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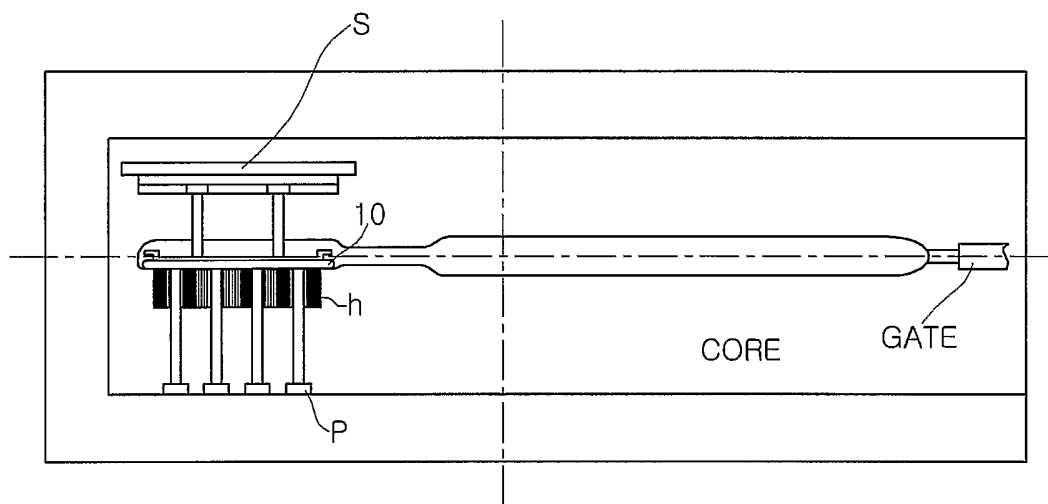
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(54) Title: MANUFACTURING METHOD OF TOOTHBRUSH



(57) Abstract: Disclosed is a method of manufacturing a toothbrush. The method includes implanting bristles (h) into a head insert 10 with a thickness of 1.5 - 3.0 mm, which has openings 11 formed therethrough and is made of a plastic, in such a way that portions of the bristles (h) protrude from a backside of the head insert 10 by 1 - 3 mm; melting the protruded portions of the bristles (h) by heating to fix the bristles (h) to the head insert 10; installing the head insert 10, to which the bristles (h) are fixed, in a mold for injection-molding handles in such a way that the bristles (h) are placed outside a cavity of the mold; and injection-molding a resin fed into the mold. Thereby, the bristles are fixed to the handle without using wires and time-efficient usage of a costly injection molding machine is maximized.

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MANUFACTURING METHOD OF TOOTHBRUSHTechnical Field

5 The present invention pertains, in general, to a method of manufacturing a toothbrush and, more particularly, to a method of manufacturing a toothbrush without using a wire, which assures improved workability.

Background Art

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 A conventional method of manufacturing a toothbrush includes molding a handle with a head having holes, implanting bristles, folded in two, into the holes, and inserting metal wires, which are slightly longer than the diameter of each hole and have elasticity, into the holes
15 to fix the bristles.

 However, the conventional method is problematic in that since the bristles are insecurely fixed into the holes, they are easily separated from the head, and that
20 impurities are easily caught in the holes formed in the head of the handle, which make the toothbrush unsanitary.

 To avoid the above problems, there is suggested a method as disclosed in Korean Pat. No. 360977, which includes implanting bristles into a mold, melting portions

of the bristles, inserted into a cavity of the mold, by heating, and injection-molding a handle of a toothbrush to unite the bristles with the handle.

5 According to the above patent, the bristles are strongly fixed to the handle, and it is not necessary to form holes on a head of the handle, thereby solving the problems as described above.

However, the above patent has the following disadvantages.

10 First, since the handle is injection-molded using a mold with an unchangeable shape, the shape of the handle cannot be easily changed. The shape of the handle is relatively sensitive to changes in consumer preference, and thus, the unchangeable shape of the handle is considered a serious problem. Even though molds with different shapes
15 may be installed in an injection molding machine to manufacture handles with different shapes, in such a case, different toothbrushes having handles with different shapes must be undesirably manufactured and sold in the same
20 quantity.

