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(54) **Touch screen control for lateral rotation of a hospital bed mattress**

(57) A controller (12) for a patient support surface (14), such as a mattress (14) having air bladders (48, 50) used for rotational therapy, has touch screen control for lateral rotation of a patient. The touch screen (40) includes graphical user interface display elements (78, 80, 82, 84, 86, 92, 94, 96) for controlling and displaying the rotational status of the support structure (14). Illustrative display elements (78, 80, 82, 84, 86, 92, 94, 96) include a patient icon (78, 92, 94, 96) that can be rotated to set

a desired rotation angle or amount. The patient icon (78, 92, 94, 96) is rotated by touching the icon (78, 92, 94, 96) with a finger and moving the finger on the screen to rotate the icon (78, 92, 94, 96) to the desired support surface rotation setting. Illustrative display elements (78, 80, 82, 84, 86, 92, 94, 96) also include graphical and/or numerical indicators (83, 85, 87) of time that may be used to select and indicate a desired dwell time (83, 85, 87) for the support surface (14) in left, right, and central rotational positions.

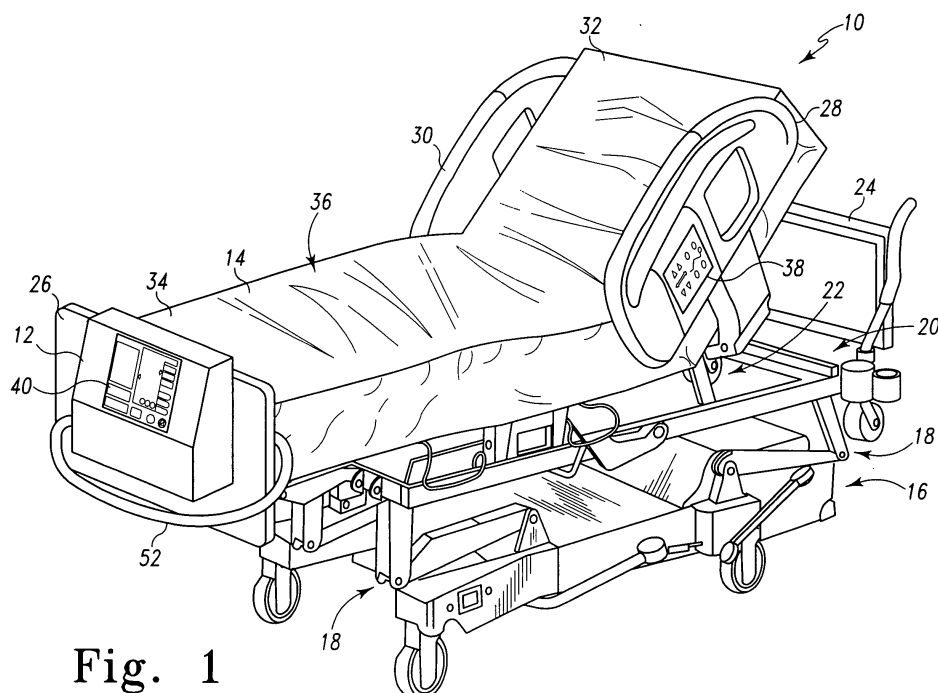


Fig. 1

Description

[0001] The present disclosure relates to a system and method for controlling patient support surfaces. More particularly, the present disclosure relates to a system and method for setting and displaying control parameters for a rotational therapy patient support surface.

[0002] Rotational therapy typically includes lateral rotation of a patient support surface for patients needing pulmonary therapy or decubitus prevention or treatment. The rotatable support surface typically includes a mattress for a hospital bed that is laterally rotated by an air support system. Therapeutic air support systems typically include air bladders that are coupled to a pneumatic control system. The pneumatic control system selectively supplies air pressure and/or a vacuum to the bladders so that the patient is laterally rotated to a desired rotational position.

[0003] Therapeutic air support systems are typically used with a hospital bed having a bed frame. The pneumatic control system includes an air handling unit that is mounted to the base of the bed and a control device mounted, for example, to the bed end rail. The patient support surface, for example a mattress including air bladders, is typically supported by the bed deck and is used in the place of a standard patient mattress.

[0004] A system and method for controlling a patient support surface may include a touch screen control for lateral rotation of the patient support surface, for example a mattress having air bladders used for rotational therapy. The touch screen may include graphical user interface display elements for controlling and displaying the rotational status of the support structure. The display elements may include a patient icon that can be rotated to set a desired rotation angle or amount. The patient icon is rotated by touching the icon with a finger and moving the finger on the screen to rotate the icon to the desired support surface rotation setting. The display elements also may include graphical and/or numerical indicators of time that may be used to select and indicate a desired dwell time for the support surface in left, right, and central rotational positions.

[0005] A patient support apparatus may include a patient support surface capable of being rotated to a first position, a control system for controlling the rotation of the support surface, a touch screen coupled to the control system, a first display element displayed on the touch screen, the display element corresponding to the rotational position of the patient support surface and capable of being rotated by at least one of touching and dragging to an orientation associated with the first position, and a second display element capable of being rotated by at least one of touching and dragging to a second position. The control system may include a pneumatic control and the patient support surface may include at least one bladder pneumatically coupled to the pneumatic control. The first display element may include a graphical depiction of an axial view of a patient from at least one of a foot

end and a head end, and the first display element and the first position may be associated with right hand rotation relative to the patient and the second display element and the second position may be associated with left hand rotation relative to the patient. The patient support apparatus may also include a third display element capable of being rotated by at least one of touching and dragging to a central position, the central position located between the first and second positions, and a fourth display element including at least one of a graphical and a numerical indicator of a dwell time associated with at least one of right, left, and central positions. The fourth display element may include an indicating element for setting the dwell time by at least one of touching and dragging the indicating element to the dwell time.

