Abstract: Disclosed herein is a lace fastening device is easy to use and simple in structure since a fastening member is fastened to the inside of a receiving member the moment a control member is rotated and restored to its original location and the fastened state of the fastening member is released when a user rotates the control member to separate the fastening member from a magnetic body. An end portion of a lace is inserted into a fixing member and stackingly fastened inside the fixing member. The lace fastening device can stably fasten the lace to a footwear since a tightly fastened state of the lace can be kept while the upper end portion of the laminated lace pressurizes the lower end portion of the lace, thereby improving productivity.
DEVICE FOR TYING SHOELACES

[Technical Field]

The present invention relates to a footwear, and more particularly, to such a lace fastening device, which is easy to mount and detach and simple in structure since a control member rotated while a fastening member is fastened to the inside of a receiving member is restored by a magnetic body, and which can keep a stable fastened state since the upper end portion of a lace fastened to a second fastening part pressurizes the lower end portion of the lace.

[Background Art]

In general, a footwear is one of life goods used in daily life, and recently, their use has been greatly increased due to an increase of people's social activities or leisure time period owing to five working days per week. Such footwears have various kinds according to their use purposes, but people can wear most of footwears using laces without regard to their use purposes.

The footwear 10 includes a body 11 having a receiving space 12 for receiving and protecting a user's foot, a protective cover 13 located on an opened instep portion of the body 11 for protecting the top of the user's foot, and connection links 14 oppositely arranged on both sides of the instep portion of the body 11 at regular intervals and fixed to the footwear 10 via fixing members 15, whereby a lace (L) is cross-fastened to the footwear.

However, the conventional footwear as constructed above has several problems in that it is complicated and takes much time to wear and unwear the footwear since the user has to tightly pull the laces after untying and slackening the laces.
to wear the footwear, and in that the laces may be loosened while the user walks, and in that the outward appearance is not good since knots of the laces are complex when the laces are tied.

[Disclosure]

[Technical Problem]

Accordingly, the present invention has been made in an effort to solve the above-mentioned problems occurring in the prior arts, and it is an object of the present invention to provide a lace fastening device, which is easy to use and simple in structure since a fastening member is released from a fastened state while a control member is separated from a magnetic body since the magnetic body is mounted inside a receiving member, and which can keep a stable fastened state of a lace since the upper end portion of the lace fastened to a second fastening part pressurizes the lower end portion of the lace.

[Technical Solution]

To achieve the above objects, the present invention provides a lace fastening device for a footwear worn on a user in such a manner that a lace is cross-fastened to connection links oppositely formed on an instep portion of the footwear at regular intervals, comprising: a first fastening part fastened between the connection links to which the lace is connected and having a fastening member fastened to the inside of a receiving member while rotating and restoring a control member, the first fastening part releasing the fastened state of the fastening member while rotating the control member to separate it from a magnetic body; and a second fastening part to which an end portion of the lace passing the final connection link of the footwear is
fit to and stackingly connected to the inside of a fixing member, so that the second fastening part can keep a tightly fastened state of the lace while the upper end portion of the stackingly connected lace pressurizes the lower end portion of the lace.

[Advantageous Effects]

The lace fastening device according to the present invention is easy to mount and detach and simple in structure since a control member rotated while a fastening member is fastened to the inside of a receiving member is restored by a magnetic body, thereby reducing the manufacturing cost. Moreover, the lace fastening device can rapidly fasten the lace to the shoe and keep a stable fastened state since the upper end portion of the lace fastened to the second fastening part pressurizes the lower end portion of the lace, thereby improving productivity.

[Description of Drawings]

FIG. 1 is a perspective view of a conventional footwear.

FIG. 2 is a perspective view of a footwear to which a lace fastening device according to a first preferred embodiment of the present invention is applied.

FIG. 3 is an exploded perspective view of a first fastening part according to the present invention.

FIG. 4 is an assembled perspective view of the first fastening part.

FIG. 5 is a view showing a fastened state of the first fastening part, wherein

FIG. 5a illustrates a state where a fastening member is fit and fastened to a receiving member,

FIG. 5b illustrates a state where the fastening member is fastened to the receiving member,
FIG. 5c illustrates a state where a control lever is rotated to release the fastened state of the fastening member, and

FIG. 5d illustrates a state where the fastening member is separated from the receiving member in the rotated state of the control lever.

FIG. 6 is a bottom perspective view of a second fastening part according to the present invention.

FIG. 7 is a side view of the second fastening part.

