Decision on Opposition

Opposition No. 2019-700541

Patentee SUMITOMO CONSTRUCTION MACHINERY CO., LTD.

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Opponent SHIMIZU, Sumiko

The case of opposition against the invention "EXCAVATOR" in Japanese Patent No. 6462794 has resulted in the following decision.

Conclusion

The correction of the specification and the Scope of Claims of Japanese Patent No. 6462794 shall be approved as the corrected specification and the Scope of Claims attached to the written correction request, concerning Claims 1 to 5 after the correction.

The patent according to Claims 1 to 5 of Japanese Patent No. 6462794 is maintained.

Reasons

No. 1 History of the procedures

Japanese Patent No. 6462794 is a divisional application filed on August 3, 2017 from Japanese Patent Application No. 2013-44534 filed on March 6, 2013, the establishment of patent right was registered on January 11, 2019, and the gazette containing the patent was issued on January 30, 2019.

Thereafter, the opposition to the granted patent was filed by the Opponent, SHIMIZU Sumiko (hereinafter, referred to as the "Opponent"), and an opposition against the granted patent was filed with respect to Claims 1 to 5.

The history after that is as follows.

September 30, 2019 (dispatch date): Notice of reasons for revocation

November 29, 2019: Submission of written opinion

January 6, 2020 (dispatch date): Notice of reasons for revocation (advance notice

of decision)

March 6, 2020: Submission of written opinion and request for correction

Note that, although it was notified to the Opponent that the request for correction was issued on March 6, 2020 (dispatched on March 23, 2020), the Opponent did not submit a written opinion during the designated period.

No. 2 Judgment on Propriety of Correction

1 Contents of correction

The contents of the correction according to the request for correction dated March 6, 2020 (hereinafter, referred to as "the request for correction") are as follows.

(1) Correction A

In Claim 1 of the Scope of Claims, the recitation "an excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, and an excavation attachment provided in a front central portion of the upper swivel body, comprising: a person detecting means provided on the upper swivel body and detecting a person within a predetermined range around the excavator; and a determining means mounted on the excavator and determining whether or not the person detecting means detects a person at a predetermined control cycle, wherein when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" is corrected to the recitation "an excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, an excavation attachment provided in a front central portion of the upper swivel body, and hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit, and having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, a camera provided on the upper swivel body, and a controller for controlling the engine on the basis of a selected position of the key switch, comprising: a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever

is shut off; wherein the controller has a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person; wherein the controller performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine; and wherein the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine." (post-correction Claims 2, 3, 4, and 5 directly or indirectly citing the recitation of Claim 1 are similarly corrected).

(2) Correction B

In Paragraph [0006] of the specification attached to the application, the description "an excavator according to the embodiment of the present invention is an excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, and an excavation attachment provided in a front central portion of the upper swivel body, comprising: a person detecting means provided on the upper swivel body and detecting a person within a predetermined range around the excavator; and a determining means mounted on the excavator and determining whether or not the person detecting means detects a person at a predetermined control cycle, wherein when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" is corrected to the description "an excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, an excavation attachment provided in a front central portion of the upper swivel body, and hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit, and having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, a camera provided on the upper swivel body, and a controller for controlling the engine on the basis of a selected position of the key switch, comprising: a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate; wherein the hydraulic lock state is a state in which a

hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off, wherein the controller has a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person; wherein the controller performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine; and wherein the determining means may detect a person while in the hydraulic lock state at the time of determining the start permission of the engine."

2 Propriety of the purpose of the correction, group of claims, the existence or absence of new matter, and the existence or absence of extension or change of scope of claims

(1) Regarding Correction A

A The purpose of the correction and the existence or absence of extension or change of scope of claims

(A) Addition of specification for "a hydraulic actuator"

In Correction A, for "a hydraulic actuator" in Claim 1, although there is no special additional specification before correction, it is acknowledged that the point of correcting it to "hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit" limits the invention according to Claim 1 before correction.

(B) Addition of the configuration of "an excavator"

In Correction A, for "an excavator" in Claim 1, it is acknowledged that the point of adding the specification "having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, a camera provided on the upper swivel body, and a controller for controlling the engine on the basis of a selected position of the key switch" limits the invention according to Claim 1 before correction.

(C) Embodying specification for "a hydraulic lock state"

In Correction A, for "a hydraulic lock state" in Claim 1, although it is described as "a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator," it is acknowledged that the point of correcting it to

the description "comprising: a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off" limits the invention according to Claim 1 before correction.

(D) Addition of specification for "a person detecting means"

In Correction A, for "a person detecting means detecting a person within a predetermined range around the excavator," it is acknowledged that the point of adding the description "performing image-processing on an input image from the camera" after assuming that "the controller" has it, limits the invention according to Claim 1 before correction.

(E) Addition of specification for "a determining means"

In Correction A, for "a determining means determining whether or not the person detecting means detects a person at a predetermined control cycle," it is acknowledged that the point of concretely specifying the operation of determination as "the controller performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine" after assuming that "the controller" has it, limits the invention according to Claim 1 before correction.

(F) Clarification of a relationship between "a hydraulic lock state" and "a determining means detecting a person", and addition of specification for each

In Correction A, in Claim 1, it is acknowledged that the point clarifying the description "when the determining means detects a person in a hydraulic lock state, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" to "the determining means may detect a person while in the hydraulic lock state" after concretely specifying "a hydraulic lock state" in (C) above, and adding the specification that the case where "the determining means may detect a person while in the hydraulic lock state" is "at the time of determining the start permission of the engine" limit the invention according to Claim 1 before correction, and aims to explain a description that was not clear before correction.

(G) Summary

Since Correction A clarifies the description that was not clear of (F) above in Claim 1 before correction, and limits the invention according to Claim 1 before correction in the points of (A) to (F) above, it is intended for the clarification of an ambiguous description and restriction of the scope of claims for patent, and does not substantially enlarge or alter the scope of claims.

Therefore, Correction A is intended for restriction of the scope of claims for patent prescribed in Article 120-5(2)(i) of the Patent Act and clarification of an ambiguous description prescribed in 120-5(2)(iii) of the Patent Act, and falls under the provisions of Article 126(6) that is applied mutatis mutandis in the provisions of Article 120-5(9) of the Patent Act.

B Presence or absence of new matter

(A) Addition of specification for "a hydraulic actuator"

In Correction A, concerning the addition of specification for "a hydraulic actuator," Paragraph [0018] of the specification describes that "this hydraulic pump which is not shown generates pilot pressure in a well-known hydraulic circuit included in the excavator 60. When a plurality of operation levers (operation units) provided in the driver's cab in the cabin 64 are operated by the operator, pilot pressure is sent to each of the corresponding hydraulic actuators for cutting, swiveling, and moving forward and backward to work. That is, the cutting, swiveling, and forward/backward movements of the excavator 60 are appropriately selected by the operator".

According to the description of Paragraph [0018], in Correction A, for "a hydraulic actuator," it is acknowledged that the point of correcting it to "hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit" was described in the specification.

(B) Addition of the configuration of "an excavator"

In Correction A, concerning the addition of the configuration of the excavator, Paragraphs [0013] to [0016] of the specification describe the following.

"[0013]

As shown in FIG. 2, the excavator start permission device 1 of Example 1 is applied to the excavator 60 (construction machine). The excavator 60 mounts the upper swivel body 63 on the crawler type lower traveling body 61 via the swivel mechanism 62 so as to be swivelable around the swivel shaft PV.

[0014]

Further, the upper swivel body 63 is provided with a cabin (driver's cab) 64 on the front left side portion thereof, and an excavation attachment E (boom, arm, bucket) on the front center portion thereof. Further, the upper swivel body 63 includes the above-mentioned cameras 2 (camera 2L, camera 2R, camera 2B) corresponding to the left side surface, the right side surface, and the rear surface, respectively.

[0015]

The engine 3 shown in FIG. 1 is installed at any position inside the upper swivel body 63. Further, the key switch 4 is installed at a position in the cabin 64 that can be operated by an operator (operator). The key switch 4 has three selected positions of start, on, and off, and when the selected position is start, a start signal is output to the controller 5 based on a well-known start circuit.

[0016]

Also, when the selected position of the key switch 4 is off, the controller 5 outputs to the engine 3 a stop command for stopping the engine 3 and turns off the power supply in the excavator 60. Further, when the selected position of the key switch 4 is on, the engine 3 continues to be driven if it is passing through the start, and if it is passing through off, the power supply in the excavator 60 is turned on while the engine 3 remains stopped. The key switch 4 of Example 1 is an example, and may also have a selected position (for example, a glow plug preheating position of the engine 3, an accessory power supply position, etc.) in addition to the above-mentioned three selected positions."

According to the descriptions of Paragraphs [0013]-[0016], in Correction A, it is acknowledged that the point of adding the specification "having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, a camera provided on the upper swivel body, and a controller for controlling the engine on the basis of a selected position of the key switch" to "an excavator" was described in the specification.

(C) Embodying specification for "a hydraulic lock state"

In Correction A, concerning embodying the specification for "a hydraulic lock state," Paragraph [0032] of the specification describes the following.

"[0032]

Here, as shown in FIG. 5, the hydraulic lock lever 6 is usually installed on the left side of the seat S in the cabin 64. When the hydraulic lock lever 6 is pulled toward the front side and moved to the position indicated by 'L' in FIG. 5, the 'hydraulic lock state' is

selected. In the "hydraulic lock state", the shut valve provided in the hydraulic circuit in the excavator 60 shuts off the hydraulic circuit between the operation lever in the cabin 64 and the hydraulic actuator. That is, even if the operator operates the operation lever, the corresponding hydraulic actuator does not operate."

According to the description of Paragraph [0032], in Correction A, it is acknowledged that the point of adding the description "comprising: a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off" to "a hydraulic lock state" was described in the specification.

(D) Addition of specification for "a person detecting means"

In Correction A, concerning the point of A (D) above, since Paragraph [0021] of the specification describes "the person detecting means 5a of the controller 5 detects a person in a predetermined ranges CL, CR, CB around the excavator 60 by obtaining, for example, an optical flow for the input images from the three cameras 2 by well-known image processing. The starting means 5b of the controller 5 outputs a start signal for starting the engine 3 to the engine 3 when the selected position of the key switch 4 is start and the permission condition by the determining means 5c of Example 1 is satisfied," for "a person detecting means detecting a person within a predetermined range around the excavator," in Correction A, it is acknowledged that the point of adding the description "performing image-processing on an input image from the camera" provided that "the controller" has it, was described in the specification.

(E) Clarification of a relationship between "a hydraulic lock state" and "a determining means detecting a person" and addition of specification for each

In Correction A, concerning the clarification of a relationship between "a hydraulic lock state" and "a determining means detecting a person" and the addition of specification for each, Paragraphs [0023] to [0025] and [0035] to [0039] describe the following.

"[0023]

The control contents of the excavator start permission device 1 of Example 1 will be described in detail below with reference to the flowchart shown in FIG. 4. As shown in step S1, the determining means 5c of the controller 5 determines whether or not the selected position of the key switch 4 is start, and if affirmative, it proceeds to step S2, and

if negative, it proceeds to END.

[0024]

In step S2, the person detecting means 5a of the controller 5 performs the above-mentioned predetermined image processing on the input images from the three cameras 2 to detect a person located in any of the predetermined ranges CL, CR, and CB. Subsequently, in step S3, the determining means 5c of the controller 5 determines whether or not it is in the state of 'is there a person?' by detecting a person with the person detecting means 5.

[0025]

In step S3, if it is determined as negative by the determining means 5c; that is, if there are no people in the predetermined ranges CL, CR, and CB, the process proceeds to step S4. In step S4, the permission means 5d of the controller 5 permits the engine 3 to start. Based on this permission, the starting means 5b of the controller 5 outputs a start signal to the engine 3 to start the engine 3".

"[0035]

Therefore, in the excavator start permission device 11 of Example 2, as shown in FIG. 5, it is inputted to the controller by using a position detection switch such as a potentiometer whether the hydraulic lock lever 6 is in the 'hydraulic lock state' or the 'hydraulic lock release state'.

[0036]

The permission means 5d of the controller 5 permits the start of the engine 3 under the condition in which there is no person in the predetermined ranges CL, CR, and CB similar to those described in Example 1, the selected position of the key switch is set as start, and the hydraulic lock lever 6 is in the 'hydraulic lock state'.

[0037]

That is, as shown in FIG. 7, step S6 is added to the control contents of the controller 5 included in the excavator start permission device 11 of Example 2 as compared with the flowchart shown in FIG. 4. In step S3, when the determining means 5c determines that there are no people in the predetermined ranges CL, CR, CB, and in step S6, the hydraulic lock lever 6 is in the 'hydraulic lock state', the process proceeds to step S4, and the permission means 5d permits the start of the engine 3.

[0038]

In step S3, when the determining means 5c determines that there are no people in the predetermined ranges CL, CR, and CB, and in step S6, it is determined that the hydraulic lock lever 6 is not in the 'hydraulic lock state', the process proceeds to step S5. In step S5, the permission means 5d disallows the start of the engine 3.

[0039]

In Example 2 as well, in step 3, if it is determined by the determining means 5c that there is a person in the predetermined ranges CL, CR, and CB, the process proceeds to step S5 and the permission means 5d determines that the start of the engine 3 is disallowed. The flowchart shown in FIG. 7 is also repeatedly executed for each control cycle of the controller 5, and the start permission method of the excavator of the present invention is executed".

According to the descriptions of Paragraphs [0023] to [0025] and [0035] to [0039] above, in Correction A, the point of provided that "the controller" has "a determining means," the point of specifying the operation of determination as "the controller performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine, " and the point of adding the specification that the case where "the determining means may detect a person in the hydraulic lock state" is "at the time of determining the start permission of the engine", all these points were described in the specification.

(F) Summary

Therefore, Correction A is a matter of correction clarifying and restricting the invention according to Claim 1 before correction within the range of the matters described in the specification and drawings, and falls under the provisions of Article 126 (5) of the Patent Act which is applied mutatis mutandis pursuant to Article 120-5(9) of the Patent Act.

(2) Regarding Correction B

Correction B is a correction for matching the description of Claim 1 of the Scope of Claims with the description of the specification in accordance with the correction related to Correction A above, and is intended to clarify a description that is not clear. The correction does not correspond to the addition of new matter, and does not substantially enlarge or alter the Scope of Claims.

Therefore, Correction B is intended to explain a description that is not clear as prescribed in Article 120-5(2)(iii) of the Patent Act, and falls under the provisions of Article 126(5) and Article 126(6) which are applied mutatis mutandis pursuant to Article 120-5(9).

(3) Regarding a group of claims and judgment on independent requirements for patentability

Regarding Claims 1 to 5 before correction, since Claims 2 to 5 directly or indirectly cite Claim 1 respectively, the correction is made in conjunction with Claim 1, in which the description is corrected by Correction A. Therefore, Claims 1 to 5 fall under a group of claims stipulated in Article 120-5(4) of the Patent Act.

Correction A clarifies the unclear descriptions of and restricts Claims 1 to 5 before correction which are a group of claims, and makes them to be Claims 1 to 5 after correction.

Further, Correction B, for Claims 1 to 5 corrected by Correction A, matches the description of the specification with the description of the Scope of Claims.

That is, the corrections by Correction A and B are requested regarding a group of claims [1 to 5].

Then, in this case, since the opposition to a granted patent regarding Claims 1 to 5 before correction is filed, the corrections by Corrections A and B are corrections related to claims to which the opposition to a granted patent is filed, and even if Correction A performs restriction of the Scope of Claims, the independent requirements for patentability of Article 126(7) of the Patent Act as applied mutatis mutandis by replacing certain terms pursuant to Article 120-5(9) of the Patent Act shall not apply to the inventions relating to Claims 1 to 5 after correction.

(4) The allegation of the Opponent

Although it was notified to the Opponent that the correction request of the case was filed, there was no response from the Opponent within the designated period, and no opinion has been asserted by the Opponent regarding the correction request of the case.

3 Summary

As described above, since the correction by the correction request of the case aims at matters prescribed in Article 120-5(2)(i) and Article 120-5(2)(iii) of the Patent Act, and falls under the provisions of Article 126(5) and Article 126(6) of the Patent Act which are applied mutatis mutandis pursuant to Article 120-5(9), the correction for Claims [1 to 5] after correction shall be approved.

No. 3 Corrected invention of the case

The inventions according to Claims 1 to 5 corrected by the correction request of

the case (hereinafter, respectively referred to as "Corrected invention 1" and the like, and the inventions according to Claims 1 to 5 are collectively referred to as "the Corrected Invention") are as specified by the following matters described in Claims 1 to 5 of the Scope of Claims.

Corrected Invention 1

"[Claim 1]

"An excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, an excavation attachment provided in a front central portion of the upper swivel body, and hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit, and

having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, a camera provided on the upper swivel body, and a controller for controlling the engine on the basis of a selected position of the key switch, comprising:

a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate,

wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off,

wherein the controller has a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person,

wherein the controller performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine, and

wherein the determining means may detect a person while in the hydraulic lock state at the time of determining the start permission of the engine."

Corrected Invention 2

"[Claim 2]

The excavator according to Claim 1, wherein the hydraulic actuator that does not operate is a swiveling motor."

Corrected Invention 3
"[Claim 3]
The excavator according to Claim 1 or 2, wherein the hydraulic actuator that does not operate is a traveling motor."

Corrected Invention 4
"[Claim 4]
The excavator according to any one of Claims 1 to 3, wherein the person detecting means detects a person on the basis of a stereo camera provided on the upper swivel body."

Corrected Invention 5
"[Claim 5]
The excavator according to Claim 4, wherein the two or more stereo cameras are provided on the upper swivel body."

No. 4 List of the evidences, outline of reasons for opposition, outline of reasons for revocation, and description of the evidences
1 List of the evidences
(1) Evidences submitted with a written opposion are as follows.

