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(54) A device for remote control of a crane

(57) A device for remote control of a crane, comprising a portable manoeuvring unit (1) provided with manoeuvring members for remote control of different crane functions and a carrying appliance (10) for attaching the manoeuvring unit (1) to the body of a crane operator. The carrying appliance comprises a waist belt (11) to be secured to the waist of the crane operator and at least two fastening straps (12a, 12b) for securing the manoeuvring unit to the waist belt. Each fastening strap is provided with adjustment means (15a, 15b) enabling an adjustment of the length (L) of the part of the respective fastening strap that extends between the waist belt and the manoeuvring unit so as to thereby allow an adjustment of the rotational position of the manoeuvring unit (1), and thus an adjustment of the inclination of the manoeuvring unit in relation to the waist belt (11), when the manoeuvring unit is attached to the body of the crane operator via the carrying appliance.

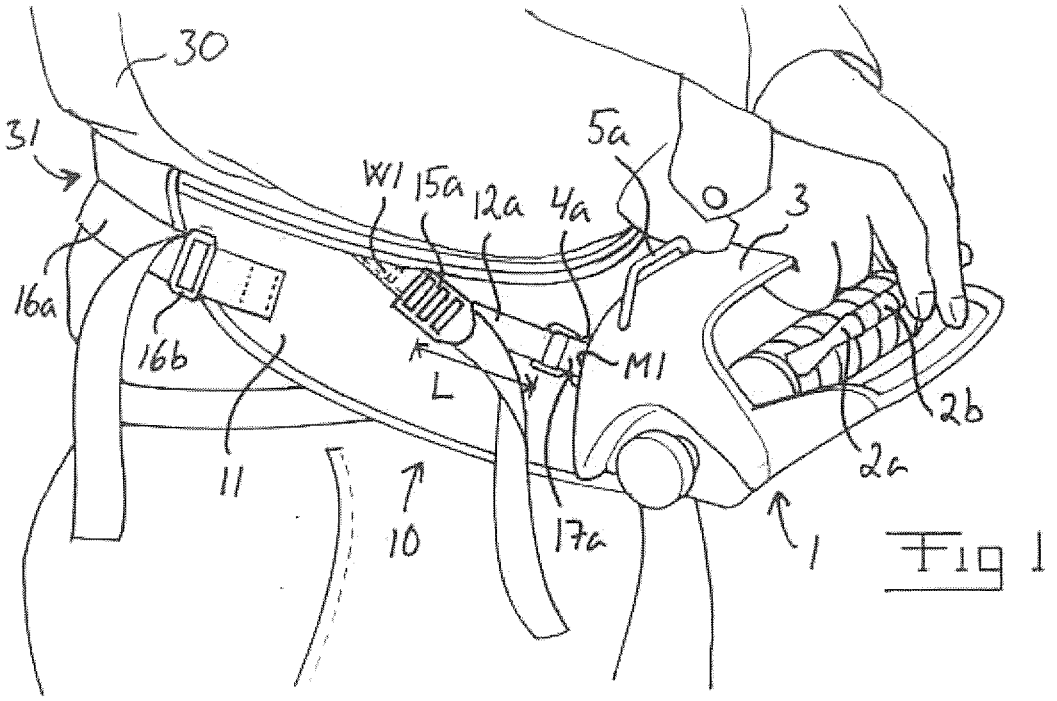

Fig 1

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Description

FIELD OF THE INVENTION AND PRIOR ART

[0001] The present invention relates to a device for remote control of a crane, such as a hydraulic lorry crane, according to the preamble of claim 1.

