The folding roller assembly 200 further includes a roller (not shown) which is rotatably
coupled to the yoke 230, and a first locking means 240 which is removably inserted into first guide grooves 221, which are formed on sidewalls of the swing case 220, or into a second guide groove 232, which is formed at a predetermined position on the yoke 230, so that the first locking means 240 locks the roller or releases the roller such that the roller can be turned. The folding roller assembly 200 further includes a second locking means 250 which locks the swing case 220 to the frame 210 or releases the swing case 220 from the frame 210 such that the swing case 220 is rotatable with respect to the frame 210.

The operation of the folding roller assembly 200 having the above-mentioned construction will be explained herein below. First, to extract the roller, which has been placed in the receiving seat of the outsole, to the outside, a user releases the locking state of the second locking means 250. Then, the swing case 220 is turned outwards by elasticity of a spring. Simultaneously, the second gear 231 of the yoke 230 is rotated along the first gear 211 of the frame 210. Thus, the roller, which is coupled to the yoke 230, is turned in a direction perpendicular to the outsole. At this time, the first locking means 240 is inserted into the second guide groove 232 of the yoke 230. Thereby, the use of the roller is allowed.

Conversely, to retract the roller into the receiving seat of the outsole, the user pulls the first locking means 240 towards the first guide grooves 221 of the swing case 220 so as to release the locking state of the first locking means 240 which has been inserted in the second guide groove 232 of the yoke 230. Thereafter, the user pushes the first locking means 240 towards the outsole. Then, the second gear 231 of the yoke 230 is rotated along the first gear 211 of the frame 210 so that the roller, which is coupled to the yoke 230, is turned in a direction parallel with the outsole. Thus, the roller is stably seated into the receiving seat of the outsole. As such, when the roller is completely retracted into the receiving seat, the swing case 220 is locked by the second locking means 250, so that the roller maintains the state of being stably placed in the receiving seat.

However, in this folding roller assembly, the yoke, to which impact is directly transferred, is merely connected to the swing case without being stably supported. That is, the yoke is indirectly supported on the swing case by the first locking means. Therefore, the folding roller assembly has a disadvantage of structural weakness.

Furthermore, because the folding roller assembly uses the gears as a means for turning the roller in a direction perpendicular to or parallel with the outsole, its structure is complicated and, as well, there is a difficulty in assembling the folding roller assembly.

Moreover, in the conventional folding roller assembly, only the locking means, which is inserted into the guide grooves, supports a large torsional force that occurs
due to the weight of the user and the turning motion of the roller. Accordingly, there is a probability of damage to the gears as well as the related elements.

**Disclosure of Invention**

**Technical Problem**

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a folding roller assembly which is mounted in a receiving seat formed in an outsole of a shoe such that a roller is extracted to the outside and retracted into the receiving seat.

Another object of the present invention is to provide a shoe having a plurality of folding roller assemblies.

**Technical Solution**

In order to accomplish the above object(s), the present invention provides a folding roller assembly, which is provided in a receiving seat formed under an outsole of a shoe such that a roller is retracted into the roller seat and is extended to an outside. The folding roller assembly includes: a frame mounted in the receiving seat; a swing case rotatably coupled at an end thereof to the frame, with a cylindrical hole formed through the swing case; a turning shaft rotatably inserted into the cylindrical hole of the swing case; a yoke coupled to an end of the turning shaft; a roller rotatably coupled to the yoke; a first locking means locking the swing case and the yoke to the frame while the roller is extracted to the outside; and a second locking means locking the first locking means and the swing case to the frame or releasing the first locking means and the swing case from the frame such that the first locking means and the swing case are rotatable with respect to the frame.

The folding roller assembly may further include a turning force generating means provided in the turning shaft, the turning force generating means being coupled at a first end thereof to the turning shaft and coupled at a second end thereof to the swing case, thus providing a turning force to the turning shaft.

