



(11)

EP 4 773 151 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.07.2026 Bulletin 2026/28

(21) Application number: **24860481.1**

(22) Date of filing: **30.08.2024**

(51) International Patent Classification (IPC):
G21F 9/30 ^(2006.01) **G21F 5/12** ^(2006.01)
G21F 5/002 ^(2006.01) **G21F 5/005** ^(2006.01)

(52) Cooperative Patent Classification (CPC):
G21F 5/002; G21F 5/005; G21F 5/12; G21F 9/30

(86) International application number:
PCT/KR2024/013096

(87) International publication number:
WO 2025/048565 (06.03.2025 Gazette 2025/10)

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **01.09.2023 KR 20230116438**

(71) Applicant: **Korea Hydro & Nuclear Power Co., Ltd
Gyeongju-si, Gyeongsangbuk-do 38120 (KR)**

(72) Inventors:
• **HWANG, Young Hwan
Daejeon 34101 (KR)**

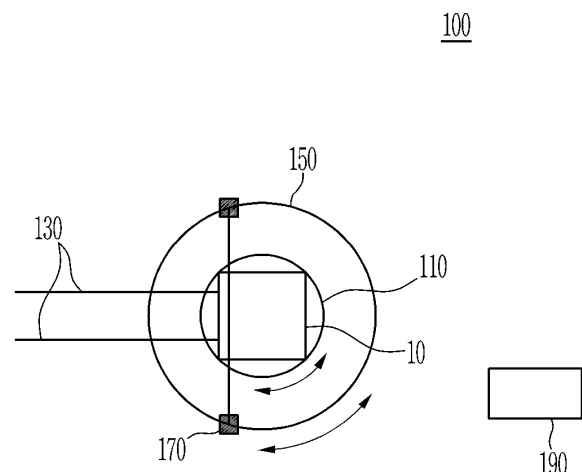
• **HWANG, Seok-Ju
Daejeon 34101 (KR)**
• **LEE, Mi-Hyun
Daejeon 34101 (KR)**
• **SON, Jung-Kwon
Daejeon 34101 (KR)**
• **KIM, Cheon-Woo
Daejeon 34101 (KR)**

(74) Representative: **Winter, Brandl - Partnerschaft
mbB
Alois-Steinecker-Straße 22
85354 Freising (DE)**

(54) **RAIL-TYPE LARGE CONCRETE DRUM CUTTING AND DISMANTLING SYSTEM AND METHOD**

(57) A rail-type large concrete drum cutting and dismantling system includes: a moving rail that loads a large concrete drum that is a radioactive waste to linearly move the large concrete drum to a predetermined position; a rotating platform that sequentially rotates the large concrete drum disposed at the predetermined position to be moved along the moving rail at a predetermined angle according to a predetermined cutting and dismantling control program; a guide rail device that is installed at a predetermined distance around the rotating platform, disposes a cutting device at a predetermined height with respect to the rotating platform, and moves the cutting device at a predetermined angle at the predetermined height; a cutting and dismantling device that cuts and dismantles the large concrete drum while moving along the guide rail device at a predetermined angle; and a control device that remotely controls the moving rail, the rotating platform, the guide rail device, and the cutting and dismantling device according to the cutting and dismantling control program.

【Figure 1】



EP 4 773 151 A1

Description**[Technical Field]**Cross-reference to related application(s)

[0001] This application claims priority to and the benefit of Korean Patent Application No. 10-2023-0116438 filed with the Korean Intellectual Property Office on September 1, 2023, the entire contents of which are incorporated herein by reference.

[0002] The present disclosure relates to a rail-type large concrete drum cutting and dismantling system and method, and more particularly, to a rail-type large concrete drum cutting and dismantling system and method capable of smoothly moving, manipulating, and handling a large concrete drum and remotely cutting and dismantling the large concrete drum without access of a worker.

[Background Art]

[0003] A large concrete container including a high-dose concentrated waste liquid and a high-dose spent resin is being stored in a radioactive waste storage for a long period.

[0004] The large concrete container includes a radioactive waste drum, and includes a concrete block-shaped outside wall with a thickness of about 10 cm to weigh 6 tons or more, and there is an insufficient device for manipulating and handling the very large and heavy concrete container.

[0005] Because the radioactive waste drum inside the large concrete container still poses a risk of exposure, a dedicated cutting and dismantling device for efficiently performing a cutting and dismantling process is required to smoothly perform the cutting and dismantling process.