[0002] A control system for controlling a hydraulic lorry crane is disclosed in SE 520 536 C2. This control system enables the control of different crane functions, such as lifting/lowering by means of a lifting cylinder, tilting by means of an outer boom cylinder, extension/retraction by means of an extension boom cylinder etc, and comprises a pump which pumps hydraulic fluid from a reservoir to a directional-control-valve block. The directional-control-valve block comprises a directional-control-valve section for each of the hydraulic crane cylinders. Hydraulic fluid is supplied to said crane cylinders in dependence on the position of the slide member in the respective valve section. The position of the slide members in the directional-control-valve sections is controlled either via a manoeuvring unit mounted in the lorry or by remote control via a portable manoeuvring unit comprising a number of manoeuvring members, e.g. in the form of manoeuvring levers, each of which being associated with a respective slide member. Control signals are transmitted via cable or a wireless connection from the portable manoeuvring unit to a processor, which in its turn controls the position of the slide members in the valve sections of the directional-control-valve block depending on the control signals from the portable manoeuvring unit. The portable manoeuvring unit could for instance be carried by the crane operator, i.e. the person operating the crane, via a neck belt or the similar.

OBJECT OF THE INVENTION

[0003] The object of the present invention is to provide a device for remote control of a crane, comprising a portable manoeuvring unit that can be carried by a crane operator in a comfortable and er-gonomical manner.

SUMMARY OF THE INVENTION

[0004] According to the present invention, said object is achieved by means of a device having the features defined in claim 1.

[0005] The inventive device is characterized in:

- that the carrying appliance comprises a waist belt to be attached to the waist of the crane operator and at least two fastening straps for securing the manoeuvring unit to the waist belt;
- that a first one of said fastening straps is secured to the waist belt via a first point of the waist belt and to the manoeuvring unit via a first point of the manoeuvring unit;
- that a second one of said fastening straps is secured to the waist belt via a second point of the waist belt and to the manoeuvring unit via a second point of the manoeuvring unit;
- that said first and second points of the waist belt are spaced apart as seen in the longitudinal direction of the waist belt, whereas said first and second points of the manoeuvring unit are spaced apart as seen in the longitudinal direction of the manoeuvring unit; and
- that said first and second fastening straps are each provided with adjustment means enabling an adjustment of the length of the part of the respective fastening strap that extends between the waist belt and the manoeuvring unit so as to thereby allow an adjustment of the rotational position of the manoeuvring unit, and thus an adjustment of the inclination of the manoeuvring unit in relation to the waist belt, when the manoeuvring unit is attached to the body of the crane operator via the carrying appliance.

[0006] The inventive solution implies that the manoeuvring unit is carried by the crane operator via a waist belt, whereby the hands of the operator are kept free and may be used for manipulating the manoeuvring members of the manoeuvring unit without being obstructed by a neck belt or the similar. Furthermore, the adjustment means make it possible to adjust the rotational position of the manoeuvring unit in a very simple manner. Hereby, it will be possible for the crane operator to give the manoeuvring unit a desired inclination in relation to his body. This implies that the crane operator quickly and easily may adapt the position of the manoeuvring unit so as to suit his specific demands and thereby obtain an ergonomically appropriate working posture when controlling the crane via the portable manoeuvring unit. Furthermore, the crane operator may quickly and easily vary the position of the manoeuvring unit so as to thereby vary his working posture when controlling the crane via the portable manoeuvring unit.

[0007] Further advantages and preferred embodiments of the invention will appear from the dependent claims and the subsequent description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] With reference to the appended drawings, a specific description of preferred embodiments of the invention cited as examples follows below. It is shown in:

Fig 1 a perspective view of a device according to the present invention attached to the waist of a crane operator, with the manoeuvring unit in a first rotational position,

Fig 2 the device according to Fig 1, with the manoeuvring unit in a second rotational position,

Fig 3 a perspective view from behind of a manoeu-

vring unit included in the device according to Figs 1 and 2, and

Fig 4 the device according to Figs 1 and 2, as seen from above.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0009] In this description and the subsequent claims the expression "portable manoeuvring unit" refers to a portable control unit that may be used for remote control of different crane functions of a crane, e.g. by controlling the supply of hydraulic fluid to the hydraulic cylinders of a hydraulic crane, such as a hydraulic lorry crane. The expression "manoeuvring members" refers to the members of the manoeuvring unit that may be manipulated by the crane operator in order to control said crane functions. The manoeuvring members preferably consist of operating levers, but may also consist of push buttons, joysticks or the similar.