FIG. 8 is a view showing a coupled state of the second fastening part, wherein

FIG. 8a illustrates a state where a lace is tightly tied on a fixing member, and

FIG. 8b illustrates a state where the tightly tied state of the lace is released by lifting up the lace.

FIG. 9 is an exploded perspective view of a second preferred embodiment of the present invention.

FIG. 10 is a sectional view of the second preferred embodiment.

FIG. 11 is a perspective view of a footwear to which the second preferred embodiment of the present invention is applied.

[Mode for Invention]

Reference will be now made in detail to the preferred embodiment of the present invention with reference to the attached drawings. FIG. 2 is a perspective view of a footwear to which a lace fastening device according to a first preferred embodiment of the present invention is applied, FIG. 3 is an exploded perspective view of a first fastening part according to the present invention, FIG. 4 is an assembled perspective view of the first fastening part, FIG. 5 is a
view showing a fastened state of the first fastening part,
FIG. 6 is a bottom perspective view of a second fastening
part according to the present invention, and FIG. 7 is a side
view of the second fastening part.

According to the present invention, there is provided a
lace fastening device for a footwear worn on a user in such a
manner that a lace \((L)\) is cross-fastened to connection links
14 oppositely formed on an instep portion of the footwear at
regular intervals, which includes: a first fastening part 100
fastened between the connection links 14 to which the lace
\((L)\) is connected and having a fastening member 130 fastened
to the inside of a receiving member 110 while rotating and
restoring a control member 120, the first fastening part 100
releasing the fastened state of the fastening member 130
while rotating the control member 120 to separate it from a
magnetic body 140; and a second fastening part 200 to which
an end portion of the lace \((L)\) passing the final connection
link 14 of the footwear 10 is fit to and stackingly connected
to the inside of a fixing member 210, so that the second
fastening part 200 can keep a tightly fastened state of the
lace while the upper end portion of the stackingly connected
lace \((L)\) pressurizes the lower end portion of the lace \((L)\).

The first fastening part 100 includes: the receiving
member 110 having a body 111 inwardly dented at both side
surfaces of the center thereof, the body 111 having a support
piece Ilia, which protrudes from a side thereof and has a
through-hole Ilia' to connect the lace \((L)\) thereto, a
receiving space 111b formed on the other side of the body 111
to fasten the fastening member 130, a mounting space 111c
opened at the bottom of the body 111 to mount the control
member thereon, and rotation holes 111d formed on both sides
of the mounting space 111c; the control member 120 made of a metal material, the control member 120 having a control board 121 mounted in the mounting space 111c, the control board 121 having rotary shafts 121a formed at both sides thereof and inserted into the rotation holes 111d, control levers 121b formed on both ends of the rotary shafts 121a to rotate the control board 121, and a control protrusion 121c protruding from the rear portion of the control board 121 to detachably mount the fastening member 130; the fastening member 130 fastened to the receiving space 111b and having a fastening plate 131, the fastening plate 131 having a plurality of fastening slots 131a to release the fastened state between the control member 120 and the fastening member 130 by an adjustment of the control protrusion 121c, support pieces 131b protruding from both sides of the rear portion of the fastening plate 131 and respectively having through-holes 131b' for fastening the lace (L) thereto; and the magnetic body 140 mounted on the upper surface of the lower end body 111 of the receiving space 111b to restore the control member 120, which repeatedly performs a rotation, while the fastening member 130 is fastened to the control member 120.

The second fastening part 200 includes: a fixing member 210 having a hollow formed therein and a fixing hole 211 to be fixed on the top of the instep of the footwear 10; a guide space 212 formed on a side of the fixing member 210 and having a movement preventing jaw 213 for preventing movement of the lace (L) fit to a side of the fixing member 210; and a guide rod 214 disposed on the lower end portion of the guide space 212 to guide the lace (L) to the guide space 212 while wrapping the lace (L).
Moreover, the lace fastening device according to the present invention further includes a third fastening part 300. The third fastening part 300 includes: a receiving member 310 having a body 311, which has a curved inner surface to be in close contact with the instep portion of the footwear 10 and has a coupling space 311a formed by an opened inside thereof, a fixing frame 312 fixed on the upper portion of the body 311 via a fixing screw 312a and having a spring 313 therein, a pressurizing piece 314 fit into the fixing frame 312 and having a semicircular section, a press piece 315 joined to an end of the pressurizing piece 314 through the body 311 for pressing the pressurizing piece 314, a release piece 316 rotatably mounted between the pressurizing piece 314 and the fixing frame 312, a plate spring 317 coupled to an end portion of the release piece 316 and operating elastically, and at least one connection link 318 formed at a side of the body to be connected with the lace (L); and a fastening member 320 inserted into the coupling space 311a and having a plurality of retaining protrusions 321 protruding in one direction to be fastened to the release piece 316 and at least one coupling link 322 formed at a side thereof to which the lace (L) is connected.

