온라인제출

서식작성기로 작성된 특허관련 서류를 온라인으로 제출할 수 있습니다.

접수증

온라인 제출 결과 아래와 같이 접수되었습니다.
제출결과조회를 통해 접수하신 서류에 대한 접수결과 및 방식심사 진행상태를 조회하실 수 있습니다.
수수료는 서식작성기에서 입력한 수수료 금액이며, 제출결과조회 화면에서 특허청 전산시스템에서 계산한 수수료를 조회할 수 있습니다.

접수일시: 2011 년 11 월 07 일 18 시 09 분 34 초

일련번호	접수번호	국제출원번호	참조기호	서류명	수수료
1	6-1-2011-0040994-52	PCT/KR2011/008425	11PP306	국제출원서	무
Message Digest : BD: E2: 35: A5: B6: 98: 73: 8A: 3C: CF: 90: E: E2: A9: 96: 0: 8F: DD: 6B: ED:					

이용방법안내

제출시 유의사항

1.온라인으로 제출한 접수서류가 ZIP파일의 손상, 전자서명 오류, 바이러스 감염 등의 “물리적인 오류”와 “명백한 반려사유”에 해당될 경우 접수가 반려될 수 있습니다.
2.수수료는 해당서류를 접수한 후 반드시 각각의 접수번호에 기관코드(0131)가 추가된 납부자번호(국제출원 접수번호 아님)를 기재하여 다음날까지 우체국 또는 은행에 납부하여야 합니다.
예) 0131-x-x-xxxx-xxxxxxx-xx
3.기타 문의사항이 있으시면 특허고객상담센터(1544-8080)에 문의하시거나 특허청 홈페이지(www.kipo.go.kr)를 참고하시기 바랍니다.

PCT REQUEST

Print Out (Original in Electronic Form)

0	**For receiving Office use only**	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	

0-4	**Form PCT/RO/101 PCT Request**	
0-4-1	Prepared Using	**PCT-SAFE Version 3.51.050.226 MT/FOP 20110701/0.20.5.19**
0-5	**Petition** The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	**Receiving Office (specified by the applicant)**	**Korean Intellectual Property Office (RO/KR)**
0-7	**Applicant's or agent's file reference**	**11PP306**
I	**Title of Invention**	**TIDAL POWER GENERATION SYSTEM**
II	**Applicant**	
II-1	This person is	**Applicant and inventor**
II-2	Applicant for	**All designated States**
II-4	Name (LAST, First)	**MOON, Je Kyung**
II-5	Address	**118-501, Hanil Apt. 1856, Jeongwang-dong, Siheung-si Gyeonggi-do 429-450 Republic of Korea**
II-6	State of nationality	**KR**
II-7	State of residence	**KR**
II-8	Telephone No.	**82-32-523-9633**
II-9	Facsimile No.	**82-2-3475-7778**
II-10	e-mail	**han4239@hanmail.net**
II-11	Applicant's registration No. with the Office	**4-2011-016089-7**

PCT REQUEST

Print Out (Original in Electronic Form)

III-1	**Applicant and/or inventor**	
III-1-1	This person is	**Applicant and inventor**
III-1-2	Applicant for	**All designated States**
III-1-4	Name (LAST, First)	**LEE, Han Seok**
III-1-5	Address	**4-604, Mido 7cha Apt. 23/7, 259-5, Cheongcheon-dong, Bupyeong-gu Incheon 403-030 Republic of Korea**
III-1-6	State of nationality	**KR**
III-1-7	State of residence	**KR**
III-1-11	Applicant's registration No. with the Office	**4-2011-016087-4**
IV-1	**Agent or common representative; or address for correspondence**	
	The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	**Agent**
IV-1-1	Name	**DARAE IP FIRM**
IV-1-2	Address	**10th Floor KIPS 647-9, Yeoksam-dong, Gangnam-gu Seoul 135-080 Republic of Korea**
IV-1-3	Telephone No.	**82-2-3475-7700**
IV-1-4	Facsimile No.	**82-2-3475-7788**
IV-1-5	e-mail	**admin@daraelaw.co.kr**
IV-1-5(a)	E-mail authorization The receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority are authorized to use this e-mail address, if the Office or Authority so wishes, to send notifications issued in respect of this international application:	**as advance copies followed by paper notifications**
IV-1-6	Agent's registration No.	**9-2003-100021-7**

PCT REQUEST

Print Out (Original in Electronic Form)

V	DESIGNATIONS	
V-1	**The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.**	
V-2	**Item V-2 may only be used to exclude (irrevocably) the designations concerned if, at the time of filing or subsequently under Rule 26bis.1, the international application contains in Box No. VI a priority claim to an earlier national application filed in the particular State concerned, in order to avoid the ceasing of the effect, under the national law, of this earlier national application.**	**KR**
VI-1	**Priority claim of earlier national application**	
VI-1-1	Filing date	**06 May 2011 (06.05.2011)**
VI-1-2	Number	**10-2011-0042827**
VI-1-3	Country	**KR**
VI-2	**Priority document request** The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	**VI-1**
VI-3	**Incorporation by reference :** where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.	
VII-1	**International Searching Authority Chosen**	**Korean Intellectual Property Office (ISA/KR)**

