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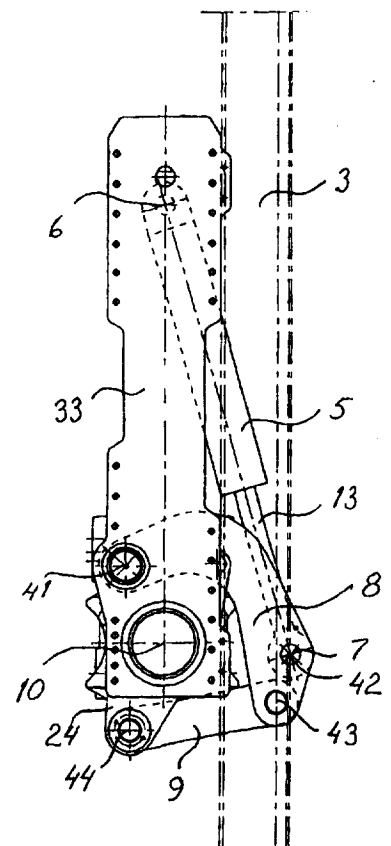
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(54) Title: ROCK DRILLING RIG

(57) Abstract

Drill rig comprising a carrier (1), a boom (2) and a feed device (3) rotatably connected with the boom by means of a rotation device and intended for a rock drilling machine (4). The rotation device comprises a hydraulic cylinder (5) between the feed device (3) and a first link (8). The first link is in addition with the hydraulic cylinder (5) rotatably connected with the feed device (3) and with a second link (9). The second link is furthermore rotatably connected with the boom (2). By means of the hydraulic cylinder the feed device can be swung about an axis of rotation (10) from a position at least 30° to one side of a vertical line (12) to a position at least 90° to the other side of the vertical line.



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Rock drilling rig

The present invention relates to a drill rig for drilling in for instance rock. More specifically the invention concerns a drill rig provided with means which allows drilling in an angular interval round about the vertical direction as well as horizontal drilling without modification of the drill rig.

In prior art drill rigs of the type which the present invention relates to one can drill within an interval extending about 45° on either side of a vertical line. When there is a need to drill horizontal holes the drill rig must be modified. This is achieved through giving the hydraulic cylinder which swings the feed device another connection point on the boom, so-called repinning. Through this, drilling can occur between a vertical position and horizontal position. In order to move the fastening point a safety shaft has to be mounted before the pin holding the hydraulic cylinder in place is taken away so that the feed device does not come loose and fall to the ground, which may cause accidents. When the safety shaft has been mounted the pin of the hydraulic cylinder is moved to the new position after which the safety shaft is taken away.

