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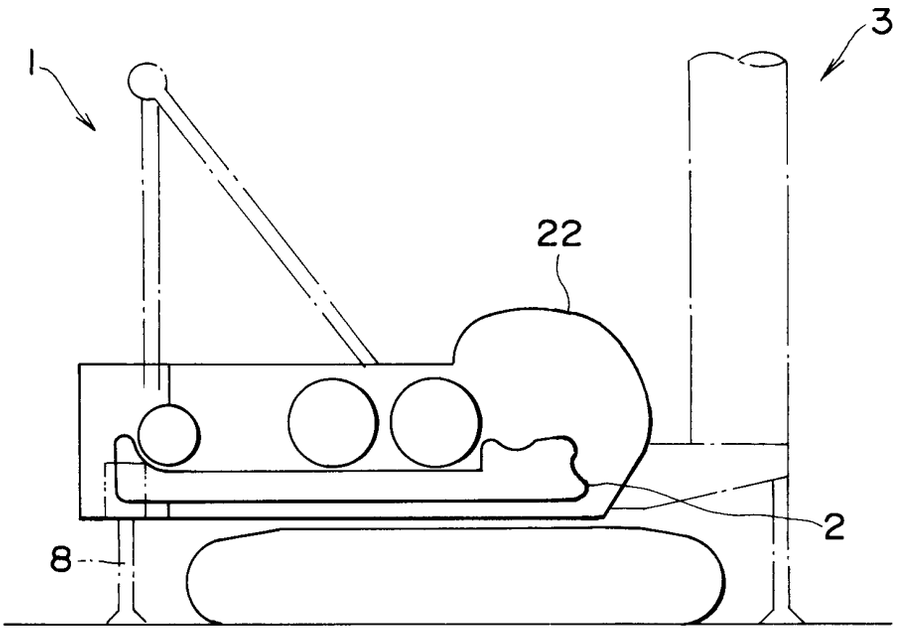
(54) Wheeled crane

(57) A crawler crane (1) according to the present invention is capable of mounting an operating attachment (3) forwardly of a revolving frame (2), is provided in a front end of the revolving frame (2) and at the rear of the front end and an upper portion of the revolving frame (2) with pin holes (4,5,6,7) engageable freely replacing the operating attachment (3), respectively, and is provided at the rear end of the revolving frame (2) with a pin hole (9,10) engageable freely detachably mounting an operating outrigger (8), thus enabling the provision of a wheeled crane (1) capable of corresponding to purposes of versatile uses.

FIG. 4



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Description

BACKGROUND OF THE INVENTION

(FIELD OF THE INVENTION)

[0001] The present invention relates to a wheeled crane capable of performing operation for versatile uses, and particularly to a crawler crane.

(DESCRIPTION OF THE RELATED ART)

[0002] The crawler crane, one kind of wheeled cranes, is excellent in stability and has a good traveling performance in uneven grounds and weak grounds, and operating uses thereof are various. There are various kinds of exclusive-use machines into which is incorporated an operating attachment, for example, such as a 3-point type, a folding leader, a standard crane and the like.

[0003] FIG. 9 shows an example of the 3-point type in which a leader attachment 52 for controlling a driving direction so that a pile may be driven accurately at a given angle is incorporated into a crawler crane 51 having a winch for hoisting a pile or a pile driver. The lower part of a leader 54 provided with a front outrigger 53 is connected to a base machine 55 which is a crane body, and the upper part of the leader 54 is supported by two stays 56 connected to left and right at the rear of the base machine. The base machine 55 is provided with a rear outrigger 57 for supporting the stays 56. In addition, a hydraulic source for operating a leader is provided, and the leader 54 can be adjusted in angle of inclination in all directions. In a two-face type leader which can be also rotated, switching between excavation and driving can be done simply.

[0004] FIG. 10 shows an example in which a folding leader is incorporated. The lower part of a leader 58 is connected at two upper and lower parts in a base machine 55 and a front portion of the base machine. FIG. 11 shows an example in which a standard crane is incorporated. The lower part of a boom 59 is mounted on the base machine to be rocked freely back and forth.

[0005] In the above-mentioned conventional constitutions, since the respective one is an exclusive-use machine, an exclusive-use design in accordance with the purpose of operation is applied, which could not be used for other kinds of machines. For example, in the 3-point exclusive-use machine shown in FIG. 9, the rear outrigger 57 is always provided on the base machine 55, and cannot be replaced by other kinds of machines. Further, the exclusive-use shape of a counterweight is necessary to prevent interference between the rear outrigger 57 and a falling preventing counterweight 60. The parts cannot be used in common, resulting in increase of cost.

[0006] Further, in the exclusive-use machine of the folding leader shown in FIG. 10, since great supporting forces are necessary at mounting positions P1, P2 for the leader 58 in front of the base machine 55, a span between the mounting positions P1, P2 is so large that the height of the base machine 55 makes higher, failing to expect compactness of apparatus. Furthermore, a problem in bringing forth an increase of cost occurs.

SUMMARY OF THE INVENTION

[0007] It is an object of the present invention to provide a wheeled crane capable of corresponding to versatile-use purposes and thereby achieving compactness and reduction in cost.

[0008] The wheeled crane according to the present invention comprises a revolving frame, a front end of the revolving frame, and an engaging portion provided at the upper part of the revolving frame in the vicinity of the front end, the engaging portion enabling an operating attachment replaceable engagement.

[0009] In this case, since the operating attachment can be engaged replaceable, various operating attachments can be incorporated in the crane body. As a result, this can correspond to versatile-use purposes. In the case where when the operating attachment is supported, the engaging portion of the revolving frame is utilized along with the engaging portion of the front end of the revolving frame (in this case, an adapter is preferably used), a large span between the support portions of the operating attachment is taken. Therefore, there is no possibility that the vertical dimension of the revolving frame increases as in the conventional exclusive-use machine, and the revolving frame can be miniaturized, and the cost can be reduced thereby.

[0010] The wheeled crane according to the present invention further comprises a revolving frame, and an engaging portion provided in the rear end of the revolving frame, the engaging portion enabling an operating outrigger detachably engagement.

