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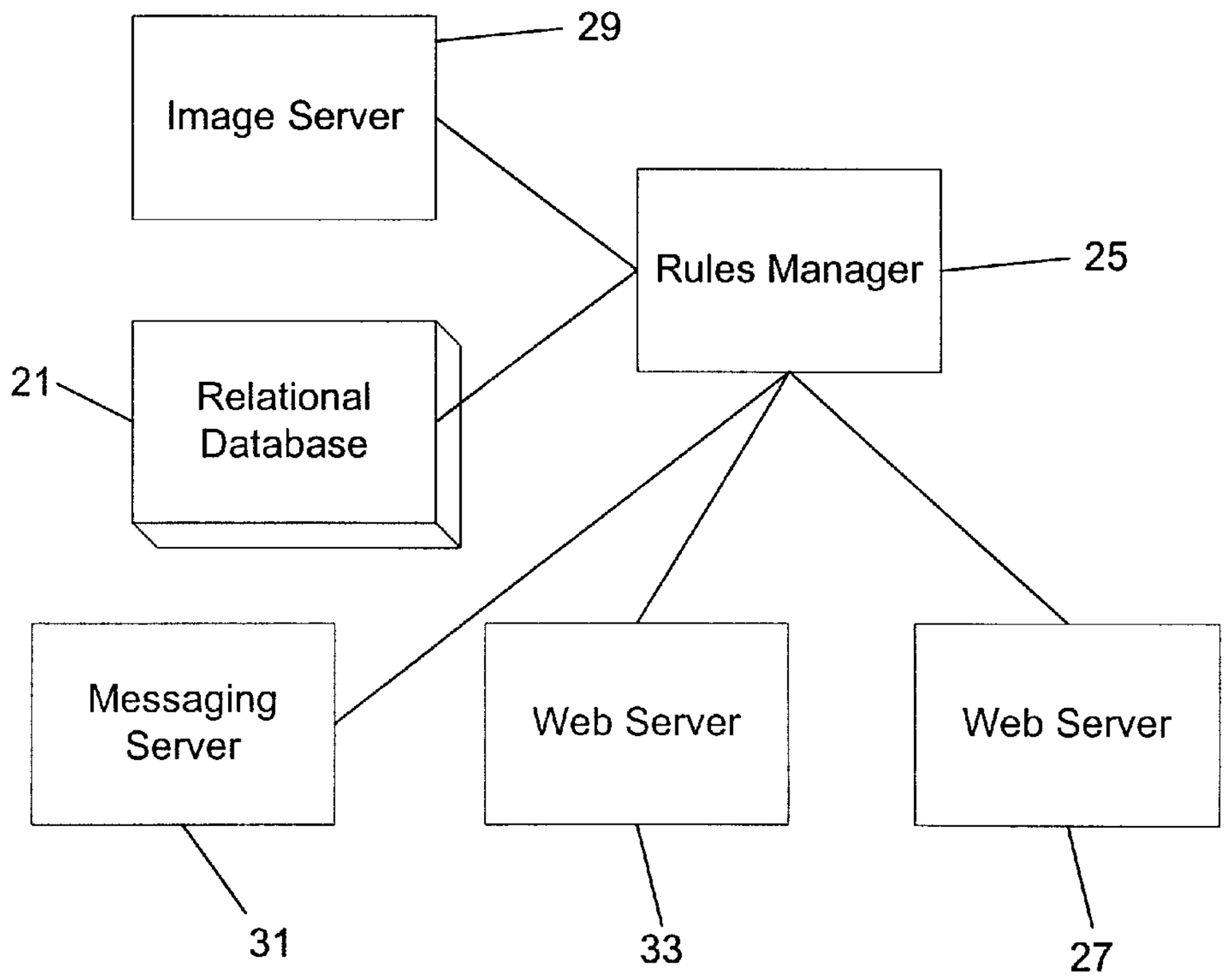
(54) Title: METHOD AND APPARATUS FOR VISUALIZATION OF ON-LINE MERCHANDISE CUSTOMIZATION



(57) Abrégé/Abstract:
A system is provided which combines visualization with a rigid constraint based set of rules for customizing a product or service. Immediate feedback is provided to the user both on how an item will look in the real world when it is manufactured. Furthermore, the user is shown how changes in earlier selections will force new selections or options that are no longer be valid given the design constraints. For example, a certain color may not be offered for a certain fabric, meaning if that fabric is chosen the previous color selection would no longer be valid. As choices are made the rendered view of the product is altered.

ABSTRACT

A system is provided which combines visualization with a rigid constraint based set of rules for customizing a product or service. Immediate feedback is provided to the user both on how an item will look in the real world when it is manufactured. Furthermore, the user is shown how changes in earlier selections will force new selections or options that are no longer be valid given the design constraints. For example, a certain color may not be offered for a certain fabric, meaning if that fabric is chosen the previous color selection would no longer be valid. As choices are made the rendered view of the product is altered.

METHOD AND APPARATUS FOR VISUALIZATION OF ON-LINE MERCHANDISE CUSTOMIZATION

FIELD OF THE INVENTION

This invention relates in general to on-line ordering of merchandise. More particularly, the invention relates to a visual platform to perform the customization of a product or service following a constraint-based set of rules.

BACKGROUND OF THE INVENTION

The Internet is especially conducive to conducting electronic commerce, particularly between businesses (B2B), due to its ability to link organizations with similar business interests, complementary products common and/or reciprocating goals. Many vendors utilize the reach and easy access of the World Wide Web to post electronic catalogues on the Internet for purchase by potential customers. Others have created 'exchanges' on the World Wide Web to connect sellers and buyers to transact by allowing sellers to electronically post their products and for buyers to browse what products are available for purchase

A number of customization technologies have been developed in the past which allow a user/buyer to select from choices that are text based only and are mutually exclusive of other choices. One prominent example is the Dell Computer on-line ordering site, which allows the user to select customizations of a microcomputer order, and shows the user the impact on price of the user's choices. No visualization is attempted (partially because it is not relevant) and choices are independent of one another.

SUMMARY OF THE INVENTION

According to the present invention, a system is provided which combines visualization with a rigid constraint based set of rules for customizing a product or service. Immediate feedback is provided to the user both on how an item will look in the real world when it is manufactured. Furthermore, the user is shown how changes in earlier selections will force new selections or options that are no longer be valid given the design constraints.

For example, a certain color may not be offered for a certain fabric, meaning if that fabric is chosen the previous color selection would no longer be valid. As choices are made the rendered view of the product is altered.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the preferred embodiment of the present invention is described herein below, with reference to the drawings in which:

Figure 1 is a block diagram of an Internet based environment for implementation of the invention;

Figure 2 is a block diagram of an on-line ordering system in which the visualization system is implemented according to the present invention; and

Figures 3A to 3N are screen prints of web pages generated by the system of Figure 2 for the purpose of user interfacing.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning to Figure 1, an on-line ordering system is shown by which a plurality of end users 1 interact over the Internet with the non-expert customization system 3 of the present invention for the purpose of designing and ordering merchandise. Upon establishing an on-line session with the non-expert customization system 3, the system prompts the user 1 for a set of constraints (e.g. quantity, price, time). The system then shows the user an electronically displayed set of configuration options which he or she can choose from to customize the design of the end product. These options include, but are not limited to colour, size, structural make-up, material and component options. The system 3 has the ability to show the user/buyer 1 only those options which will be compatible with the constraints laid out by the user/buyer and which can be supplied in a satisfactory manner by the seller operating the system 3. In addition, the user/buyer 1 will have transparent information regarding the pricing implications of his or her option choices.

The order placement system allows the seller to deliver the end product to the buyer 1 by asking the user/buyer for information including, but not limited to credit worthiness, currency preferences, sample requirements and delivery specifications. Then the order system 1 then links to the necessary service providers 5 via the Internet 2 for financing of the order, material ordering, shipment, etc.

Finally, the custom designed product is converted, electronically into a digital set of materials which gives instructions to service providers 5 (e.g. the shipper, material suppliers, manufacturer, customs broker, etc.) on how to fulfill the order. These instructions are a direct translation of the electronically displayed product into the end supplier's mother tongue.

Turning now to Figure 2, the system 3 is shown in functional terms comprising a relational database 21, applications server 23 including, among other things, rules manager 25, a web access server 27, imaging server 29 and messaging server 31. Although the database 21, rules manager 25, web server 27, imaging server 29, and messaging server 31 are shown as different functional blocks, in actual fact these functional blocks are preferably physically implemented within a single applications server.

Initially, domain analysis is performed to determine what the various customization aspects are of the product, and what the constraints are on those customizations. The end results of this domain analysis are actual customization instances. For example, when designing and ordering a customizable bag, only some colours may be available in certain fabrics, only certain pictures are applicable to certain styles, etc. Thus, in performing domain analysis the relationships between constraints and customization instances are determined and stored in relational database 21. In addition to constraints and customization instances, a raw description of the workflow is also stored in database 21. The workflow itself is dependent on three main constraints (price, quantity and time) such that the workflow is determined both by domain analysis and at run time by what constraints have been entered in the system by the user. Thus, if the user 1 is only willing to spend a certain amount of money, for many customization instances, many choices will not be shown. If the user specifies that the product is required at a certain time or in a certain quantity, other customization instances are not presented, etc.

The customization instances, constraints and flow description form tables within the database 21. The price ranges go into one rule table (Table A, below), the materials and the colours form actual instances within an element table (Table B) along with an indication of whether the element is "standard". Standard items in the database 21 dictate default elements for user presentation (e.g. default materials, default colours, etc.) An include/exclude table is provided (Table C) for dictating, as an example, what happens in the case of a material or colour which is non standard. For the present example of bags, the colour of the fabric is substantially dictated by the choice of fabric. So, in the present case there are no "standard" colours, but only a standard fabric. Consequently, the include/exclude table includes a series of rules to either add the other fabrics based on a selected style or remove the standard fabric from the styles for which such fabric is not acceptable. Finally, for the present example, a component table (Table D) is provided with a selection from three styles.

Table A

Price Range Table
Upper/lower

Table B

Element Table	std
Material 1	N
Material 2	Y
Colour 1	N
Colour 2	N
Colour 3	N
Colour 4	N

Table C

Include/Exclude Table
If style 1 include material 1
If material 2 exclude colour 4

Table D

Component Table
Style 1
Style 2
Style 3

In operation, the user 1 initiates a session with the system 3 via web server 27. The user logs in to the system with a user name and password. The rules manager 21 only shows styles to the user based on predefined "categories" of user. Thus, a given user may be a customer of a particular product provider, (e.g. a category partner who has provided a customer list for storage on the database 21). This user will not be presented with any merchandise from a "competing" supplier.

The user is prompted to enter the three main constraints (price, quantity and time) and the style of bag (Table D). In response, a particular style of bag is presented with a default fabric, a default colour, default pocket configurations, default hardware, etc. The selected bag actually exists in inventory with the foregoing series of defaults. The system 3 determines the defaults from database 21 and presents to the user 1 a bag with all those defaults. It creates an entire complete "buyable" bag which, in theory, can be immediately purchased without any further customization, if the user so wishes.

