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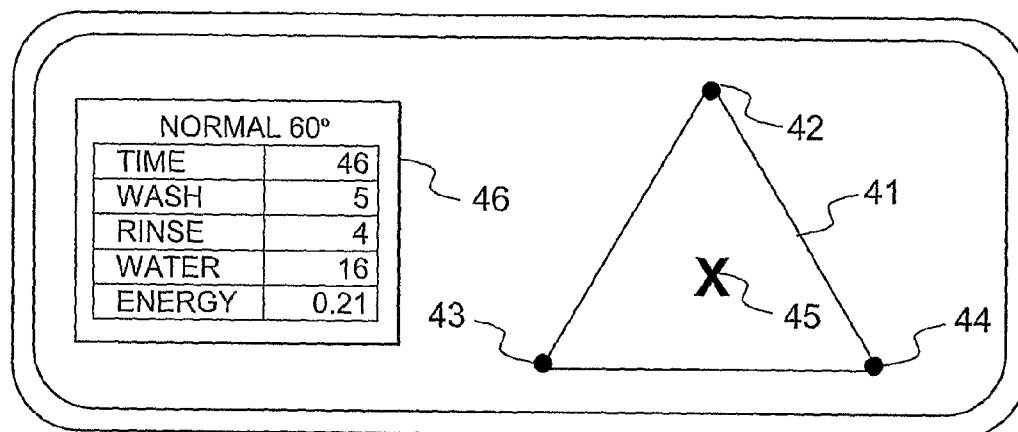
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(54) Title: DEVICE FOR CONTROLLING THE OPERATION OF A WASHING AND/OR DRYING MACHINE

40



(57) Abstract: A device is disclosed for controlling the operation of a washing and/or drying machine where the operation is defined by values of a set of quantitative operation parameters for the machine. The device comprises input means and a processor. The input means are arranged such that a user can select amongst a set of weightings between three or more qualitative operation parameters. The processor is arranged to determine values of the set of quantitative operation parameters from a user selected weighting, and to control the washing and/or drying machine according to the determined values .

WO 2007/011280 A1

DEVICE FOR CONTROLLING THE OPERATION OF A WASHING AND/OR
DRYING MACHINE

Technical Field

The present application relates to controlling the operation of a washing and/or drying machine where the operation is defined by values of a set of quantitative operation parameters.

Background

Washing and/or drying machines for household use and for professional use, such as laundry washing and/or drying machines, dry cleaning machines, dish washing machines and the like, generally comprise preset operation programs defining the operation of the washing or drying machine in question.

In order to increase the options of controlling the operation of such washing and/or drying machines, provisions have been made for the user to adapt the operation programs.

Some prior art washing and/or drying machines also present possibilities to adapt a number of different quantitative operation parameters defined by a preset operation program by means of a number of input means. For example, prior art washing machines have been provided with options to adapt the water temperature, number of rinses etc. Even though the values of the quantitative parameters in the end determine the performance of the operation of the washing machine, it is not always obvious to a user how the adaptation of one of the parameters would affect the overall performance of the washing machine. Furthermore, the adaptation of one quantitative parameter may affect the overall performance of the operation of the washing machine in one direction, and the adaptation of another qualitative parameter may affect the overall performance in the opposite direction.

Hence, adapting a number of quantitative parameters in order to achieve a desired adaptation of the overall operation of the washing machine is a complex task.

Furthermore, some prior art washing and/or drying machines allow for the user to adapt the qualitative operations parameters by selections with respect to the adaptation of overall operation. For example in some prior art washing machine, in addition to selecting an operation program, there may be an option to make selections adapting the operation with respect to parameters such as economy or speed. In these cases, the qualitative operation parameters will be adapted to reduce the cost incurred by operation, and to decrease the time spent on operation, respectively. Such parameters indicating an overall quality or performance of the operation of the washing machine may be called qualitative operations parameters. Similarly as for the quantitative operation parameters, it is not obvious for the user how the adaptation with respect to one qualitative operation parameter will affect the operation with respect to other qualitative operation parameters.

With prior art technique it is difficult for a user to control the operation of a washing and/or drying machine in order to achieve a desired adaptation of the overall operation of the machine.