Evidence A No. 1; Japanese Unexamined Patent Application Publication No. 2010-198519
(published on September 9, 2010)
Evidence A No. 2; Japanese Unexamined Patent Application Publication No. 2005-307491
(published on November 4, 2005)
Evidence A No. 3; Japanese Unexamined Patent Application Publication No. 2010-71425
(published on April 2, 2010)
Evidence A No. 4; Microfilm of Japanese Unexamined Utility Model Application Publication No. S63-51427 (Japanese Unexamined Utility Model Application Publication No. H1-156256)

(published on October 26, 1989)

Evidence A No. 5; Japanese Unexamined Patent Application Publication No. 2005-233639

(published on September 2, 2005)

Evidence A No. 6; Japanese Unexamined Patent Application Publication No. 2006-31101

(published on February 2, 2006)

(2) Evidences investigated by ex officio in the body are as follows.

Document 1; Japanese Unexamined Patent Application Publication No. 2014-173258

(a publication of unexamined application of the original application, published on September 22, 2014)

Document 2; International Publication No. WO2012/161062

(International publication published on November 29, 2012)

2 Outline of reasons for opposition, and reasons for revocation

(1) Reasons for opposition by the Opponent

The outline of reasons for opposition by the Opponent is as follows.

A (Enablement requirement)

Concerning the constitution "when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" of the inventions according to Claims 1 to 5 of the Patent, the Detailed Description of the Invention does not describe clearly and sufficiently for a person skilled in the art to work the invention.

Therefore, since the Detailed Description of the Invention of the specification does not meet the requirement stipulated in Article 36(4)(i) of the Patent Act, for the inventions according to Claims 1 to 5 of the Patent, the patent according to these inventions falls under Article 113(4) of the Patent Act, and should be invalidated.

B (Support requirement)

The matter "when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating

the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" of the inventions according to Claims 1 to 5 of the Patent, is not described and suggested in the specification and drawings of the specification.

Therefore, since the inventions according to Claims 1 to 5 of the Patent do not meet the requirement stipulated in Article 36(6)(i) of the Patent Act, the patent related to these inventions falls under Article 113(4) of the Patent Act, and should be invalidated.

C (Clarity)

The matter "when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" of the inventions according to Claims 1 to 5 of the Patent, is unclear.

Therefore, since the inventions according to Claims 1 to 5 of the Patent do not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act, the patent related to these inventions falls under Article 113(4) of the Patent Act, and should be invalidated.

D (Inventive step citing Evidence A No. 1 as a primary cited document)

Since the inventions according to Claims 1 to 5 of the Patent could have been easily conceived by a person skilled in the art on the basis of the invention described in Evidence A No. 1 distributed prior to the application of the Patent, and well-known arts also indicated in Evidence A No. 2 to Evidence A No. 6, and the Appellant should not be granted a patent for the inventions in accordance with the provisions of Article 29(2) of the Patent Act, the patent related to the inventions falls under Article 113(2) of the Patent Act, and should be invalidated.

E (Inventive step citing Evidence A No. 2 as a primary cited document)

Since the inventions according to Claims 1 to 5 of the Patent could have been easily conceived by a person skilled in the art on the basis of the invention described in Evidence A No. 2 distributed prior to the application of the Patent, the invention described in Evidence A No. 1, and well-known arts also indicated in Evidence A No. 3 to Evidence A No. 6, and the Appellant should not be granted a patent for the inventions in accordance with the provisions of Article 29(2) of the Patent Act, the patent related to the inventions falls under Article 113(2) of the Patent Act, and should be invalidated.

(2) Reasons for revocation dispatched on January 6, 2020 (advance notice of decision)

The outline of the reasons for revocation that was notified to the Patentee on January 6, 2020 (dispatch date) by the body is as follows.

A (Clarity)

It is not clear which of the following (A) and (B) is the meaning of the inventions according to Claims 1 to 5 of the Patent for the matter "when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate."

(A) The meaning where the matter "the determining means detects a person" is considered to affect whether or not it leads to the result "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate," in the same manner as the matter "while in a hydraulic lock state". (B) The meaning where although in "a hydraulic lock state," regardless of the matter "the determining means detects a person," it is brought into the state "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate," it is merely added that there is a case where "the determining means detects a person" while in "a hydraulic state".

Therefore, since the inventions according to Claims 1 to 5 of the Patent do not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act, the patent related to these inventions should be invalidated.

B (Enablement requirement)

Although the matter "when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" of the inventions according to Claims 1 to 5 of the Patent is unclear as described in A above, as described in A (A) above, if it is the outline where the matter "the determining means detects a person" is considered to affect whether or not it leads to the result "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate," in the same manner as the matter "in a hydraulic lock state," the detailed description of the specification does not explain as to what technical processing should be added to make a modification that makes "the determining means detect a person" a further condition for reaching the state in which "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" in the excavator brought into the state in which "even if an operator

operates an operation lever, the corresponding hydraulic actuator does not operate," only by setting the hydraulic lock lever to "a hydraulic lock state".

Therefore, since the detailed description of the specification does not describe the inventions related to Claims 1 to 5 clearly and sufficiently for a person skilled in the art to work the invention, and does not meet the requirement stipulated in Article 36(4)(i) of the Patent Act, the patent related to these inventions should be invalidated.

C (Support requirement)

Concerning the matter "determines whether or not the person detecting means detects a person at each predetermined control cycle" of the inventions according to Claims 1 to 5 of the Patent, and the whole of processing including the "determination," the specification only discloses as a control flow executed in the start permission of the engine of the excavator, and neither describes nor suggests that the processing is performed other than the start permission of the engine.

Further, the matter "when the determining means detects a person while in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" of Claims 1 to 5 of the Patent is unclear as described in A above, as described in A (A) above, if it is the meaning where the matter "the determining means detects a person" is considered to affect whether or not it leads to the result "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate," in the same manner as the matter "in a hydraulic lock state, the specification neither describes nor suggests to make a modification that makes "the determining means detect a person" a further condition for reaching the state in which "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" in the excavator brought into the state in which "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate," only by setting the hydraulic lock lever to "a hydraulic lock state".

Therefore, since the inventions according to Claims 1 to 5 of the Patent do not meet the requirement stipulated in Article 36(6)(i) of the Patent Act, the patent related to these inventions should be invalidated.

D (Inappropriate division, and novelty citing Document 1 as a primary cited document)

It cannot be said that the inventions according to Claims 1 to 5 of the Patent are ones of a divisional application from the invention described in the originally attached

specification, etc. of the original application, and the filing date of the Patent is the date on which the divisional application was actually filed.

Then, the inventions according to Claims 1 to 5 of the Patent are the inventions described in Document 1 that was distributed prior to the application of the Patent, and fall under Article 29(1)(iii) of the Patent Act, and thus the patent relating to the invention should be invalidated.

E (Inappropriate division, and inventive step citing Document 1 as a primary cited document)

It cannot be said that the inventions according to Claims 1 to 5 of the Patent are ones of a divisional application from the invention described in the originally attached specification, etc. of the original application, and the filing date of the Patent is the date on which the divisional application was actually filed.

Then, since the inventions according to Claims 1 to 5 of the Patent could have been easily conceived by a person skilled in the art on the basis of the invention described in Document 1 distributed prior to the application of the Patent, and the Appellant should not be granted a patent for the inventions in accordance with the provisions of Article 29(2) of the Patent Act, the patent related to the inventions should be invalidated.

F (Inventive step citing Evidence A No. 2 as a primary cited document)

Since the inventions according to Claims 1 to 5 of the Patent could have been easily conceived by a person having a usual knowledge in the technical field to which the inventions belong before the application was filed, on the basis of the inventions described in Evidence A No. 2 distributed prior to the application of the Patent and before the filing of the original application and Evidence A No. 4, or the inventions described in Evidence A No. 2 and Evidence A No. 4, and well-known indicated in Document 2, and the Appellant should not be granted a patent for the inventions in accordance with the provisions of Article 29(2) of the Patent Act, the patent related to the inventions should be invalidated.

G (Inventive step citing Evidence A No. 4 as a primary cited document)

Since the inventions according to Claims 1 to 5 of the Patent could have been easily conceived by a person having a usual knowledge in the technical field to which the inventions belong before the application was filed, on the basis of the inventions described in Evidence A No. 4 distributed prior to the application of the Patent and before the filing of the original application and Evidence A No. 2, or the inventions described in

Evidence A No. 4 and Evidence A No. 2, and well-known indicated in Document 2, and the Appellant should not be granted a patent for the inventions in accordance with the provisions of Article 29(2) of the Patent Act, the patent related to the inventions should be invalidated.

3 Description of Evidence

In view of the matters, in the order of (1) Document 1, (2) Evidence A No. 2, (3) Evidence A No. 4, (4) Evidence A No. 1, (5) Document 2, (6) Evidence A No. 3, and (7) Evidence A No. 5, checking the descriptions of the evidences, the description of each evidence is as follows.

(1) Document 1 (Japanese Unexamined Patent Application Publication No. 2014-173258)

A Described matters

Document 1 that is a publication of the unexamined original application and is a publication distributed prior to the filing date of divisional application of the Patent describes the following matters with the drawings (the underlines were drawn by the body, and the same shall apply hereinafter).

(A) Background Art and Means for solving the problem

"[Detailed Description of the Invention]

[Technical field]

[0001]

The present invention relates to a construction machine start permission device and a construction machine start permission method for ensuring safety at the time of starting an engine in a construction machine.

[Background Art]

[0002]

Examples of construction machines such as excavators are those described in Patent Document 1. In this technology, in order to prevent contact between the machine and obstacles such as workers in the vicinity, an alarm is has been proposed when it is dangerous according to the distance to the obstacle and the movement such as cutting or swiveling of the construction machine.

[Prior art Documnet]

[Patent Document]

[0003]

[Patent Document 1] Japanese Unexamined Patent Publication No. 2010-198519

[Summary of Invention]

[Problem to be solved by the invention]

[0004]

However, the prior art described in Patent Document 1 described above does not disclose a technique for ensuring the safety of workers around the construction machine when the engine of the construction machine is started.

[0005]

An object of the present invention is to provide a construction machine start permission device and a construction machine start permission method that can more reliably ensure the safety of workers in the vicinity when the engine is started.

[Means for solving the problem]

[0006]

In order to solve the above problems, the construction machine start permission device according to the present invention includes a person detecting means for detecting a person within a predetermined range around the construction machine, a starting means for starting the engine of the construction machine, a determining means for determining whether or not the person detecting means detects a person, and a permission means for permitting the engine to be started by the starting means when the determining means determines that it is negative. Here, a hydraulic lever is included, which shuts off between a hydraulic actuator of the construction machine and an operation unit operating the hydraulic actuator in the hydraulic lock state, and when the hydraulic lock lever is in the hydraulic lock state, the permission means may permit the start.

[0007]

In order to solve the above problem, the construction machine start permission method according to the present invention includes a person detection step for detecting a person within a predetermined range around a construction machine, a determination step for determining whether or not a person is detected in the person detection step, and a permission step for permitting the start of an engine of the construction machine when it is determined to be negative in the determination step.

[Effect of the Invention]

[0008]

According to the present invention, when a person (particularly a worker) is present in the vicinity, the safety of the person (worker) in the vicinity can be more reliably ensured by disallowing the start of the engine."

(B) Example 1

"[Example 1]

[0011]

As shown in FIG. 1, the construction machine start permission device 1 of Example 1 includes a camera 2, and a controller 5 that controls the engine 3 based on the selected position (start, on, off) of the key switch 4.

[0012]

The controller 5 is a computer that is provided with a CPU (Central Processing Unit), a RAM (Random Access Memory), a ROM (Read Only Memory), an NVRAM (Non-Volatile Random Access Memory), and a data bus, an input/output interface, and the like for connecting these to each other.

[0013]

The controller 5 of Example 1 stores, for example, a program for executing the start permission method of the present invention, in a ROM or NVRAM. The controller 5 configures the person detecting means 5a, the starting means 5b, the determining means 5c, and the permission means 5d by causing the CPU to execute the corresponding processing while using the RAM as the temporary storage area.

[0014]

As shown in FIG. 2, the construction machine start permission device 1 of Example 1 is applied to the excavator 60 (construction machine). The excavator 60 mounts the upper swivel body 63 on the crawler type lower traveling body 61 via the swivel mechanism 62 so as to be swivelable around the swivel shaft PV.

[0015]

Further, the upper swivel body 63 is provided with a cab (driver's cab) 64 on the front left side portion thereof, and an excavation attachment E (boom, arm, bucket) on the front center portion thereof. Further, the upper swivel body 63 includes the above-mentioned cameras 2 (camera 2L, camera 2R, camera 2B) corresponding to the left side surface, the right side surface, and the rear surface, respectively.

[0016]

The engine 3 shown in FIG. 1 is installed at any position inside the upper swivel body 63. Further, the key switch 4 is installed at a position in the cab 64 that can be operated by an operator (operator). The key switch 4 has three selected positions of start, on, and off, and when the selected position is start, a start signal is output to the controller 5 based on a well-known start circuit.

[0017]

When the selected position of the key switch 4 is off, the controller 5 outputs a stop command for stopping the engine 3 to the engine 3 and turns off the power supply

in the excavator 60. Further, when the selected position of the key switch 4 is on, the engine 3 continues to be driven if it is passing through start, and if it is passing through off, the power supply in the excavator 60 is turned on while the engine 3 remains stopped. The key switch 4 of Example 1 is an example, and may have a selected position (for example, a glow plug preheating position of the engine 3, an accessory power supply position, etc.) in addition to the above-mentioned three selected positions.

[0018]

In the construction machine start permission device 1 of Example 1, when the selected position of the key switch 4 described above is set as the start and the permission condition of Example 1 described below is satisfied, the starting means 5b outputs a start command to the engine 3. The engine 3 is started based on this start command, and a hydraulic pump that is not shown and is connected to a drive shaft of the engine 3 is driven.

[0019]

This hydraulic pump which is not shown generates pilot pressure in a well-known hydraulic circuit included in the excavator 60. When a plurality of operation levers (operation units) provided in the driver's cab in the cabin 64 are operated by the operator, pilot pressure is sent to each of the corresponding hydraulic actuators for cutting, swiveling, and moving forward and backward to work. That is, the cutting, swiveling, and forward/backward movements of the excavator 60 are appropriately selected by the operator.

[0020]

As shown in FIG. 1, the camera 2 is a device for acquiring an input image projecting the surroundings of the excavator 60. Here, the camera 2 is a monocular type, and includes, for example, an image pick-up element such as a CCD (Charge Coupled Device) or a CMOS (Complementary Metal Oxide Semiconductor). The camera 2 in first embodiment 1 captures images of the predetermined ranges CL, CR, and CB, which are likely to be blind spots of the operator shown in FIG. 3.

[0021]

The camera 2L images the fan-shaped predetermined range CL indicated by the alternate long and short dash line on the left side, the camera 2R images the fan-shaped predetermined range CR indicated by the alternate long and short dash line on the right side, and the camera 2B images the fan-shaped predetermined range CB indicated by the alternate long and short dash line on the rear surface. The installation locations of the camera 2 are not limited to the above-mentioned three locations, and may be any location that can cover the range of the operator's blind spot. For example, the camera 2 may be

attached only to the right side surface and the rear surface of the upper swivel body 63, or to all of the front surface and the right side surface, and the rear surface and the left side surface. The camera 2 outputs the input image acquired by imaging to the controller 5.

[0022]

The person detecting means 5a of the controller 5 detects a person in a predetermined ranges CL, CR, CB around the excavator 60 by obtaining, for example, an optical flow for the input images from the three cameras 2 by well-known image processing. The starting means 5b of the controller 5 outputs a start signal for starting the engine 3 to the engine 3 when the selected position of the key switch 4 is start and the permission condition by the determining means 5c of Example 1 is satisfied.

[0023]

The permission condition of the first embodiment is as follows. That is, when the determining means 5c of the controller 5 determines whether or not the person detecting means 5a detects a person when the selected position of the key switch 4 is start, and permits the starting means 5b to start the engine 3 when the determining means 5c determines that it is negative.

[0024]

The control contents of the start permission device 1 of the excavator of Example 1 will be described in detail below with reference to the flowchart shown in FIG. 4. As shown in step S1, the determining means 5c of the controller 5 determines whether or not the selected position of the key switch 4 is start, and if affirmative, it proceeds to step S2, and if negative, it proceeds to END.

[0025]

In step S2, the person detecting means 5a of the controller 5 performs the above-mentioned predetermined image processing on the input images from the three cameras 2 to detect a person located in any of the predetermined ranges CL, CR, and CB. Subsequently, in step S3, the determining means 5c of the controller 5 determines whether or not it is in the state of "is there a person?" by detecting a person with the person detecting means 5.

[0026]

In step S3, if it is determined as negative by the determining means 5c; that is, if there are no people in the predetermined ranges CL, CR, and CB, the process proceeds to step S4. In step S4, the permission means 5d of the controller 5 permits the engine 3 to start. Based on this permission, the starting means 5b of the controller 5 outputs a start signal to the engine 3 to start the engine 3.

[0027]

In step S3, when the determining means 5c determines affirmatively; that is, when there is a person in the predetermined ranges CL, CR, CB, the process proceeds to step S5, and the permission means 5d of the controller 5 disallows the start of the engine 3. Based on this disallowance, the starting means 5b of the controller 5 does not output a start signal to the engine 3 even under the condition that the selected position of the key switch 4 is set to start by the operator in step S1. The flowchart shown in FIG. 4 is repeatedly executed for each control cycle of the controller 5, and the construction machine start permission method of the present invention is executed.

[0028]

In the construction machine start permission device 1 shown in Example 1 described above, when a person is present in the predetermined ranges CL, CR, and CB around the excavator 60, even under the condition that the selected position of the key switch 4 is set to start by the operator, the start of the engine 3 can be disallowed.

[0029]

That is, in Example 1, the condition that the selected position of the key switch 4 is start and the person is present around the excavator 60 can be set as the condition for disallowing the start of the engine 3. At the same time, in Example 1, the condition that the selected position of the key switch 4 is start and a person is not present around the excavator 60 can be set as the permission condition for starting the engine 3.

[0030]

In Example 1, by separating the disallowance condition and the permission condition, it is possible to prohibit the start of the engine 3 when there is a person in the excavator 60, and to ensure the safety of the person, especially a worker. In particular, even if an operator forgets to visually check the surroundings before boarding the cabin 64 and to give an alarm by the horn after boarding, safety can be ensured according to Example 1. At the same time, in Example 1, when there is no person around the excavator 60, the engine 3 can be promptly started based on the fact that the selected position of the key switch 4 is start."