[0006] A system for controlling a patient support surface, for example a hospital bed mattress may include a touch screen, a controller coupled to the touch screen, and software enabling the controller to display a first display element on the touch screen, to monitor touch of the first display element, to rotate the first display element in response to touch, and to command rotation of the support surface based on the rotation of the first display element. The first display element may include a graphical depiction of an axial view of a person from at least one of a foot end and a head end. In the second illustrative embodiment the software may further enable the controller to display second and third display elements, to monitor touch of the second and third display elements, to rotate the second and third display elements in response to touch, and to command rotation of the support surface based on the rotation of the second and third display elements. The first display element may be associated with rotation of the support surface in a first direction, the second display element may be associated with rotation of the support surface in a second direction, and the third display element may be associated with rotation of the support surface to a central position between the first direction and the second direction. The software may further enable the controller to display a fourth display element including at least one of a graphical indicator and a numerical indicator of a parameter associated with at least one of right, left, and central rotational positions of the support surface. The parameter may include dwell time and the software may further enable the controller to display and monitor touch of the touch screen and to set the parameter based on touch of the at least one of a graphical indicator and a numerical indicator.

[0007] A method of controlling rotational parameters of a patient support surface may include any one or more of displaying graphical elements on a touch sensitive display screen, monitoring touch of the graphical elements, moving the graphical elements in response to touch, and setting a rotational parameter based on the movement of the graphical element. The graphical elements may include an element illustrative of patient rotational position and the rotational parameters may include at least one of a left rotational position, right rotational position,

central rotational position, left dwell time, right dwell time, and central dwell time. The graphical element may illustrate at least one of rotational position and rotational position dwell time. The method may further include controlling a pneumatic control system based on the rotational parameter, and the pneumatic control system may be capable of inflating and deflating at least one pneumatic bladder associated with the patient support surface.

[0008] The invention will now be further described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a hospital bed system including the touch screen control system for lateral rotation of the bed support surface according to the present disclosure;

Fig. 2 is a plan view of a touch screen layout according to the present disclosure;

Fig. 3 is a partial plan view of the touch screen of Fig. 2 illustrating selection of a rotational angle or amount for the support surface;

Fig. 4 is a partial plan view of the touch screen of Fig. 2 illustrating selection of a dwell time for a rotational position of the support surface;

Fig. 5 is a partial plan view of an alternative touch screen layout according to the present disclosure;

Fig. 6 is a block schematic diagram of the touch screen control system and pneumatic system of Fig. 1; and

Fig. 7 is a flowchart illustrating software associated with the touch screen control system of Fig. 6.

[0009] Fig. 1 illustrates a hospital bed 10 having a therapeutic support surface, for example a mattress 14 having air bladders 48, 50 (Fig. 6), and a touch screen control system 12 for controlling lateral rotation of the mattress 14. The hospital bed 10 includes a base frame 16, an intermediate frame 20 coupled to the base frame 16 by linkages 18, and an articulating deck frame 22 that is coupled to the intermediate frame 20 and that supports the mattress 14. The bed 10 also includes a head end 24, a foot end 26, a left side rail 28, and a right side rail 30. The deck frame 22 includes separate sections that articulate relative to the base frame 16 and relative to each other, for example, a mattress center section 36 that is height adjustable, and a mattress head section 32 and a mattress foot section 34 that are adjustable in elevation relative to the mattress center section 36. A patient control panel 38 is used to control articulation of the deck frame 22.

[0010] The present disclosure is directed to a system and method for setting and monitoring lateral rotational therapy of mattress 14. The air bladders 48, 50 of the mattress 14 are used to provide positioning and/or therapy, for example, rotational therapy, percussion therapy, vibration therapy, and positioning to assist turning of the patient. Referring to Fig. 6, the touch screen control sys-

tem 12 includes a touch screen 40, an electrical control system 42, and a pneumatic control system 46. The electrical control system 42 includes a controller 44 and is electrically coupled to the touch screen 40 and the pneumatic control system 46.

[0011] The electrical control system 42 provides control and monitoring of the pneumatic control system 46. The touch screen 40 provides a graphical user interface for setting and monitoring the electrical control system 42 and the pneumatic control system 46, which in turn actuate pneumatic aspects of the mattress 14. The pneumatic control system 46 operates a bladder system 47 associated with the mattress 14. The bladder system 47 may include, for example a right rotation bladder 48 and a left rotation bladder 50, or an alternative arrangement of one or more bladders to provide desired patient position and therapy. The pneumatic control system 46 is coupled to the right rotation bladder 48 and the left rotation bladder 50 by pneumatic lines 52. Additionally, pressure sensors (not shown) or alternative type sensors such as capacitive, inductive, or optical sensors, may also provide feedback control of the bladders 48 and 50 to the pneumatic control system 46 or the electrical control system 42.

[0012] The pneumatic control system 46 generally provides pressure or vacuum to, or sealing of the pneumatic lines 52 in order to selectively inflate, deflate, or maintain the inflation of the bladders 48 and 50. For example, to rotate a patient on the mattress 14 toward the right, the pneumatic control system 46 deflates the right rotation bladder 48 located under the patient's right side and inflates the left rotation bladder 50 located under the patient's left side. Alternatively, only one of or a portion of the bladders of the bladder system 47 may be actuated by inflation or deflation to laterally rotate a patient on mattress 14 to different rotational positions. Additionally, the bladder system 47 may comprise bladders that are associated with the mattress 14 in an arrangement different from that shown in Fig. 6, as is known in the art. For example, the bladder system 47 may include vertically stacked bladders, one of which is normally inflated and another that is inflated or deflated to provide rotation. Additionally, the pneumatic control system 46 may also provide other pneumatic control, for example, to provide percussion, vibration, or other desired patient therapy or positioning. The pneumatic control system 46 and the bladder system 47 of mattress 14 may alternatively include a non-pneumatic mechanical or electrometrical control and motion system, or a pneumatic system utilizing movement elements other than bladders.