Summary

A device is provided for controlling the operation of a washing and/or drying machine. The operation is defined by values of a set of quantitative operation parameters for the washing and/or drying machine. The device comprises input means operatively connected to a processor. The input means are arranged such that a user can select amongst a set of weightings between three or more qualitative operation parameters. The processor is arranged to determine values of the set of quantitative operation parameters from the weighting between the three

or more qualitative operation parameters, and to control the washing and/or drying machine according to the determined values.

The quantitative operation parameters are parameters
5 which relate to the operation of the washing machine and/or drying machine, such as the number of repetitions a step in the operation is performed, the temperature at operation, the number of rotations per minute etc. The values of the quantitative parameters determine the
10 operation of the washing and/or drying machine, and thus the performance of the operation of the machine.

The qualitative operation parameters are parameters describing the overall performance of the operation of the washing and/or drying machine, such as the overall
15 economy of the operation, the speed of completion of the operation, the quality of the result of the operation etc.

The provision of input means arranged such that a user can select amongst a set of weightings between three
20 or more qualitative operation parameters simplifies the control of the overall operation of the washing and/or drying machine.

The use of control of operation by means of the qualitative parameters enable users to predict the effect
25 on the overall performance of the operation of the washing and/or drying machine.

The use of predetermined weightings between the different qualitative parameters enables users to predict how the control with respect to one qualitative parameter
30 will affect the operation with respect to one or more of the other qualitative parameters.

A weighting, in addition to indicating the importance of one qualitative operation parameter, also indicates the importance of that qualitative operation
35 parameter in relation to the importance of one or more of the other qualitative operation parameters.

Given a selection of a weighting, values of the qualitative operation parameters should be set in order to achieve an overall operation in accordance with the weighting. The processor means is arranged to determine
5 the values of the quantitative operation parameters achieving the desired overall operation based on the weighting. The determining of values of the quantitative operation parameters from the selected weighting may be done by means of a mapping between each weighting of the
10 set of weightings and a respective set of values of the quantitative operation parameters.

One way of providing the selection of the weightings between the three or more qualitative operation parameters is by means of a display where separate
15 positions on the display correspond to different weightings of the set of weightings.

In combination with such a display, the input means are arranged such that a user can select amongst the set of weightings by selecting a position on the display. The
20 processor is then arranged to determine an adaptation of the values of the set of quantitative operation parameters from the user selected position, e.g. means of a mapping between each position of the display and a respective adaptation of the values of the quantitative
25 operation parameters.

When a display as described above is used, positions may be provided on the display which each correspond to a respective qualitative operation parameter of the three or more qualitative parameters. The weighting of the set
30 of weightings are then made to correspond to the positions on the display in such a way that the weight given to a qualitative operation parameter in a given position on the display depends on the distances from the given position to the position corresponding to that
35 qualitative operation parameter.

In addition to providing positions on the display corresponding to the qualitative operation parameters,

the display may be arranged to present a polygon having separate corners in the positions corresponding to the qualitative operation parameters. Separate positions within the polygon then correspond to different weightings of the set of weightings. The polygon preferably, but not necessarily, has the same number of corners as the number of qualitative parameters.

The user input may be realised in several ways. For example, in the case where a display is used, the input means may be arranged as a touch screen layered with the display. A user selects a weighting by selecting a position on the display which in turn is done by pressing a corresponding position on the touch screen which is layered with the display.

In alternative to the touch screen the user may select a weighting by moving a cursor to a corresponding position on the display along a first axis first and along a second perpendicular axis secondly.

The washing and/or drying machine may further be controlled by means of an operation program defining values of the set of quantitative operation parameters for the washing and/or drying machine. In this case the processor is further arranged to determine an adaptation of the operation program defined values of the set of quantitative operation parameters from the user selected weighting. The operation program would generally be one of a set of operations programs which can be selected by a user.

The device is useful in washing and/or drying machines having programs defining the operation and where the program define values of several qualitative operation parameters. For a washing machine the operation program would generally be a washing program defining the values of a set of quantitative washing parameters for the washing machine, and the three or more qualitative operation parameters would generally be qualitative washing parameters. Similarly, for a drying machine the

operation program would generally be a drying program defining the values of a set of quantitative drying parameters for the drying machine, and the three or more qualitative operation parameters would generally be
5 qualitative drying parameters.

