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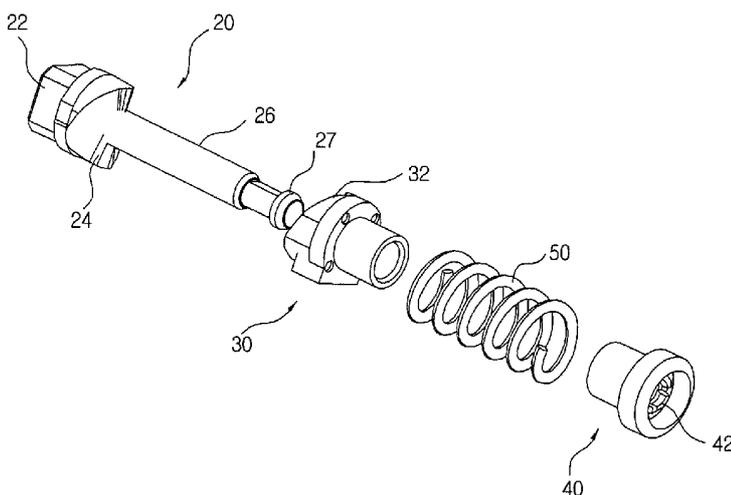
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(54) Title: A HINGE UNIT OF CELLULAR PHONE



(57) Abstract: Disclosed is a hinge unit of a cellular phone in which a fixed cam and a hinge shaft are formed integrally as well as a coupling structure is improved so that assembling components and processes accordingly are decreased in number, thereby enhancing an assembling capacity. The hinge unit of a cellular phone including a body and a folder cover with a speaker mounted thereon for mechanically connecting the folder cover to the body comprises: a fixed cam having a fixed piece formed at one end thereof and a protrusion formed at the other end thereof, the protrusion integrally formed in the middle thereof with a longitudinal hinge shaft having a fitting member mounted at an end thereof; a rotating cam rotatably mounted on the hinge shaft and having a recess formed at one end thereof so as to receive and engage fittingly with the protrusion of the fixed cam; a sleeve mounted to opposite to the rotating cam in such a manner as to be disposed coaxially with the rotating cam, the sleeve having a perfectly opened end and a jaw formed at the inner wall thereof adjacent to the opened end so that the fitting member of the hinge shaft can be fittingly coupled to the jaw; and a spring elastically fitted around both the rotating cam and the sleeve.



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## A HINGE UNIT OF CELLULAR PHONE

### **Technical Field**

5           The present invention relates to a hinge unit of a cellular phone, and more particularly to a hinge unit of a cellular phone in which a fixed cam and a hinge shaft are formed integrally as well as a coupling structure is improved so that assembling components and processes accordingly are decreased in number, thereby enhancing an assembling capability.

10

### **Background Art**

          In general, a locking hinge consists of a fixed shaft, movable shaft and a spring. The spring has a relatively small fastening unit and is fitted around the fixed shaft and the  
15   movable shaft. A principle of operating the locking hinge is that the movable shaft is turned in a rewind direction of the spring with respect to the fixed shaft in a stop state by using a small force.

          In such a locking hinge, its structure is simple, a fault is little likely to be generated and an angle adjustment is very easy, so it is widely used in a general  
20   opening/closing device and is variously applied to diverse industrial fields by modifying its shape and pattern.

          Currently, a hinge unit such a one-sided locking hinge, a two-sided locking hinge and the like is mainly used for a compact electronic appliance like a cellular phone which is the most widely used among people at present, a notebook computer, etc. Such  
25   a hinge unit employs an oppositely arranged structure of the rotating cam and the fixed cam, which makes the opening/closing of a cover of the cellular phone easy as well as uniformly maintains the opening/closing state of the cover in spite of an external shock.

          As shown in FIG. 1, a conventional hinge unit of a cellular phone includes a hinge shaft 7 having a flange mounted at one end thereof, a fixed cam 1, a rotating cam 3,

a spring 4 and a coupling ring 5. The hinge shaft passes through the fixed cam 1, the rotating cam 3, the spring and the coupling ring 5 in order. At this time, coupling projections 6 formed at the other end of the hinge shaft 7 may be inserted into and fittingly coupled to coupling grooves 2 of a through-hole formed at one end of the fixed cam 1, or a coupling portion may be formed on the hinge shaft to separately couple a flange portion to the coupling portion.