Second, if even one process is out of order in a sequence of processes constituting the method of the above patent, then all the processes must be stopped. The method disclosed in the above patent includes (1) implanting the
25 bristles into the mold, (2) melting portions of the bristles, inserted into the cavity of the mold, by heating,

and (3) injection-molding the handle. In this regard, even if one process is out of order among the three processes, the manufacturing of the toothbrush must be stopped.

Third, since operation of the injection molding machine is stopped during the implanting and melting processes, time efficiency of the manufacturing process is very poor in consideration of the costly injection molding machine.

Description of Drawings

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FIG. 1 is a perspective view of a head insert used in the present invention;

FIG. 2 is a longitudinal sectional view of a first receiving member used in the present invention;

15 FIG. 3 is a longitudinal sectional view of a second receiving member used in the present invention;

FIG. 4 is a longitudinal sectional view of the first receiving member, into which a push plate is inserted, used in the present invention;

20 FIG. 5 is a longitudinal sectional view of the head insert, into which bristles are implanted;

FIG. 6 illustrates melting of portions of the bristles, which protrude from the backside of the head insert;

25 FIG. 7 illustrates injection-molding of a handle so

as to unite the head insert, which includes the bristles implanted thereinto and is installed in a mold, with the handle; and

FIG. 8 is a perspective view of a toothbrush
5 manufactured according to the method of the present invention.

* Description of numerical references for main parts in the drawings

10: head insert, 11: opening
10 20: first receiving member,
30: second receiving member
40: push plate, 41: insertion rod
h: bristle, p: pin
s: automatically moving insertion unit

15 Disclosure

Technical Problem

Accordingly, the present invention has been made keeping in mind the above problems, such as holes formed in
20 a head of a handle of a toothbrush and use of wires, occurring in the prior art, and an object of the present invention is to provide a method of manufacturing a toothbrush, which assures high manufacturing efficiency, and in which the shape of the handle can be easily changed.

Another object of the present invention is to provide a method of manufacturing a toothbrush, in which a stoppage in one process does not affect other processes.

Technical Solution

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In order to accomplish the above object, the present invention provides a method of manufacturing a toothbrush. The method includes implanting bristles into a head insert with a thickness of 1.5 - 3.0 mm, which has openings formed therethrough and is made of a plastic, in such a way that portions of the bristles protrude from the backside of the head insert by 1 - 3 mm; melting the protruded portions of the bristles by heating to fix the bristles to the head insert; installing the head insert, to which the bristles are fixed, in a mold for injection-molding handles in such a way that the bristles are placed outside a cavity of the mold; and injection-molding a resin fed into the mold.

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Advantageous Effects

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According to the present invention, there is provided a method of manufacturing a toothbrush, in which bristles are fixed to a handle without using wires and time-efficient usage of a costly injection molding machine is maximized. Furthermore, in the present invention, a shape of the handle

can be easily changed, and a stoppage in one process does not affect other processes, thereby maximizing manufacturing efficiency.

Best Mode for Carrying Out the Invention

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Reference should now be made to the drawings, in which the same reference numerals are used throughout the different drawings to designate the same or similar components.

10 FIG. 1 is a perspective view of a head insert 10 used in the present invention, which is made of plastic and has a thickness ranging from 1.5 to 3.0 mm. When the thickness is less than such a range, the head insert 10 may bend during a melting process as will be described later, and
15 when the thickness is more than the range, a head of a toothbrush is made excessively thick.

Openings 11 are formed through the head insert 10 to implant bristles into the head insert 10 therethrough. Unlike a conventional method adopting wires, it is not
20 necessary to form the openings 11 in the same size, but shapes and sizes of the openings 11 may be controlled according to the arrangement of the bristles.

The bristles cut to a desired length are implanted through a first receiving member 20 of FIG. 2 and a second
25 receiving member 30 of FIG. 3 into the head insert 10. The

first receiving member 20, second receiving member 30, and head insert 10 have openings 11 the same shape as each other.

The first and second receiving members 20 and 30 must
5 be made of metal with excellent durability because the bristles (h) are implanted through them into the head insert 10 many times.

The bristles (h) are pushed into the first receiving member 20 using a push plate 40 (refer to FIG. 4), which is
10 provided with insertion rods 41 coinciding with the openings 11 formed through the first receiving member 20, thereby completing insertion of the bristles (h) into the first receiving member 20.