Alternatively, as indicated above, the user 1 may select from other customizable features, which causes the rules manager 25 to fire the appropriate rules and in response add and remove elements for presentation to the user 1. More particularly, the rules manager 25 fires additional rules which are consistent with the previously entered price, quantity, time and style, in order to present all of the fabrics that match the price/time criteria as well matching the chosen style and fabric. Thereafter, the same rules firing takes place for colour, and so on. Ultimately, a bag data object is created from the user selections and consequential rule firing.

All of the user interaction with the system 3 is via the web server 27 which presents a series of web pages with graphical renderings of the product under development (i.e. being customized). These HTML pages and embedded graphical images aregenerated by an image server 29 under control of rules manager 21 based on the firing of certain rules within

database 21. The image server 29 performs its graphics rendering on the server side (i.e. system 3) rather than on the client side (i.e. user 1), to avoid the necessity of developing special software to run on the client. However, it is contemplated that rendering could alternatively be implemented at the client (user 1) via downloading appropriate software to the client (e.g. Java 3D API).

Three levels of customization are provided. The least level of customization simply presents the default item with standard features, for immediate ordering by the user 1. A second level of customization provides for quick turn around times on low quantity orders. In this case, the user selects fabric and colour for the product, which are displayed to the user as a digital photograph via image server 29. The most elaborate level of customization allows the user to utilize 3-D CAD type design tools to customize the product order. The image server displays a control panel for indicating to the user 1 what design choices have been made, as well as the defaults for the particular product (e.g. bag). Continued customization is performed from the control panel display (e.g. hardware changes such as zipper, etc.). The user is permitted to change previously selected design features, in response to which the rules engine 25 fires the appropriate constraint rules from database 21 to determine whether, as a consequence of the change, some previously selected options are no longer valid. For example, if a new style is selected to replace an earlier one, the constraints mechanism checks to see whether the previously selected choices are still valid (e.g. price range, fabric, colour, etc.)

In order to set up the system for image rendering, digital photographs are first taken of a base style, to provide the "catalogue" representation. According to the aforenoted second level of customization, the digital photograph may be stylized to show the various colour and fabric options. This is accomplished via pre-processing of the images and loading of the images into the database 21. However, as indicated above, it is contemplated that the second level of customization rendering may take place on the client computer 1 by executing using Java script on the pre-processed images, rather than rendering the images on the image server 29. The last level of customization results in a 3D computer design representation of the product using CAD tools. CAD drawings are created of all of the different components that go into the product and digital photographs of the textures to be applied to the CAD drawings. The CAD drawings (e.g. AutoCAD, 3D Studio or VRML objects) are compiled or

transformed into Sun Java code using the 3D API library. Thus, instead of requiring applications to read the images and then render them, the system of the present invention transforms the images into the actual code that renders the image directly. This code is stored in the database and as the user requests product, the system assembles all of the components, and orients them together where they belong on the user's screen. Thus, within a 3D space the imaging server renders snap shots and stores the rendered versions into a directory in which then it is sent back to the user 1.

It is contemplated that a graphical button may be provided to allow the user to save a partially customized product, so that if a change is made to an earlier selection which then results in other earlier selected options being rendered invalid, the user has a simple way of returning to a previously satisfactory design. Furthermore, by saving a finished design, the design can be retrieved later for re-ordering (with or without modifications).

Turning now to the screen prints of Figures 3A to 3N, a representative example is set forth by which a user/buyer 1 is able to design and order a customized bag. In Figure 3A, a web page is presented to the user for inviting the user to "log in". Upon initiating the "log in" hypertext link, a log in web page is presented (Figure 3B). Upon entering user name and password, and clicking the "submit" button, a "design your own Onside bag" page is displayed (Figure 3C). Before proceeding with a new design, the user can review his or her existing account transactions by pressing the "account" link (which results in the web page of Figure 3D). The user can open a "main folder" by clicking on the appropriate hypertext link, permitting additional operations such as uploading of new logos (Figure 3E) or opening a previously stored bag design (Figure 3F).

Upon pressing the "new designs" link, an introductory "what's new" page is displayed (Figure 3G), from which the user can select a category of bag (Figure 3H). Upon choosing a particular category of bag (in the illustrated example, the user selects sports bags/knapsacks), the user is prompted to enter a price range, quantity required and time required (Figure 3I). Next, the user is prompted to choose a bag style (Figure 3J), as discussed above with reference to Table D. It will be noted that costs are indicated for each bag style. At this stage, the user can either order the bag as illustrated (Figure 3K) or can proceed to higher levels of customization. For example, as shown in Figure 3L, the user may choose one of a

pair of fabrics, the cost implications of which are indicated, or fabric colour (Figure 3M). At the highest level of customization (Figure 3N), the user can further revise the design to include logos, customized zippers and pockets, hardware, etc.

The presentation of options and image rendering as set forth in Figures 3A-3N complies with the constraints mapping set forth above in connection with Figure 2.

Each customizable element has a bill of materials table associated with it, such that all of the instructions for selecting components and elements is output by the system as an electronic bill of materials which, according to the invention, may be generated as an XML object in any suitable language to the suppliers 5 (e.g. materials suppliers, cut and sew operations, customs brokers, shippers, logistics professionals, etc). The suppliers 5 communicate with the system 3 either via web server 33 or through email via messaging server 31. The foregoing aspects of the invention is set forth in greater detail with reference to applicant's copending patent application entitled METHOD AND APPARATUS FOR VISUALIZATION OF ON-LINE MERCHANDISE CUSTOMIZATION, filed concurrently herewith.

Embodiments and variations of the invention are possible, as et forth above. All such changes and modifications may be made without departing from the sphere and scope of the invention as defined by the claims appended hereto.