PCT REQUEST

Print Out (Original in Electronic Form)

VIII	**Declarations**	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	–	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	–	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	–	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	–	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	–	
IX	**Check list**	Number of sheets	Electronic file(s) attached
IX-1	Request (including declaration sheets)	5	✓
IX-2	Description	7	✓
IX-3	Claims	2	✓
IX-4	Abstract	1	✓
IX-5	Drawings	5	✓
IX-7	TOTAL	20	
	Accompanying Items	Paper document(s) attached	Electronic file(s) attached
IX-8	Fee calculation sheet	–	✓
IX-9	Original separate power of attorney	–	✓
IX-18	PCT-SAFE physical media	–	–
IX-20	**Figure of the drawings which should accompany the abstract**	2	
IX-21	**Language of filing of the international application**	English	
X-1	**Signature of applicant, agent or common representative**		
X-1-1	Name (LAST, First)		
X-1-2	Name of signatory		
X-1-3	Capacity (if such capacity is not obvious from reading the request)		

PCT REQUEST

Print Out (Original in Electronic Form)

FOR RECEIVING OFFICE USE ONLY

10-1	**Date of actual receipt of the purported international application**	
10-2	**Drawings:**	
10-2-1	Received	
10-2-2	Not received	
10-3	**Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application**	
10-4	**Date of timely receipt of the required corrections under PCT Article 11(2)**	
10-5	**International Searching Authority**	ISA/KR
10-6	**Transmittal of search copy delayed until search fee is paid**	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	**Date of receipt of the record copy by the International Bureau**	

PCT POWER OF ATTORNEY

Print Out (Original in Electronic Form)

0-1	**PCT Power of Attorney (for an international application filed under the Patent Cooperation Treaty) (PCT Rule 90.4)**	
0-1-1	Prepared Using	**PCT-SAFE Version 3.51.050.226 MT/FOP 20110701/0.20.5.19**

1	**The undersigned applicant(s)**	**MOON, Je Kyung; LEE, Han Seok**
1-1-1	**hereby appoints (appoint) the following person**	**DARAE IP FIRM 10th Floor KIPS 647-9, Yeoksam-dong, Gangnam-gu Seoul 135-080 Republic of Korea**
1-2	**as**	**Agent**
1-3	**to represent the undersigned before**	**all the competent International Authorities**
1-4	**in connection with the international application identified below:**	
1-4-1	**Title of Invention**	**TIDAL POWER GENERATION SYSTEM**
1-4-2	**Applicant's or agent's file reference**	**11PP306**
1-4-3	**International application number (if already available)**	
1-4-4	**filed with the following Office as receiving Office**	**Korean Intellectual Property Office (RO/KR)**
1-5	**and to make or receive payments on behalf of the undersigned**	

2-1	**Signature of applicant, agent or common representative**	
2-1-1	Name (LAST, First)	**MOON, Je Kyung**
2-1-2	Name of signatory	
2-1-3	Capacity (if such capacity is not obvious from reading the request)	
2-2	**Signature of applicant, agent or common representative**	
2-2-1	Name (LAST, First)	**LEE, Han Seok**
2-2-2	Name of signatory	
2-2-3	Capacity (if such capacity is not obvious from reading the request)	
3	**Date**	**07 November 2011 (07.11.2011)**

PCT (ANNEX - FEE CALCULATION SHEET)

Print Out (Original in Electronic Form)

(This sheet is not part of and does not count as a sheet of the international application)

0	**For receiving Office use only**	
0-1	International Application No.	
0-2	Date stamp of the receiving Office	

0-4	**Form PCT/RO/101 (Annex) PCT Fee Calculation Sheet**				
0-4-1	Prepared Using		PCT-SAFE Version 3.51.050.226 MT/FOP 20110701/0.20.5.19		
0-9	**Applicant's or agent's file reference**		11PP306		
2	**Applicant**		MOON, Je Kyung		
12	**Calculation of prescribed fees**		Fee amount/multiplier	Total amounts (KRW)	
12-1	Transmittal fee	**T**	➪	45000	
12-2-1	Search fee	**S**	➪	1300000	
12-2-2	International search to be carried out by		KR		
12-3	International filing fee (first 30 sheets)	**i1**	1647000		
12-4	Remaining sheets		0		
12-5	Additional amount	**(X)**	0		
12-6	Total additional amount	**i2**	0		
12-7	i1 + i2 =	**i**	1647000		
12-12	Electronic Filing reduction (Full)	**R**	-371000		
12-13	Total International filing fee (i-R)	**I**	➪	1276000	
12-14	Fee for priority document Number of priority documents requested		1		
12-15	Fee per document	**(X)**	0		
12-16	Total priority document fee:	**P**	➪		
12-17	Fee for restoration of priority rights Number of requests for restoration of priority rights	**RP**	0		
	Total amount of fees for restoration of priority rights				
12-19	**TOTAL FEES PAYABLE (T+S+I+P+RP)**		➪	2621000	
12-21	**Mode of payment**		Cash		

Description

Title of Invention: TIDAL POWER GENERATION SYSTEM

Technical Field

[1] The present invention relates to a tidal power generation system of a double effect generation type which can generate electric power without converting a rotating direction of a hydraulic turbine, by opening and closing a sluice gate.

