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(71) Applicant: **KOMATSU LTD.**

Minato-ku, Tokyo 107 (JP)

(72) Inventors:

- **YOSHINADA, Hiroshi,**
Kenkyusho of Komatsu Ltd.
Hiratsuka-shi, Kanagawa 254 (JP)

- **OKAMURA, Kenji,**
Kenkyusho of Komatsu Ltd.
Hiratsuka-shi, Kanagawa 254 (JP)

- **YANAGI, Kunikazu,**
Kenkyusho of Komatsu Ltd.
Hiratsuka-shi, Kanagawa 254 (JP)

(74) Representative: **Fiener, Josef**

Patentanwälte

Kahler, Käck, Fiener et col.,

P.O. Box 12 49

87712 Mindelheim (DE)

(54) CONSTRUCTION MACHINE

(57) A construction machine for remarkably improving the operating efficiency by expanding the operating range of a working machine and enabling work of a high level to be performed in which two types of working machines are made to operate in cooperation with each other, wherein a first base table (2) supporting a first working machine (4) is disposed above a running truck

(1) in such a manner as to rotate freely in a horizontal direction, and wherein a second base table (5) supporting a second working machine (7) is disposed above the first base table (2) in such a manner as to rotate freely in the horizontal direction.

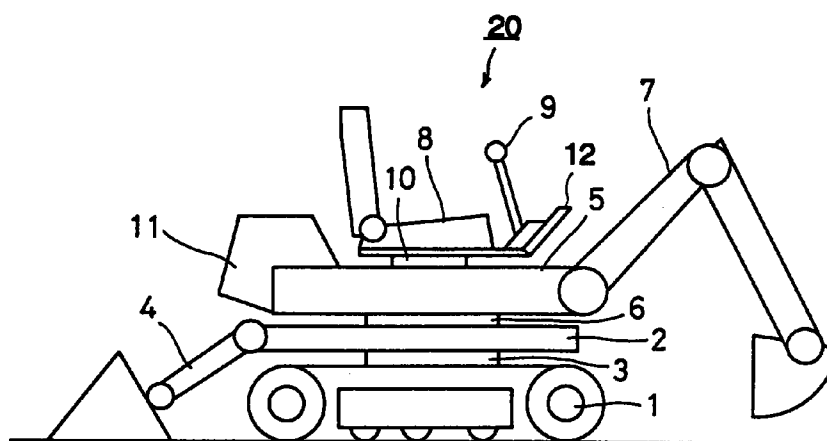


FIG.1

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Description

TECHNICAL FIELD

The present invention relates to the structure of a construction machine which travels by means of a running truck and performs work by two types of working machines, i.e., a first working machine and a second working machine.

BACKGROUND ART

Fig. 2 shows a conventional construction machine for civil engineering operations having two types of working machines.

As shown in Fig. 2, the construction machine 30 has a loading shovel 32, which is a loading machine, installed on the front of a vehicle body 31, and a backhoe 33, which is an excavating and earth removal machine, installed on the rear of the vehicle body 31. With this structure, the loading shovel 32 is able to rotate upwards and downwards within the range shown by the arrow A, but is unable to rotate side to side (horizontally), and the backhoe 33 is able to rotate upwards and downwards within the range shown by the arrow B, but is only able to rotate 90° to either side horizontally.

Because the backhoe 33 can only turn 90° to either side horizontally, once the construction machine 30 is stopped, excavation and earth removal work can only be effected within a range from the rear toward the side of the vehicle body 31, but cannot be effected within a range from the side toward the front of the vehicle body 31. Therefore, a construction machine 30 with such a structure has a limited operating range and reduced operating efficiency.

Also, a construction machine 30 with such a structure cannot have the loading shovel 32 on the front and the backhoe 33 on the rear positioned in the same horizontal direction.

An advantage of this structure is that it is not necessary to prepare two construction machines, that is, a construction machine for excavation and earth removal work and a construction machine for loading work. However, the construction machine of this structure has poor operating efficiency because the loading shovel 32 for loading work and the backhoe 33 for excavation and earth removal work can only be used one at a time.

In other words, it is not possible to perform, for example, the excavation of earth and sand with the loading shovel 32, and the loading of the excavated earth and sand with the backhoe 33 by positioning the loading shovel 32 on the front and the backhoe 33 on the rear in the same horizontal direction.

Because it is not possible to perform high level work wherein both working machines are made to operate in cooperation with each other, operating efficiency is thereby reduced.

DISCLOSURE OF THE INVENTION

The present invention has been made in view of the foregoing situation, and it is an object of the present invention to greatly improve operating efficiency by enabling high level work, wherein two types of working machine are made to operate in cooperation with each other while expanding the operating range of the working machines.

