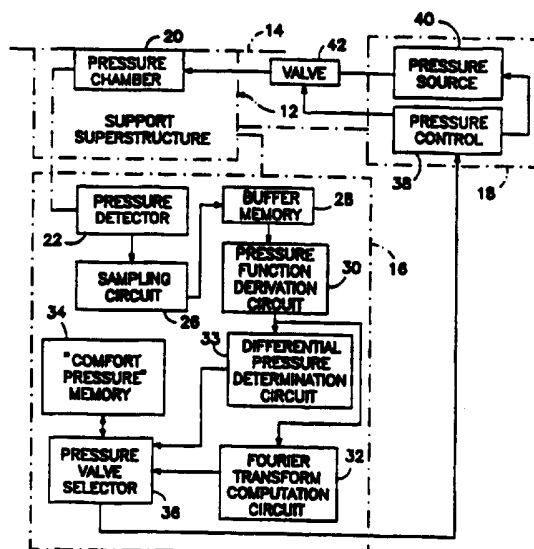




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>G06G 7/00, 7/12; A47C 7/02, 27/00; G01L 7/00</b>		<b>A3</b>	(11) International Publication Number: <b>WO 96/02181</b>
			(43) International Publication Date: 1 February 1996 (01.02.96)
(21) International Application Number: <b>PCT/US95/09233</b>	(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).		
(22) International Filing Date: <b>19 July 1995 (19.07.95)</b>			
(30) Priority Data: 08/277,230 19 July 1994 (19.07.94) US 08/340,541 16 November 1994 (16.11.94) US			
(71) Applicant: BIOMECHANICS CORPORATION OF AMERICA [US/US]; 1800 Walt Whitman Road, Melville, NY 11747 (US).	<b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>		
(72) Inventors: GROSS, Clifford, M.; 1A Harbor Court West, Roslyn Harbor, NY 11576 (US). BO, Lin; 12 Nottingham Drive, Wheatley Heights, NY 11798 (US). LU, Honzheng; 125 West 11th Street, Deer Park, NY 11729 (US).	(88) Date of publication of the international search report: 28 March 1996 (28.03.96)		
(74) Agent: HAUFF, Charles, F., Jr.; Snell & Wilmer, One Arizona Center, 400 East Van Buren, Phoenix, AZ 85004-0001 (US).			

(54) Title: SUPPORT ENHANCING DEVICE AND ASSOCIATED METHOD



## (57) Abstract

A device for supporting a human being comprises a superstructure (12) defining a support surface (14) in contact with a body part of a person and measurement componentry (16) on the superstructure (12) for periodically measuring a predetermined biomechanical parameter of person's body part to determine a load distribution on body part. The measurement componentry (16) includes a fluid filled reservoir (20) at support surface (14) and a pressure detector (22) in operative engagement with fluid in reservoir for monitoring changes in pressure of the fluid, due, for example, to varying loads caused by physical activity. Control circuitry is operatively coupled to the pressure detector (22) for monitoring and characterizing changes in pressure of the fluid over time. From control componentry (18) is disposed on the superstructure (12) and is operatively connected to the measurement componentry (16) for automatically subjecting the support surface (14), in response to the determined load distribution, to forces tending to modify a contour of the support surface (14).

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgystan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/09233

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : GO6G 7/00, 7/12; A47C 7/02, 27/00; G01L, 7/00  
US CL : Please See Extra Sheet.

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)

U.S. : 364/508, 509, 550, 551.01, 554, 558; 297/284R, 284.1, 284.2, 284.3, 284.4; 73/12.01, 12.08, 172; 36/136, 132

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

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

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US, A, 5,176,424 (TOBITA ET AL) 05 JANUARY 1993, SEE COL. 1, LINES 56-65; COL. 2, LINES 8-16; COL. 7, LINES 1-4; COL. 10, LINES 36-50	1-3, 5-6, 8, 11-16, 22, 23, 25, 26, 28 AND 31 ----- 4, 7, 9, 10, 17-31, 36-43, AND 45-52
X --- Y	US, A, 5,060,174 (GROSS) 22 OCTOBER 1991, SEE COL. 2, lines 1-3; col. 1, lines 47-50; col. 5, lines 38- col. col. 6, lines 1-9; col. 1, lines 20-65, col. 2, lines 1-29, 53-60; col.3, lines 50-68; col. 4, lines 1-10	44, 48, and 50 ----- 4, 10, 24 30, 32-43, and 45-52

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

* Special categories of cited documents:	*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
*A* document defining the general state of the art which is not considered to be part of particular relevance	*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
*E* earlier document published on or after the international filing date	*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
*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)	*G*	document member of the same patent family
*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		

Date of the actual completion of the international search

13 DECEMBER 1995

Date of mailing of the international search report

12 FEB 1996

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

EMANUEL TODD VOLTZ

Telephone No. (703) 305-9714

*Jon Hill*

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/09233

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,230,249 (SASAKI ET AL.) 27 JULY 1993, SEE COL. 1, LINES 59-68, COL. 2, LINES 1-5	7, 9, 17-19 AND 21
Y	US, A, 5,170,364 (GROSS ET AL) 08 DECEMBER 1992, SEE COL. 2, LINES 40-59, COL. 2, LINES 1-60	32-35

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/09233

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/09233

## A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

364/508, 509, 550, 551.01, 554, 558; 297/284R, 284.1, 284.2, 284.3, 284.4; 73/12.01, 12.08, 172; 36/136, 132

## BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-31, drawn to a method and associated apparatus for monitoring physical activity of a person to determine body comfort, classified in class 364, subclass 576.

Group II, claim(s) 32-52, drawn to a method and associated apparatus for providing an automatically controlled massage.

The inventions listed as Groups I and II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: In the instant case, combination as claimed does not require the particulars of the subcombination as claimed because the invention of Group I does not require an automated control massage device of Group II.