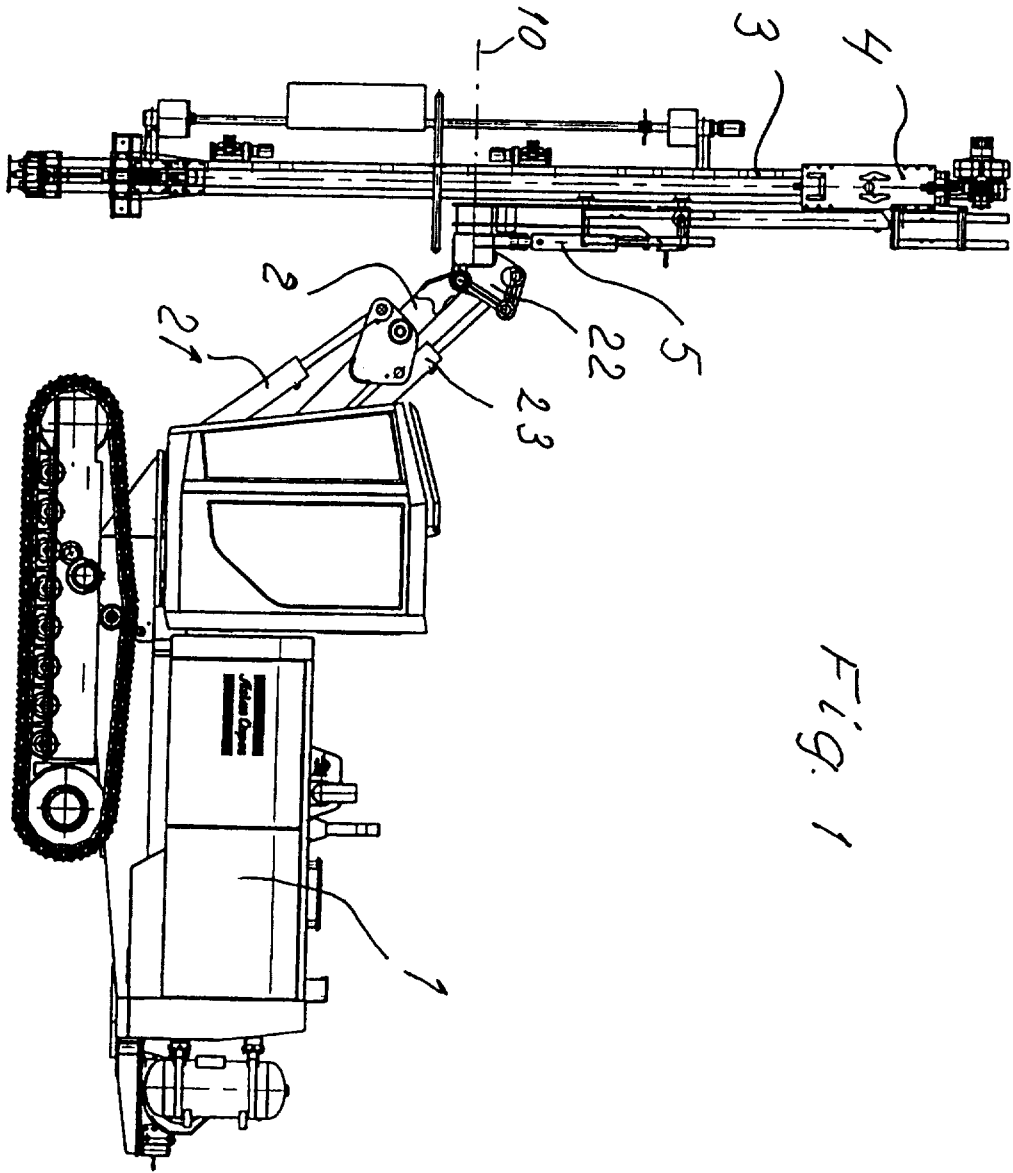
The present invention, which is defined in the subsequent claim, aims at achieving a drill rig where drilling can occur within the above mentioned angle interval without modification of the drill rig. Through this a quicker handling is obtained since the drill rig can be adjusted between the different angle regions without repinning. One obtains better safety since the risks with repinning are eliminated. Furthermore service is simplified because one can easily position the feed device in horizontal position at a suitable height above the ground.

An embodiment of the invention is described below with reference to the accompanying drawings in which fig 1 shows a drill rig according to the invention. Fig 2 shows a part of the drill rig seen from the left in fig 1. Fig 3 shows a part of the drill rig seen from the left in fig 2. Fig 4 is a view corresponding to fig 2 in another angle position. Fig 5 is a view corresponding to fig 2 in a further angle position.

The drill rig shown in the drawings comprises a carrier 1, a boom 2 which is swingably connected with the carrier. The boom can be raised or lowered by means of a hydraulic cylinder 21. The boom 2 is at its front end provided with a boom head 22. The boom head is connected with the boom 2 through a joint and is swung in the plane of the figure by means of the hydraulic cylinder 22. A feed device 3 is pivotably connected with the boom in a way to be described below. At this rotation the feed device 3 swings in a plane perpendicular to fig 1. A rock drilling machine 4 is in a usual way movable to-and-fro along the feed device. The feed device comprises in the shown example a feed holder 33 and a feed beam 3. If desired the feed holder can be omitted. The feed holder 33 is turnable about an axis of rotation 10 by means of a rotation device comprising a hydraulic cylinder 5, a first link 8 and a second link 9. The axis of rotation 10 is arranged on the boom head 22 and thus on the boom 2. One end 6 of the hydraulic cylinder 5 is connected with the feed holder 33 through a joint. The other end 7 is by means of a joint 42 articulated to the first link 8. The first link 8 is furthermore by means of a joint 41 articulated to the feed holder 33 and by means of a joint 43 articulated to a second link 9. The second link 9 is by means of a joint 44 articulated to an ear 24 on the boom head 22 and thus connected with the boom 2. In fig 4 the feed holder 33 is shown swung out in a first direction 11 relative to a vertical line 12. When the piston rod 13 of the hydraulic cylinder 5 is extended to its maximum from the hydraulic cylinder 5, i.e. in a first end position, the angle A is at least 30°. In fig 5 the feed holder 33 is shown swung out in a second direction 14 relative to the vertical line 12. When the piston rod 13 of the hydraulic cylinder 5 is in its innermost position in the hydraulic cylinder 5, i.e. in a second end position, the feed holder is swung out at least to horizontal position, i.e. the angle B is at least 90°