Background Art

[2] Tidal power generation is adapted to convert potential energy to kinetic energy using a change in sea level during the ebb and flow to produce electric energy.

[3] That is, as the tide becomes higher from the ebb tide to the high tide, the sea level also gradually becomes higher while the tide horizontally moves toward the coast. Then, in a tidal power generation system, a hydraulic turbine is installed in an inflow direction of the tide to be rotated by the tide and an electric generator is driven by a rotating force of the hydraulic turbine to produce electricity. As long as the earth and the moon exist, the tide is always horizontally moved uniformly, so many studies on tidal power which is a next-generation energy source are conducted.

[4] Tidal power generations are classified into a single pool type and a double pool type according to the number of lakes and are also classified into a single effect type and a double effect type according to the number of used flow directions of the sea.

[5] The single pool type tidal power generation uses a difference between levels of the sea and a single lake, and the double pool type tidal power generation uses a difference between levels of two lakes when the two lakes can be created, considering topography.

[6] In the Rance tidal power plant of France, which is a representative example of a tidal power plant, all of a single effect type tidal power generation, a pumping-up power generation, or a double effect type tidal power generation are possible.

[7] The single effect type tidal power generation uses a unidirectional flow from the open sea to a lake or from a lake to the open sea, and in the pumping-up power generation, water is pumped up to a lake using residual power at night and is discharged to generate electricity during the day.

[8] The double effect type tidal power generation uses a difference between levels of the open sea and a lake generated during a rising tide and an ebb tide to generate electricity in a bidirectional way. In this method, power is generated when the tide starts to move from the open sea to the lake and the sluice gate is closed when the levels of the open sea and the lake become the same. Subsequently, if a level of the lake becomes higher than that of the open sea, the sluice gate is opened again and the hydraulic turbine is

reversely rotated to generate electricity.

[9] Since the hydraulic turbine of the Rance tidal power plant generates electric power in a bidirectional way, its structure is more complex than that of a single effect type hydraulic turbine. In particular, the double effect type tidal power generation may be applied to an area whose tidal range is very large because electric power is generated again when a level of the lake becomes higher than that of the open sea. Thus, it is rather difficult to apply the double effect type tidal power generation to the Korean topography.

[10] Since the double effect type power generation corresponds to power generation of twice using a difference between water levels of the open sea and a lake, the difference between water levels of the open sea and a lake may be low as compared with the single effect type power generation, reducing an amount of generated power. Thus, the number of hydraulic turbines needs to be doubled in order to maintain the same amount of generated power as that of the single effect type power generation of twice.

[11] As illustrated in FIG. 1, the Shihwa Tidal power plant employs a single effect type by which electric power can be generated using a difference between water levels of the open sea and the lake when the tide flows in, and when the tide flows out, electric power is not generated and the water in the lake is discharged to the open sea.

[12] Since the single effect type power generation is possible only when the tide flows in, the use efficiency thereof is low and power cannot be smoothly supplied at a desired time. Further, an amount of generated power cannot be arbitrarily regulated. Furthermore, the yearly change in water levels due to the tide of Yellow Sea of Korea is not uniform, making it difficult to make an amount of generated power constant.

Disclosure of Invention

Technical Problem

[13] The present invention provides a tidal power generation system which can generate electric power without converting a rotating direction of a hydraulic turbine, by opening and closing a sluice gate. That is, the present invention provides a tidal power generation system which can continuously generate electric power bi-directionally using a unidirectional hydraulic turbine facility.

[14] Also, the present invention provides a tidal power generation system which performs double effect type power generation without being influenced by a change of seawater (i.e. a change in water levels due to high tide and ebb).

Solution to Problem

[15] The inventors realized that double effect type power generation can be performed only with a unidirectional hydraulic turbine facility by properly opening and closing four sluice gates installed in three reservoirs.

[16] Accordingly, the present invention provides a tidal power generation system including: a first reservoir equipped with first and second sluice gates; a second reservoir installed adjacent to the first reservoir and equipped with third and fourth sluice gates; a third reservoir installed adjacent to the first reservoir and the second reservoir and to which the second sluice gate and the fourth sluice gate are connected; and a power generation facility installed between the first reservoir and the second reservoir such that a hydraulic turbine is rotated while water in the first reservoir is discharged to the second reservoir, and configured to generate electricity while the hydraulic turbine is rotated, wherein electric power is generated continuously during opening/closing operations of the first and second sluice gates and the third and fourth sluice gates.

[17] The first sluice gate and the fourth sluice gate may be simultaneously opened and closed and the second sluice gate and the third sluice gate may be simultaneously opened and closed, and the first sluice gate and the second sluice gate may be alternately opened and closed, whereby electric power is generated continuously.

[18] The first sluice gate and the second sluice gate of the first reservoir may be installed opposite to each other.

[19] The third sluice gate and the fourth sluice gate of the second reservoir may be installed opposite to each other.

[20] The first sluice gate and the third sluice gate may be installed in a same direction.

[21] Seawater of the open sea may be introduced and discharged through the first sluice gate and the third sluice gate.