The turning force generating means may comprise a spring, opposite ends of which are fixed in a state in which a turning force is previously applied to the spring, so that, when the roller is retracted into the receiving seat in parallel, the turning force is stored, and, when the roller is extended to the outside, the roller is turned by the turning force to a perpendicular state thereof.

The folding roller assembly may further include a turning range limiting means provided both on an end of the swing case and on a circumferential outer surface of an end of the yoke so as to limit a turning range of the turning shaft with respect to the swing case.

The turning range limiting means may include a guide groove formed on the cir-
cumferential outer surface of the end of the yoke, and a stop protrusion provided on the
end of the swing case and placed in the guide groove of the yoke, so that the yoke is
turned under a guide of the stop protrusion of the swing case, and the turning motion of
the yoke is limited by opposite stop walls of the guide groove of the yoke.

[24] The first locking means may include: a locking slider fitted over both a part of the
swing case and a circumferential outer surface of an end of the yoke and coupled to the
swing case such that the locking slider is elastically biased towards the yoke and is
movable with respect to the swing case within a predetermined range, with locking
slots provided on sidewalls of the locking slider; and a pair of locking pins provided on
inner surfaces of sidewalls of the frame, so that, when the roller is extracted to the
outside, the locking pins are inserted into the locking slots of the locking slider, thus
locking the swing case and the yoke to the frame.

Advantageous Effects

[25] In the present invention, because a turning shaft is inserted into a cylindrical hole of
a swing case and is rotatably supported by the swing case, structural stability is
ensured.

[26] Furthermore, a locking slider simultaneously holds both a part of the swing case
and a part of a yoke, and a pair of locking pins provided on the frame is inserted into
locking grooves formed in sidewalls of the locking slider. Therefore, even though a
large torsional force due to the weight of the user and the turning motion of the roller is
applied to the folding roller assembly, the roller is stably supported.

[27] Moreover, the present invention has a simple structure in which the roller is turned
only by the elasticity of the spring. As well, the present invention is resistant to impact,
thus ensuring the stability.

Brief Description of the Drawings

[28] FIG. 1 is a bottom perspective view showing a conventional shoe having folding
roller assemblies;

[29] FIG. 2 is a sectional view schematically showing the operation of the folding roller
assembly of FIG. 1;

[30] FIG. 3 is an exploded perspective view showing another conventional folding roller
assembly;

[31] FIG. 4 is an exploded perspective view of a folding roller assembly, according to an
embodiment of the present invention;

[32] FIG. 5 is a perspective view showing the assembled folding roller assembly of FIG.
4;

[33] FIG. 6 is a bottom perspective view showing a shoe to which two folding roller
assemblies of FIG. 4 are mounted;
FIG. 7 is a side sectional view showing the folding roller assemblies of FIG. 6 which are extended to the outside;

FIG. 8 is a bottom view showing the folding roller assembly of FIG. 7 which is retracted into an outsole of the shoe; and

FIG. 9 is a front view of the folding roller assembly of FIG. 7.

**Best Mode for Carrying Out the Invention**

Hereinafter, a folding roller assembly and a shoe having the same according to an embodiment of the present invention will be described in detail with reference to the attached drawings.

FIG. 4 is an exploded perspective view of the folding roller assembly, according to the embodiment of the present invention. FIG. 5 is a perspective view showing the assembled folding roller assembly of FIG. 4.

As shown in FIGS. 4 and 5, the folding roller assembly 300 according to the embodiment of the present invention includes a frame 310 which is mounted in a receiving seat of an outsole of a shoe, and a swing case 320 which is rotatably coupled at a first end thereof to the frame 310 and is elastically biased outwards. The folding roller assembly 300 further includes a support 330 which is rotatably disposed along a longitudinal axis of the swing case 320 and is rotatably supported at a first end thereof by the swing case 320, with a yoke 331 coupled to a second end of the support 330. The folding roller assembly 300 further includes a roller 340 which is rotatably coupled to the yoke 331, and a turning force generating means which is provided in the support 330. The turning force generating means is coupled at a first end thereof to the support 330 and coupled at a second end thereof to the swing case 320, thus providing a turning force to the support 330. The folding roller assembly 300 further includes a turning range limiting means which limits a turning range of the support 330 with respect to the swing case 320. The folding roller assembly 300 further includes a first locking means which stably locks the swing case 320 and the yoke 331 to the frame 310 when the yoke 331 is swung to a position at which the roller 340 is completely extracted to the outside, and a second locking means which locks the first locking means to the frame 310 or releases the first locking means from the frame 310 such that the first locking means is rotatable with respect to the frame 310.