Next, a process that the lace (L) is fastened to the footwear 10 to which the present invention is applied will be described.

First, as shown in FIGS. 2 to 6, the lace (L) is cross-connected at least once between the connection links 14 oppositely arranged at both sides of the footwear 10, and ends of the lace (L) direct the top of the footwear 10.

The direction of the lace (L), the through-holes Ilia' of the receiving member 110 and the through-holes 131b' of
the fastening member 130 are located on the same line, and
then, the lace (L) is connected to the through-holes Ilia' and 131b' in a straight line.

In this instance, the receiving member 110 and the fastening member 130 of the first fastening part 100 keep a separated state.

In addition, after the lace (L) is directed toward the second fastening part 200 formed on the uppermost portion of the footwear 10, the front end of the lace (L) is inserted to the guide space 212, and more concretely, above the movement preventing jaw 213, and then, the inserted lace (L) is pushed to the lower end portion of the guide space 212 to be drawn outwardly from the fixing member 210.

The front end of the drawn lace (L) is turned on the guide rod 214, and then, fit into the guide space 212 below the movement preventing jaw 213 in such a way as to be closely positioned beneath the lace (L) fit into the guide space 212.

As described above, in a state where the lace (L) is inserted into the second fastening part 200, when the front end of the lace (L) located at the lower portion is pulled to the center of the footwear 10, the lace (L) is moved through the guide space 212. When the front end of the lace (L) is pulled down, since the upper end portion of the lace (L) downwardly pressurizes the lower end portion of the lace (L), the lace (L) can keep a tightly fastened state without being loosened from the second fastening part 200.

As described above, in a state where the lace (L) is fastened and fixed to the second fastening part 200, a user grasps the receiving member 110 and the fastening member 130,
and then, inserts the fastening member 130 into the receiving space 111b.

When the fastening member 130 is fastened to the receiving space 111b while passing the control protrusion 121c of the control member 120 made of the metal material, the control protrusion 121c of the control member 120 is rotated on the rotary shafts 121a by the fastening slots 131a of the fastening member 130, and at the same time, restored by a magnetic force of the magnetic body 140. The fastening member 130 is fastened to the receiving space 111b while repeating the above steps.

Here, the control member 120 may have the control board 121 entirely made of the metal material or partially made of the metal material, namely, only a portion closely contacting with the magnetic body 140 is made of the metal material.

Furthermore, to release the fastened state of the first fastening part 100, when the control levers 121b formed at both sides of the control member 120 are rotated on the rotary shafts 121a, the control board 121 is rotated on the rotary shafts 121a, so that the control protrusion 121c is released from the fastening slots 131a of the fastening member 130 and the control board 121 is separated from the magnetic body 140 simultaneously.

As described above, when the control member 120 is rotated, the fastening member 130 is outwardly separated from the receiving member 110. After the separation of the fastening member 130, when the rotation of the control levers 121b is removed, the control member 120 is restored to the original state by the magnetic force of the magnetic body 140.

Additionally, to release the fastened state of the lace (L) from the second fastening part 200, when the user grasps
the upper end portion of the lace (L) and pulls up it to the upper portion of the guide space 212, the pressurizing force pressurizing the lower end portion of the lace (L) is removed, so that the lace (L) can be relaxed since the lower end portion of the lace (L) can be freely moved.

Moreover, another preferred embodiment of the present invention will be described as follows.

First, as shown in FIG. 9 or 10, in a state where the receiving member 310 and the fastening member 320 are fastened with each other oppositely to the lace (L), the user grasps the receiving member 310 and the fastening member 320 with a hand, and then, inserts the fastening member 320 to the coupling space 311a of the receiving member 310.

In this instance, the retaining protrusion 321 of the fastening member 320 is in contact with the release piece 316 and fastened to the receiving member 310 while moving forward, and the release piece 316 supports the retaining protrusion 321 inclinably protruding in one direction while contacting with the retaining protrusion 321 by elasticity of the plate spring 317, so that the fastened state between the receiving member 310 and the fastening member 320 can be kept without release.