[22] The first sluice gate and the fourth sluice gate may be opened and the second sluice gate and the third sluice gate may be closed, such that seawater is introduced through the first sluice gate, passes through the power generation facility and the fourth sluice gate, and is stored in the third reservoir.

[23] The first sluice gate and the fourth sluice gate may be closed and the second sluice gate and the third sluice gate may be opened, such that seawater stored in the third reservoir is introduced through the second sluice gate and passes through the power generation facility and the third sluice gate to be discharged.

Advantageous Effects of Invention

[24] According to the present invention, double effect type power generation can be performed by continuously operating a power generation facility even at a marginal time other than high tide and ebb using a hydraulic turbine rotating in a single direction.

[25] Further, since the double effect type power generation is possible so that a difference between water levels of reservoirs can be controlled, an amount of generated power

and a power generation time can be easily regulated.

[26] Furthermore, since the double effect type power generation can be performed by a hydraulic turbine rotating in a single direction, more electric power can be generated as compared with a case of using a same number of hydraulic turbines in the conventional double effect type power generation.

Brief Description of Drawings

[27] The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

[28] FIG. 1 is a concept view illustrating a power generation principle of a conventional tidal power plant of Shihwa Lake of Korea;

[29] FIGS. 2 and 3 are plan views of a tidal power generation system according to an embodiment of the present invention; and

[30] FIGS. 4 to 6 illustrate construction states of the tidal power generation system according to the embodiment of the present invention.

Best Mode for Carrying out the Invention

[31] The present invention provides a tidal power generation system including: a first reservoir equipped with first and second sluice gates; a second reservoir installed adjacent to the first reservoir and equipped with third and fourth sluice gates; a third reservoir installed adjacent to the first reservoir and the second reservoir and to which the second sluice gate and the fourth sluice gate are connected; and a power generation facility installed between the first reservoir and the second reservoir such that a hydraulic turbine is rotated while water in the first reservoir is discharged to the second reservoir, and configured to generate electricity while the hydraulic turbine is rotated.

[32] Electric power is generated continuously during opening/closing operations of the first and second sluice gates and the third and fourth sluice gates.

Mode for the Invention

[33] Hereinafter, an exemplary embodiment of the present invention will be described in detail with reference to the accompanying drawings.

[34] FIGS. 2 and 3 are plan views of a tidal power generation system according to an embodiment of the present invention, wherein FIG. 2 illustrates a state where the tide of the open sea 50 is in and FIG. 3 illustrates a state where the tide of the open sea 50 is on the ebb.

[35] A first reservoir 10 is equipped with a first sluice gate 11 and a second sluice gate 12. The first sluice gate 11 and the second sluice gate 12 are preferably installed parallel to each other.

[36] A second reservoir 20 is installed adjacent to the first reservoir 10.

[37] The second reservoir 20 is equipped with a third sluice gate 21 and a fourth sluice gate 22. The third sluice gate 21 and the fourth sluice gate 22 are preferably installed in parallel to each other.

[38] The first sluice gate 11 of the first reservoir 10 and the third sluice gate 21 of the second reservoir 20 are preferably installed in series on a straight line.

[39] The first sluice gate 11 of the first reservoir 10 and the third sluice gate 21 of the second reservoir 20 are connected to the open sea 50 so that the seawater can be introduced and discharged through the first sluice gate 11 and the third sluice gate 21.

[40] The second sluice gate 12 of the first reservoir 10 and the fourth sluice gate 22 of the second reservoir 20 are connected to a third reservoir 30.

[41] In more detail, after electric power is generated while seawater flows from the first reservoir 10 to the second reservoir 20, the seawater stored in the second reservoir 20 is flowed into the third reservoir 30 through the fourth sluice gate 22. The seawater stored in the third reservoir 30 is introduced into the first reservoir 10 through the second sluice gate 12.

[42] The second sluice gate 12 of the first reservoir 10 and the fourth sluice gate 22 of the second reservoir 20 are preferably installed in series on a straight line.

[43] The sluice gates 11, 12, 21, and 22 may be designed and disposed to allow the seawater to be introduced and discharged freely, so the present invention is not limited to them.

[44] The sluice gates 11, 12, 21, and 22 may be opened and closed by using mechanical, hydraulic, and pneumatic means.

[45] The locations, sizes, intervals, number, and opening/closing methods of the sluice gates may be suitably selected, considering the topographical features of the power plant, the amount of generated electric power, etc. Preferably, more than ten sluice gates may be installed, but the present invention is not limited thereto.

[46] The third reservoir 30 serves as a storage vessel for removing the water stored in the first reservoir 10 or the second reservoir 20 to perform subsequent tidal power generation continuously after electric power is generated.

[47] The third reservoir 30 also serves as a water supply for supplying water to the first reservoir 10 or the second reservoir 20 so that tidal power generation can be performed continuously even when the seawater of the open sea fails to be supplied.

[48] As illustrated in FIGS. 2 and 3, the third reservoir 30 may be installed separately.

[49] The third reservoir 30 may be replaced by the remaining lake part left after a seawall is constructed as in the tidal generation system of FIGS. 4 to 6 and the first reservoir 10 and the second reservoir 20 are installed.