[0010] A device according to the present invention for remote control of a crane, such as a hydraulic lorry crane, is illustrated in Figs 1-4. The device comprises a portable manoeuvring unit 1 provided with manoeuvring members 2a-2f for remote control of different crane functions. In the illustrated embodiment, the manoeuvring members consist of a number of operating levers 2a-2f located adjacent to each other in a row extending in the longitudinal direction of the manoeuvring unit 1. The manoeuvring unit 1 also comprises a hand-rest 3 located above the row of manoeuvring members 2a-2f so as to allow the crane operator 30 to manipulate the manoeuvring members 2a-2f by the fingers while the palms of the hands are resting on the hand-rest 3. The manoeuvring unit 1 is preferably provided with an upwardly facing display 7 so as display different types of information that may be useful to the crane operator when controlling the crane.

[0011] The manipulation of the manoeuvring members 2a-2f generates control signals, which are transmitted via cable or a wireless connection from the manoeuvring unit 1 to the control system of the crane that is to be controlled.

[0012] The device further comprises a carrying appliance 10 for attaching the manoeuvring unit 1 to the body of the crane operator 30. The carrying appliance 10 comprises a waist belt 11 to be secured to the waist 31 of the crane operator and at least two fastening straps 12a, 12b for securing the manoeuvring unit 1 to the waist belt 11. In the illustrated embodiment, the carrying appliance 10 comprises two such fastening straps 12a, 12b. A first one 12a of said fastening straps is secured to the waist belt 11 via a first point W1 of the waist belt and to the manoeuvring unit 1 via a first point M1 of the manoeuvring unit. A second one 12b of said fastening straps is secured to the waist belt 11 via a second point W2 of the waist belt and to the manoeuvring unit 1 via a second point M2 of the manoeuvring unit. Said first and second points W1, W2 of the waist belt 11 are spaced apart as seen in the longitudinal direction of the waist belt, preferably in such a manner that said first and second points W1, W2 will be located on either side of the body of the crane operator 30 when the waist belt 11 is secured in the intended position about the waist 31 of the crane operator. Said first and second points M1, M2 of the manoeuvring unit 1 are in their turn spaced apart as seen in the longitudinal direction of the manoeuvring unit. The manoeuvring unit 1 is to be attached to the body of the crane operator 30 in front of the body and with the longitudinal axis of the manoeuvring unit extending essentially in the cross-direction of the body. The manoeuvring unit 1 is to be carried by the crane operator 30 via the fastening straps 12a, 12b and the waist belt 11 with the rear side 6 of the manoeuvring unit 1 resting against the waist belt 11 or the body of the crane operator.

[0013] The waist band 11 is provided with fastening means 16, e.g. in the form of a fastening strap 16a and an associated strap buckle 16b, for allowing the waist belt to be secured about the waist 31 of the crane operator. Said fastening means 16 could also comprise Velcro® straps or any other suitable fastening members.

[0014] The first and second fastening straps 12a, 12b are each provided with adjustment means 15a, 15b enabling an adjustment of the length L of the part of the respective fastening strap that extends between the waist belt 11 and the manoeuvring unit 1 so as to thereby allow an adjustment of the rotational position of the manoeuvring unit 1, and thus an adjustment of the inclination of the manoeuvring unit in relation to the waist belt 11 and the body of the crane operator 30, when the manoeuvring unit is attached to the waist of the operator via the carrying appliance 10.

[0015] In this description and the subsequent claims, the rotational position of the manoeuvring unit 1 refers to the rotational position of manoeuvring unit about its longitudinal axis. In Fig 1, the manoeuvring unit 1 is shown in a first rotational position with the length L of the part of the respective fastening strap 12a, 12b that extends between the waist belt and the manoeuvring unit set to be rather short. In Fig 2, said length L has been extended as compared to Fig 1 and the manoeuvring unit 1 has thereby been rotated about its longitudinal axis so as to occupy another rotational position. In order to facilitate a rotation of the manoeuvring unit 1 about its longitudinal axis in connection with an adjustment of said length L, said first and second points M1 , M2 of the manoeuvring unit 1 are preferably located above the centre of gravity of the manoeuvring unit as seen when the manoeuvring unit is positioned in an intended operating position with its longitudinal axis extending essentially horizontally and with the display 7 turned upwards.