Claim:

1. Drill rig comprising a carrier (1), a boom (2) swingably connected with the carrier, a feed device (3) by means of a rotation device rotatably connected with the boom and a rock drilling machine movable to-and-fro along the feed device, characterized in that said rotation device comprises a first link (8) which is rotatably connected with said feed device (3) and with a second link (9), that said second link (9) is rotatably connected with said first link (8) and with said boom (2), that one end (6) of a hydraulic cylinder (5) is rotatably connected with said feed device (3), that a second end (7) of said hydraulic cylinder (5) is rotatably connected with either of said first link (8) or said second link (9), that said feed device (3) is turned about an axis of rotation (10) on the boom at least 30° in a first direction (11) relative to a vertical line (12) when a piston rod (13) in said hydraulic cylinder (5) is moved to a first end position and that said feed device (3) is turned about said axis of rotation (10) at least to horizontal position in a second direction (14) relative to said vertical line (12) when said piston rod (13) in said hydraulic cylinder (5) is moved to a second end position.



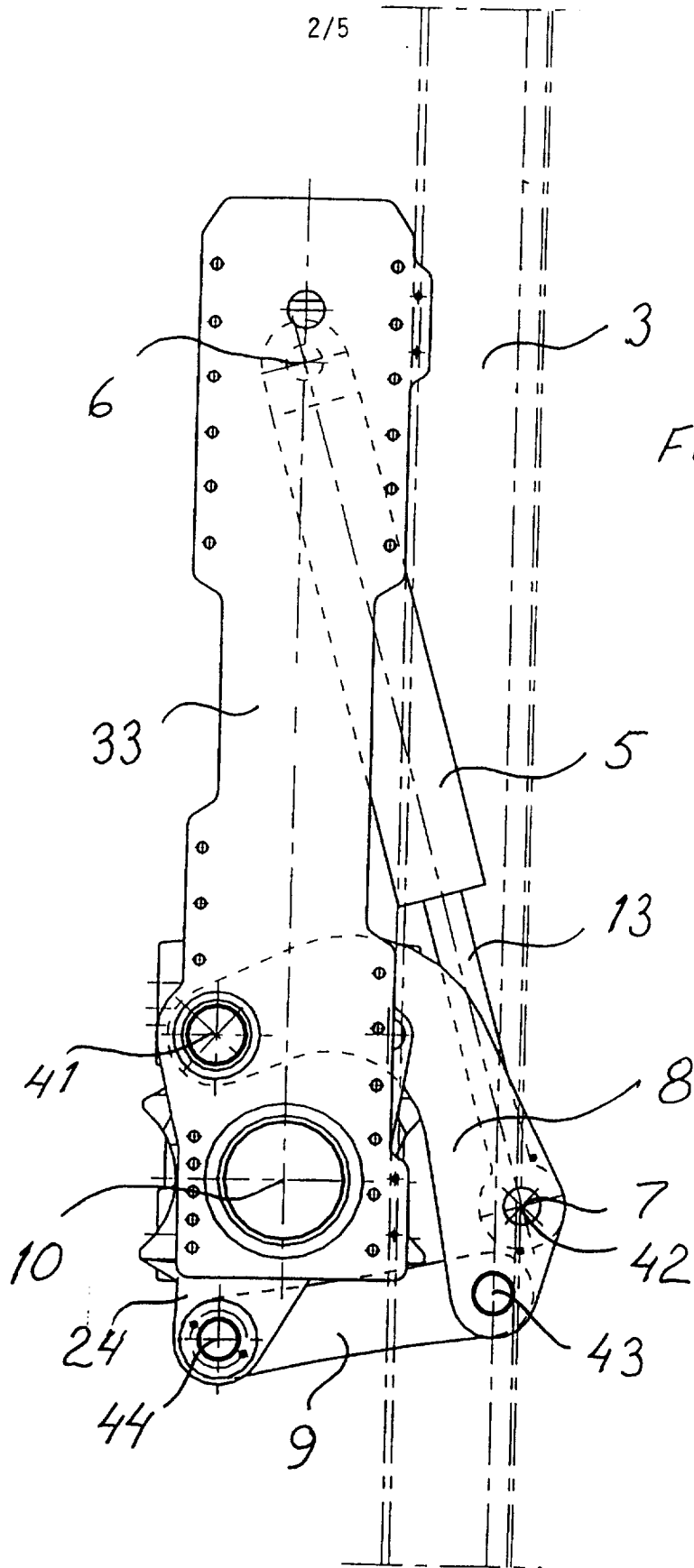
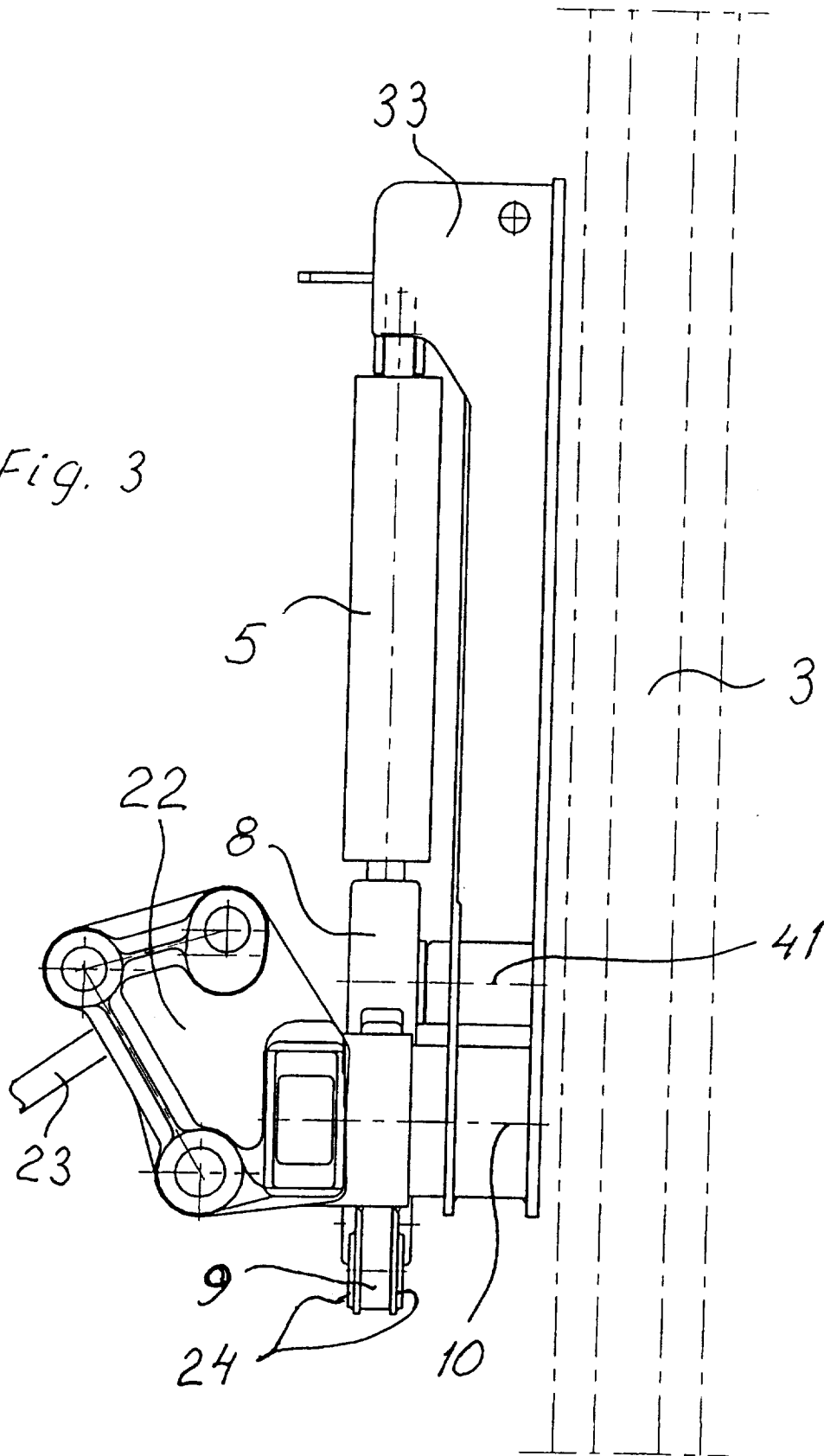
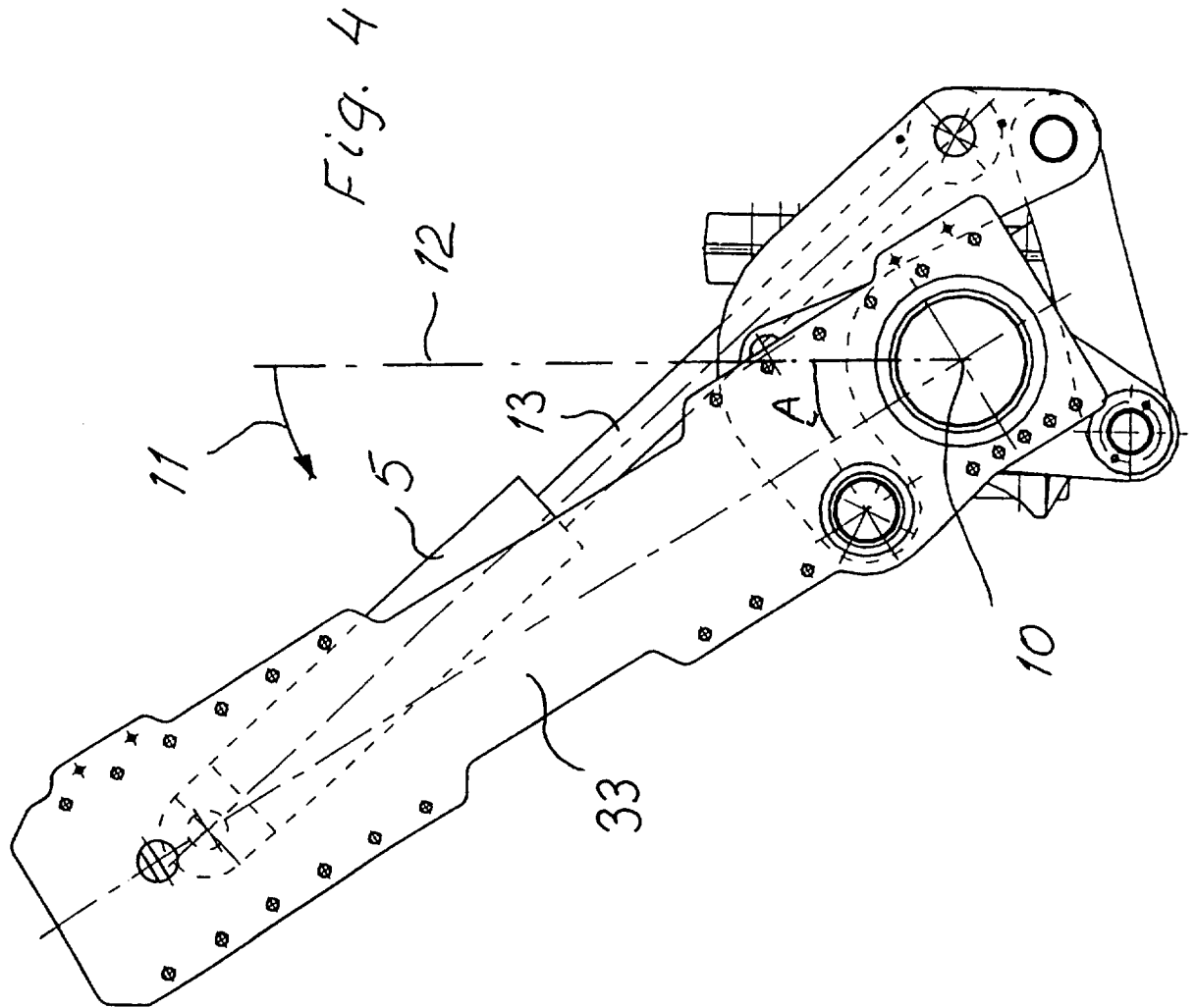


Fig. 2

Fig. 3





INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/01351

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E21B 7/02, E21B 7/04, E21B 15/04
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)

IPC6: E21B, E21C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

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

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0332883 A1 (HÜTTE & CO. BOHRTECHNIK GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG), 20 Sept 1989 (20.09.89), column 5, line 5 - line 11 --	1
A	US 4067398 A (S.M. FRANSEN ET AL), 10 January 1978 (10.01.78), abstract --	1
A	US 4022410 A (J.M. EWART ET AL), 10 May 1977 (10.05.77), figure 6 -- -----	1

Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
26 November 1997	01-12-1997

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INTERNATIONAL SEARCH REPORT

Information on patent family members

01/10/97

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0332883 A1	20/09/89	DE 3808745 A	28/09/89
US 4067398 A	10/01/78	AU 1453176 A	08/12/77
		CA 1050527 A	13/03/79
		SE 398528 B,C	27/12/77
		SE 7506370 A	05/12/76
		ZA 7603148 A	25/05/77
US 4022410 A	10/05/77	US 4185513 A	29/01/80