

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference kpcpct	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/KR2015/010143	International filing date ( <i>day/month/year</i> ) 25 September 2015 (25.09.2015)	Priority date ( <i>day/month/year</i> ) 31 August 2015 (31.08.2015)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant AN, Jang Hong			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
<p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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	Date of issuance of this report 06 March 2018 (06.03.2018)
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**PATENT COOPERATION TREATY**

**TRANSLATION**

From the  
INTERNATIONAL SEARCHING AUTHORITY

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	<b>25.04.2016</b>
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Applicant's or agent's file reference <b>kpcpct</b>	<b>FOR FURTHER ACTION</b> See paragraph 2 below
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International application No. <b>PCT/KR2015/010143</b>	International filing date (day/month/year) <b>25.09.2015</b>	Priority date (day/month/year) <b>31.08.2015</b>
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International Patent Classification (IPC) or both national classification and IPC  
**F16K5/06 (2006.01) i, F16K5/08 (2006.01) i, F16K5/20 (2006.01) i, F16K27/06 (2006.01) i**

Applicant  
**AN, Jang Hong**

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed
  - a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
  - a.  forming part of the international application as filed:
    - in the form of an Annex C/ST.25 text file.
    - on paper or in the form of an image file.
  - b.  furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
  - c.  furnished subsequent to the international filing date for the purposes of international search only:
    - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
    - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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International application No. PCT/KR2015/010143
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<b>Box No. V</b>	<b>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>
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1. Statement			
Novelty (N)	Claims	1-2	YES
	Claims	None	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-2	NO
Industrial applicability (IA)	Claims	1-2	YES
	Claims	None	NO

2. Citations and explanations:	
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Reference is made to the following documents:

D1: KR 10-0449779 B1 (KIM, Kyo Seol et al.) 22  
September 2004

D2: US 4890643 A (OLIVER, John P.) 02 January 1990

D3: KR 10-1445670 B1 (INSTITUTE FOR ADVANCED  
ENGINEERING) 01 October 2014

**1. Novelty and Inventive Step**

**1.1 Independent Claim: Claim 1**

Document **D1**, which is closest to the invention as set forth in claim **1**, discloses a ball valve comprising: a valve body (**1**) including a valve chamber (**13**) and an outlet passage (**12**) and having a stem (**7**) connected to the upper end thereof; a connection body having an inlet passage (**11**) communicating with the outlet passage (**12**) and detachably coupled to the valve body (**1**); a ball (**6**) forming a fluid passage (**61**) for controlling communication between the inlet passage (**11**) and the

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

outlet passage (12) and installed inside the valve chamber (13); seats (2) interposed between the valve body (1) and the ball (6) and between the connection body and the ball (6), respectively, so as to be in contact with a spherical protrusion (9) of the ball (6) and thus enabling the ball (6) to rotate; a stem (7), connected to the upper end of the ball (6), for rotating the ball (6); and a handle (8) coupled to the upper end of the stem, wherein an elastic spring (4), which is a plate spring for pressing the seats (2) installed on a circular support plate (3) to the ball (6) side, is installed between a fault portion (15) and the circular support plate (3) which are formed on the inner side surface of the valve chamber (14), and the circular support plate (3) having the seats (2) installed thereon is formed on the inner side surface of the connection member (see claims 1-2, and figures 1 and 3). Document D1 and claim 1 differ in that the former does not disclose the feature of claim 1 wherein concave grooves facing each other are formed, respectively, on the inner sides of a main body and a sub body, the inner sides being in contact with an entrance of a valve chamber of the main body and an entrance of a second seating portion, and the outer circumferential surface of a second seat ring is simultaneously in close contact with the inner circumferential surface of the valve chamber and the inner circumferential surface of the second seating portion and has an annular sealing portion integrally formed thereon, the annular sealing portion being inserted into the concave grooves. However, said difference is presented in document D2, which discloses a ball valve comprising counter bores (52, 53), formed so

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

as to face each other on respective inner sides in contact with two outer bodies (12, 13), and a plate portion (51), inserted into the counter bores (52, 53), integrally formed on an outer circumferential surface of a central body (14), the outer circumferential surface including seating surfaces (25, 26) and being simultaneously in close contact with the outer circumferential surfaces of the two outer bodies (12, 13) (see line 4 in column 3 - line 35 in column 4, and figure 1). Therefore, since it would be obvious to a person skilled in the art to combine the invention disclosed in document D1 and the feature disclosed in document D2, the invention as set forth in claim 1 lacks an inventive step (PCT Article 33(3)).

**1.2 Dependent Claim: Claim 2**

The additional feature set forth in claim 2 relates to scraper portions which are formed on the edges of contact surfaces between a first seat ring and the spherical surface of an opening and closing ball and between a second seat ring and the spherical surface of the opening and closing ball, and which scrape off foreign matter attached to the spherical surfaces of the opening and closing ball. Said feature is not stated in documents D1 and D2, but is presented in document D3 which discloses scrapers (150, 160) installed on edge portions of contact portions (131) between the surface of a ball (120) and an inflated sheet (130) (see paragraph Nos. [0029], [0033] and figure 3). Therefore, the invention as set forth in claim 2 would be obvious in view of documents D1 to D3 and thus lacks an inventive step (PCT Article 33(3)).

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**Box No. V** Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

2. Industrial Applicability

The invention as set forth in claims 1 and 2 is  
industrially applicable (PCT Article 33(4)).