[0006] Additionally, the large concrete drum should be able to be effectively cut and disassembled remotely without access of a worker, and the large concrete drum should be stably manipulated and handled and should be disposed at a correct position.

[Disclosure]**[Technical Problem]**

[0007] The present disclosure is intended to solve the problem described above, and a purpose of the present disclosure is intended to provide a rail-type large concrete drum cutting and dismantling system and method capable of effectively cutting and dismantling a large concrete drum, safely manipulating and handling the large concrete drum, disposing the large concrete drum at a correct position, and remotely cutting and dismantling the large concrete drum without proximity of a worker.

[Technical Solution]

[0008] A rail-type large concrete drum cutting and dismantling system according to an embodiment of the present disclosure includes: a moving rail that loads a large concrete drum that is a radioactive waste to linearly move the large concrete drum to a predetermined position; a rotating platform that sequentially rotates the large concrete drum disposed at the predetermined position to be moved along the moving rail at a predetermined angle according to a predetermined cutting and dismantling control program; a guide rail device that is installed at a predetermined distance around the rotating platform, disposes a cutting device at a predetermined height with respect to the rotating platform, and moves the cutting device at a predetermined angle at the predetermined height; a cutting and dismantling device that cuts and dismantles the large concrete drum while moving along the guide rail device at a predetermined angle; and a control device that remotely controls the moving rail, the rotating platform, the guide rail device, and the cutting and dismantling device according to the cutting and dismantling control program.

[0009] A rail-type large concrete drum cutting and dismantling method according to an embodiment of the present disclosure includes: disposing a large concrete drum above a rotating platform where cutting and dismantling is performed by operating a moving rail; moving a cutting and dismantling device dismantling the large concrete drum along a guide rail installed at an outer perimeter portion of the rotating platform to dispose the cutting and dismantling device at a correct cutting position on an upper portion of the large concrete drum; performing first cutting and dismantling on the large concrete drum by raising and lowering the cutting and dismantling device for the large concrete drum; and rotating the rotating platform at a predetermined angle according to a cutting and dismantling control program.

[Advantageous Effects]

[0010] A rail-type large concrete drum cutting and dismantling system and method according to embodiments of the present disclosure may effectively cut and dismantle a large concrete drum, may safely manipulate and handle the large concrete drum, may dispose the large concrete drum at a correct position, and may remotely cut and dismantle the large concrete drum without proximity of a worker.

[Description of the Drawings]**[0011]**

FIG. 1 is a conceptual diagram of a rail-type large concrete drum cutting and dismantling system according to an embodiment of the present disclosure. FIG. 2 is a conceptual diagram of a cutting and

dismantling device used in FIG. 1.

FIG. 3 is a block diagram showing a configuration of a control device of the rail-type large concrete drum cutting and dismantling system according to an embodiment of the present disclosure.

FIG. 4 is a flowchart describing a rail-type large concrete drum cutting and dismantling method according to an embodiment of the present disclosure.

[Mode for Invention]

[0012] An embodiment of the present disclosure will be described in detail hereinafter with reference to the accompanying drawings so that those skilled in the art to which the present disclosure belongs could easily implement the embodiment. The present disclosure may be modified in various ways, all without departing from the spirit or scope of the present disclosure.

[0013] Unless explicitly stated to the contrary, the word "comprise" and variations such as "comprises" and "comprising" in the specification and the claims should be understood to imply the inclusion of stated elements but not the exclusion of any other elements.

[0014] Hereinafter, a rail-type large concrete drum cutting and dismantling system and method according to embodiments of the present disclosure will be described in detail with reference to FIGS. 1 to 4.

[0015] First, the rail-type large concrete drum cutting and dismantling system according to embodiments of the present disclosure will be described with reference to FIGS. 1 to 3.

[0016] FIG. 1 is a conceptual diagram of a rail-type large concrete drum cutting and dismantling system according to an embodiment of the present disclosure, FIG. 2 is a conceptual diagram of a cutting and dismantling device used in FIG. 1, and FIG. 3 is a block diagram showing a configuration of a control device of the rail-type large concrete drum cutting and dismantling system according to an embodiment of the present disclosure.

[0017] As shown in FIGS. 1 to 3, a rail-type large concrete drum cutting and dismantling system 100 according to an embodiment of the present disclosure may include a moving rail (or a rotating platform moving rail) 130, a large concrete drum rotating platform 110, a guide rail device 150 for the cutting and dismantling device, a cutting and dismantling device 170, and a control device 190.