However, for such a hinge unit, there have been problems in that assembling components increases in number, its coupling structure is complicated so working processes also increases in number, which contributes to a deterioration in an assembling capability. Moreover, because this causes a unit cost of the goods to rise, the hinge unit is inefficient in terms of time and economy.

### **Disclosure of Invention**

Accordingly, it is an object of the present invention to provide a hinge unit of a cellular phone which can reduce the number of assembling components used in a hinge unit of the cellular phone and improve its coupling state.

To achieve the above object, according to the present invention, there is provided a hinge unit of a cellular phone including a body and a folder cover with a speaker mounted thereon for mechanically connecting the folder cover to the body comprising: a fixed cam having a fixed piece formed at one end thereof and a protrusion formed at the other end thereof, the protrusion integrally formed in the middle thereof with a longitudinal hinge shaft having a fitting member mounted at an end thereof; a rotating cam rotatably mounted on the hinge shaft and having a recess formed at one end thereof so as to receive and engage with the protrusion of the fixed cam; a sleeve mounted to opposite to the rotating cam in such a manner as to be disposed coaxially with the rotating cam, the sleeve having a perfectly opened end and a jaw formed at the inner wall thereof adjacent to the opened end so that the fitting member of the hinge shaft

can be fittingly coupled to the jaw; and a spring elastically fitted around both the rotating cam and the sleeve.

### **Brief Description of the Drawings**

5

Further objects and advantages of the invention can be more fully understood from the following detailed description taken in conjunction with the accompanying drawing in which:

FIG.1 is an exploded perspective view illustrating a conventional hinge unit of a  
10 cellular phone;

FIG.2 is an exploded perspective view illustrating a hinge unit of the cellular phone according to the present invention;

FIG. 3 is a perspective view illustrating the hinge unit of the cellular phone in an assembled state according to the present invention;

15 FIG. 4 is a cross sectional view illustrating the hinge unit of the cellular phone in an assembled state according to the present invention; and

FIG. 5 is a perspective view illustrating an example of a folder type cellular phone to which the hinge unit is applied according to the present invention.

### **20 Best Mode for Carrying Out the Invention**

A preferred embodiment of the present invention will now be described in detail with reference to the accompanying drawings.

25 First, the construction of a folder type cellular phone will be described in brief hereinafter with reference to FIG. 5.

FIG. 5 illustrates an example of a folder type cellular phone to which the hinge unit is applied according to the present invention.

As shown therein, the folder type cellular phone 60 includes a body 1, a folder

cover 2 and a hinge unit 3 for openably coupling the folder cover 2 to the body 1. The folder cover 2 revolves on an axis A so that it may be opened and closed with respect to the body 1.

FIG.2 is an exploded perspective view illustrating a hinge unit of the cellular phone according to the present invention and FIG. 3 is a perspective view illustrating the hinge unit of the cellular phone in an assembled state according to the present invention.

As shown in FIGs. 2 and 3, there is shown a hinge unit 3 including a fixed cam 20, a rotating cam 30, a sleeve 40 and a spring 50.

The fixed cam 20 includes a fixed piece 22 formed at one end thereof to be fixedly coupled to a casing of a cellular phone and a protrusion 24 formed at the other end thereof. The protrusion 24 is integrally formed in the middle thereof with a hinge shaft 26 which extends in a longitudinal axial direction.

The fixed cam 20 and the hinge shaft 26 are made of synthetic resin (plastic) materials having excellent endurance and chemical resistance, and may be formed integrally with each other by means of a plastic injection so that an existing process of assembling the fixed cam and the hinge shaft is not required and a unit cost is low.

The rotating cam 30 is rotatably mounted on the hinge shaft 26, and has a recess formed at one end thereof so as to receive and engage fittingly with the protrusion 24 of the fixed cam 24 so that the smooth rotation of the rotating cam 30 can rotate the recess 32 with respect to the protrusion 24. Also, the other end of the rotating cam 30 is constructed of a suitable shape in such a manner that the spring 50 is easily seated around the other end thereof.