As described above, to take off the footwear 10 in a state where the third fastening part 300 is fastened to the footwear and the footwear is tightened, when the user grasps the receiving member 310 and presses the pressing piece 315 of the receiving member 310 downwardly, the pressurizing piece 314 having the semicircular section pressurizes a portion of the release piece 316, so that the release piece 316 is rotated toward the upper portion of the body 311 by
the pressurizing piece 314 and separated from the retaining protrusion 321, whereby the fastened state can be released.

After that, the user rotates the receiving member 310 and the fastening member 320 toward both sides of the footwear 10 to laterally relax the footwear 10, so that the user can rapidly and easily take off the footwear.

Since the third fastening part 300 can be reduced and increased in its size according to the number of the connection links 318 and 322 formed at both sides of the receiving member 310 and the fastening member 320, the lace fastening device according to the present invention can be applied to small footwears, which children wear, and to footwears having long ankle portions, such as mountain-climbing boots, military shoes, work shoes, and so on, and fasten the lace to the shoe while selectively controlling tightening and release,

[industrial Applicability]

As described above, the lace fastening device according to the present invention is easy to mount and detach and simple in structure since a control member rotated while a fastening member is fastened to the inside of a receiving member is restored by a magnetic body, thereby reducing the manufacturing cost. Moreover, the lace fastening device can rapidly fasten the lace to the shoe and keep a stable fastened state since the upper end portion of the lace fastened to the second fastening part pressurizes the lower end portion of the lace, thereby improving productivity.
[CLAIMS]

[Claim 1]

A lace fastening device for a footwear worn on a user in such a manner that a lace (L) is cross-fastened to connection links 14 oppositely formed on an instep portion of the footwear at regular intervals, comprising:

- a first fastening part 100 fastened between the connection links 14 to which the lace (L) is connected and having a fastening member 130 fastened to the inside of a receiving member 110 while rotating and restoring a control member 120, the first fastening part 100 releasing the fastened state of the fastening member 130 while rotating the control member 120 to separate it from a magnetic body 140; and

- a second fastening part 200 to which an end portion of the lace (L) passing the final connection link 14 of the footwear 10 is fit to and stackingly connected to the inside of a fixing member 210, so that the second fastening part 200 can keep a tightly fastened state of the lace while the upper end portion of the stackingly connected lace (L) pressurizes the lower end portion of the lace (L).

[Claim 2]

The lace fastening device according to claim 1, wherein the first fastening part 100 includes: the receiving member 110 having a body 111 inwardly dented at both side surfaces of the center thereof, the body 111 having a support piece Ilia, which protrudes from a side thereof and has a through-hole Ilia' to connect the lace (L) thereto, a receiving space 111b formed on the other side of the body to fasten the fastening member 130, a mounting space 111c opened at the bottom of the body 111 to mount the control member thereon,
and rotation holes 111d formed on both sides of the mounting space 111c; the control member 120 made of a metal material, the control member 120 having a control board 121 mounted in the mounting space 111c, the control board 121 having rotary shafts 121a formed at both sides thereof and inserted into the rotation holes 111d, control levers 121b formed on both ends of the rotary shafts 121a to rotate the control board 121, and a control protrusion 121c protruding from the rear portion of the control board 121 to detachably mount the fastening member 130; the fastening member 130 fastened to the receiving space 111b and having a fastening plate 131, the fastening plate 131 having a plurality of fastening slots 131a to release the fastened state between the control member 120 and the fastening member 130 by an adjustment of the control protrusion 121c, support pieces 131b protruding from both sides of the rear portion of the fastening plate 131 and respectively having through-holes 131b' for fastening the lace (L) thereto; and the magnetic body 140 mounted on the upper surface of the lower end body 111 of the receiving space 111b to restore the control member 120, which repeatedly performs a rotation, while the fastening member 130 is fastened to the control member 120.

[Claim 3]

The lace fastening device according to claim 1, wherein the second fastening part 200 includes: a fixing member 210 having a hollow formed therein and a fixing hole 211 to be fixed on the top of the instep of the footwear 10; a guide space 212 formed on a side of the fixing member 210 and having a movement preventing jaw 213 for preventing movement of the lace (L) fit to a side of the fixing member 210; and a guide rod 214 disposed on the lower end portion of the guide.
space 212 to guide the lace (L) to the guide space 212 while
surrounding the lace (L).