The implanting of the bristles (h) into the head
15 insert 10 is achieved by pushing the bristles (h), inserted in the first receiving member 20, into the second receiving member 30 and head insert 10 using the push plate 40 while the first receiving member 20, second receiving member 30, and head insert 10 are sequentially layered in such a way
20 that their openings 11 are aligned with each other (refer to FIG. 5). The bristles (h) are implanted into the head insert 10 in such a manner as to protrude from the backside of the head insert 10 by a range of 1 - 3 mm, and in such a case, when protruded portions of the bristles are shorter
25 than the above range, it is difficult to clog the openings 11 through a melting process as will be described later,

and when the protruded portions of the bristles are longer than the above range, the head of the toothbrush is made excessively thick.

After the bristles (h) are implanted into the head insert 10, the portions of the bristles (h) protruding from the backside of the head insert 10 are melted by heating, thereby strongly fixing the bristles (h) to the head insert 10 while clogging the openings 11 (refer to FIG. 6).

The head insert 10, to which the bristles (h) are fixed, is installed in a mold for injection-molding handles in such a way that the bristles (h) are placed outside a cavity of the mold using an automatically moving insertion unit (s) as shown in FIG. 7, and a resin is then subjected to an injection-molding process in the resulting mold, thereby making the toothbrush. At this time, it is necessary to fasten the head insert 10 using a pin (p) to prevent the head insert 10, to which the bristles (h) are fixed, from being slipped out of the mold due to injection pressure. Through the above procedure, the bristles (h), head insert 10, and handle are united with each other, and separation of the bristles (h) from the handle is completely prevented. The resulting toothbrush manufactured according to the present invention is illustrated in FIG. 8.

Claims

1. A method of manufacturing a toothbrush, comprising:

5 implanting bristles (h) into a head insert 10 with a thickness of 1.5 - 3.0 mm, which has openings 11 formed therethrough and is made of plastic, in such a way that portions of the bristles (h) protrude from a backside of the head insert 10 by 1 - 3 mm;

10 melting the protruded portions of the bristles (h) by heating to fix the bristles (h) to the head insert 10;

 installing the head insert 10, to which the bristles (h) are fixed, in a mold for injection-molding handles in such a way that the bristles (h) are placed outside a cavity of the mold; and

15 injection-molding a resin fed into the mold.

2. The method as set forth in claim 1, wherein the bristles (h) are implanted through first and second receiving members, having openings 11 the same size as those of the head insert 10, into the head insert 10.

20 3. The method as set forth in claim 2, wherein the bristles (h) are implanted into the head insert 10 using a push plate 40, which is provided with insertion rods 41 coinciding with the openings 11.