The sleeve 40 is disposed at an end portion of the hinge unit of the present invention and serves to prevent the separation of the spring 50 from the assembled hinge unit as well as maintain the hinge unit in an elastic state. Also, the sleeve 40 has a perfectly opened end and a jaw 42 formed at the inner wall thereof adjacent to the opened end so that the fitting member 27 of the shaft 26 can be easily and fittingly coupled to the jaw.

FIG. 4 is a cross sectional view illustrating the hinge unit of the cellular phone in an assembled state according to the present invention and FIG. 5 is a perspective view illustrating an example of a cellular phone to which the hinge unit is applied according to the present invention.

5 As shown in FIGs. 4 and 5, there is shown a state in which the hinge unit is not operated. That is, when the cover of the cellular phone is closed, the protrusion 24 of the fixed cam 20 and the recess 32 of the rotating cam 30 are maintained in a state being engaged fittingly with each other. On the other hand, when the cover of the cellular phone is opened, the rotating cam 30 rotates about the hinge shaft 26. At this moment,  
10 the spring 50 is elastically moved while the coupled state of the protrusion 24 and the recess 32 is temporarily released. Then, when the rotating cam 30 goes beyond a certain released point during the rotation, the recess 32 thereof is again engaged fittingly with the protrusion 24 of the fixed cam 20 so that the cover of the cellular phone is maintained in an opened state.

15 Similarly, when the cover of the cellular phone is again closed, the rotating cam 30 rotates in a reverse direction to return to an initial state.

The fitting member 27 of the hinge shaft 26 and the jaw 42 of the sleeve 40 are configured in such a manner that they are fittingly coupled to each other when pushing against them. Therefore, the hinge unit is simple and easy to assemble as well as its  
20 coupling state is relatively rigid.

#### **Industrial Applicability**

As described above, a fixed cam and a hinge shaft are formed integrally so that assembling components is decreased in number, thereby improving an assembling capability and lowering a unit cost of a finished product to secure price competitive  
25 power.

Further, the use of coupling means such as the fitting member of the hinge shaft and the jaw of the sleeve maintains a coupled state of the hinge unit in a simple and rigid manner.

While the present invention has been described with reference to the particular illustrative embodiments, it is not to be limited to only a hinge unit of the cellular phone but also applied to a hinge unit of an information appliance, an office appliance, a household electric appliance, etc. It is to be appreciated that those skilled in the art can  
5 change or modify the hinge unit without departing from the scope and spirit of the present invention.

**What Is Claimed Is:**

1. A hinge unit of a cellular phone including a body and a folder cover with a speaker mounted thereon for mechanically connecting the folder cover to the body  
5 comprising:

a fixed cam having a fixed piece formed at one end thereof and a protrusion formed at the other end thereof, the protrusion integrally formed in the middle thereof with a longitudinal hinge shaft having a fitting member mounted at an end thereof;

a rotating cam rotatably mounted on the hinge shaft and having a recess formed  
10 at one end thereof so as to receive and engage fittingly with the protrusion of the fixed cam;

a sleeve mounted to opposite to the rotating cam in such a manner as to be disposed coaxially with the rotating cam, the sleeve having a jaw formed at the inner wall thereof so that the fitting member of the hinge shaft can be fittingly coupled to the jaw;  
15 and

a spring elastically fitted around both the rotating cam and the sleeve.

2. The hinge unit according to claim 1, wherein the fixed member, the protrusion and the hinge shaft of the fixed cam are formed as an integrated single piece by means of  
20 injection of plastic material.

