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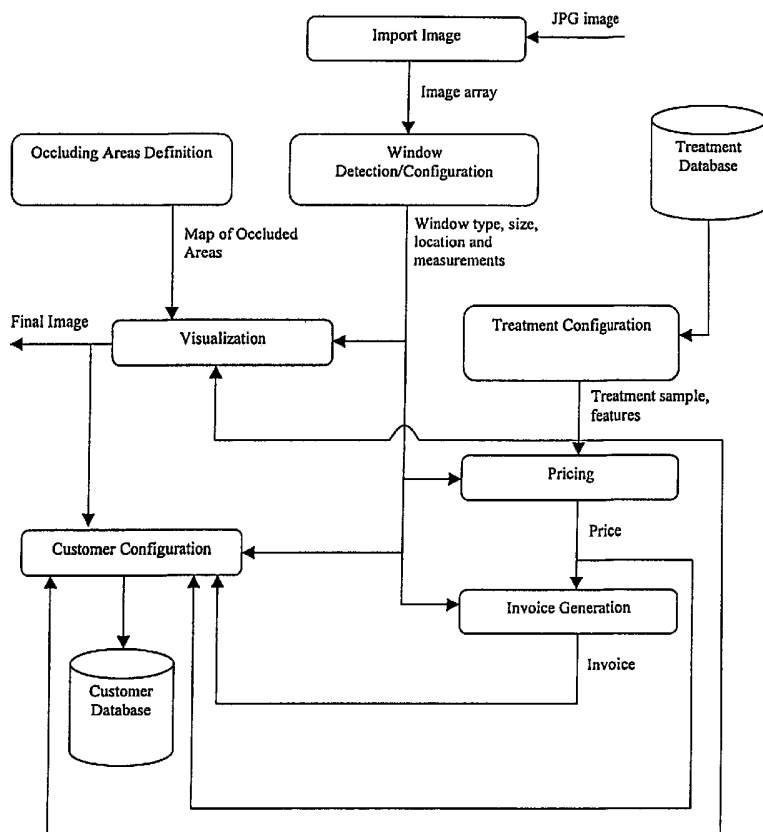
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[Continued on next page]

(54) Title: METHOD OF WINDOW TREATMENT VISUALIZATION



(57) Abstract: A method of visualizing building interior treatments associate with building interior features such as windows. An image of a building interior design feature, and an image of a treatment, are harmonized in scale and assigned dimensions corresponding to those of the feature.

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METHOD OF WINDOW TREATMENT VISUALIZATION

BACKGROUND OF THE INVENTION

The invention is in the field of interior design visualization and marketing.

BRIEF SUMMARY OF THE INVENTION

5 Treatments, or decorations, are manufactured and sold for application to interior
structure features, such as windows. Windows may include rectangular, square, patio, arch, bay,
circular, corner, hexagon, curved, tapered, triangular, oval, octagon, movable arch, French door,
and skylight window. For windows, treatments include horizontal blinds, vertical blinds, shades,
0 pleated shades, cellular shades, wood blinds, sheer horizontal blinds, Roman shades, shutters,
roller shades, sheer vertical blinds, woven woods, curtains and toppers.

 In connection with the marketing of window treatments, it is common for sales
persons to enter a customer's building or dwelling to perform window measurements and
configurations on site. If the measured window belongs to one of the types mentioned above, the
sales person determines window type, then conducts type-specific measurements. The sales
5 person then demonstrates to the customer the selection of treatment samples he carries. Samples
can be of different type (horizontal, vertical, cellular, etc.) and may have different texture or
color or both. Different window treatment types are demonstrated to the customer by showing
pictures of windows with treatment of that type applied. Textures and colors are demonstrated
by placing treatment samples against the wall and allowing the customer to see how well they
0 appear with the color and texture of the wall. For each window, the sales person provides the
customer with a price estimate, based on window size, treatment type, treatment texture, and
options. Upon completion of all configurations, the sales person may compose a quote
including, but not limited to: quote date; quote number; the sales person's number; customer
data, such name, address, phone number, and payment information; and configuration of all
5 treatments being ordered, including type, texture, color, and options; and exact pricing for each
treatment (if available) and total price. Upon submission, orders may be forwarded to the
manufacturer.