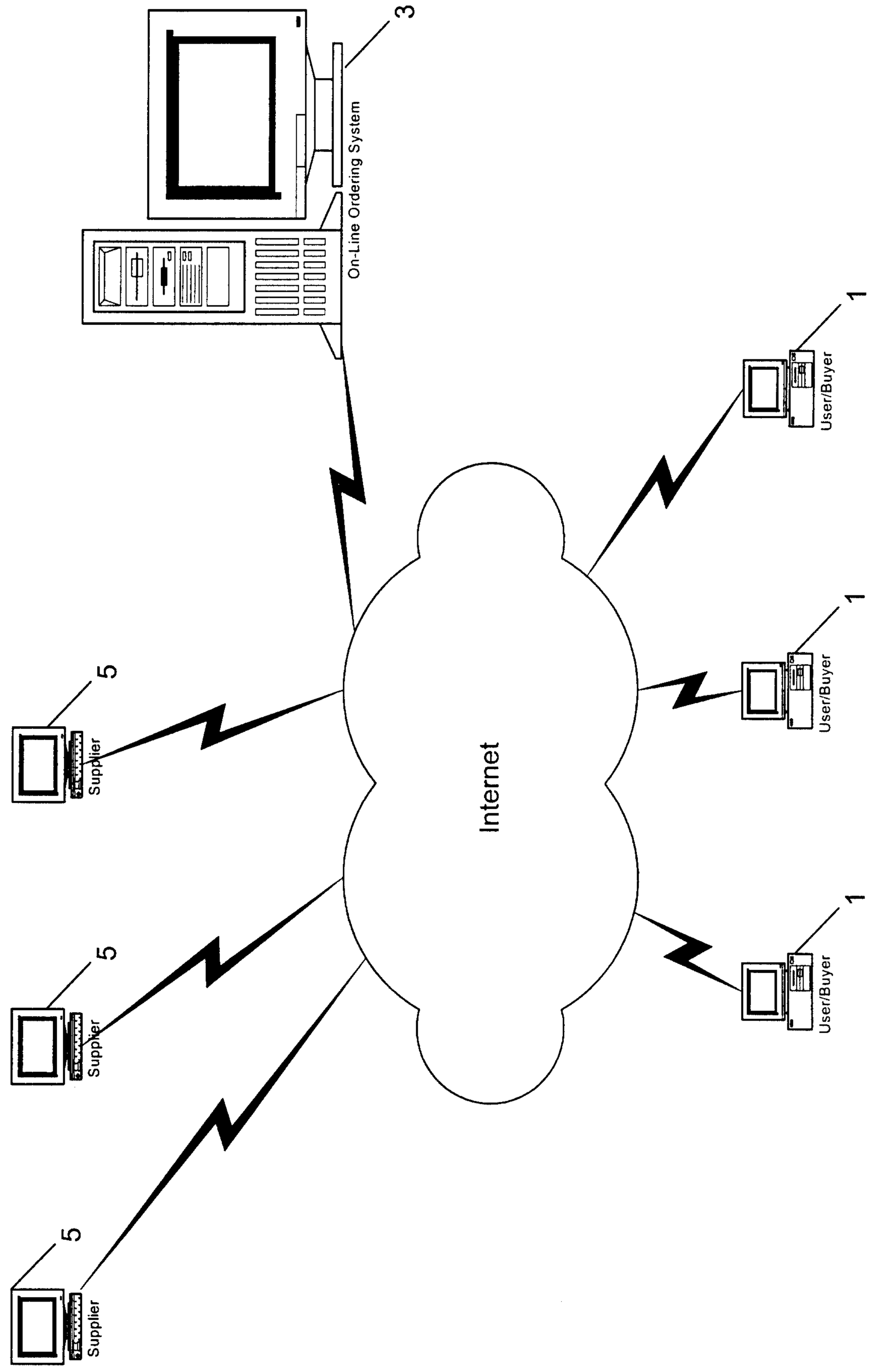

3
On-Line Ordering System
1
User/Buyer
1
User/Buyer
5
Supplier
Internet
1
User/Buyer
5
Supplier
5
Supplier

Figure 1

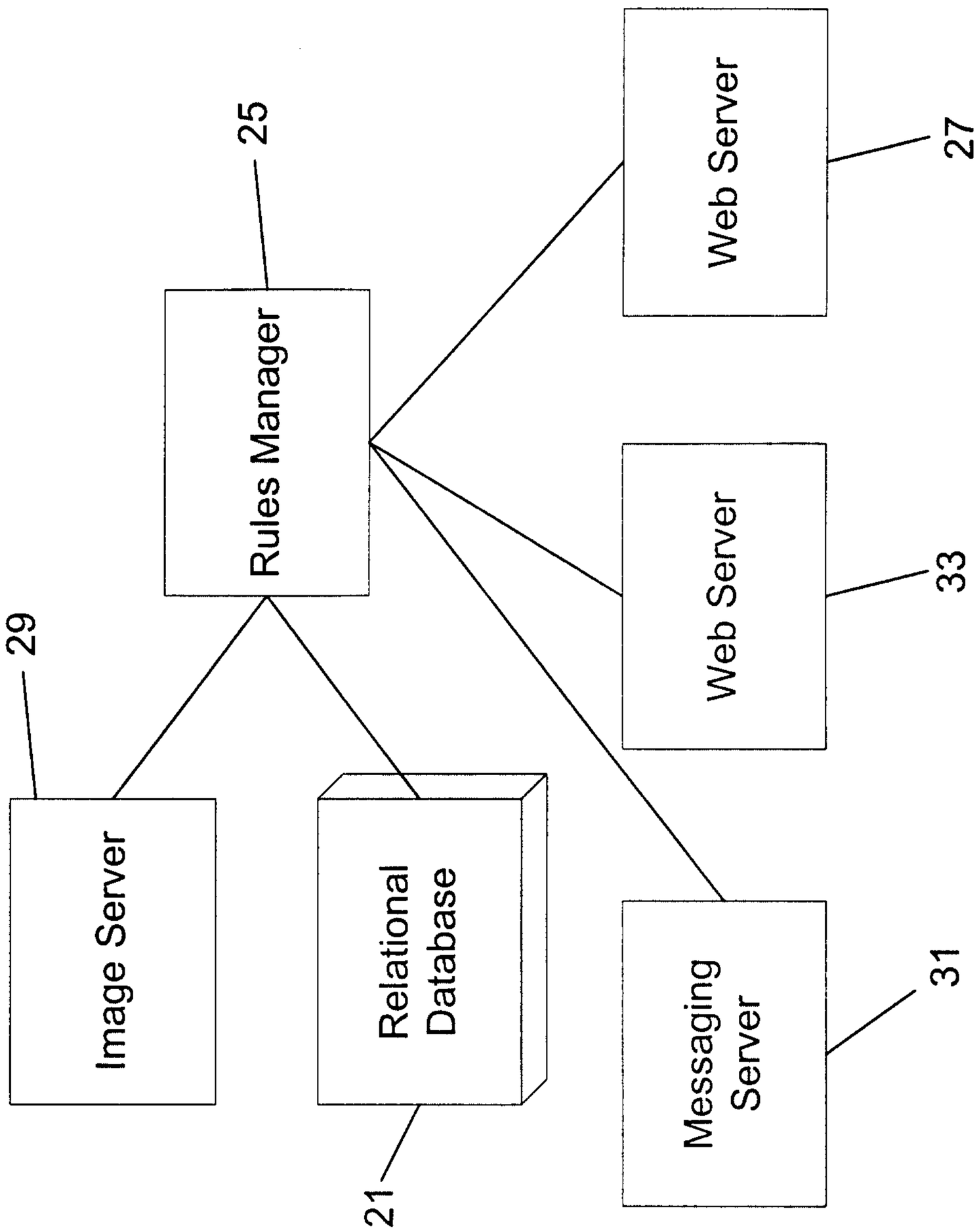
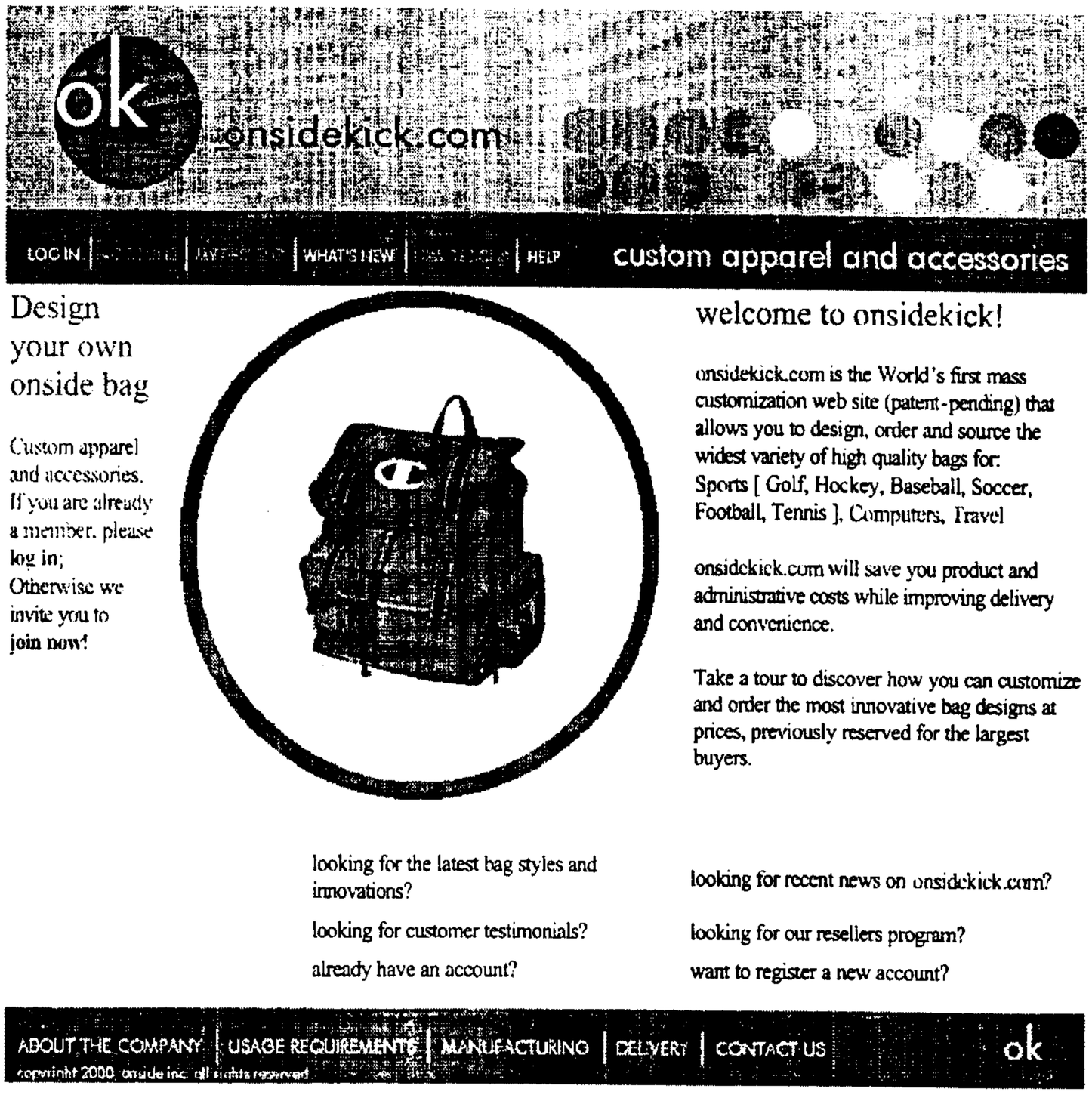

Rules Manager
25
Web Server
27
Web Server
33
Image Server
29
Relational Database
21
Messaging Server
31

Figure 2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LOG IN | | | WHAT'S NEW | | HELP
custom apparel and accessories
Design your own onside bag
Custom apparel and accessories. If you are already a member, please log in; Otherwise we invite you to join now!
welcome to onsidekick!
onsidekick.com is the World's first mass customization web site (patent-pending) that allows you to design, order and source the widest variety of high quality bags for: Sports [Golf, Hockey, Baseball, Soccer, Football, Tennis], Computers, Travel
onsidekick.com will save you product and administrative costs while improving delivery and convenience.
Take a tour to discover how you can customize and order the most innovative bag designs at prices, previously reserved for the largest buyers.
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looking for customer testimonials?
already have an account?
looking for recent news on onsidekick.com?
looking for our resellers program?
want to register a new account?
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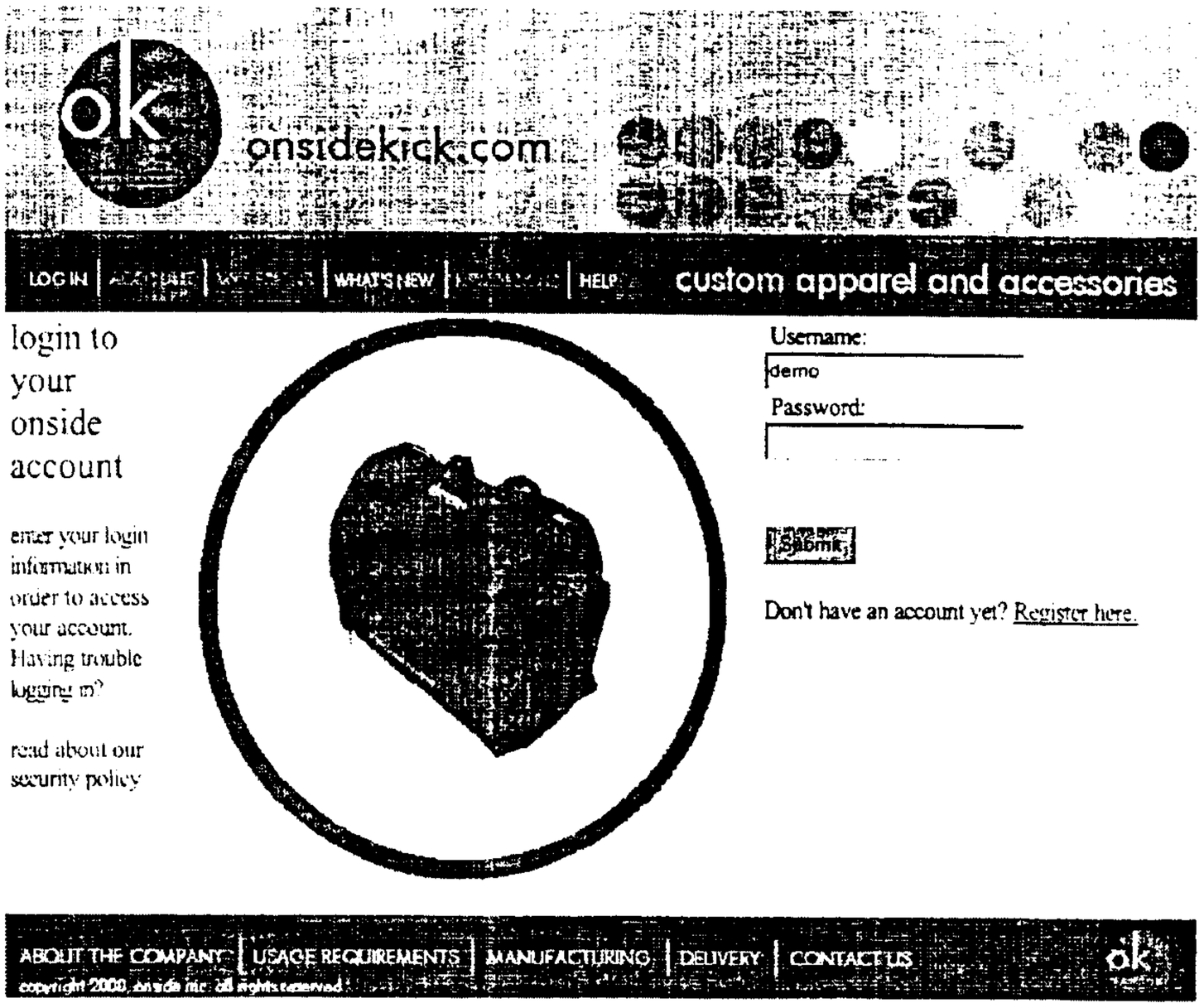
ok