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Figure 1

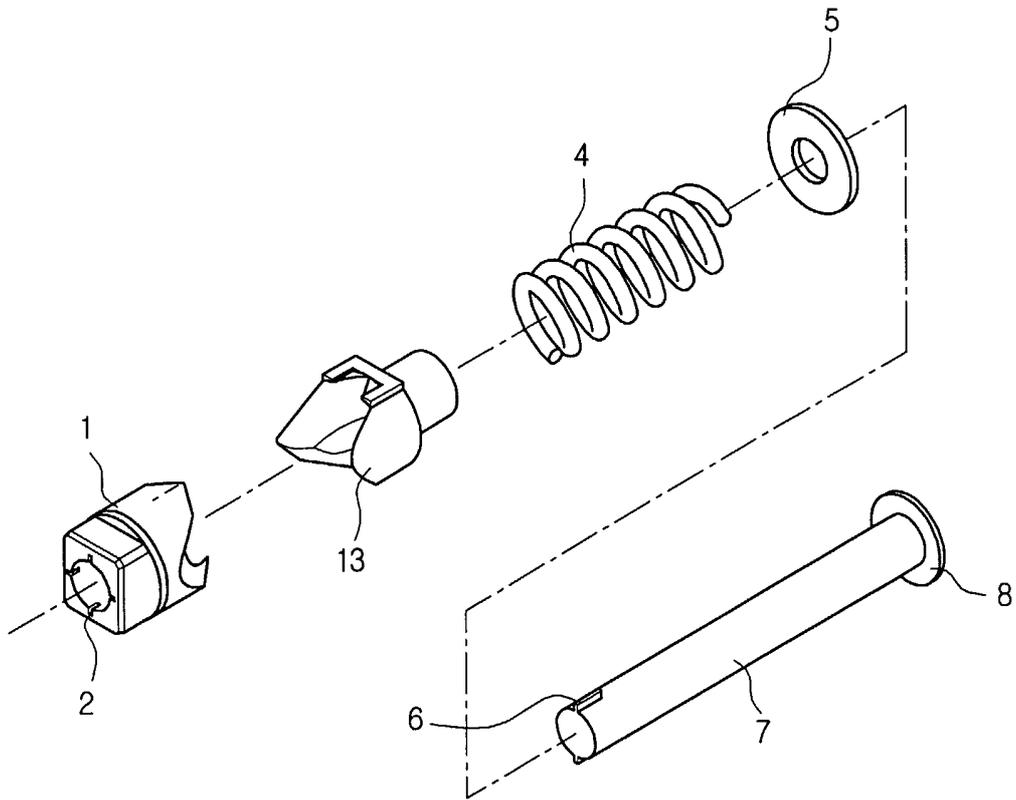


Figure 2

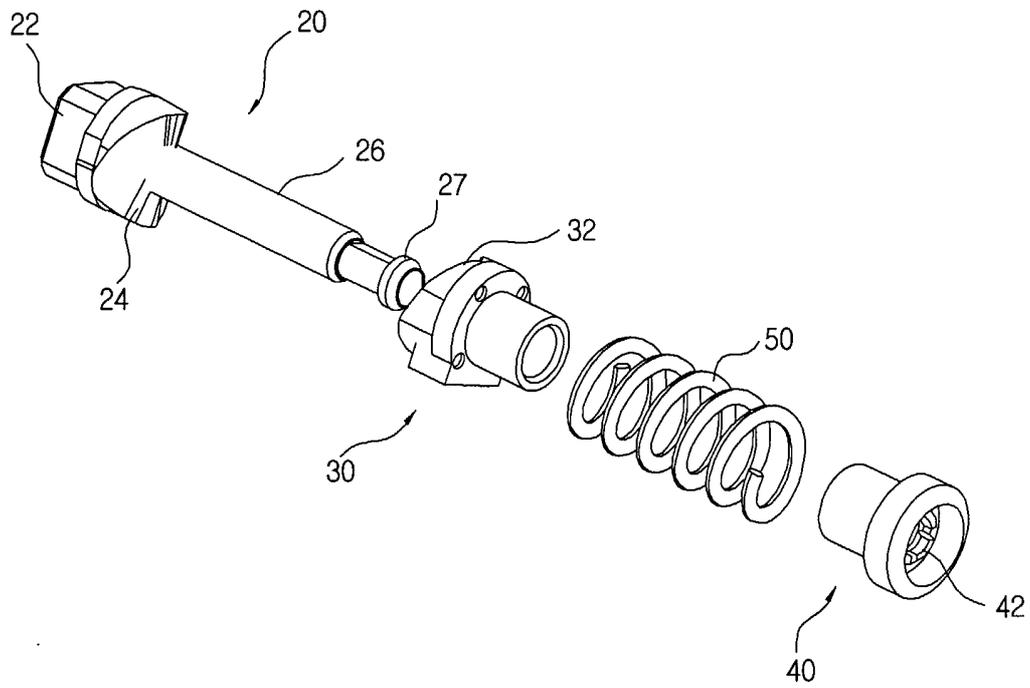
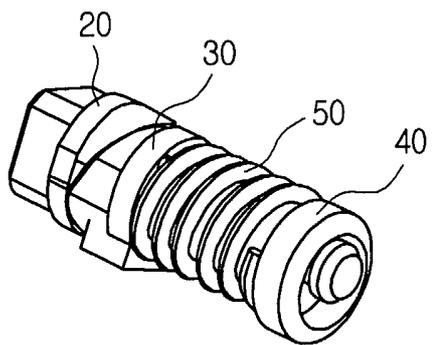