 There are many deficiencies in the foregoing procedure. Visualization of a window
treatment on a customer's window, being the customer's main criteria for selecting an offered
0 treatment, is a poorly assisted process. It is difficult for many customers to envision how a
particular treatment will appear when applied to a window, in its own setting, based on a generic

picture of a treatment view and sample of the treatment. In many cases sales may be lost simply because the customer cannot imagine how a treatment offered would look in his window, and he chooses not to buy the treatment to avoid the risk of investing in something about which he is not completely sure. Further, the sales persons are required to carry a collection of treatment
5 samples, which sometimes may be quite bulky and limit the selection they may carry. Finally, order generation is a manual process, which may be time consuming.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial modular diagram of a method illustrative of the present invention.

FIG. 2 is a depiction of vectorized window shapes.

0 FIG. 3 is a depiction of vectorized window shapes.

FIG. 4 is a depiction of vectorized window shapes.

FIG. 5 is a depiction of vectorized window shapes.

FIG. 6 is a modular diagram of treatment configuration dependencies.

DETAILED DESCRIPTION OF THE INVENTION

5 The method of the present invention may be illustrated by the operation of computer hardware and software. Fig. 1 is a partial modular diagram of such an illustration.

First, an image from a building interior feature, in this illustration a window, may be acquired using a digital camera and saved on a computer hard drive as a graphical file in JPG format. This step becomes optional in the event images in the camera can be accessed directly
0 by a treatment software as files on a "removable" drive. This is the case with most of many digital cameras, using storage media, like Sony® Memory Stick®, Compact Flash®, and IBM® MicroDrive®. Also, images can be accessed directly using specialized flash memory readers available in the market.

Second, the window image is imported by computer into a window treatment
5 visualization software ("WTVS").

Third, customer data is entered into the WTVS, namely the customer's name, address, telephone number, e-mail address, and any other identifying information such as business codes and referral information.

Fourth, the window image is displayed on a computer monitor and configured. Configuration is effected by selecting from a digital library of window types the type of window captured in the image. This selection is made from icons corresponding to such window types, which selection generates a vectorized window shape to be superimposed onto the window image. The vectorized window shapes may have three dimensions. The vectorized window shapes, illustrated in Fig. 2-5, include defining points, or verteces. A corresponding toolbar is displayed with the vectorized window selected. Tools allow the user to perform the following operations on the vectorized window: moving the entire vectorized window onto the image; stretching and squeezing the vectorized shape in three dimensions by selecting and moving the verteces as necessary to scale the vectorized window shape to the image of the window; and entering the actual window measurements that correspond to the shape of the vectorized window. The selection of measurements may vary for different window types. The window measurements are taken manually by the sales person from the actual window. In this manner, the vectorized window shape, and hence the imaged window, can be assigned the real-world dimensions of the window. The window configuration procedure can be repeated an arbitrary number of times for multiple windows of various types within the same image.

In some instances, the window image may be partially occluded by an objection in front of it, for instance, by a piece of furniture. This will cause the generated treatment image to cover the occluding object when being superimposed onto the window image. Such phenomena will produce non-natural and visually unattractive effect and thus is highly undesirable. The WTVS includes an occluding tool, using which the user can identify the occluded area on the image by outlining it. For instance, the user can "paint," or remove, the part of a chair which covers the window. This removed area is then stored in buffer to be superimposed over the final window treatment image.

Fifth, a treatment image is selected from a library of treatments. The treatment, consisting of a particular type, texture, and color, is scaled by the WTVS as a function of the treatment construction geometry, treatment parameters, and the window's geometry as determined from the window image configuration. The selected window treatment is then

superimposed onto the window image on a computer monitor. Dependencies in treatment configuration are illustrated by Fig. 6.

The treatments of the treatments library, as a function of their specified dimensions, type, texture, and color, may correspond to prices in a library of prices. The prices
5 corresponding to a particular selected treatment may be selected by the WTVS and displayed in conjunction with such treatment, and may be used to generate orders and invoices in connection with the customer's purchase of such treatment.