Fig 3A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LOG IN
WHAT'S NEW
HELP
custom apparel and accessories
login to your onside account
enter your login information in order to access your account. Having trouble logging in?
read about our security policy
Username:
demo
Password:
Submit
Don't have an account yet? Register here.
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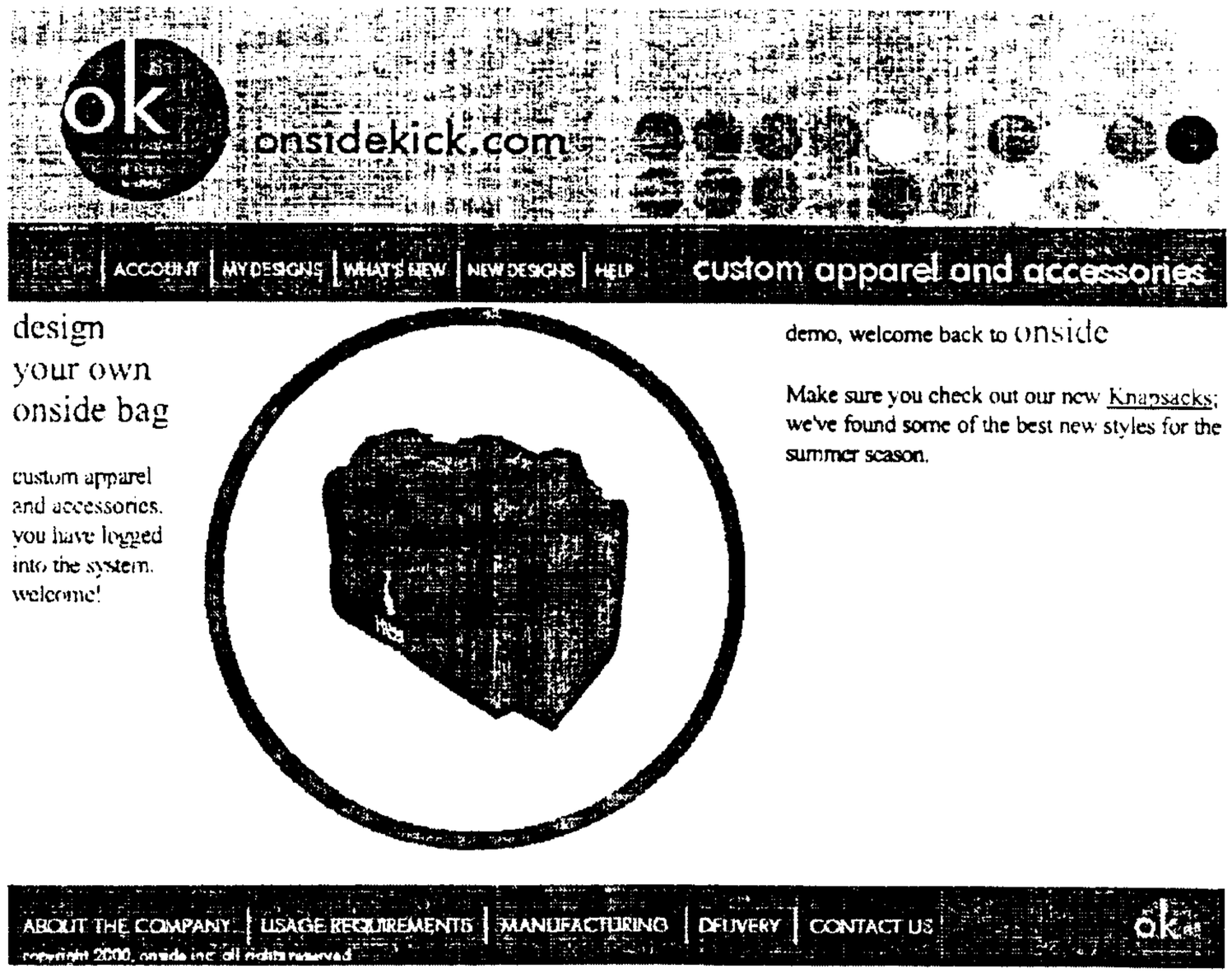
Fig. 3B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ACCOUNT | MY DESIGNS | WHAT'S NEW | NEW DESIGNS | HELP
custom apparel and accessories
design
your own
onside bag
custom apparel
and accessories.
you have logged
into the system.
welcome!
demo, welcome back to onside
Make sure you check out our new Knapsacks;
we've found some of the best new styles for the
summer season.
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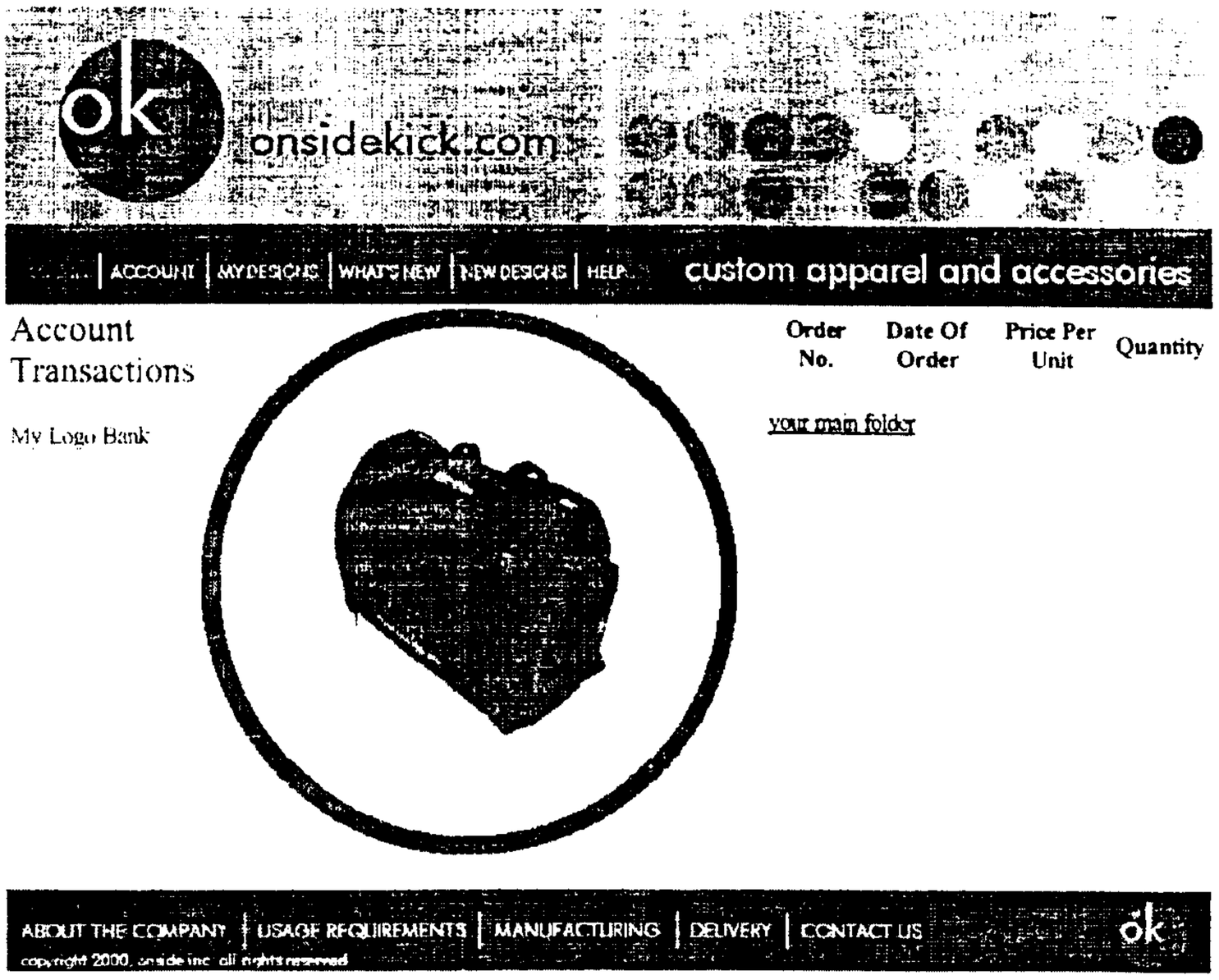
Fig 3C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ACCOUNT | MY DESIGNS | WHAT'S NEW | NEW DESIGNS | HELP
custom apparel and accessories
Account Transactions
My Logo Bank
Order No.
Date Of Order
Price Per Unit
Quantity
your main folder
your main folder
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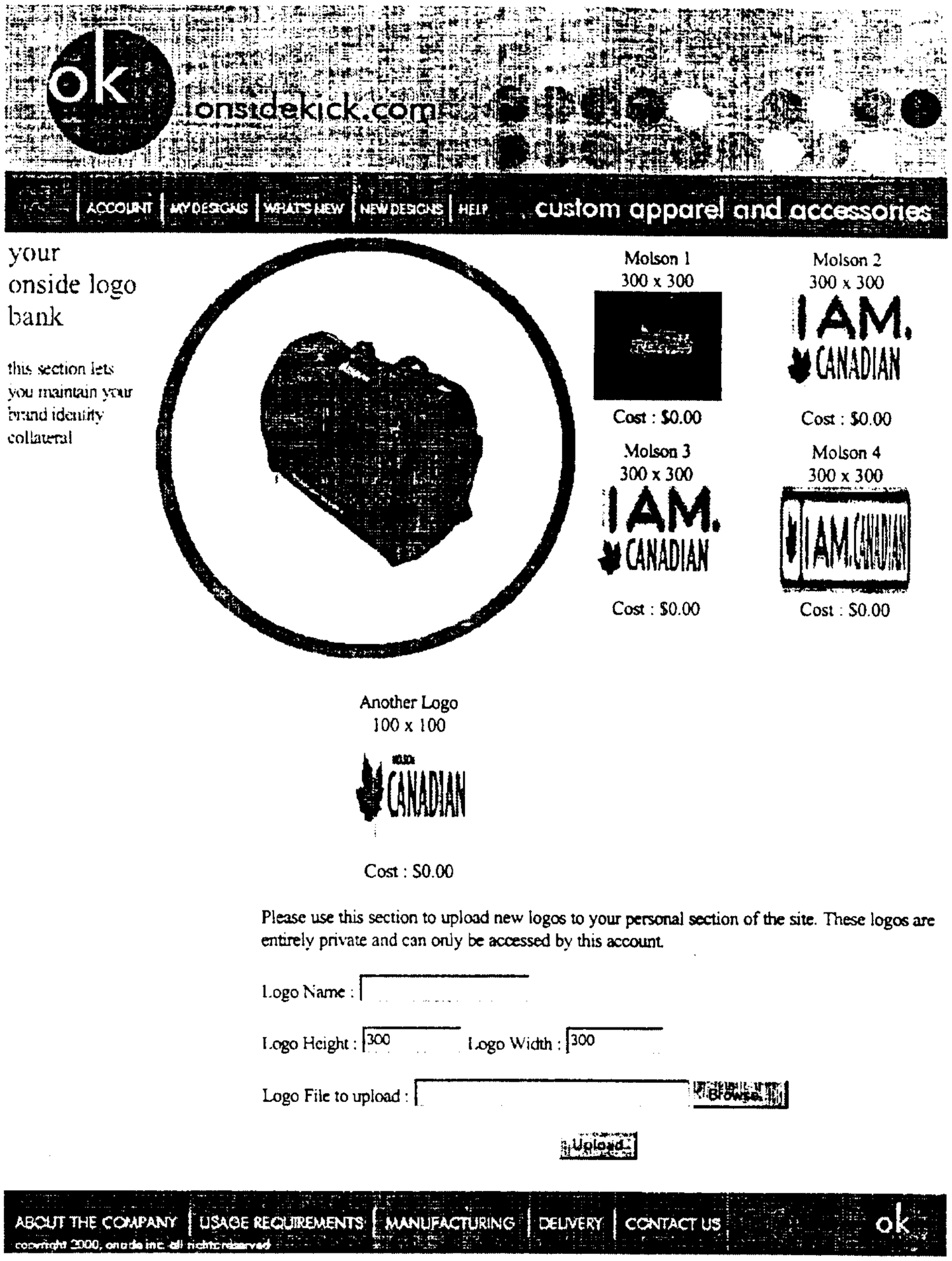
Fig 3D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custom apparel and accessories
your onside logo bank
this section lets you maintain your brand identity collateral
Another Logo
100 x 100
Molson 1
300 x 300
Cost : $0.00
Molson 2
300 x 300
I AM. CANADIAN
Cost : $0.00
Molson 3
300 x 300
I AM. CANADIAN
Cost : $0.00
Molson 4
300 x 300
I AM. CANADIAN
Cost : $0.00
Cost : $0.00
Please use this section to upload new logos to your personal section of the site. These logos are entirely private and can only be accessed by this account.
Logo Name :
Logo Height : 300
Logo Width : 300
Logo File to upload :
Browse...
Upload
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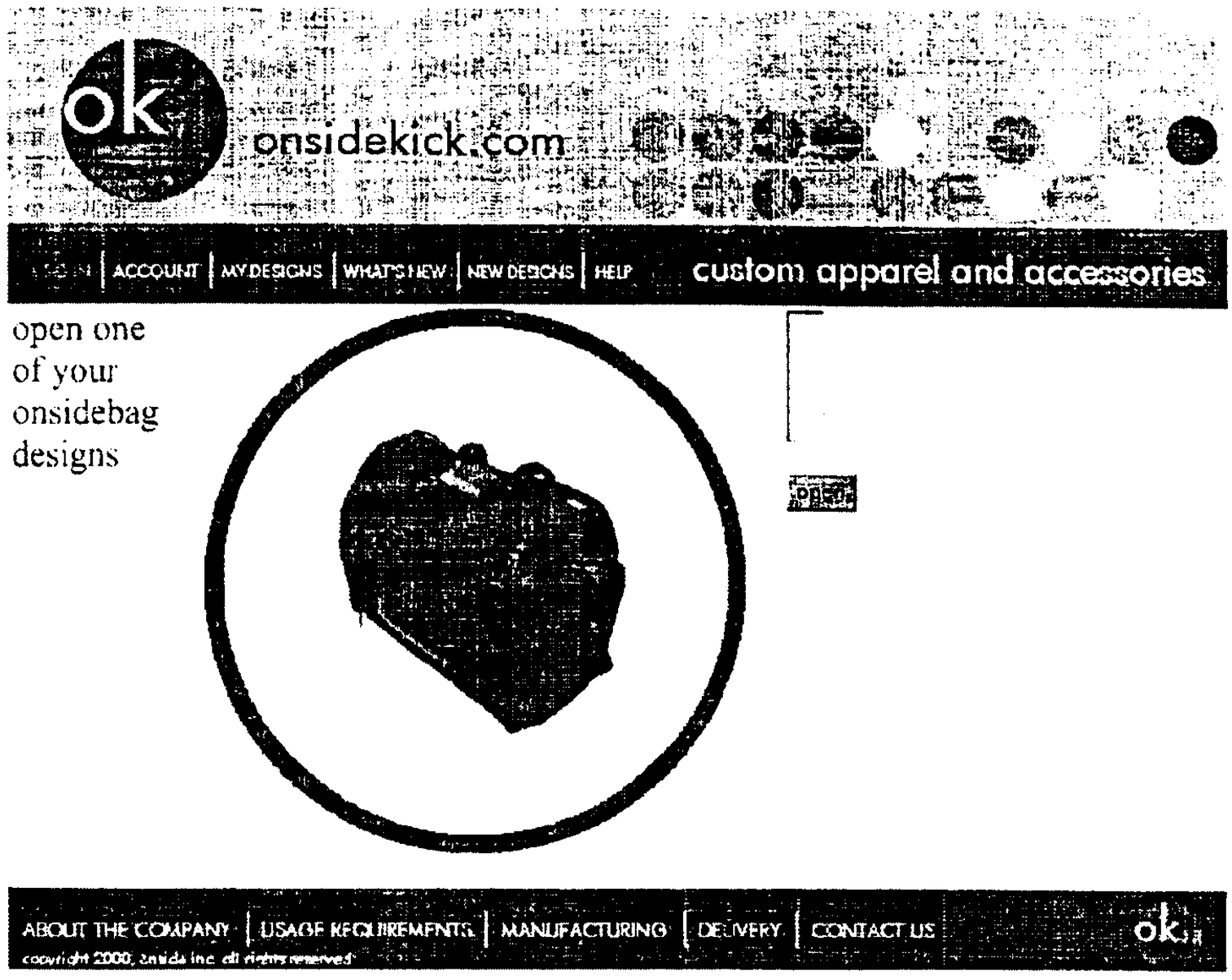
Fig. 3E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open one of your onsidebag designs
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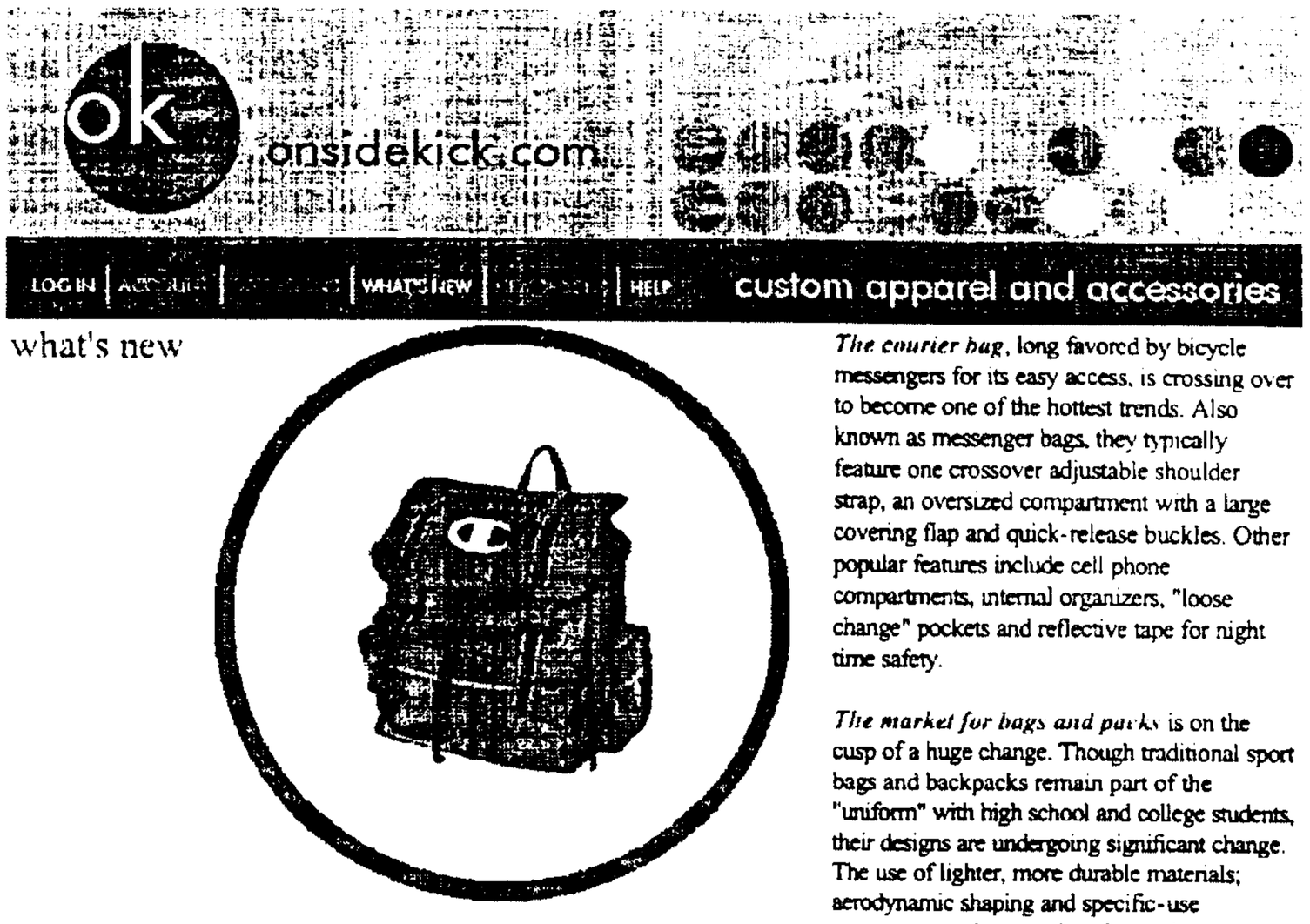
Fig. 3F