[0018] The rail-type large concrete drum cutting and dismantling system 100 according to the embodiment of the present disclosure may include the moving rail 130 for loading a large concrete drum 10 to linearly move the large concrete drum 10 to a predetermined position (i.e., a position at which the rotating platform 110 is disposed); the rotating platform 110 for sequentially rotating the large concrete drum 10 disposed at the predetermined position to be moved along the moving rail 130 at a predetermined angle according to a cutting and dismantling control program stored in a memory portion 190A;

the guide rail device 150 installed at a predetermined distance around the rotating platform 110, disposing a cutting device 171 at a predetermined height with respect to the rotating platform 110, and moving the cutting device 171 at a predetermined angle at the predetermined height; the cutting and dismantling device 170 for cutting and dismantling the large concrete drum 10 by moving along the guide rail device 150 at a predetermined angle while raising and lowering the cutting device 171 with respect to the large concrete drum 10; and the control device 190 remotely controlling operations of the moving rail 130, the rotating platform 110, the guide rail device 150, and the cutting and dismantling device 170 according to the cutting and dismantling control program.

[0019] If the large concrete drum 10 is loaded on the moving rail 130, the rail-type large concrete drum cutting and dismantling system 100 according to the embodiment of the present disclosure may be configured to be capable of rotating 360 degrees and the large concrete drum 10 may be moved to the rotating platform 110 supporting the large concrete drum 10 so that the large concrete drum 10 is disposed at a correct position for cutting and dismantling the large concrete drum 10 with respect to the cutting and dismantling device 170.

[0020] The rotating platform 110 may be configured to be capable of rotating 360 degrees to be linked to the cutting and dismantling device 170 under a control of the control device 190 so that it smoothly performs a cutting and dismantling process.

[0021] The rotating platform 110 may rotate according to a design of the cutting and dismantling process of the control device 190, and may facilitate an efficient cutting and dismantling process.

[0022] The guide rail device 150 disposed outside the rotating platform 110 may include a guide rail 151 having a circular shape, and the cutting device 171 capable of cutting and dismantling the large concrete drum 10 may move along the guide rail 151 having the circular shape to be disposed at a correct position with respect to the large concrete drum 10.

[0023] The cutting device 171 may be a band saw or a wire saw capable of cutting the large concrete drum 10.

[0024] Thus, the moving rail 130, the rotating platform 110, the guide rail device 150, and the cutting and dismantling device 170 may be remotely controlled by the control device 190 to smoothly move, manipulate, and handle the large concrete drum 10.

[0025] Even if the large concrete drum 10 is very heavy, the large concrete drum 10 may be smoothly moved and disposed along the moving rail 130 on the rotating platform 110. The cutting and dismantling device 170 may be installed at a correct position with respect to the large concrete drum 10 by operations of the rotating platform 110 and the guide rail device 150 so that a worker may not approach the large concrete drum 10 by remotely performing cutting and disassembling of the large concrete drum 10. Thus, a risk of exposure of the worker may be reduced.

[0026] According to the rail-type large concrete drum cutting and dismantling system 100 according to the embodiment of the present disclosure, it is possible to efficiently manage a radioactive waste of the large concrete drum having a quadrangular shape or a circular shape that is being stored for a long period of time.

[0027] The large concrete drum 10 that is a heavy object may be effectively disposed at a desired position (e.g., on the rotating platform 110) by the moving rail 130, and cutting and dismantling of the large concrete drum 10 may be facilitated by linkage of the rotating platform 110 and the cutting and dismantling device 170 on the guide rail device 150 so that an exposure of the worker is reduced.

[0028] As shown in FIG. 2, the cutting and dismantling device 170 may include the cutting device 171 with a band shape capable of cutting the outside of the large concrete drum 10 such as the band saw or the wire saw; a clamping portion 173 tensilely clamping both ends of the cutting device 171; an up-and-down driving portion 175 that is disposed above an upper portion of the large concrete drum 10 and pneumatically drives the clamping portion 173 up and down in a state in which the clamping portion 173 clamps the cutting device 171; and a guide rail fixing moving portion 177 capable of moving along the guide rail 151 of the guide rail device 150.