Figure 3



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Figure 4

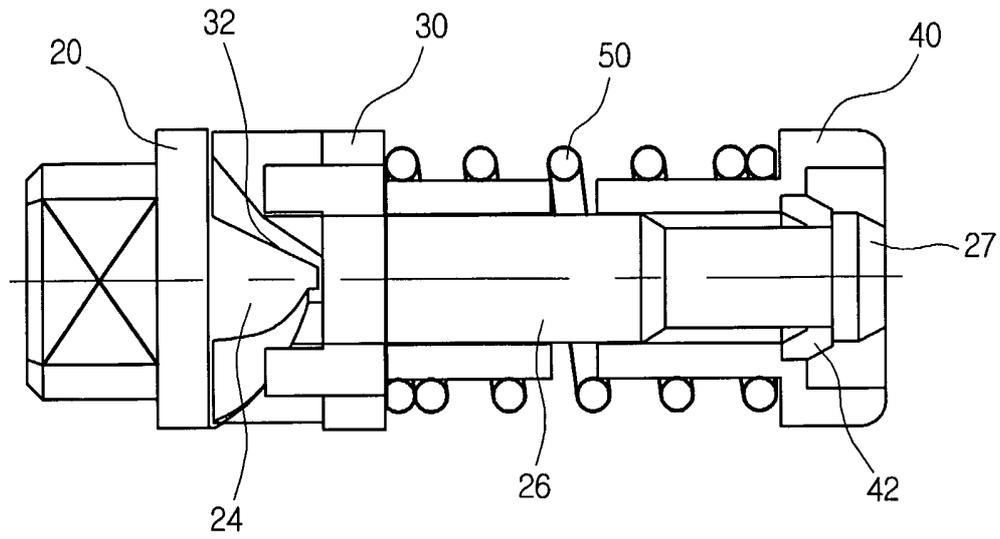
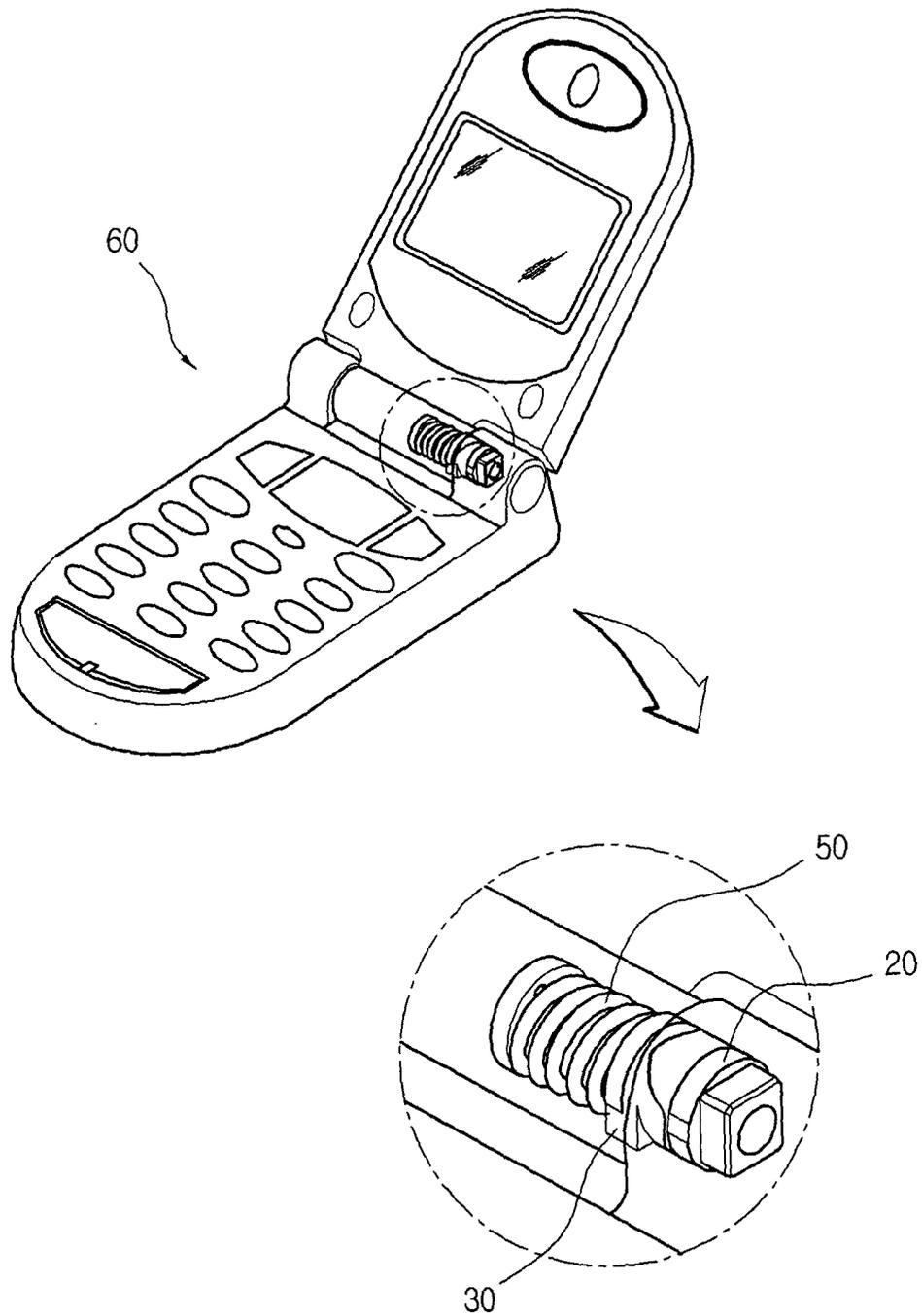