[0016] The respective adjustment means 15a, 15b preferably consists of a strap buckle, as illustrated in Figs 1 and 2. The respective strap buckle 15a, 15b is suitably fixed to the waist belt 11, e.g. by being sewn or riveted onto the waist belt.

[0017] A snap hook 17a, 17b is suitably fixed to the respective fastening strap 12a, 12b so as to allow the respective fastening strap to be releasably secured to the manoeuvring unit 1 in a quick and easy manner.

[0018] In the illustrated embodiment, the manoeuvring unit 1 is provided with a first pair 4a, 4b of fastening members designed for engagement with said fastening straps 12a, 12b, e.g. via snap hooks 17a, 17b. The fastening members 4a, 4b of said first pair are spaced apart as seen in the longitudinal direction of the manoeuvring unit. The first fastening strap 12a is to be secured to a first fastening member 4a of said pair and the second fastening strap 12b is to be secured to the other fastening member 4b of said pair. The fastening members 4a, 4b of said first pair are preferably located on the rear side 6 of the manoeuvring unit, as illustrated in Fig 3. The illustrated manoeuvring unit 1 is also provided with a second pair 5a, 5b of fastening members designed for engagement with a neck belt (not shown) so as to allow the manoeuvring unit 1 to be supported by the neck of the operator if so desired. The respective fastening member 4a, 4b, 5a, 5b suitably consists of a fastening yoke, as illustrated in Fig 3.

[0019] The inventive device may for instance be used for remote control of a hydraulic crane of the type disclosed in SE 520 536 C2.

[0020] The invention is of course not in any way restricted to the preferred embodiments described above. On the contrary, many possibilities to modifications thereof should be apparent to a person skilled in the art without departing from the basic idea of the invention as defined in the appended claims.

Claims

1. A device for remote control of a crane, comprising a portable manoeuvring unit (1) provided with manoeuvring members (2a-2f) for remote control of different crane functions and a carrying appliance (10) for attaching the manoeuvring unit (1) to the body of a crane operator, **characterized in:**

   - **that** the carrying appliance (10) comprises a waist belt (11) to be attached to the waist of the crane operator and at least two fastening straps (12a, 12b) for securing the manoeuvring unit (1) to the waist belt (11);
   - **that** a first one (12a) of said fastening straps is secured to the waist belt (11) via a first point (W1) of the waist belt and to the manoeuvring unit (1) via a first point (M1) of the manoeuvring unit;
   - **that** a second one (12b) of said fastening straps is secured to the waist belt (11) via a second point (W2) of the waist belt and to the manoeuvring unit (1) via a second point (M2) of the manoeuvring unit;
   - **that** said first and second points (W1 , W2) of the waist belt (11) are spaced apart as seen in the longitudinal direction of the waist belt, whereas said first and second points (M1, M2) of the manoeuvring unit (1) are spaced apart as seen in the longitudinal direction of the manoeuvring unit; and
   - **that** said first and second fastening straps (12a, 12b) are each provided with adjustment means (15a, 15b) enabling an adjustment of the length (L) of the part of the respective fastening strap that extends between the waist belt (11) and the manoeuvring unit (1) so as to thereby allow an adjustment of the rotational position of the manoeuvring unit (1), and thus an adjustment of the inclination of the manoeuvring unit in relation to the waist belt (11), when the manoeuvring unit is attached to the body of the crane operator via the carrying appliance.

2. A device according to claim 1, **characterized in that** the manoeuvring members (2a-2f) are located adjacent to each other in a row extending in the longitudinal direction of the manoeuvring unit (1).

3. A device according to claim 2, **characterized in that** the manoeuvring unit (1) is provided with a hand-rest (3) located above the row of manoeuvring members (2a-2f).

4. A device according to any of the preceding claims, **characterized in that** the respective adjustment means (15a, 15b) consists of a strap buckle.

5. A device according to claim 4, **characterized in that** the respective strap buckle (15a, 15b) is fixed to the waist belt (11).