[0029] If the outside of the large concrete drum 10 is cut once by the cutting and dismantling device 170, the cutting and dismantling device 170 may be disposed relative to the large concrete drum 10 by moving the rotating platform 110 to a predetermined angle so that a next cutting and dismantling operation is performed.

[0030] As shown in FIG. 3, the control device 190 of the rail-type large concrete drum cutting and dismantling system 100 according to the embodiment of the present disclosure may remotely control the moving rail 130, the rotating platform 110, the guide rail device 150, and the cutting and dismantling device 170.

[0031] To this end, the control device 190 may include the memory portion 190A in which a predetermined cutting and dismantling control program is stored; a loading control portion 191 controlling loading of the large concrete drum 10 on the moving rail 130; a moving rail control portion 193 controlling the moving rail 130 in linkage with the loading control portion 191 so that the loading of the large concrete drum 10 may be confirmed and the large concrete drum 10 may be moved to a predetermined position; a rotating platform control portion 195 controlling a rotation of a predetermined angle and fixing of the rotating platform according to the cutting and dismantling control program; a guide rail control portion 197 that allows the guide rail fixing moving portion 177 of the cutting and dismantling device 170 to move on the guide rail 151 of the guide rail device 150 according to the cutting and dismantling control program; and a cutting device control portion 199 controlling the up-and-down driving portion 175 for a cutting operation of the cutting device 171.

[0032] A rail-type large concrete drum cutting and dismantling method according to an embodiment of the present disclosure will now be described with reference to FIG. 4.

[0033] FIG. 4 is a flowchart describing the rail-type large concrete drum cutting and dismantling method according to the embodiment of the present disclosure.

[0034] As shown in FIG. 4, in the rail-type large concrete drum cutting and dismantling method according to the embodiment of the present disclosure, the large concrete drum 10 loaded on the moving rail 130 under a control of the loading control portion 191 may be operated under a control of the moving rail control portion 193 to be disposed on the rotating platform 110 (S110).

[0035] The large concrete drum rotating platform 110 may be configured to be capable of rotating 360 degrees. Thus, the cutting device 171 of the cutting and dismantling device 170 may be disposed at a predetermined position on the upper portion of the large concrete drum so that the cutting device control portion 199 of the control device 190 may smoothly perform the cutting and dismantling process (S120).

[0036] The large concrete drum cutting device 171 may be moved to the predetermined position along the guide rail 151 using the cutting device 171 of the cutting and dismantling device 170 (S130).

[0037] The large concrete drum cutting device 171 may be raised and lowered by a raising and lowering operation of the up-and-down driving portion 175 to cut and dismantle the large concrete drum (S140).

[0038] In this case, the cutting device 171 may be tensioned left and right by the clamp portion 173, and may be moved left and right to assist cutting and disassembling of the cutting device 171.

[0039] If the large concrete drum is cut and disassembled once, the rotating platform 130 may be rotated next time at a predetermined angle according to the cutting and dismantling control program of the control device 190 by the rotating platform control portion 195 to perform the cutting and dismantling process a predetermined number of times (S150).

[0040] The rail-type large concrete drum cutting and dismantling method according to the embodiment of the present disclosure may effectively cut and dismantle the large concrete drum, may safely manipulate and handle the large concrete drum, may dispose the large concrete drum at a correct position, and may remotely cut and dismantle the large concrete drum without proximity of the worker.