[Claim 4]
The lace fastening device according to claim 1, further
comprising a third fastening part 300 which includes: a
receiving member 310 having a body 311, which has a curved
inner surface to be in close contact with the instep portion
of the footwear 10 and has a coupling space 311a formed by an
opened inside thereof, a fixing frame 312 fixed on the upper
portion of the body 311 via a fixing screw 312a and having a
spring 313 therein, a pressurizing piece 314 fit into the
fixing frame 312 and having a semicircular section, a press
piece 315 joined to an end of the pressurizing piece 314
through the body 311 for pressing the pressurizing piece 314,
a release piece 316 rotatably mounted between the
pressurizing piece 314 and the fixing frame 312, a plate
spring 317 coupled to an end portion of the release piece 316
and operating elastically, and at least one connection link
318 formed at a side of the body to be connected with the
lace (L); and a fastening member 320 inserted into the
coupling space 311a and having a plurality of retaining
protrusions 321 protruding in one direction to be fastened to
the release piece 316 and at least one coupling link 322
formed at a side thereof to which the lace (L) is connected.
[Claim 1]

A lace fastening device for a footwear worn on a user in such a manner that a lace (L) is cross-fastened to connection links 14 oppositely formed on an instep portion of the footwear at regular intervals, comprising:

- a first fastening part 100 fastened between the connection links 14 to which the lace (L) is connected and having a fastening member 130 fastened to the inside of a receiving member 110 while rotating and restoring a control member 120, the first fastening part 100 releasing the fastened state of the fastening member 130 while rotating the control member 120 to separate it from a magnetic body 140; and

- a second fastening part 200 to which an end portion of the lace (L) passing the final connection link 14 of the footwear 10 is fit and stackingly connected to the inside of a fixing member 210, so that the second fastening part 200 can keep a tightly fastened state of the lace while the upper end portion of the stackingly connected lace (L) pressurizes the lower end portion of the lace (L).

[Claim 2]
The lace fastening device according to claim 1, wherein the first fastening part 100 includes: the receiving member 110 having a body 111 inwardly dented at both side surfaces of the center thereof, the body 111 having a support piece Ilia, which protrudes from a side thereof and has a through-hole Ilia' to connect the lace (L) thereto, a receiving
space 111b formed on the other side of the body to fasten the fastening member 130, a mounting space 111c opened at the bottom of the body 111 to mount the control member thereon, and rotation holes 111d formed on both sides of the mounting space 111c; the control member 120 made of a metal material, the control member 120 having a control board 121 mounted in the mounting space 111c, the control board 121 having rotary shafts 121a formed at both sides thereof and inserted into the rotation holes 111d, control levers 121b formed on both ends of the rotary shafts 121a to rotate the control board 121, and a control protrusion 121c protruding from the rear portion of the control board 121 to detachably mount the fastening member 130; the fastening member 130 fastened to the receiving space 111b and having a fastening plate 131, the fastening plate 131 having a plurality of fastening slots 131a to release the fastened state between the control member 120 and the fastening member 130 by an adjustment of the control protrusion 121c, support pieces 131b protruding from both sides of the rear portion of the fastening plate 131 and respectively having through-holes 131b' for fastening the lace (L) thereto; and the magnetic body 140 mounted on the upper surface of the lower end body 111 of the receiving space 111b to restore the control member 120, which repeatedly performs a rotation, while the fastening member 130 is fastened to the control member 120.

[claim 3]

The lace fastening device according to claim 1, wherein the second fastening part 200 includes: a fixing member 210
having a hollow formed therein and a fixing hole 211 to be fixed on the top of the instep of the footwear 10; a guide space 212 formed on a side of the fixing member 210 and having a movement preventing jaw 213 for preventing movement of the lace (L) fit to a side of the fixing member 210; and a guide rod 214 disposed on the lower end portion of the guide space 212 to guide the lace (L) to the guide space 212 while surrounding the lace (L).

[Claim 4]

The lace fastening device according to claim 1, further comprising a third fastening part 300 which includes: a receiving member 310 having a body 311, which has a curved inner surface to be in close contact with the instep portion of the footwear 10 and has a coupling space 311a formed by an opened inside thereof, a fixing frame 312 fixed on the upper portion of the body 311 via a fixing screw 312a and having a spring 313 therein, a pressurising piece 314 fit into the fixing frame 312 and having a semicircular section, a press piece 315 joined to an end of the pressurizing piece 314 through the body 311 for pressing the pressurizing piece 314, a release piece 316 rotatably mounted between the pressurizing piece 314 and the fixing frame 312, a plate spring 317 coupled to an end portion of the release piece 316 and operating elastically, and at least one connection link 318 formed at a side of the body to be connected with the lace (L); and a fastening member 320 inserted into the coupling space 311a and having a plurality of retaining protrusions 321 protruding in one direction to be fastened.
to the release piece 316 and at least one coupling link 322 formed at a side thereof to which the lace (L) is connected.