[0011] In this case, since the operating outrigger can be detachably engaged, the operating outrigger can be easily incorporated in the crane body only when necessary. As a result, this can correspond to versatile-use purposes.

[0012] Furthermore, if the above-mentioned constitutions are combined, the geometrical operation and effect can be obtained advantageously.

BRIEF DESCRIPTION OF THE DRAWING

[0013]

FIG. 1 is a top view showing the detailed construction of a revolving frame of a crawler crane according to an embodiment of the present invention;
FIG. 2 is a side view showing the detailed construction of a revolving frame of a crawler crane according to an embodiment of the present invention;
FIG. 3 is a top view showing the whole constitution of a revolving frame of a crawler crane according to

an embodiment of the present invention;

FIG. 4 is a side view showing the whole constitution of a revolving frame of a crawler crane according to an embodiment of the present invention;

FIG. 5 is a whole constitutional view showing an example in which a 3-point type operating attachment is incorporated;

FIGS. 6A, 6B, and 6C are respectively detailed constructional views of a mounting member for an operating outrigger;

FIG. 7 is a whole constitutional view showing an example in which a folding lead type operating attachment is incorporated;

FIG. 8 is a whole constitutional view showing an example in which a standard crane type operating attachment is incorporated;

FIG. 9 is a whole constitutional view showing an example in which a conventional 3-point type operating attachment is incorporated;

FIG. 10 is a whole constitutional view showing an example in which a conventional folding lead type operating attachment is incorporated; and

FIG. 11 is a whole constitutional view showing an example in which a conventional standard crane type operating attachment is incorporated.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] The embodiments according to the present invention will be described hereinafter with reference to the accompanying drawings. The ensuing embodiments show one example in which the present invention is materialized, and the technical scope of the present invention is not limited thereby.

[0015] FIGS. 1 and 2 are respectively a top view and a side view showing the detailed construction of a revolving frame of a crawler crane which is one kind of wheeled cranes according to the present embodiment (hereinafter merely referred to as "a crawler crane"); and FIGS. 3 and 4 are respectively a top view and a side view showing the whole constitution of the crawler crane. As shown in FIGS. 3 and 4, the present crawler crane is similar to that of prior art in that an operating attachment 3 can be mounted forwardly of a revolving frame 2. However, the present crawler crane 1 is different from the prior art in that as shown in FIGS. 1 and 2, the front end of the revolving frame 2, and the rear portion of the front end and the upper portion of the revolving frame 2 are provided with pin holes (corresponding to engaging portions) 4, 5, 6, 7, respectively, engageable freely replacing the operating attachment 3. The present crawler crane is also different from the prior art in that pin holes (corresponding to the engaging portions) 9, 10 engageable detachably mounting an operating outrigger 8 are provided at the rear end of the revolving frame 2. In the following, an example in which various operating attachments are incorporated into the present crawler crane will be explained.

[0016] FIG. 5 shows an example in which a 3-point type operating attachment is incorporated. In FIGS. 3 to 5, in the present crawler crane 1, a rigid revolving frame 2 is mounted to be revolved freely on a traveling body 12 provided with traveling crawlers 11 on both sides. The lower part of a 3-point type leader 13 which is one example of an operating attachment 3 is connected to the front end of the revolving frame 2. A main winding drum 14, an auxiliary winding drum 15, and a boom rising and falling drum 16 are arranged in a row on the frame at the rear thereof so as to wind each operating rope.

[0017] The revolving frame 2 is in the construction of a box with left and right side longitudinal plates 2a as bases, as shown in FIGS. 1 and 2, to thereby provide a sufficient rigidity. The left and right side longitudinal plates 2a are formed in the front ends with upper an lower pin holes 4, 5, and stays 17 extended from the leader 13 are connected by means of the pin holes 5. Further, the rear portion of the left and right side longitudinal plates 2a and the upper portion of the left and right side longitudinal plates 2a are formed with pin holes 6, 7 side by side, and stays 18 branched from the stays 17 are mounted in the pin holes 6, 7 through an adapter 19. The adapter 19 is for example, in the form of a triangular plate, lower end of which is engaged in the pin holes 6, 7, and upper end of which is engaged with the stays 18. That is, in the present embodiment, the distance between the engaging portions with the revolving frame 2 of the stays 17, 18 can be taken as long as possible, and even if the span between the pin holes 4, 5 in the front end of the revolving frame 2 is not long, the sufficient supporting force can be obtained. Conversely speaking, the span between the pin holes 4, 5 in the front end of the revolving frame 2 can be suppressed to miniaturize the revolving frame 2. Note that the adapter 19 is used only when the pin holes 6, 7 are used.

[0018] While the falling preventing counterweight 20 is originally mounted in a 3-layer construction on the rear portion of the boom rising and falling drum 16, that is, the rear end of the revolving frame 2, an outrigger mounting member 21 as shown in FIGS. 6A to 6C is provided. FIG. 6A is a top view, FIG. 6B is a rear view, and FIG. 6C is a sectional view taken along line I-I. Two stays 14 extended from the upper portion of the leader 13 are connected to the upper surface of the outrigger mounting member 21, and the leader 13 is supported vertically by the stays 14. Operating outriggers 8 are expansively mounted on left and right projecting portions of the outrigger mounting member 21 in order to support the stays 14. To this end, two pin holes 9, 10 are provided at upper and lower portions at the rear end of the left and right side longitudinal plates 2a so as to connect the operating outriggers 8 thereto. A bracket portion 21a of the outrigger mounting member 21 is fitted into the rear end of the left and right side longitudinal plates 21, and the pin holes 9, 10 are engaged with the bracket portion

21a. The operating outriggers 8 are mounted on the ends on both sides of the outrigger mounting member 21, and the stays 14 are mounted upwardly on both sides of the outrigger mounting member 21. Further, a counterweight 20 is mounted upwardly of the outrigger mounting member 21. In this case, however, the outrigger mounting member 21 is filled with hunting such as iron scraps in order to supply the shortage of weight of the counterweight caused by the outrigger mounting member 21.