To achieve the above object, the present invention provides a construction machine which travels by means of a running truck, for carrying out work using a first working machine and a second working machine, characterized in that a first base table for supporting the first working machine is disposed above the running truck in such a manner as to rotate freely in a horizontal direction; and a second base table for supporting the second working machine is disposed above the first base table in such a manner as to rotate freely in a horizontal direction.

With such a structure as above, the operating range is expanded and working efficiency is greatly improved, because the first working machine and second working machine can rotate freely in a horizontal direction without interfering with each other.

Also, because the first working machine and second working machine can be positioned on the horizontal direction, it is possible for these two working machines to operate in cooperation with each other so as to enable high level work whereby the working efficiency is greatly improved.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side view showing the structure of the construction machine according to the present invention; and

Fig. 2 is a side view showing a conventional construction machine which provides two types of working machines.

BEST MODE FOR CARRYING OUT THE INVENTION

An embodiment of the construction machine according to the present invention is explained with reference to the accompanying drawings.

Fig. 1 is a side view showing the configuration of a construction machine 20 according to an embodiment of the invention. As shown in this figure, a running truck 1 is a truck having the function of traveling. The running truck may be of, for example, a crawler type. Of course, a wheeled truck (with tires) may also be employed.

On top of the running truck 1, a turning mechanism 3, which freely turns 360° in a horizontal direction, is provided, and a first base table 2 is fixedly provided on this turning mechanism 3. A loading shovel 4, which is a first working machine, is supported on the end of this first base table 2. The loading shovel 4 can thereby be

rotated freely in a horizontal direction through the operation of the turning mechanism 3, as required. Of course, the loading shovel 4 is supported by the first base table 2 in such a manner as to move up and down freely.

Furthermore, a turning mechanism 6, which freely turns 360° in a horizontal direction, is established on top of the first base table 2, and a second base table 5 is provided on this turning mechanism 6. A backhoe 7, which is a second working machine, is supported on the end of this second base table 5. The backhoe 7 can thereby be positioned arbitrarily, as required, in a horizontal direction through the operation of the turning mechanism 6 without interfering with the loading shovel 4. The backhoe 7 is an excavating front end comprising an excavating bucket and a multiple-jointed arm.

Furthermore, a turning mechanism 10, which freely turns 360° in a horizontal direction, is provided on top of the second base table 5, and a driving floor 12 is provided on this turning mechanism 10. A driver's seat and group of operating levers 9 are provided on this driving floor 12. The driver's seat 8 can thereby be positioned arbitrarily in a horizontal direction through the operation of the turning mechanism 10, as required. This allows the driver's seat 8 to be oriented in the same direction as the direction in which the loading shovel 4 and the backhoe 7 are turned. When work is carried out in a particular direction, the operator can always view the work without being in a very uncomfortable position.

The turning centers of the turning mechanism 3, the turning mechanism 6, and the turning mechanism 10 may be on the same axis or offset appropriately with respect to each other.

Also, it is possible to have the loading shovel 4 provided on the second base table 5 (on the upper portion) and the backhoe 7 provided on the first base table 2 (on the bottom portion).

Moreover, 11 is a body cover which houses an engine for driving the running truck 1 and working machines 4 and 7, hydraulic equipment, etc.

Because the backhoe 7 can be turned in a full 360° range as noted above, it is possible to carry out excavation and earth removal work in a full horizontal range, like with an ordinary hydraulic shovel. Therefore, operating efficiency is greatly improved, because, unlike the conventional construction machine 30 having two types of working machine as shown in Fig. 2, the range for carrying out excavation and earth removal work is not limited.

Because the loading shovel 4 can also be turned in a full 360° range, the loading shovel 4 can be placed in a position and orientation which do not interfere with the excavation and earth removal work by the backhoe 7.

Furthermore, when placed in the same orientation as the turning direction of the backhoe 7 and anchored in contact with the ground, the loading shovel 4 can also function as an outrigger to ensure stability during work performed with the backhoe 7.

An ordinary small hydraulic shovel generally has an earth removal blade installed on the front of the vehicle. This earth removal blade can function as an outrigger for ensuring stability during excavation work, but can ensure adequate stability only when the shovel is oriented in the same forward direction as the earth removal blade.

In contrast, with the construction machine 20 of this embodiment, even when the backhoe 7 is turned in any direction, the loading shovel 4 can function as an outrigger by positioning it in the same direction as in the backhoe 7. As a result, stability is ensured for the full range of turning, and is thereby vastly improved.