Fig. 1

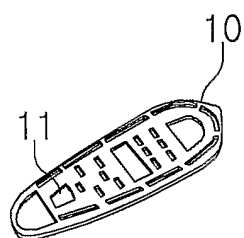


Fig. 2

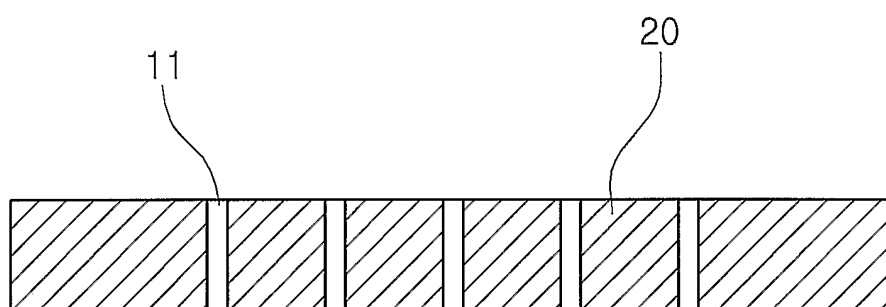


Fig. 3

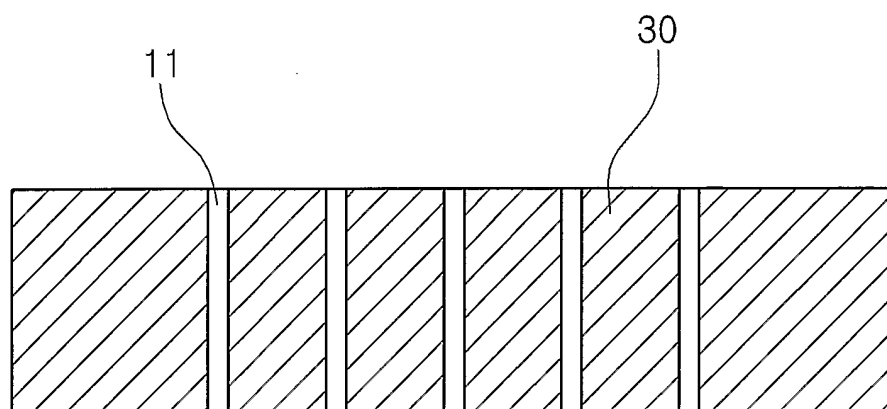
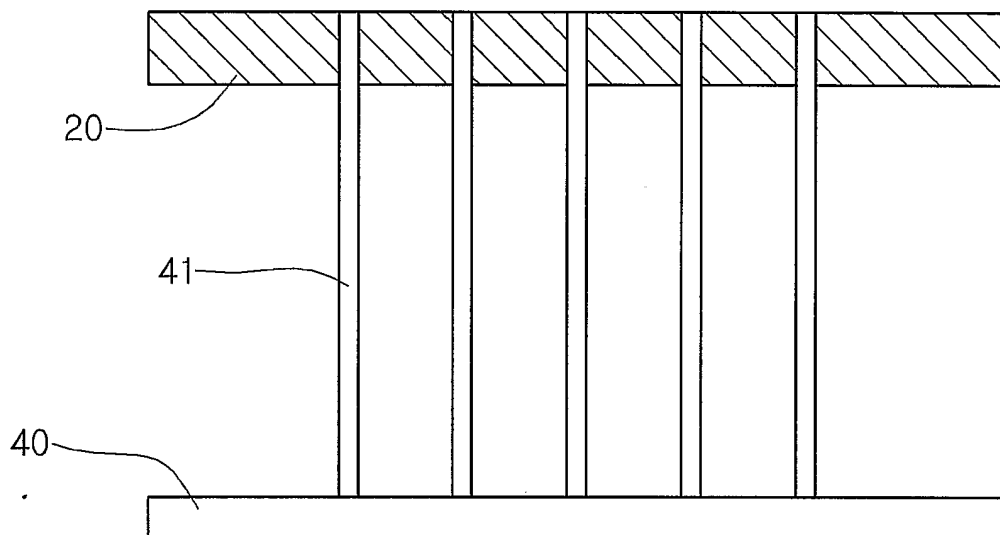
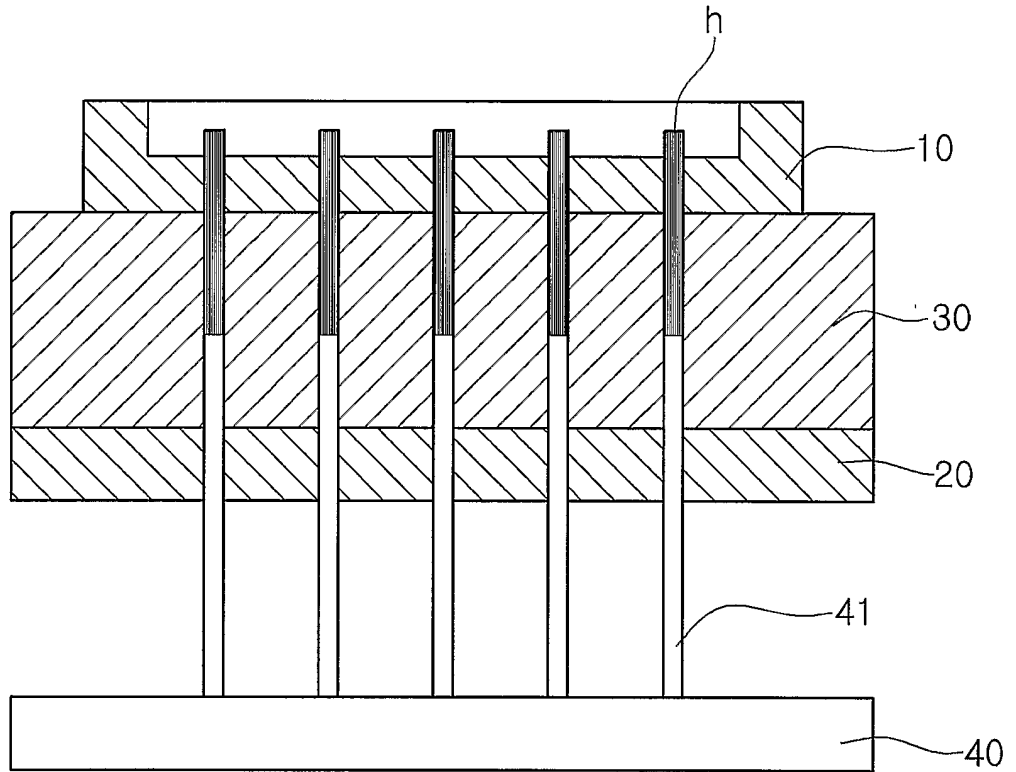