[0019] On the other hand, an engine not shown is arranged on the frame projected to left forwardly of the revolving frame 2 in FIGS. 3 and 4, and a power plant comprised of a hydraulic pump or the like likewise not shown is driven by the engine to supply pressure oil to the drums, the revolving device and the like, and to supply the traveling driving force also. On the other hand, a cabin 22 is provided on the frame projected to right forwardly of the revolving frame 2, where an operator performs various operations. As described above, the present crawler crane 1 is able to easily correspond to the 3-point type operating attachment.

[0020] Next, the 3-point type operating attachment is replaced by, for example, the folding type one. In this case, the lower part of the leader 22 is supported by the front outrigger 22a, as shown in FIGS. 1, 2 and 7. One end of a cylinder 23 is mounted in the upper pin hole 4 at the front end of the left and right side longitudinal plates 2a, and the other end thereof is mounted on the stay 25. The stay 24 branched from the central lower portion of the leader 22 is mounted in the lower pin hole 5 at the front end of the left and right side longitudinal plates 2a. The stay 25 branched from the central lower portion of the leader 22 is mounted through an adapter 19 as described above in the pin holes 6, 7 juxtaposed at the rear of the front end of the left and right side longitudinal plates 2a. In this case, since the rear outrigger is unnecessary, the upper and lower pin holes 9, 10 at the rear end of the left and right side longitudinal plates 2a are not used. As described above, the present crawler crane 1 can easily correspond also to the folding leader type operating attachment.

[0021] Next, the operating attachment is replaced by, for example, one for the standard crane. In this case, a boom 26 is merely mounted in the upper pin hole 4 at the front end of the left and right side longitudinal plate 2a, as shown in FIGS. 1, 2 and 8. In this case, accordingly, other pin holes 5, 6, 7, 9 and 10 are not used. As described above, the present crawler crane 1 can easily correspond also to the operating attachment for the standard crane. Needless to say, it can easily correspond also to other various operating attachments, as described above.

[0022] As described above, various operating attachments can be incorporated into the base machine which is the crane body by the pin holes 4, 5, 6 and 7 provided in the front end of the revolving frame 2 and at the rear of said front end. Further, since the operating outrigger 8 can be detachably fitted into the pin holes 9, 10 provided in the rear end of the revolving frame 2, the operating outrigger can be easily incorporated into the base machine. As a result, a crawler crane capable of corresponding to purposes for versatile uses can be obtained.

[0023] While in the above-described embodiments, the engaging portions with the various operating attachments 3 of the revolving frame 2 comprise the pin connecting pin holes, it is to be noted that those of pin connecting protrusions and other connecting methods, for example, bolt holes may be employed. Further, while in the above-described embodiments, the wheeled crane comprises a crawler crane as illustrated, it is to be noted of course that the invention can apply to other wheeled cranes.

[0024] A crawler crane according to the present invention is capable of mounting an operating attachment forwardly of a revolving frame, is provided in a front end of the revolving frame and at the rear of the front end and an upper portion of the revolving frame with pin holes engageable freely replacing the operating attachment, respectively, and is provided at the rear end of the revolving frame with a pin hole engageable freely detachably mounting an operating outrigger, thus enabling the provision of a wheeled crane capable of corresponding to purposes of versatile uses.

Claims

1. A wheeled crane comprising:

a revolving frame; and
a front end of said revolving frame, and an engaging portion provided at the upper part of said revolving frame in the vicinity of said front end, said engaging portion being engageable freely replacing an operating attachment.

2. A wheeled crane comprising:

a revolving frame; and
an engaging portion provided at the rear end part of said revolving frame, said engaging portion being engageable freely detachably mounting an operating outrigger;

3. A wheeled crane comprising:

a revolving frame;
a front end of said revolving frame, and an engaging portion provided at the upper part of said revolving frame in the vicinity of said front end, said engaging portion being engageable freely replacing an operating attachment; and
an engaging portion provided at the rear end part of said revolving frame, said engaging por-

tion being engageable freely detachably mounting an operating outrigger;

4. The wheeled crane according to claim 1 or 3, in which two holes are juxtaposed at the upper part in the vicinity of the front end of said revolving frame, wherein an adapter is provided in said two holes so that a lower portion thereof is engageable with said revolving frame and an upper portion thereof is engageable with an operating attachment.

5. The wheeled crane according to any of claims 1 to 4, wherein the engaging portions provided in the front end of said revolving frame, the upper portion of said revolving frame in the vicinity of said front end, and the rear end of said revolving frame, respectively, have partly or wholly pin connecting holes.

6. A wheeled crane capable of mounting an operating attachment forwardly of a revolving frame, characterized in that

engaging portion engageable freely replacing the operating attachment are provided in a front end of said revolving frame and an upper portion of said revolving frame in the vicinity of said front end, respectively.

7. A wheeled crane capable of mounting an operating attachment forwardly of a revolving frame, characterized in that

an engaging portion engageable freely detachably mounting an operating outrigger is provided at the rear end of said revolving frame.

8. A wheeled crane capable of mounting an operating attachment forwardly of a revolving frame, characterized in that

engaging portion engageable freely replacing the operating attachment are provided in a front end of said revolving frame and an upper portion of said revolving frame in the vicinity of said front end, respectively, and an engaging portion engageable freely detachably mounting an operating outrigger is provided at the rear end of said revolving frame.