[0013] Referring to Fig. 2, the touch screen 40 is shown having an exemplary display arrangement; however, alternative display and control arrangements may be utilized. The exemplary display arrangement of the touch screen 40 includes a menu display area 60, a status display area 62, and other graphical user interface elements, for example, a start button 64, a stop button 66, and an alarm silence button 68. The touch screen 40 is

of the type that provides visual display elements as well as a touch sensitive surface so that particular display elements may be selected or otherwise manipulated by touching the display surface with a finger or other object and/or dragging the finger or other object across the surface. The electrical control system 42 provides signals to touch screen 40 for displaying the various display elements, and receives signals from the touch screen 40 relating to touch selected functions.

[0014] The menu display area 60 may include menu tabs 70 for selecting between various menu display pages, for example, home, rotation, percussion, vibration, maximum inflate, turn assist, and opti-rest. Each menu page such as the home page that is shown in the menu display area 60 may include informational display elements as well as display elements that may be selected or otherwise manipulated by touch in order to set or monitor aspects of the various functions associated with the menu display pages.

[0015] The exemplary status display area 62 shown in Fig. 2 relates to rotational therapy and is used for monitoring and controlling the pneumatic control system 46 and the bladder system 47. Specifically, the exemplary status area 62 relates to lateral rotation, percussion, and vibration of mattress 14 and the bladder system 47 for pulmonary therapy or decubitus preventional treatment. The exemplary status area 62 is sub-divided into a rotation display area 72, percussion display area 74, and vibration display area 76. The exemplary display areas 72, 74 and 76 include graphical elements for setting and/or monitoring the rotational position and the dwell time for a right rotational position, central rotational position, and left rotational position, and the frequency, intensity, and duration of percussion and vibration therapy in each of the three positions. A graphical element is defined as including at least one of a graphic, letter, and number elements.

[0016] The right rotational position is defined as a lateral rotational position in which the patient is rotated toward the right hand side of the patient. The left rotational position is defined as a lateral rotational position in which the patient is rotated toward the left hand side of the patient. The central rotational position is defined as a lateral rotational position in which the patient is positioned between the right and left rotational positions. The central rotational position may or may not be the position in which the patient is laterally parallel with the base frame 16 of hospital bed 10. The rotational position may be set and displayed as, for example, a percentage of the full range of lateral rotation or the lateral rotational angle relative to the patient (or mattress 14) being laterally parallel to the base frame 16. A rotational dwell time is also associated with each of the rotational positions. The dwell time is the length of time the electrical control system 42 signals the pneumatic control system 46 to maintain the bladder system 47 in one of the patient rotational positions before signaling the pneumatic control system 46 to actuate the bladder system 47 to provide another of

the patient rotational positions. The rotational dwell time may be set and displayed, for example, in units of time such as seconds or minutes:

[0017] The exemplary rotational display area 72 includes a patient display element 78, numerical indication 80, and dwell time display elements 82, 84, and 86 for the right, central and left rotational positions respectively. The patient display element 78 may be, for example, a graphical representation of a patient viewed axially from the foot end 26 of the hospital bed 10 because the touch screen control system 12 may be located at the foot end 26. The patient display element 78 may also include labeling of the patients right side and left side to indicate the direction of rotation of the patient for the various rotational positions.

[0018] The patient display element 78 provides visual indication of the amount of selected rotation and the direction of rotation. This aspect of control system 12 is helpful visually confirming the actual rotational displacement that will result from a specific numerical setting. For example, various bed systems use degrees, percent of maximum rotation, or a different basis for setting the rotational displacement. Thus, a numerical setting of for example, 45 may anticipate a rotation of 45 degrees, but may actually be setting 45 percent of the maximum rotation, for example, 18 degrees for a bed with a maximum rotation of 40 degrees. The patient display element 78 also provides a visual indication of the direction of rotation. For example, the exemplary patient display element 78 shown in Fig. 2 graphically represents a patient viewed from the approximate vantage point of a person using the control system 12. Thus the rotation of the patient display element 78 approximately matches the real-world view of the patient direction of rotation and the amount of rotation.

[0019] Fig. 3 illustrates using the rotation display area 72 of the exemplary display arrangement of the touch screen 40 to set the rotational position of the right rotational position of the patient on the mattress 14. In order to select which of the rotational positions, right, central, or left is to be set, one of the position labels 88 located above the numerical indication 80 is pressed. To set the rotational position, the patient display element 78 is touched with a finger 79 and the finger is moved across the surface of the touch screen 40. The electrical control system 42 and touch screen 40 are programmed to rotate the patient display element 78 accordingly to the touch and movement of touch on the patient display element 78 portion of the touch screen 40.

[0020] For example, Fig. 3 illustrates touching with the finger 79 the side of the patient display element 78 labeled as the right hand patient side and dragging the finger 79 downward. Electrical control system 42 rotates the patient display element 78 toward the right hand patient side in response to the dragging of the finger. Simultaneously, the electrical control system 42 displays the numerical indication 80 (Fig. 4) of the right rotational position setting, which is also proportional to the rotation

of patient display element 78.

[0021] The central rotational positions and left rotational position can similarly be set by touching the appropriate position label 88 and touching and dragging the patient display element 78 to provide the desired amount of rotation as indicated by the numerical indication 80.

[0022] Referring to Fig. 4, a dwell time 83, 85, and 87 may also be associated with and selected for each of the rotational positions. Fig. 4 illustrates touching the right dwell time display element 82 with a finger 79 to set the desired dwell time 83. The exemplary dwell time display element 82, 84, and 86 include a circular dial having an arrow pointing to the desired setting 83, 85, and 87 and labeled along the circumference of the dial in seconds and minutes. For example, Fig. 4 illustrates touching the arrow portion of the right dwell time display element 82 and dragging the finger 79 across the surface of the touch screen 40 to set the right dwell time 83 to 20 minutes. The dwell time 85 and 87 for the central and left positions can be similarly set using the central dwell time display element 84 and the left dwell time display element 86. Alternative graphical elements and arrangements may also be utilized in place of the exemplary dwell time display elements 82, 84, and 86.