Various viewing tools may be utilized to present the configured treatment to a customer. Both the initial and the treatment generated images can be presented to a customer
0 simultaneously for better presentation effect. The price of the configured treatment may be presented once the treatment is configured. In the case of multiple windows, individual window and total prices may be presented. A "quote" view may generate and display quotes, including the customer's and the sales person's information, invoice number, window image(s), applied treatment(s), and price(s). An "invoice" view may generate and display an company-specified
5 invoice, retrieving applicable information from the WTVS database(s) and treatment configuration parameters. Treatment configuration and displaying procedure may be repeated multiple times per window, allowing superimposition of different treatments over each other. The subsequent treatment image may be displayed as overlaying the previous treatment. Such procedure can be used, for example, to configure and display valence or curtains over an already
0 configured blind. Operation of treatments, such as the opening and closing of curtains, may be simulated. The treatments can, with three-dimension simulation, be rotated in three dimensions to illustrate various views.

The method of the present invention may include a client-server architecture with the client being an individual sales person's laptop computer, and the server being located on a
5 vendor company's site. The client may include a database of customer information, prices, treatments, and other business information. The server may include a master database of customer information, prices, and other business information. The client and server may be frequently synchronized, whereby information collected by a salesman and recorded with the client may update the server database, and the new information on the server (such as available
0 treatments and prices) may update the client. Alternatively, the client-server architecture may be organized such that the client must access the server remotely during a sales presentation in order

to access vectorized shapes, treatments, or prices. The advantage of the latter architecture would be increased security of potentially sensitive business information.

CLAIMS

What is claimed is:

1. A method of visualizing building interior design treatments comprising the steps of:

5 creating an image of a building interior feature;
 selecting a feature treatment from a library of feature treatments;
 harmonizing scales of the feature and the selected feature treatment;
 and superimposing the treatment onto feature.

 2. The method of claim 1 in which the treatment is a window
0 treatment.

 3. The method of claim 1 in which the image of the treatment is
rescaled to a scale of the feature.

 4. The method of claim 1 comprising the further step of assigning to
the image the dimensions of the feature.

5 5. The method of claim 1 further comprising the step of computing a
price based on the selected window treatment.

 6. The method of claim 1 in which the harmonizing of scales
is effected by rescaling a vectorized shape to the scale of the image, and assigning
to the vectorized shape measurements of the feature.