Brief Description of the Drawings

In the following embodiments will be described with reference to the drawings. In the drawings:

10 Figure 1 shows a schematic view of a general embodiment of a device for adapting an operation program for a washing and/or drying machine.

Figure 2 shows a preferred embodiment of a device for adapting an operation program for a washing machine.

15 Figure 3 shows a display image for selecting a washing program for a washing machine.

Figure 4 shows a display image for selecting a weighting between three qualitative washing parameters in order to adapt the operation of a washing machine.

20 Figure 5 shows an alternative display image for selecting a weighting between three qualitative washing parameters in order to adapt the operation of a washing machine.

25 Detailed Description of Embodiments

A general embodiment of a device 10 for adapting an operation program for a washing and/or drying machine is shown in figure 1. The machine may be of any type in which the operation is controlled by an operation program
30 which defines values of a set of quantitative operation parameters for the machine. The quantitative operation parameters may e.g. be the number of repetitions a step of the operation is performed, the temperature during operation, the number of rotations per minute etc. The
35 values of the quantitative parameters determine the operation of the washing and/or drying machine, and thus the performance of the operation of the machine.

The device 10 according to the general embodiment comprises input means 11 and a processor 12. In the general embodiment the input means may be of any type enabling the selection between a set of predetermined weightings between the qualitative parameters.

Each selection is then mapped by means of the processor to a specific adaptation of the values of the set of quantitative operation parameters defined by the operation program. The processor is further arranged to control the washing and/or drying machine according to the values.

A preferred embodiment of a device 20 for adapting a washing program for a washing machine is illustrated in figure 2.

The device 20 according to the preferred embodiment comprises input means 21 in the form of a touch screen 22, a display 23, e.g. in the form of a LCD display, and a processor 24, e.g. in the form of a microprocessor. The device 20 in figure 2 would generally be mounted on a washing machine.

The microprocessor 24 is generally a part of an electronic unit 25 arranged in a washing machine and the microprocessor 24 performs a number of tasks of which one is to control the operation of the washing machine. The microprocessor 24 generally uses a set of predefined washing programs stored in the washing machine, e.g. in a memory 26 in the electronic unit 25. The predefined washing programs define the operation of the washing machine amongst other by means of determining a value for each of a set of quantitative parameters, such as water temperature, number of revolutions per minute during spin-drying, number of rinses etc.

The display 23 and touch screen 22 of the device 20 are preferably arranged in a configuration where the touch screen 22 is arranged on top of the display 23. The touch screen 22 should in this configuration be transparent such that the display 23 can be seen through

the touch screen 22. Both the display 23 and the touch screen 22 are operatively coupled to the electronic unit 25 comprising the microprocessor 24.

The touch screen 22 could be a general purpose touch screen 22, where pressing a position on the touch screen will generate a signal indicating this position, e.g. in a Cartesian coordinate system giving a position in horizontal direction and a position in vertical direction. The signal will be forwarded to the electronic unit 25 for further processing.

The display 23 is preferably arranged to provide information regarding selections with respect to the washing machine. The current selections provided and the current status of the display, e.g. what is disclosed and where on the display 23, is controlled by the microprocessor 24 in the electronic unit 25. A user can then make selections by pressing a position on the display 23 corresponding to a specific selection. As the display 23 and touch screen 22 are layered, this will result in the touch screen 22 being pressed in a certain position and a position signal be sent to the electronic unit 25. The microprocessor 24 is then arranged to translate a position signal indicating a position on the display 23 to a selection.

As an example of the operation of the display 23 and touch screen 22 configuration, figure 3 illustrates an image 30 on the display indicating options for selecting a predefined washing program. By pressing up and down arrows 31, 32 shown in the image 30 on the display and touch screen configuration a user can scroll through the washing programs indicated in a list 33 in the image 30 on the display. When a desired program is marked, it may be selected by pressing an enter button 34. Means for undoing any selections made are optionally provided.