[50] FIGS. 4 to 6 illustrate a construction state of the tidal power generation system where the sluice gates are disposed respectively. In more detail, the first sluice gate 11 and

the second sluice gate 12 are installed in parallel to each other, the third sluice gate 21 and the fourth sluice gate 22 are installed in parallel to each other, and the first sluice gate 11 and the third sluice gate 21, and the second sluice gate 12 and the fourth sluice gate 22 are installed in series on straight lines respectively.

[51] FIG. 5 illustrates a construction state where the second sluice gate 12 is installed in a side wall direction with respect to the first sluice gate 11 and the fourth sluice gate 22 is installed in a side wall direction with respect to the third sluice gate 21, the first sluice gate 11 and the third sluice gate 21 are installed in series on a straight line, and the second sluice gate 12 and the fourth sluice gate 22 are installed in parallel to each other.

[52] FIG. 6 illustrates a construction state where the second sluice gate 12 is installed in a side wall direction with respect to the first sluice gate 11, the third sluice gate 21 and the fourth sluice gate 22 are installed in parallel to each other, and the first sluice gate 11 and the third sluice gate 21 are installed in series on a straight line.

[53] The power generation facility 40 is installed between the first reservoir 10 and the second reservoir 20.

[54] The power generation facility 40 discharges the seawater in the first reservoir 10 to the second reservoir 20 to rotate the hydraulic turbine, but is not specifically limited as long as it can generate electric power as rotating energy is converted to electric energy while the hydraulic turbine is rotated.

[55] The hydraulic turbine of the present invention is rotated only in one flow direction of water, considering economical aspects such as enhancement of power generation efficiency, power generation management, and maintenance costs. In more detail, the hydraulic turbine of the present invention is rotated only by the water flowing from the first reservoir 10 to the second reservoir 20.

[56] The location of the power generation facility, and the intervals and number of the sluice gates may be regulated, considering a planned amount of generated electric power. Preferably, ten or more hydraulic turbines may be installed.

[57] In the tidal power generation system of the present invention, the first sluice gate and the fourth sluice gate are simultaneously opened and closed, the second sluice gate and the third sluice gate are simultaneously opened and closed, and the first sluice gate and the second sluice gate are alternately opened and closed, whereby electric power can be generated continuously. That is, double effect type power generation can be performed without converting the rotating direction of the hydraulic turbines.

[58] In more detail, as illustrated in FIG. 1, when the tide of the open sea 50 is in, the first sluice gate 11 of the first reservoir 10 and the fourth sluice of the second reservoir 20 are opened and the second sluice gate 12 of the first reservoir 10 and the third sluice gate 21 of the second reservoir are closed. In this case, the seawater is introduced

through the first sluice gate 11 of the first reservoir 10 to generate electric power by using the power generation facility 40 and the seawater having passed the fourth sluice gate 22 of the second reservoir 20 is stored in the third reservoir 30.

[59] As illustrated in FIG. 2, when the open sea 20 is on the ebb, the first sluice gate 11 of the first reservoir 10 and the fourth sluice gate 22 of the second reservoir 20 are closed and the second sluice gate 12 of the first reservoir 10 and the third sluice gate 21 of the second reservoir 20 are opened. In this case, the seawater stored in the third reservoir 30 is introduced through the second sluice gate 12 of the first reservoir 10 to generate electric power by using the power generation facility 40, and the seawater having passed the third sluice gate 21 of the second reservoir 20 is discharged to the open sea 50.

[60] The tidal power generation system of the present invention can generate electric power continuously at least four times per day. When the same topography for power generation, the same difference in water levels and the same number of hydraulic turbines as those of Shihwa Lake are maintained, the generated electric power can be increased at least twice, as compared with approximately 550 million Kw/h corresponding to an amount of electric power which is expected in Shihwa Lake.

[61] Further, since the tidal power generation system of the present invention generates electric power by using the hydraulic turbines rotating in a single direction and the reservoirs in a doubly effective manner, a difference between the water levels of the reservoirs can be controlled. Since a difference between the water levels of the reservoir can be controlled, when a same number of hydraulic turbines are used, more electric power can be generated as compared with the conventional double effect type power generation where a difference between water levels becomes gradually smaller than at an initial stage.

[62] Although the present invention has been described with reference to the limited examples and drawings, the present invention is not limited thereto and those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

[Claim 1] A tidal power generation system comprising:
a first reservoir equipped with first and second sluice gates;
a second reservoir installed adjacent to the first reservoir and equipped with third and fourth sluice gates;
a third reservoir installed adjacent to the first reservoir and the second reservoir and to which the second sluice gate and the fourth sluice gate are connected; and
a power generation facility installed between the first reservoir and the second reservoir such that a hydraulic turbine is rotated while water in the first reservoir is discharged to the second reservoir, and configured to generate electricity while the hydraulic turbine is rotated,
wherein electric power is generated continuously during opening/closing operations of the first and second sluice gates and the third and fourth sluice gates.