In this embodiment, the frame 310 has a bottom surface, and opposite sidewalls which are perpendicular to the bottom surface, thus defining a space having a predetermined size. A plurality of fastening holes is formed through the bottom surface of the frame 310, so that the frame 310 is fastened to the outsole of the shoe through the fastening holes.

The swing case 320 has a hexahedron shape through which a cylindrical hole is
formed. The cylindrical hole comprises a stepped hole having two different diameters. The swing case 320 is rotatably coupled to the sidewalls of the frame 310 and is elastically biased outwards by a spring 321. In detail, the swing case 320 is locked by the second locking means while being placed in the space defined by the frame 310. Furthermore, the swing case 320 is elastically rotated outwards when being released from the second locking means.

The swing case 320 has an elongated hole 322 which is formed through each of sidewalls of the swing case 320. The elongated holes 322 serves to limit a motion range of a locking slider 360 which will be described later herein. A plurality of first guide grooves 323, which guide the first locking means, is formed on each of outer surfaces of upper and lower walls of the swing case 320.

The support 330 includes a turning shaft 332 which is rotatably inserted into the cylindrical hole of the swing case 320 such that an end of the turning shaft 332 protrudes from the first end of the swing case 320 to a predetermined length. The support 330 further includes a retainer ring 333 which supports the protruded end of the turning shaft 332 such that the turning shaft 332 is rotatable with respect to the swing case 320, and the yoke 331 which is integrally coupled to the turning shaft 332. The roller 340 is rotatably coupled to the yoke 331. Here, an insertion hole is formed in the end of the turning shaft 332, which is opposite to the yoke 331, along a longitudinal axis of the turning shaft 332 to a predetermined depth. A through hole is formed from an end of the insertion hole to an outer surface of the turning shaft 332. The turning force generating means is inserted into the insertion hole of the turning shaft 332. The through hole of the turning shaft 332 is used for fastening the first end of the turning force generating means to the turning shaft 332. A proximal end of the yoke 331 which is coupled to the turning shaft 332 has the same shape and size as those of a circumferential outline of the swing case 320, so that the first locking means can be fitted over the proximal end of the yoke 331.

In this embodiment, the turning force generating means comprises a spring 350 which is inserted into the insertion hole of the turning shaft 332. Opposite ends of the spring 350 are fixed in a state in which a turning force is previously applied to the spring 350. That is, when the swing case 320 is placed in the space defined by the frame 310 and is locked by the second locking means, the spring 350 stores a turning force. When the swing case 320 is released from the second locking means, the turning shaft 332 is turned by the turning force of the spring 350. Such spring 350 is fixed at a first end thereof by a first locking pin (not shown) which is inserted in the through hole of the turning shaft 332. A second end of the spring 350 protrudes to the outside from the insertion hole of the turning shaft 332 and is fixed to a second end of the swing case 320 by a second locking pin 351.
Meanwhile, the turning range limiting means includes a second guide groove 334 which is formed on the circumferential outer surface of the proximal end of the yoke 331, and a stop protrusion 324 which is provided on the second end of the swing case 320 and placed in the second guide groove 334 of the yoke 331. Thus, the turning motion of the yoke 331 is executed under a guide of the stop protrusion 324 of the swing case 320, and is stopped when the stop protrusion 324 of the swing case 320 comes into contact with one of opposite stop walls of the guide groove 334 of the yoke 331. Preferably, the second guide groove 334 has a structure such that, when the roller 340 is in a state of being parallel or perpendicular to the outsole of the shoe, the swing case 320 cannot be rotated any more. Furthermore, it is preferable that the second guide groove 334 has a rounded shape for ensuring a smooth guide of the stop protrusion 324 of the swing case 320.