In the device 20 of figure 2, the input means in the form of a touch screen 22 and a display 23 are arranged to provide selections for a user corresponding to a set

of predetermined weightings between three qualitative washing parameters, more specifically between the qualitative washing parameters speed, performance and economy. The parameter speed indicates a short time for completing a wash program, the parameter performance indicates high quality wash and rinse results for a wash program, and the parameter economy indicates low overall water and energy consumption for completing a wash program.

10 In order to provide the selections for a user, an image as shown in figure 4 is shown on the display and touch screen configuration. In a section of the display a triangle 41 is optionally shown. The triangles corners 42, 43, 44 each correspond to one of the three
15 qualitative parameters. In this image for example the upper corner 42 corresponds to the parameter speed, the lower left corner corresponds to the parameter performance, and the lower right corner corresponds to the parameter economy. In a preferred configuration the
20 names of the qualitative parameters are given in the image 40 in connection with the positions corresponding to the qualitative parameters.

In order to select a weighting between the three parameters, a user should press a position within the
25 triangle. The position signal will be sent to the microprocessor. Each position then corresponds to a given weighting and the microprocessor will translate this weighting to an adaptation of the values of the quantitative parameters of the selected washing program
30 in order to adapt the operation of the washing machine in accordance with the weighting.

The set of predetermined weightings are made to correspond to the positions on the display in such a way that the weight given to a qualitative operation
35 parameter in a given position on the display depends on the distances from the given position to the position corresponding to that qualitative operation parameter.

A user pressing close to the upper corner 42 corresponding to speed, selects to have higher weight on the parameter speed and lower weight on the other two parameters economy and performance. In this case the quantitative parameters will be adapted, e.g. such as processing times for washing and rinsing sequences are shortened and the temperature is lowered to shorten the time for heating.

A user instead pressing close to the lower left corner 43 selects to have high weight on the parameter speed and lower weight on the other parameters. The cross 45 in the middle of the triangle indicates that no adaptation of the standard settings of the selected washing program should be made.

A user pressing somewhere close to the lower right corner 44, corresponding to the parameter economy, selects to have high weight on economy. In this case the temperature can be lowered, the water level lowered and any pre-washes can be removed.

A user can also choose to press e.g. in the middle of the line between the upper corner 42 and the lower right corner 44. In such a case equal weight is given to the parameter economy and the parameter speed and a low weight is given to the parameter performance.

A list 46 may be shown in the image 40, showing the values of parameters related to the qualitative parameters. The values will be adapted also in the list after selection of a weighting by a user by pressing a position in the display and touch screen configuration. Means for undoing any selections made are optionally provided.

In figure 5, an image 50 similar on the image 40 in figure 4 is shown. In addition to the triangle in the previous image 40, image 50 shows also a marked area 47 close to the lower left corner corresponding to the parameter quality. This area indicates that a pre-wash will be added. The marking of the area is provided to

make the user aware of the need for additional washing detergent if this area is pressed.

In alternative to the use of a display and touch screen configuration as disclosed in figure 2, one
5 embodiment of a device for adapting an washing program for a washing machine uses similar display images as indicated in figure 4 and figure 5 for providing the selection between weightings of a predetermined set of weightings to a user. The input means in this embodiment
10 however, may e.g. be a knob which can be turned and pressed. In order to select a position in the triangle 41 shown in figure 4 and figure 5, the knob is first turned to direct a marker to a desired position in horizontal direction. The knob is pressed to select this horizontal
15 position. The knob is then turned to direct the marker to a desired position in vertical direction and the knob is pressed when this position in vertical direction has been reached with the marker.

CLAIMS

1. A device for controlling the operation of a washing and/or drying machine, the operation being defined by values of a set of quantitative operation parameters for the washing or drying machine, comprising:
input means arranged such that a user can select amongst a set of weightings between three or more qualitative operation parameters; and
a processor arranged to determine values of the set of quantitative operation parameters from a user selected weighting, and to control the washing or drying machine according to the determined values.
2. The device according to claim 1, further comprising:
a display where different positions on the display correspond to different weightings of the set of weightings, and
wherein the input means are arranged such that a user can select amongst the set of weightings by selecting a position on the display.
3. The device according to claim 2, wherein each of the three or more qualitative parameters corresponds to a respective position on the display, and wherein the set of weightings are made to correspond to the positions on the display in such a way that the weight given to a qualitative operation parameter in a given position on the display depends on the distances from the given position to the position corresponding to that qualitative operation parameter.
4. The device according to claim 3, wherein the display is arranged to present a polygon having separate corners in the positions corresponding to the three or more qualitative operation parameters, and wherein

separate positions within the polygon correspond to different weightings of the set of weightings.