[0023] Fig. 5 illustrates a portion of an exemplary alternative rotational display area 90 that may be substituted for the display area 72. The alternative display area 90 includes a central patient display element 92 for setting and displaying the central rotational position, a right display element 94 for setting and displaying the right rotational position, a left display element 96 for setting and displaying the left rotational patient position, and selectable graphical buttons 98 and 100 for selecting between symmetric and asymmetric rotation. Alternatively, the display element 92 may represent the current rotational position of the patient on the mattress 14, and the right display element 94 and the left display element 96 may represent the rotational position settings for right and left patient rotation respectfully.

[0024] Fig. 7 is a flow-chart illustrating the software algorithm 200 associated with the controller 44 of the electrical control system 42 for enabling the above-described aspects of the touch screen control system 12 illustrated in Figs. 2-4. The algorithm 200 begins at step 202. In step 204, the controller 44 commands display of the graphical elements associated with rotational settings on the touch screen 40, for example the patient display element 78, the numerical rotational indicators 80, and the dwell time display elements 82, 84, and 86. In step 206, the controller 44 determines whether one of the display elements 78, 80, 82, 84, and 86 is being touched. If the controller 44 determines a display element is being touched, the algorithm 200 continues at step 208, else the algorithm 200 continues at step 212.

[0025] In step 208, the controller 44 adjusts the display element being touched in response to the touching of the touch screen 40. For example, if the controller 44 determines the patient display element 78 is being touched,

the element 78 is rotated in accordance with touch of and the movement of touch across the touch screen 40. In addition, the controller 44 changes the numerical indication 80 according to the movement of the patient display element 78. Similarly, if the controller 44 determines one of the dwell time display elements 82, 84, or 86 is being touched, the appropriate display element will be changed and displayed according to the touch of touch screen 40.

[0026] In step 210, the controller 44 stores the rotational parameter associated with the display element being touched. More specifically, the left, central, or right rotational position is set and stored, for example in memory (not shown) associated with the electrical control system 42, based on the touching of the patient display element 78 detected by the controller 44, and the right, central, and left rotational dwell time 83, 85, and 87 is set and stored if the controller 44 determines that the dwell time display element 82, 84 or 86 is being touched.

[0027] In step 212, the controller 44 determines whether rotational therapy is selected, for example by determining that the start button 64 has been touched on the menu display area 60 of the touch screen 40. If the controller 44 determines that rotational therapy is selected, the algorithm 200 continues at step 214, else the algorithm 200 returns to step 204. In step 214, the controller 44 enables the electrical control system 42 to control the pneumatic control system 46. For example, the pneumatic control system 46 is commanded to inflate or deflate the right rotational bladder 48 and the left rotational bladder 50 of the bladder system 47 in order to provide the rotation, percussion, and vibration of the mattress 14 according to the selected mode and the stored rotational and other parameters. For example, if rotational therapy is selected, the controller 44 signals the pneumatic control system 46 to sequence the bladder system 47 through the right, central, and left rotational positions, maintaining each position for the respective dwell time 83, 85 and 87. In step 216, the algorithm 200 is complete. In addition to the algorithm 200, the controller 44 may include other software to enable other aspects of the exemplary display arrangement shown in Fig. 2 and the other functionality of the electrical control system 42 and the pneumatic control system 46.

Claims

1. A patient support apparatus (10), comprising:

- a patient support surface (14) capable of being rotated to a first position;
- a control system (12) for controlling the rotation of the support surface (14);
- a touch screen (40) coupled to the control system (12); and
- a first display element (78, 92, 94, 96) displayed on the touch screen (40), the display element (78, 92, 94, 96) corresponding to the rotational