The first locking means includes the locking slider 360 which is fitted over both a part of the swing case 320 and the proximal end of the yoke 331. The locking slider 360 is coupled to the swing case 320 such that the locking slider 360 is elastically biased towards the yoke 331 and is movable with respect to the swing case 320 within a predetermined range. Two guide protrusions 361 are provided on inner surfaces of opposite sidewalls of the locking slider 360. Two locking slots 362 are provided on outer surfaces of the sidewalls of the locking slider 360. The first locking means further includes a pair of third locking pins 311 which are provided on inner surfaces of sidewalls of the frame 310, so that, when the roller 340 is extracted to the outside, the third locking pins 311 are inserted into the locking slots 362 of the locking slider 360, thus locking both the swing case 320 and the yoke 331 to the frame 310.

The locking slots 362 of the locking slider 360 are formed in protrusions 363 which are provided on the outer surface of the sidewalls of the locking slider 360. Each locking slot 362 is defined by opening a side of each protrusion 363 and closing an opposite side. Each protrusion 363 has upper and lower parts which have different lengths such that the third locking pins 311 of the frame 310 are smoothly inserted into and removed from the locking slots 362 of the locking slider 360. Thus, if a force is applied to the locking slider 360 in a direction opposite to the yoke 331, the third locking pins 311 are removed from the locking slots 362. In the above state, if the locking slider 360 is released, the third locking pins 311 are inserted into the locking slots 362 of the locking slider 360 by the elasticity of the spring 364. In the embodiment, when the third locking pins 311 are inserted in the locking slots 362 of the locking slider 360, the locking slider 360 simultaneously surrounds both the second end of the swing case 320 and the proximal end of the yoke 331, thus locking them together.

The spring 364 is inserted into the stepped longitudinal hole of the swing case 320
and is supported by a support ring 365. The guide protrusions 361, which are provided on the inner surface of the locking slider 360, are inserted into the elongated holes 322 of the swing case 320 while the locking slider 360 is fitted over the swing case 320, so that the locking slider 360 is connected to the spring 364. That is, the spring 364 is coupled to the guide protrusions 361 of the locking slider 360, thus compressing the locking slider 360 towards the yoke 331. Preferably, the locking slider 360 has an uneven upper surface. Thus, it is more convenient for a user when the user pulls the locking slider 360 in a direction opposite to the yoke 331 or pushes it towards the outsole of the shoe.

Meanwhile, the second locking means includes two through holes 312 which are formed through each sidewall of the frame 310, and a stopper 371 which is inserted into one through hole 312 of the first sidewall of the frame 310 and reaches the through hole 312 of the second sidewall of the frame 310. A clamp 372 is provided on a first end of the stopper 371 so that the clamp 372 is inserted into the remaining through hole 312 of the first sidewall of the frame 310 and protrudes to a predetermined length towards the space defined by the frame 310. The second locking means further includes a lever 373 which is coupled to a second end of the stopper 371 which reaches the through hole 312 of the second sidewall of the frame 310, and a spring 374 which is fitted over an outer surface of the lever 373 so as to provide elasticity to the stopper 371 such that the clamp 372 of the stopper 371 maintains its state of being inserted in the through hole 312 of the first sidewall of the frame 310. The second locking means further includes a passing groove (not shown) which is formed under a lower surface of the locking slider 360 to allow the stopper 371 to reach the second sidewall of the frame 310 through the passing groove of the locking slider 360.