5 5. The device according to claim 4, wherein the polygon has the same number of corners as the number of qualitative parameters.

6. The device according to claim 5, wherein the number of qualitative parameters is three.

10

7. The device according to any one of claims 2-6, wherein the input means is arranged as a touch screen layered with the display where the user selects a weighting by pressing a corresponding position on the touch screen.

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8. The device according to any one of claims 2-6, wherein the input means is arranged such that the user selects a weighting by moving a cursor to a corresponding position along a first axis first and along a second perpendicular axis secondly.

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9. The device according to any one of the previous claims, wherein the operation is further controlled by means of an operation program defining values of the set of quantitative operation parameters for the washing and/or drying machine, and wherein the processor is further arranged to determine an adaptation of the operation program defined values of the set of quantitative operation parameters from the determined values.

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10. The device according to any one of the preceding claims further comprising:

35

a memory arranged to store a mapping between each weighting of the set of weightings and a respective set of values of the quantitative operation parameters,

wherein the processor is arranged to determine the values of the set of quantitative operation parameters from the user selected weighting as the set of values of the quantitative operation parameters corresponding to
5 the user selected weighting in said mapping.

11. A washing machine comprising the device according to any one of claims 1-10.

12. A drying machine comprising the device
10 according to any one of claims 1-10.

13. A washing and drying machine comprising the device according to any one of claims 1-10.

10

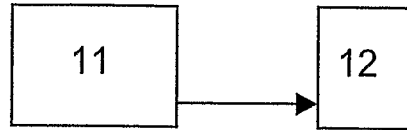


Fig. 1

20

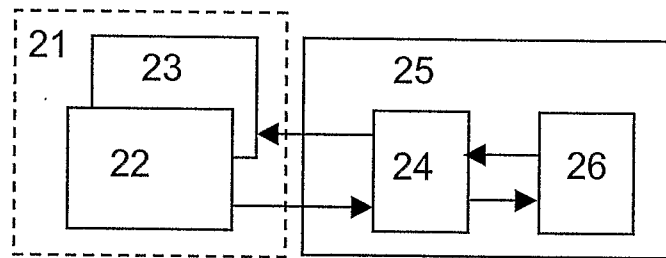


Fig. 2

30

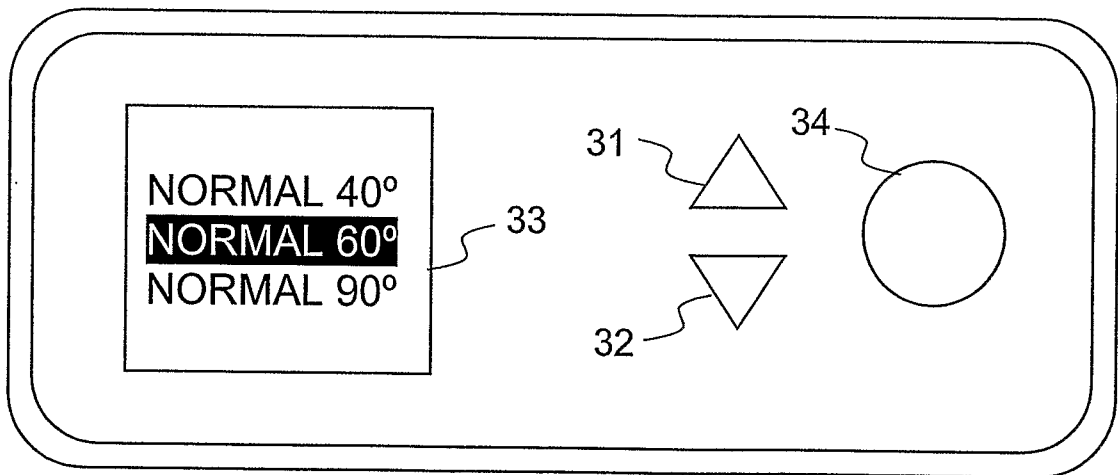


Fig. 3

40

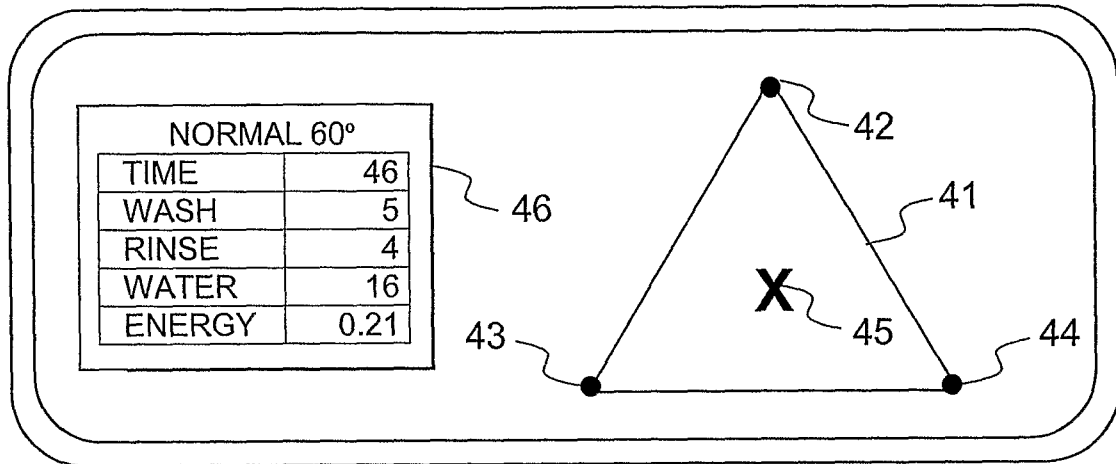


Fig. 4

50

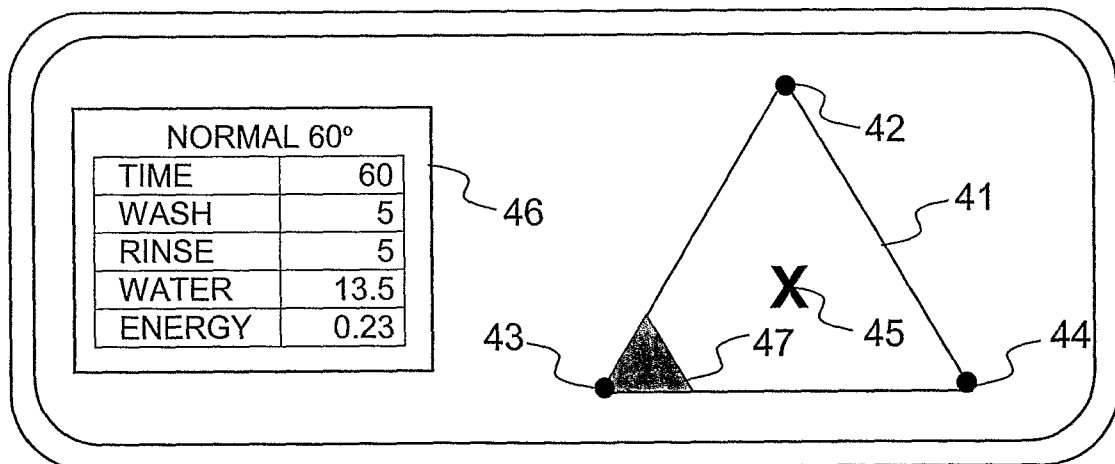


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2006/000787

A. CLASSIFICATION OF SUBJECT MATTER

IPC: 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)

IPC: D06F

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)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5905648 A (V. BADAMI), 18 May 1999 (18.05.1999), whole document --	1,11-13
A	US 20040134238 A1 (J.D. BUCKROYD ET AL), 15 July 2004 (15.07.2004) --	1-13
A	GB 2262820 A (KABUSHIKI KAISHA TOSHIBA), 30 June 1993 (30.06.1993) -- -----	1-13

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE2006/000787

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