Fig. 4



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Fig. 5



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Fig. 6

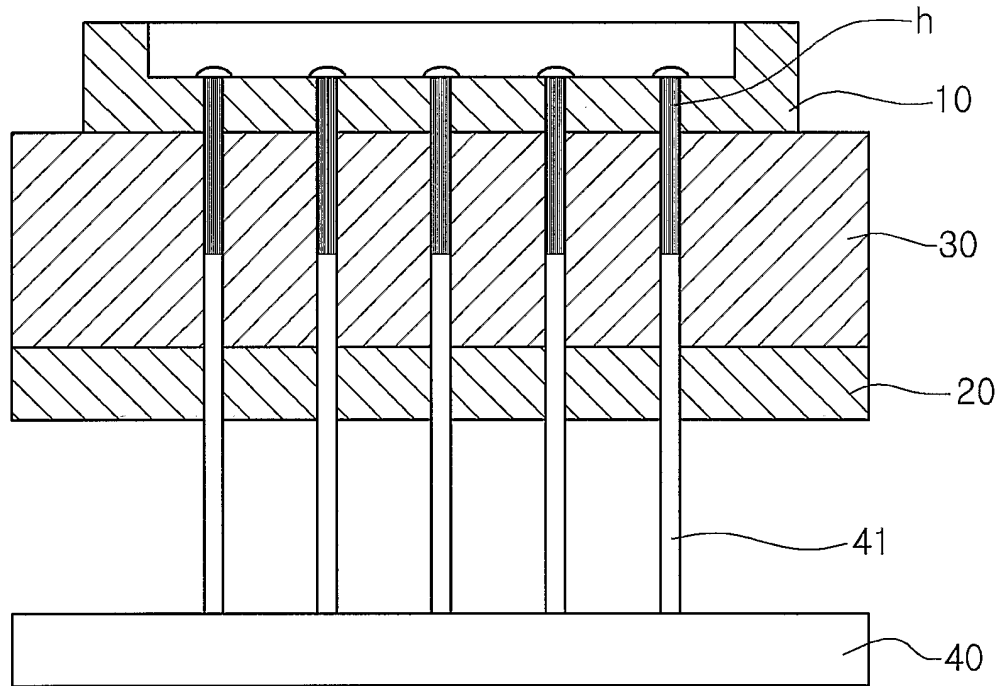


Fig. 7

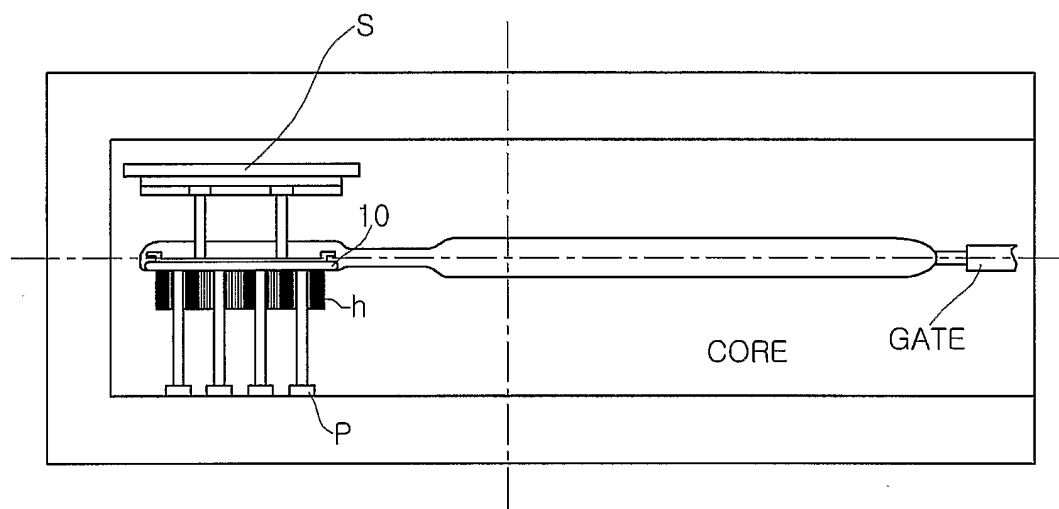
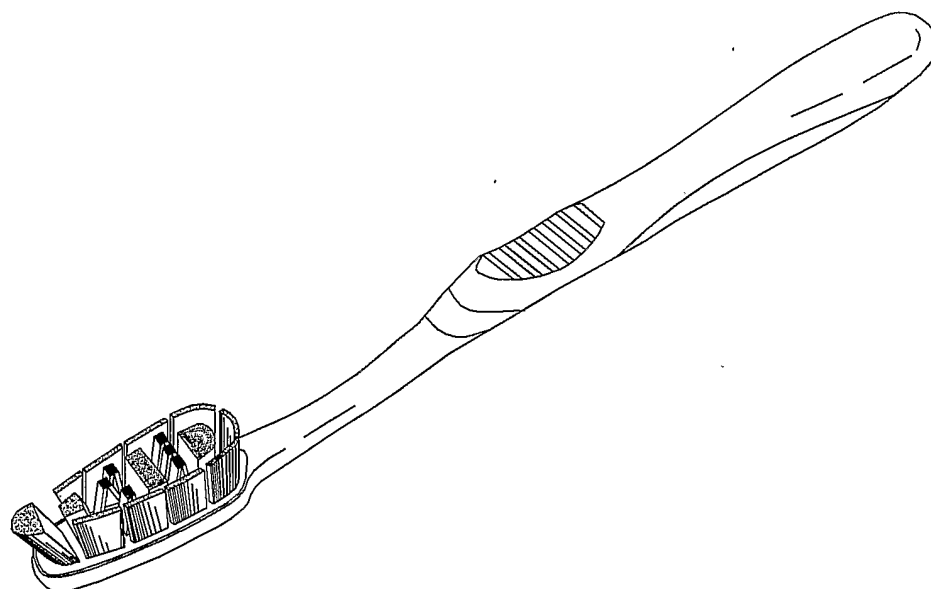


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
IPC7 B29C 45/14, A46B 5/00, A46B 9/04
 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)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 Korean Patents and Applications for Inventions since 1975
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 60-241404 A (Coronet-Werke Heinrich Schlerf GmbH) 30 November 1985 see the whole document	1-3
P, A	JP 15-189941 A (LION CORP.) 08 July 2003 see the whole document	1-3
A	US 5,158,342 A (Tien-Fa Pai) 27 October 1992 see the whole document	1-3
A	US 2001/0033875 A1 (Bart Gerard Boucherie) 25 October 2001 see the whole document	1-3
A	US 6,379,139 B1 (Bart Gerard Biucherie) 30 April 2002 see the whole document	1-3
A	KR 253132 Y1 (Park, Jae-Suk) 22 November 2001 see the whole document	1-3
A	KR 233735 Y1 (Lim, Sung-Keun) 25 October 2001 see the whole document	1-3

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

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INTERNATIONAL SEARCH REPORT

international application No.

PCT/KR2004/001082

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 60-241404 A	30.11.1985	JP 06-46962 B4 DE 3403341 A1 US 4637660 A EP 150785 B1	22.06.1994 08.08.1985 20.01.1987 12.04.1989
JP 15-189941 A	08.07.2003	NONE	
US 5158342 A	27.10.1992	NONE	
US 2001-33875 A1	25.10.2001	US 6733264 A EP 1147871 B1 DE 50100450 C0	11.05.2004 06.08.2003 11.09.2003
US 6379139 B1	30.04.2002	EP 1088641 B1 DE 50002157 C0	14.05.2003 18.06.2003
KR 253132 Y1	22.11.2001	NONE	
KR 233735 Y1	25.10.2001	NONE	