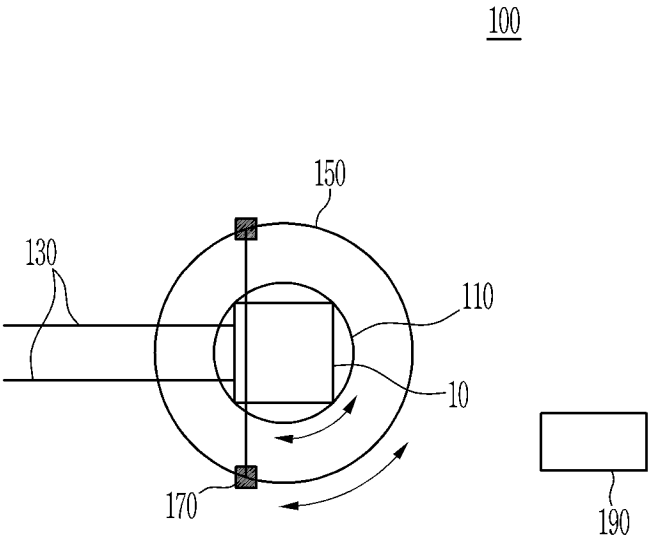
Claims

1. A rail-type large concrete drum cutting and dismantling system, comprising:

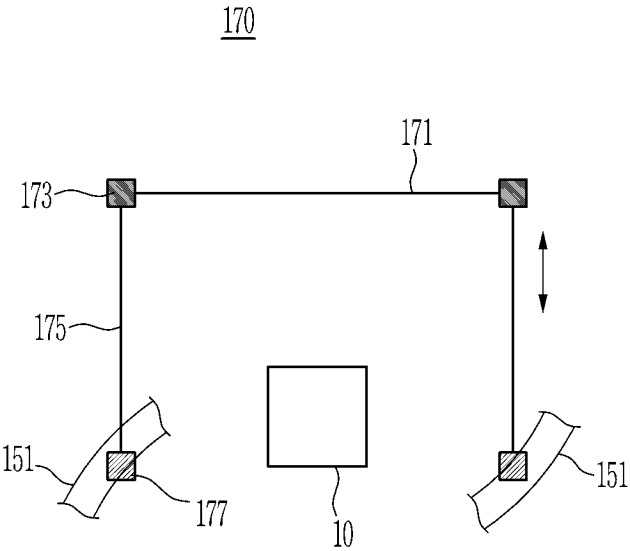
a moving rail that loads a large concrete drum that is a radioactive waste to linearly move the

- large concrete drum to a predetermined position;
- a rotating platform that sequentially rotates the large concrete drum disposed at the predetermined position to be moved along the moving rail at a predetermined angle according to a predetermined cutting and dismantling control program;
- a guide rail device that is installed at a predetermined distance around the rotating platform, disposes a cutting device at a predetermined height with respect to the rotating platform, and moves the cutting device at a predetermined angle at the predetermined height;
- a cutting and dismantling device that cuts and dismantles the large concrete drum while moving along the guide rail device at a predetermined angle; and
- a control device that remotely controls the moving rail, the rotating platform, the guide rail device, and the cutting and dismantling device according to the cutting and dismantling control program.
2. The rail-type large concrete drum cutting and dismantling system of claim 1, wherein the rotating platform fixes and supports the large concrete drum during a first cutting and dismantling operation of the cutting and dismantling device for the large concrete drum, and is rotatable at a predetermined angle for a next cutting and dismantling operation after the first cutting and dismantling operation of the cutting and dismantling device.
3. The rail-type large concrete drum cutting and dismantling system of claim 1, wherein the guide rail device comprises a guide rail disposed at an outer perimeter portion of the rotating platform, and the cutting and dismantling device comprises the cutting device having a band shape, a clamping portion tensilely clamping both ends of the cutting device, an up-and-down driving portion that is disposed above an upper portion of the large concrete drum and drives the clamping portion up and down with respect to the large concrete drum in a state in which the clamping portion clamps the cutting device, and a guide rail fixing moving portion that is fixedly supported and movable with respect to the guide rail.
4. The rail-type large concrete drum cutting and dismantling system of claim 1, wherein the control device comprises:
- a loading control portion that controls the large concrete drum to be loaded on the moving rail;
- a moving rail control portion that controls the moving rail in linkage with the loading control portion so that the loading of the large concrete drum is confirmed and the large concrete drum is moved to a predetermined position;
- a rotating platform control portion that controls a rotation of a predetermined angle and fixing of the rotating platform according to the cutting and dismantling control program; and
- a guide rail control portion that allows the cutting and dismantling device to move on the guide rail according to the cutting and dismantling control program.
5. The rail-type large concrete drum cutting and dismantling system of claim 1, further comprising a cutting device control portion that controls the cutting device to be driven up and down or left and right with respect to the large concrete drum for a cutting operation of the cutting and dismantling device for the large concrete drum.
6. A rail-type large concrete drum cutting and dismantling method, comprising:
- disposing a large concrete drum above a rotating platform where cutting and dismantling is performed by operating a moving rail;
- moving a cutting and dismantling device dismantling the large concrete drum along a guide rail installed at an outer perimeter portion of the rotating platform to dispose the cutting and dismantling device at a correct cutting position on an upper portion of the large concrete drum;
- performing first cutting and dismantling on the large concrete drum by raising and lowering the cutting and dismantling device for the large concrete drum; and
- rotating the rotating platform at a predetermined angle according to a cutting and dismantling control program.
7. The rail-type large concrete drum cutting and dismantling method of claim 6, further comprising:
- loading the large concrete drum on the moving rail;
- confirming that the large concrete drum is loaded on the moving rail;
- remotely controlling the rotating platform, a guide rail device, and the cutting and dismantling device according to the cutting and dismantling control program; and
- operating the rotating platform and the cutting and dismantling device disposed above an upper portion of the rotating platform according to the cutting and dismantling control program.