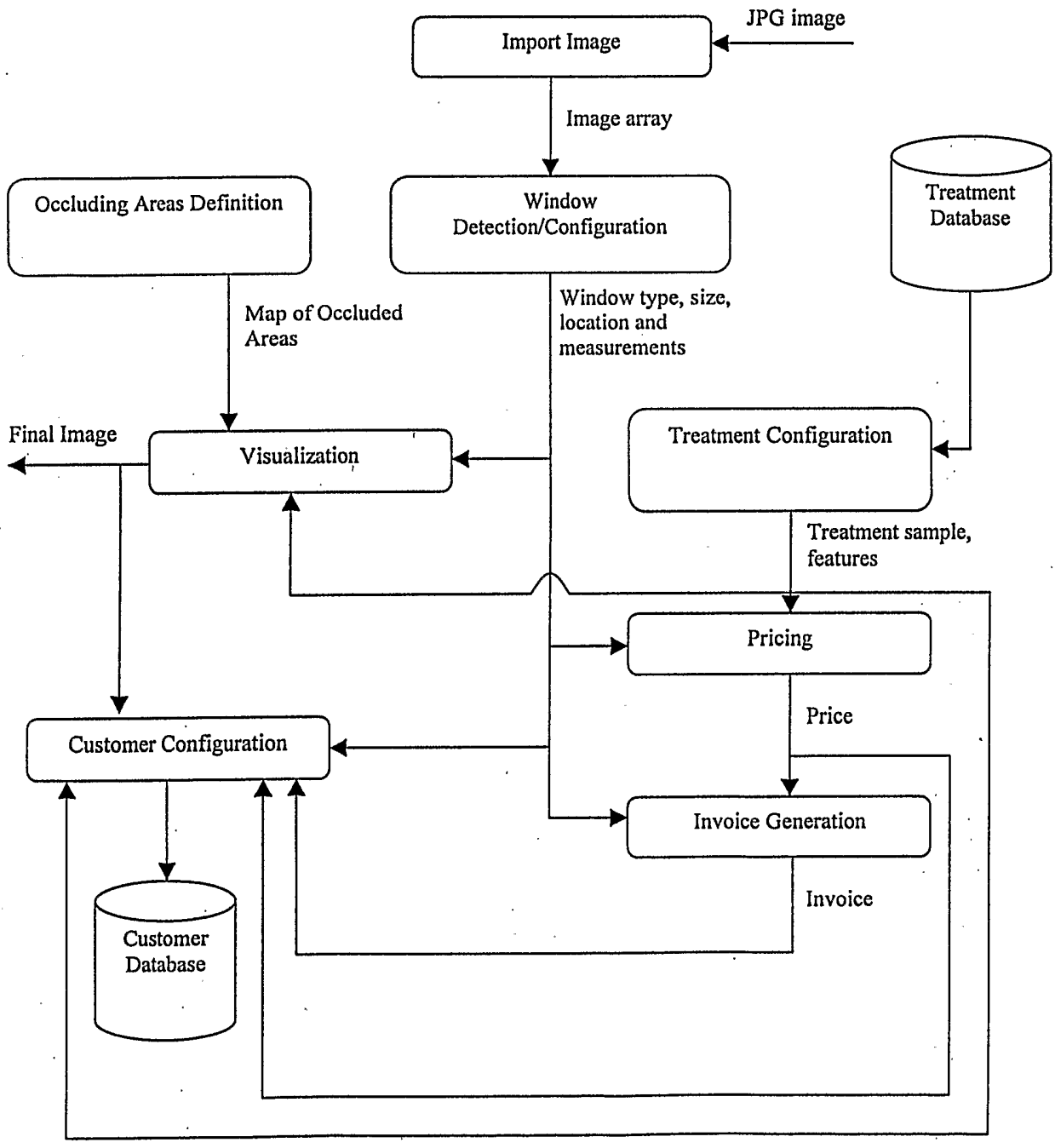


Fig. 1

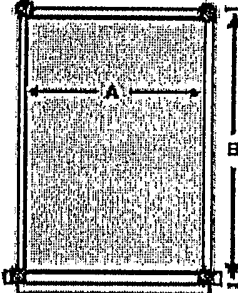
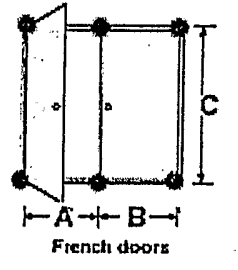
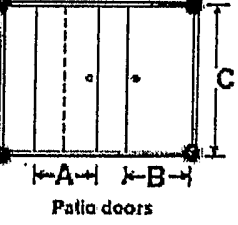
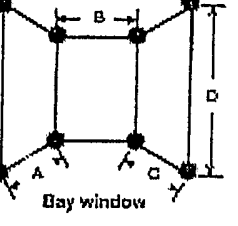
Type	Sketch	Notes
Rectangular (square) window		
French door	 <p style="text-align: center;">French doors</p>	Composed of two rectangles
Patio door window	 <p style="text-align: center;">Patio doors</p>	Represented as rectangle
Bay window	 <p style="text-align: center;">Bay window</p>	this window is composed of three rectangular windows

Fig. 2

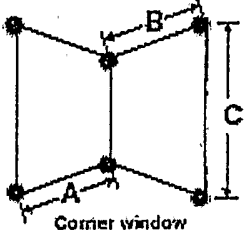
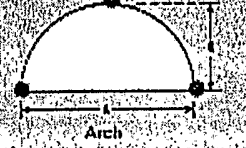
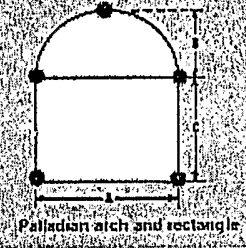
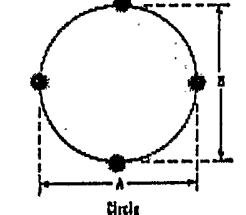
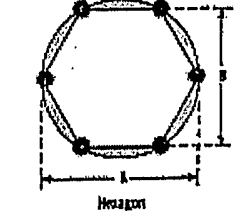
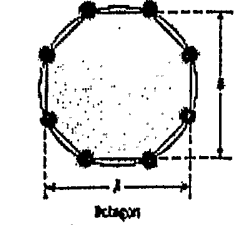
<p>Corner window</p>	 <p>Corner window</p>	<p>this window is composed of two rectangular windows</p>
<p>Arch window</p>	 <p>Arch</p>	
<p>Paladian Arch window</p>	 <p>Paladian arch and rectangle</p>	<p>Composed from arch and rectangle</p>
<p>Circular window</p>	 <p>Circle</p>	
<p>Hexagonal window</p>	 <p>Hexagon</p>	
<p>Octagonal window</p>	 <p>Octagon</p>	