- position of the patient support surface (14) and capable of being rotated by at least one of touching and dragging to an orientation associated with the first position.
2. The patient support apparatus (10) of claim 1, wherein the first display element (78, 92, 94, 96) includes a graphical depiction of an axial view of a patient from at least one of a foot end (26) and a head end (24).
 3. The patient support apparatus (10) of either claim 1 or claim 2, further comprising a second display element (78, 92, 94, 96) capable of being rotated by at least one of touching and dragging to a second position; and wherein the first display element (78, 92, 94, 96) and the first position are associated with right hand rotation relative to the patient and the second display element (78, 92, 94, 96) and the second position are associated with left hand rotation relative to the patient.
 4. The patient support apparatus (10) of claim 3, further comprising a third display element (78, 92, 94, 96) capable of being rotated by at least one of touching and dragging to a central position, the central position located between the first and second positions.
 5. The patient support apparatus (10) of claim 4, further comprising at least a fourth display element (82, 84, 86) including at least one of a graphical and a numerical indicator (82, 84, 86) of a dwell time (83, 85, 87) associated with at least one of right, left, and central positions.
 6. The patient support apparatus (10) of claim 5, wherein the at least a fourth display element includes an indicating element (82, 84, 86) for setting the dwell time (83, 85, 87) by at least one of touching and dragging the indicating element to the dwell time.
 7. The patient support apparatus (10) of any preceding claim, wherein the control system (12) includes a pneumatic control (46) and the patient support surface (14) includes at least one bladder (48, 50) pneumatically coupled to the pneumatic control (46).
 8. A system (12) for controlling a patient support surface (14), comprising:
 - a touch screen (40);
 - a controller (42) coupled to the touch screen (40); and
 - software enabling the controller (42) to:
 - display a first display element (78, 82, 84, 86, 92, 94, 96) on the touch screen (40);
 - monitor touch of the first display element (78, 82, 84, 86, 92, 94, 96);
 - rotate the first display element (78, 82, 84, 86, 92, 94, 96) in response to touch; and
 - command rotation of the support surface (14) based on the rotation of the first display element (78, 82, 84, 86, 92, 94, 96).
 9. The system 12 of claim 8, wherein the first display element (78, 82, 84, 86, 92, 94, 96) includes a graphical depiction of an axial view of a person from at least one of a foot end (26) and a head end (24).
 10. The system (12) of either claim 8 or claim 9, wherein the software further enables the controller (42) to:
 - display a second display element (78, 82, 84, 86, 92, 94, 96);
 - monitor touch of the second display element (78, 82, 84, 86, 92, 94, 96);
 - rotate the second display element (78, 82, 84, 86, 92, 94, 96) in response to touch; and
 - command rotation of the support surface (14) based on the rotation of the second display element (78, 82, 84, 86, 92, 94, 96);
 - wherein the first display element (78, 82, 84, 86, 92, 94, 96) is associated with rotation of the support surface (14) in a first direction and the second display element (78, 82, 84, 86, 92, 94, 96) is associated with rotation of the support surface (14) in a second direction.
 11. The system (12) of claim 10, wherein the software further enables the controller (42) to:
 - display a third display element (78, 82, 84, 86, 92, 94, 96);
 - monitor touch of the third display element (78, 82, 84, 86, 92, 94, 96);
 - rotate the display of the third display element (78, 82, 84, 86, 92, 94, 96) in response to touch; and
 - command rotation of the support surface (14) based on the rotation of the third display element (78, 82, 84, 86, 92, 94, 96).
 12. The system (12) of claim 11, wherein the software further enables the controller (42) to display at least a fourth display element (78, 80, 82, 83, 84, 85, 86, 87, 92, 94, 96) including at least one of a graphical indicator (78, 82, 84, 86, 92, 94, 96) and a numerical indicator (80, 83, 85, 87) of a parameter associated with at least one of right, left, and central rotational positions of the support surface (14).
 13. The system (12) of claim 12, wherein the parameter includes dwell time (83, 85, 87).

14. The system (12) of either claim 12 or claim 13, wherein the software further enables the controller (42) to:
- display and monitor touch of the at least one of
a graphical indicator (78, 82, 84, 86, 92, 94, 96) 5
and a numerical indicator (80, 83, 85, 87); and
set the parameter based on touch of the at least
one of a graphical indicator (78, 82, 84, 86, 92,
94, 96) and a numerical indicator (80, 83, 85, 87). 10
15. The system (12) of any one of claims 8 to 14, wherein the support surface (14) includes a hospital bed mattress (14).
16. A method of controlling rotational parameters of a 15
patient support surface (14) comprising:
- displaying graphical elements (78, 82, 84, 86,
92, 94, 96) on a touch sensitive display screen
(40); 20
monitoring touch of the graphical elements (78,
82, 84, 86, 92, 94, 96);
moving the graphical elements (78, 82, 84, 86,
92, 94, 96) in response to touch; and
setting a rotational parameter based on the 25
movement of the graphical element (78, 82, 84,
86, 92, 94, 96).
17. The method of claim 16, wherein the graphical elements (78, 82, 84, 86, 92, 94, 96) include an element 30
illustrative of patient rotational position (78, 92, 94, 96).
18. The method of either claim 16 or claim 17, wherein the rotational parameters includes at least one of a 35
left rotational position, right rotational position, central rotational position, left dwell time (87), right dwell time (83), and central dwell time (85).
19. The method of any one of claims 16 to 18, wherein 40
the graphical element (78, 82, 84, 86, 92, 94, 96) illustrates at least one of rotational position and rotational position dwell time (83, 85, 87).
20. The method of any one of claims 16 to 19, further 45
comprising controlling a pneumatic control system (46) based on the rotational parameter, the pneumatic control system (46) capable of inflating and deflating at least one pneumatic bladder (48,50) associated with the patient support surface (14). 50

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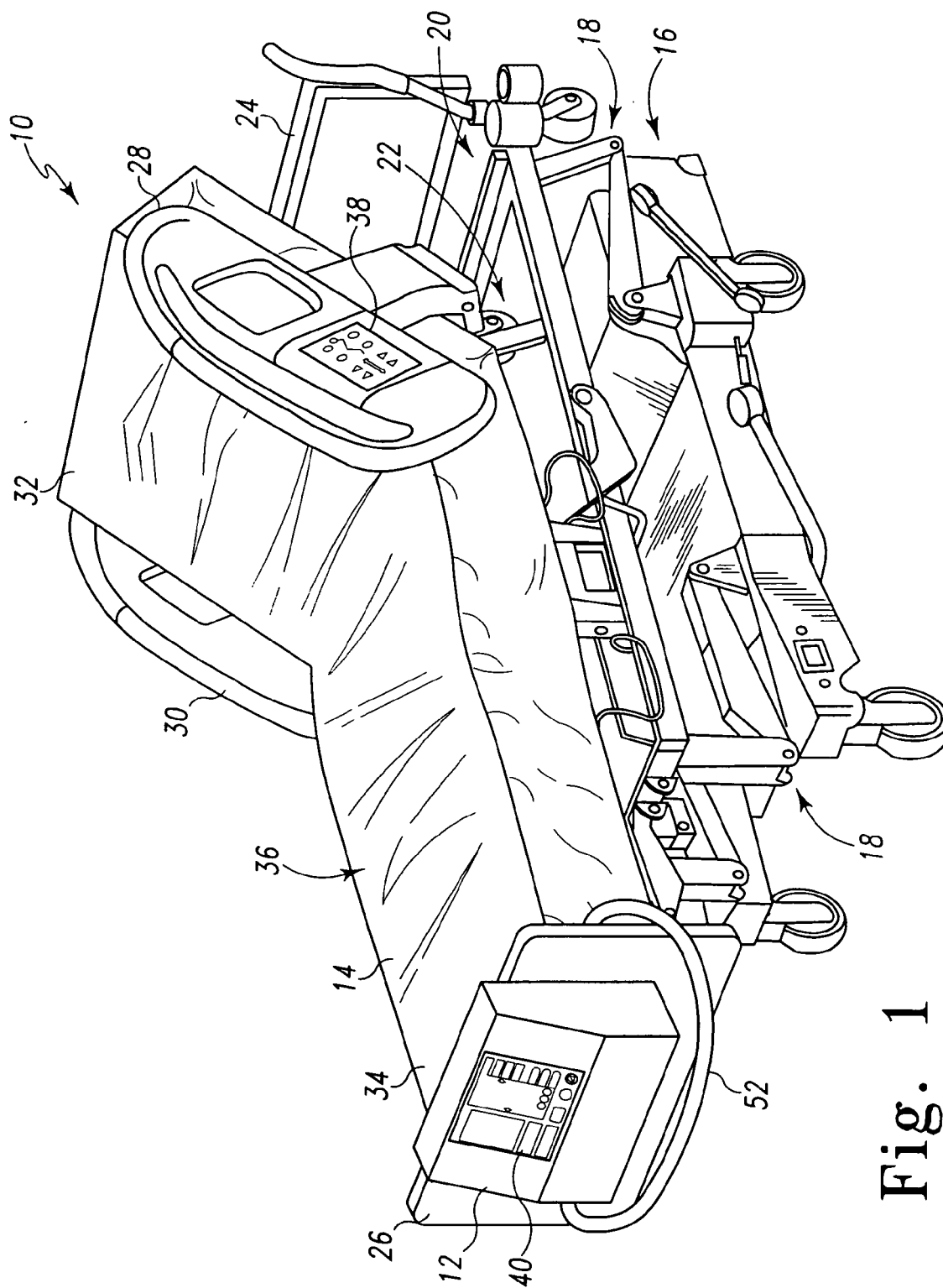