FIG. 1

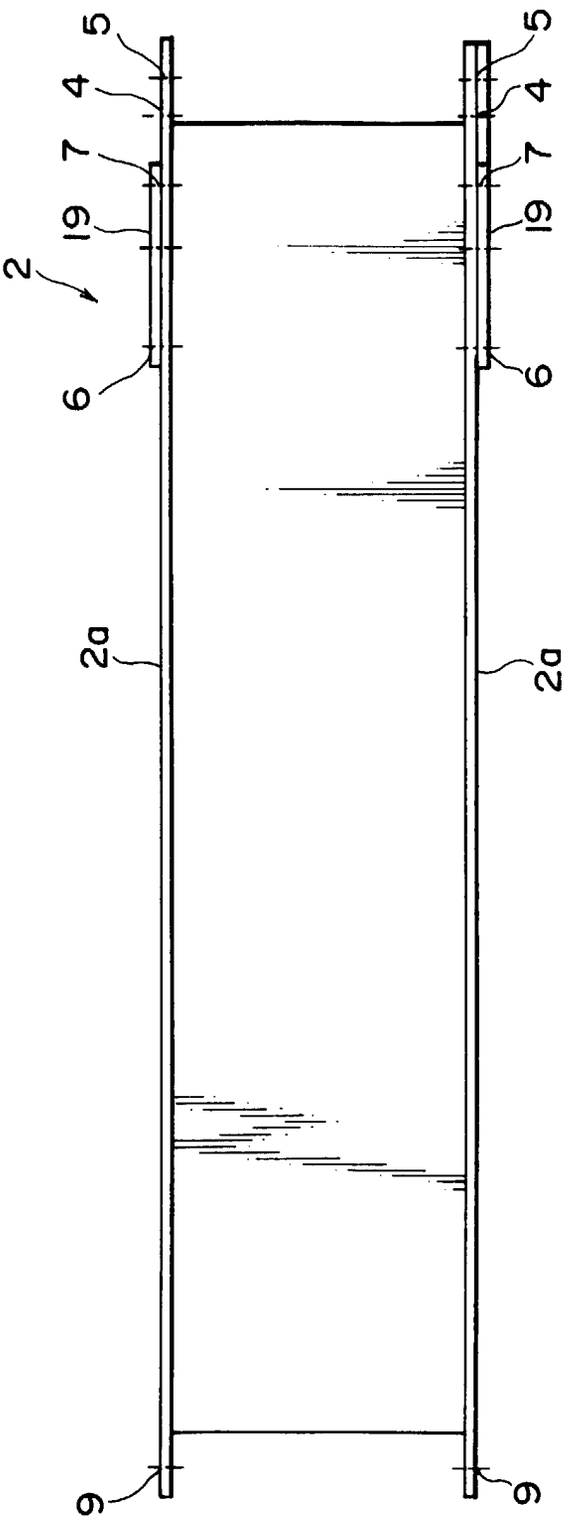


FIG. 2

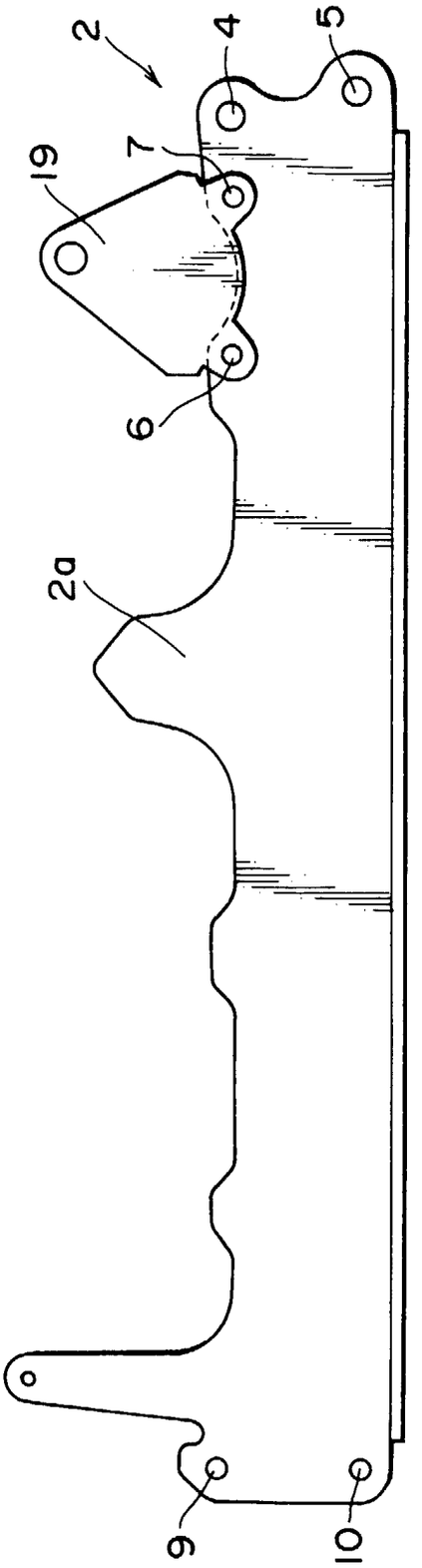


FIG. 3

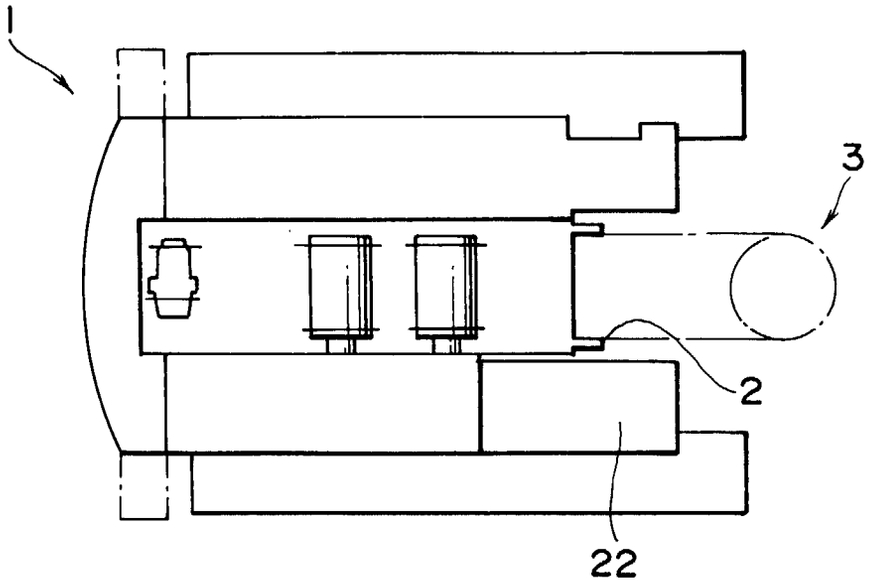


FIG. 4

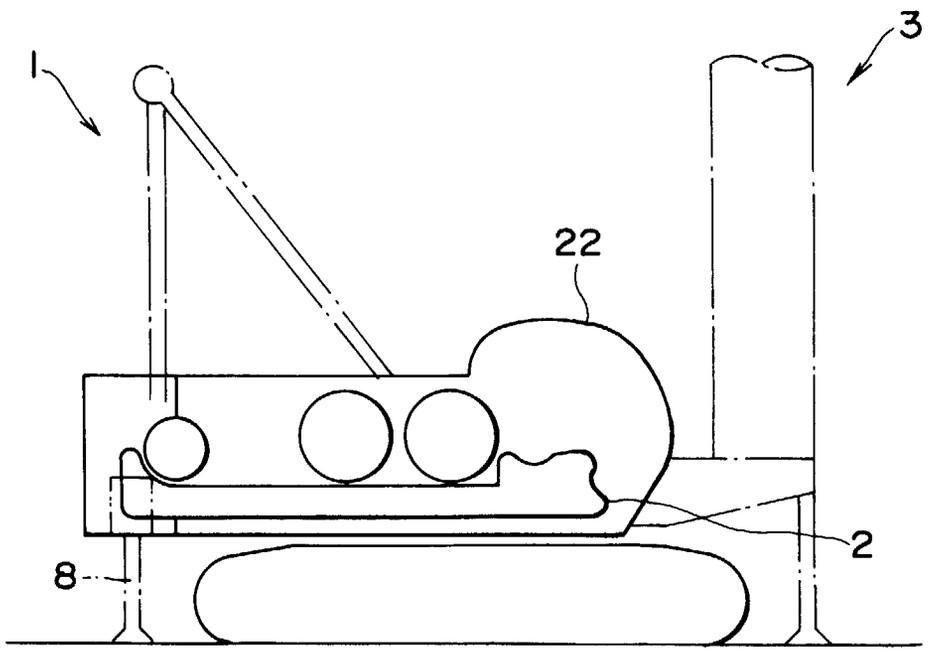


FIG. 5

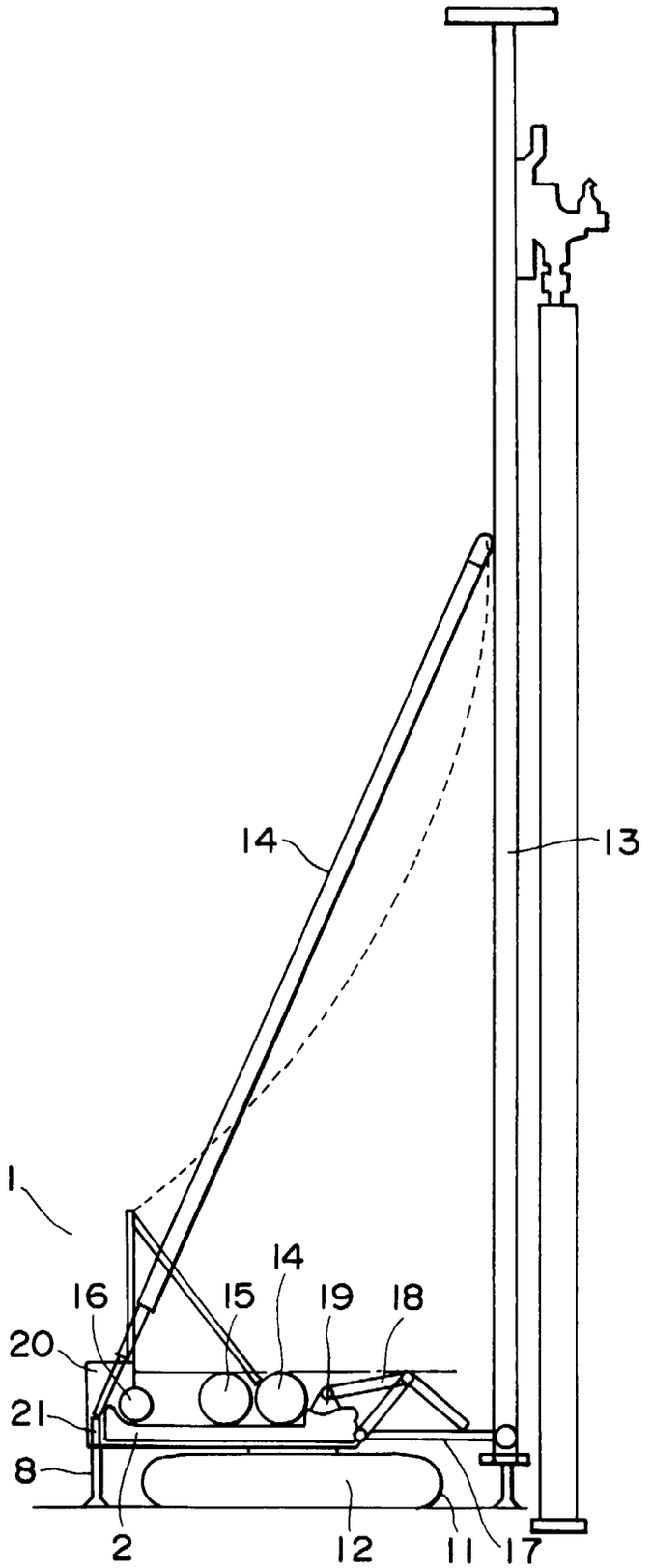


FIG. 6C