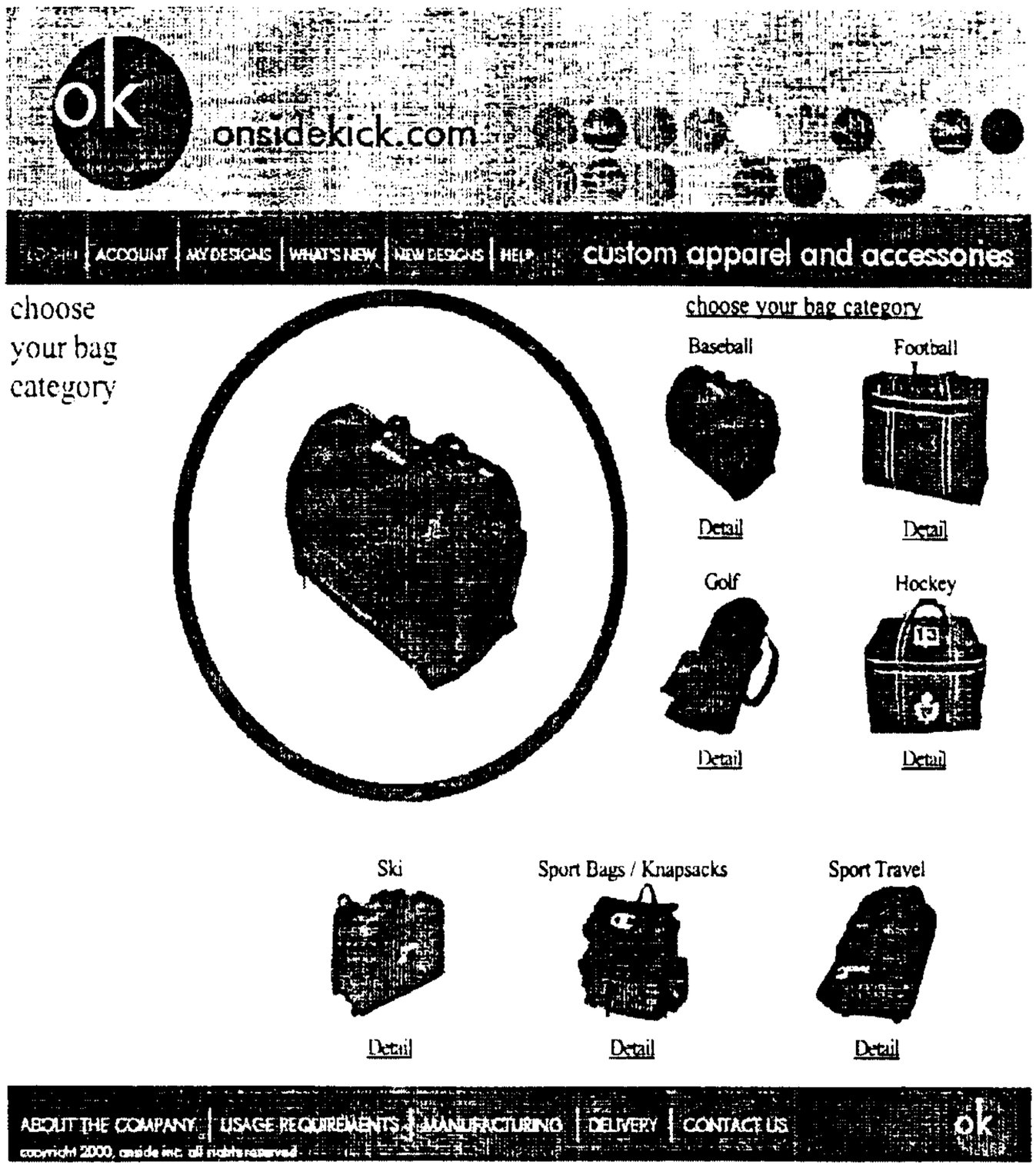
The courier bag, long favored by bicycle messengers for its easy access, is crossing over to become one of the hottest trends. Also known as messenger bags, they typically feature one crossover adjustable shoulder strap, an oversized compartment with a large covering flap and quick-release buckles. Other popular features include cell phone compartments, internal organizers, "loose change" pockets and reflective tape for night time safety.