[Claim 2] The tidal power generation system as claimed in claim 1, wherein the first sluice gate and the fourth sluice gate are simultaneously opened and closed and the second sluice gate and the third sluice gate are simultaneously opened and closed, and the first sluice gate and the second sluice gate are alternately opened and closed, whereby electric power is generated continuously.

[Claim 3] The tidal power generation system as claimed in claim 2, wherein the first sluice gate and the second sluice gate of the first reservoir are installed in parallel to each other.

[Claim 4] The tidal power generation system as claimed in claim 2, wherein the third sluice gate and the fourth sluice gate of the second reservoir are installed in parallel to each other.

[Claim 5] The tidal power generation system as claimed in claim 3 or 4, wherein the first sluice gate and the third sluice gate are installed in series on a straight line.

[Claim 6] The tidal power generation system as claimed in claim 5, wherein seawater of the open sea is introduced and discharged through the first sluice gate and the third sluice gate.

[Claim 7] The tidal power generation system as claimed in claim 6, wherein the first sluice gate and the fourth sluice gate are opened and the second sluice gate and the third sluice gate are closed, such that seawater is introduced through the first sluice gate, passes through the power

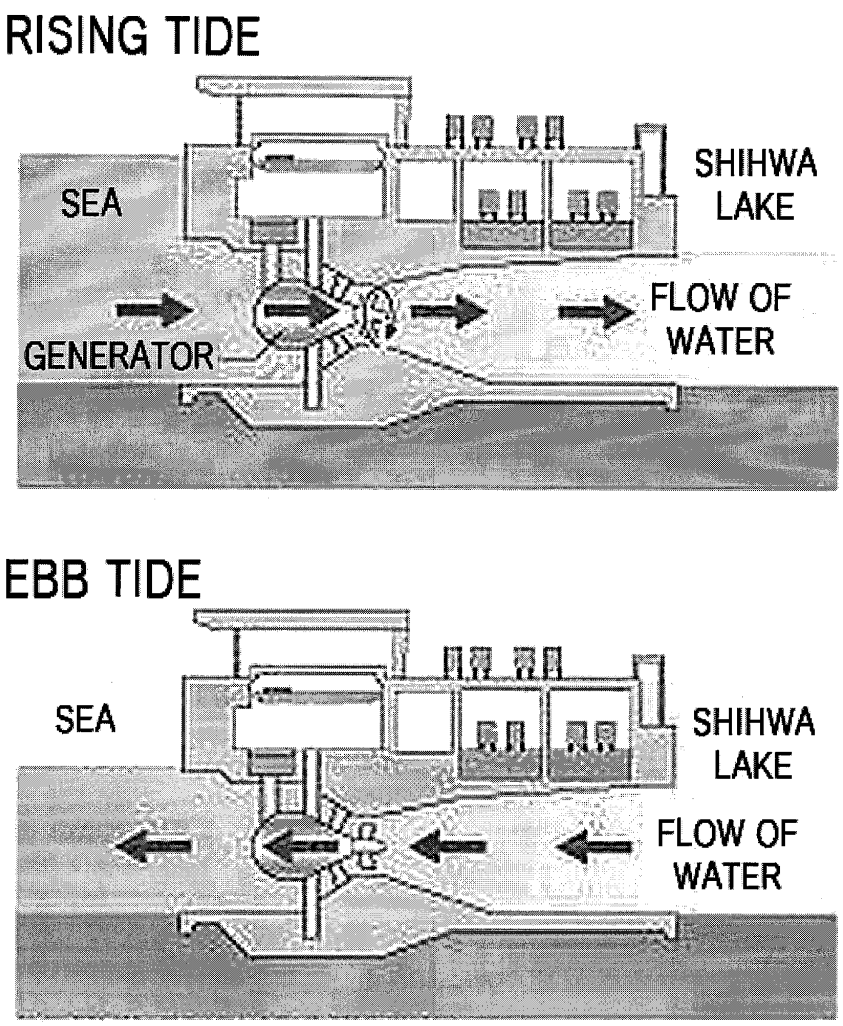
generation facility and the fourth sluice gate, and is stored in the third reservoir.

[Claim 8] The tidal power generation system as claimed in claim 6, wherein the first sluice gate and the fourth sluice gate are closed and the second sluice gate and the third sluice gate are opened, such that seawater stored in the third reservoir is introduced through the second sluice gate and passes through the power generation facility and the third sluice gate to be discharged.