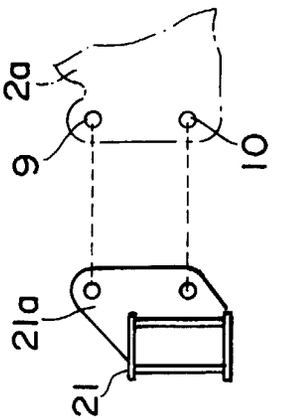


FIG. 6A

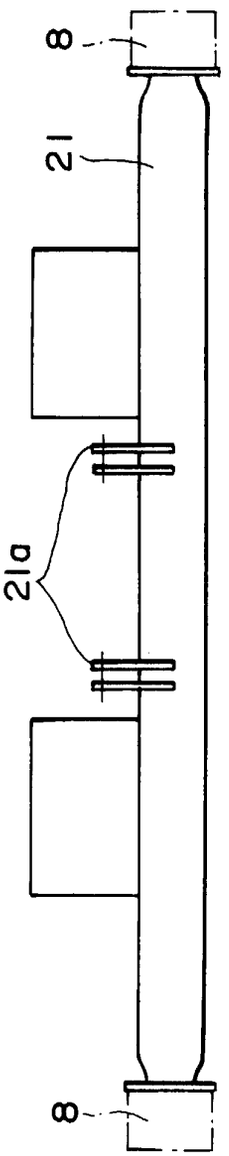


FIG. 6B

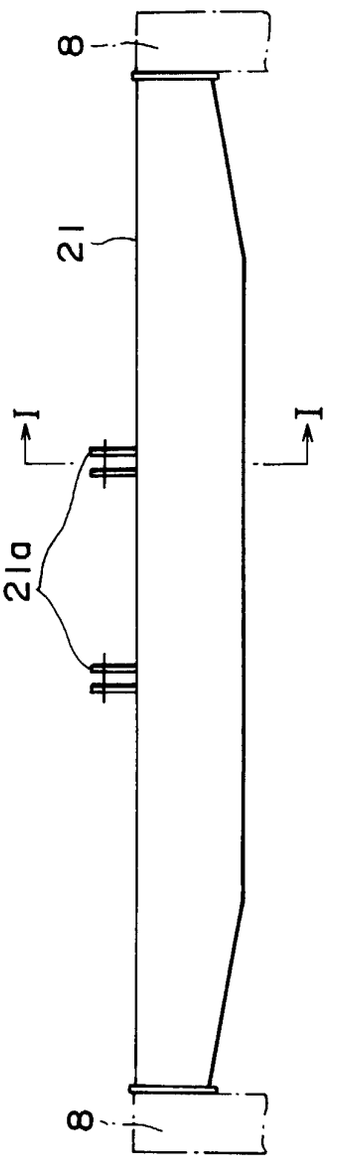


FIG. 7

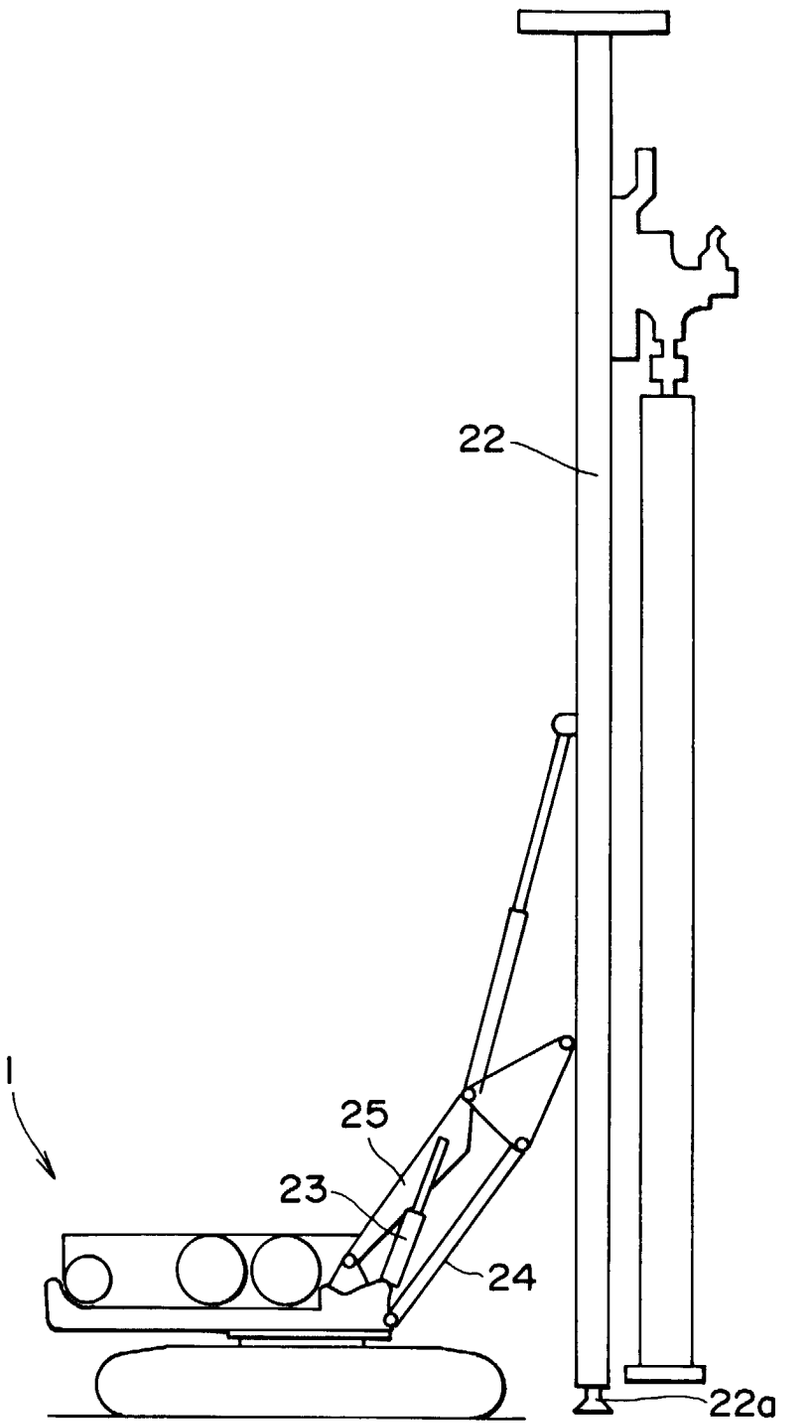


FIG. 8

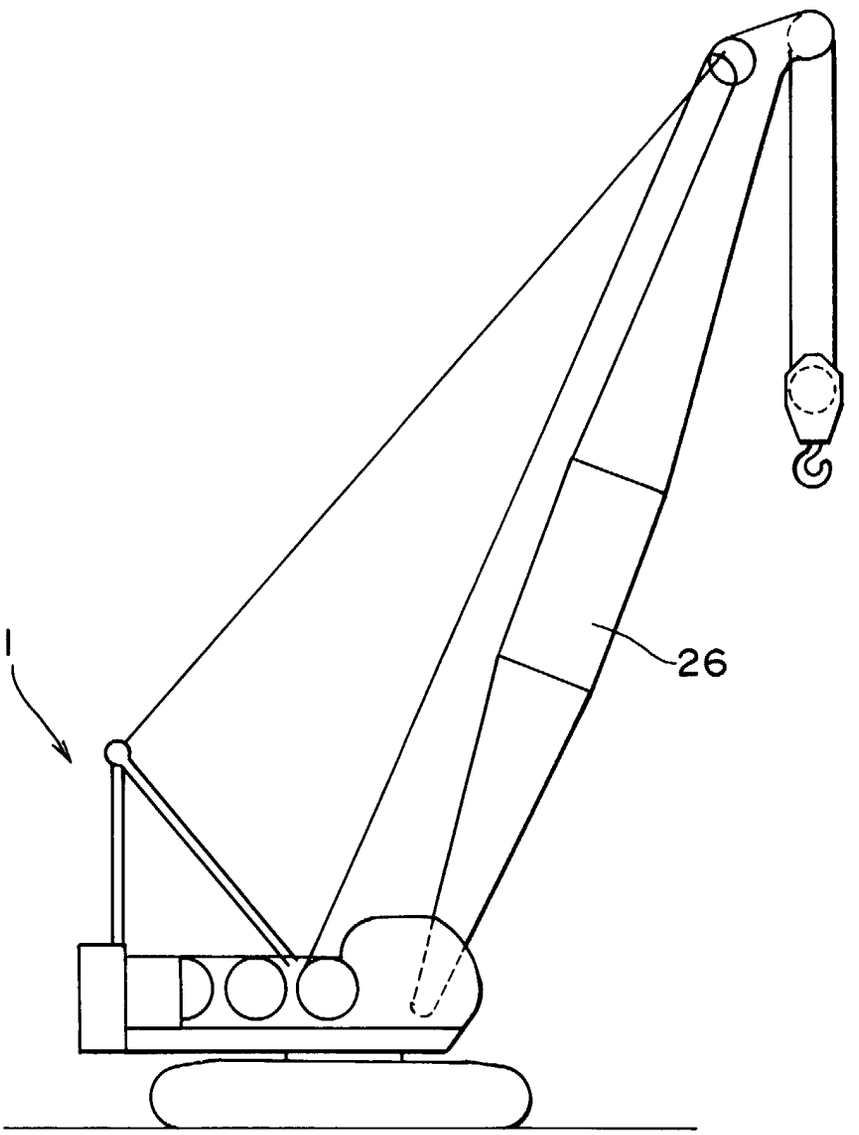


FIG. 9

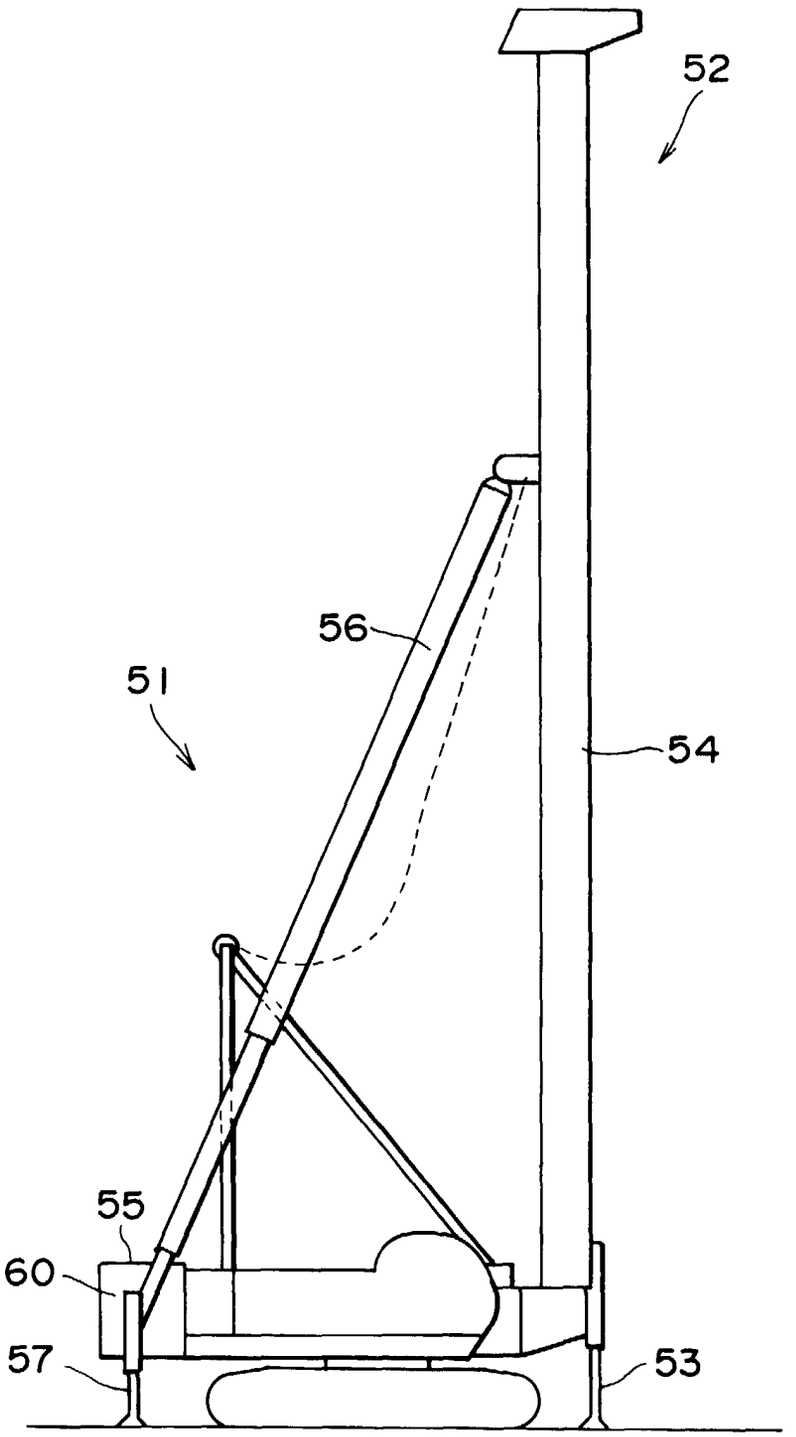