(C) Example 2

"[Example 2]

[0031]

The permission condition of Example 1 described above can be appropriately changed according to the actual operation procedure of the operator. Hereinafter, the construction machine start permission device 11 of Example 2 will be described. The

configurations common to the construction machine start permission device 1 shown in the above-described embodiment 1 are designated by the same reference numerals, and the differences will be mainly described below.

[0032]

Normally, before starting the engine 3 of the construction machine such as the excavator 60, the operator visually checks the surroundings before boarding the cabin 64, and after boarding the cabin 64, sounds a horn to prompt evacuation if there are people around, and then starts the engine 3.

[0033]

Here, as shown in FIG. 5, the hydraulic lock lever 6 is usually installed on the left side of the seat S in the cabin 64. When the hydraulic lock lever 6 is pulled toward the front side and moved to the position indicated by "L" in FIG. 5, the "hydraulic lock state" is selected. In the "hydraulic lock state", the shut valve provided in the hydraulic circuit in the excavator 60 shuts off the hydraulic circuit between the operation lever in the cabin 64 and the hydraulic actuator. That is, even if the operator operates the operation lever, the corresponding hydraulic actuator does not operate.

[0034]

When the hydraulic lock lever 6 is tilted forward and moved to the position indicated by "U" in FIG. 5, the "hydraulic lock release state" is selected. In the "hydraulic lock release state", the shut valve communicates the hydraulic circuit between the operation lever in the cabin 64 and the hydraulic actuator. That is, the corresponding hydraulic actuator corresponding when the operator operates the operation lever is operated.

[0035]

Here, when the operator boards the cabin 64, the hydraulic lock lever 6 shown in FIG. 5 is located at the position "L". When the operator himself/herself boards the cabin 64 and sits in the seat S, the hydraulic lock lever 6 is kept at the position "L" to hold the "hydraulic lock state", and then the selected position of the key switch 4 is operated to appropriately start the engine 3. After the start, the hydraulic lock lever 6 is set to the position "U" and the "hydraulic lock release state" is set so that the hydraulic actuator can be operated by the operation lever.

[0036]

Therefore, in the start permission device 11 of the excavator of Example 2, as shown in FIG. 5, it is inputted to the controller by using a position detection switch such as a potentiometer whether the hydraulic lock lever 6 is in the 'hydraulic lock state' or the 'hydraulic lock release state'.

[0037]

The permission means 5d of the controller 5, permits the start of the engine 3, under the condition in which there is no person in the predetermined ranges CL, CR, and CB similar to those described in Example 1, the selected position of the key switch is set as start, and the hydraulic lock lever 6 is in the 'hydraulic lock state'.

[0038]

That is, as shown in FIG. 7, step S6 is added to the control contents of the controller 5 included in the start permission device 11 of the excavator of Example 2 as compared with the flowchart shown in FIG. 7. In step S3, when the determining means 5c determines that there are no people in the predetermined ranges CL, CR, CB, and in step S6, the hydraulic lock lever 6 is in the 'hydraulic lock state', the process proceeds to step S4, and the permission means 5d permits the start of the engine 3.

[0039]

In step S3, when the determining means 5c determines that there are no people in the predetermined ranges CL, CR, and CB, and in step S6, it is determined that the hydraulic lock lever 6 is not in the 'hydraulic lock state', the process proceeds to step S5. In step S5, the permission means 5d disallows the start of the engine 3.

[0040]

In Example 2 as well, in step 3, if it is determined by the determining means 5c that there is a person in the predetermined ranges CL, CR, and CB, the process proceeds to step S5 and the permission means 5d determines that the start of the engine 3 is disallowed. The flowchart shown in FIG. 7 is also repeatedly executed for each control cycle of the controller 5, and the start permission method of the excavator of the present invention is executed.

[0041]

Also in the construction machine start permission device 11 shown in Example 2 described above, if a person is present in the predetermined ranges CL, CR, and CB around the excavator 60, which is the construction machine, even under the condition that the selected position of the key switch 4 is set to the start by the operator, the start of the engine 3 can be disallowed.

[0042]

Further, in Example 2, both of the case that the selected position of the key switch 4 is start and a person is present around the excavator 60, and the case that a person is not present in the excavator 60 and the hydraulic lock lever 6 is not in the 'hydraulic lock state,' are determined as the conditions for disallowing the start of the engine 3. Further, in Example 2, the case that the selected position of the key switch 4 is the start, no person

is present around the excavator 60, and the hydraulic lock lever 6 is in the 'hydraulic lock state' is determined the permission condition for staring engine 3.

[0043]

In Example 2, by separating the disallowance condition and the permission condition, it is possible to prohibit the start of the engine 3 when there is a person in the excavator 60, and to ensure the safety of the person, especially a worker.

At the same time, in Example 2, when there is no person around the excavator 60, under the additional condition that the hydraulic lock lever 6 is in 'the hydraulic lock state," the engine 3 can be started quickly on the basis of the fact that the selected position of the key switch 4 is the start.

[0044]

In Example 2, in particular, even if the operator sets the selected position of the key switch 4 as start while touching the operation lever, unintended excavation, swiveling, and forward / backward movement of the excavator 60 can be prohibited. In addition, in Example 2, the excavation, swiveling, and forward / backward movement of the excavator 60 can be prohibited immediately after the engine 3 is started. As a result, in Example 2, the safety of surrounding people can be ensured.

[0045]

Although the preferred examples of the present invention have been described in detail above, the present invention is not limited to the above-mentioned examples, and various modifications and substitutions may be added to the above-mentioned examples without departing from the scope of the present invention.

[0046]

For example, in the above-mentioned examples, it has been illustrated that the person detecting means 5a uses image processing to detect a person from an input image in a predetermined range, but the method for detecting a person is not limited to this. That is, it is also possible to use a method by pattern matching or a method of detecting a three-dimensional object using a stereo camera. Further, an active infrared sensor or a passive infrared sensor (for example, a pyroelectric infrared sensor) may be used, or a laser radar or an ultrasonic sensor may be used."

(D) Industrial applicability

"[Industrial applicability]

[0047]

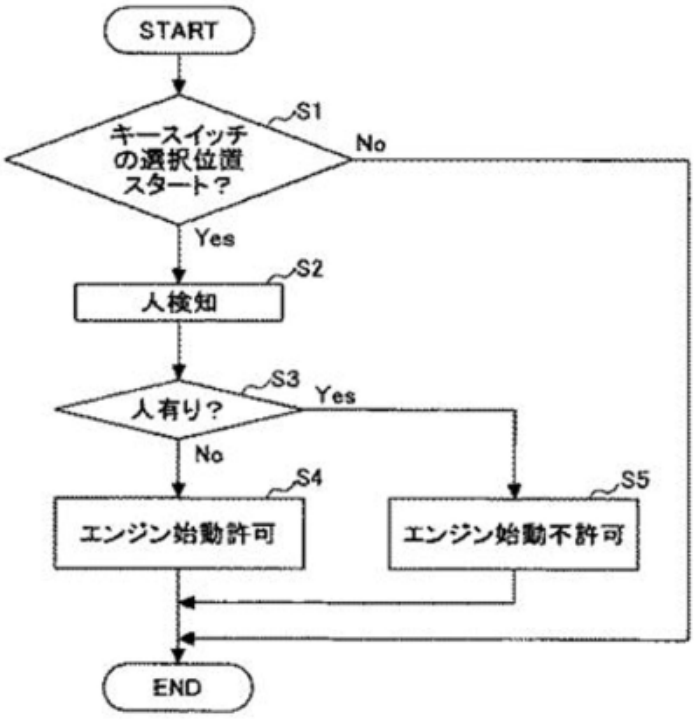
The construction machine start permission device and the construction machine start permission method of the present invention disallow the start of the engine when a

person is detected in a predetermined range around the construction machine, thereby certainly ensuring the safety of especially workers. Therefore, it is preferable for application to various construction machines."

(E) FIG. 4 and FIG. 7

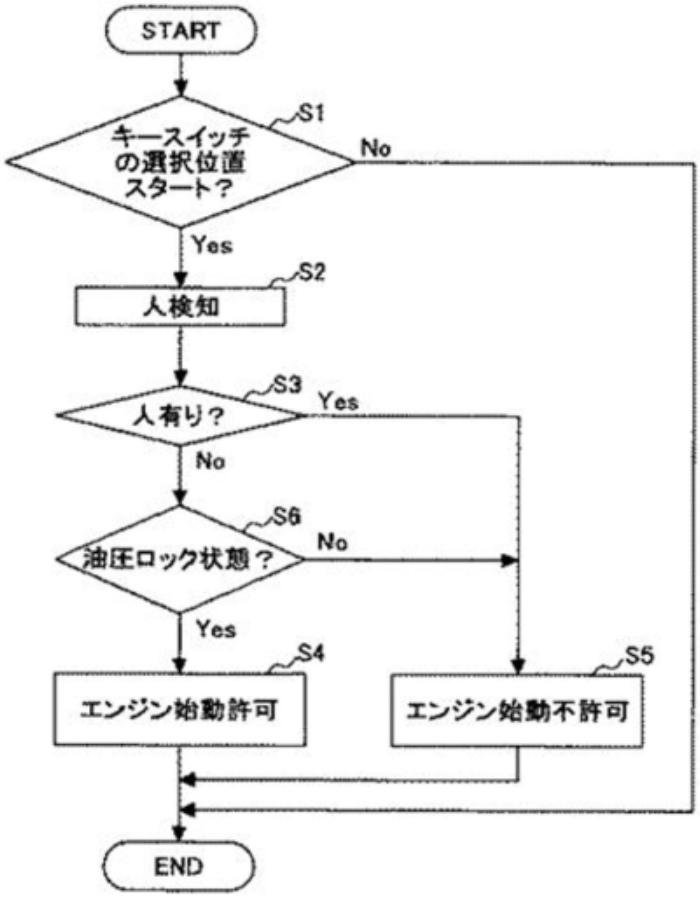
FIG. 4 and FIG. 5 illustrate the following respectively.

【図４】



【図４】 [FIG. 4]
キースイッチの選択位置 Selected Position of Key Switch
スタート？ Start?
人検知 Person detection
人有り？ Is there a person ?
エンジン始動許可 Engine start permission
エンジン始動不許可 Engine start disallowance

【図７】



【図７】　[FIG. 7]
キースイッチの選択位置　Selected Position of Key Switch
スタート？　Start?
人検知　Person detection
人有り？　Is there a person?
油圧ロック状態？　Hydraulic lock state?
エンジン始動許可　Engine start permission
エンジン始動不許可　Engine start disallowance

B　Described Invention

According to A above, Document 1 describes the following invention (hereinafter, referred to as "the invention of Document 1").

"An excavator 60 including a lower traveling body 61, an upper swivel body 63 swivelably mounted on the lower traveling body 61, an excavation attachment E provided in a front central portion of the upper swivel body 63, and hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit, and

having an engine 3 provided on the upper swivel body 63, a cab 64 provided on the upper swivel body 63, a key switch 4 of the engine provided in the cab 64, three cameras 2 provided on the upper swivel body 63, and a controller 5 for controlling the engine 3 on the basis of a selected position (start, on, and off) of the key switch 4,

wherein the controller 5 has a person detecting means performing image-processing on an input image from the cameras 2 and detecting a person within a predetermined range around the excavator 60, and a determining means 5c determining whether or not the person detecting means 5a detects a person at each predetermined control cycle at the time of determining the start permission of the engine;

wherein a hydraulic lock lever 6 capable of selecting a hydraulic lock state in which a hydraulic circuit between a hydraulic actuator of the excavator 60 and an operation lever operating the hydraulic actuator is shut off is provided, the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine 3, and even if an operator operates the operation lever, the corresponding hydraulic actuator does not operate; and

wherein a method of detecting a three-dimensional object using a stereo camera may be used for detecting a person by the person detecting means 5a."

(2) Evidence A No. 2 (Japanese Unexamined Patent Application Publication No. 2005-307491)

A Described matters

Evidence A No. 2 that was submitted by the Opponent and a publication distributed prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with the drawings.

(A) Background Art, Problem to be solved by the invention, and Means for solving the problem

"[Technical field]

[0001]

The present invention relates to a technique provided in a work vehicle such as a backhoe, in which the engine is automatically stopped after a predetermined time and the key switch is also turned off at the same time when an actuator for operating the work machine is inoperable.

[Background Art]

[0002]

Conventionally, in work machines such as backhoes and loaders equipped with excavation work machines, an operation lever for operating the driving, traveling, and the like of the work machine is arranged near the driver's seat, and a gate lever (lock lever) is provided at the doorway to the driver's seat. During the work, the operator may temporarily leave the seat in order to confirm the working position of the work machine or to check the wearing condition of the work machine. In this case, the lock lever was raised for getting off, and the engine was stopped unless the lock lever was lowered for sitting down within a predetermined time from the operation of the lock lever, thereby reducing wasteful energy consumption. Further, there is a technique in which if the operator does not return to the driver's seat and the engine is stopped after a predetermined time elapses, the power is turned off when a predetermined time elapses after the engine is stopped (see, for example, Patent Document 1).

[0003]

[Patent Document 1] Japanese Unexamined Patent Application Publication No. 2003-307142

[Disclosure of the invention]

[Problem to be solved by the invention]

[0004]

However, in the technique of Patent Document 1, although it is configured so that when the engine is stopped and a predetermined time has passed, the power supply is cut off to prevent discharge and the like and suppress battery consumption, and when a getting on/off detection means detects the operator, the power supply is connected, discharge is unavoidable because the getting on/off detection means electrically detects it. Further, since a power switch is provided separately from a key switch, an extra power switch and control circuit are required, which increases the cost. In addition, since it will be guided how to restart the vehicle when the operator gets on, it is unnecessary when a person who does not intend to operate it gets on, and since the number of people who operate it is almost limited, unnecessary guidance will be given when restarting after the engine is stopped once a person gets used to the operation.

Therefore, in the present invention, when the engine is stopped after a

predetermined time with the lock lever set to 'the inoperable' position, the key switch is also rotated to the OFF position to turn off the power, and when restarting, it is tried to be able to do it with the same operation as normal starting.

[Means for solving the problem]

[0005]

The problem to be solved by the present invention is as described above, and next, the means for solving this problem will be described.

[0006]

That is, in Claim 1, a work vehicle includes a lock lever which operates the switching means for switching between 'operable' and 'inoperable' of the actuator for driving the work machine, and engine stop means which stops an engine after a predetermined time by a delay means when operating to the 'inoperable' position after starting, and is provided with a means for turning a key switch to an OFF position in conjunction with the stop operation of the engine stop means."

(B) Embodiment

"[Best Mode for Working the Invention]

[0013]

Next, an embodiment of the invention will be described.

FIG. 1 is a side view showing a swivel work vehicle having an erroneous operation prevention device for a work vehicle of the present invention, FIG. 2 is a plan view of a driving operation unit, FIG. 3 is a hydraulic circuit diagram and an electric circuit diagram of the erroneous operation prevention device for a work vehicle, FIG. 4 is also a hydraulic circuit diagram and an electric circuit diagram when the engine is started, FIG. 5 is a hydraulic circuit diagram and an electric circuit diagram when the lock lever is set to 'inoperable' during work, FIG. 6 is a hydraulic circuit diagram and an electric circuit diagram when the lock lever is at an 'inoperable' position and a predetermined time elapses, FIG. 7 is a side sectional view of the key switch, and FIG. 8 is a rear view of the key switch.

[0014]

First, a backhoe will be described as an example of a work vehicle having a hydraulic operation device of the present invention. In FIG. 1, the backhoe has a work machine 7 mounted on the front portion of the machine, and the machine supports a swivel frame 2 so as to swivel left and right via a swivel base bearing 17 in the upper center of a crawler type traveling device 1. A blade 3 is arranged on one side in a fore-and-aft direction of the crawler type traveling device 1 so as to vertically rotate. A hood

14 covering an engine 13 and the like is arranged on the upper part of the swivel frame 2, a driver's seat 16 is located on the hood 14, hydraulic operation levers 21 and 22 and lock levers 23 and 24 and the like are located in the vicinity of the driver's seat 16, and a traveling lever 25, a pedal, and the like are located in front of the driver's seat 16 to form a driving operation unit 15. A canopy 8 is arranged above the driving operation unit 15.

[0015]

A boom bracket 12 is attached to a front end of the swivel frame 2 so as to rotate left and right, and a lower end of the boom 6 is supported to the boom bracket 12 so as to vertically rotate. The boom 6 is bent forward at a middle portion in a substantially 'dogleg' shape. An arm 5 is rotatably supported at an upper end of the boom 6, and a bucket 4 that is a working attachment is rotatably supported by a tip end portion of the arm 5. The work machine 7 is composed of the boom 6, the arm 5, the bucket 4, and the like.

[0016]

Then, the boom 6 is rotated by a boom cylinder 11, the arm 5 is rotated by an arm cylinder 10, and the bucket 4 is rotated by a bucket cylinder 9. Further, in the crawler type traveling device 1, a driving sprocket 41 is arranged on one side in the fore-and-aft direction, and a driven sprocket 42 is arranged on the other side. A track band 43 is wound between the driving sprocket 41 and the driven sprocket 42. Then, the driving sprocket 41 is driven by a hydraulic motor. Further, a swivel motor is arranged between the swivel frame 2 and the swivel base bearing 17, and the swivel frame 2 can be swiveled by the swivel motor.

[0017]

The boom cylinder 11, the arm cylinder 10, and the bucket cylinder 9 are composed of hydraulic cylinders, and hydraulic devices such as the cylinders 9, 10, 11, the swivel motor 45, and the traveling hydraulic motor 44 are referred to as hydraulic actuators. As shown in FIG. 2, a pilot valve is switched by the rotation operation of the hydraulic operation levers 21 and 22, the traveling lever 25, the pedal, etc. arranged in the driving operation unit 15, and a main valve (direction control valve) is switched from the pilot valve. Pressure oil is supplied from a hydraulic pump arranged in the hood 14 of the swivel base 2 through a hydraulic hose to perform expand driving or rotation driving.