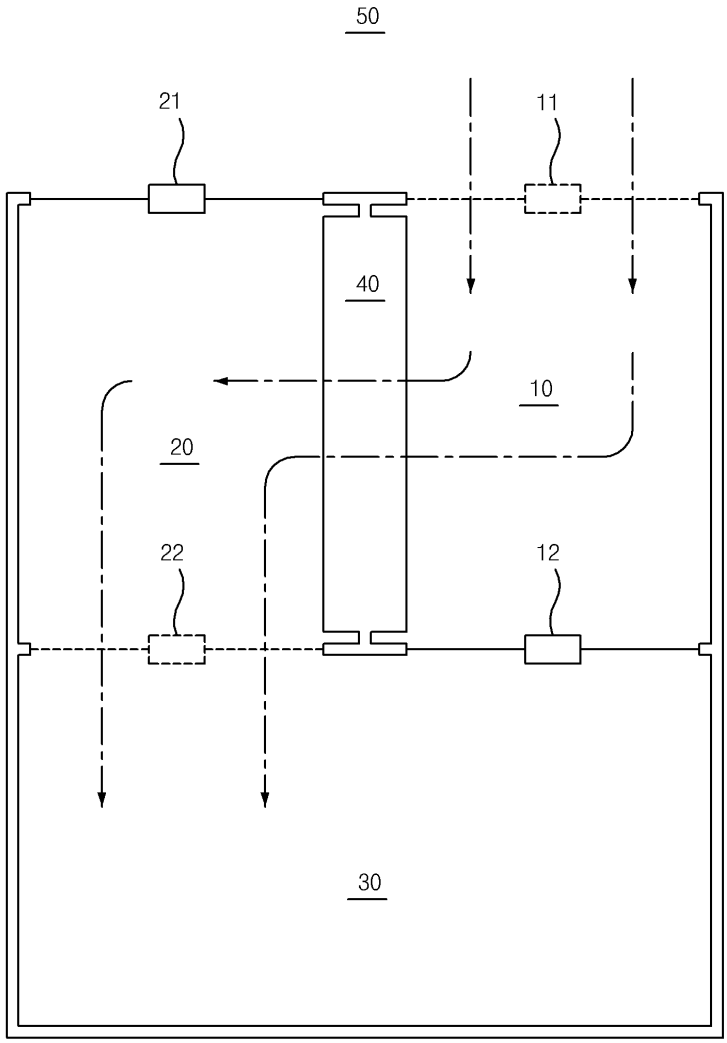
Abstract

A tidal power generation system includes: a first reservoir equipped with first and second sluice gates; a second reservoir installed adjacent to the first reservoir and equipped with third and fourth sluice gates; a third reservoir installed adjacent to the first reservoir and the second reservoir and to which the second sluice gate and the fourth sluice gate are connected; and a power generation facility installed between the first reservoir and the second reservoir such that a hydraulic turbine is rotated while water in the first reservoir is discharged to the second reservoir, and configured to generate electricity while the hydraulic turbine is rotated. Electric power is generated continuously during opening/closing operations of the first and second sluice gates and the third and fourth sluice gates. Accordingly, since double effect type power generation can be performed by continuously operating a power generation facility even at a marginal time other than high tide and ebb tide using a hydraulic turbine rotating in a single direction, an amount of generated electric power and power generation time can be easily regulated, making it possible to increase an amount of generated electric power with a same number of hydraulic turbines as compared with a conventional double effect type power generation.

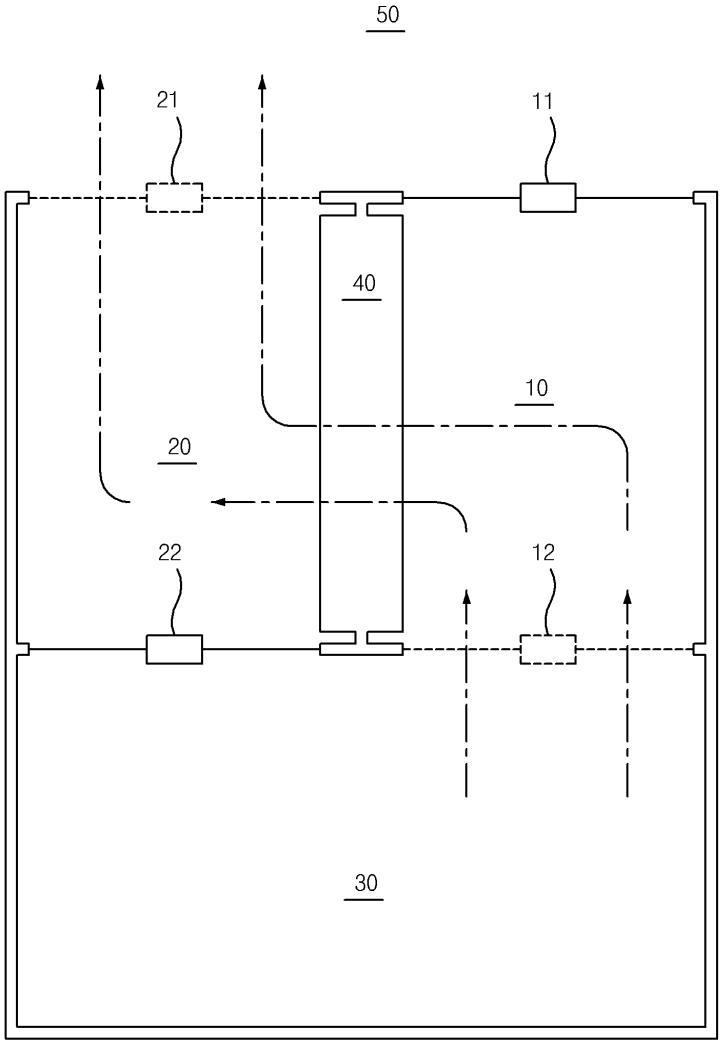
[Fig. 1]