FIG. 10

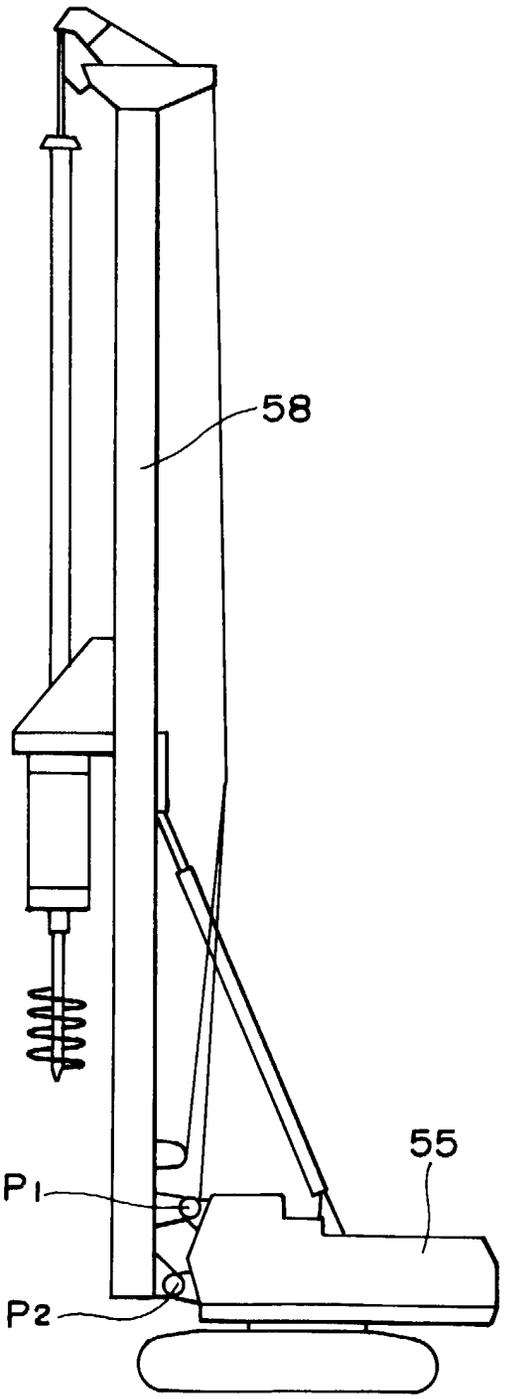
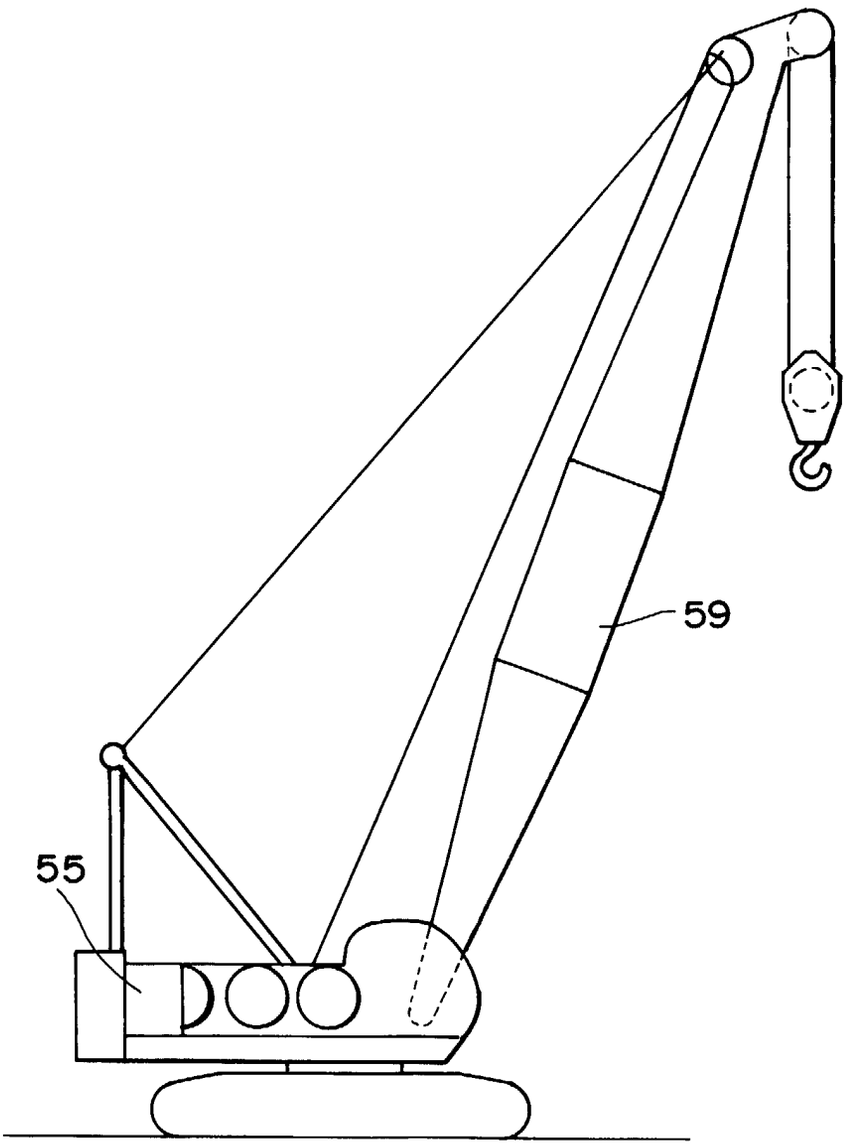


FIG. 11



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EUROPEAN SEARCH REPORT

Application Number
EP 99 12 1479

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Y	US 5 348 171 A (HAMAN) 20 September 1994 (1994-09-20) * column 8, line 35-48; figures 1-17 *	2,3,5,7,8	
A	DE 25 54 910 A (TOENSE) 16 June 1977 (1977-06-16) * page 9, line 12-19; figure 1 *	2	
A	GB 2 140 772 A (KABUSHIKI KAISHA KOBE SEIKO SHO) 5 December 1984 (1984-12-05)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B66C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 February 2000	Vollering, J

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 12 1479

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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