[0018]

The hydraulic operation levers 21 and 22, which serve as pilot operating devices for operating the work equipment 7, are arranged on both left and right sides of the driver's seat 16, respectively, and the hydraulic operation levers 21 and 22 are integrally mounted

to lever stands 28 and 29. The lock levers 23 and 24 for turning on/off (operating/non-operating) the operation of the work machine 7 by the hydraulic operation levers 21 and 22 are extended forward from the lever stands 28 and 29.

[0019]

The lock levers 23 and 24 are configured to vertically rotate. It is configured to enable the operation of the work machine 7 by operating the hydraulic operation levers 21 and 22 when the lock levers 23 and 24 are rotated downward, and to lock the work machine 7 in a lock state (inoperable) in which the work machine 7 does not operate even if the hydraulic operation levers 21 and 22 are operated when the lock levers 23 and 24 are rotated upward. In this way, a lock mechanism for locking the operation of the work machine 7 by vertically rotating the left and right lock levers 23 and 24 is configured.

[0020]

Further, when the lock levers 23 and 24 are rotated downward and the work machine 7 can be operated by the hydraulic operation lever 22, the lock levers 23 and 24 are tilted forward to block left and right doorways 19, 19, thereby preventing workers from getting on and off, and when the lock levers 23 and 24 are rotated upward, the space of the doorways 19, 19 are expanded to allow the worker to get on and off. However, it is also possible to provide a doorway on only one of the left and right sides, and in this case, the lock lever is arranged only on the side where the doorway is provided.

[0021]

Next, the lock mechanism by starting/stopping the engine of the present invention and operating the operation lever will be described with reference to FIG. 3. Hydraulic pumps 30 and 33, which serve as hydraulic pressure sources, are continuously installed and driven on the output shaft of the engine 13, and are connected so that the pressure oil discharged from the hydraulic pump 30 can be sent to the hydraulic actuators (hydraulic cylinders 9, 10, 11, and hydraulic motor) via a direction switching valve. The hydraulic cylinders 9, 10, and 11 and the hydraulic motor are each connected to a direction control valve (switching valve), and the pilot valve is switched by operating the hydraulic operation lever to control each directional control valve. Since the operation of the direction control valve and that of the hydraulic actuators are substantially the same action, the operation of the boom cylinder 11 and the direction control valve and the open/close valve controlling the expansion and contraction of the boom cylinder 11 will be described.

[0022]

The bottom side and rod side of the boom cylinder 11 are connected to the direction control valve 31 via hydraulic pipes, respectively, the direction control valve 31 is composed of a pilot-operated switching valve, and each pilot oil passage is connected

to a pilot valve (remote valve) 32 provided at the base of the hydraulic operation lever 21. The pilot valve 32 is switched by the operation of the hydraulic operation lever 21, pressure oil from the hydraulic pump 33 connected to the engine 13 is sent to the pilot valve 32 via the open/close valve 34, and pilot oil can be sent to the pilot operation unit of the direction control valve 31 by switching the pilot valve 32. The boom cylinder 11 can be expanded and contracted by switching the direction control valve 31. However, the direction control valve 31 may be composed of an electromagnetic valve, and may be configured to operate and switch a solenoid of the electromagnetic valve by providing a switch and the like on the operation lever. In this case, the open/close valve 34 is interposed between the direction control valve 31 and the hydraulic pump 30.

[0023]

The open/close valve 34 is composed of a two-position switching solenoid valve, and a solenoid 34a of the open/close valve 34 is connected to a switch 35 which is a means for detecting the operation of a lock lever 23 described later. A switching means switches between 'operable' and 'inoperable' of the boom cylinder 11 that becomes an actuator by the open/close valve 34, by switching between the oil sending to the pilot valve 32 of the pressure oil from the hydraulic pump 33 and the draining of the pressure oil of the pilot valve 32 by the actuation of the solenoid 34a.

[0024]

Thus, when the lock lever 23 is in the 'operable' position, the solenoid 34a is operated to switch the open/close valve 34, and the pressure oil from the hydraulic pump 30 is sent to the pilot operation unit of the direction control valve 31 when operating the pilot valve 32 to switch. Then, the pressure oil from the hydraulic pump 30 is sent to the actuator (boom cylinder 11) via the direction control valve 31 to operate it. On the contrary, when the lock lever 23 is rotated to the 'inoperable' position, the solenoid 34a is not operated, the open/close valve 34 cannot send the pressure oil from the hydraulic pump 33 to the pilot valve 32, the direction control valve 31 cannot be switched even if operating the hydraulic operation lever 21 (22), and the actuator cannot be operated.

[0025]

Next, an electric circuit will be described. In FIG. 3, the key switch 36 is provided with an OFF terminal 36a, an ON terminal 36b, a START terminal 36c, and the common terminal 36d, and can be connected to the common terminal 36d and any one of the OFF terminal 36a, the ON terminal 36b, and the START terminal 36c by rotating the key, and the common terminal 36d is connected to the battery 37 as a power source.

As for the structure of the key switch 36, as shown in FIGS. 7 and 8, a rotating body 36f is housed in a case 36e, the case 36e is fixed to the machine body, and a key

hole is opened at the center of one end of the rotating body 36 so as to insert the key, and a protrusion 36g protrudes from the case 36e from the outer periphery of the rotating body 36. A solenoid 51, which will be described later, is arranged on the side of the protrusion 36g, and a sliding body 51a slides by the actuation so that the protrusion 36g is pushed and can rotate in the OFF direction.

[0026]

Then, the ON terminal 36b is connected to a terminal 35a that is one (ON/OFF means side of the power supply) of the two terminals of the switch 35 that detects the rotation position of the lock lever 23 (24), and the START terminal 36c is connected to a terminal 35b that is the other (start limiting means side) of the switch 35. The switch 35 is integrally composed of a two-pole reversing type switch, and the contact 35d is urged to always abut on and close the terminal 35b by the urging force of the spring 35c, and when the lock lever 23 is rotated to the 'operable' position, a projecting piece 23a provided at the base of the lock lever 23 pushes the contact 35d to close the terminal 35a. On the contrary, when the lock lever 23 is rotated to the 'inoperable' position, the terminal 35b is closed.

[0027]

The lock lever 23, the contact 35d, and the terminal 35b serve as a start limiting means, and the terminal 35b is opened by the rotation of the lock lever 23 so that the key switch 36 cannot be started (started) even when set to the start position. Further, the lock lever 23, the contact 35d, and the terminal 35a serve as an ON/OFF means for supplying electric power to the operation unit (solenoid 34a) of the switching means (open/close valve 34), and the contact 35a is closed (turned ON) by the rotation of the lock lever 23, at the 'operable' position to supply the electric power to the open/close valve 34 to operate, and the pressure oil can be sent. At the 'inoperable' position, the contact 35a is opened (turned OFF), the electric power is not supplied to the solenoid 34a, and the open/close valve 34 is not operated, so that the pressure oil is not sent to the pilot valve 32.

[0028]

The terminal 35a connects a primary side to the ON terminal 36b of the key switch 36, and a secondary side is connected to a first input terminal 38a of a timer 38 serving as a delay means and the solenoid 34a of the open/close valve 34. The timer 38 is supplied electric power from the battery 37, and is configured to set and change a delay time (first delay time and second delay time described later) by a changing means 49. A solenoid 51 that is a means for inputting the stop of an engine stop means 40 and returning the key switch to the OFF position is connected to an output side. However, the means

for turning off the key switch 35 is not limited to the solenoid, and may be an electric cylinder, a motor, or the like.

Therefore, when the key switch 36 is in the ON position and the lock lever 23 is rotated to the 'operable' position, the terminal 35a is closed to operate the open/close valve 34, and the actuator can be operated by operating the hydraulic operation levers 21 and 22. When the lock lever 23 is in the 'inoperable' position, the terminal 35a is opened so as not to operate the open/close valve 34, pressure oil is not sent to the pilot valves 32 and 33, and the actuator cannot be operated even if rotating the hydraulic operation levers 21 and 22.

[0029]

Further, the timer 38 is reset when the lock lever 23 is rotated to the 'operable' position to close the terminal 35a, the power is input to the first input terminal 38a, and the ON signal is input. When the power is cut off by rotating the lock lever 23 to the 'inoperable' position and an OFF signal is input to the first input terminal 38a, the timer 38 is operated to output a stop signal to the engine stop means 40 after the set time (first delay time) to stop the engine 13. Simultaneously, the key switch 36 is turned OFF by the solenoid 51. That is, the timer 38 has the first input terminal 38a and the second input terminal 38b, and is reset when an ON signal is input the first input terminal 38a. When an OFF signal is input, the timer is operated to output to the engine stop means 40 from the output terminal after the first delay time to stop the engine 13. After the first delay time, the output terminal outputs to the engine stop means 40 to stop the engine 13, and at the same time, the solenoid 51 is operated so that the sliding body 51a pushes the protrusion 36g to move (rotate) the key switch 36 from the ON position to the OFF position. If there is an ON signal within the first delay time, it is reset and the engine 13 remains in actuation.

[0030]

The secondary side of the terminal 35b is connected to the second input terminal 38b of the timer 38 and a solenoid 39a of a relay 39 which is an engine start circuit (including a cell motor actuation circuit and an ignition circuit). The relay 39 has the solenoid 39a and a contact 39b, and the contact 39b is connected between the battery 37 and the cell motor 44. A pinion 45 is fixedly attached to the output shaft of the cell motor 44, and the pinion 45 meshes with a starting gear 46 fixedly attached to the flywheel of the engine 13. The contact 39b is always 'opened', and when the solenoid 39a is operated, it is 'closed'. That is, when the lock lever 23 rotates the key switch 36 to the START position in the 'inoperable' position, a current flows through the solenoid 39a, the contact 39b is closed to drive the cell motor 44, and the flywheel is rotated to start the

engine 13.

[0031]

When the second input terminal 38b of the timer 38 receives an OFF signal input, the timer is operated and outputs to the engine stop means 40 from the output terminal after the second delay time to stop the engine 13, and is reset when an ON signal is input to the first input terminal 38a within the second deal time, and the engine 13 remains in operation. That is, if the key switch 36 is rotated to the START position, the terminal 35a is closed and the ON signal is input to the second input terminal 38b when the lock lever 23 is in the 'inoperable' position, and at the same time, the cell motor 44 is driven. When the engine 13 is started in this way, the key switch 36 changes from the START position to the ON position, and an OFF signal is input to the second input terminal 38b to operate the timer.

[0032]

When the second delay time elapses, the output terminal of the timer 38 outputs to the engine stop means 40 to stop the engine 13, and when the lock lever 23 is rotated from the 'inoperable' position to the 'operable' position within the second delay time, the terminal 35a is closed to input an ON signal to the first input terminal 38a, and the timer 38 is reset to enable the engine 13 to maintain the operation state.

[0033]

Further, when an ON signal is input to the second input terminal 38b of the timer 38, the stop output from the timer 38 is released, and this ON signal is used as a release signal of the engine stop means 40. That is, after leaving the machine with the lock lever 23 rotated to the 'inoperable' position and the first delay time elapses, the output of the timer 38 is in a state of stopping the engine stop means 40. On the other hand, in order to start the engine 13, the key switch 36 is rotated to the START position while the lock lever 23 is rotated to the 'inoperable' position, but the timer 38 is not reset unless an ON signal is input, so that the engine stop means 40 remains in the stopped state, and the engine 13 cannot be started only by rotating the key switch 36 to the START position. Therefore, if the key switch 36 is rotated to the START position when the lock lever 23 is in the 'inoperable' position, in order to release the stop of the engine stop means 40, the ON signal when rotated to the START position is input as a stop release input signal to the second input terminal 38b of the timer 38, and the stop output to the engine stop means 40 of the timer 38 is released. Therefore, the rotation of the key switch 36 to the START position and the rotation of the lock lever 23 (24) to the 'inoperable' position serve as stop release means.

[0034]

The operation will be described in the above configuration.

First, when the operator gets on and is seated in the work vehicle, both the lock levers 23 and 24 are rotated to the 'inoperable' position. That is, the lock levers 23 and 23 are rotated rearward so as to enable passage through the doorway 19. In this state, as shown in FIG. 4, the terminal 35b of the switch 35 is closed, and when the key switch 36 is rotated to the START terminal 36c position, it is connected to the battery 37 which is the starting power source, a stop release signal is output to the second input terminal 38b of the timer 38, and the stop of the engine stop means 40 is released, to bring the engine 13 into an operable state. At the same time, the solenoid 39a of the relay 39 is operated, the contact 39b is closed, and electric power is supplied to the cell motor 44 to rotate and start the flywheel.

[0035]

At this time, if either or both of the lock levers 23 and 24 are rotated to the 'operable' position, the relay 39 does not operate, and the contact 39b is opened so that the starter motor 44 cannot be driven and the engine 13 cannot be started. Therefore, even if the hydraulic operation levers 21 and 22 are accidentally touched when the engine 13 is started, the open/close valve 34 is in the blocked state, so that the direction control valve 31 is not operated and it is safe because the actuator does not operate.

[0036]

When the engine 13 starts, the key switch 36 is rotated to the ON position, the cell motor 44 is stopped, and an OFF signal is input to the second input terminal 38b to operate the timer 38. Then, as shown in FIG. 3, when performing the work, the lock levers 23 and 24 are rotated forward to be set in the 'operable' position.

However, if the time from when the engine is started until the lock lever is rotated from the 'inoperable' position to the 'operable' position is not operated within the second set time, the timer 38 outputs a stop signal to stop the engine 13, and the key switch 36 is also rotated to the OFF position. In this way, unnecessary driving of the engine 13 is prevented, fuel consumption is suppressed, and battery discharge is also prevented.

[0037]

Then, by rotating the lock levers 23 and 24 to the 'operable' position, the terminal 35a of the switch 35 is closed, an ON signal is input to the first input terminal 38a of the timer 38, and the timer (second delay time) is reset. At the same time, power is supplied to the solenoid 34a of the open/close valve 34 to be turned on, pressure oil is sent to the pilot valve 32 of the hydraulic operation levers 21 and 22, and oil is sent to a pilot operation unit of the direction control valve 31 by operating the hydraulic operation levers 21 and 22, thereby switching the direction control valve 31. In this way, the actuator

can be driven by operating the hydraulic operation levers 21 and 22 to operate the work machine 7.

[0038]

Then, during the work, when temporarily leaving from the driving operation unit 15 for inspection or confirmation, if the lock lever 23 or 24 is lifted and rotated to the 'inoperable' position, as shown in FIG. 5, the terminal 35a of the switch 35 is opened, the open/close valve is switched to the block position, and the direction control valve 31 cannot be switched even if the hydraulic operation levers 21 and 22 are operated. That is, even if the hydraulic operation levers 21 and 22 are accidentally touched, the actuator is not operated. Then, when the OFF signal is input to the first input terminal 38a of the timer 38, the timer 38 operates and starts counting the first delay time. At this time, the engine 13 remains in operation.

[0039]

When the operator returns to the driving operation unit 15 and rotates the lock levers 23 and 24 to the 'operable' position within the first delay time set in the timer 38, the terminal 35a of the switch 35 is closed, an ON signal is input to the first input terminal 38a of the timer 38 to reset the timer (first delay time), the engine stop means 40 is not operated, and the engine 13 remains in operation to continue the work. When the ON signal is input to the first input terminal 38a in this way, both the first delay time and the second delay time of the timer 38 can be reset, and the configuration for resetting can be simplified.

[0040]

Further, if the operator cannot return to the driving operation unit 15 and the first delay time set in the timer 38 elapses, the timer 38 sends a stop signal to the engine stop means 40 to stop the engine 13. At the same time, the solenoid 51 is operated to rotate the key switch 36 from the ON position to the OFF position. In this way, wasteful fuel consumption can be suppressed. At this time, the lock lever 23 or 24 is in the 'inoperable' position, and even if the hydraulic operation levers 21 and 22 are operated by mistake, it is safe because the actuator does not operate.

When the work is performed again from the engine stop state, as described above, the key switch 36 may be rotated to start the engine 13 while the lock levers 23 and 24 are rotated to the 'inoperable' position, and no operation is required to release the engine stop."

B Described Invention

According to A above, Evidence A No. 2 describes the following invention

(hereinafter, referred to as "Invention A-2").

"A backhoe having a hydraulic operation device,

wherein a work machine 7 is mounted on the front portion of a machine, and the machine supports a swivel frame 2 so as to swivel left and right via a swivel base bearing 17 in the upper center of a crawler type traveling device 1,

wherein the work machine 7 composed of a boom 6 supported to a boom bracket 12, an arm supported at an upper end of the boom 6, and a bucket 4 that is a working attachment supported at a tip end portion of the arm 5 is provided at a front end of the swivel frame 2, and

wherein a hood 14 covering an engine 13 and the like is arranged on the upper part of the swivel frame 2, a driver's seat 16 is located on the hood 14, hydraulic operation levers 21 and 22 and lock levers 23 and 24 and the like are located in the vicinity of the driver's seat 16, a traveling lever 25, a pedal, and the like are located in front of the driver's seat 16 to form a driving operation unit 15, a canopy 8 is arranged above the driving operation unit 15, and if a key switch 36 is rotated to a START terminal 36c position while an operator gets on and is seated in a work vehicle, the stop of an engine stop means 40 is released to bring the engine 13 into an operable state, comprising:

hydraulic actuators such as hydraulic cylinders 9, 10, 11, a swivel motor 45, and a traveling hydraulic motor 44 rotation-operate the boom 6, the arm 5, and the bucket 4, respectively,

wherein the hydraulic cylinders 9, 10, and 11 and the hydraulic motor that are hydraulic actuators are configured to be connected to direction control valves (switching valve) respectively, and to be driven by being supplied pressure oil discharged from a hydraulic pump 30 via the direction switch valve by switching a pilot valve by the operation of a hydraulic operation lever to control each of the direction control valves,

wherein the operation of each direction control valve and the hydraulic actuators are substantially the same action,

wherein the open/close valve 34 is interposed between the direction control valve 31 and the hydraulic pump 30, and if the lock lever 23 or 24 is lifted and rotated to an 'inoperable' position, the open/close valve 34 is switched to a block position, and even if the hydraulic operation levers 21 and 22 are operated, the direction control valves 31 are not switched, and even if the hydraulic operation levers 21 and 22 are accidentally touched, the actuator does not operate,

wherein when the engine 13 is started, if either or both of the lock levers 23 and 24 are rotated to an 'operable' position, the engine 13 cannot be started, and if the time until the lock levers 23 and 24 at the 'inoperable' position to the 'operable' position after

starting the engine 13 exceeds a second set time, the engine 13 is stopped, and on the other hand, by rotating the lock levers 23 and 24 to the 'operable' position by the time a second delay time elapses after the start of the engine 13, the actuator can be driven by operating the hydraulic operation levers 21 and 22,

wherein during the work, if the lock lever 23 or 24 is lifted and rotated to the 'inoperable' position, even if the hydraulic operation levers 21 and 22 are accidentally touched, the actuator is not operated and the engine 13 remains in operation until a first delay time elapses."