Fig. 1

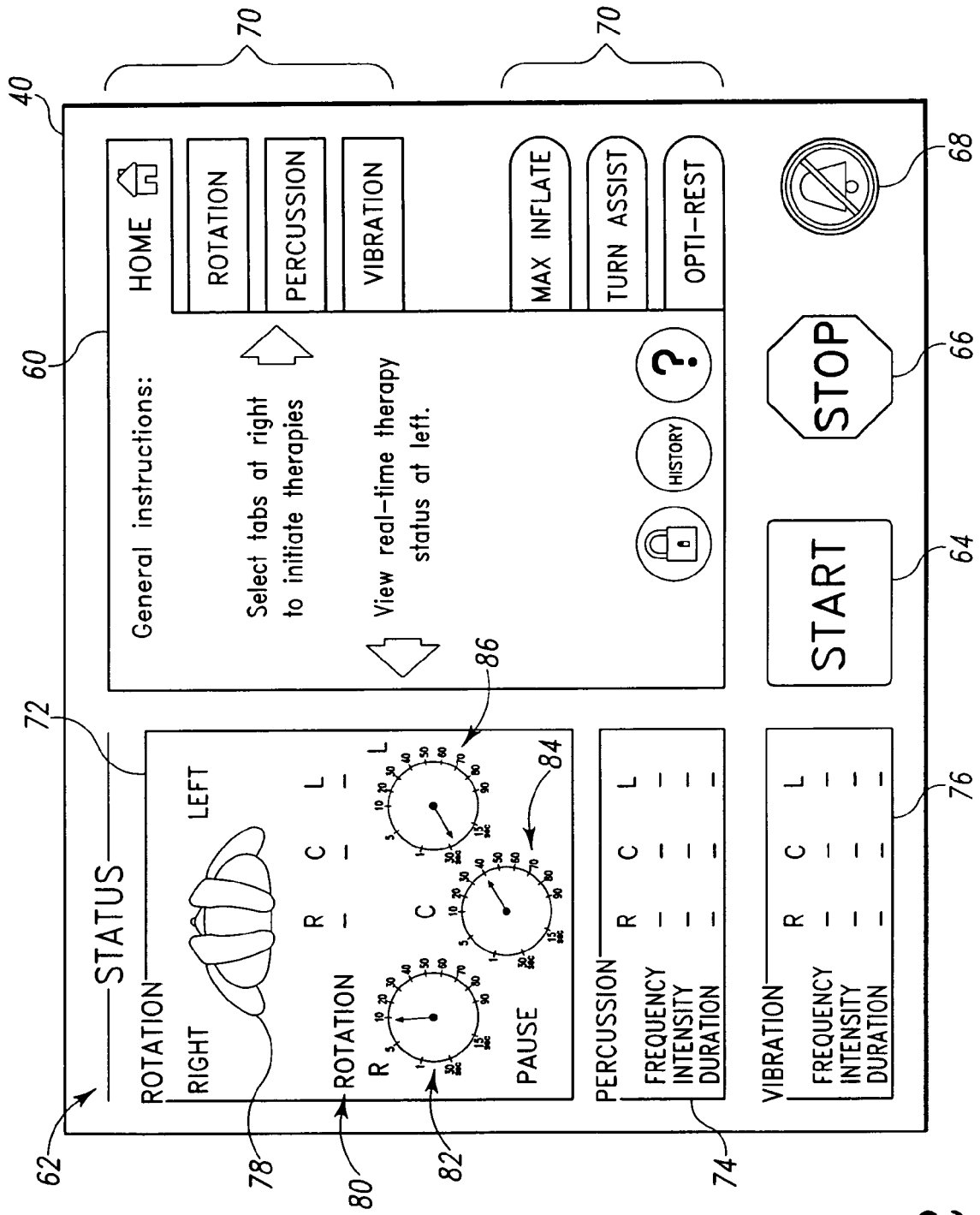


Fig. 2

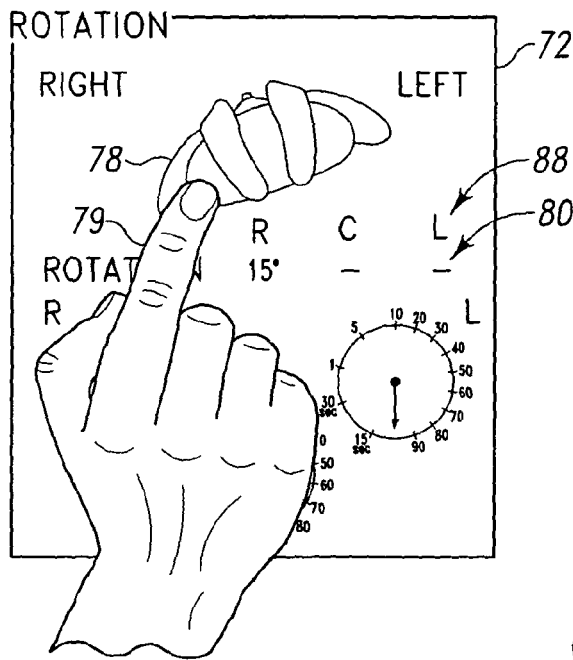


Fig. 3

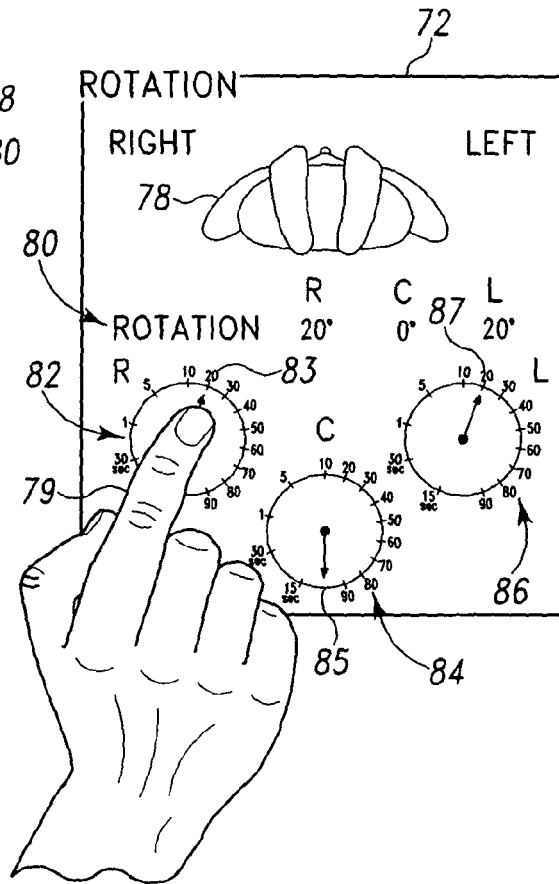


Fig. 4

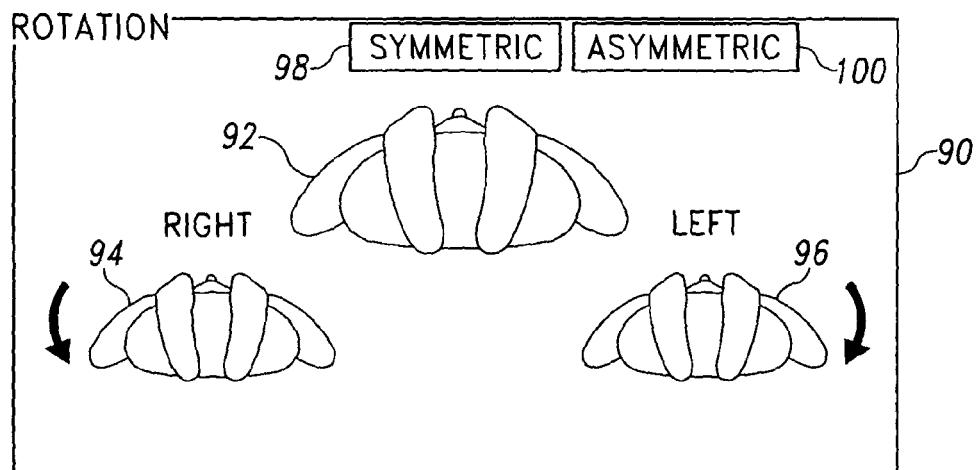


Fig. 5

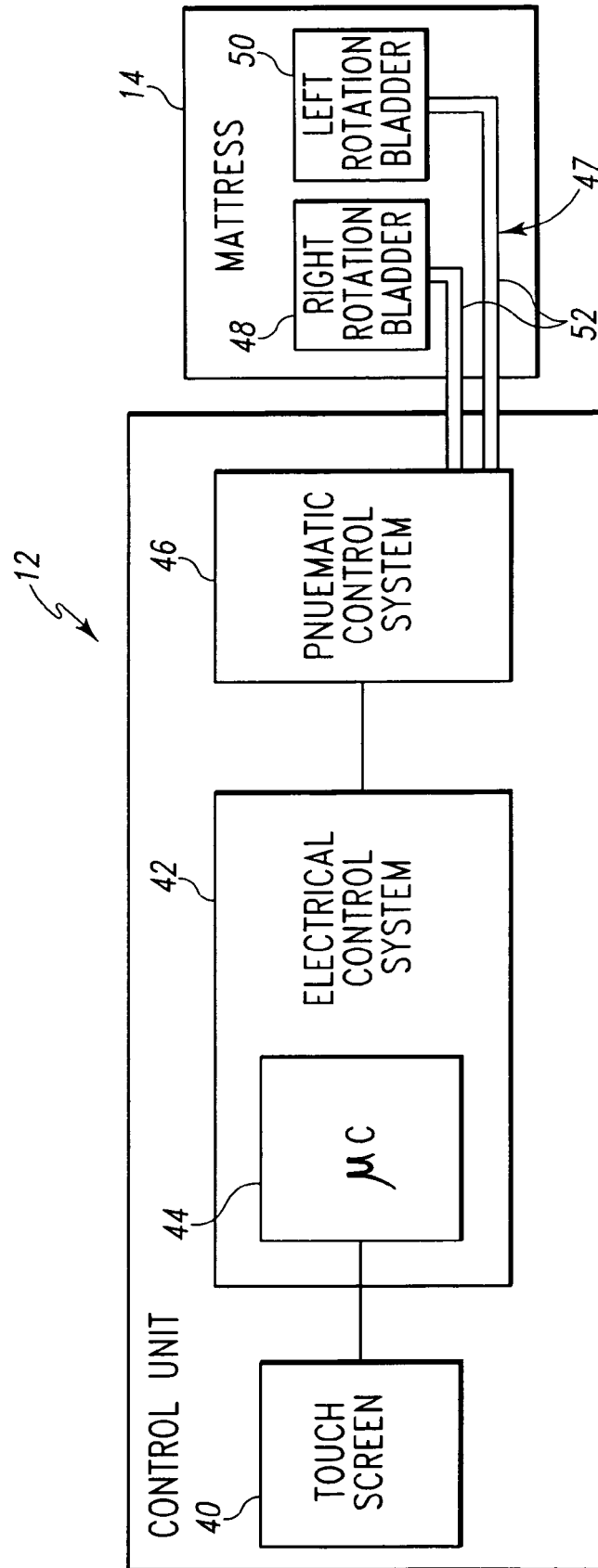


Fig. 6

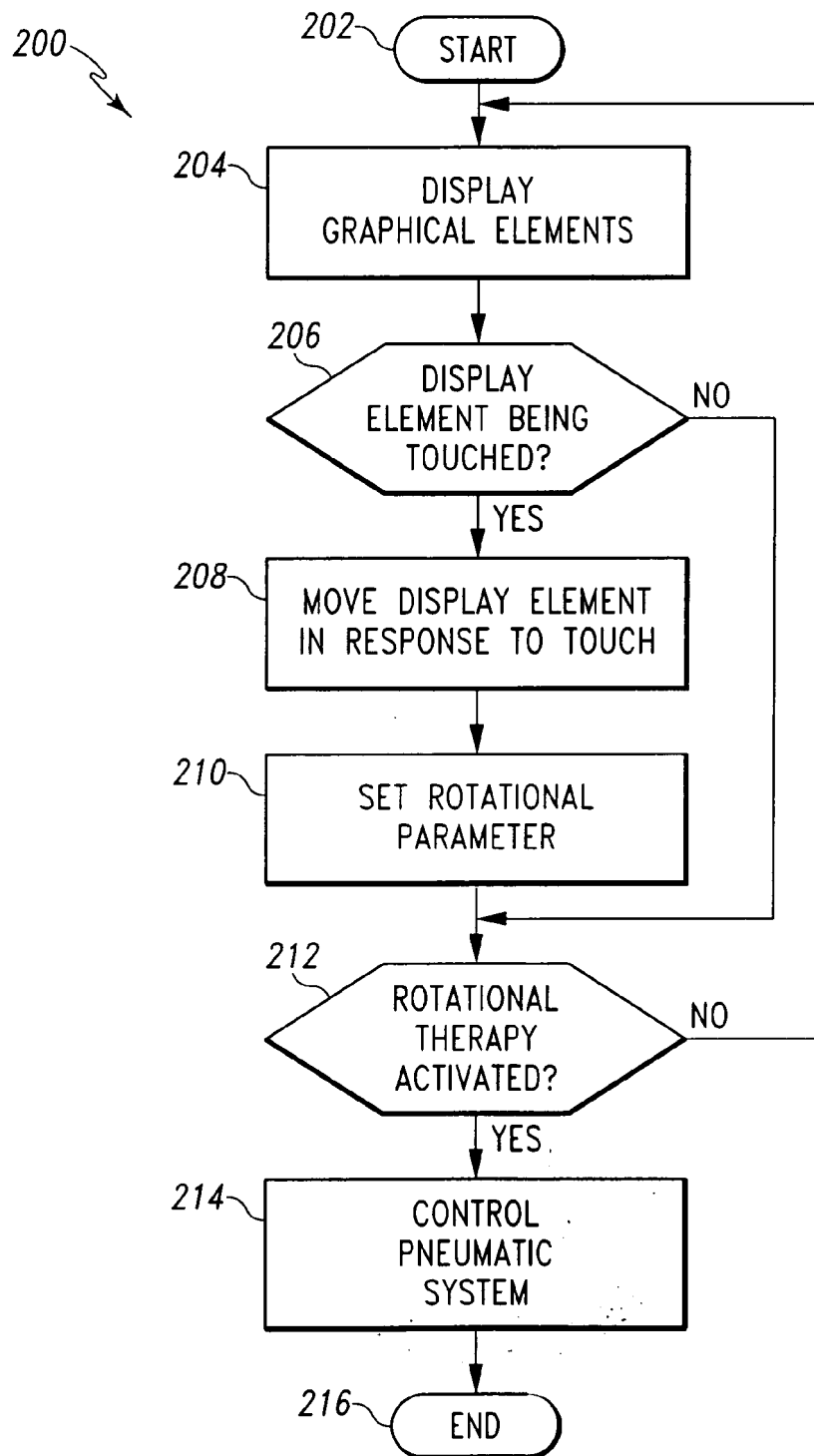


Fig. 7



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 25 7540

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 452 159 A (KCI LICENSING, INC) 1 September 2004 (2004-09-01)	1-6,8-19	A61G7/018
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			TECHNICAL FIELDS SEARCHED (IPC)
			A61G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 March 2006	Examiner Birlanga Pérez, J-M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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02-03-2006

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