The clamp 372 of the stopper 371 is hooked to a lower part of the locking slider 360 such that the swing case 320 cannot be rotated while the roller 340 is retracted in the receiving seat of the outsole. When the lever 373 is pushed, the clamp 372 releases the swing case 320. Therefore, an end of the clamp 372 preferably has an inclined surface for ensuring smooth locking and unlocking motions. Alternatively, the clamp 372 may be hooked to a lower part of the swing case 320 so as to maintain the locked state of the swing case 320. Of course, even in this case, when the lever 373 is pushed, the swing case 320 is released from the clamp 372. As a further alternative, the second locking means may have a structure such that the swing case 320 is released from the clamp 372 by pulling the lever 373 rather than pushing it.

In the embodiment, a pair of protrusion bars 313 may be provided on ends of the sidewalls of the frame 310. The protrusion bars 313 serve to guide the locking slider 360 such that the locking slider 360 rotates more smoothly. As well, the protrusion bars 313 serve to stably support the locking slider 360 when the roller 340 is
completely extracted to the outside. Furthermore, a guide tip 335 may be provided at a predetermined position on the yoke 331 so that the guide tip 335 comes into contact with the protrusion bar 313, thus ensuring a smooth rotation of the support 330.

[52] Hereinafter, a shoe with folding roller assemblies having the above-mentioned structure according to the present invention will be explained.

[53] FIG. 6 is a bottom perspective view showing the shoe to which two folding roller assemblies of FIG. 4 are mounted. FIG. 7 is a side sectional view showing the folding roller assemblies of FIG. 6 which are extended to the outside. FIG. 8 is a bottom view showing the folding roller assembly of FIG. 7 which is retracted into an outsole of the shoe. FIG. 9 is a front view of the folding roller assembly shown in FIG. 7.

[54] As shown in FIGS. 6 through 9, the folding roller assembly 300 is mounted in each of receiving seats which are formed at front and rear positions in the outsole of the shoe. Here, support frames (F) are provided in the receiving seats of the shoe so as to firmly support the pair of folding roller assemblies, which are spaced apart from each other by a predetermined distance. Furthermore, an opening is formed at a predetermined position in each frame (F) so that the lever 373 of the folding roller assembly 300 is exposed through the opening to the outside.

[55] The folding roller assemblies 300 are mounted to the support frames (F) in a line such that the levers 373 are exposed to the outside both through the openings of the frames (F) and through a sidewall of the outsole of the shoe. Unlike the above-mentioned embodiment, a plurality of folding roller assemblies 300 may be disposed in a line.

[56] The usage of the shoe having the folding roller assembly according to the present invention will be explained.

[57] To extend each roller 340, which has been in the receiving seat of the outsole of the shoe, to the outside, the user releases the locking state of the second locking means. In other words, the user pushes the lever 373, which is exposed through the sidewall of the outsole, so that the locking slider 360, which has been in the locked state thereof due to the clamp 373 of the stopper 371, is released. Then, the swing case 320 is rotated outwards by the elasticity of the spring 321. Simultaneously, the turning shaft 332 and the yoke 331 are turned by the turning force of the spring 350 which is provided in the turning shaft 332, so that the roller 340 becomes perpendicular to the outsole. At this time, the second guide groove 334 of the yoke 331 moves under a guide of the stop protrusion 324 of the swing case 320 while the turning shaft 332 is turned. When the stop protrusion 324 comes into contact with the stop wall of the second guide groove 334, the turning shaft 332 is not turned any more. Thus, the roller 340 is positioned perpendicular to the outsole.

[58] As such, when the roller 340 is perpendicular to the outsole, the locking slider 360
is moved towards the yoke 331 by the elasticity of the spring 364, so that the third locking pins 311 of the frame 310 are inserted into the locking slots 362 of the locking slider 360. At this time, both the first end of the swing case 320 and the proximal end of the yoke 331 are simultaneously fastened by the locking slider 360. As such, when the swing case 320 and the yoke 331 are stably fastened to the frame 310 by the first locking means, the user is allowed to roller-skate using the shoe.