(3) Evidence A No. 4 (Microfilm of Japanese Unexamined Utility Model Application Publication No. S63-51427 (Japanese Unexamined Utility Model Application Publication No. H1-156256))

A Described matters

Evidence A No. 4 that was submitted by the Opponent and that is a publication distributed prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with the drawings.

(A) Claim of Utility Model Registration

"2. Claim of Utility Model Registration

A safety device of a construction machine, wherein in a swiveling range entry alarm device of the construction machine consisting of a lower traveling body and an upper swivel body, arranging obstacle sensors on right and left sides of the upper swivel body respectively, monitoring whether or not an obstacle exists around the upper swivel body, and making a controller portion to output a detection signal thereof to make the alarm device operable, alarms are provided on an outer peripheral portion of the upper swivel body and in a cab respectively, an electric circuit of the upper alarm device can be energized when a key switch of an engine is turned on, and when an obstacle exists within a detection signal range of the obstacle sensors, it is set to be able to generate alarm sound from all alarms on the outer periphery of the upper swivel body and in the cab."

(B) Prior art, problem to be solved, and means for solving the problem

"Field of industrial application

The device is related to a safety device of a construction machine equipped with an obstacle sensor and alarms.

Prior art

FIG. 3 is a side view of a hydraulic excavator of the construction machine. In

the figure, reference numeral 1 is a lower traveling body, reference numeral 2 is an upper swivel body, reference numeral 3 is a cab of the upper swivel body 2, and reference numeral 4 is an alarm provided in the cab 3. FIG. 4 is a top view of a hydraulic excavator provided with a conventional alarm device. In the figure, reference numerals 5 and 6 are obstacle sensors attached to right and left side portions of the upper swivel body 2, and reference numeral 0 is a swivel center.

In the conventional alarm device (not shown), the obstacle sensors are respectively attached to right and left side portions of the upper swivel body, and detection signals by the obstacle sensors are output to a control device during swiveling work of the hydraulic excavator to issue alarm sound from an alarm (such as a buzzer) in the cab 3.

The problem to be solved of the device

In the conventional alarm device, if the obstacle sensors detect an obstacle such as a person or an animal when the hydraulic excavator performs swiveling work, alarm sound provided in the cab is issued. Therefore, while the excavator is performing work other than swiveling work, other people or animals have entered a work range. Further, it was dangerous because it was not possible to actively confirm the alarm to other people and animals who had entered the area.

The object of the device is to solve the above problem, and to provide a safety device that enables the operation of a signal range entry alarm device while a key switch is turned on for a construction machinery engine, and issues an alarm to people and animals that enter the signal range in that state.

Means for solving the problem

The means of the device for solving the problem is configured by

A. providing alarms on an outer peripheral portion of an upper swivel body and in a cab, respectively,

B. enabling the energization of an electric circuit of an alarm device when a key switch of an engine is turned on, and

C. setting to be able to generate alarm sound from all alarms on the outer periphery of the upper swivel body and in the cab when an obstacle exists within a detection signal range of the obstacle sensors."

Function

A. Since the electric circuit of the alarm device can be energized when the key switch of the engine is turned on, the alarm device can be operated not only when the construction machine performs swiveling work, but also while the key switch is turned on.

B. Since the alarms are provided on the outer peripheral portion of the upper swivel body and in the cab, respectively, if people, and animals enter the signal ranges in the state of

A above, the alarm in the cab issues alarm sound to a driver, and the alarm provided on the outer peripheral portion of the upper swivel body issues alarm sound to the entering person, animal, etc. respectively.
C. According to B above, a driver recognizes the entry of obstacles within the signal ranges, and the entering people, animals, etc. are urged to evict from the signal ranges."

(C) Example and Effect

"Example

Hereinafter, the safety device according to the device will be described in detail with reference to the drawings. FIG. 1 is a top view of a hydraulic excavator provided with a safety device 7 according to the device. In the figure, reference numeral 8 is an upper swivel body, reference numerals 9 and 19 are obstacles sensors attached to left side portions of the upper swivel body 8, respectively, reference numerals 11 and 12 are obstacle sensors attached to right side portions, reference numeral 14 is an alarm provided in a cab 13, reference numerals 15 and 16 are alarms provided on an outer peripheral portion of the upper swivel body 8, respectively, reference numeral 17 is an engine, A, B, C, and D are signal ranges (detection signal ranges) of the obstacle sensors 9, 10, 11, and 12 respectively, and R is a rear end swivel radius of the upper swivel body 8. FIG. 2 is an electric circuit diagram for the alarm device 18 of the safety device 7 according to the device. In the figure, reference numeral 19 is a key switch, reference numeral 20 is a power supply, and reference numeral 21 is a controller portion.

Next, the configuration of the safety device 7 according to the device will be described with reference to FIGS. 1 and 2. The alarms 15 and 16 are provided on the outer peripheral portion of the upper swivel body 8 and in the cab 13 respectively. Further, when the key switch 19 of the engine 17 is turned on, the electric circuit of the alarm device 18 can be energized, and when an obstacle exists in the detection signal ranges A, B, C, and D of the obstacle sensors 9, 10, 11, and 12, it is set to be able to generate alarm sound from all alarms on the upper swivel body 8 and in the cab 13.

Next, the operating function of the safety device 7 according to the device will be described. Since when the key switch 19 of the engine 17 is turned on, the electric circuit of the alarm device 18 can be energized, not only when the hydraulic excavator performs swiveling work, the alarm device 18 can be operated while the key switch 19 is turned on. While the key switch 19 is turned on, if people, animals, etc. enter the signal ranges A, ..., D of the obstacle sensors 9, ..., 12, any one of the obstacle sensors 9, ..., 12 detects the obstacle. A detection signal from the detecting obstacle sensor is output to the controller portion 21. Then, on the basis of the detection signal, all alarms 14, 15,

and 16 connected to the controller portion 21 issue alarm sound. Thereby, a driver in the cab 13 recognizes the signal range entry of the obstacle by the alarm sound of the alarm 14, and the entering people, animals, etc. are urged to evict from the signal ranges."

Effect of the device

In a conventional alarm device, while an excavator performs swiveling work, if an obstacle sensor detects an obstacle such as a person, animal, etc., alarm sound provided in a cab is issued. Therefore, while the excavator is performing work other than swiveling work, other people or animals have entered a work range. Further, it was dangerous because it was not possible to actively confirm the alarm to other people and animals who had entered the area.

However, in the safety device according to the device, it is configured so that the alarms are provided on the outer peripheral portion of the upper swivel body and in the cab, the electric circuit of the alarm device can be energized when the key switch of the engine is turned on, and alarm sound is issued from all alarms on the upper swivel body and in the cab when the obstacle exists in the detection signal ranges of the obstacle sensors.

Therefore, in the safety device according to the device, while the key switch of the engine is turned on, when obstacles enter the signal ranges of the obstacle sensors, a driver recognizes the entry of obstacles within the signal ranges, and the entering people, animals, etc. are urged to evict by alarm sound of the alarm provided on the outer peripheral portion of the upper swivel body. As described above, the safety function of the construction machine is improved."

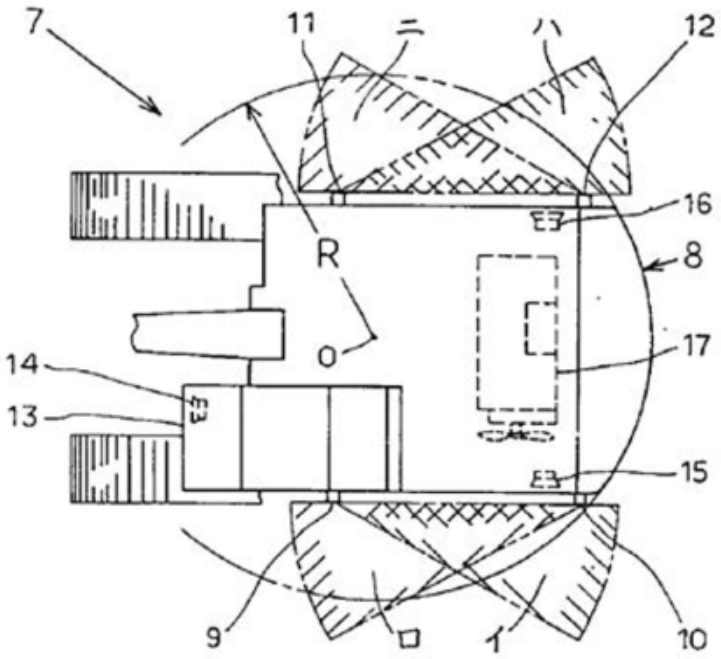
(D) Brief description of drawings

"4. Brief description of drawings

FIG. 1 is a top view of an excavator provided with a safety device according to the device, FIG. 2 is an electric circuit diagram for the alarm device of the safety device according to the device, FIG. 3 is a side view of a hydraulic excavator of the construction machine, and FIG. 4 is a top view of a hydraulic excavator provided with a conventional alarm device."

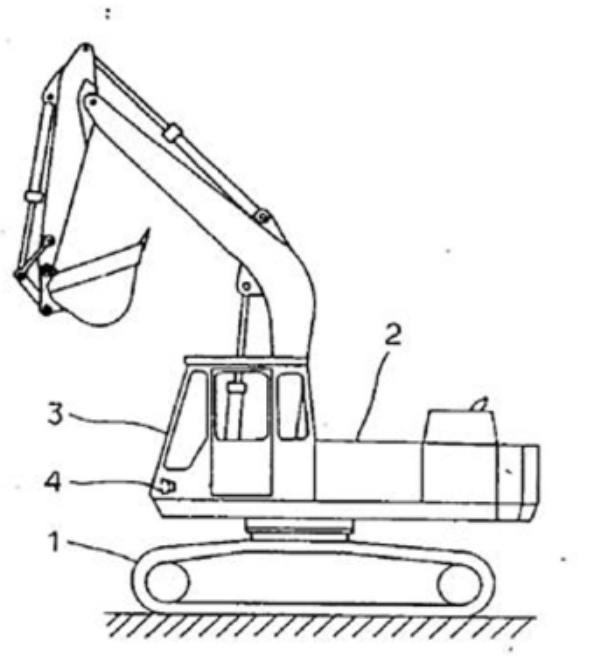
(E) Drawings

FIG. 1 and FIG. 3 illustrate the following, respectively.



第 1 図

第１図　FIG. 1



第 3 図

第３図　FIG. 3

According to FIG. 1, it can be understood that a member shown halfway above the cab 13 in a plan view is a boom-shaped member of the hydraulic excavator seen in a side view of FIG. 3, and it can be seen that the boom-shaped member is provided at the front center portion of the upper swivel body 8 of the hydraulic excavator.

According to FIG. 3, it can be seen that the hydraulic excavator has a boom-shaped member and an arm-shaped member at the upper part of the cab 3 in a side view, and a bucket-shaped member is provided at the tip of the arm-shaped member.

According to FIG. 1 and FIG. 3, it can be seen that the cab 13 and the engine 17 are provided in the upper swivel body 8 of the hydraulic excavator.

B　Described invention

According to A above, Evidence A No. 4 describes the following invention (hereinafter, referred to as "Invention A-4").

"A hydraulic excavator, having a lower traveling body, an upper swivel body 8, a boom-shaped member, and an arm-shaped member provided at a front central portion of the upper swivel body 8, and a bucket-shaped member attached to a tip end of the arm-shaped

member, and

provided with a cab 13 and an engine 17 on the upper swivel body 8, comprising:

obstacle sensors 9, 10, 11, and 12 which are provided on a left side portion and a right side portion of the upper swivel body 8, and output detection signals to a controller portion 21 if obstacles such as people and animals enter respective detection signal ranges; and

the controller portion 21 that can issue alarm sound from alarms 15, 16, and 14 connected to the controller portion 21 on the basis of the detection signals from the obstacle sensors 9, 10, 11, and 12,

wherein not only when the hydraulic excavator performs swiveling work, while a key switch 19 of the engine 17 is turned on, if the obstacles such as people and animals enter the signal ranges of the obstacle sensors 9, 10, 11, and 12, all alarms 14, 15, and 16 connected to the controller portion 21 are set to issue alarm sound."

(4) Evidence A No. 1 (Japanese Unexamined Patent Application Publication No. 2010-198519)

A Described matters

Evidence A No. 1 that was publicly known prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with drawings.

(A) Example 1

"[Example 1]

[0021]

An overview of a hydraulic excavator, which is an example of a work machine, is shown in FIG. 1. The hydraulic excavator is composed of an articulated front working machine 1A including a boom 1a, an arm 1b, and a bucket 1c that rotate in the vertical direction, and a vehicle body 1B including an upper swivel body 1d and a lower traveling body 1e. The upper swivel body 1d is provided with a driver's cab 1f. The base end of the boom 1a of the front working machine 1A is supported by a front portion of the upper swivel body 1d. The boom 1a, the arm 1b, the bucket 1c, the upper swivel body 1d, and the lower traveling body 1e are driven by actuators of a boom cylinder 3a, an arm cylinder 3b, a bucket cylinder 3c, a swivel motor 3d (not shown in FIG. 1), and left and right traveling motors 3e (not shown), respectively. Further, the boom 1a, the arm 1b, the bucket 1c, and the upper swivel body 1d are provided with angle detectors 8a, 8b, 8c, and 8d for detecting their respective rotation angles. Further, a camera 13a is installed

behind the machine to capture a rear scene, and a millimeter wave radar (distance sensor) 14a is installed to measure the distance from the rear of the machine to an obstacle. Further, a camera 13b is installed on the right side of the machine to capture a scene on the right side, and a distance sensor 14b (not shown) is installed to measure the distance from the right side of the machine to the obstacle.

[0022]

FIG. 2 is an explanatory diagram showing a procedure example of operation and processing flow in the work of a hydraulic excavator which is an example of a work machine. In the explanatory example of FIG. 2, the camera 13a and the millimeter wave radar 14a are used as the distance sensors.

[0023]

At a certain time 1701, the camera 13a captures a scene, and when the machine starts excavation 1702, image processing 1706 is performed using the scene captured by an obstacle detecting means 600 to detect the presence or absence of obstacles during the excavation work 1703. On the other hand, the millimeter wave radar 14a constantly performs sensing 1712 while the machine is working. Therefore, during the excavation work 1703, the presence/absence of an obstacle, and the type of the obstacle (person or non-person) which are results 1706 of the image processing, and the distance data of the obstacle of the millimeter wave radar 14a, are integrated (fused) to output 1707 the results of the obstacle presence/absence and the type of the obstacle, and the distance data to the obstacle. An operator confirms these results with a monitor or voice, and operates the machine while confirming the degree of danger around the changing direction when the operation is changed (reverse, swiveling, etc.).

[0024]

Now, when a person exists within the operating position range on the right side and the front working machine is swiveled right 1704 (confirmed by a signal 1708 of the front working machine 1A and an optical flow 1709 using the camera image), there is a high possibility of contacting with the person, so that the front working machine is stopped as a control 1710 for avoiding contact to ensure the safety of the person. Further, when an object exists within the operating position range on the right side, the front working machine 1A is slowly operated as a control 1710 for avoiding contact. At this time, after the contact avoidance control, the obstacle detecting means 600 using the shooting scene of the camera 13a may also be stopped and restarted at the start of excavation.

[0025]

On the other hand, if a person exists within the rear moving range and the lower

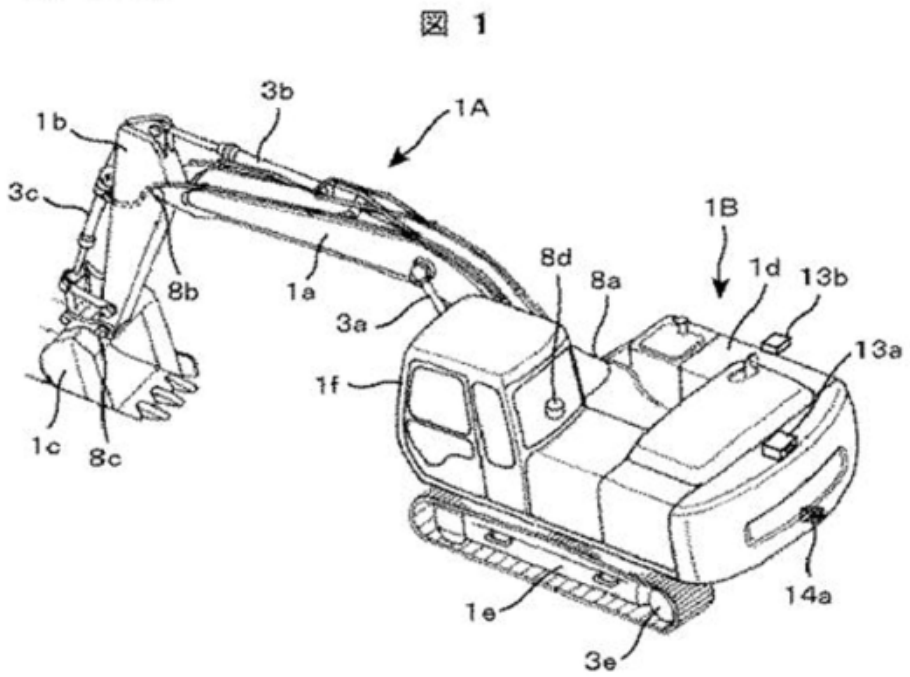
traveling body moves backward 1705, there is a high possibility that the lower traveling body will come into contact with the person. Therefore, as a control 1711 for avoiding contact, the movement of the lower traveling body is stopped, and the safety of the person is ensured.