The market for bags and packs is on the cusp of a huge change. Though traditional sport bags and backpacks remain part of the "uniform" with high school and college students, their designs are undergoing significant change. The use of lighter, more durable materials; aerodynamic shaping and specific-use compartments have replaced generic gym bag and knapsack designs. Much like the evolution of shoes, bags have become specific to individual activities and applications.

Ripstop material continues to increase in popularity. Because of it's ability to minimize the severity of a hole tearing further, ripstop is being more frequently used to insure durablitity. In the event the material is cut by a sharp object, it's unique "checker board" pattern limits the material from tearing further, which reduces damage and allows for easy repair - hence "ripstop". Other benefits include it's light weight and modern look.

Business bags are no longer what they used to be. With the emergence of the "knapsack generation" entering the work world, more executives are shying away from the traditional briefcase. Instead, sport bags, business duffles and backpacks have become their choice. Many factors have influenced this trend, such as more companies opting for casual dress codes. However, possibly the greatest influence has been the increased popularity in physical fitness combined with longer work days. People are now having to squeeze in workouts immediately before or after work and on lunch hours. Consequently, their work bags need to accommodate workout gear. Features such as padded laptop and cell phone compartments have also become more of a necessity.

Fig. 3G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NEW DESIGNS
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custom apparel and accessories
choose your bag category
choose your bag category
Baseball
Football
Detail
Detail
Golf
Hockey
Detail
Detail
Ski
Sport Bags / Knapsacks
Sport Travel
Detail
Detail
Detail
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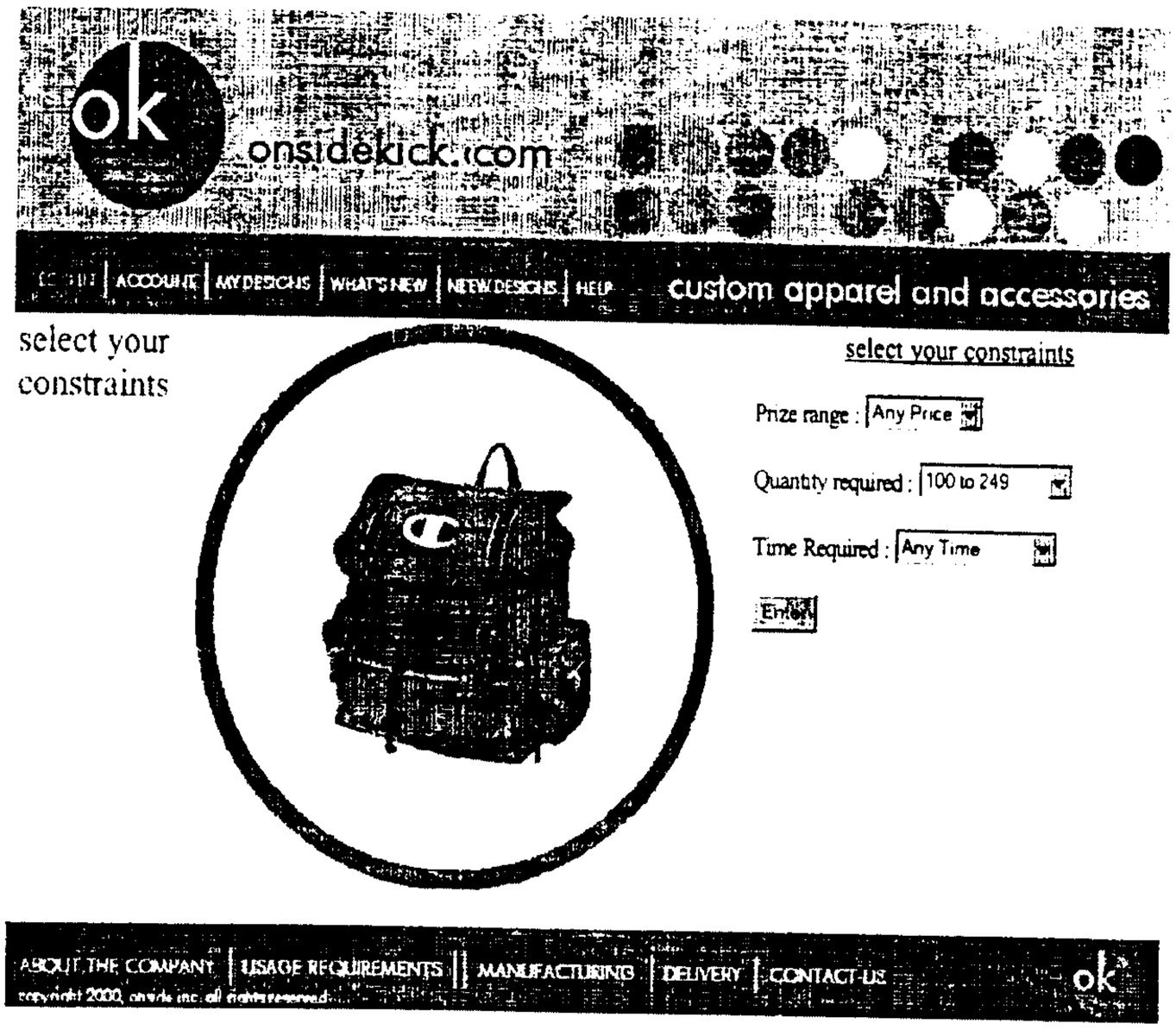
Fig. 3H