6. A device according to any of the preceding claims, **characterized in that** the respective fastening strap (12a, 12b) is provided with a snap hook (17a, 17b) so as to allow the respective fastening strap to be releasably secured to the manoeuvring unit (1).

7. A device according to any of the preceding claims, **characterized in that** the manoeuvring unit (1) is provided with a first pair (4a, 4b) of fastening members designed for engagement with said fastening straps (12a, 12b), the fastening members (4a, 4b) of said first pair being spaced apart as seen in the longitudinal direction of the manoeuvring unit.

8. A device according to claim 7, **characterized in that** the fastening members (4a, 4b) of said first pair are located on the rear side (6) of the manoeuvring unit.

9. A device according to claim 7 or 8, **characterized in that** the manoeuvring unit (1) is provided with a

second pair (5a, 5b) of fastening members designed for engagement with a neck belt so as to allow the manoeuvring unit (1) to be supported by the neck of the crane operator.

10. A device according to any of claims 7-9, **characterized in that** the respective fastening member (4a, 4b; 5a, 5b) consists of a fastening yoke.

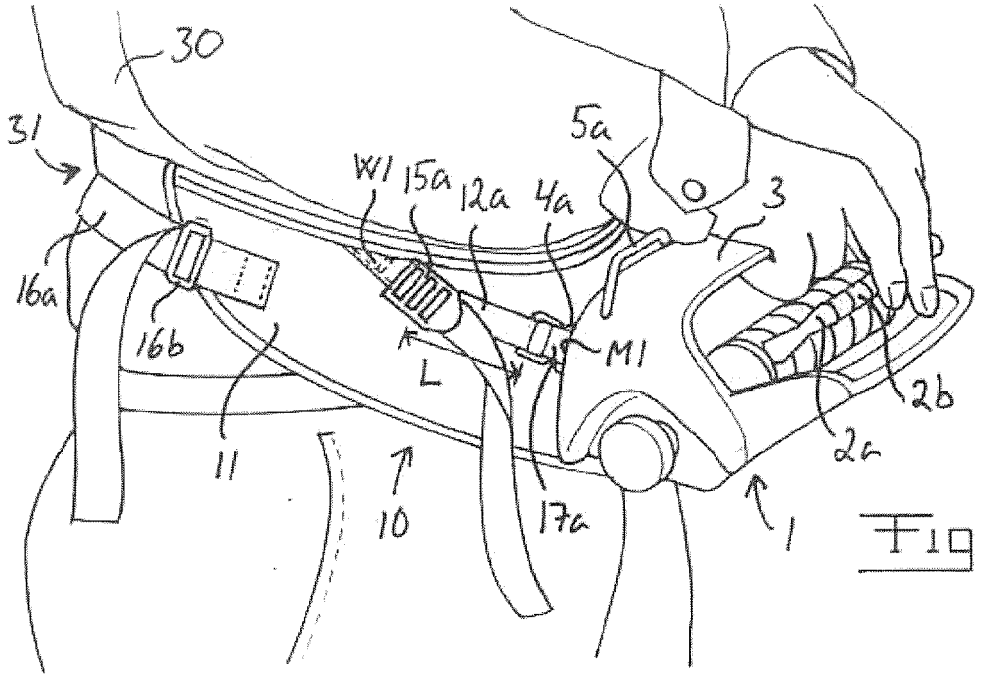
30
31
W1
15a
12a
4a
5a
3
16a
16b
L
M1
2b
2a
11
10
17a
1