Also, because the loading shovel 4 can be turned in a full 360° range, loading work can be carried out in a full range of horizontal directions. For this reason, carrying out of loading work is not limited to in a forward direction, as with the conventional construction machine 30 having two types of working machines shown in Fig. 2. In fact, the loading work can be carried out in flexible loading attitudes so that operating efficiency is greatly improved. Incidentally, loading work using this loading shovel 4 can be carried out smoothly if the second base table 5 is turned in a direction so as not to interfere with the work and if the backhoe 7 is stowed in a folded position.

Furthermore, the operating efficiency can be greatly improved by turning the loading shovel 4 and backhoe 7 in the same direction so that such a work cooperation can be made with these working machines that the backhoe 7, having excavated the earth and sand or gravel, directly loads the excavated earth, etc. to the loading shovel 4.

Moreover, in this embodiment, the working machines 4 and 7 are able to rotate in a full range (360°) in a horizontal direction. However, it is also possible to have the turning range limited to a necessary range. Since the work cooperation by these two working machines can be carried out as long as the loading shovel 4 and backhoe 7 are turned in the same direction. Therefore, the loading shovel 4 may be limited to a turning range of 90° to either side thereof.

Moreover, in the present embodiment, although the working machines are presumed to be a loading shovel 4 and a backhoe 7, other embodiments in which other types of working machines are used as appropriate for the work, are also possible.

For example, an earth moving blade capable of moving upwards and downwards may be installed instead of a loading shovel 4 capable of moving upwards and downwards.

Moreover, in the present embodiment, the second working machine 7 is installed rotatably in a horizontal direction, above the first working machine 4 which is rotatable in a horizontal direction. The present invention is not limited to this configuration and other types of working machine, depending on the work, may be installed, so as to rotate freely in a horizontal direction,

above the second working machine 7.

INDUSTRIAL APPLICABILITY

The present invention can be applied to other types of machinery which carry out work using two types of working machines, as well as to construction machinery. 5

Claims 10

1. A construction machine which travels by means of a running truck, for carrying out work using a first working machine and a second working machine, characterized in that 15
 - a first base table for supporting the first working machine is disposed above the running truck in such a manner as to rotate freely in a horizontal direction; and 20
 - a second base table for supporting the second working machine is disposed above the first base table in such a manner as to rotate freely in a horizontal direction. 25
2. The construction machine according to claim 1, wherein the second base table is disposed above the first base table in such a manner that the axis of rotation of the second base table is on the same axis as the axis of rotation of the first base table. 30
3. The construction machine according to claim 1, wherein the first working machine is a loading shovel or earth removal blade capable of moving upwards and downwards, and the second working machine is an excavating front end comprising an excavation bucket and a multi-jointed arm. 35
4. The construction machine according to claim 1, wherein an operator's seat is further disposed above the second base table in such a manner as to rotate freely in a horizontal direction. 40

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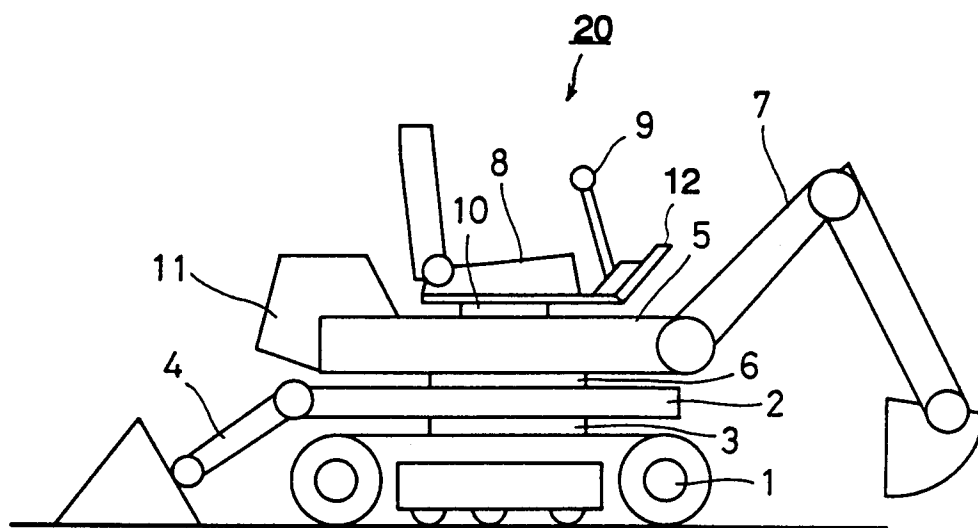