Figure 5



INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR02/01569

<p><b>A. CLASSIFICATION OF SUBJECT MATTER</b></p> <p><b>IPC7 H04B 1/38</b></p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>														
<p><b>B. FIELDS SEARCHED</b></p> <p>Minimum documentation searched (classification system followed by classification symbols)</p> <p>IPC 7 H04B 1/38, G06F1/ , 19/</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Korean Patents and applications for inventions since 1975 Korean Utility models and applications for Utility models since 1975</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)</p>														
<p><b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b></p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>KR 20-222454 U (Hanbit corp) 20 Feb 2001 (20. 2. 2001.) See the figure 4</td> <td>1-2</td> </tr> <tr> <td>A</td> <td>KR 20-187687 U (Park Sueg-Heun) 40 April 2000 (20. 4. 2000.) See the abstract and figure 2</td> <td>1</td> </tr> <tr> <td>A</td> <td>EP 961459 (NOKIA) 1. Dec 1999 (1. 12. 1999) See the abstract</td> <td>1</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	KR 20-222454 U (Hanbit corp) 20 Feb 2001 (20. 2. 2001.) See the figure 4	1-2	A	KR 20-187687 U (Park Sueg-Heun) 40 April 2000 (20. 4. 2000.) See the abstract and figure 2	1	A	EP 961459 (NOKIA) 1. Dec 1999 (1. 12. 1999) See the abstract	1
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<p>Date of the actual completion of the international search</p> <p>09 DECEMBER 2002 (09.12.2002)</p>		<p>Date of mailing of the international search report</p> <p>09 DECEMBER 2002 (09.12.2002)</p>												
<p>Name and mailing address of the ISA/KR</p> <p> Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea</p> <p>Facsimile No. 82-42-472-7140</p>		<p>Authorized officer</p> <p>OH, Sang Kyoon</p> <p>Telephone No. 82-42-481-5950</p> <p></p>												