Fig 1

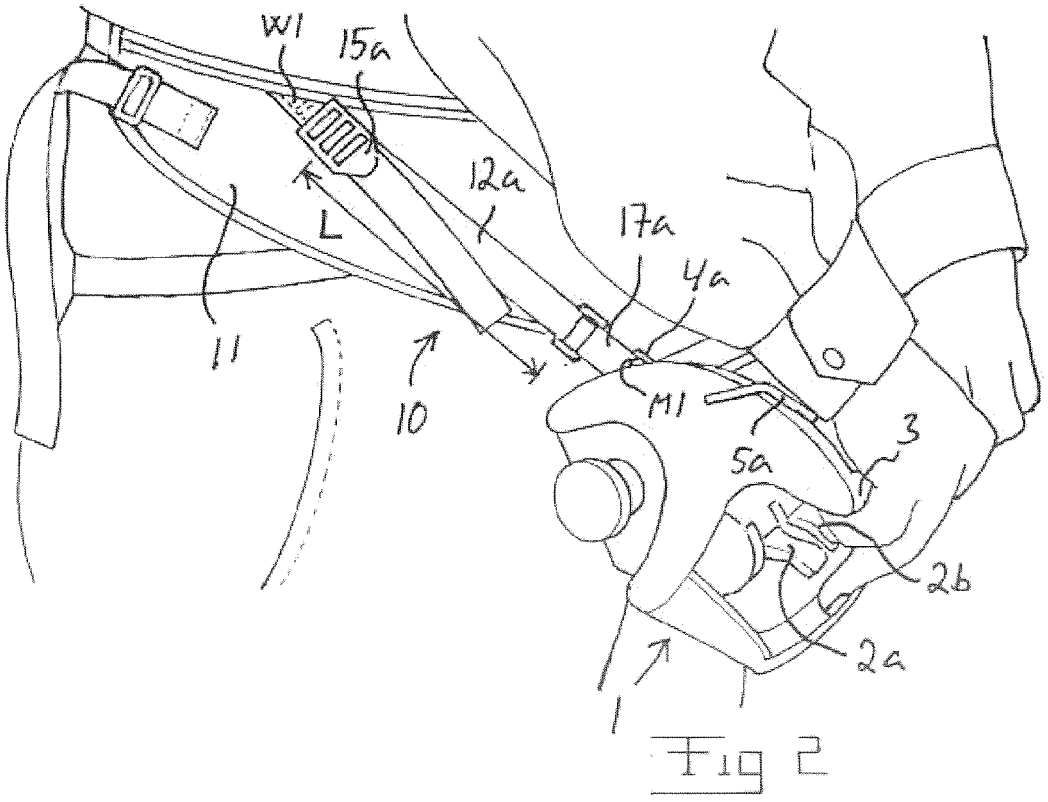
W1
15a
12a
L
17a
4a
11
10
M1
5a
3
2b
2a
1

Fig 2

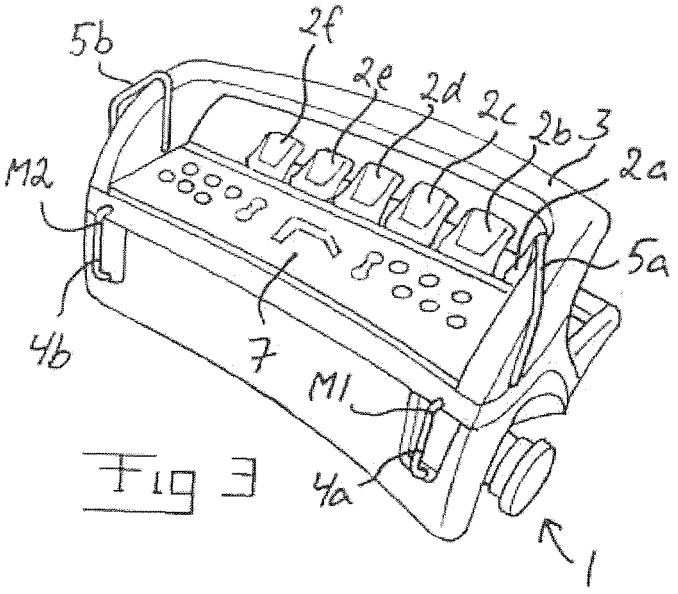
5b
2f
2e
2d
2c
2b
3
2a
M2
5a
4b
7
M1
4a
1