[0026]

Here, although the detection by the camera 13a is shown only in an example during excavation, sensing may be performed at all times while the machine is working."

(B) FIG. 1

【図１】



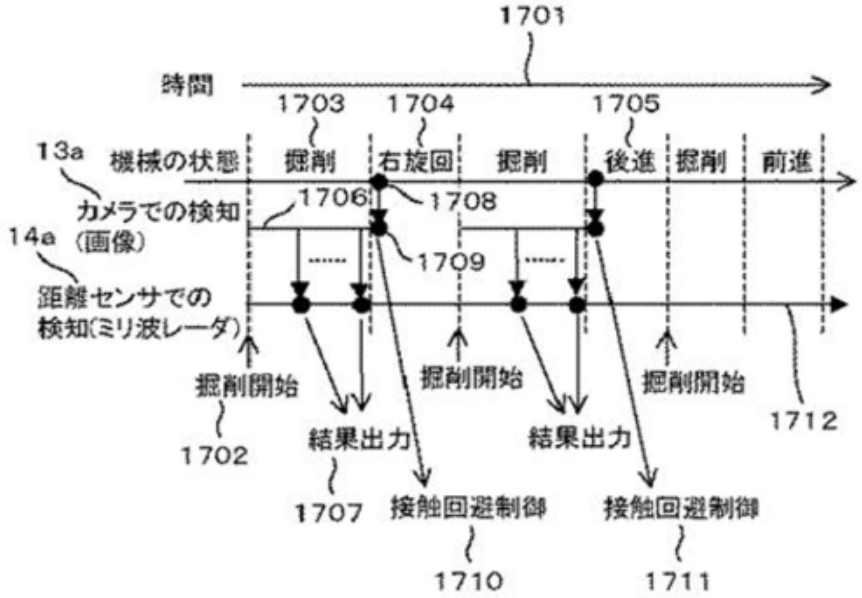
【図１】 [FIG. 1]

According to FIG. 1, it can be seen that both of the camera 13a and the camera 13b are installed on the upper swivel body 1d.

(C) FIG. 2

【図２】

図２



【図２】 [FIG. 2]

時間 Time

機械の状態 State of machine

カメラでの検知（画像） Detection by cameras

距離センサでの検知（ミリ波レーダ） Detection by distance sensors

掘削 Excavation

右旋回 Swiveling right

後進 Moving backward

前進 Moving forward

掘削開始 Starting excavation

結果出力 Result output

接触回避制御 Control for avoiding contact

B Described invention

According to A above, Evidence A No. 1 describes the following invention hereinafter, referred to as "Invention A-1").

"A hydraulic excavator is composed of an articulated front working machine 1A including a boom 1a, an arm 1b, and a bucket 1c that rotate in the vertical direction, and a vehicle

body 1B including an upper swivel body 1d and a lower traveling body 1e, in which the base end of the boom 1a of the front working machine 1A is supported by a front portion of the upper swivel body 1d, and the boom 1a, the arm 1b, the bucket 1c, the upper swivel body 1d, and the lower traveling body 1e are driven by actuators of a boom cylinder 3a, an arm cylinder 3b, a bucket cylinder 3c, a swivel motor 3d, and left and right traveling motors 3e, respectively,

the upper swivel body 1d provided with a cab 1f,

wherein a camera 13a is installed behind the upper swivel body 1d of the machine to capture a rear scene, and a camera 13b is installed on the right side of the upper swivel body 1a of the machine to capture a scene on the right side, when the machine starts excavation 1702, image processing 1706 is performed using the scene captured to detect the presence or absence of obstacles during the excavation work 1703,

wherein when a person exists within the operating position range on the right side and the front working machine is swiveled right 1704, there is a high possibility of contacting with the person, so that the front working machine is stopped as a control 1710 for avoiding contact, and

wherein sensing may be performed at all times while the machine is working."

(5) Document 2 (International Publication No. WO2012/161062)

Document 2 that was publicly known prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with drawings.

"[0009]

[Example 1]

FIG. 1 illustrates a top view of an electric swiveling apparatus according to Example 1. Although an excavator provided with the electric swiveling apparatus is described, for example, this example can be applied to construction machinery that is capable of a swiveling operation in addition to the excavator.

[0010]

A swivel body 2 is mounted on a base 1. The base 1 is a traveling body including, for example, crawlers and the like. The swivel body 2 swivels about a swiveling center 3 with respect to the base 1. An attachment 4 is attached to the swivel body 2. The attachment 4 swivels about the swiveling center 3 together with the swivel body 2. In a case where the electric swiveling apparatus is an excavator, the attachment 4 is composed of a boom, an arm and a bucket, for example.

.... (Omitted) ....

[0033]

A plurality of, for example, four obstacle detectors 7 are attached to the swivel body 2. The obstacle detectors 7 detect an obstacle around the swivel body 2. A worker, a dump truck, or the like can be exemplified as an example of the obstacle. For example, a transmitter 11 is attached to a helmet 10 of the worker. For example, an omnidirectional marker light emitter is employed for the transmitter 11. For example, a CCD camera acquiring an image of the transmitter 11 is employed for the obstacle detector 7. It is possible to calculate a position of the transmitter 11 by imaging one transmitter 11 with the plurality of obstacle detectors 7. Since the obstacle detectors 7 are attached to the swivel body 2, a relative position of the transmitter 11 with respect to the swivel body 2 as a reference; that is, a relative position of the obstacle, is calculated."

(6) Evidence A No. 3 (Japanese Unexamined Patent Application Publication No. 2010-71425)

Evidence A No. 3 that was publicly known prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with drawings.

"[0036]

FIG. 4 is a diagram showing the appearance of a hydraulic excavator on which the hydraulic drive device of the present embodiment is mounted. The hydraulic excavator includes a lower traveling body 101, an upper swivel body 102 swivelably mounted on the lower traveling body 101, and a front working machine 104 coupled to a tip end portion of the upper swivel body 102 via a swing post 103 so as to rotate in vertical and lateral directions. The lower traveling body 101 is a crawler type, and a blade 106 for excretion of soil is provided on the front side of a track frame 105 so as to be vertically movable. The upper swivel body 102 includes a swivel base 107 forming a base lower structure and a canopy type cab 108 provided on the swivel base 107. The front working machine 104 includes a boom 111, an arm 112, and a bucket 113, the base end of the boom is pin-coupled to the swing post 103, the tip of the boom 111 is pin-coupled to the base end of the arm 112, and the tip end of the arm 112 is pin-coupled to the bucket 113.

[0037]

The boom 111 and arm 112 rotate by expanding and contracting the boom cylinder 5a and the arm cylinder 5b shown in FIG. 1, and the upper swivel body 102 rotates by rotating the swivel motor 5c shown in FIG. 1. The bucket 113 rotates by expanding and contracting the bucket cylinder 117, the blade 106 moves up and down by expanding and contracting the blade cylinder (not shown), and the lower traveling body 101 travels by

rotating the left and right traveling motors 118a and 118b. The swing post 103 rotates by expanding and contracting the swing cylinder 119. In the hydraulic circuit diagram of FIG. 1, the actuators such as the bucket cylinder 117, the traveling motors 118a and 118b, and the swing cylinder 119 are not shown.

[0038]

The driver's cab 108 is provided with a driver's seat 121 on which an operator is seated, and an operation lever device 122 for a bucket boom and an operation lever device 123 for a swivel arm are provided on both the right and left sides of the driver's seat 121. A gate lock lever 24 is provided at the entrance portion of the driver's seat 121. The solid line position in the figure indicates the unlocked position that prevents an occupant from getting on and off the driver's seat 121, and the broken line position indicates the lock position that allows the occupant to get on and off the driver's seat 121. The operation lever devices 122 and 123 have built-in remote control valves connected to the pilot oil passage 3b shown in FIGS. 1 to 3.

-Operation-

Next, the operation of the present embodiment will be described.

[0039]

At the end of the day's work, the operator turns off an engine key switch that is not shown to stop engine 1. At this time, in order to ensure safety, the operator operates the gate lock lever 24 to the locked position to switch the gate lock valve 23 to the inoperable position of the flow rate control valve (the position where the pilot oil passage 3b is communicated with the tank T). Further, when the engine 1 is stopped, the hydraulic pump 2 does not discharge the pressure oil, so that the hydraulic pump 2 has a maximum tilt due to the action of the spring 31b of the torque tilt control unit 30a. Therefore, at the start of one day's work such as the next day, the gate lock lever 24 is in the locked position and the tilt (capacity) of the hydraulic pump 2 is maximized.

[0040]

At the start of a day's work, the operator operates an engine key switch that is not shown to start the engine 1. At this time, as described above, the gate lock lever 24 is in the locked position, and the gate lock valve 23 is in the position where the pilot oil passage 3b is communicated with the tank T.

[0041]

Immediately after starting the engine 1, in the LS control valve 32, the tilt (capacity) of the hydraulic pump 2 is controlled (load sensing control) so that the differential pressure (LS differential pressure) between the discharge pressure of the hydraulic pump 2 guided toward the pressure receiving portions 32a and 32b and the

pressure of the signal pressure oil passage 7 is equal to the target LS differential pressure set by the spring 34. At this time, since the operation lever is not operated and the flow rate control valves 42a to 42c are in the neutral position, the pressure of the signal pressure oil passage 7 is tank pressure, and the tilt of the hydraulic pump 2 is controlled from the maximum tilt before the start of the above work to the minimum tilt, and the discharge flow rate of the hydraulic pump 2 is controlled to be the minimum. Even when the operation lever is not operated and the flow rate control valves 42a to 42c are in the neutral position, the discharge flow rate of the hydraulic pump 2 is controlled not to be zero, but to be the minimum is to ensure the initial responsivity of the actuator when the flow rate control valves 42a to 42c are operated from the neutral position by operating the operation lever. All the discharged oil of the hydraulic pump 2 returns to the tank T via the unload valve 9.

[0042]

In this state, the gate lock lever 24 is in the locked position, and the gate lock valve 23 communicates the pilot oil passage 3b with the tank T, so that the unload valve 9 and the hydraulic piston device 20 are in the state shown in FIG. 3. In this state, the oil chamber 20b of the hydraulic piston device 20 communicates with the tank T, no oil pressure is generated by the pressure receiving portion 28 of the piston 26 located in the oil chamber 20b, and the unload valve 9 is switched to a fully opened state by the force of the spring 27. In this state, the discharge pressure of the hydraulic pump 2 is reduced to about the tank pressure.

[0043]

After that, when the operator operates the gate lock lever 24 to the unlocked position, the gate lock valve 23 connects the discharge oil passage 3a of the pilot pump 3 to the pilot oil passage 3b, so that discharged oil of the pilot pump 3 is introduced to the oil chamber 20b of the hydraulic piston device 20, the force of the spring 27 forcibly pushing the valve spool 51 of the unload valve 9 in the opening direction is released by the hydraulic pressure generated in the pressure receiving portion 28 of the piston 26, and as a result, the unload valve 9 is in the state shown in FIG. 2. At this time, when the operation lever is not operated and the flow rate control valves 42a to 42c are in the neutral position, the pressure of the signal pressure oil passage 7 becomes the tank pressure, and the discharge pressure of the hydraulic pump 2 is controlled to be pressure Pun (pressure corresponding to the target unload differential pressure) according to the setting of the spring 9c of the unload valve 9 and the override characteristic of the unload valve 9. This pressure Pun is set to a value much lower than the relief pressure Pr of the main relief valve 13, which is the relief pressure of the circuit (Pun <0.15 Pr). The override

characteristic of the unload valve 9 is a characteristic that the setting (spring force) of the spring 9c increases as the passing flow rate of the unload valve 9 increases, and the control pressure (target unload differential pressure) of the unload valve 9 increases."

(7) Evidence A No. 5 (Japanese Unexamined Patent Application Publication No. 2005-233639)

Evidence A No. 5 that was publicly known prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with drawings.

"[0012]

Embodiment 1

FIG. 1 shows a schematic view indicating a stereo camera system (hereinafter, simply referred to as a camera system) according to the present invention that performs the calibration method according to Embodiment 1 of the present invention. The camera system 2 includes first and second stereo cameras 6 (6A, 6B) that roughly capture a predetermined range in the field of view, and a host computer 8 that measures the three-dimensional positions of a person P captured by each stereo camera 6 at the observation place. Each stereo camera 6 is provided with a pair of cameras (left and right cameras). In the present application, it is assumed that the left and right cameras are calibrated accurately.

[0013]

The control unit 10 of the host computer 8 is connected with an image memory 12A for storing the time-series data of a first stereo image (a pair of images captured by the left and right cameras) captured by the stereo camera 6A, an image memory 12B for storing the time-series data of the second stereo image captured by the stereo camera 6B, a camera information management unit 14 for managing information (total six parameters of three for the positions, and three for postures) on the three-dimensional positions and postures of the predetermined stereo cameras 6A and 6B (left and right cameras), a three-dimensional position calculation unit 16 for calculating a first three-dimensional position of the person P on the basis of the stereo image captured by the stereo camera 6A and calculating a second three-dimensional position of the person P on the basis of the stereo image captured by the stereo camera 6B, a projected person area calculation unit 18 for producing first and second images including first and second 'projected person areas' correlated with a projected image projecting the person captured within the stereo image on a floor surface (a ground surface) on the basis of the first and second three-dimensional positions calculated by the calculation unit 16, a concealed area calculation unit 20 for

calculating 'a concealed area' corresponding to a dead angle of the stereo camera which is concealed by the person P, and a calibration correction unit 21 for correcting a calibration when there is an error in the calibration between the stereo cameras 6A and 6B. In this embodiment, as described below, when one person is observed by each stereo camera 6A, 6B, the calibration between the stereo cameras 6A and 6B is corrected. Further, as the observation place, it is preferable to select a place where there is little traffic and there is a high possibility of one person even if there are people in the observation place."

(8) Evidence A No. 6 (Japanese Unexamined Patent Application Publication No. 2006-31101)

Evidence A No. 6 that was publicly known prior to the filing date of the divisional application of the Patent and the filing date of the original application describes the following matters with drawings.

"[0028]

FIG. 3 is a diagram showing a configuration in which the stereo camera unit 12 is mounted on a vehicle. As shown in the figure, the viewpoint of the image pickup means of the stereo camera unit is switched according to the perspective of the subject. Two stereo camera units 12 are installed in parallel on the rear of the own vehicle 1. In this case, as described above, the stereo camera units 12A and 12B are installed so that the arrangement distance therebetween is longer than the baseline length of the stereo camera unit 12 alone.

[0029]

As shown in FIG. (1), the image pickup area of the stereo camera unit 12 is a short-range image pickup area that is effective as a distance-measurable image pickup area because the distance of the image pickup device is separated from the limit of the measurement rejection accuracy calculated from the angle of view and the baseline length. In the figure, 40 shows an image pickup area of an image used at a short distance by the baseline length e (baseline length at a short distance) of the stereo camera units 12A and 12B.

[0030]

On the other hand, as shown in FIG. (2), the image pickup area obtained by combining the stereo camera unit pairs 12AL-12BL or 12AR-12BR is a long-distance image pickup area. In the figure, 42 shows an image pickup area of an image used at a long distance with a baseline length f (baseline length at a long distance) between stereo camera units. The baseline length f between the stereo camera units is longer than the

baseline length e of the stereo camera unit 12, and distance measurement based on imaging of an area effective for long-distance, which was difficult with the baseline length e of the stereo camera unit 12, becomes possible."

No. 5 Judgment

As described in No. 3 above, since all the corrections made by the request for correction of the case have been approved, Corrected Inventions 1 to 5 will be judged below.

1 Regarding reasons for revocation described in the previous notice of reasons for revocation (advance notice of decision)

(1) Clarity

The description "when the determining means detects a person in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" that existed in Claim 1 before the correction of the case, was corrected by the correction of the case.

According to the description "comprising a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off" and the description "the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine" in Claim 1 after the correction of the case, in Corrected Inventions 1 to 5, it has been clarified that it is brought into "a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate" by the operation of "a hydraulic lock lever," and it has been clarified that the relationship between "a hydraulic lock state" and "the determining means detects a person" is the relationship "the determining means may detect a person in the hydraulic lock state".

Therefore, Corrected Inventions 1 to 5 are not unclear in the point notified about the inventions according to Claims 1 to 5 before the correction of the case in the previous reasons for revocation (advance notice of decision), and should not be invalidated for the reasons for revocation because of violation of clarity.

(2) Enablement requirement

The description "when the determining means detects a person in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" that existed in Claim 1 before the correction of the case, was corrected by the correction of the case.

Then, the matter "comprising a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off" of Corrected Inventions 1 to 5 is explained clearly and sufficiently to the extent that allows a person skilled in the art to work that, according to the following description in Paragraph [0032] of the specification.

"[0032]

Here, as shown in FIG. 5, the hydraulic lock lever 6 is usually installed on the left side of the seat S in the cabin 64. When the hydraulic lock lever 6 is pulled toward the front side and moved to the position indicated by 'L' in FIG. 5, the 'hydraulic lock state' is selected. In the 'hydraulic lock state', the shut valve provided in the hydraulic circuit in the excavator 60 shuts off the hydraulic circuit between the operation lever in the cabin 64 and the hydraulic actuator. That is, even if the operator operates the operation lever, the corresponding hydraulic actuator does not operate."

The matter "the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine" of Corrected Inventions 1 to 5 is also explained clearly and sufficiently to the extent that allows a person skilled in the art to work that, according to the following description in Paragraphs [0035] to [0039] of the specification.

"[0035]

Therefore, in the excavator start permission device 11 of Example 2, as shown in FIG. 5, it is inputted to the controller by using a position detection switch such as a potentiometer whether the hydraulic lock lever 6 is in the 'hydraulic lock state' or the 'hydraulic lock release state'.