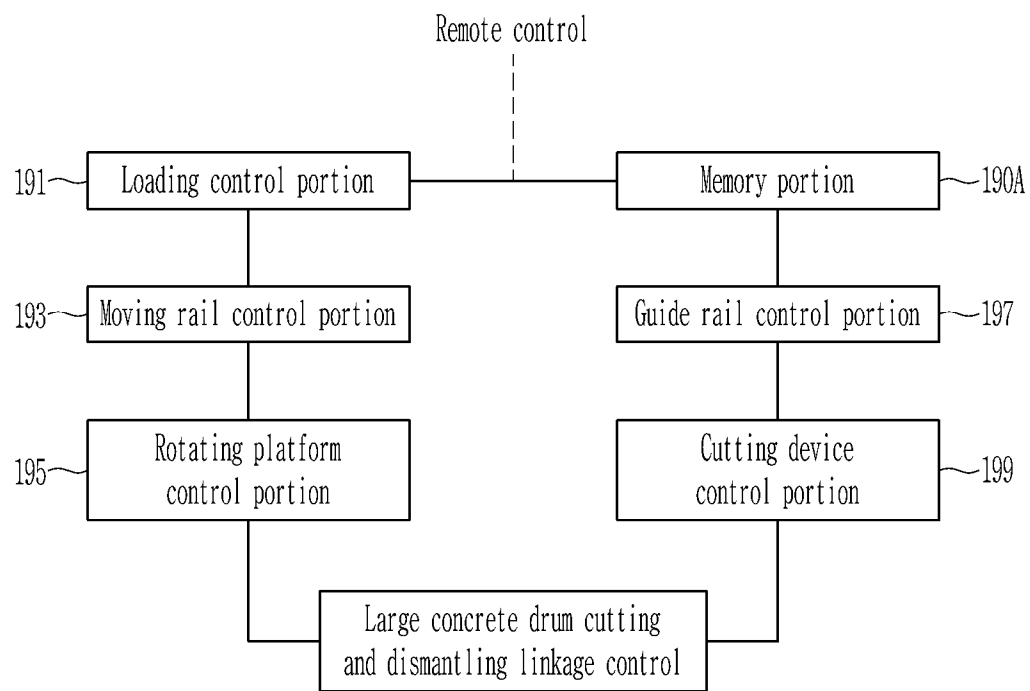
【Figure 1】



【Figure 2】

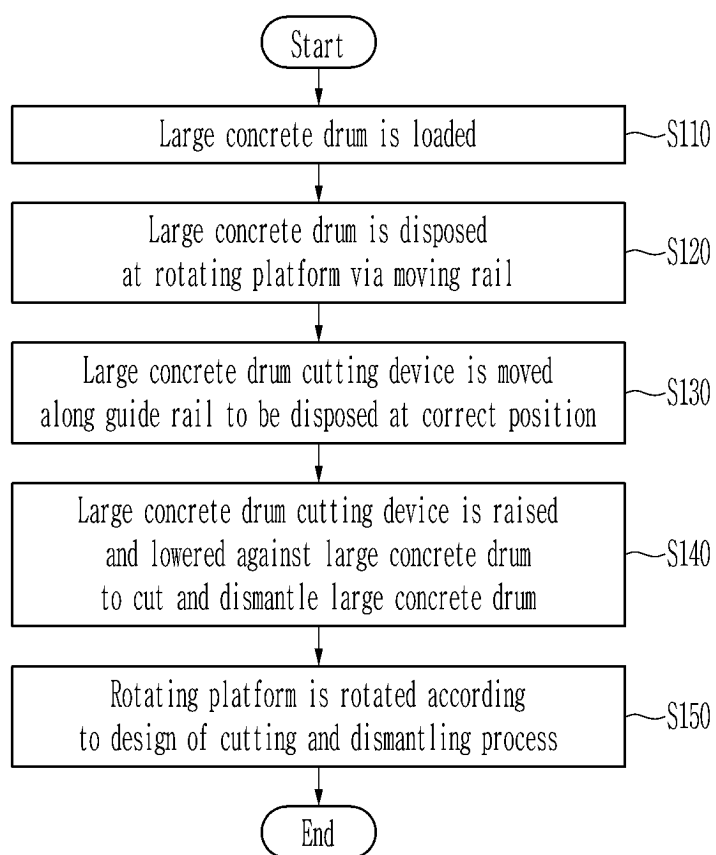


【Figure 3】



190

【Figure 4】



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/013096

A. CLASSIFICATION OF SUBJECT MATTER

G21F 9/30(2006.01)i; G21F 5/12(2006.01)i; G21F 5/002(2006.01)i; G21F 5/005(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)

G21F 9/30(2006.01); B23D 35/00(2006.01); G21C 13/00(2006.01); G21C 19/10(2006.01); G21C 19/32(2006.01);
G21F 7/06(2006.01); G21F 9/36(2006.01)

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: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 레일(rail), 절단(cutting), 해체(dismantling), 회전(rotation), 콘크리트(concrete)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-1676457 B1 (HYOSUNG C AND P CO., LTD.) 15 November 2016 (2016-11-15) See paragraphs [0015]-[0035] and [0051]-[0057]; and figures 1-4 and 11-12.	1-7
Y	JP 2021-060224 A (HITACHI PLANT CONSTRUCTION LTD.) 15 April 2021 (2021-04-15) See paragraphs [0002]-[0003], [0018] and [0022]-[0029]; and figures 1-6 and 13.	1-7
A	KR 10-2015-0075802 A (KOREA ATOMIC ENERGY RESEARCH INSTITUTE) 06 July 2015 (2015-07-06) See paragraphs [0022]-[0042]; and figures 1-7.	1-7
A	KR 10-2351442 B1 (KOREA HYDRO & NUCLEAR POWER CO., LTD.) 17 January 2022 (2022-01-17) See paragraphs [0019]-[0023]; and figures 2-3.	1-7
A	US 2014-0186144 A1 (SINGH, Krishna P.) 03 July 2014 (2014-07-03) See paragraphs [0049]-[0052]; and figures 6-9.	1-7

☐ 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

“D” document cited by the applicant in the international application

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“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

09 December 2024

Date of mailing of the international search report