Fig 3

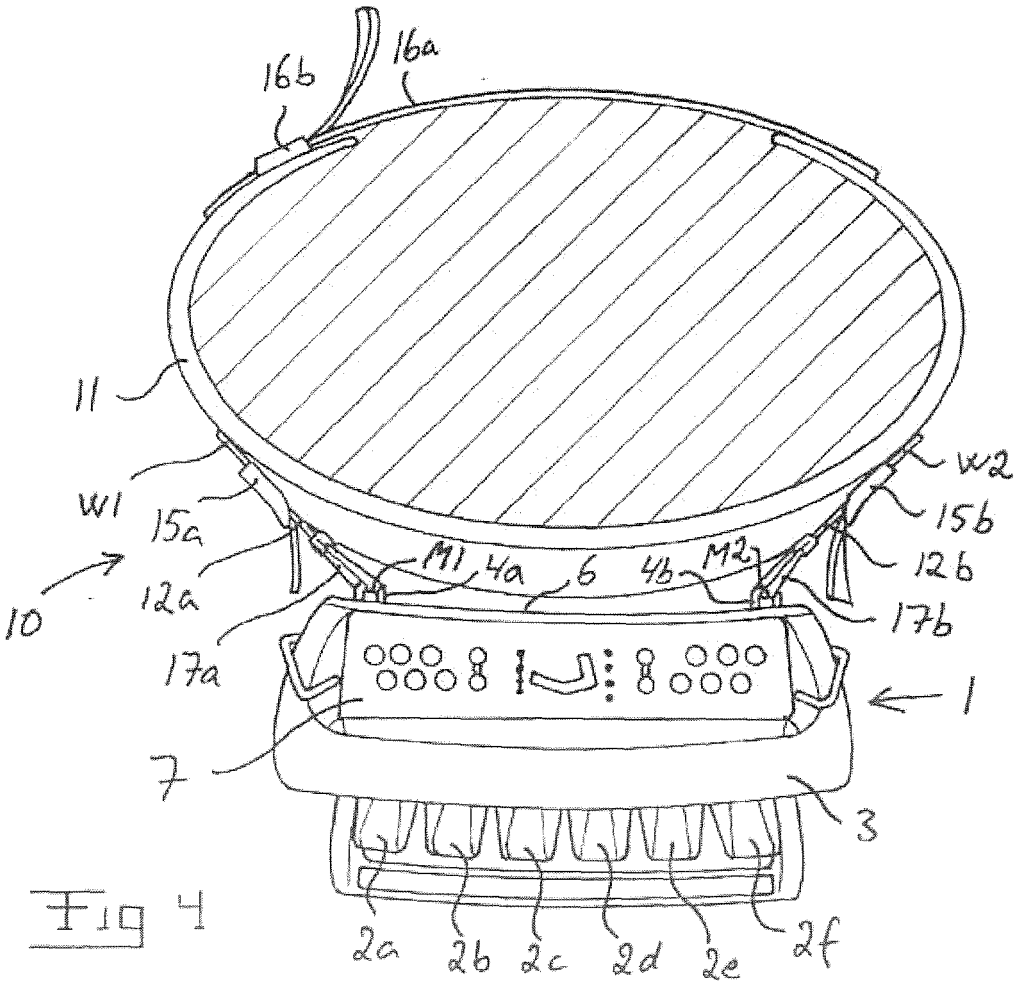
16b
16a
11
W1
W2
15a
15b
12a
12b
10
M1
4a
6
4b
M2
17a
17b
1
7
3
2a
2b
2c
2d
2e
2f

Fig 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 0170

DOCUMENTS CONSIDERED TO BE RELEVANT

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A	FR 1 489 857 A (LA TELEMECANIQUE ELECTRIQUE) 28 July 1967 (1967-07-28) * page 2, line 2 - line 17; figures 1,2 *	1	
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A	FR 2 693 974 A (ATLANTIQUE CHANTIERS) 28 January 1994 (1994-01-28) * page 3, paragraph 2; figure 2 *	1	
A	DE 203 05 707 U1 (INTEGRATED ELECTRONIC SYSTEMS !SYS CONSULTING GMBH) 12 June 2003 (2003-06-12) * the whole document *	1	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
Munich	1 August 2005	Ferrien, Y

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 10 0170

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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