RISING TIDE
SEA
SHIHWA LAKE
FLOW OF WATER
GENERATOR
EBB TIDE
SEA
SHIHWA LAKE
FLOW OF WATER
DISCHARGE WATER WITHOUT GENERATING ELECTRIC POWER

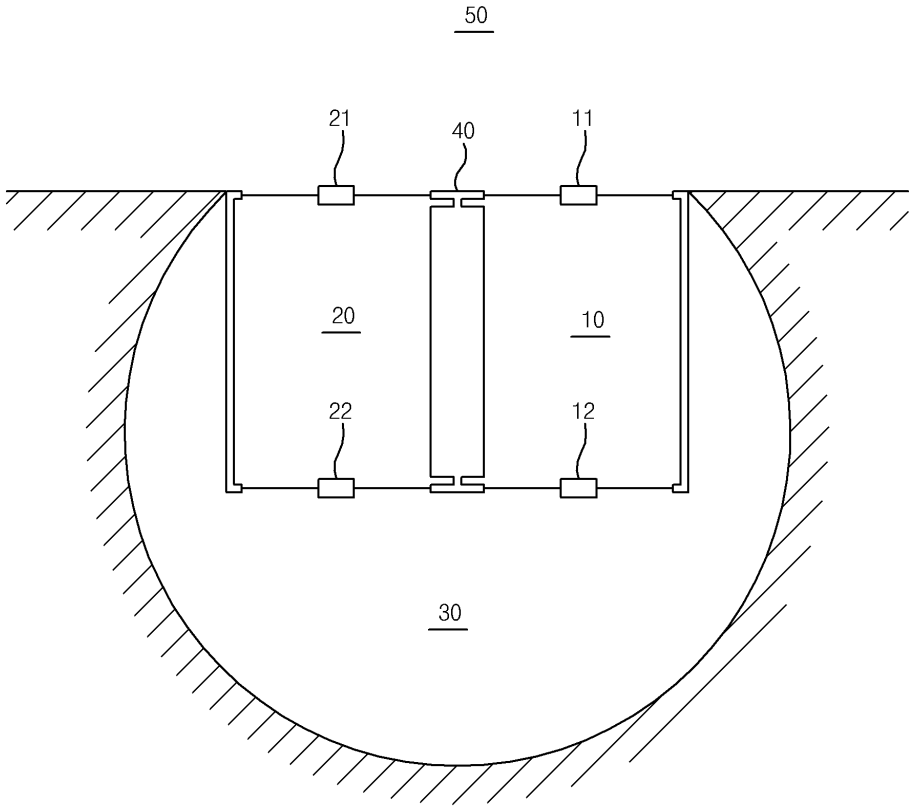
[Fig. 2]



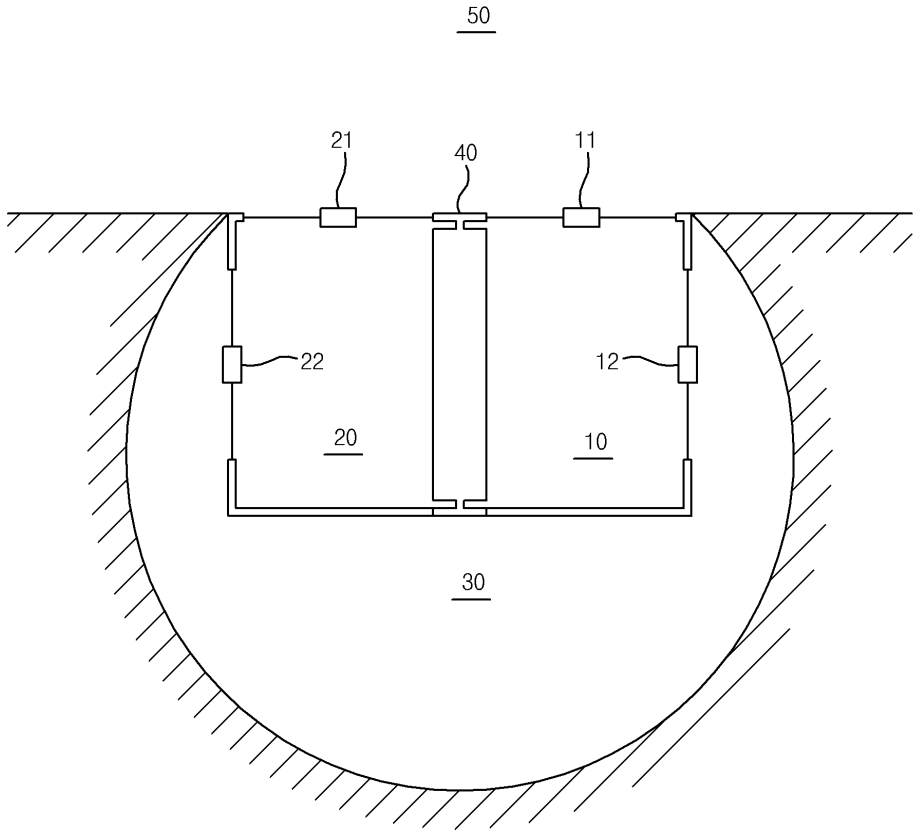
[Fig. 3]



[Fig. 4]



[Fig. 5]



[Fig. 6]