09 December 2024

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208

Facsimile No. +82-42-481-8578

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2024/013096

5

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-1676457 B1	15 November 2016	None	
JP 2021-060224 A	15 April 2021	JP 7267894 B2	02 May 2023
KR 10-2015-0075802 A	06 July 2015	KR 10-1534675 B1	08 July 2015
KR 10-2351442 B1	17 January 2022	CA 3196331 A1	28 April 2022
		CN 116508113 A	28 July 2023
		EP 4235701 A1	30 August 2023
		US 2024-0001459 A1	04 January 2024
		WO 2022-086223 A1	28 April 2022
US 2014-0186144 A1	03 July 2014	CN 101960534 A	26 January 2011
		CN 101960534 B	20 August 2014
		CN 103531259 A	22 January 2014
		RU 2010-121767 A	10 December 2011
		RU 2465661 C2	27 October 2012
		UA 100707 C2	25 January 2013
		UA 104989 C2	10 April 2014
		US 10026514 B2	17 July 2018
		US 10446285 B2	15 October 2019
		US 10939787 B2	09 March 2021
		US 2008-0069291 A1	20 March 2008
		US 2009-0175404 A1	09 July 2009
		US 2012-0306172 A1	06 December 2012
		US 2013-0070885 A1	21 March 2013
		US 2014-0105347 A1	17 April 2014
		US 2016-0372224 A1	22 December 2016
		US 2017-0345520 A1	30 November 2017
		US 2018-0025796 A1	25 January 2018
		US 2018-0277273 A1	27 September 2018
		US 2019-0328189 A1	31 October 2019
		US 2021-0225540 A1	22 July 2021
		US 2022-0246321 A9	04 August 2022
		US 8135107 B2	13 March 2012
		US 8345813 B2	01 January 2013
		US 8576976 B2	05 November 2013
		US 8929504 B2	06 January 2015
		US 9728284 B2	08 August 2017
		US 9728286 B2	08 August 2017
		WO 2008-030987 A2	13 March 2008
		WO 2008-030987 A3	20 November 2008
		WO 2009-058896 A1	07 May 2009

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- KR 1020230116438 [0001]