[0036]

In the permission means 5d of the controller 5, permits the start of the engine 3, under the condition in which there is no person in the predetermined ranges CL, CR, and CB similar to those described in Example 1, the selected position of the key switch is set

as the start, and the hydraulic lock lever 6 is in the 'hydraulic lock state'.
[0037]

That is, as shown in FIG. 7, step S6 is added to the control contents of the controller 5 included in the excavator start permission device 11 of Example 2 as compared with the flowchart shown in FIG. 7. In step S3, when the determining means 5c determines that there are no people in the predetermined ranges CL, CR, CB, and in step S6, the hydraulic lock lever 6 is in the 'hydraulic lock state', the process proceeds to step S4, and the permission means 5d permits the start of the engine 3.
[0038]

In step S3, when the determining means 5c determines that there are no people in the predetermined ranges CL, CR, and CB, and in step S6, it is determined that the hydraulic lock lever 6 is not in the 'hydraulic lock state', the process proceeds to step S5. In step S5, the permission means 5d disallows the start of the engine 3.
[0039]

In Example 2 as well, in step 3, if it is determined by the determining means 5c that there is a person in the predetermined ranges CL, CR, and CB, the process proceeds to step S5 and the permission means 5d determines that the start of the engine 3 is disallowed. The flowchart shown in FIG. 7 is also repeatedly executed for each control cycle of the controller 5, and the start permission method of the excavator of the present invention is executed".

Therefore, the detailed description of the invention in the specification does not have deficiency of enablement requirements notified in the previous reasons for revocation (advance notice of decision), and Corrected Inventions 1 to 5 should not be invalidated for the reasons for revocation related to the enablement requirements.

(3) Support requirement

The description "determining whether or not the person detecting means detects a person at a predetermined control cycle" and the description "when the determining means detects a person in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" that existed in Claim 1 before the correction of the case were corrected by the correction of the case.

In Corrected Inventions 1 to 5, it is specified that the matter "determines whether or not the person detecting means detects a person at each predetermined control cycle

by the determining means" and the matter "the determining means may detect a person in the hydraulic lock state" are "at the time of determining the start permission of the engine". Further, it is specified that "a hydraulic lock state" itself is a state "comprising "a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate," wherein "the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off".

Then, it can be said that the above-mentioned matters in Corrected Inventions 1 to 5 are described and supported in the specification, according to the descriptions of Paragraphs [0035] to [0039] and the description of Paragraph [0032] of the specification described in (2) above.

Therefore, Corrected Inventions 1 to 5 are not those that were not described in the specification in the point notified about the inventions according to Claims 1 to 5 before the correction of the case in the previous reasons for revocation (advance notice of decision), and should not be invalidated for the reasons for revocation because of violation of support requirement.

(4) Inappropriate division, and novelty citing Document 1 as a primary cited document

A Propriety of division

In the original specification and drawings of Japanese Patent Application No. 2013-44534 (hereinafter referred to as "the original application"), which is the original application of the Patent, the same description as Document 1 described in No. 4-3(1) above applies.

The description of the original specification of the original application, regarding Example 1 and Example 2 indicated in the description of No. 4-3(1) A (B) and 4-3(1) A (C) above, is related to "the start permission" of the engine of "the construction machine" whose specific example is "an excavator," the problem to be solved by the invention indicated by the description of No. 4-3 (1) A (A) and the industrial applicability indicated by the description of No. 4-3 (1) A (D) were completed as a description of "the start permission" of the engine of the construction machine.

Then, in the original specification and drawings of the original application, regarding the flow chart of FIG. 4 or Fig. 7 including the matter that "the determining means 5c" "determines whether or not the person detecting means 5a detects a person," although it is described that it is "repeatedly executed for each control cycle of the controller 5," the flow charts of FIG. 4 and FIG. 7 are executed as "the start permission

method" of the engine of the excavator, and it is not described in the original specification and the like of the original application that the flow chart of FIG. 4 or FIG. 7 is executed regardless of whether or not the key switch of the engine is made to "start". Further, in the original specification and drawings of the original application, as described in Paragraph [0033] described in No. 4-3 (1) A (C) above, it is described that by bringing "the hydraulic lock lever 6" into "the hydraulic lock state," it is brought into the state in which "even if the operator operates the operation lever, the corresponding hydraulic actuator does not operate." On the other hand, there is no description about technical processing for making "the determining means detects a person" affect whether or not it is brought in the state in which "even if the operator operates the operation lever, the corresponding hydraulic actuator does not operate."

Against this, in the inventions according to Claims 1 to 5 before the correction of the case, the action that "the determining means" "determining whether or not the person detecting means detects a person at a predetermined control cycle" and the whole action including the determination of "the determining means" were extended regardless of the requirement of engine start processing when "the key switch" if the engine is made to be "start," and beyond the scope of the matters described in the original specification and drawings of the original application. Further, in the invention according to Claims 1 to 5 before the correction of the case, although the matter specifying the invention "when the determining means detects a person in a hydraulic lock state between a hydraulic actuator of the excavator and an operation unit operating the hydraulic actuator, even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate" was unclear as shown in No. 4-2 (2) A, if the matter specifying the invention has the meaning where the matter "the determining means detects a person" is considered to affect whether or not it leads to the result "even if an operator operates an operation lever, the corresponding hydraulic actuator does not operate," in the same manner as the matter "in a hydraulic lock state," since in the original specification and drawings of the original application, there is no description about technical processing for making "the determining means detects a person" affect whether or not it is brought in the state in which "even if the operator operates the operation lever, the corresponding hydraulic actuator does not operate," it was beyond the scope of the matters described in the original specification and drawings of the original application in this point.

However, in Corrected Inventions 1 to 5, it is specified that the action that "the determining means" "determining whether or not the person detecting means detects a person at a predetermined control cycle" is "at the time of determining the start permission of the engine," and it is specified that "a hydraulic lock state" itself is a state "comprising

"a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate," wherein "the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off". Further, it has been clarified that the relationship between "a hydraulic lock state" and "the determining means detects a person" is the relationship "the determining means may detect a person in the hydraulic lock state".

Accordingly, it can be said that Corrected Inventions 1 to 5 are divisional applications filed from the invention described in the original specification of the original application, and there is no deficiency in inappropriate division pointed out in the previous notification of reasons for revocation (advance notice of decision).

Therefore, it is considered that the patent application of the case was made at the time of the original application.

B Novelty citing Document 1 as a primary cited document

As described in A above, since it is considered that the patent application of the case was made at the time of the original application, the novelty of Corrected Inventions 1 to 5 is not denied according to Document 1 published after the filing of the original application.

Therefore, Corrected Inventions 1 to 5 of the case should not be invalidated for the previous reasons for revocation (advance notice of decision) due to lack of novelty citing Document 1 as a primary cited document, which were notified about the inventions according to Claims 1 to 5 before the correction of the case.

(5) Inappropriate division, and inventive step citing Document 1 as a primary cited document

As described in (4) A above, since it is considered that the patent application of the case was made at the time of the original application, the inventive step of Corrected Inventions 1 to 5 is not denied by citing Document 1 published after the filing of the original application as a primary cited document.

Therefore, Corrected Inventions 1 to 5 of the case should not be invalidated for the previous reasons for revocation (advance notice of decision) due to lack of inventive step citing Document 1 as a primary cited document, which were notified about the inventions according to Claims 1 to 5 before the correction of the case.

(6) Inventive step citing Evidence A No. 2 as a primary cited document

A Corrected Invention 1

(A) Comparison

Invention A-2 and Corrected Invention 1 will be compared.

Considering that "a work machine" "composed of a boom 6, an arm 5, and a bucket 4" provided on "a backhoe" in Invention A-2, is described as "an excavation attachment E (boom, arm, bucket)" in Paragraph [0014] of the specification, it corresponds to "an excavation attachment" provided on "an excavator" of Corrected Invention 1. "a backhoe" in Invention A-2 corresponds to "an excavator" in Corrected Invention 1.

"A crawler type traveling device 1" in Invention A-2 corresponds to "a lower traveling body" in Corrected Invention 1, and "a swivel frame 2 supported so as to swivel left and right via a swivel base bearing 17 in the upper center of a crawler type traveling device 1" in Invention A-2 corresponds to "an upper swivel body swivelably mounted on the lower traveling body" in Corrected Invention 1.

Considering that "(boom, arm, and bucket)" is added to "an excavation attachment E" in Paragraph [0014] of the specification, "the work machine 7 composed of a boom 6 supported to a boom bracket 12, an arm supported at an upper end of the boom 6, and a bucket 4 that is a working attachment supported at a tip end portion of the arm 5" in Invention A-2, corresponds to "an excavation attachment" in Corrected Invention 1. Further, in Invention A-2, the configuration in which "the work machine 7" is mounted on the front end portion of a swivel frame" and the configuration in which "an excavation attachment" is "provided at a front central portion of the upper swivel body" are common in the point that "an excavation attachment" is provided in "front" of "the upper swivel body".

Considering that it is configured to be connected to direction control valves (switching valve) respectively, and to be driven by being supplied pressure oil discharged from a hydraulic pump 30 via the direction switch valve by switching a pilot valve by the operation of a hydraulic operation lever to control each of the direction control valves, "actuators such as hydraulic cylinders 9, 10, 11, a swivel motor 45, and a traveling hydraulic motor 44 rotation-operating the boom 6, the arm 5 and the bucket 4 respectively," in Invention A-2, corresponds to "hydraulic actuators for cutting, swiveling and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit" in Corrected Invention 1.

In Invention A-2, the configuration "a hood 14 covering an engine 13 and the like is arranged on the upper part of the swivel frame 2," means that the engine 13 is provided on the swivel frame 2, so that it corresponds to the configuration that "an engine" is provided on "the upper swivel body" in Corrected Invention 1. In Invention A-2, the

configuration "a driver's seat 16 is located on the hood 14" arranged on "the upper part of the swivel frame 2," "hydraulic operation levers 21 and 22 and lock levers 23 and 24 and the like are located in the vicinity of the driver's seat 16, a traveling lever 25, a pedal and the like are located in front of the driver's seat 16 to form a driving operation unit 15, a canopy 8 is arranged above the driving operation unit 15" corresponds to "a cab" is provided on "the upper swivel body" in Corrected Invention 1. Further, considering the fact that "a key switch 36" making "an engine 13" in an "operable state" is located in the vicinity of "a driving operation unit 15" of "an engine 13," "in Invention A-2, the configuration "if a key switch 36 is rotated to a START terminal 36c position while an operator gets on and is seated in a work vehicle, the stop of an engine stop means 40 is released to bring the engine 13 into an operable state" corresponds to the configuration that "the key switch of the engine" is provided "in the cab" in Corrected Invention 1.

In Invention A-2, the configuration that "the open/close valve 34 is interposed between the direction control valve 31 and the hydraulic pump 30, and if the lock lever 23 or 24 is lifted and rotated to an 'inoperable' position, the open/close valve 34 is switched to a block position, and even if the hydraulic operation levers 21 and 22 are operated, the direction control valves 31 are not switched, and even if the hydraulic operation levers 21 and 22 are accidentally touched, the actuator does not operate," and the operation of each direction control valve and the hydraulic actuators are substantially the same action, corresponds to the fact "comprising a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off" of Corrected Invention 1.

From the above, Invention A-2 and Corrected Invention 1 are identical in the point that

"An excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, an excavation attachment provided in a front of the upper swivel body, and hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit, and

having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, comprising:

a hydraulic lock lever that can select a hydraulic lock state in which even if an

operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate,

wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off,"

and are different in the following points.

<Different Feature 1>

Concerning the installation position of the excavation attachment with respect to the upper swivel body, in Corrected Invention 1, it is specified as "a front central portion," whereas, in Invention A-2, it is "a front end" in a fore-and-aft direction, but it is not specified as "a central portion" in a width direction.

<Different Feature 2>

In Corrected Invention 1, "a camera provided on the upper swivel body, and a controller for controlling the engine on the basis of a selected position of the key switch" are provided, "the controller" has "person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person," "the controller" "performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine," and "the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine," whereas,

in Invention A-2, although "when the engine 13 is started, if either or both of the lock levers 23 and 24 are rotated to an 'operable' position, the engine 13 cannot be started, and if the time until the lock levers 23 and 24 at the 'inoperable' position to the 'operable' position after starting the engine 13 exceeds a second set time, the engine 13 is stopped," "a camera" and "a controller for controlling the engine on the basis of a selected position of the key switch" are not provided, "determining the start permission of the engine" by "a camera" and "the controller" "performing image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time

of determining the start permission of the engine," is not performed, and the control that "the determining means may detect a person" "in the hydraulic lock state" "at the time of determining the start permission of the engine" is not performed.

(B) Judgment

In view of the matters, Different Feature 2 will be judged.

Evidence A No. 4 describes Invention A-4 recognized in No. 4-3 (3) B, and Invention A-4 has the configuration that "a hydraulic excavator" is provided with "obstacle sensors 9, 10, 11, and 12 which are provided on a left side portion and a right side portion of the upper swivel body 8, and output detection signals to a controller portion 21 if obstacles such as people and animals enter respective detection signal ranges; and the controller portion 21 that can issue alarm sound from alarms 15, 16, and 14 connected to the controller portion 21 on the basis of the detection signals from the obstacle sensors 9, 10, 11, and 12," and "not only when the hydraulic excavator performs swiveling work, while a key switch 19 of an engine 17 is turned on, if the obstacles such as people and animals enter the signal ranges of the obstacle sensors 9, 10, 11, and 12, all alarms 14, 15, and 16 connected to the controller portion 21 are set to issue alarm sound".

However, in the above-mentioned configuration of Invention A-4, "while a key switch 19 of the engine 17 is turned on," "if the obstacles such as people and animals enter the signal ranges," it merely "issues alarm sound," and does not perform the start permission determination of the engine using the obstacle sensors and the controller. Therefore, even if combining the above-mentioned configuration of Invention A-4 with Invention A-2, this does not lead to the configuration of the Corrected Invention 1 according to Different Feature 2.

Further, Evidence A No. 1 describes Invention A-1 recognized in No. 4-3 (4) B, and Invention A-1 is provided with "a camera" in "a hydraulic excavator" and has the configuration "sensing may be performed at all times while the machine is working," but it does not indicate the configuration of Corrected Invention 1 according to Different Feature 2 that "the determining means may detect a person" "in the hydraulic lock state" "at the time of determining the start permission of the engine". Evidence A No. 3 describes the matters described in No. 4-3 (6) above, and it is shown that when turning off the engine key switch of the hydraulic excavator, an operator operates the gate lock lever 24 to a lock position, and when the operator starts the engine 1, the gate lock lever 24 is in the lock position, but it does not indicate the configuration of Corrected Invention 1 according to Different Feature 2 that "the determining means may detect a person" "in the hydraulic lock state" "at the time of determining the start permission of the engine".

Although Document 2, Evidence A No. 5, and Evidence A No. 6 describe the matters respectively described in No. 4-3 (5), (7) and (8) above, it merely shows the use of a plurality of cameras or stereo cameras, and does not indicate the configuration of Corrected Invention 1 according to Different Feature 2.

Then, although Invention A-2 has the configuration "when the engine 13 is started, if either or both of the lock levers 23 and 24 are rotated to an 'operable' position, the engine 13 cannot be started" about the ensuring of safety at the time of starting the engine, there was no motivation to add more complex controls with sensors and controllers to allow the engine to start, and even considering the matters described in Evidence A No. 1, Evidence A No. 3 to Evidence A No. 6, and Document 2, it cannot be said that the configuration of Corrected Invention 1 according to Different Feature 2 could have been easily conceived by a person skilled in the art.

Also, as shown in (4) above, Document 1 cannot be used as a prior art in determining the inventive step of Corrected Invention 1.

Therefore, in Invention A-2, the configuration of Corrected Invention 1 according to Different Feature 2 could not have been easily conceived by a person skilled in the art, even considering the matters described in Invention A-4, Invention A-1, Evidence A No. 3, Evidence A No. 5 to Evidence A No. 6, and Document 2.

Then, since it is not easy to conceive of the configuration of Corrected Invention 1 according to Different Feature 2, Corrected Invention 1 could not have been easily invented by a person skilled in the art by citing Invention A-2 as a primary cited invention, without examining Different Feature 1.

B Corrected Inventions 2 to 5

Corrected Inventions 2 to 5 all have all the configurations of Corrected Invention 1, and are further added limitation thereto.

Then, as described in A above, since Corrected Invention 1 could not have been easily invented by a person skilled in the art by citing Invention A-2 as a primary cited invention, Corrected Inventions 2 to 5 could not have been easily invented by a person skilled in the art by citing Invention A-2 as a primary cited invention, either.

C Summary

As described above, Corrected Inventions 1 to 5 should not be invalidated for the reasons for revocation due to lack of inventive step citing Evidence A No. 2 as a primary cited document, which is notified about the inventions according to Claims 1 to 5 before

the correction of the case, in the previous reasons for revocation (advance notice of decision).

(7) Inventive step citing Evidence A No. 4 as a primary cited document

A Corrected Invention 1

(A) Comparison

Invention A-4 and Corrected Invention 1 will be compared.

"A lower traveling body" in Invention A-1 corresponds to "a lower traveling body" in Corrected Invention 1.

"An upper swivel body 8" in Invention A-4, considering that it is swivelable on the lower traveling body, corresponds to "an upper swivel body swivelably mounted on the lower traveling body" in Corrected Invention 1.

"A boom-shaped member and an arm-shaped member, and a bucket-shaped member attached to a tip end of the arm-shaped member" in Invention A-4, considering that Paragraph [0014] of the specification describes "an excavation attachment E (boom, arm, bucket), corresponds to "an excavation attachment" provided on "an excavator" of Corrected Invention. Further, the configuration in Invention A-4 that "a boom-shaped member and an arm-shaped member, and a bucket-shaped member attached to a tip end of the arm-shaped member" are provided at "a front central portion of the upper swivel body 8" corresponds to the configuration in Corrected Invention 1 that "an excavation attachment" is provided at "a front central portion of the upper swivel body".

The configuration in Invention A-1 that "a hydraulic excavator" is "provided with a cab 13 and an engine 17 on the upper swivel body 8" corresponds to the configuration in Corrected Invention 1 that "an excavator" has "an engine provided on the upper swivel body, and a cab provided on the upper swivel body".