Conversely, to retract each roller 340 into the receiving seat of the outsole of the shoe, the user pulls the locking slider 360 in a direction opposite to the yoke 331. Then, the third locking pins 311 of the frame 310 are removed from the locking slots 362 of the locking slider 360. Furthermore, the yoke 331 is released from the locking slider 360. In this state, the user pushes the locking slider 360 towards the outsole of the shoe, so that the turning shaft 332 and the yoke 331 are turned in a direction parallel to the outsole. Thereby, a turning force is stored in the spring 350 which is provided in the turning shaft 332. Continuously, when the roller 340 is completely retracted into the receiving seat, the clamp 372 of the stopper 371 is hooked to the locking slider 360, thus bringing the roller 340 into the locked state. At this time, the stopper 371, which passes through the sidewalls of the frame 310, is inserted into the insert groove formed under the lower surface of the locking slider 360. As such, the locked state of the roller 340 is not released, so long as the lever 373, which protrudes from the sidewall of the outsole, is not pushed. As a result, the roller 340 is stably seated in the receiving seat of the outsole.
Claims

[1] A folding roller assembly, which is provided in a receiving seat formed under an outsole of a shoe such that a roller is retracted into the roller seat and is extended to an outside, the folding roller assembly comprising:
   a frame mounted in the receiving seat;
   a swing case rotatably coupled at an end thereof to the frame, with a cylindrical hole formed through the swing case;
   a turning shaft rotatably inserted into the cylindrical hole of the swing case;
   a yoke coupled to an end of the turning shaft;
   a roller rotatably coupled to the yoke;
   first locking means locking the swing case and the yoke to the frame while the roller is extracted to the outside; and
   second locking means locking the first locking means and the swing case to the frame or releasing the first locking means and the swing case from the frame such that the first locking means and the swing case are rotatable with respect to the frame.

[2] The folding roller assembly according to claim 1, further comprising:
   turning force generating means provided in the turning shaft, the turning force generating means being coupled at a first end thereof to the turning shaft and coupled at a second end thereof to the swing case, thus providing a turning force to the turning shaft.

[3] The folding roller assembly according to claim 2, wherein the turning force generating means comprises a spring, opposite ends of which are fixed in a state in which a turning force is previously applied to the spring, so that, when the roller is retracted into the receiving seat in parallel, the turning force is stored, and, when the roller is extended to the outside, the roller is turned by the turning force to a perpendicular state thereof.

[4] The folding roller assembly according to claim 1 or 2, further comprising:
   turning range limiting means provided both on an end of the swing case and on a circumferential outer surface of an end of the yoke so as to limit a turning range of the turning shaft with respect to the swing case.

[5] The folding roller assembly according to claim 4, wherein the turning range limiting means comprises a guide groove formed on the circumferential outer surface of the end of the yoke, and a stop protrusion provided on the end of the swing case and placed in the guide groove of the yoke, so that the yoke is turned under a guide of the stop protrusion of the swing case, and the turning motion of the yoke is limited by opposite stop walls of the guide groove of the yoke.
The folding roller assembly according to claim 1 or 2, wherein the first locking means comprises: a locking slider fitted over both a part of the swing case and a circumferential outer surface of an end of the yoke and coupled to the swing case such that the locking slider is elastically biased towards the yoke and is movable with respect to the swing case within a predetermined range, with locking slots provided on sidewalls of the locking slider; and a pair of locking pins provided on inner surfaces of sidewalls of the frame, so that, when the roller is extracted to the outside, the locking pins are inserted into the locking slots of the locking slider, thus locking the swing case and the yoke to the frame.

A shoe comprising a plurality of folding roller assemblies, which are provided in receiving seats formed under an outsole of the shoe such that rollers are extracted to an outside and are retracted into the roller seats, wherein each of the folding roller assemblies comprises:

- a frame mounted in the receiving seat;
- a swing case rotatably coupled at an end thereof to the frame, with a cylindrical hole formed through the swing case;
- a turning shaft rotatably inserted into the cylindrical hole of the swing case;
- a yoke coupled to an end of the turning shaft;
- a roller rotatably coupled to the yoke;
- first locking means locking the swing case and the yoke to the frame while the roller is extended to the outside; and
- second locking means locking the first locking means and the swing case to the frame or releasing the first locking means and the swing case from the frame such that the first locking means and the swing case are rotatable with respect to the frame.