onsidekick.com
ACCOUNT
MY DESIGNS
WHAT'S NEW
NEW DESIGNS
HELP
custom apparel and accessories
select your constraints
select your constraints
Prize range : Any Price
Quantity required : 100 to 249
Time Required : Any Time
Enter
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USAGE REQUIREMENTS
MANUFACTURING
DELIVERY
CONTACT US
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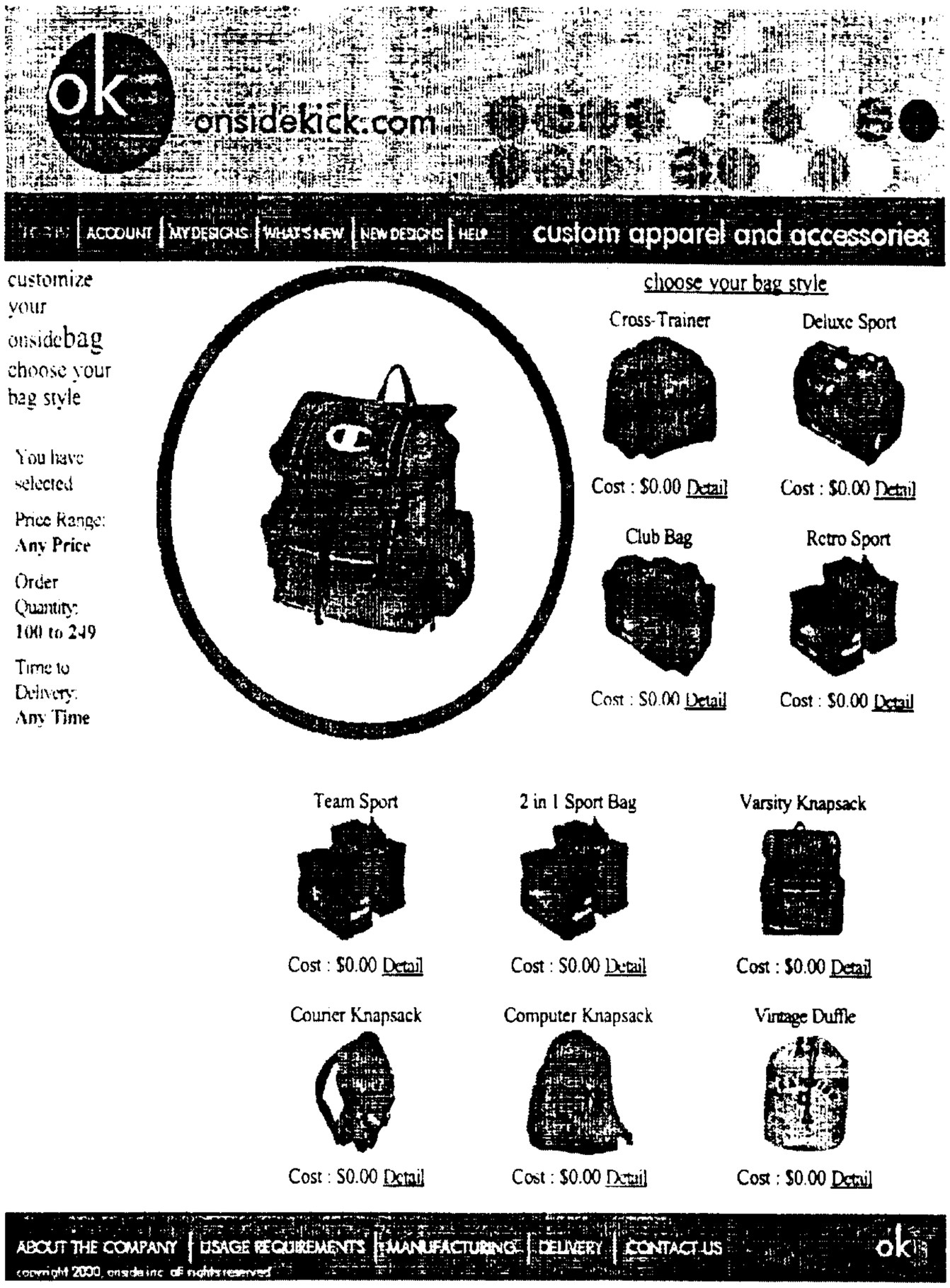
Fig. 3I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custom apparel and accessories
customize your onsidebag choose your bag style
You have selected
Price Range: Any Price
Order Quantity: 100 to 249
Time to Delivery: Any Time
choose your bag style
Cross-Trainer
Cost : $0.00 Detail
Deluxe Sport
Cost : $0.00 Detail
Club Bag
Cost : $0.00 Detail
Retro Sport
Cost : $0.00 Detail
Team Sport
Cost : $0.00 Detail
2 in 1 Sport Bag
Cost : $0.00 Detail
Varsity Knapsack
Cost : $0.00 Detail
Courier Knapsack
Cost : $0.00 Detail
Computer Knapsack
Cost : $0.00 Detail
Vintage Duffle
Cost : $0.00 Detail
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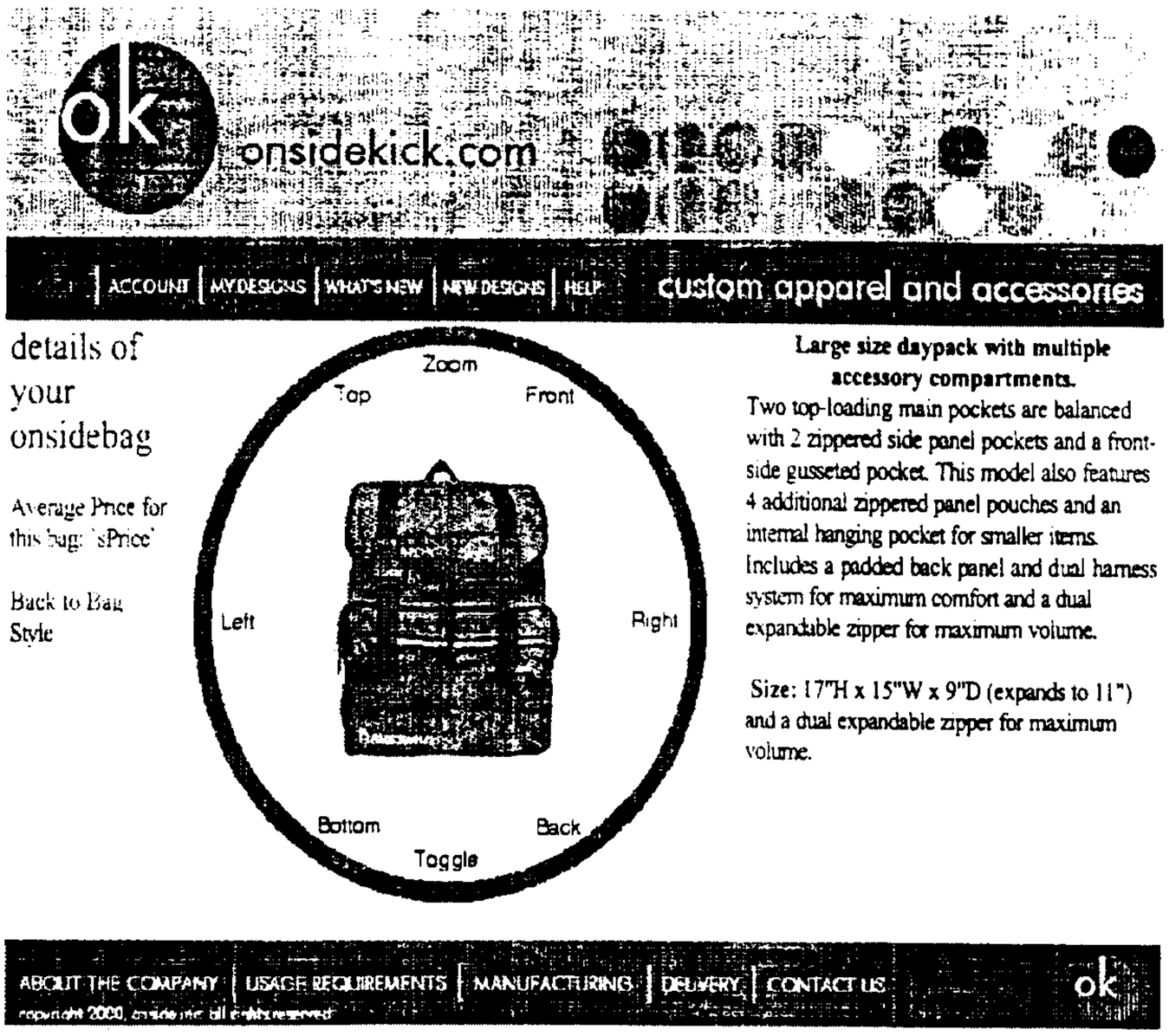
Fig. 3J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custom apparel and accessories
details of your onsidebag
Average Price for this bag: 'sPrice'
Back to Bag Style
Zoom
Top
Front
Left
Right
Bottom
Back
Toggle
Large size daypack with multiple accessory compartments.
Two top-loading main pockets are balanced with 2 zippered side panel pockets and a front-side gusseted pocket. This model also features 4 additional zippered panel pouches and an internal hanging pocket for smaller items. Includes a padded back panel and dual harness system for maximum comfort and a dual expandable zipper for maximum volume.
Size: 17"H x 15"W x 9"D (expands to 11") and a dual expandable zipper for maximum volume.
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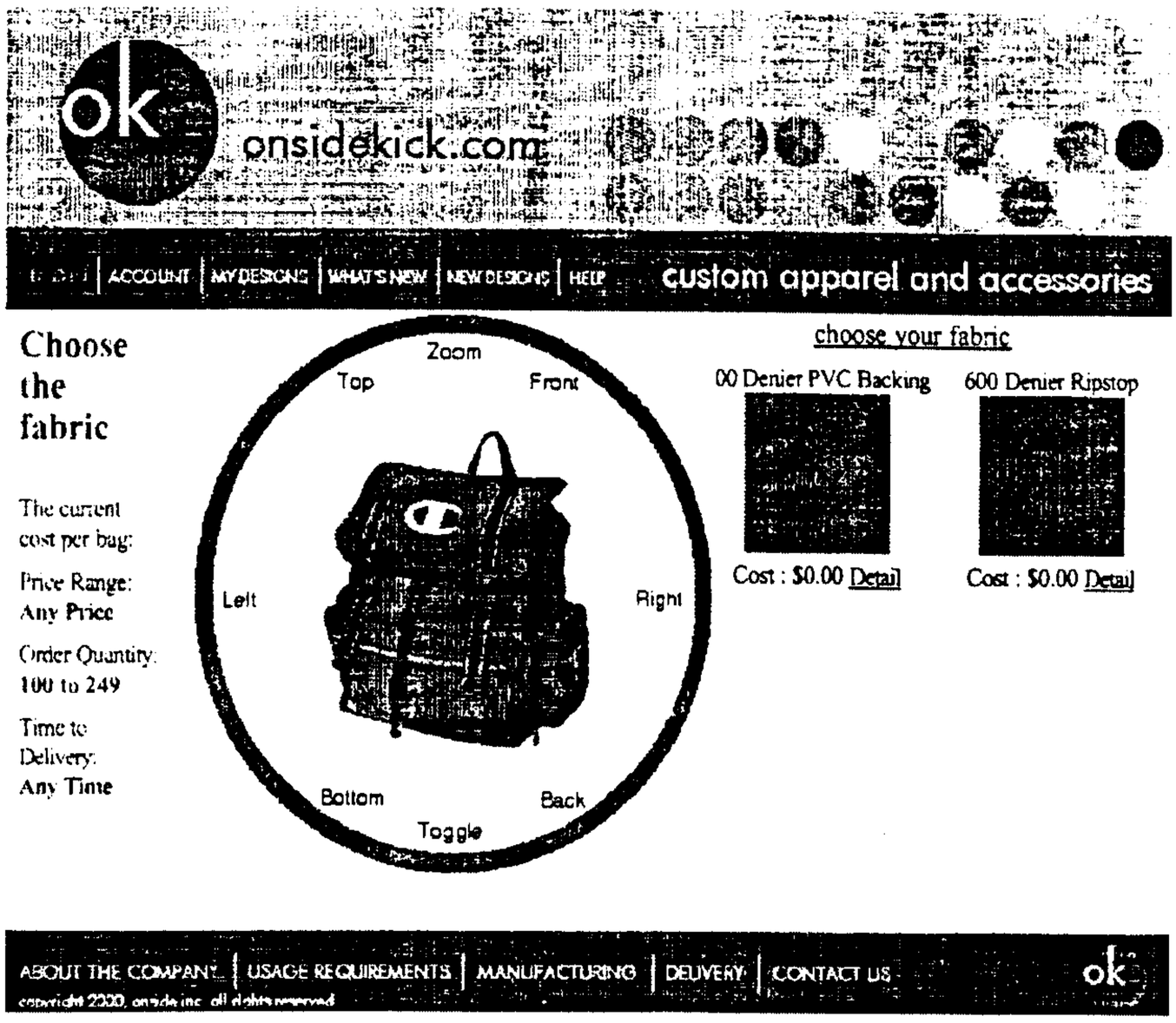
Fig 3k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custom apparel and accessories
Choose the fabric
The current cost per bag:
Price Range: Any Price
Order Quantity: 100 to 249
Time to Delivery: Any Time
Zoom
Top
Front
Left
Right
Bottom
Back
Toggle
choose your fabric
00 Denier PVC Backing
Cost : $0.00 Detail
600 Denier Ripstop
Cost : $0.00 Detail
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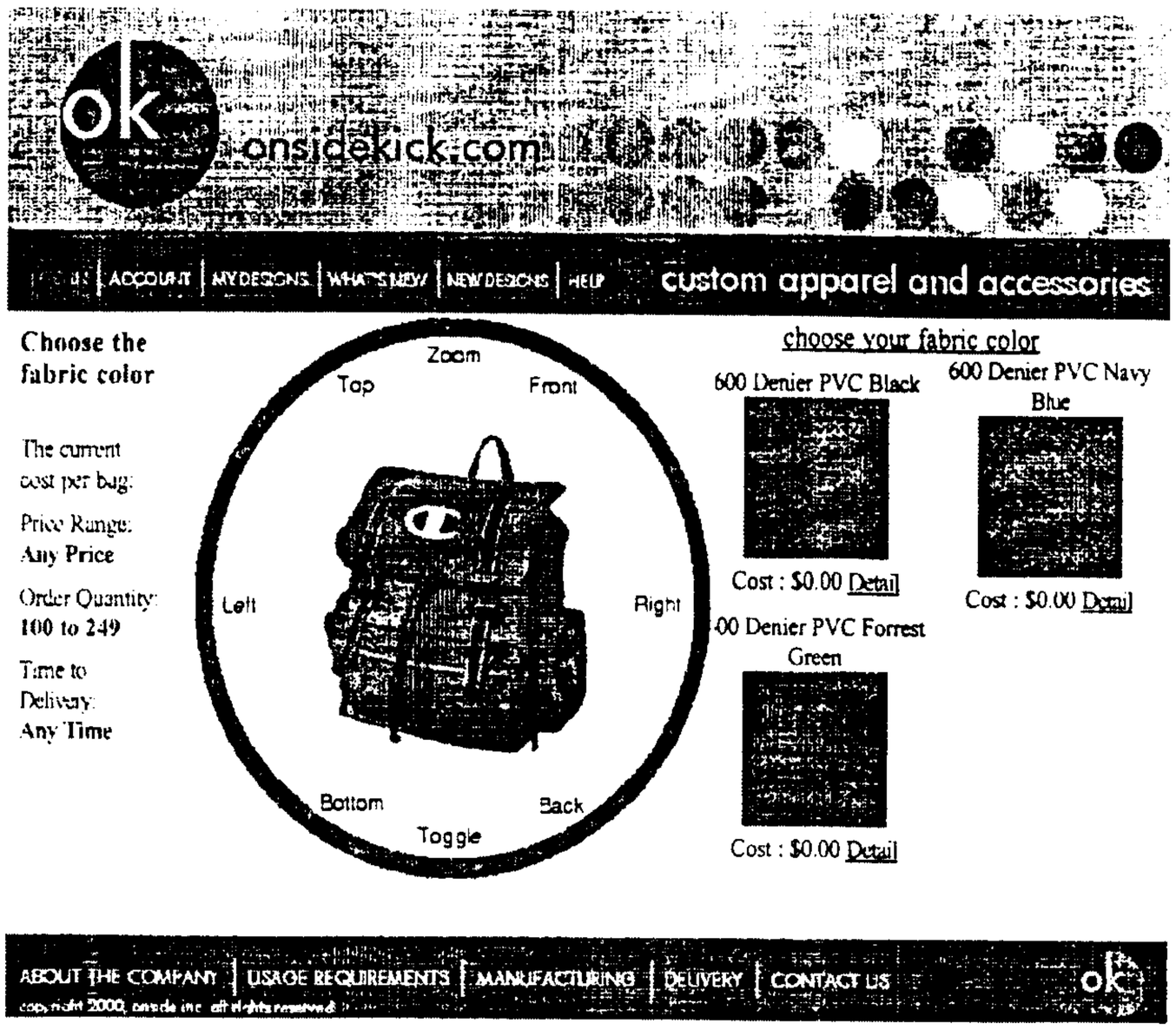
Fig. 3L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WHAT'S NEW
NEW DESIGNS
HELP
custom apparel and accessories
Choose the fabric color
The current cost per bag:
Price Range: Any Price
Order Quantity: 100 to 249
Time to Delivery: Any Time
Zoom
Top
Front
Left
Right
Bottom
Back
Toggle
choose your fabric color
600 Denier PVC Black
Cost : $0.00 Detail
600 Denier PVC Navy Blue
Cost : $0.00 Detail
600 Denier PVC Forrest Green
Cost : $0.00 Detail
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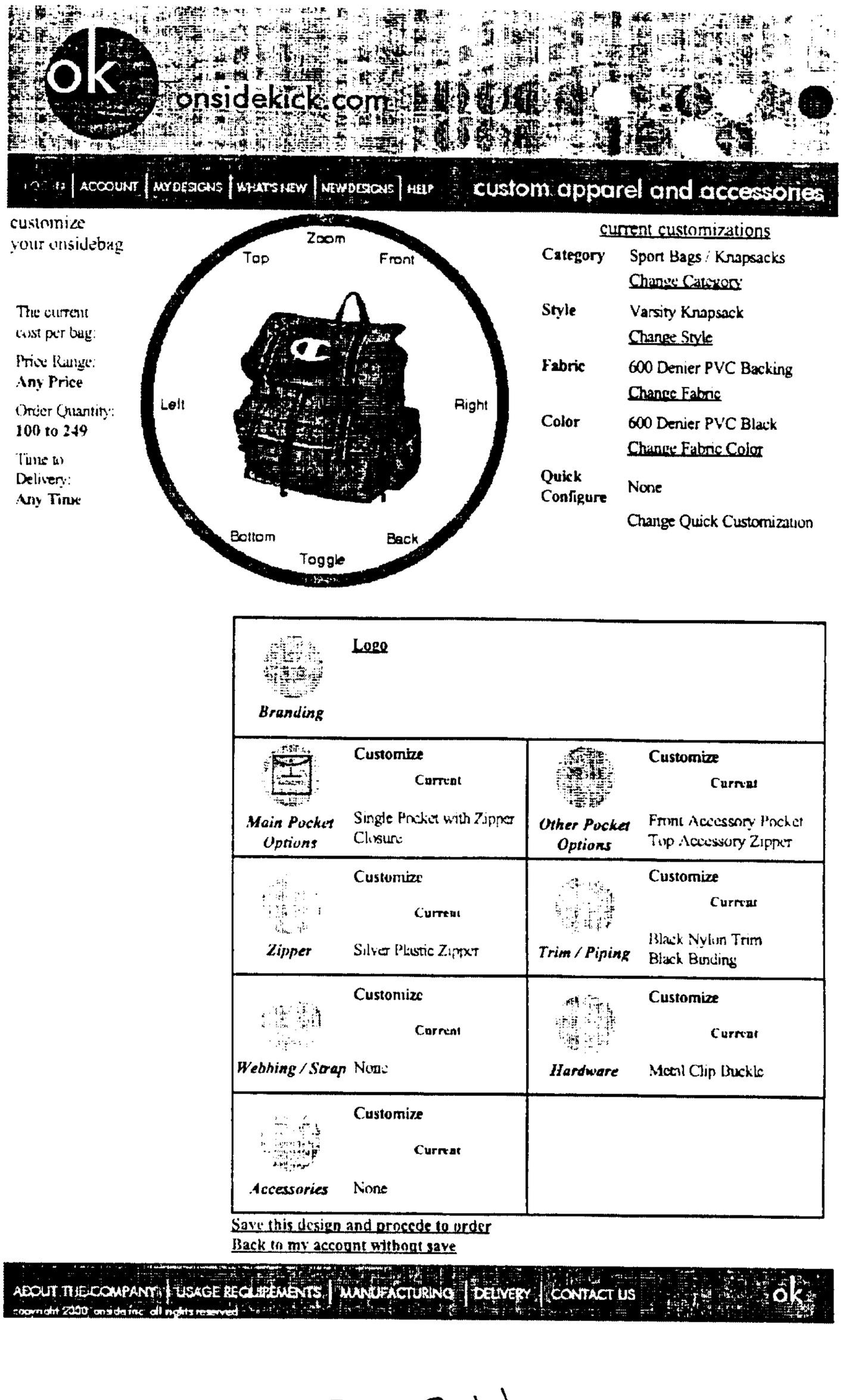
Fig. 3M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custom apparel and accessories
customize your onsidebag
The current cost per bag:
Price Range: Any Price
Order Quantity: 100 to 249
Time to Delivery: Any Time
Zoom
Top
Front
Left
Right
Bottom
Back
Toggle
current customizations
Category Sport Bags / Knapsacks
Change Category
Style Varsity Knapsack
Change Style
Fabric 600 Denier PVC Backing
Change Fabric
Color 600 Denier PVC Black
Change Fabric Color
Quick Configure None
Change Quick Customization
Logo
Branding
Customize
Current
Main Pocket Options
Single Pocket with Zipper Closure
Other Pocket Options
Front Accessory Pocket
Top Accessory Zipper
Zipper
Silver Plastic Zipper
Trim / Piping
Black Nylon Trim
Black Binding
Webbing / Strap
None
Hardware
Metal Clip Buckle
Accessories
None
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Fig. 3N