[Claim 5]

A lace fastening device for a footwear worn on a user in such a manner that a lace (L) is cross-fastened to connection links 14 oppositely formed on an instep portion of the footwear at regular intervals, comprising:

a fastening part 100 fastened between the connection links 14 to which the lace (L) is connected and having a fastening member 130 fastened to the inside of a receiving member 110 while rotating and restoring a control member 120, the first fastening part 100 releasing the fastened state of the fastening member 130 while rotating the control member 120 to separate it from a magnetic body 140.

[Claim 6]

The lace fastening device according to claim 5, wherein the fastening part 100 includes: the receiving member 110 having a body 111 inwardly dented at both side surfaces of the center thereof, the body 111 having a support piece Ilia, which protrudes from a side thereof and has a through-hole Ilia' to connect the lace (L) thereto, a receiving space 111b formed on the other side of the body to fasten the fastening member 130, a mounting space 111c opened at the bottom of the body 111 to mount the control member thereon, and rotation holes 111d formed on both sides of the mounting space 111c; the control member 120 made of a metal material, the control member 120 having a control board 121 mounted in the mounting space 111c, the control board 121 having rotary
shafts 121a formed at both sides thereof and inserted into the rotation holes llld, control levers 121b formed on both ends of the rotary shafts 121a to rotate the control board 121, and a control protrusion 121c protruding from the rear portion of the control board 121 to detachably mount the fastening member 130; the fastening member 130 fastened to the receiving space lllb and having a fastening plate 131, the fastening plate 131 having a plurality of fastening slots 131a to release the fastened state between the control member 120 and the fastening member 130 by an adjustment of the control protrusion I21σ, support pieces 131b protruding from both sides of the rear portion of the fastening plate 131 and respectively having through-holes 131b' for fastening the lace (L) thereto; and the magnetic body 140 mounted on the upper surface of the lower end body 111 of the receiving space lllb to restore the control member 120, which repeatedly performs a rotation, while the fastening member 130 is fastened to the control member 120.

[claim 7]

A lace fastening device for a footwear worn on a user in such a manner that a lace (L) is cross-fastened to connection links 14 oppositely formed on an instep portion of the footwear at regular intervals, comprising:

a fastening part 200 to which an end portion of the lace (L) passing the final connection link 14 of the footwear JO is fit and stackingly connected to the inside of a fixing member 210, so that the fastening part 200 can keep a tightly fastened state of the lace while the upper end
portion of the stackingly connected lace (L) pressurizes the lower end portion of the lace (L).

[Claim 8]

The lace fastening device according to claim 7, wherein the fastening part 200 includes: a fixing member 210 having a hollow formed therein and a fixing hole 211 to be fixed on the top of the instep of the loottwear 10; a guide space 212 formed on a side of the fixing member 210 and having a movement preventing jaw 213 for preventing movement of the lace (L) fit to a side of the fixing member 210; and a guide rod 214 disposed on the lower end portion of the guide space 212 to guide the lace (L) fo the guide space 212 while surrounding the lace (L).
Fig. 5a

Fig. 5b
Fig. 6
Fig. 7
Fig. 8a

Fig. 8b
Fig. 10
Fig. 11
INTERNATIONAL SEARCH REPORT

International application No

PCT/KR2007/002016

A. CLASSIFICATION OF SUBJECT MATTER

A43C II/14 (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 A43C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility Models since 1975
Japanese Utility Models and applications for Utility models since 1975

eKIPASS (KIPO internal)

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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<tr>
<td>A</td>
<td>KR 20-0409510 Y1 (WHANG, Jong-O) 24 Feb 2006 See the claim 1 to 4, figures</td>
<td>1 - 4</td>
</tr>
<tr>
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<td>A</td>
<td>KR 1995-0009223 Y1 (KWON, Young-Joon) 23 Oct 1995 See the figure 1</td>
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☐ Further documents are listed in the continuation of Box C  ☒ See patent family annex

* Special categories of cited documents
"A" document defining the general state of the art which is not considered to be of particular relevance
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"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search

17 AUGUST 2007 (17.08.2007)

Date of mailing of the international search report

17 AUGUST 2007 (17.08.2007)

Name and mailing address of the ISA/KR

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PARK, Sung Ho
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Form PCT/ISA/210 (second sheet) (April 2007)
<table>
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