The shoe according to claim 7, wherein each of the folding roller assemblies further comprises:

turning force generating means provided in the turning shaft, the turning force generating means being coupled at a first end thereof to the turning shaft and coupled at a second end thereof to the swing case, thus providing a turning force to the turning shaft.

The shoe according to claim 8, wherein the turning force generating means of each of the folding roller assemblies comprises a spring, opposite ends of which are fixed in a state in which a turning force is previously applied to the spring, so that, when the roller is retracted into the receiving seat in parallel, the turning force is stored, and, when the roller is extended to the outside, the roller is turned by the turning force to a perpendicular state thereof.

The shoe according to claim 7 or 8, wherein each of the folding roller assemblies
further comprises:

turning range limiting means provided both on an end of the swing case and on a circumferential outer surface of an end of the yoke so as to limit a turning range of the turning shaft with respect to the swing case.

[11] The shoe according to claim 10, wherein the turning range limiting means of each of the folding roller assemblies comprises a guide groove formed on the circumferential outer surface of the end of the yoke, and a stop protrusion provided on the end of the swing case and placed in the guide groove of the yoke, so that the yoke is turned under a guide of the stop protrusion of the swing case, and the turning motion of the yoke is limited by opposite stop walls of the guide groove of the yoke.

[12] The shoe according to claim 7 or 8, wherein the first locking means of each of the folding roller assemblies comprises: a locking slider fitted over both a part of the swing case and a circumferential outer surface of an end of the yoke and coupled to the swing case such that the locking slider is elastically biased towards the yoke and is movable with respect to the swing case within a predetermined range, with locking slots provided on sidewalls of the locking slider; and a pair of locking pins provided on inner surfaces of sidewalls of the frame, so that, when the roller is extracted to the outside, the locking pins are inserted into the locking slots of the locking slider, thus locking the swing case and the yoke to the frame.
INTERNATIONAL SEARCH REPORT

INTERNATIONAL APPLICATION NO.
PCT/KR2005/001495

A. CLASSIFICATION OF SUBJECT MATTER

A63C 17/20(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 A63C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DLEPHION & KIPONET, "ROLLER" & "FOLD"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td>A</td>
<td>US 6,120,039 A (Fred Clementi) 19 Sep 2000 see the column 4 row 15 ~ column 6 row 10 and fig 1 ~ fig6</td>
<td>1 ~ 12</td>
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<tr>
<td>A</td>
<td>US 6,042,125 A (Elbert Hsin En Wu) 28 Mar 2000 see the abstract and figs</td>
<td>1 ~ 12</td>
</tr>
<tr>
<td>A</td>
<td>US 6,536,785 A (Billy Lee) 25 Mar 2003 see the abstract and figs</td>
<td>1 ~ 12</td>
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<tr>
<td>A</td>
<td>US 6,364,322 A (Billy Lee) 2 Apr 2002 see the abstract and figs</td>
<td>1 ~ 12</td>
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</table>

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

16 JANUARY 2006 (16.01.2006)

Date of mailing of the international search report

16 JANUARY 2006 (16.01.2006)

Name and mailing address of the ISA/KR

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Facsimile No. 82-42-472-7140

Authorized officer

HAM, Jong Hyun

Telephone No. 82-42-481-5458
<table>
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<th>Patent family member(s)</th>
<th>Publication date</th>
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<tr>
<td></td>
<td></td>
<td>EP 1121182</td>
<td>2001. 8.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 112277</td>
<td>2001. 2.22</td>
</tr>
<tr>
<td>US 6,042,125</td>
<td>2000. 3.28</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>US 6,536,785</td>
<td>2003. 3.25</td>
<td>NONE</td>
<td>NONE</td>
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<tr>
<td>US 6,364,322</td>
<td>2002. 4.2</td>
<td>NONE</td>
<td>NONE</td>
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