FIG.1

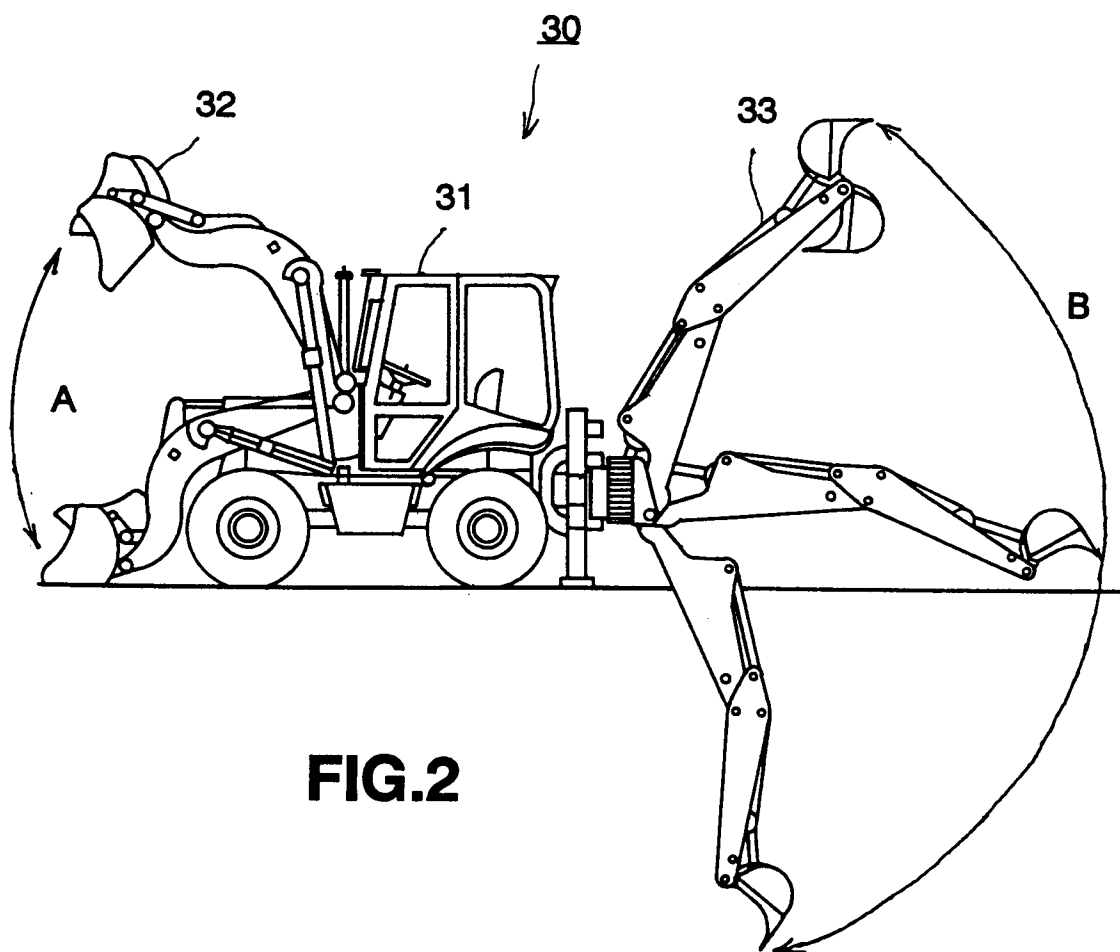


FIG.2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP96/03779

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl ⁶ E02F3/96		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Int. Cl ⁶ E02F3/96		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Jitsuyo Shinan Koho 1926 - 1996		
Kokai Jitsuyo Shinan Koho 1971 - 1996		
Toroku Jitsuyo Shinan Koho 1994 - 1996		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP, 133159, Cl (Masakuni Hayashi),	1 - 2
Y	December 26, 1939 (26. 12. 39) (Family: none)	3 - 4
Y	JP, 58-85666, U (Kanzaki Kokyukoki Mfg. Co., Ltd.),	3 - 4
	June 10, 1983 (10. 06. 83) (Family: none)	
Y	JP, 54-173501, U (Furukawa Co., Ltd.),	3 - 4
	December 7, 1979 (07. 12. 79) (Family: none)	
Y	JP, 54-84801, U (Yanmar Diesel Engine Co., Ltd.),	3 - 4
	June 15, 1979 (15. 06. 79) (Family: none)	
Y	JP, 54-39902, U (Kubota Corp.),	3 - 4
	March 28, 1979 (28. 03. 79) (Family: none)	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
March 28, 1997 (28. 03. 97)		April 8, 1997 (08. 04. 97)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)