Fig. 3

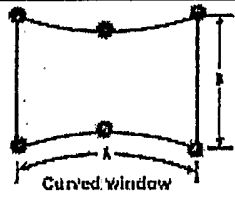
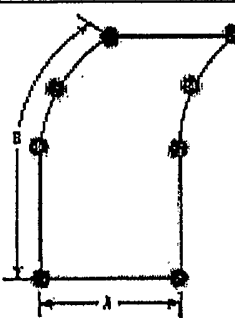
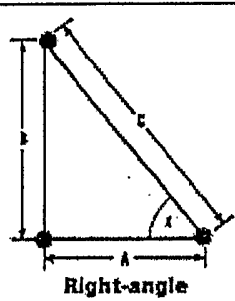
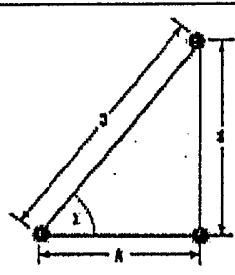
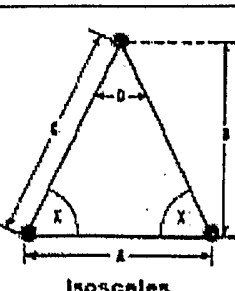
<p>Curved window</p>	 <p>Curved Window</p>
<p>Greenhouse window</p>	 <p>Greenhouse window</p>
<p>Triangular window – right triangle (right)</p>	 <p>Right-angle</p>
<p>Triangular window – right triangle (left)</p>	
<p>Triangular window (Isosceles)</p>	 <p>Isosceles</p>

Fig. 4

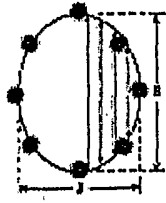
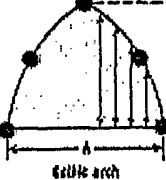



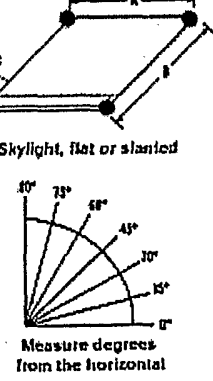
<p>Oval window</p>		
<p>Celtic arch</p>		
<p>Eyebrow</p>		
<p>Quarter circle (right)</p>		
<p>Quarter circle (left)</p>		
<p>Skylight window</p>	 <p>Skylight, flat or slanted</p> <p>Measure degrees from the horizontal</p>	<p>this can also be a variation of a rectangular window</p>