"A key switch 19 of the engine 17" in Invention A-4, considering that it is obvious that it is provided in "a cab 13," corresponds to "a key switch of the engine provided in the cab" in Corrected Invention 1.

"Obstacle sensors 9, 10, 11, and 12 which are provided on a left side portion and a right side portion of the upper swivel body 8, and output detection signals to a controller portion 21 if obstacles such as people and animals enter respective detection signal ranges" in Invention A-4, and "a camera provided on the upper swivel body" in Corrected Invention 1 are common in the point that it is "a sensor provided on the upper swivel body".

Considering that it is understood that when an alarm sound is issued, it is determined whether or not an obstacle has been detected within the signal range, the

configuration in Invention A-4 "comprising the controller portion 21 that can issue alarm sound from alarms 15, 16, and 14 connected to the controller portion 21 on the basis of the detection signals from the obstacle sensors 9, 10, 11, and 12, wherein not only when the hydraulic excavator performs swiveling work, while a key switch 19 of an engine 17 is turned on, if the obstacles such as people and animals enter the signal ranges of the obstacle sensors 9, 10, 11, and 12, all alarms 14, 15, and 16 connected to the controller portion 21 are set to issue alarm sound," and the configuration in Corrected Invention 1 "a controller for controlling the engine on the basis of a selected position of the key switch" "wherein the controller has a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person, wherein the controller performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine, and wherein the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine" are common in the point of having "a controller" and "determining whether or not an obstacle in a predetermined range is detected on the basis of a sensor".

From the above, Invention A-4 and Corrected Invention 1 are identical in the point that

"An excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, and an excavation attachment provided in a front central portion of the upper swivel body, and

having an engine provided on the upper swivel body, a cab provided on the upper swivel body, a key switch of the engine provided in the cab, a sensor provided on the upper swivel body, and a controller,

wherein it is determined whether or not an obstacle in a predetermined range is detected on the basis of a sensor,"

and are different in the following point.

<Different Feature 3>

Concerning a hydraulic actuator and a lock state,

in Corrected Invention 1, it is specified that "hydraulic actuators for cutting,

swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit" are provided, and the matter "comprising a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off" is specified, whereas

in Invention A-4, although it is understood that there is a hydraulic actuator because it is a "hydraulic excavator," the details of the hydraulic actuator, the existence of the hydraulic lock lever, and the hydraulic lock state are not specified.

<Different Feature 4>

Concerning a sensor,

in Corrected Invention 1, it is specified as "a camera," whereas

in Invention A-4, "obstacle sensors 9, 10, 11, and 12" are not specified as "cameras".

<Different Feature 5>

Concerning a controller,

in Corrected Invention 1, it is specified that "a controller"

* is "a controller for controlling the engine on the basis of a selected position of the key switch,"
* has "a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person,"
* "performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine," and
* "the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine," whereas

in Invention A-4, "the controller portion 21" "can issue alarm sound from the connected alarms 15, 16, and 14" on the basis of "detection signals from the obstacle sensors 9, 10, 11, and 12, " and "while a key switch 19 of the engine 17 is turned on, if

the obstacles such as people and animals enter the signal ranges of the obstacle sensors 9, 10, 11, and 12, all alarms 14, 15, and 16 connected to the controller portion 21 are set to issue alarm sound".

(B) Judgment

In view of the matters, Different Feature 5 will be judged.

Evidence A No. 2 describes Invention A-2 recognized in No. 4-3 (2) B above, and Invention A-2 has the configuration that in "a backhoe" in which "if a key switch 36 is rotated to a START terminal 36c position while an operator gets on and is seated in a work vehicle, the stop of an engine stop means 40 is released to bring the engine 13 into an operable state," "when the engine 13 is started, if either or both of the lock levers 23 and 24 are rotated to an "operable" position, the engine 13 cannot be started".

However, the above mentioned configuration of Invention A-2 does not show the configuration that "the controller" "determines whether or not the person detecting means detects a person at each predetermined control cycle" "at the time of determining the start permission of the engine" of the configuration of Corrected Invention 1 according to Different Feature 5.

Further, Evidence A No. 1 describes Invention A-1 recognized in No. 4-3 (4) B above, and although Invention A-1 has the configuration that "a hydraulic excavator" is provided with "a camera" and "sensing may be performed at all times while the machine is working," it does not show the configuration that "the controller" "determines whether or not the person detecting means detects a person at each predetermined control cycle" "at the time of determining the start permission of the engine" of the configuration of Corrected Invention 1 according to Different Feature 5. Evidence A No. 3 describes the matter described in No. 4-3 (6) above, and it is shown that when turning off the engine key switch of the hydraulic excavator, an operator operates the gate lock lever 24 to a lock position, and when the operator starts the engine 1, the gate lock lever 24 is in the lock position, but it does not indicate the configuration of Corrected Invention 1 according to Different Feature 5 that "the controller" "determines whether or not the person detecting means detects a person at each predetermined control cycle" "at the time of determining the start permission of the engine". Although Document 2, Evidence A No. 5, and Evidence A No. 6 describe the matters respectively described in No. 4-3 (5), (7) and (8) above, it merely shows the use of a plurality of cameras or stereo cameras, and does not indicate the configuration of Corrected Invention 1 according to Different Feature 5, for other than the use of the camera.

Then, returning to Invention A-4, in Invention A-1, "the controller portion 21"

merely "issues alarm sound" "while a key switch 19 of the engine 17 is turned on," "if the obstacles such as people and animals enter the detection signal ranges," and there is no suggestion about the matter the controller portion 21 performs the engine start permission determination by using signals of the obstacle sensors, and there is no motivation to make such modifications.

Also, as shown in (4) above, Document 1 cannot be used as a prior art in determining the inventive step of Corrected Invention 1.

Therefore, in Invention A-4, the configuration of Corrected Invention 1 according to Different Feature 5 could not have been easily conceived by a person skilled in the art, even considering the matters described in Invention A-2, Invention A-1, Evidence A No. 3, Evidence A No. 5 to Evidence A No. 6, and Document 2.

Then, since it is not easy to conceive of the configuration of Corrected Invention 1 according to Different Feature 5, Corrected Invention 1 could not have been easily invented by a person skilled in the art by citing Invention A-4 as a primary cited invention, without examining Different Feature 1.

B Corrected Inventions 2 to 5

Corrected Inventions 2 to 5 all have all the configurations of Corrected Invention 1, and are further add limitation thereto.

Then, as described in A above, since Corrected Invention 1 could not have been easily invented by a person skilled in the art by citing Invention A-4 as a primary cited invention, Corrected Inventions 2 to 5 could not have been easily invented by a person skilled in the art by citing Invention A-4 as a primary cited invention, either.

C Summary

As described above, Corrected Inventions 1 to 5 should not be invalidated for the reasons for revocation due to lack of inventive step citing Evidence A No. 4 as a primary cited document, which is notified about the inventions according to Claims 1 to 5 before the correction of the case, in the previous reasons for revocation (advance notice of decision).

2 Regarding reasons for opposition to the grant of a patent that have not been adopted in the previous notice of reasons for revocation (advance notice of decision)

The Opponent opposes, in the written opposition, that the inventions according to Claims 1 to 5 before the correction of the case could have been easily invented by a person

skilled in the art on the basis of the invention described in Evidence A No. 1 distributed prior to the application of the Patent, and the well-known arts described in Evidence A No. 2 to Evidence A No. 6.

As described in No. 3 above, since all the corrections made by the request for correction of the case have been approved, it will be judged whether or not Corrected Inventions 1 to 5 should be invalidated for the grounds of the opposition.

(1) Corrected invention 1 of the case

A Comparison

Invention A-1 and Corrected Invention 1 will be compared.

"A lower traveling body 1e" in Invention A-1 corresponds to "a lower traveling body" in Corrected Invention 1. "An upper swivel body 1d" in Invention A-1 correspond to "an upper swivel body" in Corrected Invention 1. In Invention A-1, since "an upper swivel body 1d" is "driven" by "a swivel motor 3d," it is obvious that "an upper swivel body 1d" can be swiveled on "a lower traveling body 1e," and the configuration in Invention A-1, corresponds to the configuration that "an upper swivel body" is "swivelably mounted on the lower traveling body" in Corrected Invention 1.

In Invention A-1, considering that "excavation work" is performed, "an articulated front working machine 1A including a boom 1a, an arm 1b, and a bucket 1c" corresponds to "an excavation attachment" in Corrected Invention 1. The configuration in Invention A-1 that "a base end of the boom 1a of the front working machine 1A" is "supported by a front portion of the upper swivel body 1d," and the configuration in Corrected Invention that "an excavation attachment" is "provided on a front central portion of the upper swivel body" are common in the point of the configuration that "an excavation attachment" is "provided in front of the upper swivel body".

In Invention A-1, the configuration "the boom 1a, the arm 1b, the bucket 1c, the upper swivel body 1d, and the lower traveling body 1e are driven by actuators of a boom cylinder 3a, an arm cylinder 3b, a bucket cylinder 3c, a swivel motor 3d, and left and right traveling motors 3e and 3f, respectively," considering that it is understood that Invention A-1 is "a hydraulic excavator" and each actuator is a hydraulic actuator, and that it is technical common knowledge that the hydraulic actuators operate by sending pilot pressure from a hydraulic pump to a hydraulic circuit, corresponds to the configuration that "hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit" are included, in Corrected Invention 1.

In Invention A-1, the configuration "the upper swivel body 1d provided with a cab

1f" corresponds to "a cab provided on the upper swivel body" in Corrected Invention 1.

In Invention A-1, the configuration in which "a camera 13a is installed behind the upper swivel body 1d of the machine" and "a camera 13b is installed on the right side of the upper swivel body 1a of the machine" corresponds to the configuration "a camera provided on the upper swivel body" in Corrected Invention 1.

"A hydraulic excavator" in Invention A-1 corresponds to "an excavator" in Corrected Invention 1.

In Invention A-1, the configuration "image processing 1706 is performed using the scene captured" by "a camera 13a" and "a camera 13b" corresponds to the configuration "performing image-processing on an input image from the camera" in Corrected Invention 1. In Invention A-1, the configuration "image processing 1706 is performed to detect the presence or absence of obstacles during the excavation work 1703, wherein when a person exists within the operating position range on the right side and the front working machine is swiveled right 1704, there is a high possibility of contacting with the person, so that the front working machine is stopped as a control 1710 for avoiding contact" corresponds to the configuration "detecting a person within a predetermined range around the excavator" in Corrected Invention 1.

From the above, Invention A-1 and Corrected Invention 1 are identical in the point that

"An excavator including a lower traveling body, an upper swivel body swivelably mounted on the lower traveling body, an excavation attachment provided in a front central portion of the upper swivel body, and hydraulic actuators for cutting, swiveling, and moving forward/backward respectively operated by fed pilot pressure from a hydraulic pump by a hydraulic circuit, and

having a cab provided on the upper swivel body, and a camera provided on the upper swivel body,

wherein image-processing is performed on an input image from the camera and a person within a predetermined range around the excavator is detected,"

and are different in the following points.

<Different Feature 6>

Concerning the installation position of the excavation attachment with respect to the upper swivel body,

in Corrected Invention 1, it is specified as "a front central portion," whereas, in Invention A-1, it is "in front of" in a fore-and-aft direction, but it is not specified as "a

central portion" in a width direction.

<Different Feature 7>

Concerning the hydraulic lock lever and the hydraulic lock state,

in Corrected Invention 1, it is specified as "comprising a hydraulic lock lever that can select a hydraulic lock state in which even if an operator operates an operation lever operating the actuator, the corresponding hydraulic actuator does not operate, wherein the hydraulic lock state is a state in which a hydraulic circuit generating pilot pressure for operating the hydraulic actuator with the operation of the operation lever is shut off," whereas

in Invention A-1, the existence or absence of the hydraulic lock lever and the hydraulic lock state are not specified.

<Different Feature 8>

Concerning the engine and the control of the engine,

in Corrected Invention 1, "an engine provided on the upper swivel body" and "a key switch of the engine provided in the cab" are provided, and "a controller for controlling the engine on the basis of a selected position of the key switch" is also provided. It is specified that "the controller"

* has "a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether or not the person detecting means detects a person," and
* "performs image-processing on an input image from the camera by the person detecting means, detects a person within the predetermined range around the excavator, and determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine," and
* "the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine," whereas

in Invention A-1, the existence of "the engine" and "the key switch of the engine" are not specified, and "a controller for controlling the engine on the basis of a selected position of the key switch" is not provided.

Further, assuming that "the controller" has "a person detecting means performing image-processing on an input image from the camera and detecting a person within a predetermined range around the excavator, and a determining means determining whether

or not the person detecting means detects a person," the processing which "determines whether or not the person detecting means detects a person at each predetermined control cycle by the determining means at the time of determining the start permission of the engine" is not performed, and it is not the one in which "the determining means may detect a person in the hydraulic lock state at the time of determining the start permission of the engine."

B Judgment

In view of the matters, Different Feature 8 will be judged.

Evidence A No. 2 describes Invention A-2 recognized in No. 4-3 (2) B above, and Invention A-2 has the configuration that in "a backhoe" in which "if a key switch 36 is rotated to a START terminal 36c position while an operator gets on and is seated in a work vehicle, the stop of an engine stop means 40 is released to bring the engine 13 into an operable state," "when the engine 13 is started, if either or both of the lock levers 23 and 24 are rotated to an "operable" position, the engine 13 cannot be started".

However, the above mentioned configuration of Invention A-2 does not show the configuration that "the controller" "determines whether or not the person detecting means detects a person at each predetermined control cycle" "at the time of determining the start permission of the engine" of the configuration of Corrected Invention 1 according to Different Feature 8.

Evidence A No. 4 described Invention A-4 recognized in No. 4-3 (3) B, and Invention A-4 has the configuration that "a hydraulic excavator" is provided with "obstacle sensors 9, 10, 11, and 12 which are provided on a left side portion and a right side portion of the upper swivel body 8, and output detection signals to a controller portion 21 if obstacles such as people and animals enter respective detection signal ranges, and the controller portion 21 that can issue alarm sound from alarms 15, 16, and 14 connected to the controller portion 21 on the basis of the detection signals from the obstacle sensors 9, 10, 11, and 12," and "not only when the hydraulic excavator performs swiveling work, while a key switch 19 of the engine 17 is turned on, if the obstacles such as people and animals enter the signal ranges of the obstacle sensors 9, 10, 11, and 12, all alarms 14, 15, and 16 connected to the controller portion 21 are set to issue alarm sound".

However, in the above-mentioned configuration of Invention A-4, "while a key switch 19 of the engine 17 is turned on," "if the obstacles such as people and animals enter the signal ranges," it merely "issues alarm sound," and does not perform the start permission determination of the engine using the obstacle sensors and the controller. Therefore, the configuration of Invention A-4 does not indicate the configuration "the

controller" "determines whether or not the person detecting means detects a person at each predetermined control cycle" "at the time of determining the start permission of the engine" of the configuration of Corrected Invention 1 according to Different Feature 8.

Evidence A No. 3 describes the matters described in No. 4-3 (6) above, and it is shown that when turning off the engine key switch of the hydraulic excavator, an operator operates the gate lock lever 24 to a lock position, but it does not indicate the configuration that "the controller" "determines whether or not the person detecting means detects a person at each predetermined control cycle" "at the time of determining the start permission of the engine" of the configuration of Corrected Invention 1 according to Different Feature 8. Although Document 2, Evidence A No. 5, and Evidence A No. 6 describe the matters respectively described in No. 4-3 (5), (7) and (8) above, it merely shows the use of a plurality of cameras or stereo cameras, and does not indicate the configuration of Corrected Invention 1 according to Different Feature 8.

Then, returning to Invention A-1, in Invention A-1, "the controller portion 21" merely "issues alarm sound" "while a key switch 19 of the engine 17 is turned on," "if the obstacles such as people and animals enter the detection signal ranges," and there is no suggestion about the matter that the controller portion 21 performs the engine start permission determination by using signals of the obstacle sensors, and there is no motivation to make such modifications.

Also, as shown in 1 (4) above, Document 1 cannot be used as a prior art in determining the inventive step of Corrected Invention 1.

Therefore, in Invention A-1, the configuration of Corrected Invention 1 according to Different Feature 8 could not have been easily conceived by a person skilled in the art, even considering the matters described in Invention A-2, Invention A-4, Evidence A No. 3, Evidence A No. 5 to Evidence A No. 6, and Document 2.

Then, since it is not easy to conceive of the configuration of Corrected Invention 1 according to Different Feature 8, Corrected Invention 1 could not have been easily invented by a person skilled in the art by citing Invention A-1 as a primary cited invention, without examining Different Features 6 and 7.

(2) Corrected Inventions 2 to 5

Corrected Inventions 2 to 5 all have all the configurations of Corrected Invention 1, and are further added limitation thereto.

Then, as described in (A) above, since Corrected Invention 1 could not have been easily invented by a person skilled in the art by citing Invention A-1 as a primary cited

invention, Corrected Inventions 2 to 5 could not have been easily invented by a person skilled in the art by citing Invention A-1 as a primary cited invention, either.

(3) Summary

As described above, Corrected Inventions 1 to 5 should not be invalidated for the reasons for revocation due to lack of inventive step citing Evidence A No. 1 as a primary cited document, which is opposed by the Opponent in the written opposition.

3 The Opponent's allegation

Although the Opponent alleges that the patent for Claims 1 to 5 of the Patent before the correction of the case should be invalidated for the reasons for opposition described in the written opposition, a written opinion or the like was not submitted to the notification that the request for correction was issued, and no particular allegation has been made regarding Corrected Inventions 1 to 5.

No. 6 Closing

As described above, all the corrections of the case have been approved, and the patent according to Corrected Inventions 1 to 5 cannot be invalidated for the reasons for revocation described in the notice of reasons for revocation and the reasons for opposition described in the written opposition.

Further, no other reason for revoking the patent according to Corrected Invention 1 to 5 is found.

Therefore, the decision shall be made as described in the conclusion.

June 22, 2020

Chief administrative judge: AKITA, Masayuki
Administrative judge: ARIIE, Hideo
Administrative judge: NISHIDA, Hidehiko