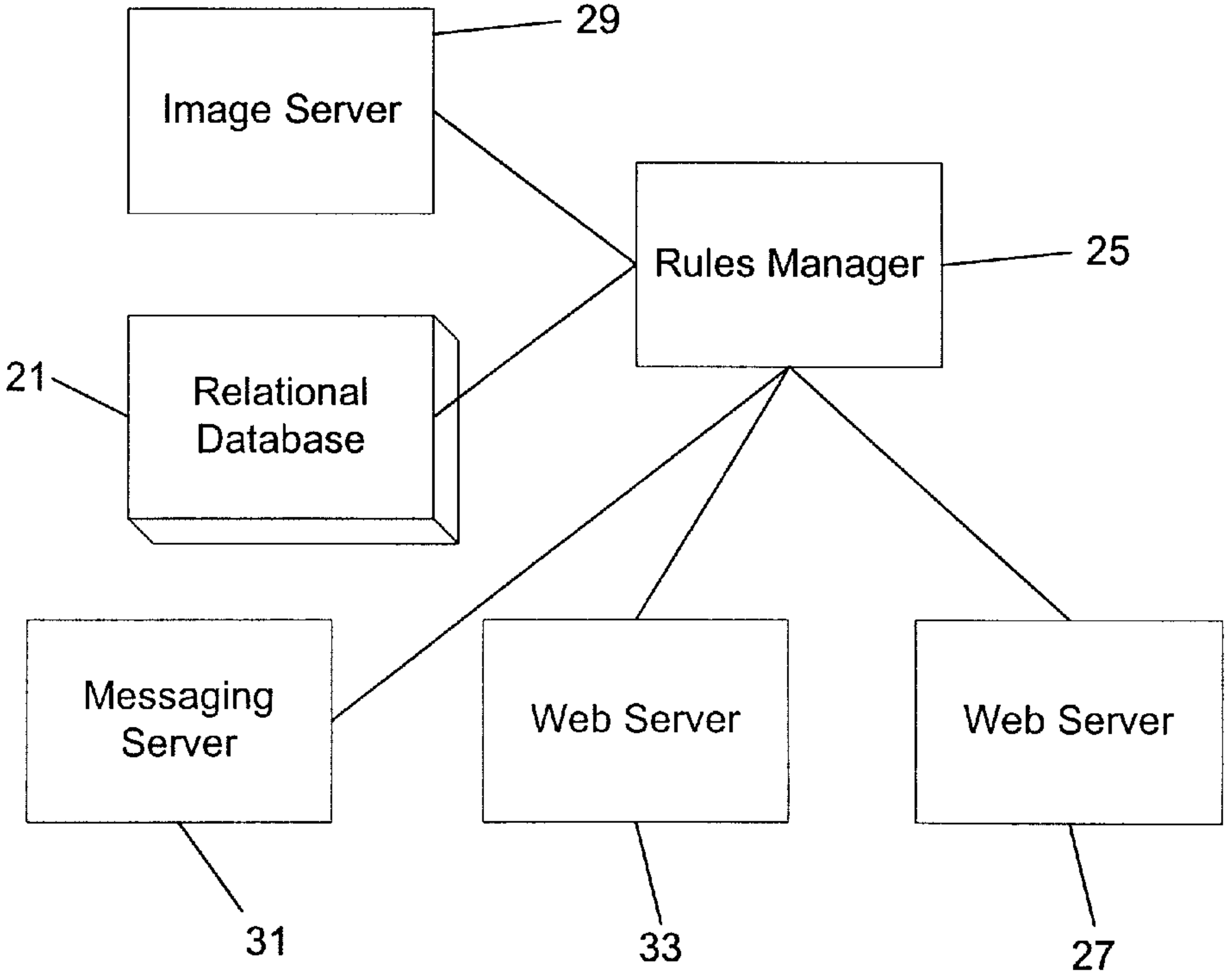
Image Server
29
Rules Manager
25
21
Relational Database
Messaging Server
Web Server
Web Server
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33
27