Fig. 5

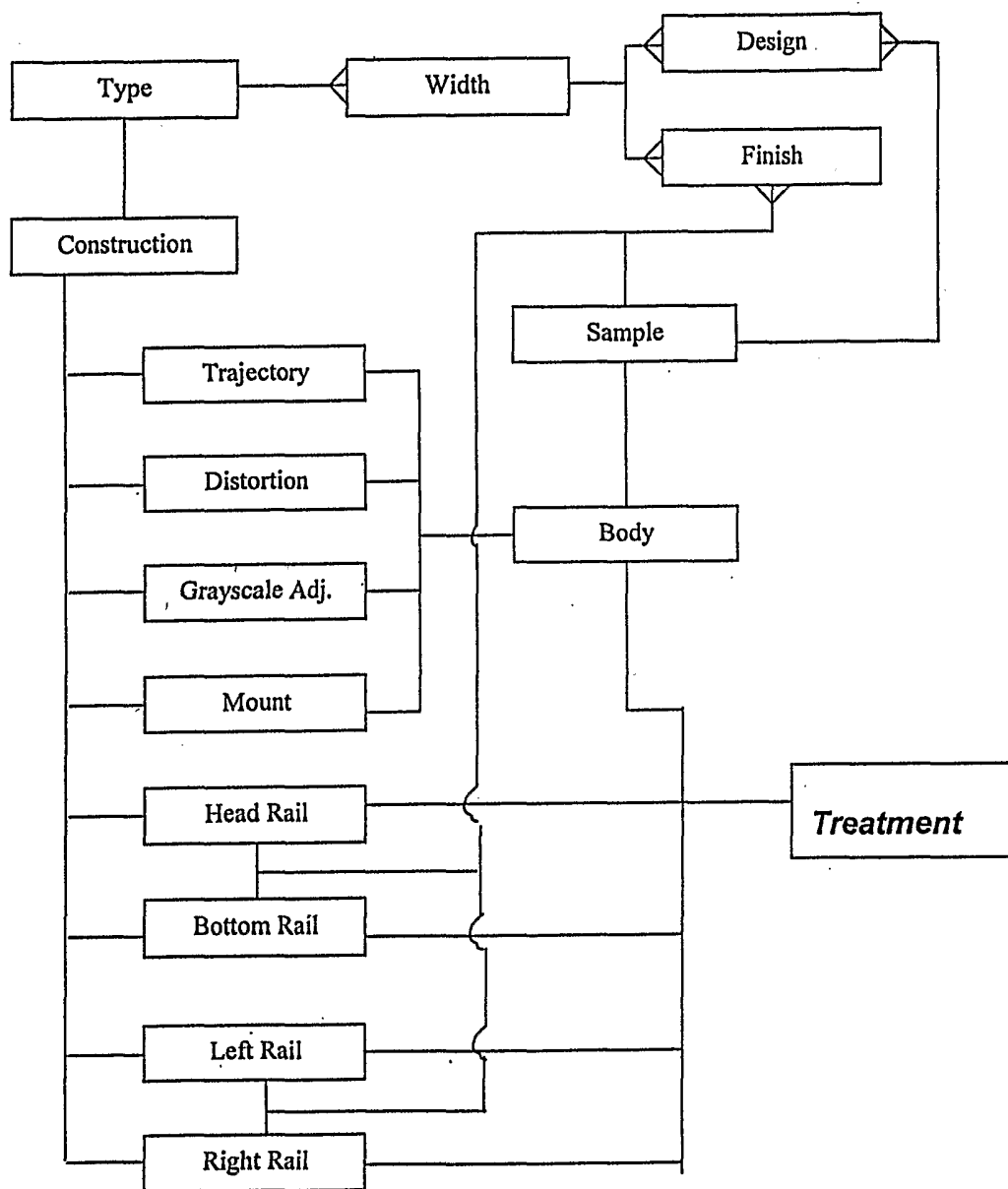


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/31978

A. CLASSIFICATION OF SUBJECT MATTER	
IPC(7) : G06F 17/50 US CL : 703/1, 7	
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. : 703/1, 7	
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) EAST, IEEE, ACM	
C. DOCUMENTS CONSIDERED TO BE RELEVANT	
Category *	Citation of document, with indication, where appropriate, of the relevant passages
X	US 5,668,736 (DOUGLAS et al.) September 16, 1997 (16.09.1997), column 2, lines 54-67, and column 3, lines 10-20, 35-67,
X	US 5,975,908 (HULTEN) 2 November 1999 (2.11.1999), column 2, line 58 to col.3, line 60.

Y	
X	US 6,014, 503 ((NAGATA et al.) 11 January 2000 (11.01.2000), col. 12, line 50 to col.13, line 40, and Fig. 1, Fig.7, and Fig.9

Y	
X	Funkhouser, T. et al. "Management of Large Amounts of Data in Interactive Building Walkthroughs". Proceedings of the 1992 Symposium on Ineractive 3D Graphics. 1992.
---	ISBN 0-89791-467-8. p.12, Section 2 "Modeling Phase", and pp.16-17 "Object Hierarchy", and Fig. 11.
Y	
Y	US 6,037,945 (LOVELAND) 14 March 2000 (14.03.2000) col.3, lines 9-67.
<input type="checkbox"/>	Further documents are listed in the continuation of Box C.
<input type="checkbox"/>	See patent family annex.
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